elmhurst energy

# SAP Report Submission for Building Regulations Compliance

Client: Vivid Design Studio

Project: Plot 1 , Bitterne Parish Church, Whites Lane
Bitterne, Southampton, Hampshire , SO19 7NP

Contact: Mark Rogers
Surecalc Limited
mark@surecalc.co.uk

Report Issue Date: 06/12/2023

EXCELLENCE IN ENERGY ASSESSMENT

# CODE FOR SUSTAINABLE HOMES
## Calculation Type: New Build (As Designed)

| | | | |
|---|---|---|---|
| **Property Reference** | sc121832 | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling Part L 2021 |
| **Property** | Plot 1 , Bitterne Parish Church, Whites Lane, Bitterne, Southampton, Hampshire , SO19 7NP | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 88 B | **DER** | 13.07 | **TER** | 24.89 |
| **Environmental** | 89 B | **% DER<TER** | 47.50 | | |
| **$CO_2$ Emissions (t/year)** | 1.00 | **DFEE** | 40.37 | **TFEE** | 51.83 |
| **General Requirements Compliance** | Pass | **% DFEE<TFEE** | 22.12 | | |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers, Surecalc Limited, Tel: 01243572695, mark@surecalc.co.uk | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Vivid Design Studio | | |

## ENE 1 - Dwelling Emission Rate calculation

| | | | |
|---|---|---|---|
| Total floor area | 98.5 | $m^2$ | |
| DER | 13.07 | $kgCO_2/yr/m^2$ | |
| TER | 24.89 | $kgCO_2/yr/m^2$ | |
| $CO_2$ emissions offset from additional allowable electricity generation | 0.00 | $kgCO_2/yr/m^2$ | (ZC7) |
| Residual $CO_2$ emissions offset from biofuel CHP | 0.00 | $kgCO_2/yr/m^2$ | (ZC5) |
| Total $CO_2$ emissions offset from SAP Section 16 allowances | 0.00 | $kgCO_2/yr/m^2$ | |
| DER accounting for SAP Section 16 allowances | 13.07 | $kgCO_2/yr/m^2$ | |
| Reduction DER/TER | 47.50 | % | |
| CfSH ENE1 credits achieved | 5.2 | | |
| CfSH ENE1 level achieved | 4 | | |

## ENE 2 – Fabric Energy Efficiency calculation

| | | | |
|---|---|---|---|
| Dwelling type | House, Semi-Detached | | |
| Fabric energy efficiency (F.E.E.) | 40.37 | $kWh/m^2/yr$ | |
| CfSH ENE2 credits achieved | 8.4 | | |
| CfSH ENE1 and 2 overall level achieved | 4 | | |

## ENE 7 – Low and Zero Carbon Technologies calculation

**Standard case $CO_2$ emissions**

| | | | |
|---|---|---|---|
| Total floor area | 98.5 | $m^2$ | |
| DER | 18.34 | $kgCO_2/yr/m^2$ | |
| $CO_2$ emissions from electrical appliances | 15.27 | $kgCO_2/yr/m^2$ | (ZC2) |
| $CO_2$ emissions from cooking | 1.87 | $kgCO_2/yr/m^2$ | (ZC3) |
| Standard case total $CO_2$ emissions | 35.49 | $kgCO_2/yr/m^2$ | (ZC4) |
| Net Standard case $CO_2$ emissions | 35.49 | $kgCO_2/yr/m^2$ | (ZC8) |

**Actual case $CO_2$ emissions**

| | | | |
|---|---|---|---|
| DER | 16.17 | $kgCO_2/yr/m^2$ | |
| $CO_2$ emissions from electrical appliances | 15.27 | $kgCO_2/yr/m^2$ | (ZC2) |
| $CO_2$ emissions from cooking | 1.87 | $kgCO_2/yr/m^2$ | (ZC3) |
| Actual case total $CO_2$ emissions | 33.32 | $kgCO_2/yr/m^2$ | (ZC4) |
| $CO_2$ emissions from Biomass | 0.00 | $kgCO_2/yr/m^2$ | (ZC5) |
| $CO_2$ reduction from additional allowable electricity generation | 0.00 | $kgCO_2/yr/m^2$ | (ZC7) |
| Net Actual case $CO_2$ emissions | 33.32 | $kgCO_2/yr/m^2$ | (ZC8) |
| Improvement in net actual/net standard case $CO_2$ emissions | 6 | % | |



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

| | |
|---|---|
| ENE7 credits achieved | 0 |



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

# Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Array SAP 10 program, Array

**Date:** Wed 06 Dec 2023 15:16:31

| Project Information | | | |
|---|---|---|---|
| Assessed By | Mark Rogers | Building Type | House, Semi-detached |
| OCDEA Registration | EES/004179 | Assessment Date | 2023-12-06 |

| Dwelling Details | | | |
|---|---|---|---|
| Assessment Type | As designed | Total Floor Area | 98 $m^2$ |
| Site Reference | sc100228 P1 Bitterne Church | Plot Reference | 001 |
| Address | Bitterne Parish Church Plot 1 Whites Lane, Southampton, SO19 7NP | | |

| Client Details | |
|---|---|
| Name | Philip Dudley |
| Company | Vivid Design Studio |
| Address | NA, NA, NA |

**This report covers items included within the SAP calculations. It is not a complete report of regulations compliance.**

| 1a Target emission rate and dwelling emission rate | | |
|---|---|---|
| Fuel for main heating system | Electricity | |
| *Target carbon dioxide emission rate* | *10.44 $kgCO_2/m^2$* | |
| Dwelling carbon dioxide emission rate | 3.83 $kgCO_2/m^2$ | OK |
| **1b Target primary energy rate and dwelling primary energy** | | |
| *Target primary energy* | *54.43 $kWh_{PE}/m^2$* | |
| Dwelling primary energy | 39.83 $kWh_{PE}/m^2$ | OK |
| **1c Target fabric energy efficiency and dwelling fabric energy efficiency** | | |
| *Target fabric energy efficiency* | *36.9 $kWh/m^2$* | |
| Dwelling fabric energy efficiency | 34.8 $kWh/m^2$ | OK |

| 2a Fabric U-values | | | | |
|---|---|---|---|---|
| **Element** | ***Maximum permitted average U-Value [$W/m^2K$]*** | **Dwelling average U-Value [$W/m^2K$]** | **Element with highest individual U-Value** | |
| External walls | *0.26* | 0.22 | Walls (1) (0.22) | OK |
| Party walls | *0.2* | 0 | Party Wall (1) (0) | **N/A** |
| Curtain walls | *1.6* | 0 | N/A | **N/A** |
| Floors | *0.18* | 0.11 | Ground Floor (0.11) | OK |
| Roofs | *0.16* | 0.09 | Roof (1) (0.09) | OK |
| Windows, doors, and roof windows | *1.6* | 1.2 | Front East Door (1.2) | OK |
| Rooflights | *2.2* | N/A | N/A | **N/A** |

| 2b Envelope elements (better than typically expected values are flagged with a subsequent (!)) | | |
|---|---|---|
| **Name** | **Net area [$m^2$]** | **U-Value [$W/m^2K$]** |
| Exposed wall: Walls (1) | 84.24 | 0.22 |
| Exposed wall: Walls (2) | 6 | 0.21 |
| Party wall: Party Wall (1) | 47.38 | 0 **(!)** |
| Ground floor: Ground Floor, Ground Floor | 49.7 | 0.11 |
| Exposed roof: Roof (1) | 49.7 | 0.09 **(!)** |

| 2c Openings (better than typically expected values are flagged with a subsequent (!)) | | | | |
|---|---|---|---|---|
| **Name** | **Area [$m^2$]** | **Orientation** | **Frame factor** | **U-Value [$W/m^2K$]** |
| Front East Door, New Dwell Entrance Door | 2.01 | East | N/A | 1.2 |
| Front East Windows, New Dwelling DG Window | 2.73 | East | 0.7 | 1.2 |
| Front East Window, New Dwelling DG Window | 1.9 | East | 0.7 | 1.2 |
| Side South Windows, New Dwelling DG Window | 2.87 | South | 0.7 | 1.2 |
| Rear West Windows, New Dwelling DG Window | 3.94 | West | 0.7 | 1.2 |
| Rear West Windows, New Dwell DG French Doors | 3.92 | West | 0.7 | 1.2 |

| Name | Area [$m^2$] | Orientation | Frame factor | U-Value [$W/m^2K$] |
|---|---|---|---|---|

| 2d Thermal bridging (better than typically expected values are flagged with a subsequent (!)) | | | | |
|---|---|---|---|---|
| Building part **1 - Main Dwelling**: Thermal bridging calculated from linear thermal transmittances for each junction | | | | |
| **Main element** | **Junction detail** | **Source** | **Psi value [W/mK]** | **Drawing / reference** |
| External wall | E2: Other lintels (including other steel lintels) | Calculated by person with suitable expertise | 0.05 | IG or Keystone Hi Therm + |
| External wall | E3: Sill | Calculated by person with suitable expertise | 0.018 **(!)** | Recognised Construction Detail |
| External wall | E4: Jamb | Calculated by person with suitable expertise | 0.014 **(!)** | Recognised Construction Detail |
| External wall | E5: Ground floor (normal) | Calculated by person with suitable expertise | 0.068 | Recognised Construction Detail |
| External wall | E6: Intermediate floor within a dwelling | Calculated by person with suitable expertise | 0.001 **(!)** | Recognised Construction Detail |
| External wall | E10: Eaves (insulation at ceiling level) | Calculated by person with suitable expertise | 0.055 | Recognised Construction Detail |
| External wall | E12: Gable (insulation at ceiling level) | Calculated by person with suitable expertise | 0.058 | Recognised Construction Detail |
| External wall | E16: Corner (normal) | Calculated by person with suitable expertise | 0.051 | Recognised Construction Detail |
| External wall | E17: Corner (inverted - internal area greater than external area) | Calculated by person with suitable expertise | -0.1 | Recognised Construction Detail |
| External wall | E18: Party wall between dwellings | Calculated by person with suitable expertise | 0.044 | Recognised Construction Detail |
| Party wall | P1: Ground floor | Calculated by person with suitable expertise | 0.103 | Recognised Construction Detail |
| Party wall | P2: Intermediate floor within a dwelling | SAP table default | 0 **(!)** | |
| Party wall | P4: Roof (insulation at ceiling level) | Calculated by person with suitable expertise | 0.101 | Recognised Construction Detail |
| External wall | E24: Eaves (insulation at ceiling level - inverted) | SAP table default | 0.15 | |

| 3 Air permeability (better than typically expected values are flagged with a subsequent (!)) | | |
|---|---|---|
| *Maximum permitted air permeability at 50Pa* | *8 $m^3/hm^2$* | |
| Dwelling air permeability at 50Pa | 5.05 $m^3/hm^2$, Design value | **OK** |
| Air permeability test certificate reference | | |

| 4 Space heating | |
|---|---|
| **Main heating system 1**: Heat pump with radiators or underfloor heating - Electricity | |
| Efficiency | 233.9% |
| Emitter type | Radiators |
| Flow temperature | 55°C |
| System type | Heat Pump |
| Manufacturer | Daikin Europe NV |
| Model | EDLA04EV3 |
| Commissioning | |
| **Secondary heating system**: N/A | |
| Fuel | N/A |
| Efficiency | N/A |
| Commissioning | |

| 5 Hot water | | |
|---|---|---|
| **Cylinder/store** - type: Cylinder | | |
| Capacity | 180 litres | |
| Declared heat loss | 1.39 kWh/day | |
| Primary pipework insulated | Yes | |
| Manufacturer | | |
| Model | | |
| Commissioning | | |
| **Waste water heat recovery system 1** - type: N/A | | |
| Efficiency | | |
| Manufacturer | | |
| Model | | |

| 6 Controls | | |
|---|---|---|
| **Main heating 1** - type: Time and temperature zone control by arrangement of plumbing and electrical services | | |
| Function | | |
| Ecodesign class | | |
| Manufacturer | | |
| Model | | |
| **Water heating** - type: Cylinder thermostat and HW separately timed | | |
| Manufacturer | | |
| Model | | |

| 7 Lighting | | |
|---|---|---|
| *Minimum permitted light source efficacy* | *75 lm/W* | |
| Lowest light source efficacy | 75 lm/W | OK |
| External lights control | N/A | |

| 8 Mechanical ventilation | | |
|---|---|---|
| **System type:** N/A | | |
| *Maximum permitted specific fan power* | *N/A* | |
| Specific fan power | N/A | **N/A** |
| *Minimum permitted heat recovery efficiency* | *N/A* | |
| Heat recovery efficiency | N/A | **N/A** |
| Manufacturer/Model | | |
| Commissioning | | |

| 9 Local generation |
|---|
| N/A |

| 10 Heat networks |
|---|
| N/A |

| 11 Supporting documentary evidence |
|---|
| N/A |

| 12 Declarations | |
|---|---|
| **a. Assessor Declaration** | |
| This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report. | |
| Signed:<br><br>Name: | Assessor ID:<br><br>Date: |
| **b. Client Declaration** | |
| N/A | |

# Predicted Energy Assessment

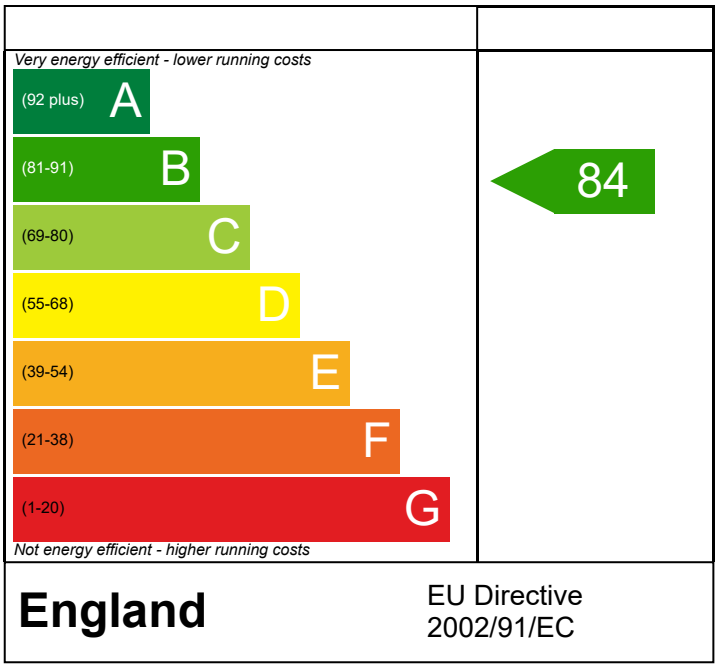
Plot 1 , Bitterne Parish Church, Whites Lane,
Southampton, Hampshire , SO19 7NP

| | |
|---|---|
| Dwelling type: | House, Semi-Detached |
| Date of assessment: | 06/12/2023 |
| Produced by: | Mark Rogers |
| Total floor area: | 98.5 m² |
| DRRN: | 9962-8226-7083 |

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

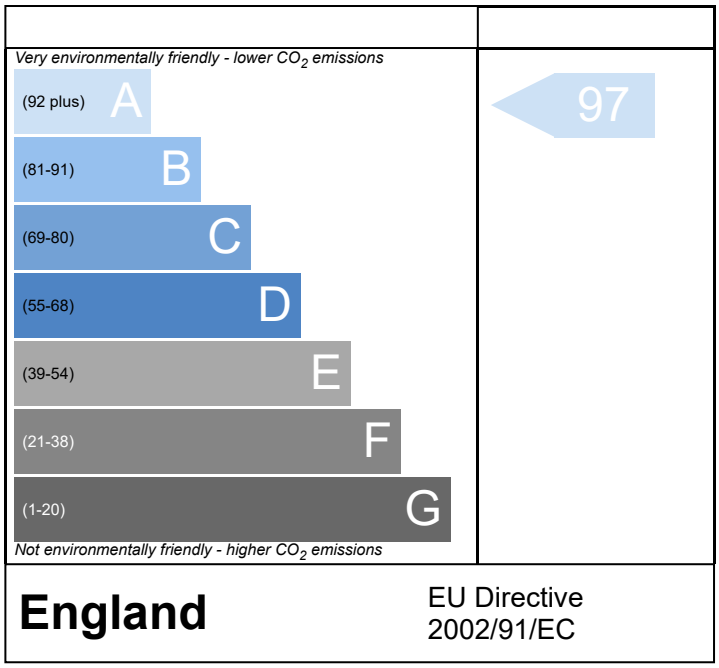
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

## Energy Efficiency Rating




The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

## Environmental Impact ($CO_2$) Rating




The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide ($CO_2$) emissions. The higher the rating the less impact it has on the environment.

# Summary for Input Data

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| | | | |
|---|---|---|---|
| **Property Reference** | sc100228 P1 Bitterne Church | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling |
| **Property** | Plot 1 , Bitterne Parish Church, Whites Lane, Southampton, Hampshire , SO19 7NP | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 84 B | **DER** | 3.83 | **TER** | 10.44 |
| **Environmental** | 97 A | **% DER < TER** | | | 63.31 |
| **$CO_2$ Emissions (t/year)** | 0.31 | **DFEE** | 34.79 | **TFEE** | 36.86 |
| **Compliance Check** | See BREL | **% DFEE < TFEE** | | | 5.61 |
| **% DPER < TPER** | 26.82 | **DPER** | 39.83 | **TPER** | 54.43 |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Philip Dudley | | |

## SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

| | |
|---|---|
| **Orientation** | East |
| **Property Tenture** | ND |
| **Transaction Type** | 6 |
| **Terrain Type** | Suburban |
| **1.0 Property Type** | House, Semi-Detached |
| **2.0 Number of Storeys** | 2 |
| **3.0 Date Built** | 2023 |
| **4.0 Sheltered Sides** | 1 |
| **5.0 Sunlight/Shade** | Average or unknown |
| **6.0 Thermal Mass Parameter** | Precise calculation |
| **7.0 Electricity Tariff** | Standard |
| Smart electricity meter fitted | No |
| Smart gas meter fitted | No |

**7.0 Measurements**

| | Heat Loss Perimeter | Internal Floor Area | Average Storey Height |
|---|---|---|---|
| **Ground floor:** | 21.35 m | 49.70 m² | 2.39 m |
| **1st Storey:** | 20.50 m | 48.80 m² | 2.76 m |

**8.0 Living Area** 13.88 m²

**9.0 External Walls**

| Description | Type | Construction | U-Value (W/m²K) | Kappa (kJ/m²K) | Gross Area(m²) | Nett Area (m²) | Shelter Res | Shelter | Openings | Area Calculation Type |
|---|---|---|---|---|---|---|---|---|---|---|
| External Cavity Wall | Cavity Wall | Cavity wall; plasterboard on dabs or battens, lightweight aggregate block, filled cavity, any outside structure | 0.22 | 110.00 | 99.71 | 84.24 | 0.00 | None | 15.47 | Calculate Wall Area |
| External Tile Hung Wall | Cavity Wall | Cavity wall; plasterboard on dabs or battens, lightweight aggregate block, filled cavity, any outside structure | 0.21 | 110.00 | 7.90 | 6.00 | 0.00 | None | 1.90 | Enter Gross Area |

**9.1 Party Walls**

| Description | Type | Construction | U-Value (W/m²K) | Kappa (kJ/m²K) | Area (m²) | Shelter Res | Shelter |
|---|---|---|---|---|---|---|---|
| Party Wall | Filled Cavity with Edge Sealing | Single plasterboard on dabs both sides, lightweight aggregate blocks, cavity or cavity fill | 0.00 | 110.00 | 47.38 | | None |

**9.2 Internal Walls**

| Description | Construction | Kappa (kJ/m²K) | Area (m²) |
|---|---|---|---|
| Internal Stud Walls | Plasterboard on timber frame | 9.00 | 187.53 |

**10.0 External Roofs**

| Description | Type | Construction | U-Value (W/m²K) | Kappa (kJ/m²K) | Gross Area(m²) | Nett Area (m²) | Shelter Code | Shelter Factor | Calculation Type | Openings |
|---|---|---|---|---|---|---|---|---|---|---|
| External Pitched Roofs | External Plane Roof | Plasterboard, insulated at ceiling level | 0.09 | 9.00 | 49.70 | 49.70 | None | 0.00 | Calculate Wall Area | 0.00 |

**10.2 Internal Ceilings**

| Description | Storey | Construction | Area (m²) |
|---|---|---|---|
| Internal Ceiling | Lowest occupied | Plasterboard ceiling, carpeted chipboard floor | 48.80 |

**11.0 Heat Loss Floors**

# Summary for Input Data

| Description | Type | Storey Index | Construction | U-Value (W/m²K) | Shelter Code | Shelter Factor | Kappa (kJ/m²K) | Area (m²) |
|---|---|---|---|---|---|---|---|---|
| Ground Floor | Ground Floor - Solid | Lowest occupied | Suspended concrete floor, carpeted | 0.11 | None | 0.00 | 75.00 | 49.70 |

**11.2 Internal Floors**

| Description | Storey Index | Construction | Kappa (kJ/m²K) | Area (m²) |
|---|---|---|---|---|
| Internal Floor | | Plasterboard ceiling, carpeted chipboard floor | 9.00 | 48.80 |

**12.0 Opening Types**

| Description | Data Source | Type | Glazing | Glazing Gap | Filling Type | G-value | Frame Type | Frame Factor | U Value (W/m²K) |
|---|---|---|---|---|---|---|---|---|---|
| New Dwell Entrance Door | Manufacturer | Half Glazed Door | Double Low-E Soft 0.05 | | | 0.36 | | 0.70 | 1.20 |
| New Dwell DG French Doors | Manufacturer | Window | Double Low-E Soft 0.05 | | | 0.71 | | 0.70 | 1.20 |
| New Dwelling DG Window | Manufacturer | Window | Double Low-E Soft 0.05 | | | 0.71 | | 0.70 | 1.20 |

**13.0 Openings**

| Name | Opening Type | Location | Orientation | Area (m²) | Pitch |
|---|---|---|---|---|---|
| Front East Door | New Dwell Entrance Door | External Cavity Wall | East | 2.01 | |
| Front East Windows | New Dwelling DG Window | External Cavity Wall | East | 2.73 | |
| Front East Window | New Dwelling DG Window | External Tile Hung Wall | East | 1.90 | |
| Side South Windows | New Dwelling DG Window | External Cavity Wall | South | 2.87 | |
| Rear West Windows | New Dwelling DG Window | External Cavity Wall | West | 3.94 | |
| Rear West Windows | New Dwell DG French Doors | External Cavity Wall | West | 3.92 | |

| | | |
|---|---|---|
| **14.0 Conservatory** | None | |
| **15.0 Draught Proofing** | 100 | % |
| **16.0 Draught Lobby** | No | |
| **17.0 Thermal Bridging** | Calculate Bridges | |

**17.1 List of Bridges**

| Bridge Type | Source Type | Length | Psi | Adjusted | Reference: | Imported |
|---|---|---|---|---|---|---|
| E2 Other lintels (including other steel lintels) | Independently assessed | 12.52 | 0.05 | 0.05 | IG or Keystone Hi Therm + | No |
| E3 Sill | Independently assessed | 11.56 | 0.02 | 0.02 | Recognised Construction Detail | No |
| E4 Jamb | Independently assessed | 28.80 | 0.01 | 0.01 | Recognised Construction Detail | No |
| E5 Ground floor (normal) | Independently assessed | 21.36 | 0.07 | 0.07 | Recognised Construction Detail | No |
| E6 Intermediate floor within a dwelling | Independently assessed | 20.50 | 0.00 | 0.00 | Recognised Construction Detail | No |
| E10 Eaves (insulation at ceiling level) | Independently assessed | 19.36 | 0.06 | 0.06 | Recognised Construction Detail | No |
| E12 Gable (insulation at ceiling level) | Independently assessed | 3.98 | 0.06 | 0.06 | Recognised Construction Detail | No |
| E16 Corner (normal) | Independently assessed | 15.08 | 0.05 | 0.05 | Recognised Construction Detail | No |
| E17 Corner (inverted – internal area greater than external area) | Independently assessed | 4.78 | -0.10 | -0.10 | Recognised Construction Detail | No |
| E18 Party wall between dwellings | Independently assessed | 10.30 | 0.04 | 0.04 | Recognised Construction Detail | No |
| P1 Party wall - Ground floor | Independently assessed | 9.20 | 0.10 | 0.10 | Recognised Construction Detail | No |
| P2 Party wall - Intermediate floor within a dwelling | Table K1 - Default | 9.20 | 0.00 | 0.00 | | No |
| P4 Party wall - Roof (insulation at ceiling level) | Independently assessed | 9.20 | 0.10 | 0.10 | Recognised Construction Detail | No |
| E24 Eaves (insulation at ceiling level - inverted) | Table K1 - Default | 1.98 | 0.15 | 0.15 | | No |

| | | |
|---|---|---|
| Y-value | 0.00 | W/m²K |
| **18.0 Pressure Testing** | Yes | |
| Designed $AP_{50}$ | 5.05 | m³/(h.m²) @ 50 Pa |
| Test Method | Blower Door | |
| **19.0 Mechanical Ventilation** | | |
| **Mechanical Ventilation** | | |
| Mechanical Ventilation System Present | No | |
| **20.0 Fans, Open Fireplaces, Flues** | | |
| **21.0 Fixed Cooling System** | No | |
| **22.0 Lighting** | | |
| No Fixed Lighting | No | |

| Name | Efficacy | Power | Capacity | Count |
|---|---|---|---|---|
| Low energy Lighting | 75.00 | 15 | 1125 | 36 |

| | | |
|---|---|---|
| **24.0 Main Heating 1** | Database | |
| Description | Electric Air Source Heat Pump | |
| Percentage of Heat | 100.00 | % |
| Database Ref. No. | 106465 | |
| Fuel Type | Electricity | |
| In Winter | 0.00 | |

# Summary for Input Data

| | |
|---|---|
| In Summer | 0.00 |
| Model Name | EDLA04EV3 |
| Manufacturer | Daikin Europe NV |
| System Type | Heat Pump |
| Controls SAP Code | 2207 |
| PCDF Controls | 0 |
| Is MHS Pumped | Pump in heated space |
| Heating Pump Age | 2013 or later |
| Heat Emitter | Radiators |
| Flow Temperature | Enter value |
| Flow Temperature Value | 55.00 |

**25.0 Main Heating 2** None

**26.0 Heat Networks** None

| | Heat Source | Fuel Type | Heating Use | Efficiency | Percentage Of Heat | Heat | Heat Power Ratio | Electrical | Fuel Factor | Efficiency type |
|---|---|---|---|---|---|---|---|---|---|---|
| Heat source 1 | | | | | | | | | | |
| Heat source 2 | | | | | | | | | | |
| Heat source 3 | | | | | | | | | | |
| Heat source 4 | | | | | | | | | | |
| Heat source 5 | | | | | | | | | | |

**28.0 Water Heating**

| | |
|---|---|
| Water Heating | Main Heating 1 |
| SAP Code | 901 |
| Flue Gas Heat Recovery System | No |
| Waste Water Heat Recovery Instantaneous System 1 | No |
| Waste Water Heat Recovery Instantaneous System 2 | No |
| Waste Water Heat Recovery Storage System | No |
| Solar Panel | No |
| Water use <= 125 litres/person/day | Yes |
| Cold Water Source | From mains |
| Bath Count | 1 |
| Immersion Only Heating Hot Water | No |

**28.1 Showers**

| Description | Shower Type | Flow Rate [l/min] | Rated Power [kW] | Connected | Connected To |
|---|---|---|---|---|---|

**28.3 Waste Water Heat Recovery System**

| | | |
|---|---|---|
| **29.0 Hot Water Cylinder** | Hot Water Cylinder | |
| Cylinder Stat | Yes | |
| Cylinder In Heated Space | Yes | |
| Independent Time Control | Yes | |
| Insulation Type | Measured Loss | |
| Cylinder Volume | 180.00 | L |
| Loss | 1.39 | kWh/day |
| Pipes insulation | Fully insulated primary pipework | |
| In Airing Cupboard | No | |

**31.0 Thermal Store** None

**Recommendations**

**Lower cost measures**

**None**

**Further measures to achieve even higher standards**

| | Typical Cost | Typical savings per year | Ratings after improvement |
|---|---|---|---|

# Summary for Input Data

| | | SAP rating | Environmental Impact |
|---|---|---|---|
| £4,000 - £6,000 | £47 | B 85 | A 97 |
| £3,500 - £5,500 | £196 | B 91 | A 98 |
| | | 0 | 0 |

# Thermal Bridging

elmhurst energy

| | | | |
|---|---|---|---|
| **Property Reference** | sc100228 P1 Bitterne Church | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | Semi-Detached House |
| **Property** | Plot 1 , Bitterne Parish Church, Whites Lane, Southampton, Hampshire , SO19 7NP | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 84 B | **DER** | 3.83 | **TER** | 10.44 |
| **Environmental** | 97 A | **% DER < TER** | | | 63.31 |
| **$CO_2$ Emissions (t/year)** | 0.31 | **DFEE** | 34.79 | **TFEE** | 36.86 |
| **Compliance Check** | See BREL | **% DFEE < TFEE** | | | 5.61 |
| **% DPER < TPER** | 26.82 | **DPER** | 39.83 | **TPER** | 54.43 |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Philip Dudley | | |

| | Junction details | Source Type | Psi (W/mK) | Length (m) | Result | Reference |
|---|---|---|---|---|---|---|
| External wall | E2 Other lintels (including other steel lintels) | Independently assessed | 0.050 | 12.52 | 0.63 | IG or Keystone Hi Therm + |
| External wall | E3 Sill | Independently assessed | 0.018 | 11.56 | 0.21 | Recognised Construction Detail |
| External wall | E4 Jamb | Independently assessed | 0.014 | 28.80 | 0.40 | Recognised Construction Detail |
| External wall | E5 Ground floor (normal) | Independently assessed | 0.068 | 21.36 | 1.45 | Recognised Construction Detail |
| External wall | E6 Intermediate floor within a dwelling | Independently assessed | 0.001 | 20.50 | 0.02 | Recognised Construction Detail |
| External wall | E10 Eaves (insulation at ceiling level) | Independently assessed | 0.055 | 19.36 | 1.06 | Recognised Construction Detail |
| External wall | E12 Gable (insulation at ceiling level) | Independently assessed | 0.058 | 3.98 | 0.23 | Recognised Construction Detail |
| External wall | E16 Corner (normal) | Independently assessed | 0.051 | 15.08 | 0.77 | Recognised Construction Detail |
| External wall | E17 Corner (inverted – internal area greater than external area) | Independently assessed | -0.100 | 4.78 | -0.48 | Recognised Construction Detail |
| External wall | E18 Party wall between dwellings | Independently assessed | 0.044 | 10.30 | 0.45 | Recognised Construction Detail |
| Party wall | P1 Party wall - Ground floor | Independently assessed | 0.103 | 9.20 | 0.95 | Recognised Construction Detail |
| Party wall | P2 Party wall - Intermediate floor within a dwelling | Table K1 - Default | 0.000 | 9.20 | 0.00 | |
| Party wall | P4 Party wall - Roof (insulation at ceiling level) | Independently assessed | 0.101 | 9.20 | 0.93 | Recognised Construction Detail |
| External wall | E24 Eaves (insulation at ceiling level - inverted) | Table K1 - Default | 0.150 | 1.98 | 0.30 | |

Total: 177.82 W/mK:

Y-Value: 0.00 W/m²K:

# U-VALUE CALCULATOR REPORT

| | | | |
|---|---|---|---|
| **Property Reference** | sc121832 | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling Part L 2021 |
| **Project** | Plot 1 , Bitterne Parish Church, Whites Lane, Bitterne, Southampton, Hampshire , SO19 7NP | | |
| **Calculation Type** | New Build (As Designed) | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 88 B | **DER** | 13.07 | **TER** | 24.89 |
| **Environmental** | 89 B | **% DER<TER** | 47.50 | | |
| **$CO_2$ Emissions (t/year)** | 1.00 | **DFEE** | 40.37 | **TFEE** | 51.83 |
| **General Requirements Compliance** | Pass | **% DFEE<TFEE** | 22.12 | | |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers, Surecalc Limited, Tel: 01243572695, mark@surecalc.co.uk | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Vivid Design Studio | | |

## Building Elements

### Roof 000002 - Pitched Roof Insulated Ceiling Vivid

**Roof Type: Pitched Roof, insulated flat ceiling**

| Layer | Description | Thickness (mm) | Conductivity (W/m²K) | Resistance (m²K/W) | Fraction (%) |
|---|---|---|---|---|---|
| **Ext surface** | | | | 0.0400 | |
| **Layer 1** | **Loft Space** | | | | |
| | Main construction | 0 | 0.0600 | 0.0600 | 100.00 |
| **Layer 2** | **Mineral wool** | | | | |
| | Main construction | 350 | 0.0440 | 7.9545 | 100.00 |
| | Corrections - Air Gap: Level 0, Fasteners: None or plastic | | | | |
| **Layer 3** | **Mineral wool quilt** | | | | |
| | Main construction | 150 | 0.0440 | 3.4091 | 93.67 |
| | Main construction | 150 | 0.1300 | 1.1538 | 6.33 |
| | Corrections - Air Gap: Level 0, Fasteners: None or plastic | | | | |
| **Layer 4** | **Plasterboard, standard** | | | | |
| | Main construction | 12.5 | 0.2100 | 0.0595 | 100.00 |
| **Int surface** | | | | 0.1000 | |

**Total resistance:** **Upper limit =** 11.449 m² K/W **Lower limit =** 11.248 m² K/W **Average =** 11.348 m² K/W

**Total correction =** 0.0030 m² K/W **U-value (unrounded) =** 0.09 W/m² K

**Unheated space:** None

**Total thickness: 513 mm** **U-value: 0.09 W/m² K** **Kappa: n/a**



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

# U-VALUE CALCULATOR REPORT

| | | | |
|---|---|---|---|
| **Property Reference** | sc121832 | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling Part L 2021 |
| **Project** | Plot 1 , Bitterne Parish Church, Whites Lane, Bitterne, Southampton, Hampshire , SO19 7NP | | |
| **Calculation Type** | New Build (As Designed) | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 88 B | **DER** | 13.07 | **TER** | 24.89 |
| **Environmental** | 89 B | **% DER<TER** | 47.50 | | |
| **$CO_2$ Emissions (t/year)** | 1.00 | **DFEE** | 40.37 | **TFEE** | 51.83 |
| **General Requirements Compliance** | Pass | **% DFEE<TFEE** | 22.12 | | |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers, Surecalc Limited, Tel: 01243572695, mark@surecalc.co.uk | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Vivid Design Studio | | |

## Building Elements

### Wall 000001 - Vivid Cavity Wall 125 Knauf Supafil 34

**Wall Type: Standard Wall**

| Layer | Description | Thickness (mm) | Conductivity (W/m²K) | Resistance (m²K/W) | Fraction (%) |
|---|---|---|---|---|---|
| **Ext surface** | | | | 0.0400 | |
| **Layer 1** | **Brick, outer leaf** | | | | |
| | Main construction | 102 | 0.7700 | 0.1325 | 82.81 |
| | Main construction | 102 | 0.9407 | 0.1084 | 17.19 |
| **Layer 2** | **Knauf Supafil 34 blown Cavity Fill** | | | | |
| | Main construction | 125 | 0.0340 | 3.6765 | 100.00 |
| | Corrections - Air Gap: Level 0, Fasteners: Wall ties, Cross sectional area: 12.50 mm², Lambda: 17.000 W/m.K, per m²: 2.500 | | | | |
| **Layer 3** | **Masterblock Masterlite Ultra** | | | | |
| | Main construction | 100 | 0.2700 | 0.3704 | 93.43 |
| | Main construction | 100 | 0.8803 | 0.1136 | 6.57 |
| **Layer 4** | **airspace/plaster dabs** | | | | |
| | Main construction | 15 | 0.1000 | 0.1500 | 80.00 |
| | Main construction | 15 | 0.0882 | 0.1700 | 20.00 |
| | Corrections - Cavity Unventilated, Emissivity: Normal | | | | |
| **Layer 5** | **Plasterboard, standard** | | | | |
| | Main construction | 12.5 | 0.2100 | 0.0595 | 100.00 |
| **Int surface** | | | | 0.1300 | |

**Total resistance:** **Upper limit =** 4.541 m² K/W **Lower limit =** 4.510 m² K/W **Average =** 4.525 m² K/W

**Total correction =** 0.0018 m² K/W **U-value (unrounded) =** 0.22 W/m² K

**Unheated space:** None

**Total thickness: 355 mm** **U-value: 0.22 W/m² K** **Kappa: n/a**



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

# U-VALUE CALCULATOR REPORT

| | | | |
|---|---|---|---|
| **Property Reference** | sc121832 | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling Part L 2021 |
| **Project** | Plot 1 , Bitterne Parish Church, Whites Lane, Bitterne, Southampton, Hampshire , SO19 7NP | | |
| **Calculation Type** | New Build (As Designed) | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 88 B | **DER** | 13.07 | **TER** | 24.89 |
| **Environmental** | 89 B | **% DER<TER** | 47.50 | | |
| **$CO_2$ Emissions (t/year)** | 1.00 | **DFEE** | 40.37 | **TFEE** | 51.83 |
| **General Requirements Compliance** | Pass | **% DFEE<TFEE** | 22.12 | | |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers, Surecalc Limited, Tel: 01243572695, mark@surecalc.co.uk | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Vivid Design Studio | | |

## Building Elements

### Wall 000004 - Vivid Cavity Wall 125 Knauf Supafil 34

**Wall Type: Standard Wall**

| Layer | Description | Thickness (mm) | Conductivity (W/m²K) | Resistance (m²K/W) | Fraction (%) |
|---|---|---|---|---|---|
| **Ext surface** | | | | 0.0400 | |
| **Layer 1** | **Tile Hanging** | | | | |
| | Main construction | 15 | 1.0000 | 0.0150 | 100.00 |
| **Layer 2** | **airspace/timber battens** | | | | |
| | Main construction | 22 | 0.1222 | 0.1800 | 89.63 |
| | Main construction | 22 | 0.1243 | 0.1770 | 10.37 |
| | Corrections - Cavity Unventilated, Emissivity: Normal | | | | |
| **Layer 3** | **Blockwork, medium** | | | | |
| | Main construction | 100 | 0.5700 | 0.1754 | 93.43 |
| | Main construction | 100 | 0.8803 | 0.1136 | 6.57 |
| **Layer 4** | **Knauf Supafil 34 blown Cavity Fill** | | | | |
| | Main construction | 125 | 0.0340 | 3.6765 | 100.00 |
| | Corrections - Air Gap: Level 0, Fasteners: Wall ties, Cross sectional area: 12.50 mm², Lambda: 17.000 W/m.K, per m²: 2.500 | | | | |
| **Layer 5** | **Masterblock Masterlite Ultra** | | | | |
| | Main construction | 100 | 0.2700 | 0.3704 | 93.43 |
| | Main construction | 100 | 0.8803 | 0.1136 | 6.57 |
| **Layer 6** | **airspace/plaster dabs** | | | | |
| | Main construction | 15 | 0.1000 | 0.1500 | 80.00 |
| | Main construction | 15 | 0.0882 | 0.1700 | 20.00 |
| | Corrections - Cavity Unventilated, Emissivity: Normal | | | | |
| **Layer 7** | **Plasterboard, standard** | | | | |
| | Main construction | 12.5 | 0.2100 | 0.0595 | 100.00 |
| **Int surface** | | | | 0.1300 | |

**Total resistance:** **Upper limit =** 4.779 m² K/W **Lower limit =** 4.746 m² K/W **Average =** 4.762 m² K/W

**Total correction =** 0.0016 m² K/W **U-value (unrounded) =** 0.21 W/m² K

**Unheated space:** None

**Total thickness: 390 mm** **U-value: 0.21 W/m² K** **Kappa: n/a**



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

# U-VALUE CALCULATOR REPORT

| | | | |
|---|---|---|---|
| **Property Reference** | sc121832 | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling Part L 2021 |
| **Project** | Plot 1 , Bitterne Parish Church, Whites Lane, Bitterne, Southampton, Hampshire , SO19 7NP | | |
| **Calculation Type** | New Build (As Designed) | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 88 B | **DER** | 13.07 | **TER** | 24.89 |
| **Environmental** | 89 B | **% DER<TER** | 47.50 | | |
| **$CO_2$ Emissions (t/year)** | 1.00 | **DFEE** | 40.37 | **TFEE** | 51.83 |
| **General Requirements Compliance** | Pass | **% DFEE<TFEE** | 22.12 | | |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers, Surecalc Limited, Tel: 01243572695, mark@surecalc.co.uk | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Vivid Design Studio | | |

## Building Elements

### Floor 000003 - Ground Floor Beam and Block

**Floor Type: Suspended Floor**
**Area = 49.70 m², Perimeter = 21.35 m, Wall thickness = 300.00 mm, Soil: Unknown**
**Depth of underfloor space below ground:0.200 m  Floor wind shielding: Average (suburban)**
**Floor height above ground:h = 0.150 m**
**U-value of walls above ground:Uw = 0.220 m**
**Ventilation openings per perimeter length:e = 0.0015 %**
**Mean wind speed:v = 5.000 m/s**
**Resistance on solum:Rg = 0.000 m²K/W**

| Layer | Description | Thickness (mm) | Conductivity (W/m²K) | Resistance (m²K/W) | Fraction (%) |
|---|---|---|---|---|---|
| **Ext surface** | | | | 0.1700 | |
| **Layer 1** | **Blockwork** | | | | |
| | Main construction | 100 | 0.1900 | 0.5263 | 90.91 |
| | Main construction | 100 | 1.0000 | 0.1000 | 9.09 |
| **Layer 2** | **Mannok Therm Floor** | | | | |
| | Main construction | 150 | 0.0220 | 6.8182 | 100.00 |
| | Corrections - Air Gap: Level 1, Fasteners: None or plastic | | | | |
| **Layer 3** | **Screed** | | | | |
| | Main construction | 75 | 1.1500 | 0.0652 | 100.00 |
| **Int surface** | | | | 0.1700 | |

**Total resistance:** **Upper limit =** 7.709 m² K/W **Lower limit =** 7.603 m² K/W **Average =** 7.656 m² K/W

**Total correction =** 0.0079 m² K/W **U-value (unrounded) =** 0.11 W/m² K

**Unheated space:** None

**Total thickness: 325 mm** **U-value: 0.11 W/m² K** **Kappa: n/a**



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

elmhurst energy

# SAP Report Submission for Building Regulations Compliance

Client: Vivid Design Studio

Project: Plot 2, Bitterne Parish Church, Whites Lane
Bitterne, Southampton, Hampshire , SO19 7NP

Contact: Mark Rogers
Surecalc Limited
mark@surecalc.co.uk

Report Issue Date: 06/12/2023

EXCELLENCE IN ENERGY ASSESSMENT

# CODE FOR SUSTAINABLE HOMES
## Calculation Type: New Build (As Designed)

| | | | |
|---|---|---|---|
| **Property Reference** | sc121833 | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling Part L 2021 |
| **Property** | Plot 2, Bitterne Parish Church, Whites Lane, Bitterne, Southampton, Hampshire , SO19 7NP | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 88 B | **DER** | 13.52 | **TER** | 25.39 |
| **Environmental** | 89 B | **% DER<TER** | 46.75 | | |
| **$CO_2$ Emissions (t/year)** | 1.02 | **DFEE** | 41.82 | **TFEE** | 53.06 |
| **General Requirements Compliance** | Pass | **% DFEE<TFEE** | 21.19 | | |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers, Surecalc Limited, Tel: 01243572695, mark@surecalc.co.uk | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Vivid Design Studio | | |

## ENE 1 - Dwelling Emission Rate calculation

| | | | |
|---|---|---|---|
| Total floor area | 97.6 | $m^2$ | |
| DER | 13.52 | $kgCO_2/yr/m^2$ | |
| TER | 25.39 | $kgCO_2/yr/m^2$ | |
| $CO_2$ emissions offset from additional allowable electricity generation | 0.00 | $kgCO_2/yr/m^2$ | (ZC7) |
| Residual $CO_2$ emissions offset from biofuel CHP | 0.00 | $kgCO_2/yr/m^2$ | (ZC5) |
| Total $CO_2$ emissions offset from SAP Section 16 allowances | 0.00 | $kgCO_2/yr/m^2$ | |
| DER accounting for SAP Section 16 allowances | 13.52 | $kgCO_2/yr/m^2$ | |
| Reduction DER/TER | 46.75 | % | |
| CfSH ENE1 credits achieved | 5.2 | | |
| CfSH ENE1 level achieved | 4 | | |

## ENE 2 – Fabric Energy Efficiency calculation

| | | | |
|---|---|---|---|
| Dwelling type | House, Semi-Detached | | |
| Fabric energy efficiency (F.E.E.) | 41.82 | $kWh/m^2/yr$ | |
| CfSH ENE2 credits achieved | 8.0 | | |
| CfSH ENE1 and 2 overall level achieved | 4 | | |

## ENE 7 – Low and Zero Carbon Technologies calculation

**Standard case $CO_2$ emissions**

| | | | |
|---|---|---|---|
| Total floor area | 97.6 | $m^2$ | |
| DER | 18.84 | $kgCO_2/yr/m^2$ | |
| $CO_2$ emissions from electrical appliances | 15.32 | $kgCO_2/yr/m^2$ | (ZC2) |
| $CO_2$ emissions from cooking | 1.89 | $kgCO_2/yr/m^2$ | (ZC3) |
| Standard case total $CO_2$ emissions | 36.05 | $kgCO_2/yr/m^2$ | (ZC4) |
| Net Standard case $CO_2$ emissions | 36.05 | $kgCO_2/yr/m^2$ | (ZC8) |

**Actual case $CO_2$ emissions**

| | | | |
|---|---|---|---|
| DER | 16.64 | $kgCO_2/yr/m^2$ | |
| $CO_2$ emissions from electrical appliances | 15.32 | $kgCO_2/yr/m^2$ | (ZC2) |
| $CO_2$ emissions from cooking | 1.89 | $kgCO_2/yr/m^2$ | (ZC3) |
| Actual case total $CO_2$ emissions | 33.85 | $kgCO_2/yr/m^2$ | (ZC4) |
| $CO_2$ emissions from Biomass | 0.00 | $kgCO_2/yr/m^2$ | (ZC5) |
| $CO_2$ reduction from additional allowable electricity generation | 0.00 | $kgCO_2/yr/m^2$ | (ZC7) |
| Net Actual case $CO_2$ emissions | 33.85 | $kgCO_2/yr/m^2$ | (ZC8) |
| Improvement in net actual/net standard case $CO_2$ emissions | 6 | % | |



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

| | |
|---|---|
| ENE7 credits achieved | 0 |



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

# Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Array SAP 10 program, Array

**Date:** Wed 06 Dec 2023 15:17:41

| Project Information | | | |
|---|---|---|---|
| Assessed By | Mark Rogers | Building Type | House, Semi-detached |
| OCDEA Registration | EES/004179 | Assessment Date | 2023-12-06 |

| Dwelling Details | | | |
|---|---|---|---|
| Assessment Type | As designed | Total Floor Area | 98 $m^2$ |
| Site Reference | sc100229 P2 Bitterne Church | Plot Reference | 001 |
| Address | Bitterne Parish Church Plot 2 Whites Lane, Southampton, SO19 7NP | | |

| Client Details | |
|---|---|
| Name | Philip Dudley |
| Company | Vivid Design Studio |
| Address | NA, NA, NA |

**This report covers items included within the SAP calculations. It is not a complete report of regulations compliance.**

| 1a Target emission rate and dwelling emission rate | | |
|---|---|---|
| Fuel for main heating system | Electricity | |
| *Target carbon dioxide emission rate* | *10.66 $kgCO_2/m^2$* | |
| Dwelling carbon dioxide emission rate | 3.91 $kgCO_2/m^2$ | OK |
| **1b Target primary energy rate and dwelling primary energy** | | |
| *Target primary energy* | *55.61 $kWh_{PE}/m^2$* | |
| Dwelling primary energy | 40.74 $kWh_{PE}/m^2$ | OK |
| **1c Target fabric energy efficiency and dwelling fabric energy efficiency** | | |
| *Target fabric energy efficiency* | *37.4 $kWh/m^2$* | |
| Dwelling fabric energy efficiency | 35.8 $kWh/m^2$ | OK |

| 2a Fabric U-values | | | | |
|---|---|---|---|---|
| **Element** | ***Maximum permitted average U-Value [$W/m^2K$]*** | **Dwelling average U-Value [$W/m^2K$]** | **Element with highest individual U-Value** | |
| External walls | *0.26* | 0.22 | Walls (1) (0.22) | OK |
| Party walls | *0.2* | 0 | Party Wall (1) (0) | **N/A** |
| Curtain walls | *1.6* | 0 | N/A | **N/A** |
| Floors | *0.18* | 0.11 | Ground Floor (0.11) | OK |
| Roofs | *0.16* | 0.09 | Roof (1) (0.09) | OK |
| Windows, doors, and roof windows | *1.6* | 1.2 | Front East Door (1.2) | OK |
| Rooflights | *2.2* | N/A | N/A | **N/A** |

| 2b Envelope elements (better than typically expected values are flagged with a subsequent (!)) | | |
|---|---|---|
| **Name** | **Net area [$m^2$]** | **U-Value [$W/m^2K$]** |
| Exposed wall: Walls (1) | 83.28 | 0.22 |
| Exposed wall: Walls (2) | 6 | 0.21 |
| Party wall: Party Wall (1) | 47.38 | 0 **(!)** |
| Ground floor: Ground Floor, Ground Floor | 48.8 | 0.11 |
| Exposed roof: Roof (1) | 48.8 | 0.09 **(!)** |

| 2c Openings (better than typically expected values are flagged with a subsequent (!)) | | | | |
|---|---|---|---|---|
| **Name** | **Area [$m^2$]** | **Orientation** | **Frame factor** | **U-Value [$W/m^2K$]** |
| Front East Door, New Dwell Entrance Door | 2.01 | East | N/A | 1.2 |
| Front East Windows, New Dwelling DG Window | 2.73 | East | 0.7 | 1.2 |
| Front East Window, New Dwelling DG Window | 1.9 | East | 0.7 | 1.2 |
| Side North Windows, New Dwelling DG Window | 1.8 | North | 0.7 | 1.2 |
| Rear West Windows, New Dwelling DG Window | 3.94 | West | 0.7 | 1.2 |
| Rear West Windows, New Dwell DG French Doors | 3.92 | West | 0.7 | 1.2 |

| Name | Area [$m^2$] | Orientation | Frame factor | U-Value [$W/m^2K$] |
|---|---|---|---|---|

| 2d Thermal bridging (better than typically expected values are flagged with a subsequent (!)) | | | | |
|---|---|---|---|---|
| Building part **1 - Main Dwelling**: Thermal bridging calculated from linear thermal transmittances for each junction | | | | |
| **Main element** | **Junction detail** | **Source** | **Psi value [W/mK]** | **Drawing / reference** |
| External wall | E2: Other lintels (including other steel lintels) | Calculated by person with suitable expertise | 0.05 | IG or Keystone Hi Therm + |
| External wall | E3: Sill | Calculated by person with suitable expertise | 0.018 **(!)** | Recognised Construction Detail |
| External wall | E4: Jamb | Calculated by person with suitable expertise | 0.014 **(!)** | Recognised Construction Detail |
| External wall | E5: Ground floor (normal) | Calculated by person with suitable expertise | 0.068 | Recognised Construction Detail |
| External wall | E6: Intermediate floor within a dwelling | Calculated by person with suitable expertise | 0.001 **(!)** | Recognised Construction Detail |
| External wall | E10: Eaves (insulation at ceiling level) | Calculated by person with suitable expertise | 0.055 | Recognised Construction Detail |
| External wall | E12: Gable (insulation at ceiling level) | Calculated by person with suitable expertise | 0.058 | Recognised Construction Detail |
| External wall | E16: Corner (normal) | Calculated by person with suitable expertise | 0.051 | Recognised Construction Detail |
| External wall | E18: Party wall between dwellings | Calculated by person with suitable expertise | 0.044 | Recognised Construction Detail |
| Party wall | P1: Ground floor | Calculated by person with suitable expertise | 0.103 | Recognised Construction Detail |
| Party wall | P2: Intermediate floor within a dwelling | SAP table default | 0 **(!)** | |
| Party wall | P4: Roof (insulation at ceiling level) | Calculated by person with suitable expertise | 0.101 | Recognised Construction Detail |

| 3 Air permeability (better than typically expected values are flagged with a subsequent (!)) | | |
|---|---|---|
| *Maximum permitted air permeability at 50Pa* | *8 $m^3/hm^2$* | |
| Dwelling air permeability at 50Pa | 5.05 $m^3/hm^2$, Design value | **OK** |
| Air permeability test certificate reference | | |

| 4 Space heating | |
|---|---|
| **Main heating system 1**: Heat pump with radiators or underfloor heating - Electricity | |
| Efficiency | 233.8% |
| Emitter type | Radiators |
| Flow temperature | 55°C |
| System type | Heat Pump |
| Manufacturer | Daikin Europe NV |
| Model | EDLA04EV3 |
| Commissioning | |
| **Secondary heating system**: N/A | |
| Fuel | N/A |
| Efficiency | N/A |
| Commissioning | |

| 5 Hot water | | |
|---|---|---|
| **Cylinder/store** - type: Cylinder | | |
| Capacity | 180 litres | |
| Declared heat loss | 1.39 kWh/day | |
| Primary pipework insulated | Yes | |
| Manufacturer | | |
| Model | | |
| Commissioning | | |
| **Waste water heat recovery system 1** - type: N/A | | |
| Efficiency | | |
| Manufacturer | | |
| Model | | |

| 6 Controls | | |
|---|---|---|
| **Main heating 1** - type: Time and temperature zone control by arrangement of plumbing and electrical services | | |
| Function | | |
| Ecodesign class | | |
| Manufacturer | | |
| Model | | |
| **Water heating** - type: Cylinder thermostat and HW separately timed | | |
| Manufacturer | | |
| Model | | |

| 7 Lighting | | |
|---|---|---|
| *Minimum permitted light source efficacy* | *75 lm/W* | |
| Lowest light source efficacy | 75 lm/W | OK |
| External lights control | N/A | |

| 8 Mechanical ventilation | | |
|---|---|---|
| **System type:** N/A | | |
| *Maximum permitted specific fan power* | *N/A* | |
| Specific fan power | N/A | **N/A** |
| *Minimum permitted heat recovery efficiency* | *N/A* | |
| Heat recovery efficiency | N/A | **N/A** |
| Manufacturer/Model | | |
| Commissioning | | |

| 9 Local generation |
|---|
| N/A |

| 10 Heat networks |
|---|
| N/A |

| 11 Supporting documentary evidence |
|---|
| N/A |

| 12 Declarations | |
|---|---|
| **a. Assessor Declaration** | |
| This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report. | |
| Signed:<br><br>Name: | Assessor ID:<br><br>Date: |
| **b. Client Declaration** | |
| N/A | |

# Predicted Energy Assessment

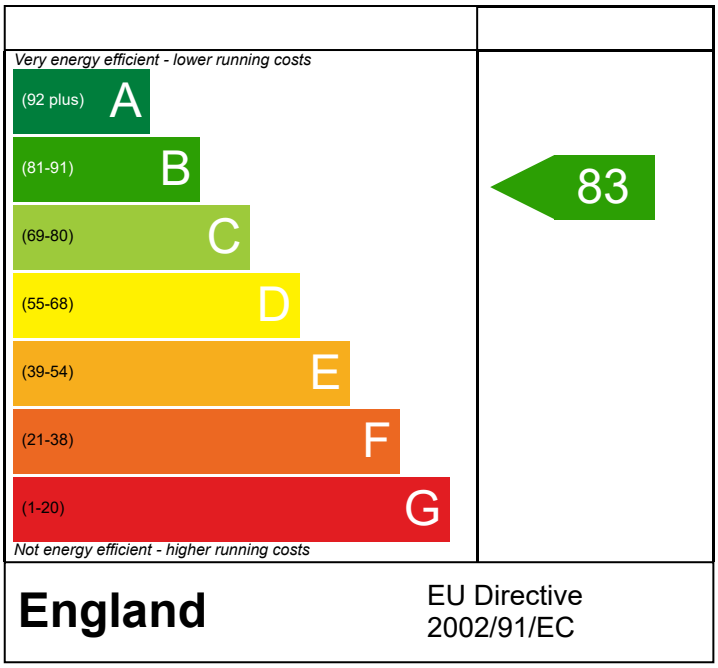
Plot 2, Bitterne Parish Church, Whites Lane,
Southampton, Hampshire , SO19 7NP

| | |
|---|---|
| Dwelling type: | House, Semi-Detached |
| Date of assessment: | 06/12/2023 |
| Produced by: | Mark Rogers |
| Total floor area: | 97.6 m² |
| DRRN: | 5523-6223-0972 |

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

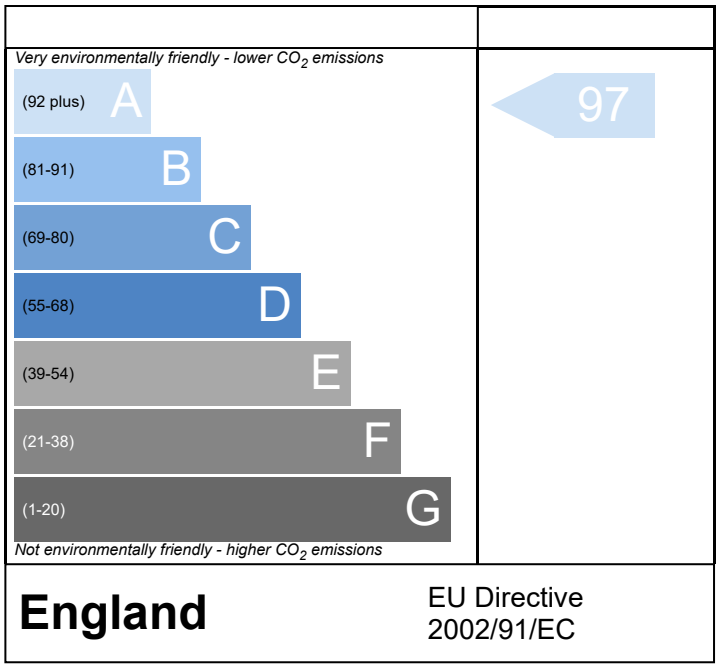
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

## Energy Efficiency Rating




The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

## Environmental Impact ($CO_2$) Rating




The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide ($CO_2$) emissions. The higher the rating the less impact it has on the environment.

# Summary for Input Data

elmhurst energy

| | | | |
|---|---|---|---|
| **Property Reference** | sc100229 P2 Bitterne Church | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling |
| **Property** | Plot 2, Bitterne Parish Church, Whites Lane, Southampton, Hampshire , SO19 7NP | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 83 B | **DER** | 3.91 | **TER** | 10.66 |
| **Environmental** | 97 A | **% DER < TER** | | | 63.32 |
| **$CO_2$ Emissions (t/year)** | 0.32 | **DFEE** | 35.77 | **TFEE** | 37.43 |
| **Compliance Check** | See BREL | **% DFEE < TFEE** | | | 4.44 |
| **% DPER < TPER** | 26.73 | **DPER** | 40.74 | **TPER** | 55.61 |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Philip Dudley | | |

## SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

| | |
|---|---|
| **Orientation** | East |
| **Property Tenture** | ND |
| **Transaction Type** | 6 |
| **Terrain Type** | Suburban |
| **1.0 Property Type** | House, Semi-Detached |
| **2.0 Number of Storeys** | 2 |
| **3.0 Date Built** | 2023 |
| **4.0 Sheltered Sides** | 1 |
| **5.0 Sunlight/Shade** | Average or unknown |
| **6.0 Thermal Mass Parameter** | Precise calculation |
| **7.0 Electricity Tariff** | Standard |
| Smart electricity meter fitted | No |
| Smart gas meter fitted | No |

**7.0 Measurements**

| | Heat Loss Perimeter | Internal Floor Area | Average Storey Height |
|---|---|---|---|
| **Ground floor:** | 20.50 m | 48.80 m² | 2.39 m |
| **1st Storey:** | 20.50 m | 48.80 m² | 2.76 m |

**8.0 Living Area** 13.88 m²

**9.0 External Walls**

| Description | Type | Construction | U-Value (W/m²K) | Kappa (kJ/m²K) | Gross Area(m²) | Nett Area (m²) | Shelter Res | Shelter | Openings | Area Calculation Type |
|---|---|---|---|---|---|---|---|---|---|---|
| External Cavity Wall | Cavity Wall | Cavity wall; plasterboard on dabs or battens, lightweight aggregate block, filled cavity, any outside structure | 0.22 | 110.00 | 97.68 | 83.28 | 0.00 | None | 14.40 | Calculate Wall Area |
| External Tile Hung Wall | Cavity Wall | Cavity wall; plasterboard on dabs or battens, lightweight aggregate block, filled cavity, any outside structure | 0.21 | 110.00 | 7.90 | 6.00 | 0.00 | None | 1.90 | Enter Gross Area |

**9.1 Party Walls**

| Description | Type | Construction | U-Value (W/m²K) | Kappa (kJ/m²K) | Area (m²) | Shelter Res | Shelter |
|---|---|---|---|---|---|---|---|
| Party Wall | Filled Cavity with Edge Sealing | Single plasterboard on dabs both sides, lightweight aggregate blocks, cavity or cavity fill | 0.00 | 110.00 | 47.38 | | None |

**9.2 Internal Walls**

| Description | Construction | Kappa (kJ/m²K) | Area (m²) |
|---|---|---|---|
| Internal Stud Walls | Plasterboard on timber frame | 9.00 | 187.53 |

**10.0 External Roofs**

| Description | Type | Construction | U-Value (W/m²K) | Kappa (kJ/m²K) | Gross Area(m²) | Nett Area (m²) | Shelter Code | Shelter Factor | Calculation Type | Openings |
|---|---|---|---|---|---|---|---|---|---|---|
| External Pitched Roofs | External Plane Roof | Plasterboard, insulated at ceiling level | 0.09 | 9.00 | 48.80 | 48.80 | None | 0.00 | Calculate Wall Area | 0.00 |

**10.2 Internal Ceilings**

| Description | Storey | Construction | Area (m²) |
|---|---|---|---|
| Internal Ceiling | Lowest occupied | Plasterboard ceiling, carpeted chipboard floor | 48.80 |

**11.0 Heat Loss Floors**

# Summary for Input Data

elmhurst energy

| Description | Type | Storey Index | Construction | U-Value (W/m²K) | Shelter Code | Shelter Factor | Kappa (kJ/m²K) | Area (m²) |
|---|---|---|---|---|---|---|---|---|
| Ground Floor | Ground Floor - Solid | Lowest occupied | Suspended concrete floor, carpeted | 0.11 | None | 0.00 | 75.00 | 48.80 |

**11.2 Internal Floors**

| Description | Storey Index | Construction | Kappa (kJ/m²K) | Area (m²) |
|---|---|---|---|---|
| Internal Floor | | Plasterboard ceiling, carpeted chipboard floor | 9.00 | 48.80 |

**12.0 Opening Types**

| Description | Data Source | Type | Glazing | Glazing Gap | Filling Type | G-value | Frame Type | Frame Factor | U Value (W/m²K) |
|---|---|---|---|---|---|---|---|---|---|
| New Dwell Entrance Door | Manufacturer | Half Glazed Door | Double Low-E Soft 0.05 | | | 0.36 | | 0.70 | 1.20 |
| New Dwell DG French Doors | Manufacturer | Window | Double Low-E Soft 0.05 | | | 0.71 | | 0.70 | 1.20 |
| New Dwelling DG Window | Manufacturer | Window | Double Low-E Soft 0.05 | | | 0.71 | | 0.70 | 1.20 |

**13.0 Openings**

| Name | Opening Type | Location | Orientation | Area (m²) | Pitch |
|---|---|---|---|---|---|
| Front East Door | New Dwell Entrance Door | External Cavity Wall | East | 2.01 | |
| Front East Windows | New Dwelling DG Window | External Cavity Wall | East | 2.73 | |
| Front East Window | New Dwelling DG Window | External Tile Hung Wall | East | 1.90 | |
| Side North Windows | New Dwelling DG Window | External Cavity Wall | North | 1.80 | |
| Rear West Windows | New Dwelling DG Window | External Cavity Wall | West | 3.94 | |
| Rear West Windows | New Dwell DG French Doors | External Cavity Wall | West | 3.92 | |

| | | |
|---|---|---|
| **14.0 Conservatory** | None | |
| **15.0 Draught Proofing** | 100 | % |
| **16.0 Draught Lobby** | No | |

| | | |
|---|---|---|
| **17.0 Thermal Bridging** | Calculate Bridges | |

**17.1 List of Bridges**

| Bridge Type | Source Type | Length | Psi | Adjusted | Reference: | Imported |
|---|---|---|---|---|---|---|
| E2 Other lintels (including other steel lintels) | Independently assessed | 11.46 | 0.05 | 0.05 | IG or Keystone Hi Therm + | No |
| E3 Sill | Independently assessed | 10.50 | 0.02 | 0.02 | Recognised Construction Detail | No |
| E4 Jamb | Independently assessed | 28.80 | 0.01 | 0.01 | Recognised Construction Detail | No |
| E5 Ground floor (normal) | Independently assessed | 20.50 | 0.07 | 0.07 | Recognised Construction Detail | No |
| E6 Intermediate floor within a dwelling | Independently assessed | 20.50 | 0.00 | 0.00 | Recognised Construction Detail | No |
| E10 Eaves (insulation at ceiling level) | Independently assessed | 18.52 | 0.06 | 0.06 | Recognised Construction Detail | No |
| E12 Gable (insulation at ceiling level) | Independently assessed | 1.98 | 0.06 | 0.06 | Recognised Construction Detail | No |
| E16 Corner (normal) | Independently assessed | 10.30 | 0.05 | 0.05 | Recognised Construction Detail | No |
| E18 Party wall between dwellings | Independently assessed | 10.30 | 0.04 | 0.04 | Recognised Construction Detail | No |
| P1 Party wall - Ground floor | Independently assessed | 9.20 | 0.10 | 0.10 | Recognised Construction Detail | No |
| P2 Party wall - Intermediate floor within a dwelling | Table K1 - Default | 9.20 | 0.00 | 0.00 | | No |
| P4 Party wall - Roof (insulation at ceiling level) | Independently assessed | 9.20 | 0.10 | 0.10 | Recognised Construction Detail | No |

| | | |
|---|---|---|
| Y-value | 0.00 | W/m²K |

| | | |
|---|---|---|
| **18.0 Pressure Testing** | Yes | |
| Designed $AP_{50}$ | 5.05 | m³/(h.m²) @ 50 Pa |
| Test Method | Blower Door | |

**19.0 Mechanical Ventilation**

**Mechanical Ventilation**

| | | |
|---|---|---|
| Mechanical Ventilation System Present | No | |

**20.0 Fans, Open Fireplaces, Flues**

| | | |
|---|---|---|
| **21.0 Fixed Cooling System** | No | |

**22.0 Lighting**

| | | |
|---|---|---|
| No Fixed Lighting | No | |

| Name | Efficacy | Power | Capacity | Count |
|---|---|---|---|---|
| Low energy Lighting | 75.00 | 15 | 1125 | 36 |

| | | |
|---|---|---|
| **24.0 Main Heating 1** | Database | |
| Description | Electric Air Source Heat Pump | |
| Percentage of Heat | 100.00 | % |
| Database Ref. No. | 106465 | |
| Fuel Type | Electricity | |
| In Winter | 0.00 | |
| In Summer | 0.00 | |
| Model Name | EDLA04EV3 | |

# Summary for Input Data

| | |
|---|---|
| Manufacturer | Daikin Europe NV |
| System Type | Heat Pump |
| Controls SAP Code | 2207 |
| PCDF Controls | 0 |
| Is MHS Pumped | Pump in heated space |
| Heating Pump Age | 2013 or later |
| Heat Emitter | Radiators |
| Flow Temperature | Enter value |
| Flow Temperature Value | 55.00 |

**25.0 Main Heating 2** — None

**26.0 Heat Networks** — None

| | Heat Source | Fuel Type | Heating Use | Efficiency | Percentage Of Heat | Heat | Heat Power Ratio | Electrical | Fuel Factor | Efficiency type |
|---|---|---|---|---|---|---|---|---|---|---|
| Heat source 1 | | | | | | | | | | |
| Heat source 2 | | | | | | | | | | |
| Heat source 3 | | | | | | | | | | |
| Heat source 4 | | | | | | | | | | |
| Heat source 5 | | | | | | | | | | |

**28.0 Water Heating**

| | |
|---|---|
| Water Heating | Main Heating 1 |
| SAP Code | 901 |
| Flue Gas Heat Recovery System | No |
| Waste Water Heat Recovery Instantaneous System 1 | No |
| Waste Water Heat Recovery Instantaneous System 2 | No |
| Waste Water Heat Recovery Storage System | No |
| Solar Panel | No |
| Water use <= 125 litres/person/day | Yes |
| Cold Water Source | From mains |
| Bath Count | 1 |
| Immersion Only Heating Hot Water | No |

**28.1 Showers**

| Description | Shower Type | Flow Rate [l/min] | Rated Power [kW] | Connected | Connected To |
|---|---|---|---|---|---|

**28.3 Waste Water Heat Recovery System**

| | | |
|---|---|---|
| **29.0 Hot Water Cylinder** | Hot Water Cylinder | |
| Cylinder Stat | Yes | |
| Cylinder In Heated Space | Yes | |
| Independent Time Control | Yes | |
| Insulation Type | Measured Loss | |
| Cylinder Volume | 180.00 | L |
| Loss | 1.39 | kWh/day |
| Pipes insulation | Fully insulated primary pipework | |
| In Airing Cupboard | No | |

**31.0 Thermal Store** — None

**Recommendations**

**Lower cost measures**

**None**

**Further measures to achieve even higher standards**

| Typical Cost | Typical savings per year | Ratings after improvement SAP rating | Environmental Impact |
|---|---|---|---|
| £4,000 - £6,000 | £47 | B 84 | A 97 |
| £3,500 - £5,500 | £196 | B 90 | A 98 |
| | | 0 | 0 |

# Thermal Bridging

| | | | |
|---|---|---|---|
| **Property Reference** | sc100229 P2 Bitterne Church | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | Semi-Detached House |
| **Property** | Plot 2, Bitterne Parish Church, Whites Lane, Southampton, Hampshire , SO19 7NP | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 83 B | **DER** | 3.91 | **TER** | 10.66 |
| **Environmental** | 97 A | **% DER < TER** | | | 63.32 |
| **$CO_2$ Emissions (t/year)** | 0.32 | **DFEE** | 35.77 | **TFEE** | 37.43 |
| **Compliance Check** | See BREL | **% DFEE < TFEE** | | | 4.44 |
| **% DPER < TPER** | 26.73 | **DPER** | 40.74 | **TPER** | 55.61 |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Philip Dudley | | |

| | Junction details | Source Type | Psi (W/mK) | Length (m) | Result | Reference |
|---|---|---|---|---|---|---|
| External wall | E2 Other lintels (including other steel lintels) | Independently assessed | 0.050 | 11.46 | 0.57 | IG or Keystone Hi Therm + |
| External wall | E3 Sill | Independently assessed | 0.018 | 10.50 | 0.19 | Recognised Construction Detail |
| External wall | E4 Jamb | Independently assessed | 0.014 | 28.80 | 0.40 | Recognised Construction Detail |
| External wall | E5 Ground floor (normal) | Independently assessed | 0.068 | 20.50 | 1.39 | Recognised Construction Detail |
| External wall | E6 Intermediate floor within a dwelling | Independently assessed | 0.001 | 20.50 | 0.02 | Recognised Construction Detail |
| External wall | E10 Eaves (insulation at ceiling level) | Independently assessed | 0.055 | 18.52 | 1.02 | Recognised Construction Detail |
| External wall | E12 Gable (insulation at ceiling level) | Independently assessed | 0.058 | 1.98 | 0.11 | Recognised Construction Detail |
| External wall | E16 Corner (normal) | Independently assessed | 0.051 | 10.30 | 0.53 | Recognised Construction Detail |
| External wall | E18 Party wall between dwellings | Independently assessed | 0.044 | 10.30 | 0.45 | Recognised Construction Detail |
| Party wall | P1 Party wall - Ground floor | Independently assessed | 0.103 | 9.20 | 0.95 | Recognised Construction Detail |
| Party wall | P2 Party wall - Intermediate floor within a dwelling | Table K1 - Default | 0.000 | 9.20 | 0.00 | |
| Party wall | P4 Party wall - Roof (insulation at ceiling level) | Independently assessed | 0.101 | 9.20 | 0.93 | Recognised Construction Detail |

Total: 160.46 W/mK:

Y-Value: 0.00 W/m²K:

# U-VALUE CALCULATOR REPORT

| | | | |
|---|---|---|---|
| **Property Reference** | sc121833 | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling Part L 2021 |
| **Project** | Plot 2, Bitterne Parish Church, Whites Lane, Bitterne, Southampton, Hampshire , SO19 7NP | | |
| **Calculation Type** | New Build (As Designed) | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 88 B | **DER** | 13.52 | **TER** | 25.39 |
| **Environmental** | 89 B | **% DER<TER** | 46.75 | | |
| **$CO_2$ Emissions (t/year)** | 1.02 | **DFEE** | 41.82 | **TFEE** | 53.06 |
| **General Requirements Compliance** | Pass | **% DFEE<TFEE** | 21.19 | | |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers, Surecalc Limited, Tel: 01243572695, mark@surecalc.co.uk | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Vivid Design Studio | | |

## Building Elements

### Roof 000002 - Pitched Roof Insulated Ceiling Vivid

**Roof Type: Pitched Roof, insulated flat ceiling**

| Layer | Description | Thickness (mm) | Conductivity (W/m²K) | Resistance (m²K/W) | Fraction (%) |
|---|---|---|---|---|---|
| **Ext surface** | | | | 0.0400 | |
| **Layer 1** | **Loft Space** | | | | |
| | Main construction | 0 | 0.0600 | 0.0600 | 100.00 |
| **Layer 2** | **Mineral wool** | | | | |
| | Main construction | 350 | 0.0440 | 7.9545 | 100.00 |
| | Corrections - Air Gap: Level 0, Fasteners: None or plastic | | | | |
| **Layer 3** | **Mineral wool quilt** | | | | |
| | Main construction | 150 | 0.0440 | 3.4091 | 93.67 |
| | Main construction | 150 | 0.1300 | 1.1538 | 6.33 |
| | Corrections - Air Gap: Level 0, Fasteners: None or plastic | | | | |
| **Layer 4** | **Plasterboard, standard** | | | | |
| | Main construction | 12.5 | 0.2100 | 0.0595 | 100.00 |
| **Int surface** | | | | 0.1000 | |

**Total resistance:** **Upper limit =** 11.449 m² K/W **Lower limit =** 11.248 m² K/W **Average =** 11.348 m² K/W

**Total correction =** 0.0030 m² K/W **U-value (unrounded) =** 0.09 W/m² K

**Unheated space:** None

**Total thickness: 513 mm** **U-value: 0.09 W/m² K** **Kappa: n/a**



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

# U-VALUE CALCULATOR REPORT

| | | | |
|---|---|---|---|
| **Property Reference** | sc121833 | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling Part L 2021 |
| **Project** | Plot 2, Bitterne Parish Church, Whites Lane, Bitterne, Southampton, Hampshire , SO19 7NP | | |
| **Calculation Type** | New Build (As Designed) | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 88 B | **DER** | 13.52 | **TER** | 25.39 |
| **Environmental** | 89 B | **% DER<TER** | 46.75 | | |
| **$CO_2$ Emissions (t/year)** | 1.02 | **DFEE** | 41.82 | **TFEE** | 53.06 |
| **General Requirements Compliance** | Pass | **% DFEE<TFEE** | 21.19 | | |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers, Surecalc Limited, Tel: 01243572695, mark@surecalc.co.uk | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Vivid Design Studio | | |

## Building Elements

### Wall 000001 - Vivid Cavity Wall 125 Knauf Supafil 34

**Wall Type: Standard Wall**

| Layer | Description | Thickness (mm) | Conductivity (W/m²K) | Resistance (m²K/W) | Fraction (%) |
|---|---|---|---|---|---|
| **Ext surface** | | | | 0.0400 | |
| **Layer 1** | **Brick, outer leaf** | | | | |
| | Main construction | 102 | 0.7700 | 0.1325 | 82.81 |
| | Main construction | 102 | 0.9407 | 0.1084 | 17.19 |
| **Layer 2** | **Knauf Supafil 34 blown Cavity Fill** | | | | |
| | Main construction | 125 | 0.0340 | 3.6765 | 100.00 |
| | Corrections - Air Gap: Level 0, Fasteners: Wall ties, Cross sectional area: 12.50 mm², Lambda: 17.000 W/m.K, per m²: 2.500 | | | | |
| **Layer 3** | **Masterblock Masterlite Ultra** | | | | |
| | Main construction | 100 | 0.2700 | 0.3704 | 93.43 |
| | Main construction | 100 | 0.8803 | 0.1136 | 6.57 |
| **Layer 4** | **airspace/plaster dabs** | | | | |
| | Main construction | 15 | 0.1000 | 0.1500 | 80.00 |
| | Main construction | 15 | 0.0882 | 0.1700 | 20.00 |
| | Corrections - Cavity Unventilated, Emissivity: Normal | | | | |
| **Layer 5** | **Plasterboard, standard** | | | | |
| | Main construction | 12.5 | 0.2100 | 0.0595 | 100.00 |
| **Int surface** | | | | 0.1300 | |

**Total resistance:** **Upper limit =** 4.541 m² K/W **Lower limit =** 4.510 m² K/W **Average =** 4.525 m² K/W

**Total correction =** 0.0018 m² K/W **U-value (unrounded) =** 0.22 W/m² K

**Unheated space:** None

**Total thickness: 355 mm** **U-value: 0.22 W/m² K** **Kappa: n/a**



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

# U-VALUE CALCULATOR REPORT

| | | | |
|---|---|---|---|
| **Property Reference** | sc121833 | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling Part L 2021 |
| **Project** | Plot 2, Bitterne Parish Church, Whites Lane, Bitterne, Southampton, Hampshire , SO19 7NP | | |
| **Calculation Type** | New Build (As Designed) | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 88 B | **DER** | 13.52 | **TER** | 25.39 |
| **Environmental** | 89 B | **% DER<TER** | 46.75 | | |
| **$CO_2$ Emissions (t/year)** | 1.02 | **DFEE** | 41.82 | **TFEE** | 53.06 |
| **General Requirements Compliance** | Pass | **% DFEE<TFEE** | 21.19 | | |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers, Surecalc Limited, Tel: 01243572695, mark@surecalc.co.uk | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Vivid Design Studio | | |

## Building Elements

### Wall 000004 - Vivid Cavity Wall 125 Knauf Supafil 34

**Wall Type: Standard Wall**

| Layer | Description | Thickness (mm) | Conductivity (W/m²K) | Resistance (m²K/W) | Fraction (%) |
|---|---|---|---|---|---|
| **Ext surface** | | | | 0.0400 | |
| **Layer 1** | **Tile Hanging** | | | | |
| | Main construction | 15 | 1.0000 | 0.0150 | 100.00 |
| **Layer 2** | **airspace/timber battens** | | | | |
| | Main construction | 22 | 0.1222 | 0.1800 | 89.63 |
| | Main construction | 22 | 0.1243 | 0.1770 | 10.37 |
| | Corrections - Cavity Unventilated, Emissivity: Normal | | | | |
| **Layer 3** | **Blockwork, medium** | | | | |
| | Main construction | 100 | 0.5700 | 0.1754 | 93.43 |
| | Main construction | 100 | 0.8803 | 0.1136 | 6.57 |
| **Layer 4** | **Knauf Supafil 34 blown Cavity Fill** | | | | |
| | Main construction | 125 | 0.0340 | 3.6765 | 100.00 |
| | Corrections - Air Gap: Level 0, Fasteners: Wall ties, Cross sectional area: 12.50 mm², Lambda: 17.000 W/m.K, per m²: 2.500 | | | | |
| **Layer 5** | **Masterblock Masterlite Ultra** | | | | |
| | Main construction | 100 | 0.2700 | 0.3704 | 93.43 |
| | Main construction | 100 | 0.8803 | 0.1136 | 6.57 |
| **Layer 6** | **airspace/plaster dabs** | | | | |
| | Main construction | 15 | 0.1000 | 0.1500 | 80.00 |
| | Main construction | 15 | 0.0882 | 0.1700 | 20.00 |
| | Corrections - Cavity Unventilated, Emissivity: Normal | | | | |
| **Layer 7** | **Plasterboard, standard** | | | | |
| | Main construction | 12.5 | 0.2100 | 0.0595 | 100.00 |
| **Int surface** | | | | 0.1300 | |

**Total resistance:** **Upper limit =** 4.779 m² K/W **Lower limit =** 4.746 m² K/W **Average =** 4.762 m² K/W

**Total correction =** 0.0016 m² K/W **U-value (unrounded) =** 0.21 W/m² K

**Unheated space:** None

**Total thickness: 390 mm** **U-value: 0.21 W/m² K** **Kappa: n/a**



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

# U-VALUE CALCULATOR REPORT

| | | | |
|---|---|---|---|
| **Property Reference** | sc121833 | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling Part L 2021 |
| **Project** | Plot 2, Bitterne Parish Church, Whites Lane, Bitterne, Southampton, Hampshire , SO19 7NP | | |
| **Calculation Type** | New Build (As Designed) | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 88 B | **DER** | 13.52 | **TER** | 25.39 |
| **Environmental** | 89 B | **% DER<TER** | 46.75 | | |
| **$CO_2$ Emissions (t/year)** | 1.02 | **DFEE** | 41.82 | **TFEE** | 53.06 |
| **General Requirements Compliance** | Pass | **% DFEE<TFEE** | 21.19 | | |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers, Surecalc Limited, Tel: 01243572695, mark@surecalc.co.uk | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Vivid Design Studio | | |

## Building Elements

### Floor 000003 - Ground Floor Beam and Block

**Floor Type: Suspended Floor**
**Area = 48.80 m², Perimeter = 20.50 m, Wall thickness = 300.00 mm, Soil: Unknown**
**Depth of underfloor space below ground:0.200 m  Floor wind shielding: Average (suburban)**
**Floor height above ground:h = 0.150 m**
**U-value of walls above ground:Uw = 0.220 m**
**Ventilation openings per perimeter length:e = 0.0015 %**
**Mean wind speed:v = 5.000 m/s**
**Resistance on solum:Rg = 0.000 m²K/W**

| Layer | Description | Thickness (mm) | Conductivity (W/m²K) | Resistance (m²K/W) | Fraction (%) |
|---|---|---|---|---|---|
| **Ext surface** | | | | 0.1700 | |
| **Layer 1** | **Blockwork** | | | | |
| | Main construction | 100 | 0.1900 | 0.5263 | 90.91 |
| | Main construction | 100 | 1.0000 | 0.1000 | 9.09 |
| **Layer 2** | **Mannok Therm Floor** | | | | |
| | Main construction | 150 | 0.0220 | 6.8182 | 100.00 |
| | Corrections - Air Gap: Level 1, Fasteners: None or plastic | | | | |
| **Layer 3** | **Screed** | | | | |
| | Main construction | 75 | 1.1500 | 0.0652 | 100.00 |
| **Int surface** | | | | 0.1700 | |

**Total resistance:** **Upper limit =** 7.709 m² K/W **Lower limit =** 7.603 m² K/W **Average =** 7.656 m² K/W

**Total correction =** 0.0079 m² K/W **U-value (unrounded) =** 0.11 W/m² K

**Unheated space:** None

**Total thickness: 325 mm** **U-value: 0.11 W/m² K** **Kappa: n/a**



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

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# SAP Report Submission for Building Regulations Compliance

Client: Vivid Design Studio

Project: Plot 3, Bitterne Parish Church, Whites Lane
Bitterne, Southampton, Hampshire , SO19 7NP

Contact: Mark Rogers
Surecalc Limited
mark@surecalc.co.uk

Report Issue Date: 06/12/2023

EXCELLENCE IN ENERGY ASSESSMENT

# CODE FOR SUSTAINABLE HOMES
# Calculation Type: New Build (As Designed)

| | | | |
|---|---|---|---|
| **Property Reference** | sc121834 | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling Part L 2021 |
| **Property** | Plot 3, Bitterne Parish Church, Whites Lane, Bitterne, Southampton, Hampshire , SO19 7NP | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 87 B | **DER** | 14.88 | **TER** | 27.06 |
| **Environmental** | 89 B | **% DER<TER** | 45.00 | | |
| **$CO_2$ Emissions (t/year)** | 0.93 | **DFEE** | 42.35 | **TFEE** | 54.07 |
| **General Requirements Compliance** | Pass | **% DFEE<TFEE** | 21.66 | | |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers, Surecalc Limited, Tel: 01243572695, mark@surecalc.co.uk | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Vivid Design Studio | | |

## ENE 1 - Dwelling Emission Rate calculation

| | | | |
|---|---|---|---|
| Total floor area | 81.4 | $m^2$ | |
| DER | 14.88 | $kgCO_2/yr/m^2$ | |
| TER | 27.06 | $kgCO_2/yr/m^2$ | |
| $CO_2$ emissions offset from additional allowable electricity generation | 0.00 | $kgCO_2/yr/m^2$ | (ZC7) |
| Residual $CO_2$ emissions offset from biofuel CHP | 0.00 | $kgCO_2/yr/m^2$ | (ZC5) |
| Total $CO_2$ emissions offset from SAP Section 16 allowances | 0.00 | $kgCO_2/yr/m^2$ | |
| DER accounting for SAP Section 16 allowances | 14.88 | $kgCO_2/yr/m^2$ | |
| Reduction DER/TER | 45.00 | % | |
| CfSH ENE1 credits achieved | 5.0 | | |
| CfSH ENE1 level achieved | 4 | | |

## ENE 2 – Fabric Energy Efficiency calculation

| | | | |
|---|---|---|---|
| Dwelling type | House, End-Terrace | | |
| Fabric energy efficiency (F.E.E.) | 42.35 | $kWh/m^2/yr$ | |
| CfSH ENE2 credits achieved | 7.9 | | |
| CfSH ENE1 and 2 overall level achieved | 4 | | |

## ENE 7 – Low and Zero Carbon Technologies calculation

**Standard case $CO_2$ emissions**

| | | | |
|---|---|---|---|
| Total floor area | 81.4 | $m^2$ | |
| DER | 19.74 | $kgCO_2/yr/m^2$ | |
| $CO_2$ emissions from electrical appliances | 16.19 | $kgCO_2/yr/m^2$ | (ZC2) |
| $CO_2$ emissions from cooking | 2.20 | $kgCO_2/yr/m^2$ | (ZC3) |
| Standard case total $CO_2$ emissions | 38.12 | $kgCO_2/yr/m^2$ | (ZC4) |
| Net Standard case $CO_2$ emissions | 38.12 | $kgCO_2/yr/m^2$ | (ZC8) |

**Actual case $CO_2$ emissions**

| | | | |
|---|---|---|---|
| DER | 18.46 | $kgCO_2/yr/m^2$ | |
| $CO_2$ emissions from electrical appliances | 16.19 | $kgCO_2/yr/m^2$ | (ZC2) |
| $CO_2$ emissions from cooking | 2.20 | $kgCO_2/yr/m^2$ | (ZC3) |
| Actual case total $CO_2$ emissions | 36.84 | $kgCO_2/yr/m^2$ | (ZC4) |
| $CO_2$ emissions from Biomass | 0.00 | $kgCO_2/yr/m^2$ | (ZC5) |
| $CO_2$ reduction from additional allowable electricity generation | 0.00 | $kgCO_2/yr/m^2$ | (ZC7) |
| Net Actual case $CO_2$ emissions | 36.84 | $kgCO_2/yr/m^2$ | (ZC8) |
| Improvement in net actual/net standard case $CO_2$ emissions | 3 | % | |



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| | |
|---|---|
| ENE7 credits achieved | 0 |



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# Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Array SAP 10 program, Array

**Date:** Wed 06 Dec 2023 15:18:27

| Project Information | | | |
|---|---|---|---|
| Assessed By | Mark Rogers | Building Type | House, End-terrace |
| OCDEA Registration | EES/004179 | Assessment Date | 2023-12-06 |

| Dwelling Details | | | |
|---|---|---|---|
| Assessment Type | As designed | Total Floor Area | 81 $m^2$ |
| Site Reference | sc100230 P3 Bitterne Church | Plot Reference | 001 |
| Address | Bitterne Parish Church Plot 3 Whites Lane, Southampton, SO19 7NP | | |

| Client Details | |
|---|---|
| Name | Philip Dudley |
| Company | Vivid Design Studio |
| Address | NA, NA, NA |

**This report covers items included within the SAP calculations. It is not a complete report of regulations compliance.**

| 1a Target emission rate and dwelling emission rate | | |
|---|---|---|
| Fuel for main heating system | Electricity | |
| *Target carbon dioxide emission rate* | *11.68 $kgCO_2/m^2$* | |
| Dwelling carbon dioxide emission rate | 4.05 $kgCO_2/m^2$ | OK |
| **1b Target primary energy rate and dwelling primary energy** | | |
| *Target primary energy* | *61.03 $kWh_{PE}/m^2$* | |
| Dwelling primary energy | 42.3 $kWh_{PE}/m^2$ | OK |
| **1c Target fabric energy efficiency and dwelling fabric energy efficiency** | | |
| *Target fabric energy efficiency* | *38.0 $kWh/m^2$* | |
| Dwelling fabric energy efficiency | 36.0 $kWh/m^2$ | OK |

| 2a Fabric U-values | | | | |
|---|---|---|---|---|
| **Element** | ***Maximum permitted average U-Value [$W/m^2K$]*** | **Dwelling average U-Value [$W/m^2K$]** | **Element with highest individual U-Value** | |
| External walls | *0.26* | 0.22 | Walls (1) (0.22) | OK |
| Party walls | *0.2* | 0 | Party Wall (1) (0) | **N/A** |
| Curtain walls | *1.6* | 0 | N/A | **N/A** |
| Floors | *0.18* | 0.11 | Ground Floor (0.11) | OK |
| Roofs | *0.16* | 0.09 | Roof (1) (0.09) | OK |
| Windows, doors, and roof windows | *1.6* | 1.2 | Front South Door (1.2) | OK |
| Rooflights | *2.2* | N/A | N/A | **N/A** |

| 2b Envelope elements (better than typically expected values are flagged with a subsequent (!)) | | |
|---|---|---|
| **Name** | **Net area [$m^2$]** | **U-Value [$W/m^2K$]** |
| Exposed wall: Walls (1) | 78.06 | 0.22 |
| Party wall: Party Wall (1) | 47.17 | 0 **(!)** |
| Ground floor: Ground Floor, Ground Floor | 40.7 | 0.11 |
| Exposed roof: Roof (1) | 40.7 | 0.09 **(!)** |

| 2c Openings (better than typically expected values are flagged with a subsequent (!)) | | | | |
|---|---|---|---|---|
| **Name** | **Area [$m^2$]** | **Orientation** | **Frame factor** | **U-Value [$W/m^2K$]** |
| Front South Door, New Dwell Entrance Door | 2.01 | South | N/A | 1.2 |
| Front South Windows, New Dwelling DG Window | 4.18 | South | 0.7 | 1.2 |
| Side East Windows, New Dwelling DG Window | 2.16 | East | 0.7 | 1.2 |
| Rear North Windows, New Dwelling DG Window | 3.06 | North | 0.7 | 1.2 |
| Rear North Windows, New Dwell DG French Doors | 3.33 | North | 0.7 | 1.2 |

| 2d Thermal bridging (better than typically expected values are flagged with a subsequent (!)) |
|---|
| Building part **1 - Main Dwelling**: Thermal bridging calculated from linear thermal transmittances for each junction |

| Main element | Junction detail | Source | Psi value [W/mK] | Drawing / reference |
|---|---|---|---|---|
| External wall | E2: Other lintels (including other steel lintels) | Calculated by person with suitable expertise | 0.05 | IG or Keystone Hi Therm + |
| External wall | E3: Sill | Calculated by person with suitable expertise | 0.018 **(!)** | Recognised Construction Detail |
| External wall | E4: Jamb | Calculated by person with suitable expertise | 0.014 **(!)** | Recognised Construction Detail |
| External wall | E5: Ground floor (normal) | Calculated by person with suitable expertise | 0.068 | Recognised Construction Detail |
| External wall | E6: Intermediate floor within a dwelling | Calculated by person with suitable expertise | 0.001 **(!)** | Recognised Construction Detail |
| External wall | E10: Eaves (insulation at ceiling level) | Calculated by person with suitable expertise | 0.055 | Recognised Construction Detail |
| External wall | E16: Corner (normal) | Calculated by person with suitable expertise | 0.051 | Recognised Construction Detail |
| External wall | E18: Party wall between dwellings | Calculated by person with suitable expertise | 0.044 | Recognised Construction Detail |
| Party wall | P1: Ground floor | Calculated by person with suitable expertise | 0.103 | Recognised Construction Detail |
| Party wall | P2: Intermediate floor within a dwelling | SAP table default | 0 **(!)** | |
| Party wall | P4: Roof (insulation at ceiling level) | Calculated by person with suitable expertise | 0.101 | Recognised Construction Detail |

| 3 Air permeability (better than typically expected values are flagged with a subsequent (!)) | | |
|---|---|---|
| *Maximum permitted air permeability at 50Pa* | *8 $m^3/hm^2$* | |
| Dwelling air permeability at 50Pa | 5.05 $m^3/hm^2$, Design value | OK |
| Air permeability test certificate reference | | |

| 4 Space heating | |
|---|---|
| **Main heating system 1**: Heat pump with radiators or underfloor heating - Electricity | |
| Efficiency | 232.5% |
| Emitter type | Radiators |
| Flow temperature | 55°C |
| System type | Heat Pump |
| Manufacturer | Daikin Europe NV |
| Model | EDLA04EV3 |
| Commissioning | |
| **Secondary heating system**: N/A | |
| Fuel | N/A |
| Efficiency | N/A |
| Commissioning | |

| 5 Hot water | |
|---|---|
| **Cylinder/store** - type: Cylinder | |
| Capacity | 180 litres |
| Declared heat loss | 1.39 kWh/day |
| Primary pipework insulated | Yes |
| Manufacturer | |
| Model | |
| Commissioning | |
| **Waste water heat recovery system 1** - type: N/A | |
| Efficiency | |
| Manufacturer | |
| Model | |

| 6 Controls | | |
|---|---|---|
| **Main heating 1** - type: Time and temperature zone control by arrangement of plumbing and electrical services | | |
| Function | | |
| Ecodesign class | | |
| Manufacturer | | |
| Model | | |
| **Water heating** - type: Cylinder thermostat and HW separately timed | | |
| Manufacturer | | |
| Model | | |

| 7 Lighting | | |
|---|---|---|
| *Minimum permitted light source efficacy* | *75 lm/W* | |
| Lowest light source efficacy | 75 lm/W | **OK** |
| External lights control | N/A | |

| 8 Mechanical ventilation | | |
|---|---|---|
| **System type:** N/A | | |
| *Maximum permitted specific fan power* | *N/A* | |
| Specific fan power | N/A | **N/A** |
| *Minimum permitted heat recovery efficiency* | *N/A* | |
| Heat recovery efficiency | N/A | **N/A** |
| Manufacturer/Model | | |
| Commissioning | | |

| 9 Local generation |
|---|
| N/A |

| 10 Heat networks |
|---|
| N/A |

| 11 Supporting documentary evidence |
|---|
| N/A |

| 12 Declarations | |
|---|---|
| **a. Assessor Declaration** | |
| This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report. | |
| Signed:<br><br>Name: | Assessor ID:<br><br>Date: |
| **b. Client Declaration** | |
| N/A | |

# Predicted Energy Assessment

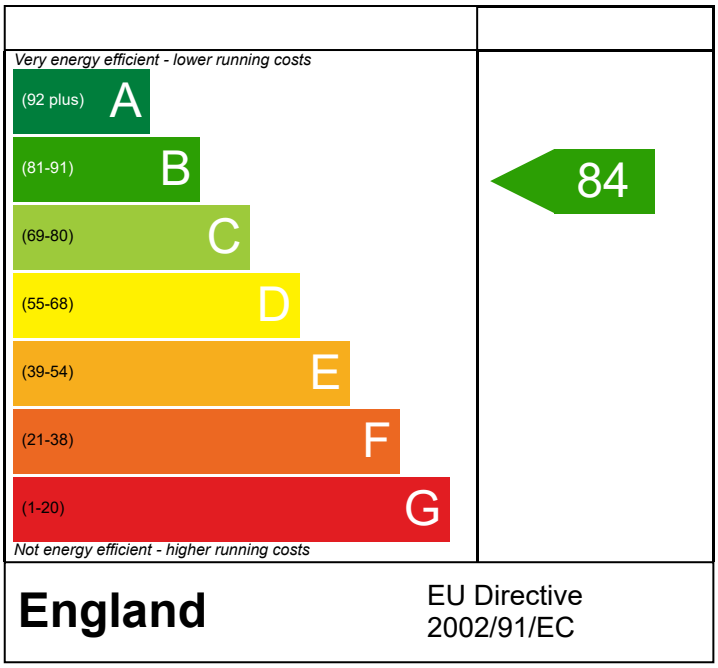
Plot 3, Bitterne Parish Church, Whites Lane,
Southampton, Hampshire , SO19 7NP

| | |
|---|---|
| Dwelling type: | House, End-Terrace |
| Date of assessment: | 06/12/2023 |
| Produced by: | Mark Rogers |
| Total floor area: | 81.4 m² |
| DRRN: | 0520-6251-0972 |

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

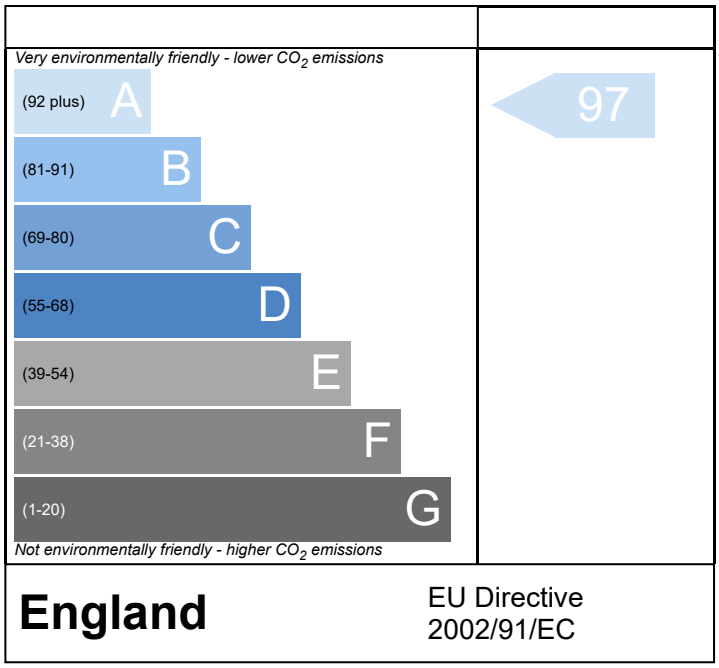
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

## Energy Efficiency Rating




The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

## Environmental Impact ($CO_2$) Rating




The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide ($CO_2$) emissions. The higher the rating the less impact it has on the environment.

# Summary for Input Data

elmhurst energy

| | | | |
|---|---|---|---|
| **Property Reference** | sc100230 P3 Bitterne Church | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling |
| **Property** | Plot 3, Bitterne Parish Church, Whites Lane, Southampton, Hampshire , SO19 7NP | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 84 B | **DER** | 4.05 | **TER** | 11.68 |
| **Environmental** | 97 A | **% DER < TER** | | | 65.33 |
| **$CO_2$ Emissions (t/year)** | 0.27 | **DFEE** | 36.04 | **TFEE** | 37.96 |
| **Compliance Check** | See BREL | **% DFEE < TFEE** | | | 5.06 |
| **% DPER < TPER** | 30.70 | **DPER** | 42.30 | **TPER** | 61.03 |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Philip Dudley | | |

## SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

| | |
|---|---|
| **Orientation** | South |
| **Property Tenture** | ND |
| **Transaction Type** | 6 |
| **Terrain Type** | Suburban |
| **1.0 Property Type** | House, End-Terrace |
| **2.0 Number of Storeys** | 2 |
| **3.0 Date Built** | 2023 |
| **4.0 Sheltered Sides** | 1 |
| **5.0 Sunlight/Shade** | Average or unknown |
| **6.0 Thermal Mass Parameter** | Precise calculation |
| **7.0 Electricity Tariff** | Standard |
| Smart electricity meter fitted | No |
| Smart gas meter fitted | No |

**7.0 Measurements**

| | Heat Loss Perimeter | Internal Floor Area | Average Storey Height |
|---|---|---|---|
| **Ground floor:** | 18.02 m | 40.70 m² | 2.39 m |
| **1st Storey:** | 18.02 m | 40.70 m² | 2.76 m |

**8.0 Living Area** 18.06 m²

**9.0 External Walls**

| Description | Type | Construction | U-Value (W/m²K) | Kappa (kJ/m²K) | Gross Area(m²) | Nett Area (m²) | Shelter Res | Shelter | Openings | Area Calculation Type |
|---|---|---|---|---|---|---|---|---|---|---|
| External Cavity Wall | Cavity Wall | Cavity wall; plasterboard on dabs or battens, lightweight aggregate block, filled cavity, any outside structure | 0.22 | 110.00 | 92.80 | 78.06 | 0.00 | None | 14.74 | Calculate Wall Area |

**9.1 Party Walls**

| Description | Type | Construction | U-Value (W/m²K) | Kappa (kJ/m²K) | Area (m²) | Shelter Res | Shelter |
|---|---|---|---|---|---|---|---|
| Party Wall | Filled Cavity with Edge Sealing | Single plasterboard on dabs both sides, lightweight aggregate blocks, cavity or cavity fill | 0.00 | 110.00 | 47.17 | | None |

**9.2 Internal Walls**

| Description | Construction | Kappa (kJ/m²K) | Area (m²) |
|---|---|---|---|
| Internal Stud Walls | Plasterboard on timber frame | 9.00 | 140.29 |

**10.0 External Roofs**

| Description | Type | Construction | U-Value (W/m²K) | Kappa (kJ/m²K) | Gross Area(m²) | Nett Area (m²) | Shelter Code | Shelter Factor | Calculation Type | Openings |
|---|---|---|---|---|---|---|---|---|---|---|
| External Pitched Roofs | External Plane Roof | Plasterboard, insulated at ceiling level | 0.09 | 9.00 | 40.70 | 40.70 | None | 0.00 | Calculate Wall Area | 0.00 |

**10.2 Internal Ceilings**

| Description | Storey | Construction | Area (m²) |
|---|---|---|---|
| Internal Ceiling | Lowest occupied | Plasterboard ceiling, carpeted chipboard floor | 40.70 |

**11.0 Heat Loss Floors**

| Description | Type | Storey Index | Construction | U-Value (W/m²K) | Shelter Code | Shelter Factor | Kappa (kJ/m²K) | Area (m²) |
|---|---|---|---|---|---|---|---|---|
| Ground Floor | Ground Floor - Solid | Lowest occupied | Suspended concrete floor, carpeted | 0.11 | None | 0.00 | 75.00 | 40.70 |

# Summary for Input Data

elmhurst energy

**11.2 Internal Floors**

| Description | Storey Index | Construction | Kappa (kJ/m²K) | Area (m²) |
|---|---|---|---|---|
| Internal Floor | | Plasterboard ceiling, carpeted chipboard floor | 9.00 | 40.70 |

**12.0 Opening Types**

| Description | Data Source | Type | Glazing | Glazing Gap | Filling Type | G-value | Frame Type | Frame Factor | U Value (W/m²K) |
|---|---|---|---|---|---|---|---|---|---|
| New Dwell Entrance Door | Manufacturer | Half Glazed Door | Double Low-E Soft 0.05 | | | 0.36 | | 0.70 | 1.20 |
| New Dwell DG French Doors | Manufacturer | Window | Double Low-E Soft 0.05 | | | 0.71 | | 0.70 | 1.20 |
| New Dwelling DG Window | Manufacturer | Window | Double Low-E Soft 0.05 | | | 0.71 | | 0.70 | 1.20 |

**13.0 Openings**

| Name | Opening Type | Location | Orientation | Area (m²) | Pitch |
|---|---|---|---|---|---|
| Front South Door | New Dwell Entrance Door | External Cavity Wall | South | 2.01 | |
| Front South Windows | New Dwelling DG Window | External Cavity Wall | South | 4.18 | |
| Side East Windows | New Dwelling DG Window | External Cavity Wall | East | 2.16 | |
| Rear North Windows | New Dwelling DG Window | External Cavity Wall | North | 3.06 | |
| Rear North Windows | New Dwell DG French Doors | External Cavity Wall | North | 3.33 | |

| | | |
|---|---|---|
| **14.0 Conservatory** | None | |
| **15.0 Draught Proofing** | 100 | % |
| **16.0 Draught Lobby** | No | |
| **17.0 Thermal Bridging** | Calculate Bridges | |

**17.1 List of Bridges**

| Bridge Type | Source Type | Length | Psi | Adjusted | Reference: | Imported |
|---|---|---|---|---|---|---|
| E2 Other lintels (including other steel lintels) | Independently assessed | 10.78 | 0.05 | 0.05 | IG or Keystone Hi Therm + | No |
| E3 Sill | Independently assessed | 9.82 | 0.02 | 0.02 | Recognised Construction Detail | No |
| E4 Jamb | Independently assessed | 28.50 | 0.01 | 0.01 | Recognised Construction Detail | No |
| E5 Ground floor (normal) | Independently assessed | 18.02 | 0.07 | 0.07 | Recognised Construction Detail | No |
| E6 Intermediate floor within a dwelling | Independently assessed | 18.02 | 0.00 | 0.00 | Recognised Construction Detail | No |
| E10 Eaves (insulation at ceiling level) | Independently assessed | 18.02 | 0.06 | 0.06 | Recognised Construction Detail | No |
| E16 Corner (normal) | Independently assessed | 10.30 | 0.05 | 0.05 | Recognised Construction Detail | No |
| E18 Party wall between dwellings | Independently assessed | 10.30 | 0.04 | 0.04 | Recognised Construction Detail | No |
| P1 Party wall - Ground floor | Independently assessed | 9.16 | 0.10 | 0.10 | Recognised Construction Detail | No |
| P2 Party wall - Intermediate floor within a dwelling | Table K1 - Default | 9.16 | 0.00 | 0.00 | | No |
| P4 Party wall - Roof (insulation at ceiling level) | Independently assessed | 9.16 | 0.10 | 0.10 | Recognised Construction Detail | No |

| | | |
|---|---|---|
| Y-value | 0.00 | W/m²K |
| **18.0 Pressure Testing** | Yes | |
| Designed $AP_{50}$ | 5.05 | m³/(h.m²) @ 50 Pa |
| Test Method | Blower Door | |

**19.0 Mechanical Ventilation**

**Mechanical Ventilation**

| | | |
|---|---|---|
| Mechanical Ventilation System Present | No | |

**20.0 Fans, Open Fireplaces, Flues**

| | | |
|---|---|---|
| **21.0 Fixed Cooling System** | No | |

**22.0 Lighting**

| | | |
|---|---|---|
| No Fixed Lighting | No | |

| Name | Efficacy | Power | Capacity | Count |
|---|---|---|---|---|
| Low energy Lighting | 75.00 | 15 | 1125 | 24 |

| | | |
|---|---|---|
| **24.0 Main Heating 1** | Database | |
| Description | Electric Air Source Heat Pump | |
| Percentage of Heat | 100.00 | % |
| Database Ref. No. | 106465 | |
| Fuel Type | Electricity | |
| In Winter | 0.00 | |
| In Summer | 0.00 | |
| Model Name | EDLA04EV3 | |
| Manufacturer | Daikin Europe NV | |
| System Type | Heat Pump | |
| Controls SAP Code | 2207 | |

# Summary for Input Data

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| | |
|---|---|
| PCDF Controls | 0 |
| Is MHS Pumped | Pump in heated space |
| Heating Pump Age | 2013 or later |
| Heat Emitter | Radiators |
| Flow Temperature | Enter value |
| Flow Temperature Value | 55.00 |

**25.0 Main Heating 2** — None

**26.0 Heat Networks** — None

| | Heat Source | Fuel Type | Heating Use | Efficiency | Percentage Of Heat | Heat | Heat Power Ratio | Electrical | Fuel Factor | Efficiency type |
|---|---|---|---|---|---|---|---|---|---|---|
| Heat source 1 | | | | | | | | | | |
| Heat source 2 | | | | | | | | | | |
| Heat source 3 | | | | | | | | | | |
| Heat source 4 | | | | | | | | | | |
| Heat source 5 | | | | | | | | | | |

**28.0 Water Heating**

| | |
|---|---|
| Water Heating | Main Heating 1 |
| SAP Code | 901 |
| Flue Gas Heat Recovery System | No |
| Waste Water Heat Recovery Instantaneous System 1 | No |
| Waste Water Heat Recovery Instantaneous System 2 | No |
| Waste Water Heat Recovery Storage System | No |
| Solar Panel | No |
| Water use <= 125 litres/person/day | Yes |
| Cold Water Source | From mains |
| Bath Count | 1 |
| Immersion Only Heating Hot Water | No |

**28.1 Showers**

| Description | Shower Type | Flow Rate [l/min] | Rated Power [kW] | Connected | Connected To |
|---|---|---|---|---|---|

**28.3 Waste Water Heat Recovery System**

| | | |
|---|---|---|
| **29.0 Hot Water Cylinder** | Hot Water Cylinder | |
| Cylinder Stat | Yes | |
| Cylinder In Heated Space | Yes | |
| Independent Time Control | Yes | |
| Insulation Type | Measured Loss | |
| Cylinder Volume | 180.00 | L |
| Loss | 1.39 | kWh/day |
| Pipes insulation | Fully insulated primary pipework | |
| In Airing Cupboard | No | |

**31.0 Thermal Store** — None

**Recommendations**

**Lower cost measures**

**None**

**Further measures to achieve even higher standards**

| Typical Cost | Typical savings per year | Ratings after improvement SAP rating | Environmental Impact |
|---|---|---|---|
| £4,000 - £6,000 | £46 | B 85 | A 97 |
| £3,500 - £5,500 | £187 | B 91 | A 98 |
| | | 0 | 0 |

# Thermal Bridging

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| | | | |
|---|---|---|---|
| **Property Reference** | sc100230 P3 Bitterne Church | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | End-Terrace House |
| **Property** | Plot 3, Bitterne Parish Church, Whites Lane, Southampton, Hampshire , SO19 7NP | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 84 B | **DER** | 4.05 | **TER** | 11.68 |
| **Environmental** | 97 A | **% DER < TER** | | | 65.33 |
| **$CO_2$ Emissions (t/year)** | 0.27 | **DFEE** | 36.04 | **TFEE** | 37.96 |
| **Compliance Check** | See BREL | **% DFEE < TFEE** | | | 5.06 |
| **% DPER < TPER** | 30.70 | **DPER** | 42.30 | **TPER** | 61.03 |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Philip Dudley | | |

| | Junction details | Source Type | Psi (W/mK) | Length (m) | Result | Reference |
|---|---|---|---|---|---|---|
| External wall | E2 Other lintels (including other steel lintels) | Independently assessed | 0.050 | 10.78 | 0.54 | IG or Keystone Hi Therm + |
| External wall | E3 Sill | Independently assessed | 0.018 | 9.82 | 0.18 | Recognised Construction Detail |
| External wall | E4 Jamb | Independently assessed | 0.014 | 28.50 | 0.40 | Recognised Construction Detail |
| External wall | E5 Ground floor (normal) | Independently assessed | 0.068 | 18.02 | 1.23 | Recognised Construction Detail |
| External wall | E6 Intermediate floor within a dwelling | Independently assessed | 0.001 | 18.02 | 0.02 | Recognised Construction Detail |
| External wall | E10 Eaves (insulation at ceiling level) | Independently assessed | 0.055 | 18.02 | 0.99 | Recognised Construction Detail |
| External wall | E16 Corner (normal) | Independently assessed | 0.051 | 10.30 | 0.53 | Recognised Construction Detail |
| External wall | E18 Party wall between dwellings | Independently assessed | 0.044 | 10.30 | 0.45 | Recognised Construction Detail |
| Party wall | P1 Party wall - Ground floor | Independently assessed | 0.103 | 9.16 | 0.94 | Recognised Construction Detail |
| Party wall | P2 Party wall - Intermediate floor within a dwelling | Table K1 - Default | 0.000 | 9.16 | 0.00 | |
| Party wall | P4 Party wall - Roof (insulation at ceiling level) | Independently assessed | 0.101 | 9.16 | 0.93 | Recognised Construction Detail |

Total: 151.24 W/mK:

Y-Value: 0.00 W/m²K:

# U-VALUE CALCULATOR REPORT

| | | | |
|---|---|---|---|
| **Property Reference** | sc121834 | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling Part L 2021 |
| **Project** | Plot 3, Bitterne Parish Church, Whites Lane, Bitterne, Southampton, Hampshire , SO19 7NP | | |
| **Calculation Type** | New Build (As Designed) | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 87 B | **DER** | 14.88 | **TER** | 27.06 |
| **Environmental** | 89 B | **% DER<TER** | 45.00 | | |
| **$CO_2$ Emissions (t/year)** | 0.93 | **DFEE** | 42.35 | **TFEE** | 54.07 |
| **General Requirements Compliance** | Pass | **% DFEE<TFEE** | 21.66 | | |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers, Surecalc Limited, Tel: 01243572695, mark@surecalc.co.uk | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Vivid Design Studio | | |

## Building Elements

### Roof 000002 - Pitched Roof Insulated Ceiling Vivid

**Roof Type: Pitched Roof, insulated flat ceiling**

| Layer | Description | Thickness (mm) | Conductivity (W/m²K) | Resistance (m²K/W) | Fraction (%) |
|---|---|---|---|---|---|
| **Ext surface** | | | | 0.0400 | |
| **Layer 1** | **Loft Space** | | | | |
| | Main construction | 0 | 0.0600 | 0.0600 | 100.00 |
| **Layer 2** | **Mineral wool** | | | | |
| | Main construction | 350 | 0.0440 | 7.9545 | 100.00 |
| | Corrections - Air Gap: Level 0, Fasteners: None or plastic | | | | |
| **Layer 3** | **Mineral wool quilt** | | | | |
| | Main construction | 150 | 0.0440 | 3.4091 | 93.67 |
| | Main construction | 150 | 0.1300 | 1.1538 | 6.33 |
| | Corrections - Air Gap: Level 0, Fasteners: None or plastic | | | | |
| **Layer 4** | **Plasterboard, standard** | | | | |
| | Main construction | 12.5 | 0.2100 | 0.0595 | 100.00 |
| **Int surface** | | | | 0.1000 | |

**Total resistance:** **Upper limit =** 11.449 m² K/W **Lower limit =** 11.248 m² K/W **Average =** 11.348 m² K/W

**Total correction =** 0.0030 m² K/W **U-value (unrounded) =** 0.09 W/m² K

**Unheated space:** None

**Total thickness: 513 mm** **U-value: 0.09 W/m² K** **Kappa: n/a**



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

# U-VALUE CALCULATOR REPORT

| | | | |
|---|---|---|---|
| **Property Reference** | sc121834 | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling Part L 2021 |
| **Project** | Plot 3, Bitterne Parish Church, Whites Lane, Bitterne, Southampton, Hampshire , SO19 7NP | | |
| **Calculation Type** | New Build (As Designed) | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 87 B | **DER** | 14.88 | **TER** | 27.06 |
| **Environmental** | 89 B | **% DER<TER** | 45.00 | | |
| **$CO_2$ Emissions (t/year)** | 0.93 | **DFEE** | 42.35 | **TFEE** | 54.07 |
| **General Requirements Compliance** | Pass | **% DFEE<TFEE** | 21.66 | | |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers, Surecalc Limited, Tel: 01243572695, mark@surecalc.co.uk | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Vivid Design Studio | | |

## Building Elements

### Wall 000001 - Vivid Cavity Wall 125 Knauf Supafil 34

**Wall Type: Standard Wall**

| Layer | Description | Thickness (mm) | Conductivity (W/m²K) | Resistance (m²K/W) | Fraction (%) |
|---|---|---|---|---|---|
| **Ext surface** | | | | 0.0400 | |
| **Layer 1** | **Brick, outer leaf** | | | | |
| | Main construction | 102 | 0.7700 | 0.1325 | 82.81 |
| | Main construction | 102 | 0.9407 | 0.1084 | 17.19 |
| **Layer 2** | **Knauf Supafil 34 blown Cavity Fill** | | | | |
| | Main construction | 125 | 0.0340 | 3.6765 | 100.00 |
| | Corrections - Air Gap: Level 0, Fasteners: Wall ties, Cross sectional area: 12.50 mm², Lambda: 17.000 W/m.K, per m²: 2.500 | | | | |
| **Layer 3** | **Masterblock Masterlite Ultra** | | | | |
| | Main construction | 100 | 0.2700 | 0.3704 | 93.43 |
| | Main construction | 100 | 0.8803 | 0.1136 | 6.57 |
| **Layer 4** | **airspace/plaster dabs** | | | | |
| | Main construction | 15 | 0.1000 | 0.1500 | 80.00 |
| | Main construction | 15 | 0.0882 | 0.1700 | 20.00 |
| | Corrections - Cavity Unventilated, Emissivity: Normal | | | | |
| **Layer 5** | **Plasterboard, standard** | | | | |
| | Main construction | 12.5 | 0.2100 | 0.0595 | 100.00 |
| **Int surface** | | | | 0.1300 | |

**Total resistance:** **Upper limit =** 4.541 m² K/W **Lower limit =** 4.510 m² K/W **Average =** 4.525 m² K/W

**Total correction =** 0.0018 m² K/W **U-value (unrounded) =** 0.22 W/m² K

**Unheated space:** None

**Total thickness: 355 mm** **U-value: 0.22 W/m² K** **Kappa: n/a**



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

# U-VALUE CALCULATOR REPORT

| | | | |
|---|---|---|---|
| **Property Reference** | sc121834 | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling Part L 2021 |
| **Project** | Plot 3, Bitterne Parish Church, Whites Lane, Bitterne, Southampton, Hampshire , SO19 7NP | | |
| **Calculation Type** | New Build (As Designed) | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 87 B | **DER** | 14.88 | **TER** | 27.06 |
| **Environmental** | 89 B | **% DER<TER** | 45.00 | | |
| **$CO_2$ Emissions (t/year)** | 0.93 | **DFEE** | 42.35 | **TFEE** | 54.07 |
| **General Requirements Compliance** | Pass | **% DFEE<TFEE** | 21.66 | | |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers, Surecalc Limited, Tel: 01243572695, mark@surecalc.co.uk | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Vivid Design Studio | | |

## Building Elements

### Floor 000003 - Ground Floor Beam and Block

**Floor Type: Suspended Floor**
**Area = 40.70 m², Perimeter = 18.02 m, Wall thickness = 300.00 mm, Soil: Unknown**
**Depth of underfloor space below ground:0.200 m  Floor wind shielding: Average (suburban)**
**Floor height above ground:h = 0.150 m**
**U-value of walls above ground:Uw = 0.220 m**
**Ventilation openings per perimeter length:e = 0.0015 %**
**Mean wind speed:v = 5.000 m/s**
**Resistance on solum:Rg = 0.000 m²K/W**

| Layer | Description | Thickness (mm) | Conductivity (W/m²K) | Resistance (m²K/W) | Fraction (%) |
|---|---|---|---|---|---|
| **Ext surface** | | | | 0.1700 | |
| **Layer 1** | **Blockwork** | | | | |
| | Main construction | 100 | 0.1900 | 0.5263 | 90.91 |
| | Main construction | 100 | 1.0000 | 0.1000 | 9.09 |
| **Layer 2** | **Mannok Therm Floor** | | | | |
| | Main construction | 150 | 0.0220 | 6.8182 | 100.00 |
| | Corrections - Air Gap: Level 1, Fasteners: None or plastic | | | | |
| **Layer 3** | **Screed** | | | | |
| | Main construction | 75 | 1.1500 | 0.0652 | 100.00 |
| **Int surface** | | | | 0.1700 | |

**Total resistance:** **Upper limit =** 7.709 m² K/W **Lower limit =** 7.603 m² K/W **Average =** 7.656 m² K/W

**Total correction =** 0.0079 m² K/W **U-value (unrounded) =** 0.11 W/m² K

**Unheated space:** None

**Total thickness: 325 mm** **U-value: 0.11 W/m² K** **Kappa: n/a**



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

elmhurst energy

# SAP Report Submission for Building Regulations Compliance

Client: Vivid Design Studio

Project: Plot 4, Bitterne Parish Church, Whites Lane
Bitterne, Southampton, Hampshire , SO19 7NP

Contact: Mark Rogers
Surecalc Limited
mark@surecalc.co.uk

Report Issue Date: 06/12/2023

EXCELLENCE IN ENERGY ASSESSMENT

# CODE FOR SUSTAINABLE HOMES
## Calculation Type: New Build (As Designed)

| | | | |
|---|---|---|---|
| **Property Reference** | sc121835 | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling Part L 2021 |
| **Property** | Plot 4, Bitterne Parish Church, Whites Lane, Bitterne, Southampton, Hampshire , SO19 7NP | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 88 B | **DER** | 14.11 | **TER** | 24.58 |
| **Environmental** | 90 B | **% DER<TER** | 42.60 | | |
| **$CO_2$ Emissions (t/year)** | 0.86 | **DFEE** | 34.65 | **TFEE** | 45.09 |
| **General Requirements Compliance** | Pass | **% DFEE<TFEE** | 23.16 | | |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers, Surecalc Limited, Tel: 01243572695, mark@surecalc.co.uk | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Vivid Design Studio | | |

## ENE 1 - Dwelling Emission Rate calculation

| | | | |
|---|---|---|---|
| Total floor area | 81.4 | $m^2$ | |
| DER | 14.11 | $kgCO_2/yr/m^2$ | |
| TER | 24.58 | $kgCO_2/yr/m^2$ | |
| $CO_2$ emissions offset from additional allowable electricity generation | 0.00 | $kgCO_2/yr/m^2$ | (ZC7) |
| Residual $CO_2$ emissions offset from biofuel CHP | 0.00 | $kgCO_2/yr/m^2$ | (ZC5) |
| Total $CO_2$ emissions offset from SAP Section 16 allowances | 0.00 | $kgCO_2/yr/m^2$ | |
| DER accounting for SAP Section 16 allowances | 14.11 | $kgCO_2/yr/m^2$ | |
| Reduction DER/TER | 42.60 | % | |
| CfSH ENE1 credits achieved | 4.8 | | |
| CfSH ENE1 level achieved | 4 | | |

## ENE 2 – Fabric Energy Efficiency calculation

| | | | |
|---|---|---|---|
| Dwelling type | House, Mid-Terrace | | |
| Fabric energy efficiency (F.E.E.) | 34.65 | $kWh/m^2/yr$ | |
| CfSH ENE2 credits achieved | 8.1 | | |
| CfSH ENE1 and 2 overall level achieved | 4 | | |

## ENE 7 – Low and Zero Carbon Technologies calculation

**Standard case $CO_2$ emissions**

| | | | |
|---|---|---|---|
| Total floor area | 81.4 | $m^2$ | |
| DER | 17.79 | $kgCO_2/yr/m^2$ | |
| $CO_2$ emissions from electrical appliances | 16.19 | $kgCO_2/yr/m^2$ | (ZC2) |
| $CO_2$ emissions from cooking | 2.20 | $kgCO_2/yr/m^2$ | (ZC3) |
| Standard case total $CO_2$ emissions | 36.17 | $kgCO_2/yr/m^2$ | (ZC4) |
| Net Standard case $CO_2$ emissions | 36.17 | $kgCO_2/yr/m^2$ | (ZC8) |

**Actual case $CO_2$ emissions**

| | | | |
|---|---|---|---|
| DER | 17.66 | $kgCO_2/yr/m^2$ | |
| $CO_2$ emissions from electrical appliances | 16.19 | $kgCO_2/yr/m^2$ | (ZC2) |
| $CO_2$ emissions from cooking | 2.20 | $kgCO_2/yr/m^2$ | (ZC3) |
| Actual case total $CO_2$ emissions | 36.04 | $kgCO_2/yr/m^2$ | (ZC4) |
| $CO_2$ emissions from Biomass | 0.00 | $kgCO_2/yr/m^2$ | (ZC5) |
| $CO_2$ reduction from additional allowable electricity generation | 0.00 | $kgCO_2/yr/m^2$ | (ZC7) |
| Net Actual case $CO_2$ emissions | 36.04 | $kgCO_2/yr/m^2$ | (ZC8) |
| Improvement in net actual/net standard case $CO_2$ emissions | 0 | % | |



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| | |
|---|---|
| ENE7 credits achieved | 0 |



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

# Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Array SAP 10 program, Array

**Date:** Wed 06 Dec 2023 15:24:01

| Project Information | | | |
|---|---|---|---|
| Assessed By | Mark Rogers | Building Type | House, Mid-terrace |
| OCDEA Registration | EES/004179 | Assessment Date | 2023-12-06 |

| Dwelling Details | | | |
|---|---|---|---|
| Assessment Type | As designed | Total Floor Area | 81 $m^2$ |
| Site Reference | sc100231 P4 Bitterne Church | Plot Reference | 001 |
| Address | Bitterne Parish Church Plot 4 Whites Lane, Southampton, SO19 7NP | | |

| Client Details | |
|---|---|
| Name | Philip Dudley |
| Company | Vivid Design Studio |
| Address | NA, NA, NA |

**This report covers items included within the SAP calculations. It is not a complete report of regulations compliance.**

| 1a Target emission rate and dwelling emission rate | | |
|---|---|---|
| Fuel for main heating system | Electricity | |
| *Target carbon dioxide emission rate* | *10.08 $kgCO_2/m^2$* | |
| Dwelling carbon dioxide emission rate | 3.56 $kgCO_2/m^2$ | OK |
| **1b Target primary energy rate and dwelling primary energy** | | |
| *Target primary energy* | *52.5 $kWh_{PE}/m^2$* | |
| Dwelling primary energy | 37.3 $kWh_{PE}/m^2$ | OK |
| **1c Target fabric energy efficiency and dwelling fabric energy efficiency** | | |
| *Target fabric energy efficiency* | *30.3 $kWh/m^2$* | |
| Dwelling fabric energy efficiency | 28.3 $kWh/m^2$ | OK |

| 2a Fabric U-values | | | | |
|---|---|---|---|---|
| **Element** | ***Maximum permitted average U-Value [$W/m^2K$]*** | **Dwelling average U-Value [$W/m^2K$]** | **Element with highest individual U-Value** | |
| External walls | *0.26* | 0.22 | Walls (1) (0.22) | OK |
| Party walls | *0.2* | 0 | Party Wall (1) (0) | **N/A** |
| Curtain walls | *1.6* | 0 | N/A | **N/A** |
| Floors | *0.18* | 0.11 | Ground Floor (0.11) | OK |
| Roofs | *0.16* | 0.09 | Roof (1) (0.09) | OK |
| Windows, doors, and roof windows | *1.6* | 1.2 | Front South Door (1.2) | OK |
| Rooflights | *2.2* | N/A | N/A | **N/A** |

| 2b Envelope elements (better than typically expected values are flagged with a subsequent (!)) | | |
|---|---|---|
| **Name** | **Net area [$m^2$]** | **U-Value [$W/m^2K$]** |
| Exposed wall: Walls (1) | 32.95 | 0.22 |
| Party wall: Party Wall (1) | 94.34 | 0 **(!)** |
| Ground floor: Ground Floor, Ground Floor | 40.7 | 0.11 |
| Exposed roof: Roof (1) | 40.7 | 0.09 **(!)** |

| 2c Openings (better than typically expected values are flagged with a subsequent (!)) | | | | |
|---|---|---|---|---|
| **Name** | **Area [$m^2$]** | **Orientation** | **Frame factor** | **U-Value [$W/m^2K$]** |
| Front South Door, New Dwell Entrance Door | 2.01 | South | N/A | 1.2 |
| Front South Windows, New Dwelling DG Window | 4.18 | South | 0.7 | 1.2 |
| Rear North Windows, New Dwelling DG Window | 3.06 | North | 0.7 | 1.2 |
| Rear North Windows, New Dwell DG French Doors | 3.33 | North | 0.7 | 1.2 |

| 2d Thermal bridging (better than typically expected values are flagged with a subsequent (!)) |
|---|
| Building part **1 - Main Dwelling**: Thermal bridging calculated from linear thermal transmittances for each junction |

| Main element | Junction detail | Source | Psi value [W/mK] | Drawing / reference |
|---|---|---|---|---|
| External wall | E2: Other lintels (including other steel lintels) | Calculated by person with suitable expertise | 0.05 | IG or Keystone Hi Therm + |
| External wall | E3: Sill | Calculated by person with suitable expertise | 0.018 **(!)** | Recognised Construction Detail |
| External wall | E4: Jamb | Calculated by person with suitable expertise | 0.014 **(!)** | Recognised Construction Detail |
| External wall | E5: Ground floor (normal) | Calculated by person with suitable expertise | 0.068 | Recognised Construction Detail |
| External wall | E6: Intermediate floor within a dwelling | Calculated by person with suitable expertise | 0.001 **(!)** | Recognised Construction Detail |
| External wall | E10: Eaves (insulation at ceiling level) | Calculated by person with suitable expertise | 0.055 | Recognised Construction Detail |
| External wall | E18: Party wall between dwellings | Calculated by person with suitable expertise | 0.044 | Recognised Construction Detail |
| Party wall | P1: Ground floor | Calculated by person with suitable expertise | 0.103 | Recognised Construction Detail |
| Party wall | P2: Intermediate floor within a dwelling | SAP table default | 0 **(!)** | |
| Party wall | P4: Roof (insulation at ceiling level) | Calculated by person with suitable expertise | 0.101 | Recognised Construction Detail |

| 3 Air permeability (better than typically expected values are flagged with a subsequent (!)) | | |
|---|---|---|
| *Maximum permitted air permeability at 50Pa* | *8 $m^3/hm^2$* | |
| Dwelling air permeability at 50Pa | 5.05 $m^3/hm^2$, Design value | OK |
| Air permeability test certificate reference | | |

| 4 Space heating | |
|---|---|
| **Main heating system 1**: Heat pump with radiators or underfloor heating - Electricity | |
| Efficiency | 232.5% |
| Emitter type | Radiators |
| Flow temperature | 55°C |
| System type | Heat Pump |
| Manufacturer | Daikin Europe NV |
| Model | EDLA04EV3 |
| Commissioning | |
| **Secondary heating system**: N/A | |
| Fuel | N/A |
| Efficiency | N/A |
| Commissioning | |

| 5 Hot water | |
|---|---|
| **Cylinder/store** - type: Cylinder | |
| Capacity | 180 litres |
| Declared heat loss | 1.39 kWh/day |
| Primary pipework insulated | Yes |
| Manufacturer | |
| Model | |
| Commissioning | |
| **Waste water heat recovery system 1** - type: N/A | |
| Efficiency | |
| Manufacturer | |
| Model | |

| 6 Controls | | |
|---|---|---|
| **Main heating 1** - type: Time and temperature zone control by arrangement of plumbing and electrical services | | |
| Function | | |
| Ecodesign class | | |
| Manufacturer | | |
| Model | | |
| **Water heating** - type: Cylinder thermostat and HW separately timed | | |
| Manufacturer | | |
| Model | | |

| 7 Lighting | | |
|---|---|---|
| *Minimum permitted light source efficacy* | *75 lm/W* | |
| Lowest light source efficacy | 75 lm/W | **OK** |
| External lights control | N/A | |

| 8 Mechanical ventilation | | |
|---|---|---|
| **System type:** N/A | | |
| *Maximum permitted specific fan power* | *N/A* | |
| Specific fan power | N/A | **N/A** |
| *Minimum permitted heat recovery efficiency* | *N/A* | |
| Heat recovery efficiency | N/A | **N/A** |
| Manufacturer/Model | | |
| Commissioning | | |

| 9 Local generation |
|---|
| N/A |

| 10 Heat networks |
|---|
| N/A |

| 11 Supporting documentary evidence |
|---|
| N/A |

| 12 Declarations | |
|---|---|
| **a. Assessor Declaration** | |
| This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report. | |
| Signed:<br><br>Name: | Assessor ID:<br><br>Date: |
| **b. Client Declaration** | |
| N/A | |

# Predicted Energy Assessment

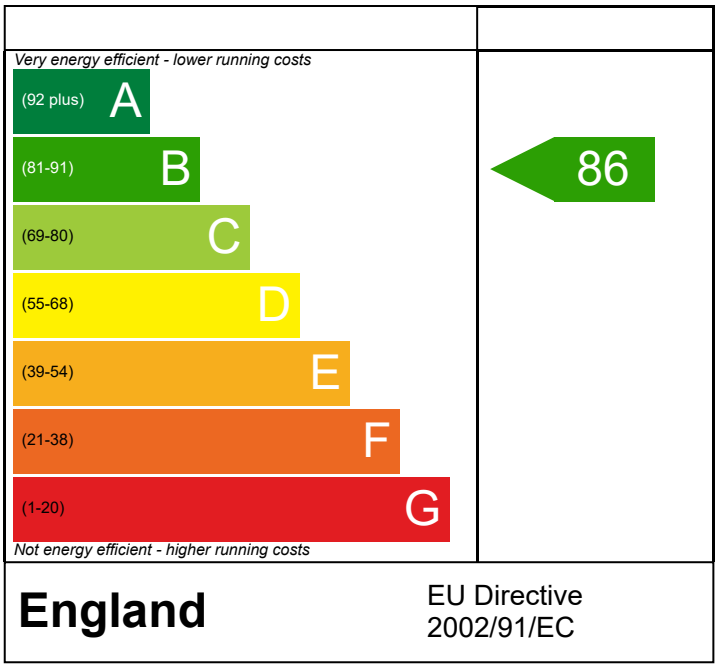
Plot 4, Bitterne Parish Church, Whites Lane,
Southampton, Hampshire , SO19 7NP

| | |
|---|---|
| Dwelling type: | House, Mid-Terrace |
| Date of assessment: | 06/12/2023 |
| Produced by: | Mark Rogers |
| Total floor area: | 81.4 m² |
| DRRN: | 7207-0026-6915 |

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

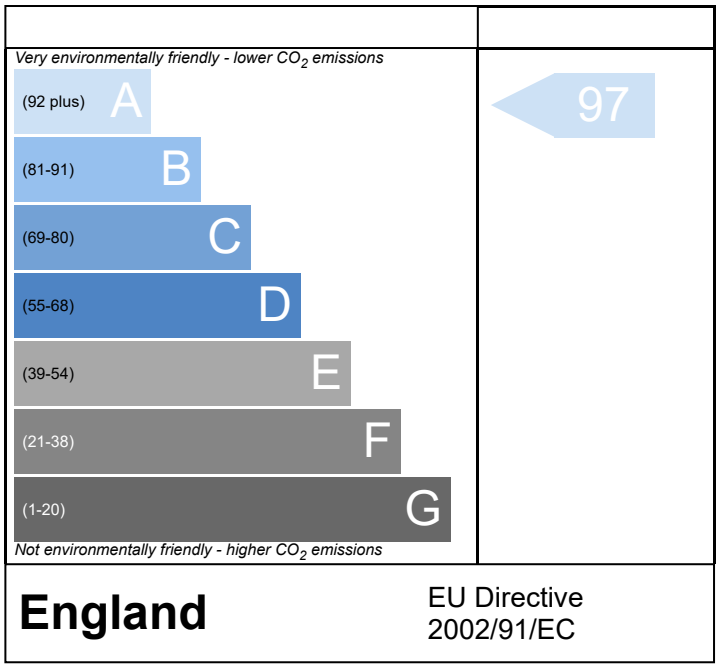
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

## Energy Efficiency Rating




The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

## Environmental Impact ($CO_2$) Rating




The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide ($CO_2$) emissions. The higher the rating the less impact it has on the environment.

# Summary for Input Data

elmhurst energy

| | | | |
|---|---|---|---|
| **Property Reference** | sc100231 P4 Bitterne Church | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling |
| **Property** | Plot 4, Bitterne Parish Church, Whites Lane, Southampton, Hampshire , SO19 7NP | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 86 B | **DER** | 3.56 | **TER** | 10.08 |
| **Environmental** | 97 A | **% DER < TER** | | | 64.68 |
| **$CO_2$ Emissions (t/year)** | 0.24 | **DFEE** | 28.25 | **TFEE** | 30.29 |
| **Compliance Check** | See BREL | **% DFEE < TFEE** | | | 6.74 |
| **% DPER < TPER** | 28.95 | **DPER** | 37.30 | **TPER** | 52.50 |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Philip Dudley | | |

## SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

| | |
|---|---|
| **Orientation** | South |
| **Property Tenture** | ND |
| **Transaction Type** | 6 |
| **Terrain Type** | Suburban |
| **1.0 Property Type** | House, Mid-Terrace |
| **2.0 Number of Storeys** | 2 |
| **3.0 Date Built** | 2023 |
| **4.0 Sheltered Sides** | 2 |
| **5.0 Sunlight/Shade** | Average or unknown |
| **6.0 Thermal Mass Parameter** | Precise calculation |
| **7.0 Electricity Tariff** | Standard |
| Smart electricity meter fitted | No |
| Smart gas meter fitted | No |

**7.0 Measurements**

| | Heat Loss Perimeter | Internal Floor Area | Average Storey Height |
|---|---|---|---|
| **Ground floor:** | 8.84 m | 40.70 m² | 2.39 m |
| **1st Storey:** | 8.84 m | 40.70 m² | 2.76 m |

**8.0 Living Area** 18.06 m²

**9.0 External Walls**

| Description | Type | Construction | U-Value (W/m²K) | Kappa (kJ/m²K) | Gross Area(m²) | Nett Area (m²) | Shelter Res | Shelter | Openings | Area Calculation Type |
|---|---|---|---|---|---|---|---|---|---|---|
| External Cavity Wall | Cavity Wall | Cavity wall; plasterboard on dabs or battens, lightweight aggregate block, filled cavity, any outside structure | 0.22 | 110.00 | 45.53 | 32.95 | 0.00 | None | 12.58 | Calculate Wall Area |

**9.1 Party Walls**

| Description | Type | Construction | U-Value (W/m²K) | Kappa (kJ/m²K) | Area (m²) | Shelter Res | Shelter |
|---|---|---|---|---|---|---|---|
| Party Wall | Filled Cavity with Edge Sealing | Single plasterboard on dabs both sides, lightweight aggregate blocks, cavity or cavity fill | 0.00 | 110.00 | 94.34 | | None |

**9.2 Internal Walls**

| Description | Construction | Kappa (kJ/m²K) | Area (m²) |
|---|---|---|---|
| Internal Stud Walls | Plasterboard on timber frame | 9.00 | 140.29 |

**10.0 External Roofs**

| Description | Type | Construction | U-Value (W/m²K) | Kappa (kJ/m²K) | Gross Area(m²) | Nett Area (m²) | Shelter Code | Shelter Factor | Calculation Type | Openings |
|---|---|---|---|---|---|---|---|---|---|---|
| External Pitched Roofs | External Plane Roof | Plasterboard, insulated at ceiling level | 0.09 | 9.00 | 40.70 | 40.70 | None | 0.00 | Calculate Wall Area | 0.00 |

**10.2 Internal Ceilings**

| Description | Storey | Construction | Area (m²) |
|---|---|---|---|
| Internal Ceiling | Lowest occupied | Plasterboard ceiling, carpeted chipboard floor | 40.70 |

**11.0 Heat Loss Floors**

| Description | Type | Storey Index | Construction | U-Value (W/m²K) | Shelter Code | Shelter Factor | Kappa (kJ/m²K) | Area (m²) |
|---|---|---|---|---|---|---|---|---|
| Ground Floor | Ground Floor - Solid | Lowest occupied | Suspended concrete floor, carpeted | 0.11 | None | 0.00 | 75.00 | 40.70 |

# Summary for Input Data

elmhurst energy

**11.2 Internal Floors**

| Description | Storey Index | Construction | Kappa (kJ/m²K) | Area (m²) |
|---|---|---|---|---|
| Internal Floor | | Plasterboard ceiling, carpeted chipboard floor | 9.00 | 40.70 |

**12.0 Opening Types**

| Description | Data Source | Type | Glazing | Glazing Gap | Filling Type | G-value | Frame Type | Frame Factor | U Value (W/m²K) |
|---|---|---|---|---|---|---|---|---|---|
| New Dwell Entrance Door | Manufacturer | Half Glazed Door | Double Low-E Soft 0.05 | | | 0.36 | | 0.70 | 1.20 |
| New Dwell DG French Doors | Manufacturer | Window | Double Low-E Soft 0.05 | | | 0.71 | | 0.70 | 1.20 |
| New Dwelling DG Window | Manufacturer | Window | Double Low-E Soft 0.05 | | | 0.71 | | 0.70 | 1.20 |

**13.0 Openings**

| Name | Opening Type | Location | Orientation | Area (m²) | Pitch |
|---|---|---|---|---|---|
| Front South Door | New Dwell Entrance Door | External Cavity Wall | South | 2.01 | |
| Front South Windows | New Dwelling DG Window | External Cavity Wall | South | 4.18 | |
| Rear North Windows | New Dwelling DG Window | External Cavity Wall | North | 3.06 | |
| Rear North Windows | New Dwell DG French Doors | External Cavity Wall | North | 3.33 | |

| | | |
|---|---|---|
| **14.0 Conservatory** | None | |
| **15.0 Draught Proofing** | 100 | % |
| **16.0 Draught Lobby** | No | |

| | | |
|---|---|---|
| **17.0 Thermal Bridging** | Calculate Bridges | |

**17.1 List of Bridges**

| Bridge Type | Source Type | Length | Psi | Adjusted | Reference: | Imported |
|---|---|---|---|---|---|---|
| E2 Other lintels (including other steel lintels) | Independently assessed | 8.74 | 0.05 | 0.05 | IG or Keystone Hi Therm + | No |
| E3 Sill | Independently assessed | 7.78 | 0.02 | 0.02 | Recognised Construction Detail | No |
| E4 Jamb | Independently assessed | 22.20 | 0.01 | 0.01 | Recognised Construction Detail | No |
| E5 Ground floor (normal) | Independently assessed | 8.84 | 0.07 | 0.07 | Recognised Construction Detail | No |
| E6 Intermediate floor within a dwelling | Independently assessed | 8.84 | 0.00 | 0.00 | Recognised Construction Detail | No |
| E10 Eaves (insulation at ceiling level) | Independently assessed | 8.84 | 0.06 | 0.06 | Recognised Construction Detail | No |
| E18 Party wall between dwellings | Independently assessed | 20.60 | 0.04 | 0.04 | Recognised Construction Detail | No |
| P1 Party wall - Ground floor | Independently assessed | 18.32 | 0.10 | 0.10 | Recognised Construction Detail | No |
| P2 Party wall - Intermediate floor within a dwelling | Table K1 - Default | 18.32 | 0.00 | 0.00 | | No |
| P4 Party wall - Roof (insulation at ceiling level) | Independently assessed | 18.32 | 0.10 | 0.10 | Recognised Construction Detail | No |

| | | |
|---|---|---|
| Y-value | 0.00 | W/m²K |

| | | |
|---|---|---|
| **18.0 Pressure Testing** | Yes | |
| Designed $AP_{50}$ | 5.05 | m³/(h.m²) @ 50 Pa |
| Test Method | Blower Door | |

**19.0 Mechanical Ventilation**

**Mechanical Ventilation**

| | | |
|---|---|---|
| Mechanical Ventilation System Present | No | |

**20.0 Fans, Open Fireplaces, Flues**

| | | |
|---|---|---|
| **21.0 Fixed Cooling System** | No | |

**22.0 Lighting**

| | | |
|---|---|---|
| No Fixed Lighting | No | |

| Name | Efficacy | Power | Capacity | Count |
|---|---|---|---|---|
| Low energy Lighting | 75.00 | 15 | 1125 | 24 |

| | | |
|---|---|---|
| **24.0 Main Heating 1** | Database | |
| Description | Electric Air Source Heat Pump | |
| Percentage of Heat | 100.00 | % |
| Database Ref. No. | 106465 | |
| Fuel Type | Electricity | |
| In Winter | 0.00 | |
| In Summer | 0.00 | |
| Model Name | EDLA04EV3 | |
| Manufacturer | Daikin Europe NV | |
| System Type | Heat Pump | |
| Controls SAP Code | 2207 | |
| PCDF Controls | 0 | |

# Summary for Input Data

elmhurst energy

| | |
|---|---|
| Is MHS Pumped | Pump in heated space |
| Heating Pump Age | 2013 or later |
| Heat Emitter | Radiators |
| Flow Temperature | Enter value |
| Flow Temperature Value | 55.00 |

**25.0 Main Heating 2** — None

**26.0 Heat Networks** — None

| | Heat Source | Fuel Type | Heating Use | Efficiency | Percentage Of Heat | Heat | Heat Power Ratio | Electrical | Fuel Factor | Efficiency type |
|---|---|---|---|---|---|---|---|---|---|---|
| Heat source 1 | | | | | | | | | | |
| Heat source 2 | | | | | | | | | | |
| Heat source 3 | | | | | | | | | | |
| Heat source 4 | | | | | | | | | | |
| Heat source 5 | | | | | | | | | | |

**28.0 Water Heating**

| | |
|---|---|
| Water Heating | Main Heating 1 |
| SAP Code | 901 |
| Flue Gas Heat Recovery System | No |
| Waste Water Heat Recovery Instantaneous System 1 | No |
| Waste Water Heat Recovery Instantaneous System 2 | No |
| Waste Water Heat Recovery Storage System | No |
| Solar Panel | No |
| Water use <= 125 litres/person/day | Yes |
| Cold Water Source | From mains |
| Bath Count | 1 |
| Immersion Only Heating Hot Water | No |

**28.1 Showers**

| Description | Shower Type | Flow Rate [l/min] | Rated Power [kW] | Connected | Connected To |
|---|---|---|---|---|---|

**28.3 Waste Water Heat Recovery System**

| | | |
|---|---|---|
| **29.0 Hot Water Cylinder** | Hot Water Cylinder | |
| Cylinder Stat | Yes | |
| Cylinder In Heated Space | Yes | |
| Independent Time Control | Yes | |
| Insulation Type | Measured Loss | |
| Cylinder Volume | 180.00 | L |
| Loss | 1.39 | kWh/day |
| Pipes insulation | Fully insulated primary pipework | |
| In Airing Cupboard | No | |

**31.0 Thermal Store** — None

**Recommendations**

**Lower cost measures**

**None**

**Further measures to achieve even higher standards**

| | Typical Cost | Typical savings per year | Ratings after improvement SAP rating | Environmental Impact |
|---|---|---|---|---|
| | £4,000 - £6,000 | £46 | B 87 | A 97 |
| | £3,500 - £5,500 | £186 | A 93 | A 98 |
| | | | 0 | 0 |

# Thermal Bridging

elmhurst energy

| | | | |
|---|---|---|---|
| **Property Reference** | sc100231 P4 Bitterne Church | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | Mid-Terrace House |
| **Property** | Plot 4, Bitterne Parish Church, Whites Lane, Southampton, Hampshire , SO19 7NP | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 86 B | **DER** | 3.56 | **TER** | 10.08 |
| **Environmental** | 97 A | **% DER < TER** | | | 64.68 |
| **$CO_2$ Emissions (t/year)** | 0.24 | **DFEE** | 28.25 | **TFEE** | 30.29 |
| **Compliance Check** | See BREL | **% DFEE < TFEE** | | | 6.74 |
| **% DPER < TPER** | 28.95 | **DPER** | 37.30 | **TPER** | 52.50 |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Philip Dudley | | |

| | Junction details | Source Type | Psi (W/mK) | Length (m) | Result | Reference |
|---|---|---|---|---|---|---|
| External wall | E2 Other lintels (including other steel lintels) | Independently assessed | 0.050 | 8.74 | 0.44 | IG or Keystone Hi Therm + |
| External wall | E3 Sill | Independently assessed | 0.018 | 7.78 | 0.14 | Recognised Construction Detail |
| External wall | E4 Jamb | Independently assessed | 0.014 | 22.20 | 0.31 | Recognised Construction Detail |
| External wall | E5 Ground floor (normal) | Independently assessed | 0.068 | 8.84 | 0.60 | Recognised Construction Detail |
| External wall | E6 Intermediate floor within a dwelling | Independently assessed | 0.001 | 8.84 | 0.01 | Recognised Construction Detail |
| External wall | E10 Eaves (insulation at ceiling level) | Independently assessed | 0.055 | 8.84 | 0.49 | Recognised Construction Detail |
| External wall | E18 Party wall between dwellings | Independently assessed | 0.044 | 20.60 | 0.91 | Recognised Construction Detail |
| Party wall | P1 Party wall - Ground floor | Independently assessed | 0.103 | 18.32 | 1.89 | Recognised Construction Detail |
| Party wall | P2 Party wall - Intermediate floor within a dwelling | Table K1 - Default | 0.000 | 18.32 | 0.00 | |
| Party wall | P4 Party wall - Roof (insulation at ceiling level) | Independently assessed | 0.101 | 18.32 | 1.85 | Recognised Construction Detail |

Total: 140.80 W/mK:

Y-Value: 0.00 W/m²K:

# U-VALUE CALCULATOR REPORT

| | | | |
|---|---|---|---|
| **Property Reference** | sc121835 | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling Part L 2021 |
| **Project** | Plot 4, Bitterne Parish Church, Whites Lane, Bitterne, Southampton, Hampshire , SO19 7NP | | |
| **Calculation Type** | New Build (As Designed) | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 88 B | **DER** | 14.11 | **TER** | 24.58 |
| **Environmental** | 90 B | **% DER<TER** | 42.60 | | |
| **$CO_2$ Emissions (t/year)** | 0.86 | **DFEE** | 34.65 | **TFEE** | 45.09 |
| **General Requirements Compliance** | Pass | **% DFEE<TFEE** | 23.16 | | |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers, Surecalc Limited, Tel: 01243572695, mark@surecalc.co.uk | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Vivid Design Studio | | |

## Building Elements

### Roof 000002 - Pitched Roof Insulated Ceiling Vivid

**Roof Type: Pitched Roof, insulated flat ceiling**

| Layer | Description | Thickness (mm) | Conductivity (W/m²K) | Resistance (m²K/W) | Fraction (%) |
|---|---|---|---|---|---|
| **Ext surface** | | | | 0.0400 | |
| **Layer 1** | **Loft Space** | | | | |
| | Main construction | 0 | 0.0600 | 0.0600 | 100.00 |
| **Layer 2** | **Mineral wool** | | | | |
| | Main construction | 350 | 0.0440 | 7.9545 | 100.00 |
| | Corrections - Air Gap: Level 0, Fasteners: None or plastic | | | | |
| **Layer 3** | **Mineral wool quilt** | | | | |
| | Main construction | 150 | 0.0440 | 3.4091 | 93.67 |
| | Main construction | 150 | 0.1300 | 1.1538 | 6.33 |
| | Corrections - Air Gap: Level 0, Fasteners: None or plastic | | | | |
| **Layer 4** | **Plasterboard, standard** | | | | |
| | Main construction | 12.5 | 0.2100 | 0.0595 | 100.00 |
| **Int surface** | | | | 0.1000 | |

**Total resistance:** **Upper limit =** 11.449 m² K/W **Lower limit =** 11.248 m² K/W **Average =** 11.348 m² K/W

**Total correction =** 0.0030 m² K/W **U-value (unrounded) =** 0.09 W/m² K

**Unheated space:** None

**Total thickness: 513 mm** **U-value: 0.09 W/m² K** **Kappa: n/a**



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

# U-VALUE CALCULATOR REPORT

| | | | |
|---|---|---|---|
| **Property Reference** | sc121835 | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling Part L 2021 |
| **Project** | Plot 4, Bitterne Parish Church, Whites Lane, Bitterne, Southampton, Hampshire , SO19 7NP | | |
| **Calculation Type** | New Build (As Designed) | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 88 B | **DER** | 14.11 | **TER** | 24.58 |
| **Environmental** | 90 B | **% DER<TER** | 42.60 | | |
| **$CO_2$ Emissions (t/year)** | 0.86 | **DFEE** | 34.65 | **TFEE** | 45.09 |
| **General Requirements Compliance** | Pass | **% DFEE<TFEE** | 23.16 | | |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers, Surecalc Limited, Tel: 01243572695, mark@surecalc.co.uk | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Vivid Design Studio | | |

## Building Elements

### Wall 000001 - Vivid Cavity Wall 125 Knauf Supafil 34

**Wall Type: Standard Wall**

| Layer | Description | Thickness (mm) | Conductivity (W/m²K) | Resistance (m²K/W) | Fraction (%) |
|---|---|---|---|---|---|
| **Ext surface** | | | | 0.0400 | |
| **Layer 1** | **Brick, outer leaf** | | | | |
| | Main construction | 102 | 0.7700 | 0.1325 | 82.81 |
| | Main construction | 102 | 0.9407 | 0.1084 | 17.19 |
| **Layer 2** | **Knauf Supafil 34 blown Cavity Fill** | | | | |
| | Main construction | 125 | 0.0340 | 3.6765 | 100.00 |
| | Corrections - Air Gap: Level 0, Fasteners: Wall ties, Cross sectional area: 12.50 mm², Lambda: 17.000 W/m.K, per m²: 2.500 | | | | |
| **Layer 3** | **Masterblock Masterlite Ultra** | | | | |
| | Main construction | 100 | 0.2700 | 0.3704 | 93.43 |
| | Main construction | 100 | 0.8803 | 0.1136 | 6.57 |
| **Layer 4** | **airspace/plaster dabs** | | | | |
| | Main construction | 15 | 0.1000 | 0.1500 | 80.00 |
| | Main construction | 15 | 0.0882 | 0.1700 | 20.00 |
| | Corrections - Cavity Unventilated, Emissivity: Normal | | | | |
| **Layer 5** | **Plasterboard, standard** | | | | |
| | Main construction | 12.5 | 0.2100 | 0.0595 | 100.00 |
| **Int surface** | | | | 0.1300 | |

**Total resistance:** **Upper limit =** 4.541 m² K/W **Lower limit =** 4.510 m² K/W **Average =** 4.525 m² K/W

**Total correction =** 0.0018 m² K/W **U-value (unrounded) =** 0.22 W/m² K

**Unheated space:** None

**Total thickness: 355 mm** **U-value: 0.22 W/m² K** **Kappa: n/a**



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

# U-VALUE CALCULATOR REPORT

| | | | |
|---|---|---|---|
| **Property Reference** | sc121835 | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling Part L 2021 |
| **Project** | Plot 4, Bitterne Parish Church, Whites Lane, Bitterne, Southampton, Hampshire , SO19 7NP | | |
| **Calculation Type** | New Build (As Designed) | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 88 B | **DER** | 14.11 | **TER** | 24.58 |
| **Environmental** | 90 B | **% DER<TER** | 42.60 | | |
| **$CO_2$ Emissions (t/year)** | 0.86 | **DFEE** | 34.65 | **TFEE** | 45.09 |
| **General Requirements Compliance** | Pass | **% DFEE<TFEE** | 23.16 | | |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers, Surecalc Limited, Tel: 01243572695, mark@surecalc.co.uk | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Vivid Design Studio | | |

## Building Elements

### Floor 000003 - Ground Floor Beam and Block

**Floor Type: Suspended Floor**
**Area = 40.70 m², Perimeter = 18.02 m, Wall thickness = 300.00 mm, Soil: Unknown**
**Depth of underfloor space below ground:0.200 m  Floor wind shielding: Average (suburban)**
**Floor height above ground:h = 0.150 m**
**U-value of walls above ground:Uw = 0.220 m**
**Ventilation openings per perimeter length:e = 0.0015 %**
**Mean wind speed:v = 5.000 m/s**
**Resistance on solum:Rg = 0.000 m²K/W**

| Layer | Description | Thickness (mm) | Conductivity (W/m²K) | Resistance (m²K/W) | Fraction (%) |
|---|---|---|---|---|---|
| **Ext surface** | | | | 0.1700 | |
| **Layer 1** | **Blockwork** | | | | |
| | Main construction | 100 | 0.1900 | 0.5263 | 90.91 |
| | Main construction | 100 | 1.0000 | 0.1000 | 9.09 |
| **Layer 2** | **Mannok Therm Floor** | | | | |
| | Main construction | 150 | 0.0220 | 6.8182 | 100.00 |
| | Corrections - Air Gap: Level 1, Fasteners: None or plastic | | | | |
| **Layer 3** | **Screed** | | | | |
| | Main construction | 75 | 1.1500 | 0.0652 | 100.00 |
| **Int surface** | | | | 0.1700 | |

**Total resistance:** **Upper limit =** 7.709 m² K/W **Lower limit =** 7.603 m² K/W **Average =** 7.656 m² K/W

**Total correction =** 0.0079 m² K/W **U-value (unrounded) =** 0.11 W/m² K

**Unheated space:** None

**Total thickness: 325 mm** **U-value: 0.11 W/m² K** **Kappa: n/a**



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

elmhurst energy

# SAP Report Submission for Building Regulations Compliance

Client: Vivid Design Studio

Project: Plot 5, Bitterne Parish Church, Whites Lane
Bitterne, Southampton, Hampshire , SO19 7NP

Contact: Mark Rogers
Surecalc Limited
mark@surecalc.co.uk

Report Issue Date: 06/12/2023

EXCELLENCE IN ENERGY ASSESSMENT

# CODE FOR SUSTAINABLE HOMES
## Calculation Type: New Build (As Designed)

| | | | |
|---|---|---|---|
| **Property Reference** | sc121836 | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling Part L 2021 |
| **Property** | Plot 5, Bitterne Parish Church, Whites Lane, Bitterne, Southampton, Hampshire , SO19 7NP | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 88 B | **DER** | 14.78 | **TER** | 26.82 |
| **Environmental** | 89 B | **% DER<TER** | 44.90 | | |
| **$CO_2$ Emissions (t/year)** | 0.92 | **DFEE** | 41.65 | **TFEE** | 53.26 |
| **General Requirements Compliance** | Pass | **% DFEE<TFEE** | 21.80 | | |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers, Surecalc Limited, Tel: 01243572695, mark@surecalc.co.uk | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Vivid Design Studio | | |

## ENE 1 - Dwelling Emission Rate calculation

| | | | |
|---|---|---|---|
| Total floor area | 81.4 | $m^2$ | |
| DER | 14.78 | $kgCO_2/yr/m^2$ | |
| TER | 26.82 | $kgCO_2/yr/m^2$ | |
| $CO_2$ emissions offset from additional allowable electricity generation | 0.00 | $kgCO_2/yr/m^2$ | (ZC7) |
| Residual $CO_2$ emissions offset from biofuel CHP | 0.00 | $kgCO_2/yr/m^2$ | (ZC5) |
| Total $CO_2$ emissions offset from SAP Section 16 allowances | 0.00 | $kgCO_2/yr/m^2$ | |
| DER accounting for SAP Section 16 allowances | 14.78 | $kgCO_2/yr/m^2$ | |
| Reduction DER/TER | 44.90 | % | |
| CfSH ENE1 credits achieved | 5.0 | | |
| CfSH ENE1 level achieved | 4 | | |

## ENE 2 – Fabric Energy Efficiency calculation

| | | | |
|---|---|---|---|
| Dwelling type | House, End-Terrace | | |
| Fabric energy efficiency (F.E.E.) | 41.65 | $kWh/m^2/yr$ | |
| CfSH ENE2 credits achieved | 8.1 | | |
| CfSH ENE1 and 2 overall level achieved | 4 | | |

## ENE 7 – Low and Zero Carbon Technologies calculation

**Standard case $CO_2$ emissions**

| | | | |
|---|---|---|---|
| Total floor area | 81.4 | $m^2$ | |
| DER | 19.55 | $kgCO_2/yr/m^2$ | |
| $CO_2$ emissions from electrical appliances | 16.19 | $kgCO_2/yr/m^2$ | (ZC2) |
| $CO_2$ emissions from cooking | 2.20 | $kgCO_2/yr/m^2$ | (ZC3) |
| Standard case total $CO_2$ emissions | 37.93 | $kgCO_2/yr/m^2$ | (ZC4) |
| Net Standard case $CO_2$ emissions | 37.93 | $kgCO_2/yr/m^2$ | (ZC8) |

**Actual case $CO_2$ emissions**

| | | | |
|---|---|---|---|
| DER | 18.37 | $kgCO_2/yr/m^2$ | |
| $CO_2$ emissions from electrical appliances | 16.19 | $kgCO_2/yr/m^2$ | (ZC2) |
| $CO_2$ emissions from cooking | 2.20 | $kgCO_2/yr/m^2$ | (ZC3) |
| Actual case total $CO_2$ emissions | 36.75 | $kgCO_2/yr/m^2$ | (ZC4) |
| $CO_2$ emissions from Biomass | 0.00 | $kgCO_2/yr/m^2$ | (ZC5) |
| $CO_2$ reduction from additional allowable electricity generation | 0.00 | $kgCO_2/yr/m^2$ | (ZC7) |
| Net Actual case $CO_2$ emissions | 36.75 | $kgCO_2/yr/m^2$ | (ZC8) |
| Improvement in net actual/net standard case $CO_2$ emissions | 3 | % | |



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

| | |
|---|---|
| ENE7 credits achieved | 0 |



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

# Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Array SAP 10 program, Array

**Date:** Wed 06 Dec 2023 15:25:08

| Project Information | | | |
|---|---|---|---|
| Assessed By | Mark Rogers | Building Type | House, End-terrace |
| OCDEA Registration | EES/004179 | Assessment Date | 2023-12-06 |

| Dwelling Details | | | |
|---|---|---|---|
| Assessment Type | As designed | Total Floor Area | 81 $m^2$ |
| Site Reference | sc100232 P5 Bitterne Church | Plot Reference | 001 |
| Address | Bitterne Parish Church Plot 5 Whites Lane, Southampton, SO19 7NP | | |

| Client Details | |
|---|---|
| Name | Philip Dudley |
| Company | Vivid Design Studio |
| Address | NA, NA, NA |

**This report covers items included within the SAP calculations. It is not a complete report of regulations compliance.**

| 1a Target emission rate and dwelling emission rate | | |
|---|---|---|
| Fuel for main heating system | Electricity | |
| *Target carbon dioxide emission rate* | *11.53 $kgCO_2/m^2$* | |
| Dwelling carbon dioxide emission rate | 4.01 $kgCO_2/m^2$ | OK |
| **1b Target primary energy rate and dwelling primary energy** | | |
| *Target primary energy* | *60.25 $kWh_{PE}/m^2$* | |
| Dwelling primary energy | 41.84 $kWh_{PE}/m^2$ | OK |
| **1c Target fabric energy efficiency and dwelling fabric energy efficiency** | | |
| *Target fabric energy efficiency* | *37.3 $kWh/m^2$* | |
| Dwelling fabric energy efficiency | 35.4 $kWh/m^2$ | OK |

| 2a Fabric U-values | | | | |
|---|---|---|---|---|
| **Element** | ***Maximum permitted average U-Value [$W/m^2K$]*** | **Dwelling average U-Value [$W/m^2K$]** | **Element with highest individual U-Value** | |
| External walls | *0.26* | 0.22 | Walls (1) (0.22) | OK |
| Party walls | *0.2* | 0 | Party Wall (1) (0) | **N/A** |
| Curtain walls | *1.6* | 0 | N/A | **N/A** |
| Floors | *0.18* | 0.11 | Ground Floor (0.11) | OK |
| Roofs | *0.16* | 0.09 | Roof (1) (0.09) | OK |
| Windows, doors, and roof windows | *1.6* | 1.2 | Front South Door (1.2) | OK |
| Rooflights | *2.2* | N/A | N/A | **N/A** |

| 2b Envelope elements (better than typically expected values are flagged with a subsequent (!)) | | |
|---|---|---|
| **Name** | **Net area [$m^2$]** | **U-Value [$W/m^2K$]** |
| Exposed wall: Walls (1) | 78.06 | 0.22 |
| Party wall: Party Wall (1) | 47.17 | 0 **(!)** |
| Ground floor: Ground Floor, Ground Floor | 40.7 | 0.11 |
| Exposed roof: Roof (1) | 40.7 | 0.09 **(!)** |

| 2c Openings (better than typically expected values are flagged with a subsequent (!)) | | | | |
|---|---|---|---|---|
| **Name** | **Area [$m^2$]** | **Orientation** | **Frame factor** | **U-Value [$W/m^2K$]** |
| Front South Door, New Dwell Entrance Door | 2.01 | South | N/A | 1.2 |
| Front South Windows, New Dwelling DG Window | 4.18 | South | 0.7 | 1.2 |
| Side West Windows, New Dwelling DG Window | 2.16 | West | 0.7 | 1.2 |
| Rear North Windows, New Dwelling DG Window | 3.06 | North | 0.7 | 1.2 |
| Rear North Windows, New Dwell DG French Doors | 3.33 | North | 0.7 | 1.2 |

| 2d Thermal bridging (better than typically expected values are flagged with a subsequent (!)) |
|---|
| Building part **1 - Main Dwelling**: Thermal bridging calculated from linear thermal transmittances for each junction |

| Main element | Junction detail | Source | Psi value [W/mK] | Drawing / reference |
|---|---|---|---|---|
| External wall | E2: Other lintels (including other steel lintels) | Calculated by person with suitable expertise | 0.05 | IG or Keystone Hi Therm + |
| External wall | E3: Sill | Calculated by person with suitable expertise | 0.018 **(!)** | Recognised Construction Detail |
| External wall | E4: Jamb | Calculated by person with suitable expertise | 0.014 **(!)** | Recognised Construction Detail |
| External wall | E5: Ground floor (normal) | Calculated by person with suitable expertise | 0.068 | Recognised Construction Detail |
| External wall | E6: Intermediate floor within a dwelling | Calculated by person with suitable expertise | 0.001 **(!)** | Recognised Construction Detail |
| External wall | E10: Eaves (insulation at ceiling level) | Calculated by person with suitable expertise | 0.055 | Recognised Construction Detail |
| External wall | E16: Corner (normal) | Calculated by person with suitable expertise | 0.051 | Recognised Construction Detail |
| External wall | E18: Party wall between dwellings | Calculated by person with suitable expertise | 0.044 | Recognised Construction Detail |
| Party wall | P1: Ground floor | Calculated by person with suitable expertise | 0.103 | Recognised Construction Detail |
| Party wall | P2: Intermediate floor within a dwelling | SAP table default | 0 **(!)** | |
| Party wall | P4: Roof (insulation at ceiling level) | Calculated by person with suitable expertise | 0.101 | Recognised Construction Detail |

| 3 Air permeability (better than typically expected values are flagged with a subsequent (!)) | | |
|---|---|---|
| *Maximum permitted air permeability at 50Pa* | *8 $m^3/hm^2$* | |
| Dwelling air permeability at 50Pa | 5.05 $m^3/hm^2$, Design value | OK |
| Air permeability test certificate reference | | |

| 4 Space heating | |
|---|---|
| **Main heating system 1**: Heat pump with radiators or underfloor heating - Electricity | |
| Efficiency | 232.4% |
| Emitter type | Radiators |
| Flow temperature | 55°C |
| System type | Heat Pump |
| Manufacturer | Daikin Europe NV |
| Model | EDLA04EV3 |
| Commissioning | |
| **Secondary heating system**: N/A | |
| Fuel | N/A |
| Efficiency | N/A |
| Commissioning | |

| 5 Hot water | |
|---|---|
| **Cylinder/store** - type: Cylinder | |
| Capacity | 180 litres |
| Declared heat loss | 1.39 kWh/day |
| Primary pipework insulated | Yes |
| Manufacturer | |
| Model | |
| Commissioning | |
| **Waste water heat recovery system 1** - type: N/A | |
| Efficiency | |
| Manufacturer | |
| Model | |

| 6 Controls | | |
|---|---|---|
| **Main heating 1** - type: Time and temperature zone control by arrangement of plumbing and electrical services | | |
| Function | | |
| Ecodesign class | | |
| Manufacturer | | |
| Model | | |
| **Water heating** - type: Cylinder thermostat and HW separately timed | | |
| Manufacturer | | |
| Model | | |

| 7 Lighting | | |
|---|---|---|
| *Minimum permitted light source efficacy* | *75 lm/W* | |
| Lowest light source efficacy | 75 lm/W | **OK** |
| External lights control | N/A | |

| 8 Mechanical ventilation | | |
|---|---|---|
| **System type:** N/A | | |
| *Maximum permitted specific fan power* | *N/A* | |
| Specific fan power | N/A | **N/A** |
| *Minimum permitted heat recovery efficiency* | *N/A* | |
| Heat recovery efficiency | N/A | **N/A** |
| Manufacturer/Model | | |
| Commissioning | | |

| 9 Local generation |
|---|
| N/A |

| 10 Heat networks |
|---|
| N/A |

| 11 Supporting documentary evidence |
|---|
| N/A |

| 12 Declarations | |
|---|---|
| **a. Assessor Declaration** | |
| This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report. | |
| Signed:<br><br>Name: | Assessor ID:<br><br>Date: |
| **b. Client Declaration** | |
| N/A | |

# Predicted Energy Assessment

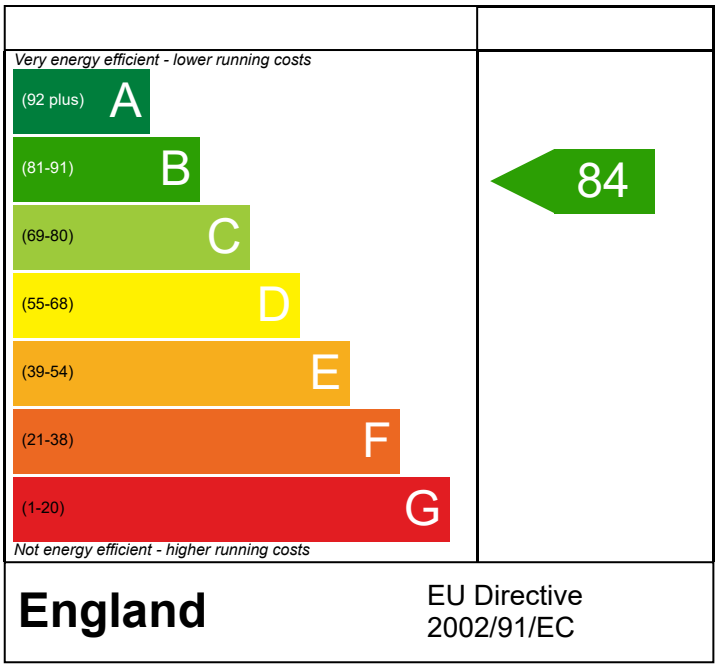
Plot 5, Bitterne Parish Church, Whites Lane,
Southampton, Hampshire , SO19 7NP

| | |
|---|---|
| Dwelling type: | House, End-Terrace |
| Date of assessment: | 06/12/2023 |
| Produced by: | Mark Rogers |
| Total floor area: | 81.4 m² |
| DRRN: | 3952-4246-7033 |

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

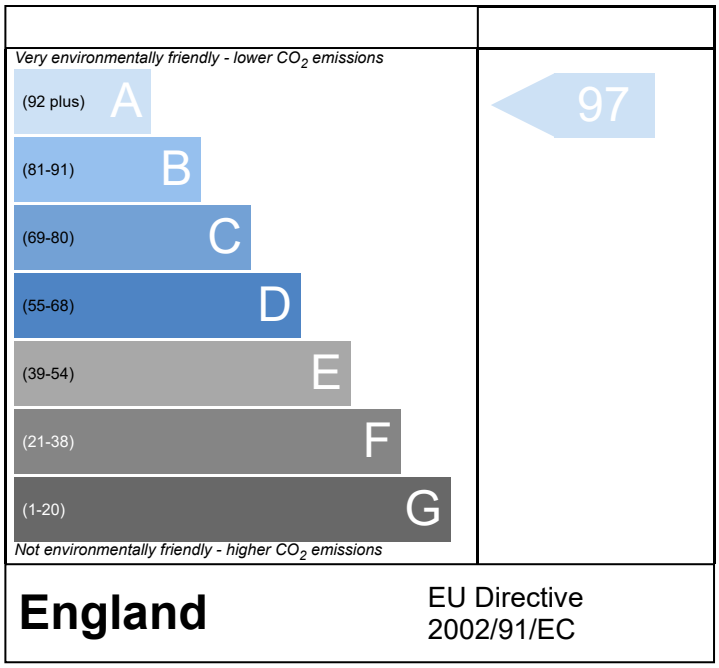
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

## Energy Efficiency Rating




The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

## Environmental Impact ($CO_2$) Rating




The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide ($CO_2$) emissions. The higher the rating the less impact it has on the environment.

# Summary for Input Data

elmhurst energy

| | | | |
|---|---|---|---|
| **Property Reference** | sc100232 P5 Bitterne Church | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling |
| **Property** | Plot 5, Bitterne Parish Church, Whites Lane, Southampton, Hampshire , SO19 7NP | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 84 B | **DER** | 4.01 | **TER** | 11.53 |
| **Environmental** | 97 A | **% DER < TER** | | | 65.22 |
| **$CO_2$ Emissions (t/year)** | 0.27 | **DFEE** | 35.37 | **TFEE** | 37.29 |
| **Compliance Check** | See BREL | **% DFEE < TFEE** | | | 5.16 |
| **% DPER < TPER** | 30.55 | **DPER** | 41.84 | **TPER** | 60.25 |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Philip Dudley | | |

## SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

| | |
|---|---|
| **Orientation** | South |
| **Property Tenture** | ND |
| **Transaction Type** | 6 |
| **Terrain Type** | Suburban |
| **1.0 Property Type** | House, End-Terrace |
| **2.0 Number of Storeys** | 2 |
| **3.0 Date Built** | 2023 |
| **4.0 Sheltered Sides** | 2 |
| **5.0 Sunlight/Shade** | Average or unknown |
| **6.0 Thermal Mass Parameter** | Precise calculation |
| **7.0 Electricity Tariff** | Standard |
| Smart electricity meter fitted | No |
| Smart gas meter fitted | No |

**7.0 Measurements**

| | Heat Loss Perimeter | Internal Floor Area | Average Storey Height |
|---|---|---|---|
| **Ground floor:** | 18.02 m | 40.70 m² | 2.39 m |
| **1st Storey:** | 18.02 m | 40.70 m² | 2.76 m |

**8.0 Living Area** 18.06 m²

**9.0 External Walls**

| Description | Type | Construction | U-Value (W/m²K) | Kappa (kJ/m²K) | Gross Area(m²) | Nett Area (m²) | Shelter Res | Shelter | Openings | Area Calculation Type |
|---|---|---|---|---|---|---|---|---|---|---|
| External Cavity Wall | Cavity Wall | Cavity wall; plasterboard on dabs or battens, lightweight aggregate block, filled cavity, any outside structure | 0.22 | 110.00 | 92.80 | 78.06 | 0.00 | None | 14.74 | Calculate Wall Area |

**9.1 Party Walls**

| Description | Type | Construction | U-Value (W/m²K) | Kappa (kJ/m²K) | Area (m²) | Shelter Res | Shelter |
|---|---|---|---|---|---|---|---|
| Party Wall | Filled Cavity with Edge Sealing | Single plasterboard on dabs both sides, lightweight aggregate blocks, cavity or cavity fill | 0.00 | 110.00 | 47.17 | | None |

**9.2 Internal Walls**

| Description | Construction | Kappa (kJ/m²K) | Area (m²) |
|---|---|---|---|
| Internal Stud Walls | Plasterboard on timber frame | 9.00 | 140.29 |

**10.0 External Roofs**

| Description | Type | Construction | U-Value (W/m²K) | Kappa (kJ/m²K) | Gross Area(m²) | Nett Area (m²) | Shelter Code | Shelter Factor | Calculation Type | Openings |
|---|---|---|---|---|---|---|---|---|---|---|
| External Pitched Roofs | External Plane Roof | Plasterboard, insulated at ceiling level | 0.09 | 9.00 | 40.70 | 40.70 | None | 0.00 | Calculate Wall Area | 0.00 |

**10.2 Internal Ceilings**

| Description | Storey | Construction | Area (m²) |
|---|---|---|---|
| Internal Ceiling | Lowest occupied | Plasterboard ceiling, carpeted chipboard floor | 40.70 |

**11.0 Heat Loss Floors**

| Description | Type | Storey Index | Construction | U-Value (W/m²K) | Shelter Code | Shelter Factor | Kappa (kJ/m²K) | Area (m²) |
|---|---|---|---|---|---|---|---|---|
| Ground Floor | Ground Floor - Solid | Lowest occupied | Suspended concrete floor, carpeted | 0.11 | None | 0.00 | 75.00 | 40.70 |

# Summary for Input Data

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**11.2 Internal Floors**

| Description | Storey Index | Construction | Kappa (kJ/m²K) | Area (m²) |
|---|---|---|---|---|
| Internal Floor | | Plasterboard ceiling, carpeted chipboard floor | 9.00 | 40.70 |

**12.0 Opening Types**

| Description | Data Source | Type | Glazing | Glazing Gap | Filling Type | G-value | Frame Type | Frame Factor | U Value (W/m²K) |
|---|---|---|---|---|---|---|---|---|---|
| New Dwell Entrance Door | Manufacturer | Half Glazed Door | Double Low-E Soft 0.05 | | | 0.36 | | 0.70 | 1.20 |
| New Dwell DG French Doors | Manufacturer | Window | Double Low-E Soft 0.05 | | | 0.71 | | 0.70 | 1.20 |
| New Dwelling DG Window | Manufacturer | Window | Double Low-E Soft 0.05 | | | 0.71 | | 0.70 | 1.20 |

**13.0 Openings**

| Name | Opening Type | Location | Orientation | Area (m²) | Pitch |
|---|---|---|---|---|---|
| Front South Door | New Dwell Entrance Door | External Cavity Wall | South | 2.01 | |
| Front South Windows | New Dwelling DG Window | External Cavity Wall | South | 4.18 | |
| Side West Windows | New Dwelling DG Window | External Cavity Wall | West | 2.16 | |
| Rear North Windows | New Dwelling DG Window | External Cavity Wall | North | 3.06 | |
| Rear North Windows | New Dwell DG French Doors | External Cavity Wall | North | 3.33 | |

| | | |
|---|---|---|
| **14.0 Conservatory** | None | |
| **15.0 Draught Proofing** | 100 | % |
| **16.0 Draught Lobby** | No | |
| **17.0 Thermal Bridging** | Calculate Bridges | |

**17.1 List of Bridges**

| Bridge Type | Source Type | Length | Psi | Adjusted | Reference: | Imported |
|---|---|---|---|---|---|---|
| E2 Other lintels (including other steel lintels) | Independently assessed | 10.78 | 0.05 | 0.05 | IG or Keystone Hi Therm + | No |
| E3 Sill | Independently assessed | 9.82 | 0.02 | 0.02 | Recognised Construction Detail | No |
| E4 Jamb | Independently assessed | 28.50 | 0.01 | 0.01 | Recognised Construction Detail | No |
| E5 Ground floor (normal) | Independently assessed | 18.02 | 0.07 | 0.07 | Recognised Construction Detail | No |
| E6 Intermediate floor within a dwelling | Independently assessed | 18.02 | 0.00 | 0.00 | Recognised Construction Detail | No |
| E10 Eaves (insulation at ceiling level) | Independently assessed | 18.02 | 0.06 | 0.06 | Recognised Construction Detail | No |
| E16 Corner (normal) | Independently assessed | 10.30 | 0.05 | 0.05 | Recognised Construction Detail | No |
| E18 Party wall between dwellings | Independently assessed | 10.30 | 0.04 | 0.04 | Recognised Construction Detail | No |
| P1 Party wall - Ground floor | Independently assessed | 9.16 | 0.10 | 0.10 | Recognised Construction Detail | No |
| P2 Party wall - Intermediate floor within a dwelling | Table K1 - Default | 9.16 | 0.00 | 0.00 | | No |
| P4 Party wall - Roof (insulation at ceiling level) | Independently assessed | 9.16 | 0.10 | 0.10 | Recognised Construction Detail | No |

| | | |
|---|---|---|
| Y-value | 0.00 | W/m²K |
| **18.0 Pressure Testing** | Yes | |
| Designed $AP_{50}$ | 5.05 | m³/(h.m²) @ 50 Pa |
| Test Method | Blower Door | |
| **19.0 Mechanical Ventilation** | | |
| **Mechanical Ventilation** | | |
| Mechanical Ventilation System Present | No | |
| **20.0 Fans, Open Fireplaces, Flues** | | |
| **21.0 Fixed Cooling System** | No | |
| **22.0 Lighting** | | |
| No Fixed Lighting | No | |

| Name | Efficacy | Power | Capacity | Count |
|---|---|---|---|---|
| Low energy Lighting | 75.00 | 15 | 1125 | 24 |

| | | |
|---|---|---|
| **24.0 Main Heating 1** | Database | |
| Description | Electric Air Source Heat Pump | |
| Percentage of Heat | 100.00 | % |
| Database Ref. No. | 106465 | |
| Fuel Type | Electricity | |
| In Winter | 0.00 | |
| In Summer | 0.00 | |
| Model Name | EDLA04EV3 | |
| Manufacturer | Daikin Europe NV | |
| System Type | Heat Pump | |
| Controls SAP Code | 2207 | |

# Summary for Input Data

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| | |
|---|---|
| PCDF Controls | 0 |
| Is MHS Pumped | Pump in heated space |
| Heating Pump Age | 2013 or later |
| Heat Emitter | Radiators |
| Flow Temperature | Enter value |
| Flow Temperature Value | 55.00 |

**25.0 Main Heating 2** — None

**26.0 Heat Networks** — None

| | Heat Source | Fuel Type | Heating Use | Efficiency | Percentage Of Heat | Heat | Heat Power Ratio | Electrical | Fuel Factor | Efficiency type |
|---|---|---|---|---|---|---|---|---|---|---|
| Heat source 1 | | | | | | | | | | |
| Heat source 2 | | | | | | | | | | |
| Heat source 3 | | | | | | | | | | |
| Heat source 4 | | | | | | | | | | |
| Heat source 5 | | | | | | | | | | |

**28.0 Water Heating**

| | |
|---|---|
| Water Heating | Main Heating 1 |
| SAP Code | 901 |
| Flue Gas Heat Recovery System | No |
| Waste Water Heat Recovery Instantaneous System 1 | No |
| Waste Water Heat Recovery Instantaneous System 2 | No |
| Waste Water Heat Recovery Storage System | No |
| Solar Panel | No |
| Water use <= 125 litres/person/day | Yes |
| Cold Water Source | From mains |
| Bath Count | 1 |
| Immersion Only Heating Hot Water | No |

**28.1 Showers**

| Description | Shower Type | Flow Rate [l/min] | Rated Power [kW] | Connected | Connected To |
|---|---|---|---|---|---|

**28.3 Waste Water Heat Recovery System**

| | | |
|---|---|---|
| **29.0 Hot Water Cylinder** | Hot Water Cylinder | |
| Cylinder Stat | Yes | |
| Cylinder In Heated Space | Yes | |
| Independent Time Control | Yes | |
| Insulation Type | Measured Loss | |
| Cylinder Volume | 180.00 | L |
| Loss | 1.39 | kWh/day |
| Pipes insulation | Fully insulated primary pipework | |
| In Airing Cupboard | No | |

**31.0 Thermal Store** — None

**Recommendations**

**Lower cost measures**

**None**

**Further measures to achieve even higher standards**

| Typical Cost | Typical savings per year | Ratings after improvement SAP rating | Environmental Impact |
|---|---|---|---|
| £4,000 - £6,000 | £46 | B 85 | A 97 |
| £3,500 - £5,500 | £187 | B 91 | A 98 |
| | | 0 | 0 |

# Thermal Bridging

elmhurst energy

| | | | |
|---|---|---|---|
| **Property Reference** | sc100232 P5 Bitterne Church | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | End-Terrace House |
| **Property** | Plot 5, Bitterne Parish Church, Whites Lane, Southampton, Hampshire , SO19 7NP | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 84 B | **DER** | 4.01 | **TER** | 11.53 |
| **Environmental** | 97 A | **% DER < TER** | | | 65.22 |
| **$CO_2$ Emissions (t/year)** | 0.27 | **DFEE** | 35.37 | **TFEE** | 37.29 |
| **Compliance Check** | See BREL | **% DFEE < TFEE** | | | 5.16 |
| **% DPER < TPER** | 30.55 | **DPER** | 41.84 | **TPER** | 60.25 |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Philip Dudley | | |

| | Junction details | Source Type | Psi (W/mK) | Length (m) | Result | Reference |
|---|---|---|---|---|---|---|
| External wall | E2 Other lintels (including other steel lintels) | Independently assessed | 0.050 | 10.78 | 0.54 | IG or Keystone Hi Therm + |
| External wall | E3 Sill | Independently assessed | 0.018 | 9.82 | 0.18 | Recognised Construction Detail |
| External wall | E4 Jamb | Independently assessed | 0.014 | 28.50 | 0.40 | Recognised Construction Detail |
| External wall | E5 Ground floor (normal) | Independently assessed | 0.068 | 18.02 | 1.23 | Recognised Construction Detail |
| External wall | E6 Intermediate floor within a dwelling | Independently assessed | 0.001 | 18.02 | 0.02 | Recognised Construction Detail |
| External wall | E10 Eaves (insulation at ceiling level) | Independently assessed | 0.055 | 18.02 | 0.99 | Recognised Construction Detail |
| External wall | E16 Corner (normal) | Independently assessed | 0.051 | 10.30 | 0.53 | Recognised Construction Detail |
| External wall | E18 Party wall between dwellings | Independently assessed | 0.044 | 10.30 | 0.45 | Recognised Construction Detail |
| Party wall | P1 Party wall - Ground floor | Independently assessed | 0.103 | 9.16 | 0.94 | Recognised Construction Detail |
| Party wall | P2 Party wall - Intermediate floor within a dwelling | Table K1 - Default | 0.000 | 9.16 | 0.00 | |
| Party wall | P4 Party wall - Roof (insulation at ceiling level) | Independently assessed | 0.101 | 9.16 | 0.93 | Recognised Construction Detail |

Total: 151.24 W/mK:

Y-Value: 0.00 W/m²K:

# U-VALUE CALCULATOR REPORT

| | | | |
|---|---|---|---|
| **Property Reference** | sc121836 | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling Part L 2021 |
| **Project** | Plot 5, Bitterne Parish Church, Whites Lane, Bitterne, Southampton, Hampshire , SO19 7NP | | |
| **Calculation Type** | New Build (As Designed) | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 88 B | **DER** | 14.78 | **TER** | 26.82 |
| **Environmental** | 89 B | **% DER<TER** | 44.90 | | |
| **$CO_2$ Emissions (t/year)** | 0.92 | **DFEE** | 41.65 | **TFEE** | 53.26 |
| **General Requirements Compliance** | Pass | **% DFEE<TFEE** | 21.80 | | |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers, Surecalc Limited, Tel: 01243572695, mark@surecalc.co.uk | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Vivid Design Studio | | |

## Building Elements

### Roof 000002 - Pitched Roof Insulated Ceiling Vivid

**Roof Type: Pitched Roof, insulated flat ceiling**

| Layer | Description | Thickness (mm) | Conductivity (W/m²K) | Resistance (m²K/W) | Fraction (%) |
|---|---|---|---|---|---|
| **Ext surface** | | | | 0.0400 | |
| **Layer 1** | **Loft Space** | | | | |
| | Main construction | 0 | 0.0600 | 0.0600 | 100.00 |
| **Layer 2** | **Mineral wool** | | | | |
| | Main construction | 350 | 0.0440 | 7.9545 | 100.00 |
| | Corrections - Air Gap: Level 0, Fasteners: None or plastic | | | | |
| **Layer 3** | **Mineral wool quilt** | | | | |
| | Main construction | 150 | 0.0440 | 3.4091 | 93.67 |
| | Main construction | 150 | 0.1300 | 1.1538 | 6.33 |
| | Corrections - Air Gap: Level 0, Fasteners: None or plastic | | | | |
| **Layer 4** | **Plasterboard, standard** | | | | |
| | Main construction | 12.5 | 0.2100 | 0.0595 | 100.00 |
| **Int surface** | | | | 0.1000 | |

**Total resistance:** **Upper limit =** 11.449 m² K/W **Lower limit =** 11.248 m² K/W **Average =** 11.348 m² K/W

**Total correction =** 0.0030 m² K/W **U-value (unrounded) =** 0.09 W/m² K

**Unheated space:** None

**Total thickness: 513 mm** **U-value: 0.09 W/m² K** **Kappa: n/a**



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

# U-VALUE CALCULATOR REPORT

| | | | |
|---|---|---|---|
| **Property Reference** | sc121836 | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling Part L 2021 |
| **Project** | Plot 5, Bitterne Parish Church, Whites Lane, Bitterne, Southampton, Hampshire , SO19 7NP | | |
| **Calculation Type** | New Build (As Designed) | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 88 B | **DER** | 14.78 | **TER** | 26.82 |
| **Environmental** | 89 B | **% DER<TER** | 44.90 | | |
| **$CO_2$ Emissions (t/year)** | 0.92 | **DFEE** | 41.65 | **TFEE** | 53.26 |
| **General Requirements Compliance** | Pass | **% DFEE<TFEE** | 21.80 | | |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers, Surecalc Limited, Tel: 01243572695, mark@surecalc.co.uk | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Vivid Design Studio | | |

## Building Elements

### Wall 000001 - Vivid Cavity Wall 125 Knauf Supafil 34

**Wall Type: Standard Wall**

| Layer | Description | Thickness (mm) | Conductivity (W/m²K) | Resistance (m²K/W) | Fraction (%) |
|---|---|---|---|---|---|
| **Ext surface** | | | | 0.0400 | |
| **Layer 1** | **Brick, outer leaf** | | | | |
| | Main construction | 102 | 0.7700 | 0.1325 | 82.81 |
| | Main construction | 102 | 0.9407 | 0.1084 | 17.19 |
| **Layer 2** | **Knauf Supafil 34 blown Cavity Fill** | | | | |
| | Main construction | 125 | 0.0340 | 3.6765 | 100.00 |
| | Corrections - Air Gap: Level 0, Fasteners: Wall ties, Cross sectional area: 12.50 mm², Lambda: 17.000 W/m.K, per m²: 2.500 | | | | |
| **Layer 3** | **Masterblock Masterlite Ultra** | | | | |
| | Main construction | 100 | 0.2700 | 0.3704 | 93.43 |
| | Main construction | 100 | 0.8803 | 0.1136 | 6.57 |
| **Layer 4** | **airspace/plaster dabs** | | | | |
| | Main construction | 15 | 0.1000 | 0.1500 | 80.00 |
| | Main construction | 15 | 0.0882 | 0.1700 | 20.00 |
| | Corrections - Cavity Unventilated, Emissivity: Normal | | | | |
| **Layer 5** | **Plasterboard, standard** | | | | |
| | Main construction | 12.5 | 0.2100 | 0.0595 | 100.00 |
| **Int surface** | | | | 0.1300 | |

**Total resistance:** **Upper limit =** 4.541 m² K/W **Lower limit =** 4.510 m² K/W **Average =** 4.525 m² K/W

**Total correction =** 0.0018 m² K/W **U-value (unrounded) =** 0.22 W/m² K

**Unheated space:** None

**Total thickness: 355 mm** **U-value: 0.22 W/m² K** **Kappa: n/a**



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

# U-VALUE CALCULATOR REPORT

| | | | |
|---|---|---|---|
| **Property Reference** | sc121836 | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling Part L 2021 |
| **Project** | Plot 5, Bitterne Parish Church, Whites Lane, Bitterne, Southampton, Hampshire , SO19 7NP | | |
| **Calculation Type** | New Build (As Designed) | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 88 B | **DER** | 14.78 | **TER** | 26.82 |
| **Environmental** | 89 B | **% DER<TER** | 44.90 | | |
| **$CO_2$ Emissions (t/year)** | 0.92 | **DFEE** | 41.65 | **TFEE** | 53.26 |
| **General Requirements Compliance** | Pass | **% DFEE<TFEE** | 21.80 | | |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers, Surecalc Limited, Tel: 01243572695, mark@surecalc.co.uk | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Vivid Design Studio | | |

## Building Elements

### Floor 000003 - Ground Floor Beam and Block

**Floor Type: Suspended Floor**
**Area = 40.70 m², Perimeter = 18.02 m, Wall thickness = 300.00 mm, Soil: Unknown**
**Depth of underfloor space below ground:0.200 m  Floor wind shielding: Average (suburban)**
**Floor height above ground:h = 0.150 m**
**U-value of walls above ground:Uw = 0.220 m**
**Ventilation openings per perimeter length:e = 0.0015 %**
**Mean wind speed:v = 5.000 m/s**
**Resistance on solum:Rg = 0.000 m²K/W**

| Layer | Description | Thickness (mm) | Conductivity (W/m²K) | Resistance (m²K/W) | Fraction (%) |
|---|---|---|---|---|---|
| **Ext surface** | | | | 0.1700 | |
| **Layer 1** | **Blockwork** | | | | |
| | Main construction | 100 | 0.1900 | 0.5263 | 90.91 |
| | Main construction | 100 | 1.0000 | 0.1000 | 9.09 |
| **Layer 2** | **Mannok Therm Floor** | | | | |
| | Main construction | 150 | 0.0220 | 6.8182 | 100.00 |
| | Corrections - Air Gap: Level 1, Fasteners: None or plastic | | | | |
| **Layer 3** | **Screed** | | | | |
| | Main construction | 75 | 1.1500 | 0.0652 | 100.00 |
| **Int surface** | | | | 0.1700 | |

**Total resistance:** **Upper limit =** 7.709 m² K/W **Lower limit =** 7.603 m² K/W **Average =** 7.656 m² K/W

**Total correction =** 0.0079 m² K/W **U-value (unrounded) =** 0.11 W/m² K

**Unheated space:** None

**Total thickness: 325 mm** **U-value: 0.11 W/m² K** **Kappa: n/a**



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

elmhurst energy

# SAP Report Submission for Building Regulations Compliance

Client: Vivid Design Studio

Project: Plot 6, Bitterne Parish Church, Whites Lane
Bitterne, Southampton, Hampshire , SO19 7NP

Contact: Mark Rogers
Surecalc Limited
mark@surecalc.co.uk

Report Issue Date: 06/12/2023

EXCELLENCE IN ENERGY ASSESSMENT

# CODE FOR SUSTAINABLE HOMES
## Calculation Type: New Build (As Designed)

| | | | |
|---|---|---|---|
| **Property Reference** | sc121837 | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling Part L 2021 |
| **Property** | Plot 6, Bitterne Parish Church, Whites Lane, Bitterne, Southampton, Hampshire , SO19 7NP | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 87 B | **DER** | 14.88 | **TER** | 27.06 |
| **Environmental** | 89 B | **% DER<TER** | 45.00 | | |
| **$CO_2$ Emissions (t/year)** | 0.93 | **DFEE** | 42.35 | **TFEE** | 54.07 |
| **General Requirements Compliance** | Pass | **% DFEE<TFEE** | 21.66 | | |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers, Surecalc Limited, Tel: 01243572695, mark@surecalc.co.uk | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Vivid Design Studio | | |

## ENE 1 - Dwelling Emission Rate calculation

| | | | |
|---|---|---|---|
| Total floor area | 81.4 | $m^2$ | |
| DER | 14.88 | $kgCO_2/yr/m^2$ | |
| TER | 27.06 | $kgCO_2/yr/m^2$ | |
| $CO_2$ emissions offset from additional allowable electricity generation | 0.00 | $kgCO_2/yr/m^2$ | (ZC7) |
| Residual $CO_2$ emissions offset from biofuel CHP | 0.00 | $kgCO_2/yr/m^2$ | (ZC5) |
| Total $CO_2$ emissions offset from SAP Section 16 allowances | 0.00 | $kgCO_2/yr/m^2$ | |
| DER accounting for SAP Section 16 allowances | 14.88 | $kgCO_2/yr/m^2$ | |
| Reduction DER/TER | 45.00 | % | |
| CfSH ENE1 credits achieved | 5.0 | | |
| CfSH ENE1 level achieved | 4 | | |

## ENE 2 – Fabric Energy Efficiency calculation

| | | | |
|---|---|---|---|
| Dwelling type | House, End-Terrace | | |
| Fabric energy efficiency (F.E.E.) | 42.35 | $kWh/m^2/yr$ | |
| CfSH ENE2 credits achieved | 7.9 | | |
| CfSH ENE1 and 2 overall level achieved | 4 | | |

## ENE 7 – Low and Zero Carbon Technologies calculation

**Standard case $CO_2$ emissions**

| | | | |
|---|---|---|---|
| Total floor area | 81.4 | $m^2$ | |
| DER | 19.74 | $kgCO_2/yr/m^2$ | |
| $CO_2$ emissions from electrical appliances | 16.19 | $kgCO_2/yr/m^2$ | (ZC2) |
| $CO_2$ emissions from cooking | 2.20 | $kgCO_2/yr/m^2$ | (ZC3) |
| Standard case total $CO_2$ emissions | 38.12 | $kgCO_2/yr/m^2$ | (ZC4) |
| Net Standard case $CO_2$ emissions | 38.12 | $kgCO_2/yr/m^2$ | (ZC8) |

**Actual case $CO_2$ emissions**

| | | | |
|---|---|---|---|
| DER | 18.46 | $kgCO_2/yr/m^2$ | |
| $CO_2$ emissions from electrical appliances | 16.19 | $kgCO_2/yr/m^2$ | (ZC2) |
| $CO_2$ emissions from cooking | 2.20 | $kgCO_2/yr/m^2$ | (ZC3) |
| Actual case total $CO_2$ emissions | 36.84 | $kgCO_2/yr/m^2$ | (ZC4) |
| $CO_2$ emissions from Biomass | 0.00 | $kgCO_2/yr/m^2$ | (ZC5) |
| $CO_2$ reduction from additional allowable electricity generation | 0.00 | $kgCO_2/yr/m^2$ | (ZC7) |
| Net Actual case $CO_2$ emissions | 36.84 | $kgCO_2/yr/m^2$ | (ZC8) |
| Improvement in net actual/net standard case $CO_2$ emissions | 3 | % | |



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

| | |
|---|---|
| ENE7 credits achieved | 0 |



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

# Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Array SAP 10 program, Array

**Date:** Wed 06 Dec 2023 15:25:56

| Project Information | | | |
|---|---|---|---|
| Assessed By | Mark Rogers | Building Type | House, End-terrace |
| OCDEA Registration | EES/004179 | Assessment Date | 2023-12-06 |

| Dwelling Details | | | |
|---|---|---|---|
| Assessment Type | As designed | Total Floor Area | 81 $m^2$ |
| Site Reference | sc100233 P6 Bitterne Church | Plot Reference | 001 |
| Address | Bitterne Parish Church Plot 6 Whites Lane, Southampton, SO19 7NP | | |

| Client Details | |
|---|---|
| Name | Philip Dudley |
| Company | Vivid Design Studio |
| Address | NA, NA, NA |

**This report covers items included within the SAP calculations. It is not a complete report of regulations compliance.**

| 1a Target emission rate and dwelling emission rate | | |
|---|---|---|
| Fuel for main heating system | Electricity | |
| *Target carbon dioxide emission rate* | *11.68 $kgCO_2/m^2$* | |
| Dwelling carbon dioxide emission rate | 4.05 $kgCO_2/m^2$ | OK |
| **1b Target primary energy rate and dwelling primary energy** | | |
| *Target primary energy* | *61.03 $kWh_{PE}/m^2$* | |
| Dwelling primary energy | 42.3 $kWh_{PE}/m^2$ | OK |
| **1c Target fabric energy efficiency and dwelling fabric energy efficiency** | | |
| *Target fabric energy efficiency* | *38.0 $kWh/m^2$* | |
| Dwelling fabric energy efficiency | 36.0 $kWh/m^2$ | OK |

| 2a Fabric U-values | | | | |
|---|---|---|---|---|
| **Element** | ***Maximum permitted average U-Value [$W/m^2K$]*** | **Dwelling average U-Value [$W/m^2K$]** | **Element with highest individual U-Value** | |
| External walls | *0.26* | 0.22 | Walls (1) (0.22) | OK |
| Party walls | *0.2* | 0 | Party Wall (1) (0) | **N/A** |
| Curtain walls | *1.6* | 0 | N/A | **N/A** |
| Floors | *0.18* | 0.11 | Ground Floor (0.11) | OK |
| Roofs | *0.16* | 0.09 | Roof (1) (0.09) | OK |
| Windows, doors, and roof windows | *1.6* | 1.2 | Front South Door (1.2) | OK |
| Rooflights | *2.2* | N/A | N/A | **N/A** |

| 2b Envelope elements (better than typically expected values are flagged with a subsequent (!)) | | |
|---|---|---|
| **Name** | **Net area [$m^2$]** | **U-Value [$W/m^2K$]** |
| Exposed wall: Walls (1) | 78.06 | 0.22 |
| Party wall: Party Wall (1) | 47.17 | 0 **(!)** |
| Ground floor: Ground Floor, Ground Floor | 40.7 | 0.11 |
| Exposed roof: Roof (1) | 40.7 | 0.09 **(!)** |

| 2c Openings (better than typically expected values are flagged with a subsequent (!)) | | | | |
|---|---|---|---|---|
| **Name** | **Area [$m^2$]** | **Orientation** | **Frame factor** | **U-Value [$W/m^2K$]** |
| Front South Door, New Dwell Entrance Door | 2.01 | South | N/A | 1.2 |
| Front South Windows, New Dwelling DG Window | 4.18 | South | 0.7 | 1.2 |
| Side East Windows, New Dwelling DG Window | 2.16 | East | 0.7 | 1.2 |
| Rear North Windows, New Dwelling DG Window | 3.06 | North | 0.7 | 1.2 |
| Rear North Windows, New Dwell DG French Doors | 3.33 | North | 0.7 | 1.2 |

| 2d Thermal bridging (better than typically expected values are flagged with a subsequent (!)) |
|---|
| Building part **1 - Main Dwelling**: Thermal bridging calculated from linear thermal transmittances for each junction |

| Main element | Junction detail | Source | Psi value [W/mK] | Drawing / reference |
|---|---|---|---|---|
| External wall | E2: Other lintels (including other steel lintels) | Calculated by person with suitable expertise | 0.05 | IG or Keystone Hi Therm + |
| External wall | E3: Sill | Calculated by person with suitable expertise | 0.018 **(!)** | Recognised Construction Detail |
| External wall | E4: Jamb | Calculated by person with suitable expertise | 0.014 **(!)** | Recognised Construction Detail |
| External wall | E5: Ground floor (normal) | Calculated by person with suitable expertise | 0.068 | Recognised Construction Detail |
| External wall | E6: Intermediate floor within a dwelling | Calculated by person with suitable expertise | 0.001 **(!)** | Recognised Construction Detail |
| External wall | E10: Eaves (insulation at ceiling level) | Calculated by person with suitable expertise | 0.055 | Recognised Construction Detail |
| External wall | E16: Corner (normal) | Calculated by person with suitable expertise | 0.051 | Recognised Construction Detail |
| External wall | E18: Party wall between dwellings | Calculated by person with suitable expertise | 0.044 | Recognised Construction Detail |
| Party wall | P1: Ground floor | Calculated by person with suitable expertise | 0.103 | Recognised Construction Detail |
| Party wall | P2: Intermediate floor within a dwelling | SAP table default | 0 **(!)** | |
| Party wall | P4: Roof (insulation at ceiling level) | Calculated by person with suitable expertise | 0.101 | Recognised Construction Detail |

| 3 Air permeability (better than typically expected values are flagged with a subsequent (!)) | | |
|---|---|---|
| *Maximum permitted air permeability at 50Pa* | *8 $m^3/hm^2$* | |
| Dwelling air permeability at 50Pa | 5.05 $m^3/hm^2$, Design value | OK |
| Air permeability test certificate reference | | |

| 4 Space heating | |
|---|---|
| **Main heating system 1**: Heat pump with radiators or underfloor heating - Electricity | |
| Efficiency | 232.5% |
| Emitter type | Radiators |
| Flow temperature | 55°C |
| System type | Heat Pump |
| Manufacturer | Daikin Europe NV |
| Model | EDLA04EV3 |
| Commissioning | |
| **Secondary heating system**: N/A | |
| Fuel | N/A |
| Efficiency | N/A |
| Commissioning | |

| 5 Hot water | |
|---|---|
| **Cylinder/store** - type: Cylinder | |
| Capacity | 180 litres |
| Declared heat loss | 1.39 kWh/day |
| Primary pipework insulated | Yes |
| Manufacturer | |
| Model | |
| Commissioning | |
| **Waste water heat recovery system 1** - type: N/A | |
| Efficiency | |
| Manufacturer | |
| Model | |

| 6 Controls | | |
|---|---|---|
| **Main heating 1** - type: Time and temperature zone control by arrangement of plumbing and electrical services | | |
| Function | | |
| Ecodesign class | | |
| Manufacturer | | |
| Model | | |
| **Water heating** - type: Cylinder thermostat and HW separately timed | | |
| Manufacturer | | |
| Model | | |

| 7 Lighting | | |
|---|---|---|
| *Minimum permitted light source efficacy* | *75 lm/W* | |
| Lowest light source efficacy | 75 lm/W | **OK** |
| External lights control | N/A | |

| 8 Mechanical ventilation | | |
|---|---|---|
| **System type:** N/A | | |
| *Maximum permitted specific fan power* | *N/A* | |
| Specific fan power | N/A | **N/A** |
| *Minimum permitted heat recovery efficiency* | *N/A* | |
| Heat recovery efficiency | N/A | **N/A** |
| Manufacturer/Model | | |
| Commissioning | | |

| 9 Local generation |
|---|
| N/A |

| 10 Heat networks |
|---|
| N/A |

| 11 Supporting documentary evidence |
|---|
| N/A |

| 12 Declarations | |
|---|---|
| **a. Assessor Declaration** | |
| This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report. | |
| Signed:<br><br>Name: | Assessor ID:<br><br>Date: |
| **b. Client Declaration** | |
| N/A | |

# Predicted Energy Assessment

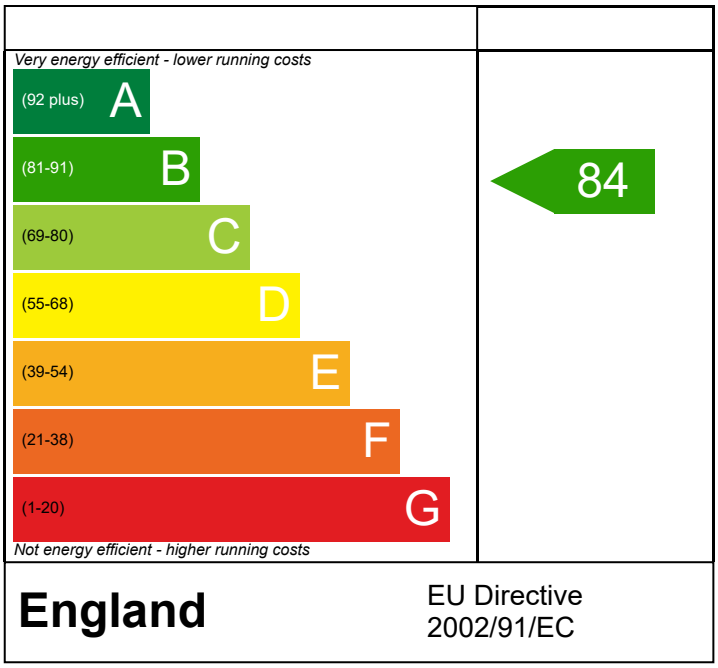
Plot 6, Bitterne Parish Church, Whites Lane,
Southampton, Hampshire , SO19 7NP

| | |
|---|---|
| Dwelling type: | House, End-Terrace |
| Date of assessment: | 06/12/2023 |
| Produced by: | Mark Rogers |
| Total floor area: | 81.4 m² |
| DRRN: | 1346-2092-0170 |

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

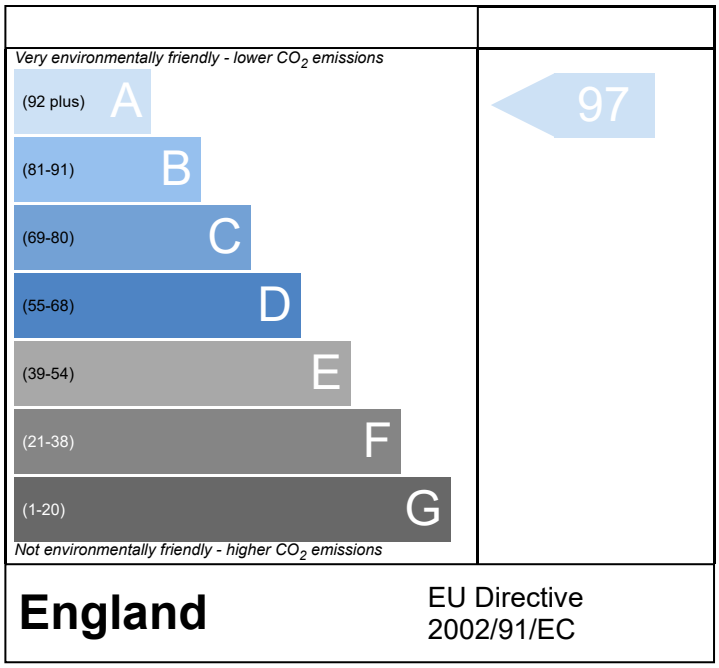
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

## Energy Efficiency Rating




The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

## Environmental Impact ($CO_2$) Rating




The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide ($CO_2$) emissions. The higher the rating the less impact it has on the environment.

# Summary for Input Data

elmhurst energy

| | | | |
|---|---|---|---|
| **Property Reference** | sc100233 P6 Bitterne Church | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling |
| **Property** | Plot 6, Bitterne Parish Church, Whites Lane, Southampton, Hampshire , SO19 7NP | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 84 B | **DER** | 4.05 | **TER** | 11.68 |
| **Environmental** | 97 A | **% DER < TER** | | | 65.33 |
| **$CO_2$ Emissions (t/year)** | 0.27 | **DFEE** | 36.04 | **TFEE** | 37.96 |
| **Compliance Check** | See BREL | **% DFEE < TFEE** | | | 5.06 |
| **% DPER < TPER** | 30.70 | **DPER** | 42.30 | **TPER** | 61.03 |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Philip Dudley | | |

## SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

| | |
|---|---|
| **Orientation** | South |
| **Property Tenture** | ND |
| **Transaction Type** | 6 |
| **Terrain Type** | Suburban |
| **1.0 Property Type** | House, End-Terrace |
| **2.0 Number of Storeys** | 2 |
| **3.0 Date Built** | 2023 |
| **4.0 Sheltered Sides** | 1 |
| **5.0 Sunlight/Shade** | Average or unknown |
| **6.0 Thermal Mass Parameter** | Precise calculation |
| **7.0 Electricity Tariff** | Standard |
| Smart electricity meter fitted | No |
| Smart gas meter fitted | No |

**7.0 Measurements**

| | Heat Loss Perimeter | Internal Floor Area | Average Storey Height |
|---|---|---|---|
| **Ground floor:** | 18.02 m | 40.70 m² | 2.39 m |
| **1st Storey:** | 18.02 m | 40.70 m² | 2.76 m |

**8.0 Living Area** 18.06 m²

**9.0 External Walls**

| Description | Type | Construction | U-Value (W/m²K) | Kappa (kJ/m²K) | Gross Area(m²) | Nett Area (m²) | Shelter Res | Shelter | Openings | Area Calculation Type |
|---|---|---|---|---|---|---|---|---|---|---|
| External Cavity Wall | Cavity Wall | Cavity wall; plasterboard on dabs or battens, lightweight aggregate block, filled cavity, any outside structure | 0.22 | 110.00 | 92.80 | 78.06 | 0.00 | None | 14.74 | Calculate Wall Area |

**9.1 Party Walls**

| Description | Type | Construction | U-Value (W/m²K) | Kappa (kJ/m²K) | Area (m²) | Shelter Res | Shelter |
|---|---|---|---|---|---|---|---|
| Party Wall | Filled Cavity with Edge Sealing | Single plasterboard on dabs both sides, lightweight aggregate blocks, cavity or cavity fill | 0.00 | 110.00 | 47.17 | | None |

**9.2 Internal Walls**

| Description | Construction | Kappa (kJ/m²K) | Area (m²) |
|---|---|---|---|
| Internal Stud Walls | Plasterboard on timber frame | 9.00 | 140.29 |

**10.0 External Roofs**

| Description | Type | Construction | U-Value (W/m²K) | Kappa (kJ/m²K) | Gross Area(m²) | Nett Area (m²) | Shelter Code | Shelter Factor | Calculation Type | Openings |
|---|---|---|---|---|---|---|---|---|---|---|
| External Pitched Roofs | External Plane Roof | Plasterboard, insulated at ceiling level | 0.09 | 9.00 | 40.70 | 40.70 | None | 0.00 | Calculate Wall Area | 0.00 |

**10.2 Internal Ceilings**

| Description | Storey | Construction | Area (m²) |
|---|---|---|---|
| Internal Ceiling | Lowest occupied | Plasterboard ceiling, carpeted chipboard floor | 40.70 |

**11.0 Heat Loss Floors**

| Description | Type | Storey Index | Construction | U-Value (W/m²K) | Shelter Code | Shelter Factor | Kappa (kJ/m²K) | Area (m²) |
|---|---|---|---|---|---|---|---|---|
| Ground Floor | Ground Floor - Solid | Lowest occupied | Suspended concrete floor, carpeted | 0.11 | None | 0.00 | 75.00 | 40.70 |

# Summary for Input Data

elmhurst energy

**11.2 Internal Floors**

| Description | Storey Index | Construction | Kappa (kJ/m²K) | Area (m²) |
|---|---|---|---|---|
| Internal Floor | | Plasterboard ceiling, carpeted chipboard floor | 9.00 | 40.70 |

**12.0 Opening Types**

| Description | Data Source | Type | Glazing | Glazing Gap | Filling Type | G-value | Frame Type | Frame Factor | U Value (W/m²K) |
|---|---|---|---|---|---|---|---|---|---|
| New Dwell Entrance Door | Manufacturer | Half Glazed Door | Double Low-E Soft 0.05 | | | 0.36 | | 0.70 | 1.20 |
| New Dwell DG French Doors | Manufacturer | Window | Double Low-E Soft 0.05 | | | 0.71 | | 0.70 | 1.20 |
| New Dwelling DG Window | Manufacturer | Window | Double Low-E Soft 0.05 | | | 0.71 | | 0.70 | 1.20 |

**13.0 Openings**

| Name | Opening Type | Location | Orientation | Area (m²) | Pitch |
|---|---|---|---|---|---|
| Front South Door | New Dwell Entrance Door | External Cavity Wall | South | 2.01 | |
| Front South Windows | New Dwelling DG Window | External Cavity Wall | South | 4.18 | |
| Side East Windows | New Dwelling DG Window | External Cavity Wall | East | 2.16 | |
| Rear North Windows | New Dwelling DG Window | External Cavity Wall | North | 3.06 | |
| Rear North Windows | New Dwell DG French Doors | External Cavity Wall | North | 3.33 | |

| | | |
|---|---|---|
| **14.0 Conservatory** | None | |
| **15.0 Draught Proofing** | 100 | % |
| **16.0 Draught Lobby** | No | |
| **17.0 Thermal Bridging** | Calculate Bridges | |

**17.1 List of Bridges**

| Bridge Type | Source Type | Length | Psi | Adjusted | Reference: | Imported |
|---|---|---|---|---|---|---|
| E2 Other lintels (including other steel lintels) | Independently assessed | 10.78 | 0.05 | 0.05 | IG or Keystone Hi Therm + | No |
| E3 Sill | Independently assessed | 9.82 | 0.02 | 0.02 | Recognised Construction Detail | No |
| E4 Jamb | Independently assessed | 28.50 | 0.01 | 0.01 | Recognised Construction Detail | No |
| E5 Ground floor (normal) | Independently assessed | 18.02 | 0.07 | 0.07 | Recognised Construction Detail | No |
| E6 Intermediate floor within a dwelling | Independently assessed | 18.02 | 0.00 | 0.00 | Recognised Construction Detail | No |
| E10 Eaves (insulation at ceiling level) | Independently assessed | 18.02 | 0.06 | 0.06 | Recognised Construction Detail | No |
| E16 Corner (normal) | Independently assessed | 10.30 | 0.05 | 0.05 | Recognised Construction Detail | No |
| E18 Party wall between dwellings | Independently assessed | 10.30 | 0.04 | 0.04 | Recognised Construction Detail | No |
| P1 Party wall - Ground floor | Independently assessed | 9.16 | 0.10 | 0.10 | Recognised Construction Detail | No |
| P2 Party wall - Intermediate floor within a dwelling | Table K1 - Default | 9.16 | 0.00 | 0.00 | | No |
| P4 Party wall - Roof (insulation at ceiling level) | Independently assessed | 9.16 | 0.10 | 0.10 | Recognised Construction Detail | No |

| | | |
|---|---|---|
| Y-value | 0.00 | W/m²K |
| **18.0 Pressure Testing** | Yes | |
| Designed $AP_{50}$ | 5.05 | m³/(h.m²) @ 50 Pa |
| Test Method | Blower Door | |

**19.0 Mechanical Ventilation**

**Mechanical Ventilation**

| | | |
|---|---|---|
| Mechanical Ventilation System Present | No | |

**20.0 Fans, Open Fireplaces, Flues**

| | | |
|---|---|---|
| **21.0 Fixed Cooling System** | No | |

**22.0 Lighting**

| | | |
|---|---|---|
| No Fixed Lighting | No | |

| Name | Efficacy | Power | Capacity | Count |
|---|---|---|---|---|
| Low energy Lighting | 75.00 | 15 | 1125 | 24 |

| | | |
|---|---|---|
| **24.0 Main Heating 1** | Database | |
| Description | Electric Air Source Heat Pump | |
| Percentage of Heat | 100.00 | % |
| Database Ref. No. | 106465 | |
| Fuel Type | Electricity | |
| In Winter | 0.00 | |
| In Summer | 0.00 | |
| Model Name | EDLA04EV3 | |
| Manufacturer | Daikin Europe NV | |
| System Type | Heat Pump | |
| Controls SAP Code | 2207 | |

# Summary for Input Data

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| | |
|---|---|
| PCDF Controls | 0 |
| Is MHS Pumped | Pump in heated space |
| Heating Pump Age | 2013 or later |
| Heat Emitter | Radiators |
| Flow Temperature | Enter value |
| Flow Temperature Value | 55.00 |

**25.0 Main Heating 2** — None

**26.0 Heat Networks** — None

| | Heat Source | Fuel Type | Heating Use | Efficiency | Percentage Of Heat | Heat | Heat Power Ratio | Electrical | Fuel Factor | Efficiency type |
|---|---|---|---|---|---|---|---|---|---|---|
| Heat source 1 | | | | | | | | | | |
| Heat source 2 | | | | | | | | | | |
| Heat source 3 | | | | | | | | | | |
| Heat source 4 | | | | | | | | | | |
| Heat source 5 | | | | | | | | | | |

**28.0 Water Heating**

| | |
|---|---|
| Water Heating | Main Heating 1 |
| SAP Code | 901 |
| Flue Gas Heat Recovery System | No |
| Waste Water Heat Recovery Instantaneous System 1 | No |
| Waste Water Heat Recovery Instantaneous System 2 | No |
| Waste Water Heat Recovery Storage System | No |
| Solar Panel | No |
| Water use <= 125 litres/person/day | Yes |
| Cold Water Source | From mains |
| Bath Count | 1 |
| Immersion Only Heating Hot Water | No |

**28.1 Showers**

| Description | Shower Type | Flow Rate [l/min] | Rated Power [kW] | Connected | Connected To |
|---|---|---|---|---|---|

**28.3 Waste Water Heat Recovery System**

| | | |
|---|---|---|
| **29.0 Hot Water Cylinder** | Hot Water Cylinder | |
| Cylinder Stat | Yes | |
| Cylinder In Heated Space | Yes | |
| Independent Time Control | Yes | |
| Insulation Type | Measured Loss | |
| Cylinder Volume | 180.00 | L |
| Loss | 1.39 | kWh/day |
| Pipes insulation | Fully insulated primary pipework | |
| In Airing Cupboard | No | |

**31.0 Thermal Store** — None

**Recommendations**

**Lower cost measures**

**None**

**Further measures to achieve even higher standards**

| Typical Cost | Typical savings per year | Ratings after improvement SAP rating | Environmental Impact |
|---|---|---|---|
| £4,000 - £6,000 | £46 | B 85 | A 97 |
| £3,500 - £5,500 | £187 | B 91 | A 98 |
| | | 0 | 0 |

# Thermal Bridging

elmhurst energy

| | | | |
|---|---|---|---|
| **Property Reference** | sc100233 P6 Bitterne Church | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | End-Terrace House |
| **Property** | Plot 6, Bitterne Parish Church, Whites Lane, Southampton, Hampshire , SO19 7NP | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 84 B | **DER** | 4.05 | **TER** | 11.68 |
| **Environmental** | 97 A | **% DER < TER** | | | 65.33 |
| **$CO_2$ Emissions (t/year)** | 0.27 | **DFEE** | 36.04 | **TFEE** | 37.96 |
| **Compliance Check** | See BREL | **% DFEE < TFEE** | | | 5.06 |
| **% DPER < TPER** | 30.70 | **DPER** | 42.30 | **TPER** | 61.03 |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Philip Dudley | | |

| | Junction details | Source Type | Psi (W/mK) | Length (m) | Result | Reference |
|---|---|---|---|---|---|---|
| External wall | E2 Other lintels (including other steel lintels) | Independently assessed | 0.050 | 10.78 | 0.54 | IG or Keystone Hi Therm + |
| External wall | E3 Sill | Independently assessed | 0.018 | 9.82 | 0.18 | Recognised Construction Detail |
| External wall | E4 Jamb | Independently assessed | 0.014 | 28.50 | 0.40 | Recognised Construction Detail |
| External wall | E5 Ground floor (normal) | Independently assessed | 0.068 | 18.02 | 1.23 | Recognised Construction Detail |
| External wall | E6 Intermediate floor within a dwelling | Independently assessed | 0.001 | 18.02 | 0.02 | Recognised Construction Detail |
| External wall | E10 Eaves (insulation at ceiling level) | Independently assessed | 0.055 | 18.02 | 0.99 | Recognised Construction Detail |
| External wall | E16 Corner (normal) | Independently assessed | 0.051 | 10.30 | 0.53 | Recognised Construction Detail |
| External wall | E18 Party wall between dwellings | Independently assessed | 0.044 | 10.30 | 0.45 | Recognised Construction Detail |
| Party wall | P1 Party wall - Ground floor | Independently assessed | 0.103 | 9.16 | 0.94 | Recognised Construction Detail |
| Party wall | P2 Party wall - Intermediate floor within a dwelling | Table K1 - Default | 0.000 | 9.16 | 0.00 | |
| Party wall | P4 Party wall - Roof (insulation at ceiling level) | Independently assessed | 0.101 | 9.16 | 0.93 | Recognised Construction Detail |

Total: 151.24 W/mK:

Y-Value: 0.00 W/m²K:

# U-VALUE CALCULATOR REPORT

| | | | |
|---|---|---|---|
| **Property Reference** | sc121837 | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling Part L 2021 |
| **Project** | Plot 6, Bitterne Parish Church, Whites Lane, Bitterne, Southampton, Hampshire , SO19 7NP | | |
| **Calculation Type** | New Build (As Designed) | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 87 B | **DER** | 14.88 | **TER** | 27.06 |
| **Environmental** | 89 B | **% DER<TER** | 45.00 | | |
| **$CO_2$ Emissions (t/year)** | 0.93 | **DFEE** | 42.35 | **TFEE** | 54.07 |
| **General Requirements Compliance** | Pass | **% DFEE<TFEE** | 21.66 | | |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers, Surecalc Limited, Tel: 01243572695, mark@surecalc.co.uk | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Vivid Design Studio | | |

## Building Elements

### Roof 000002 - Pitched Roof Insulated Ceiling Vivid

**Roof Type: Pitched Roof, insulated flat ceiling**

| Layer | Description | Thickness (mm) | Conductivity (W/m²K) | Resistance (m²K/W) | Fraction (%) |
|---|---|---|---|---|---|
| **Ext surface** | | | | 0.0400 | |
| **Layer 1** | **Loft Space** | | | | |
| | Main construction | 0 | 0.0600 | 0.0600 | 100.00 |
| **Layer 2** | **Mineral wool** | | | | |
| | Main construction | 350 | 0.0440 | 7.9545 | 100.00 |
| | Corrections - Air Gap: Level 0, Fasteners: None or plastic | | | | |
| **Layer 3** | **Mineral wool quilt** | | | | |
| | Main construction | 150 | 0.0440 | 3.4091 | 93.67 |
| | Main construction | 150 | 0.1300 | 1.1538 | 6.33 |
| | Corrections - Air Gap: Level 0, Fasteners: None or plastic | | | | |
| **Layer 4** | **Plasterboard, standard** | | | | |
| | Main construction | 12.5 | 0.2100 | 0.0595 | 100.00 |
| **Int surface** | | | | 0.1000 | |

**Total resistance:** **Upper limit =** 11.449 m² K/W **Lower limit =** 11.248 m² K/W **Average =** 11.348 m² K/W

**Total correction =** 0.0030 m² K/W **U-value (unrounded) =** 0.09 W/m² K

**Unheated space:** None

**Total thickness: 513 mm** **U-value: 0.09 W/m² K** **Kappa: n/a**



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

# U-VALUE CALCULATOR REPORT

| | | | |
|---|---|---|---|
| **Property Reference** | sc121837 | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling Part L 2021 |
| **Project** | Plot 6, Bitterne Parish Church, Whites Lane, Bitterne, Southampton, Hampshire , SO19 7NP | | |
| **Calculation Type** | New Build (As Designed) | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 87 B | **DER** | 14.88 | **TER** | 27.06 |
| **Environmental** | 89 B | **% DER<TER** | 45.00 | | |
| **$CO_2$ Emissions (t/year)** | 0.93 | **DFEE** | 42.35 | **TFEE** | 54.07 |
| **General Requirements Compliance** | Pass | **% DFEE<TFEE** | 21.66 | | |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers, Surecalc Limited, Tel: 01243572695, mark@surecalc.co.uk | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Vivid Design Studio | | |

## Building Elements

### Wall 000001 - Vivid Cavity Wall 125 Knauf Supafil 34

**Wall Type: Standard Wall**

| Layer | Description | Thickness (mm) | Conductivity (W/m²K) | Resistance (m²K/W) | Fraction (%) |
|---|---|---|---|---|---|
| **Ext surface** | | | | 0.0400 | |
| **Layer 1** | **Brick, outer leaf** | | | | |
| | Main construction | 102 | 0.7700 | 0.1325 | 82.81 |
| | Main construction | 102 | 0.9407 | 0.1084 | 17.19 |
| **Layer 2** | **Knauf Supafil 34 blown Cavity Fill** | | | | |
| | Main construction | 125 | 0.0340 | 3.6765 | 100.00 |
| | Corrections - Air Gap: Level 0, Fasteners: Wall ties, Cross sectional area: 12.50 mm², Lambda: 17.000 W/m.K, per m²: 2.500 | | | | |
| **Layer 3** | **Masterblock Masterlite Ultra** | | | | |
| | Main construction | 100 | 0.2700 | 0.3704 | 93.43 |
| | Main construction | 100 | 0.8803 | 0.1136 | 6.57 |
| **Layer 4** | **airspace/plaster dabs** | | | | |
| | Main construction | 15 | 0.1000 | 0.1500 | 80.00 |
| | Main construction | 15 | 0.0882 | 0.1700 | 20.00 |
| | Corrections - Cavity Unventilated, Emissivity: Normal | | | | |
| **Layer 5** | **Plasterboard, standard** | | | | |
| | Main construction | 12.5 | 0.2100 | 0.0595 | 100.00 |
| **Int surface** | | | | 0.1300 | |

**Total resistance:** **Upper limit =** 4.541 m² K/W **Lower limit =** 4.510 m² K/W **Average =** 4.525 m² K/W

**Total correction =** 0.0018 m² K/W **U-value (unrounded) =** 0.22 W/m² K

**Unheated space:** None

**Total thickness: 355 mm** **U-value: 0.22 W/m² K** **Kappa: n/a**



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

# U-VALUE CALCULATOR REPORT

| | | | |
|---|---|---|---|
| **Property Reference** | sc121837 | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling Part L 2021 |
| **Project** | Plot 6, Bitterne Parish Church, Whites Lane, Bitterne, Southampton, Hampshire , SO19 7NP | | |
| **Calculation Type** | New Build (As Designed) | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 87 B | **DER** | 14.88 | **TER** | 27.06 |
| **Environmental** | 89 B | **% DER<TER** | 45.00 | | |
| **$CO_2$ Emissions (t/year)** | 0.93 | **DFEE** | 42.35 | **TFEE** | 54.07 |
| **General Requirements Compliance** | Pass | **% DFEE<TFEE** | 21.66 | | |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers, Surecalc Limited, Tel: 01243572695, mark@surecalc.co.uk | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Vivid Design Studio | | |

## Building Elements

### Floor 000003 - Ground Floor Beam and Block

**Floor Type: Suspended Floor**
**Area = 40.70 m², Perimeter = 18.02 m, Wall thickness = 300.00 mm, Soil: Unknown**
**Depth of underfloor space below ground:0.200 m  Floor wind shielding: Average (suburban)**
**Floor height above ground:h = 0.150 m**
**U-value of walls above ground:Uw = 0.220 m**
**Ventilation openings per perimeter length:e = 0.0015 %**
**Mean wind speed:v = 5.000 m/s**
**Resistance on solum:Rg = 0.000 m²K/W**

| Layer | Description | Thickness (mm) | Conductivity (W/m²K) | Resistance (m²K/W) | Fraction (%) |
|---|---|---|---|---|---|
| **Ext surface** | | | | 0.1700 | |
| **Layer 1** | **Blockwork** | | | | |
| | Main construction | 100 | 0.1900 | 0.5263 | 90.91 |
| | Main construction | 100 | 1.0000 | 0.1000 | 9.09 |
| **Layer 2** | **Mannok Therm Floor** | | | | |
| | Main construction | 150 | 0.0220 | 6.8182 | 100.00 |
| | Corrections - Air Gap: Level 1, Fasteners: None or plastic | | | | |
| **Layer 3** | **Screed** | | | | |
| | Main construction | 75 | 1.1500 | 0.0652 | 100.00 |
| **Int surface** | | | | 0.1700 | |

**Total resistance:** **Upper limit =** 7.709 m² K/W **Lower limit =** 7.603 m² K/W **Average =** 7.656 m² K/W

**Total correction =** 0.0079 m² K/W **U-value (unrounded) =** 0.11 W/m² K

**Unheated space:** None

**Total thickness: 325 mm** **U-value: 0.11 W/m² K** **Kappa: n/a**



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

elmhurst energy

# SAP Report Submission for Building Regulations Compliance

Client: Vivid Design Studio

Project: Plot 7, Bitterne Parish Church, Whites Lane
Bitterne, Southampton, Hampshire , SO19 7NP

Contact: Mark Rogers
Surecalc Limited
mark@surecalc.co.uk

Report Issue Date: 06/12/2023

EXCELLENCE IN ENERGY ASSESSMENT

# CODE FOR SUSTAINABLE HOMES
## Calculation Type: New Build (As Designed)

sure calc ltd

| | | | |
|---|---|---|---|
| **Property Reference** | sc121838 | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling Part L 2021 |
| **Property** | Plot 7, Bitterne Parish Church, Whites Lane, Bitterne, Southampton, Hampshire , SO19 7NP | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 87 B | **DER** | 14.88 | **TER** | 27.06 |
| **Environmental** | 89 B | **% DER<TER** | 45.00 | | |
| **$CO_2$ Emissions (t/year)** | 0.93 | **DFEE** | 42.35 | **TFEE** | 54.07 |
| **General Requirements Compliance** | Pass | **% DFEE<TFEE** | 21.66 | | |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers, Surecalc Limited, Tel: 01243572695, mark@surecalc.co.uk | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Vivid Design Studio | | |

## ENE 1 - Dwelling Emission Rate calculation

| | | | |
|---|---|---|---|
| Total floor area | 81.4 | $m^2$ | |
| DER | 14.88 | $kgCO_2/yr/m^2$ | |
| TER | 27.06 | $kgCO_2/yr/m^2$ | |
| $CO_2$ emissions offset from additional allowable electricity generation | 0.00 | $kgCO_2/yr/m^2$ | (ZC7) |
| Residual $CO_2$ emissions offset from biofuel CHP | 0.00 | $kgCO_2/yr/m^2$ | (ZC5) |
| Total $CO_2$ emissions offset from SAP Section 16 allowances | 0.00 | $kgCO_2/yr/m^2$ | |
| DER accounting for SAP Section 16 allowances | 14.88 | $kgCO_2/yr/m^2$ | |
| Reduction DER/TER | 45.00 | % | |
| CfSH ENE1 credits achieved | 5.0 | | |
| CfSH ENE1 level achieved | 4 | | |

## ENE 2 – Fabric Energy Efficiency calculation

| | | | |
|---|---|---|---|
| Dwelling type | House, End-Terrace | | |
| Fabric energy efficiency (F.E.E.) | 42.35 | $kWh/m^2/yr$ | |
| CfSH ENE2 credits achieved | 7.9 | | |
| CfSH ENE1 and 2 overall level achieved | 4 | | |

## ENE 7 – Low and Zero Carbon Technologies calculation

**Standard case $CO_2$ emissions**

| | | | |
|---|---|---|---|
| Total floor area | 81.4 | $m^2$ | |
| DER | 19.74 | $kgCO_2/yr/m^2$ | |
| $CO_2$ emissions from electrical appliances | 16.19 | $kgCO_2/yr/m^2$ | (ZC2) |
| $CO_2$ emissions from cooking | 2.20 | $kgCO_2/yr/m^2$ | (ZC3) |
| Standard case total $CO_2$ emissions | 38.12 | $kgCO_2/yr/m^2$ | (ZC4) |
| Net Standard case $CO_2$ emissions | 38.12 | $kgCO_2/yr/m^2$ | (ZC8) |

**Actual case $CO_2$ emissions**

| | | | |
|---|---|---|---|
| DER | 18.46 | $kgCO_2/yr/m^2$ | |
| $CO_2$ emissions from electrical appliances | 16.19 | $kgCO_2/yr/m^2$ | (ZC2) |
| $CO_2$ emissions from cooking | 2.20 | $kgCO_2/yr/m^2$ | (ZC3) |
| Actual case total $CO_2$ emissions | 36.84 | $kgCO_2/yr/m^2$ | (ZC4) |
| $CO_2$ emissions from Biomass | 0.00 | $kgCO_2/yr/m^2$ | (ZC5) |
| $CO_2$ reduction from additional allowable electricity generation | 0.00 | $kgCO_2/yr/m^2$ | (ZC7) |
| Net Actual case $CO_2$ emissions | 36.84 | $kgCO_2/yr/m^2$ | (ZC8) |
| Improvement in net actual/net standard case $CO_2$ emissions | 3 | % | |

| | |
|---|---|
| ENE7 credits achieved | 0 |



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

# Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Array SAP 10 program, Array

**Date:** Wed 06 Dec 2023 15:26:39

| Project Information | | | |
|---|---|---|---|
| Assessed By | Mark Rogers | Building Type | House, End-terrace |
| OCDEA Registration | EES/004179 | Assessment Date | 2023-12-06 |

| Dwelling Details | | | |
|---|---|---|---|
| Assessment Type | As designed | Total Floor Area | 81 $m^2$ |
| Site Reference | sc100234 P7 Bitterne Church | Plot Reference | 001 |
| Address | Bitterne Parish Church Plot 7 Whites Lane, Southampton, SO19 7NP | | |

| Client Details | |
|---|---|
| Name | Philip Dudley |
| Company | Vivid Design Studio |
| Address | NA, NA, NA |

**This report covers items included within the SAP calculations. It is not a complete report of regulations compliance.**

| 1a Target emission rate and dwelling emission rate | | |
|---|---|---|
| Fuel for main heating system | Electricity | |
| *Target carbon dioxide emission rate* | *11.68 $kgCO_2/m^2$* | |
| Dwelling carbon dioxide emission rate | 4.05 $kgCO_2/m^2$ | OK |
| **1b Target primary energy rate and dwelling primary energy** | | |
| *Target primary energy* | *61.03 $kWh_{PE}/m^2$* | |
| Dwelling primary energy | 42.3 $kWh_{PE}/m^2$ | OK |
| **1c Target fabric energy efficiency and dwelling fabric energy efficiency** | | |
| *Target fabric energy efficiency* | *38.0 $kWh/m^2$* | |
| Dwelling fabric energy efficiency | 36.0 $kWh/m^2$ | OK |

| 2a Fabric U-values | | | | |
|---|---|---|---|---|
| **Element** | ***Maximum permitted average U-Value [$W/m^2K$]*** | **Dwelling average U-Value [$W/m^2K$]** | **Element with highest individual U-Value** | |
| External walls | *0.26* | 0.22 | Walls (1) (0.22) | OK |
| Party walls | *0.2* | 0 | Party Wall (1) (0) | **N/A** |
| Curtain walls | *1.6* | 0 | N/A | **N/A** |
| Floors | *0.18* | 0.11 | Ground Floor (0.11) | OK |
| Roofs | *0.16* | 0.09 | Roof (1) (0.09) | OK |
| Windows, doors, and roof windows | *1.6* | 1.2 | Front South Door (1.2) | OK |
| Rooflights | *2.2* | N/A | N/A | **N/A** |

| 2b Envelope elements (better than typically expected values are flagged with a subsequent (!)) | | |
|---|---|---|
| **Name** | **Net area [$m^2$]** | **U-Value [$W/m^2K$]** |
| Exposed wall: Walls (1) | 78.06 | 0.22 |
| Party wall: Party Wall (1) | 47.17 | 0 **(!)** |
| Ground floor: Ground Floor, Ground Floor | 40.7 | 0.11 |
| Exposed roof: Roof (1) | 40.7 | 0.09 **(!)** |

| 2c Openings (better than typically expected values are flagged with a subsequent (!)) | | | | |
|---|---|---|---|---|
| **Name** | **Area [$m^2$]** | **Orientation** | **Frame factor** | **U-Value [$W/m^2K$]** |
| Front South Door, New Dwell Entrance Door | 2.01 | South | N/A | 1.2 |
| Front South Windows, New Dwelling DG Window | 4.18 | South | 0.7 | 1.2 |
| Side West Windows, New Dwelling DG Window | 2.16 | West | 0.7 | 1.2 |
| Rear North Windows, New Dwelling DG Window | 3.06 | North | 0.7 | 1.2 |
| Rear North Windows, New Dwell DG French Doors | 3.33 | North | 0.7 | 1.2 |

| 2d Thermal bridging (better than typically expected values are flagged with a subsequent (!)) |
|---|
| Building part **1 - Main Dwelling**: Thermal bridging calculated from linear thermal transmittances for each junction |

| Main element | Junction detail | Source | Psi value [W/mK] | Drawing / reference |
|---|---|---|---|---|
| External wall | E2: Other lintels (including other steel lintels) | Calculated by person with suitable expertise | 0.05 | IG or Keystone Hi Therm + |
| External wall | E3: Sill | Calculated by person with suitable expertise | 0.018 **(!)** | Recognised Construction Detail |
| External wall | E4: Jamb | Calculated by person with suitable expertise | 0.014 **(!)** | Recognised Construction Detail |
| External wall | E5: Ground floor (normal) | Calculated by person with suitable expertise | 0.068 | Recognised Construction Detail |
| External wall | E6: Intermediate floor within a dwelling | Calculated by person with suitable expertise | 0.001 **(!)** | Recognised Construction Detail |
| External wall | E10: Eaves (insulation at ceiling level) | Calculated by person with suitable expertise | 0.055 | Recognised Construction Detail |
| External wall | E16: Corner (normal) | Calculated by person with suitable expertise | 0.051 | Recognised Construction Detail |
| External wall | E18: Party wall between dwellings | Calculated by person with suitable expertise | 0.044 | Recognised Construction Detail |
| Party wall | P1: Ground floor | Calculated by person with suitable expertise | 0.103 | Recognised Construction Detail |
| Party wall | P2: Intermediate floor within a dwelling | SAP table default | 0 **(!)** | |
| Party wall | P4: Roof (insulation at ceiling level) | Calculated by person with suitable expertise | 0.101 | Recognised Construction Detail |

| 3 Air permeability (better than typically expected values are flagged with a subsequent (!)) | | |
|---|---|---|
| *Maximum permitted air permeability at 50Pa* | *8 $m^3/hm^2$* | |
| Dwelling air permeability at 50Pa | 5.05 $m^3/hm^2$, Design value | OK |
| Air permeability test certificate reference | | |

| 4 Space heating | |
|---|---|
| **Main heating system 1**: Heat pump with radiators or underfloor heating - Electricity | |
| Efficiency | 232.5% |
| Emitter type | Radiators |
| Flow temperature | 55°C |
| System type | Heat Pump |
| Manufacturer | Daikin Europe NV |
| Model | EDLA04EV3 |
| Commissioning | |
| **Secondary heating system**: N/A | |
| Fuel | N/A |
| Efficiency | N/A |
| Commissioning | |

| 5 Hot water | |
|---|---|
| **Cylinder/store** - type: Cylinder | |
| Capacity | 180 litres |
| Declared heat loss | 1.39 kWh/day |
| Primary pipework insulated | Yes |
| Manufacturer | |
| Model | |
| Commissioning | |
| **Waste water heat recovery system 1** - type: N/A | |
| Efficiency | |
| Manufacturer | |
| Model | |

| 6 Controls | | |
|---|---|---|
| **Main heating 1** - type: Time and temperature zone control by arrangement of plumbing and electrical services | | |
| Function | | |
| Ecodesign class | | |
| Manufacturer | | |
| Model | | |
| **Water heating** - type: Cylinder thermostat and HW separately timed | | |
| Manufacturer | | |
| Model | | |

| 7 Lighting | | |
|---|---|---|
| *Minimum permitted light source efficacy* | *75 lm/W* | |
| Lowest light source efficacy | 75 lm/W | **OK** |
| External lights control | N/A | |

| 8 Mechanical ventilation | | |
|---|---|---|
| **System type:** N/A | | |
| *Maximum permitted specific fan power* | *N/A* | |
| Specific fan power | N/A | **N/A** |
| *Minimum permitted heat recovery efficiency* | *N/A* | |
| Heat recovery efficiency | N/A | **N/A** |
| Manufacturer/Model | | |
| Commissioning | | |

| 9 Local generation |
|---|
| N/A |

| 10 Heat networks |
|---|
| N/A |

| 11 Supporting documentary evidence |
|---|
| N/A |

| 12 Declarations | |
|---|---|
| **a. Assessor Declaration** | |
| This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report. | |
| Signed:<br><br>Name: | Assessor ID:<br><br>Date: |
| **b. Client Declaration** | |
| N/A | |

# Predicted Energy Assessment

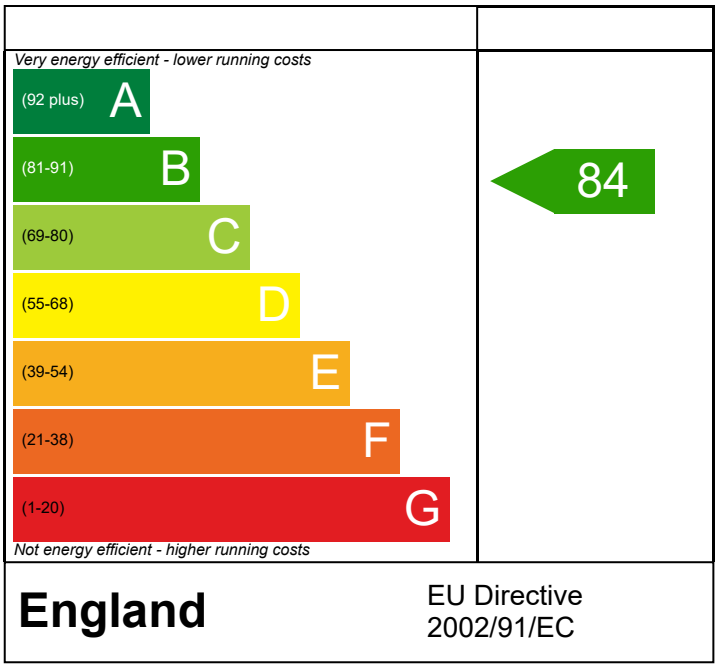
Plot 7, Bitterne Parish Church, Whites Lane,
Southampton, Hampshire , SO19 7NP

| | |
|---|---|
| Dwelling type: | House, End-Terrace |
| Date of assessment: | 06/12/2023 |
| Produced by: | Mark Rogers |
| Total floor area: | 81.4 m² |
| DRRN: | 0207-3520-6991 |

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

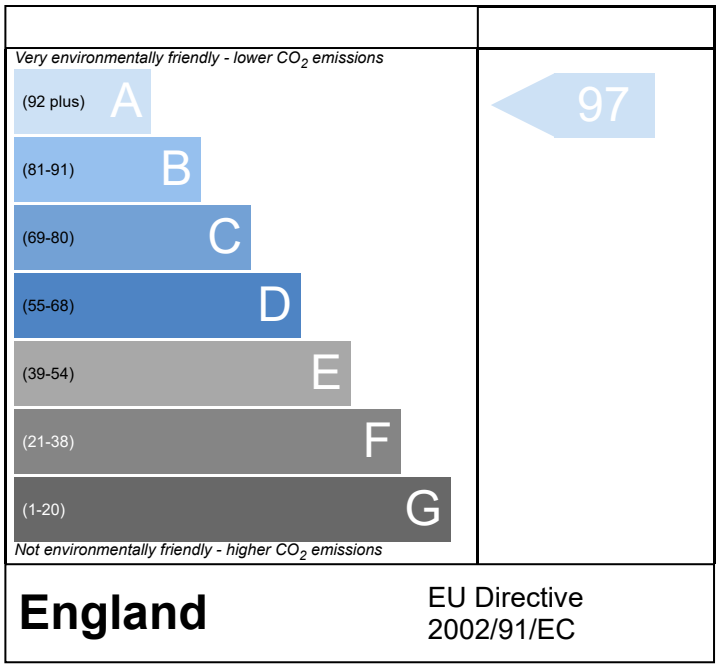
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

## Energy Efficiency Rating




The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

## Environmental Impact ($CO_2$) Rating




The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide ($CO_2$) emissions. The higher the rating the less impact it has on the environment.

# Summary for Input Data

| | | | |
|---|---|---|---|
| **Property Reference** | sc100234 P7 Bitterne Church | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling |
| **Property** | Plot 7, Bitterne Parish Church, Whites Lane, Southampton, Hampshire , SO19 7NP | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 84 B | **DER** | 4.05 | **TER** | 11.68 |
| **Environmental** | 97 A | **% DER < TER** | | | 65.33 |
| **$CO_2$ Emissions (t/year)** | 0.27 | **DFEE** | 36.04 | **TFEE** | 37.96 |
| **Compliance Check** | See BREL | **% DFEE < TFEE** | | | 5.06 |
| **% DPER < TPER** | 30.70 | **DPER** | 42.30 | **TPER** | 61.03 |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Philip Dudley | | |

## SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

| | |
|---|---|
| **Orientation** | South |
| **Property Tenture** | ND |
| **Transaction Type** | 6 |
| **Terrain Type** | Suburban |
| **1.0 Property Type** | House, End-Terrace |
| **2.0 Number of Storeys** | 2 |
| **3.0 Date Built** | 2023 |
| **4.0 Sheltered Sides** | 1 |
| **5.0 Sunlight/Shade** | Average or unknown |
| **6.0 Thermal Mass Parameter** | Precise calculation |
| **7.0 Electricity Tariff** | Standard |
| Smart electricity meter fitted | No |
| Smart gas meter fitted | No |

**7.0 Measurements**

| | Heat Loss Perimeter | Internal Floor Area | Average Storey Height |
|---|---|---|---|
| **Ground floor:** | 18.02 m | 40.70 m² | 2.39 m |
| **1st Storey:** | 18.02 m | 40.70 m² | 2.76 m |

**8.0 Living Area** 18.06 m²

**9.0 External Walls**

| Description | Type | Construction | U-Value (W/m²K) | Kappa (kJ/m²K) | Gross Area(m²) | Nett Area (m²) | Shelter Res | Shelter | Openings | Area Calculation Type |
|---|---|---|---|---|---|---|---|---|---|---|
| External Cavity Wall | Cavity Wall | Cavity wall; plasterboard on dabs or battens, lightweight aggregate block, filled cavity, any outside structure | 0.22 | 110.00 | 92.80 | 78.06 | 0.00 | None | 14.74 | Calculate Wall Area |

**9.1 Party Walls**

| Description | Type | Construction | U-Value (W/m²K) | Kappa (kJ/m²K) | Area (m²) | Shelter Res | Shelter |
|---|---|---|---|---|---|---|---|
| Party Wall | Filled Cavity with Edge Sealing | Single plasterboard on dabs both sides, lightweight aggregate blocks, cavity or cavity fill | 0.00 | 110.00 | 47.17 | | None |

**9.2 Internal Walls**

| Description | Construction | Kappa (kJ/m²K) | Area (m²) |
|---|---|---|---|
| Internal Stud Walls | Plasterboard on timber frame | 9.00 | 140.29 |

**10.0 External Roofs**

| Description | Type | Construction | U-Value (W/m²K) | Kappa (kJ/m²K) | Gross Area(m²) | Nett Area (m²) | Shelter Code | Shelter Factor | Calculation Type | Openings |
|---|---|---|---|---|---|---|---|---|---|---|
| External Pitched Roofs | External Plane Roof | Plasterboard, insulated at ceiling level | 0.09 | 9.00 | 40.70 | 40.70 | None | 0.00 | Calculate Wall Area | 0.00 |

**10.2 Internal Ceilings**

| Description | Storey | Construction | Area (m²) |
|---|---|---|---|
| Internal Ceiling | Lowest occupied | Plasterboard ceiling, carpeted chipboard floor | 40.70 |

**11.0 Heat Loss Floors**

| Description | Type | Storey Index | Construction | U-Value (W/m²K) | Shelter Code | Shelter Factor | Kappa (kJ/m²K) | Area (m²) |
|---|---|---|---|---|---|---|---|---|
| Ground Floor | Ground Floor - Solid | Lowest occupied | Suspended concrete floor, carpeted | 0.11 | None | 0.00 | 75.00 | 40.70 |

# Summary for Input Data

elmhurst energy

**11.2 Internal Floors**

| Description | Storey Index | Construction | Kappa (kJ/m²K) | Area (m²) |
|---|---|---|---|---|
| Internal Floor | | Plasterboard ceiling, carpeted chipboard floor | 9.00 | 40.70 |

**12.0 Opening Types**

| Description | Data Source | Type | Glazing | Glazing Gap | Filling Type | G-value | Frame Type | Frame Factor | U Value (W/m²K) |
|---|---|---|---|---|---|---|---|---|---|
| New Dwell Entrance Door | Manufacturer | Half Glazed Door | Double Low-E Soft 0.05 | | | 0.36 | | 0.70 | 1.20 |
| New Dwell DG French Doors | Manufacturer | Window | Double Low-E Soft 0.05 | | | 0.71 | | 0.70 | 1.20 |
| New Dwelling DG Window | Manufacturer | Window | Double Low-E Soft 0.05 | | | 0.71 | | 0.70 | 1.20 |

**13.0 Openings**

| Name | Opening Type | Location | Orientation | Area (m²) | Pitch |
|---|---|---|---|---|---|
| Front South Door | New Dwell Entrance Door | External Cavity Wall | South | 2.01 | |
| Front South Windows | New Dwelling DG Window | External Cavity Wall | South | 4.18 | |
| Side West Windows | New Dwelling DG Window | External Cavity Wall | West | 2.16 | |
| Rear North Windows | New Dwelling DG Window | External Cavity Wall | North | 3.06 | |
| Rear North Windows | New Dwell DG French Doors | External Cavity Wall | North | 3.33 | |

| | | |
|---|---|---|
| **14.0 Conservatory** | None | |
| **15.0 Draught Proofing** | 100 | % |
| **16.0 Draught Lobby** | No | |
| **17.0 Thermal Bridging** | Calculate Bridges | |

**17.1 List of Bridges**

| Bridge Type | Source Type | Length | Psi | Adjusted | Reference: | Imported |
|---|---|---|---|---|---|---|
| E2 Other lintels (including other steel lintels) | Independently assessed | 10.78 | 0.05 | 0.05 | IG or Keystone Hi Therm + | No |
| E3 Sill | Independently assessed | 9.82 | 0.02 | 0.02 | Recognised Construction Detail | No |
| E4 Jamb | Independently assessed | 28.50 | 0.01 | 0.01 | Recognised Construction Detail | No |
| E5 Ground floor (normal) | Independently assessed | 18.02 | 0.07 | 0.07 | Recognised Construction Detail | No |
| E6 Intermediate floor within a dwelling | Independently assessed | 18.02 | 0.00 | 0.00 | Recognised Construction Detail | No |
| E10 Eaves (insulation at ceiling level) | Independently assessed | 18.02 | 0.06 | 0.06 | Recognised Construction Detail | No |
| E16 Corner (normal) | Independently assessed | 10.30 | 0.05 | 0.05 | Recognised Construction Detail | No |
| E18 Party wall between dwellings | Independently assessed | 10.30 | 0.04 | 0.04 | Recognised Construction Detail | No |
| P1 Party wall - Ground floor | Independently assessed | 9.16 | 0.10 | 0.10 | Recognised Construction Detail | No |
| P2 Party wall - Intermediate floor within a dwelling | Table K1 - Default | 9.16 | 0.00 | 0.00 | | No |
| P4 Party wall - Roof (insulation at ceiling level) | Independently assessed | 9.16 | 0.10 | 0.10 | Recognised Construction Detail | No |

| | | |
|---|---|---|
| Y-value | 0.00 | W/m²K |
| **18.0 Pressure Testing** | Yes | |
| Designed $AP_{50}$ | 5.05 | m³/(h.m²) @ 50 Pa |
| Test Method | Blower Door | |
| **19.0 Mechanical Ventilation** | | |
| **Mechanical Ventilation** | | |
| Mechanical Ventilation System Present | No | |
| **20.0 Fans, Open Fireplaces, Flues** | | |
| **21.0 Fixed Cooling System** | No | |
| **22.0 Lighting** | | |
| No Fixed Lighting | No | |

| Name | Efficacy | Power | Capacity | Count |
|---|---|---|---|---|
| Low energy Lighting | 75.00 | 15 | 1125 | 24 |

| | | |
|---|---|---|
| **24.0 Main Heating 1** | Database | |
| Description | Electric Air Source Heat Pump | |
| Percentage of Heat | 100.00 | % |
| Database Ref. No. | 106465 | |
| Fuel Type | Electricity | |
| In Winter | 0.00 | |
| In Summer | 0.00 | |
| Model Name | EDLA04EV3 | |
| Manufacturer | Daikin Europe NV | |
| System Type | Heat Pump | |
| Controls SAP Code | 2207 | |

# Summary for Input Data

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| | |
|---|---|
| PCDF Controls | 0 |
| Is MHS Pumped | Pump in heated space |
| Heating Pump Age | 2013 or later |
| Heat Emitter | Radiators |
| Flow Temperature | Enter value |
| Flow Temperature Value | 55.00 |

**25.0 Main Heating 2** — None

**26.0 Heat Networks** — None

| | Heat Source | Fuel Type | Heating Use | Efficiency | Percentage Of Heat | Heat | Heat Power Ratio | Electrical | Fuel Factor | Efficiency type |
|---|---|---|---|---|---|---|---|---|---|---|
| Heat source 1 | | | | | | | | | | |
| Heat source 2 | | | | | | | | | | |
| Heat source 3 | | | | | | | | | | |
| Heat source 4 | | | | | | | | | | |
| Heat source 5 | | | | | | | | | | |

**28.0 Water Heating**

| | |
|---|---|
| Water Heating | Main Heating 1 |
| SAP Code | 901 |
| Flue Gas Heat Recovery System | No |
| Waste Water Heat Recovery Instantaneous System 1 | No |
| Waste Water Heat Recovery Instantaneous System 2 | No |
| Waste Water Heat Recovery Storage System | No |
| Solar Panel | No |
| Water use <= 125 litres/person/day | Yes |
| Cold Water Source | From mains |
| Bath Count | 1 |
| Immersion Only Heating Hot Water | No |

**28.1 Showers**

| Description | Shower Type | Flow Rate [l/min] | Rated Power [kW] | Connected | Connected To |
|---|---|---|---|---|---|

**28.3 Waste Water Heat Recovery System**

| | | |
|---|---|---|
| **29.0 Hot Water Cylinder** | Hot Water Cylinder | |
| Cylinder Stat | Yes | |
| Cylinder In Heated Space | Yes | |
| Independent Time Control | Yes | |
| Insulation Type | Measured Loss | |
| Cylinder Volume | 180.00 | L |
| Loss | 1.39 | kWh/day |
| Pipes insulation | Fully insulated primary pipework | |
| In Airing Cupboard | No | |

**31.0 Thermal Store** — None

**Recommendations**

**Lower cost measures**

**None**

**Further measures to achieve even higher standards**

| Typical Cost | Typical savings per year | Ratings after improvement SAP rating | Environmental Impact |
|---|---|---|---|
| £4,000 - £6,000 | £46 | B 85 | A 97 |
| £3,500 - £5,500 | £187 | B 91 | A 98 |
| | | 0 | 0 |

# Thermal Bridging

elmhurst energy

| | | | |
|---|---|---|---|
| **Property Reference** | sc100234 P7 Bitterne Church | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | End-Terrace House |
| **Property** | Plot 7, Bitterne Parish Church, Whites Lane, Southampton, Hampshire , SO19 7NP | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 84 B | **DER** | 4.05 | **TER** | 11.68 |
| **Environmental** | 97 A | **% DER < TER** | | | 65.33 |
| **$CO_2$ Emissions (t/year)** | 0.27 | **DFEE** | 36.04 | **TFEE** | 37.96 |
| **Compliance Check** | See BREL | **% DFEE < TFEE** | | | 5.06 |
| **% DPER < TPER** | 30.70 | **DPER** | 42.30 | **TPER** | 61.03 |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Philip Dudley | | |

| | Junction details | Source Type | Psi (W/mK) | Length (m) | Result | Reference |
|---|---|---|---|---|---|---|
| External wall | E2 Other lintels (including other steel lintels) | Independently assessed | 0.050 | 10.78 | 0.54 | IG or Keystone Hi Therm + |
| External wall | E3 Sill | Independently assessed | 0.018 | 9.82 | 0.18 | Recognised Construction Detail |
| External wall | E4 Jamb | Independently assessed | 0.014 | 28.50 | 0.40 | Recognised Construction Detail |
| External wall | E5 Ground floor (normal) | Independently assessed | 0.068 | 18.02 | 1.23 | Recognised Construction Detail |
| External wall | E6 Intermediate floor within a dwelling | Independently assessed | 0.001 | 18.02 | 0.02 | Recognised Construction Detail |
| External wall | E10 Eaves (insulation at ceiling level) | Independently assessed | 0.055 | 18.02 | 0.99 | Recognised Construction Detail |
| External wall | E16 Corner (normal) | Independently assessed | 0.051 | 10.30 | 0.53 | Recognised Construction Detail |
| External wall | E18 Party wall between dwellings | Independently assessed | 0.044 | 10.30 | 0.45 | Recognised Construction Detail |
| Party wall | P1 Party wall - Ground floor | Independently assessed | 0.103 | 9.16 | 0.94 | Recognised Construction Detail |
| Party wall | P2 Party wall - Intermediate floor within a dwelling | Table K1 - Default | 0.000 | 9.16 | 0.00 | |
| Party wall | P4 Party wall - Roof (insulation at ceiling level) | Independently assessed | 0.101 | 9.16 | 0.93 | Recognised Construction Detail |

Total: 151.24 W/mK:

Y-Value: 0.00 W/m²K:

# U-VALUE CALCULATOR REPORT

| | | | |
|---|---|---|---|
| **Property Reference** | sc121838 | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling Part L 2021 |
| **Project** | Plot 7, Bitterne Parish Church, Whites Lane, Bitterne, Southampton, Hampshire , SO19 7NP | | |
| **Calculation Type** | New Build (As Designed) | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 87 B | **DER** | 14.88 | **TER** | 27.06 |
| **Environmental** | 89 B | **% DER<TER** | 45.00 | | |
| **$CO_2$ Emissions (t/year)** | 0.93 | **DFEE** | 42.35 | **TFEE** | 54.07 |
| **General Requirements Compliance** | Pass | **% DFEE<TFEE** | 21.66 | | |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers, Surecalc Limited, Tel: 01243572695, mark@surecalc.co.uk | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Vivid Design Studio | | |

## Building Elements

### Roof 000002 - Pitched Roof Insulated Ceiling Vivid

**Roof Type: Pitched Roof, insulated flat ceiling**

| Layer | Description | Thickness (mm) | Conductivity (W/m²K) | Resistance (m²K/W) | Fraction (%) |
|---|---|---|---|---|---|
| **Ext surface** | | | | 0.0400 | |
| **Layer 1** | **Loft Space** | | | | |
| | Main construction | 0 | 0.0600 | 0.0600 | 100.00 |
| **Layer 2** | **Mineral wool** | | | | |
| | Main construction | 350 | 0.0440 | 7.9545 | 100.00 |
| | Corrections - Air Gap: Level 0, Fasteners: None or plastic | | | | |
| **Layer 3** | **Mineral wool quilt** | | | | |
| | Main construction | 150 | 0.0440 | 3.4091 | 93.67 |
| | Main construction | 150 | 0.1300 | 1.1538 | 6.33 |
| | Corrections - Air Gap: Level 0, Fasteners: None or plastic | | | | |
| **Layer 4** | **Plasterboard, standard** | | | | |
| | Main construction | 12.5 | 0.2100 | 0.0595 | 100.00 |
| **Int surface** | | | | 0.1000 | |

**Total resistance:** **Upper limit =** 11.449 m² K/W **Lower limit =** 11.248 m² K/W **Average =** 11.348 m² K/W

**Total correction =** 0.0030 m² K/W **U-value (unrounded) =** 0.09 W/m² K

**Unheated space:** None

**Total thickness: 513 mm** **U-value: 0.09 W/m² K** **Kappa: n/a**



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

# U-VALUE CALCULATOR REPORT

| | | | |
|---|---|---|---|
| **Property Reference** | sc121838 | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling Part L 2021 |
| **Project** | Plot 7, Bitterne Parish Church, Whites Lane, Bitterne, Southampton, Hampshire , SO19 7NP | | |
| **Calculation Type** | New Build (As Designed) | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 87 B | **DER** | 14.88 | **TER** | 27.06 |
| **Environmental** | 89 B | **% DER<TER** | 45.00 | | |
| **$CO_2$ Emissions (t/year)** | 0.93 | **DFEE** | 42.35 | **TFEE** | 54.07 |
| **General Requirements Compliance** | Pass | **% DFEE<TFEE** | 21.66 | | |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers, Surecalc Limited, Tel: 01243572695, mark@surecalc.co.uk | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Vivid Design Studio | | |

## Building Elements

### Wall 000001 - Vivid Cavity Wall 125 Knauf Supafil 34

**Wall Type: Standard Wall**

| Layer | Description | Thickness (mm) | Conductivity (W/m²K) | Resistance (m²K/W) | Fraction (%) |
|---|---|---|---|---|---|
| **Ext surface** | | | | 0.0400 | |
| **Layer 1** | **Brick, outer leaf** | | | | |
| | Main construction | 102 | 0.7700 | 0.1325 | 82.81 |
| | Main construction | 102 | 0.9407 | 0.1084 | 17.19 |
| **Layer 2** | **Knauf Supafil 34 blown Cavity Fill** | | | | |
| | Main construction | 125 | 0.0340 | 3.6765 | 100.00 |
| | Corrections - Air Gap: Level 0, Fasteners: Wall ties, Cross sectional area: 12.50 mm², Lambda: 17.000 W/m.K, per m²: 2.500 | | | | |
| **Layer 3** | **Masterblock Masterlite Ultra** | | | | |
| | Main construction | 100 | 0.2700 | 0.3704 | 93.43 |
| | Main construction | 100 | 0.8803 | 0.1136 | 6.57 |
| **Layer 4** | **airspace/plaster dabs** | | | | |
| | Main construction | 15 | 0.1000 | 0.1500 | 80.00 |
| | Main construction | 15 | 0.0882 | 0.1700 | 20.00 |
| | Corrections - Cavity Unventilated, Emissivity: Normal | | | | |
| **Layer 5** | **Plasterboard, standard** | | | | |
| | Main construction | 12.5 | 0.2100 | 0.0595 | 100.00 |
| **Int surface** | | | | 0.1300 | |

**Total resistance:** **Upper limit =** 4.541 m² K/W **Lower limit =** 4.510 m² K/W **Average =** 4.525 m² K/W

**Total correction =** 0.0018 m² K/W **U-value (unrounded) =** 0.22 W/m² K

**Unheated space:** None

**Total thickness: 355 mm** **U-value: 0.22 W/m² K** **Kappa: n/a**



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

# U-VALUE CALCULATOR REPORT

| | | | |
|---|---|---|---|
| **Property Reference** | sc121838 | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling Part L 2021 |
| **Project** | Plot 7, Bitterne Parish Church, Whites Lane, Bitterne, Southampton, Hampshire , SO19 7NP | | |
| **Calculation Type** | New Build (As Designed) | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 87 B | **DER** | 14.88 | **TER** | 27.06 |
| **Environmental** | 89 B | **% DER<TER** | 45.00 | | |
| **$CO_2$ Emissions (t/year)** | 0.93 | **DFEE** | 42.35 | **TFEE** | 54.07 |
| **General Requirements Compliance** | Pass | **% DFEE<TFEE** | 21.66 | | |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers, Surecalc Limited, Tel: 01243572695, mark@surecalc.co.uk | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Vivid Design Studio | | |

## Building Elements

### Floor 000003 - Ground Floor Beam and Block

**Floor Type: Suspended Floor**
**Area = 40.70 m², Perimeter = 18.02 m, Wall thickness = 300.00 mm, Soil: Unknown**
**Depth of underfloor space below ground:0.200 m  Floor wind shielding: Average (suburban)**
**Floor height above ground:h = 0.150 m**
**U-value of walls above ground:Uw = 0.220 m**
**Ventilation openings per perimeter length:e = 0.0015 %**
**Mean wind speed:v = 5.000 m/s**
**Resistance on solum:Rg = 0.000 m²K/W**

| Layer | Description | Thickness (mm) | Conductivity (W/m²K) | Resistance (m²K/W) | Fraction (%) |
|---|---|---|---|---|---|
| **Ext surface** | | | | 0.1700 | |
| **Layer 1** | **Blockwork** | | | | |
| | Main construction | 100 | 0.1900 | 0.5263 | 90.91 |
| | Main construction | 100 | 1.0000 | 0.1000 | 9.09 |
| **Layer 2** | **Mannok Therm Floor** | | | | |
| | Main construction | 150 | 0.0220 | 6.8182 | 100.00 |
| | Corrections - Air Gap: Level 1, Fasteners: None or plastic | | | | |
| **Layer 3** | **Screed** | | | | |
| | Main construction | 75 | 1.1500 | 0.0652 | 100.00 |
| **Int surface** | | | | 0.1700 | |

**Total resistance:** **Upper limit =** 7.709 m² K/W **Lower limit =** 7.603 m² K/W **Average =** 7.656 m² K/W

**Total correction =** 0.0079 m² K/W **U-value (unrounded) =** 0.11 W/m² K

**Unheated space:** None

**Total thickness: 325 mm** **U-value: 0.11 W/m² K** **Kappa: n/a**



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

elmhurst energy

# SAP Report Submission for Building Regulations Compliance

Client: Vivid Design Studio

Project: Plot 8, Bitterne Parish Church, Whites Lane
Bitterne, Southampton, Hampshire , SO19 7NP

Contact: Mark Rogers
Surecalc Limited
mark@surecalc.co.uk

Report Issue Date: 06/12/2023

EXCELLENCE IN ENERGY ASSESSMENT

# CODE FOR SUSTAINABLE HOMES
## Calculation Type: New Build (As Designed)

| | | | |
|---|---|---|---|
| **Property Reference** | sc121839 | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling Part L 2021 |
| **Property** | Plot 8, Bitterne Parish Church, Whites Lane, Bitterne, Southampton, Hampshire , SO19 7NP | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 88 B | **DER** | 13.52 | **TER** | 25.39 |
| **Environmental** | 89 B | **% DER<TER** | 46.75 | | |
| **$CO_2$ Emissions (t/year)** | 1.02 | **DFEE** | 41.82 | **TFEE** | 53.06 |
| **General Requirements Compliance** | Pass | **% DFEE<TFEE** | 21.19 | | |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers, Surecalc Limited, Tel: 01243572695, mark@surecalc.co.uk | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Vivid Design Studio | | |

## ENE 1 - Dwelling Emission Rate calculation

| | | | |
|---|---|---|---|
| Total floor area | 97.6 | $m^2$ | |
| DER | 13.52 | $kgCO_2/yr/m^2$ | |
| TER | 25.39 | $kgCO_2/yr/m^2$ | |
| $CO_2$ emissions offset from additional allowable electricity generation | 0.00 | $kgCO_2/yr/m^2$ | (ZC7) |
| Residual $CO_2$ emissions offset from biofuel CHP | 0.00 | $kgCO_2/yr/m^2$ | (ZC5) |
| Total $CO_2$ emissions offset from SAP Section 16 allowances | 0.00 | $kgCO_2/yr/m^2$ | |
| DER accounting for SAP Section 16 allowances | 13.52 | $kgCO_2/yr/m^2$ | |
| Reduction DER/TER | 46.75 | % | |
| CfSH ENE1 credits achieved | 5.2 | | |
| CfSH ENE1 level achieved | 4 | | |

## ENE 2 – Fabric Energy Efficiency calculation

| | | | |
|---|---|---|---|
| Dwelling type | House, Semi-Detached | | |
| Fabric energy efficiency (F.E.E.) | 41.82 | $kWh/m^2/yr$ | |
| CfSH ENE2 credits achieved | 8.0 | | |
| CfSH ENE1 and 2 overall level achieved | 4 | | |

## ENE 7 – Low and Zero Carbon Technologies calculation

**Standard case $CO_2$ emissions**

| | | | |
|---|---|---|---|
| Total floor area | 97.6 | $m^2$ | |
| DER | 18.84 | $kgCO_2/yr/m^2$ | |
| $CO_2$ emissions from electrical appliances | 15.32 | $kgCO_2/yr/m^2$ | (ZC2) |
| $CO_2$ emissions from cooking | 1.89 | $kgCO_2/yr/m^2$ | (ZC3) |
| Standard case total $CO_2$ emissions | 36.05 | $kgCO_2/yr/m^2$ | (ZC4) |
| Net Standard case $CO_2$ emissions | 36.05 | $kgCO_2/yr/m^2$ | (ZC8) |

**Actual case $CO_2$ emissions**

| | | | |
|---|---|---|---|
| DER | 16.64 | $kgCO_2/yr/m^2$ | |
| $CO_2$ emissions from electrical appliances | 15.32 | $kgCO_2/yr/m^2$ | (ZC2) |
| $CO_2$ emissions from cooking | 1.89 | $kgCO_2/yr/m^2$ | (ZC3) |
| Actual case total $CO_2$ emissions | 33.85 | $kgCO_2/yr/m^2$ | (ZC4) |
| $CO_2$ emissions from Biomass | 0.00 | $kgCO_2/yr/m^2$ | (ZC5) |
| $CO_2$ reduction from additional allowable electricity generation | 0.00 | $kgCO_2/yr/m^2$ | (ZC7) |
| Net Actual case $CO_2$ emissions | 33.85 | $kgCO_2/yr/m^2$ | (ZC8) |
| Improvement in net actual/net standard case $CO_2$ emissions | 6 | % | |



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| | |
|---|---|
| ENE7 credits achieved | 0 |



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# Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Array SAP 10 program, Array

**Date:** Wed 06 Dec 2023 15:27:21

| Project Information | | | |
|---|---|---|---|
| Assessed By | Mark Rogers | Building Type | House, Semi-detached |
| OCDEA Registration | EES/004179 | Assessment Date | 2023-12-06 |

| Dwelling Details | | | |
|---|---|---|---|
| Assessment Type | As designed | Total Floor Area | 98 $m^2$ |
| Site Reference | sc100235 P8 Bitterne Church | Plot Reference | 001 |
| Address | Bitterne Parish Church Plot 8 Whites Lane, Southampton, SO19 7NP | | |

| Client Details | |
|---|---|
| Name | Philip Dudley |
| Company | Vivid Design Studio |
| Address | NA, NA, NA |

**This report covers items included within the SAP calculations. It is not a complete report of regulations compliance.**

| 1a Target emission rate and dwelling emission rate | | |
|---|---|---|
| Fuel for main heating system | Electricity | |
| *Target carbon dioxide emission rate* | *10.66 $kgCO_2/m^2$* | |
| Dwelling carbon dioxide emission rate | 3.91 $kgCO_2/m^2$ | OK |
| **1b Target primary energy rate and dwelling primary energy** | | |
| *Target primary energy* | *55.61 $kWh_{PE}/m^2$* | |
| Dwelling primary energy | 40.74 $kWh_{PE}/m^2$ | OK |
| **1c Target fabric energy efficiency and dwelling fabric energy efficiency** | | |
| *Target fabric energy efficiency* | *37.4 $kWh/m^2$* | |
| Dwelling fabric energy efficiency | 35.8 $kWh/m^2$ | OK |

| 2a Fabric U-values | | | | |
|---|---|---|---|---|
| **Element** | ***Maximum permitted average U-Value [$W/m^2K$]*** | **Dwelling average U-Value [$W/m^2K$]** | **Element with highest individual U-Value** | |
| External walls | *0.26* | 0.22 | Walls (1) (0.22) | OK |
| Party walls | *0.2* | 0 | Party Wall (1) (0) | **N/A** |
| Curtain walls | *1.6* | 0 | N/A | **N/A** |
| Floors | *0.18* | 0.11 | Ground Floor (0.11) | OK |
| Roofs | *0.16* | 0.09 | Roof (1) (0.09) | OK |
| Windows, doors, and roof windows | *1.6* | 1.2 | Front East Door (1.2) | OK |
| Rooflights | *2.2* | N/A | N/A | **N/A** |

| 2b Envelope elements (better than typically expected values are flagged with a subsequent (!)) | | |
|---|---|---|
| **Name** | **Net area [$m^2$]** | **U-Value [$W/m^2K$]** |
| Exposed wall: Walls (1) | 83.28 | 0.22 |
| Exposed wall: Walls (2) | 6 | 0.21 |
| Party wall: Party Wall (1) | 47.38 | 0 **(!)** |
| Ground floor: Ground Floor, Ground Floor | 48.8 | 0.11 |
| Exposed roof: Roof (1) | 48.8 | 0.09 **(!)** |

| 2c Openings (better than typically expected values are flagged with a subsequent (!)) | | | | |
|---|---|---|---|---|
| **Name** | **Area [$m^2$]** | **Orientation** | **Frame factor** | **U-Value [$W/m^2K$]** |
| Front East Door, New Dwell Entrance Door | 2.01 | West | N/A | 1.2 |
| Front East Windows, New Dwelling DG Window | 2.73 | West | 0.7 | 1.2 |
| Front East Window, New Dwelling DG Window | 1.9 | West | 0.7 | 1.2 |
| Side North Windows, New Dwelling DG Window | 1.8 | North | 0.7 | 1.2 |
| Rear West Windows, New Dwelling DG Window | 3.94 | East | 0.7 | 1.2 |
| Rear West Windows, New Dwell DG French Doors | 3.92 | East | 0.7 | 1.2 |

| Name | Area [$m^2$] | Orientation | Frame factor | U-Value [$W/m^2K$] |
|---|---|---|---|---|

| 2d Thermal bridging (better than typically expected values are flagged with a subsequent (!)) | | | | |
|---|---|---|---|---|
| Building part **1 - Main Dwelling**: Thermal bridging calculated from linear thermal transmittances for each junction | | | | |
| **Main element** | **Junction detail** | **Source** | **Psi value [W/mK]** | **Drawing / reference** |
| External wall | E2: Other lintels (including other steel lintels) | Calculated by person with suitable expertise | 0.05 | IG or Keystone Hi Therm + |
| External wall | E3: Sill | Calculated by person with suitable expertise | 0.018 **(!)** | Recognised Construction Detail |
| External wall | E4: Jamb | Calculated by person with suitable expertise | 0.014 **(!)** | Recognised Construction Detail |
| External wall | E5: Ground floor (normal) | Calculated by person with suitable expertise | 0.068 | Recognised Construction Detail |
| External wall | E6: Intermediate floor within a dwelling | Calculated by person with suitable expertise | 0.001 **(!)** | Recognised Construction Detail |
| External wall | E10: Eaves (insulation at ceiling level) | Calculated by person with suitable expertise | 0.055 | Recognised Construction Detail |
| External wall | E12: Gable (insulation at ceiling level) | Calculated by person with suitable expertise | 0.058 | Recognised Construction Detail |
| External wall | E16: Corner (normal) | Calculated by person with suitable expertise | 0.051 | Recognised Construction Detail |
| External wall | E18: Party wall between dwellings | Calculated by person with suitable expertise | 0.044 | Recognised Construction Detail |
| Party wall | P1: Ground floor | Calculated by person with suitable expertise | 0.103 | Recognised Construction Detail |
| Party wall | P2: Intermediate floor within a dwelling | SAP table default | 0 **(!)** | |
| Party wall | P4: Roof (insulation at ceiling level) | Calculated by person with suitable expertise | 0.101 | Recognised Construction Detail |

| 3 Air permeability (better than typically expected values are flagged with a subsequent (!)) | | |
|---|---|---|
| *Maximum permitted air permeability at 50Pa* | *8 $m^3/hm^2$* | |
| Dwelling air permeability at 50Pa | 5.05 $m^3/hm^2$, Design value | **OK** |
| Air permeability test certificate reference | | |

| 4 Space heating | |
|---|---|
| **Main heating system 1**: Heat pump with radiators or underfloor heating - Electricity | |
| Efficiency | 233.8% |
| Emitter type | Radiators |
| Flow temperature | 55°C |
| System type | Heat Pump |
| Manufacturer | Daikin Europe NV |
| Model | EDLA04EV3 |
| Commissioning | |
| **Secondary heating system**: N/A | |
| Fuel | N/A |
| Efficiency | N/A |
| Commissioning | |

| 5 Hot water | | |
|---|---|---|
| **Cylinder/store** - type: Cylinder | | |
| Capacity | 180 litres | |
| Declared heat loss | 1.39 kWh/day | |
| Primary pipework insulated | Yes | |
| Manufacturer | | |
| Model | | |
| Commissioning | | |
| **Waste water heat recovery system 1** - type: N/A | | |
| Efficiency | | |
| Manufacturer | | |
| Model | | |

| 6 Controls | | |
|---|---|---|
| **Main heating 1** - type: Time and temperature zone control by arrangement of plumbing and electrical services | | |
| Function | | |
| Ecodesign class | | |
| Manufacturer | | |
| Model | | |
| **Water heating** - type: Cylinder thermostat and HW separately timed | | |
| Manufacturer | | |
| Model | | |

| 7 Lighting | | |
|---|---|---|
| *Minimum permitted light source efficacy* | *75 lm/W* | |
| Lowest light source efficacy | 75 lm/W | OK |
| External lights control | N/A | |

| 8 Mechanical ventilation | | |
|---|---|---|
| **System type:** N/A | | |
| *Maximum permitted specific fan power* | *N/A* | |
| Specific fan power | N/A | **N/A** |
| *Minimum permitted heat recovery efficiency* | *N/A* | |
| Heat recovery efficiency | N/A | **N/A** |
| Manufacturer/Model | | |
| Commissioning | | |

| 9 Local generation |
|---|
| N/A |

| 10 Heat networks |
|---|
| N/A |

| 11 Supporting documentary evidence |
|---|
| N/A |

| 12 Declarations | |
|---|---|
| **a. Assessor Declaration** | |
| This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report. | |
| Signed:<br><br>Name: | Assessor ID:<br><br>Date: |
| **b. Client Declaration** | |
| N/A | |

# Predicted Energy Assessment

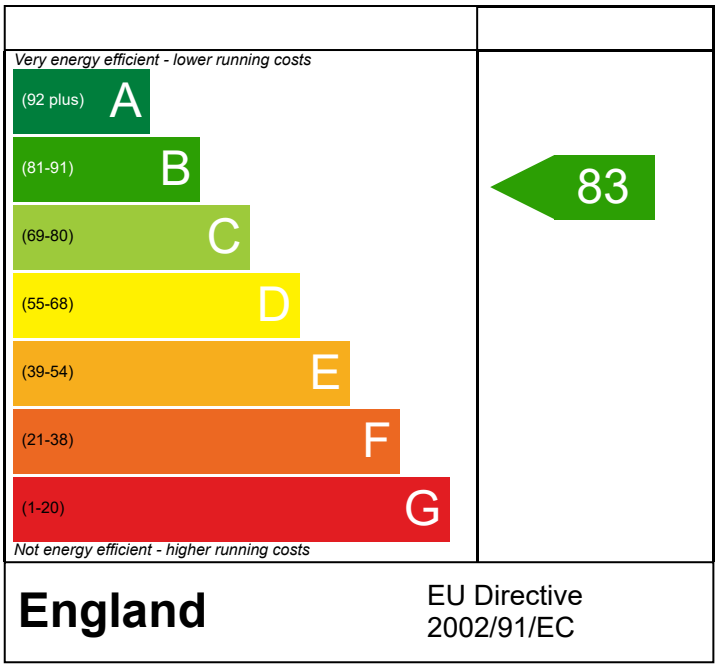
Plot 8, Bitterne Parish Church, Whites Lane,
Southampton, Hampshire , SO19 7NP

| | |
|---|---|
| Dwelling type: | House, Semi-Detached |
| Date of assessment: | 06/12/2023 |
| Produced by: | Mark Rogers |
| Total floor area: | 97.6 m² |
| DRRN: | 6525-6220-0972 |

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

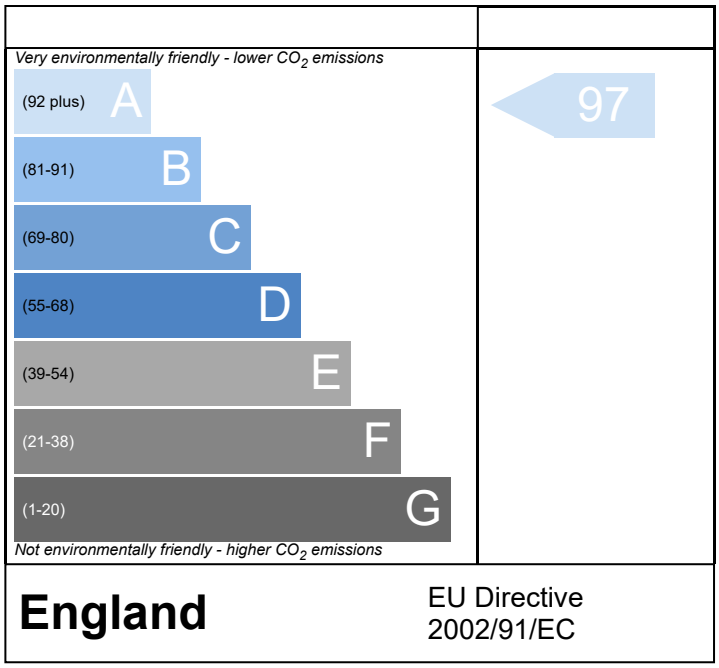
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

## Energy Efficiency Rating




The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

## Environmental Impact ($CO_2$) Rating




The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide ($CO_2$) emissions. The higher the rating the less impact it has on the environment.

# Summary for Input Data

elmhurst energy

| | | | |
|---|---|---|---|
| **Property Reference** | sc100235 P8 Bitterne Church | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling |
| **Property** | Plot 8, Bitterne Parish Church, Whites Lane, Southampton, Hampshire , SO19 7NP | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 83 B | **DER** | 3.91 | **TER** | 10.66 |
| **Environmental** | 97 A | **% DER < TER** | | | 63.32 |
| **$CO_2$ Emissions (t/year)** | 0.32 | **DFEE** | 35.77 | **TFEE** | 37.43 |
| **Compliance Check** | See BREL | **% DFEE < TFEE** | | | 4.44 |
| **% DPER < TPER** | 26.73 | **DPER** | 40.74 | **TPER** | 55.61 |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Philip Dudley | | |

## SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

| | |
|---|---|
| **Orientation** | West |
| **Property Tenture** | ND |
| **Transaction Type** | 6 |
| **Terrain Type** | Suburban |
| **1.0 Property Type** | House, Semi-Detached |
| **2.0 Number of Storeys** | 2 |
| **3.0 Date Built** | 2023 |
| **4.0 Sheltered Sides** | 1 |
| **5.0 Sunlight/Shade** | Average or unknown |
| **6.0 Thermal Mass Parameter** | Precise calculation |
| **7.0 Electricity Tariff** | Standard |
| Smart electricity meter fitted | No |
| Smart gas meter fitted | No |

**7.0 Measurements**

| | Heat Loss Perimeter | Internal Floor Area | Average Storey Height |
|---|---|---|---|
| **Ground floor:** | 20.50 m | 48.80 m² | 2.39 m |
| **1st Storey:** | 20.50 m | 48.80 m² | 2.76 m |

**8.0 Living Area** 13.88 m²

**9.0 External Walls**

| Description | Type | Construction | U-Value (W/m²K) | Kappa (kJ/m²K) | Gross Area(m²) | Nett Area (m²) | Shelter Res | Shelter | Openings | Area Calculation Type |
|---|---|---|---|---|---|---|---|---|---|---|
| External Cavity Wall | Cavity Wall | Cavity wall; plasterboard on dabs or battens, lightweight aggregate block, filled cavity, any outside structure | 0.22 | 110.00 | 97.68 | 83.28 | 0.00 | None | 14.40 | Calculate Wall Area |
| External Tile Hung Wall | Cavity Wall | Cavity wall; plasterboard on dabs or battens, lightweight aggregate block, filled cavity, any outside structure | 0.21 | 110.00 | 7.90 | 6.00 | 0.00 | None | 1.90 | Enter Gross Area |

**9.1 Party Walls**

| Description | Type | Construction | U-Value (W/m²K) | Kappa (kJ/m²K) | Area (m²) | Shelter Res | Shelter |
|---|---|---|---|---|---|---|---|
| Party Wall | Filled Cavity with Edge Sealing | Single plasterboard on dabs both sides, lightweight aggregate blocks, cavity or cavity fill | 0.00 | 110.00 | 47.38 | | None |

**9.2 Internal Walls**

| Description | Construction | Kappa (kJ/m²K) | Area (m²) |
|---|---|---|---|
| Internal Stud Walls | Plasterboard on timber frame | 9.00 | 187.53 |

**10.0 External Roofs**

| Description | Type | Construction | U-Value (W/m²K) | Kappa (kJ/m²K) | Gross Area(m²) | Nett Area (m²) | Shelter Code | Shelter Factor | Calculation Type | Openings |
|---|---|---|---|---|---|---|---|---|---|---|
| External Pitched Roofs | External Plane Roof | Plasterboard, insulated at ceiling level | 0.09 | 9.00 | 48.80 | 48.80 | None | 0.00 | Calculate Wall Area | 0.00 |

**10.2 Internal Ceilings**

| Description | Storey | Construction | Area (m²) |
|---|---|---|---|
| Internal Ceiling | Lowest occupied | Plasterboard ceiling, carpeted chipboard floor | 48.80 |

**11.0 Heat Loss Floors**

# Summary for Input Data

elmhurst energy

| Description | Type | Storey Index | Construction | U-Value (W/m²K) | Shelter Code | Shelter Factor | Kappa (kJ/m²K) | Area (m²) |
|---|---|---|---|---|---|---|---|---|
| Ground Floor | Ground Floor - Solid | Lowest occupied | Suspended concrete floor, carpeted | 0.11 | None | 0.00 | 75.00 | 48.80 |

**11.2 Internal Floors**

| Description | Storey Index | Construction | Kappa (kJ/m²K) | Area (m²) |
|---|---|---|---|---|
| Internal Floor | | Plasterboard ceiling, carpeted chipboard floor | 9.00 | 48.80 |

**12.0 Opening Types**

| Description | Data Source | Type | Glazing | Glazing Gap | Filling Type | G-value | Frame Type | Frame Factor | U Value (W/m²K) |
|---|---|---|---|---|---|---|---|---|---|
| New Dwell Entrance Door | Manufacturer | Half Glazed Door | Double Low-E Soft 0.05 | | | 0.36 | | 0.70 | 1.20 |
| New Dwell DG French Doors | Manufacturer | Window | Double Low-E Soft 0.05 | | | 0.71 | | 0.70 | 1.20 |
| New Dwelling DG Window | Manufacturer | Window | Double Low-E Soft 0.05 | | | 0.71 | | 0.70 | 1.20 |

**13.0 Openings**

| Name | Opening Type | Location | Orientation | Area (m²) | Pitch |
|---|---|---|---|---|---|
| Front East Door | New Dwell Entrance Door | External Cavity Wall | West | 2.01 | |
| Front East Windows | New Dwelling DG Window | External Cavity Wall | West | 2.73 | |
| Front East Window | New Dwelling DG Window | External Tile Hung Wall | West | 1.90 | |
| Side North Windows | New Dwelling DG Window | External Cavity Wall | North | 1.80 | |
| Rear West Windows | New Dwelling DG Window | External Cavity Wall | East | 3.94 | |
| Rear West Windows | New Dwell DG French Doors | External Cavity Wall | East | 3.92 | |

| | | |
|---|---|---|
| **14.0 Conservatory** | None | |
| **15.0 Draught Proofing** | 100 | % |
| **16.0 Draught Lobby** | No | |
| **17.0 Thermal Bridging** | Calculate Bridges | |

**17.1 List of Bridges**

| Bridge Type | Source Type | Length | Psi | Adjusted | Reference: | Imported |
|---|---|---|---|---|---|---|
| E2 Other lintels (including other steel lintels) | Independently assessed | 11.46 | 0.05 | 0.05 | IG or Keystone Hi Therm + | No |
| E3 Sill | Independently assessed | 10.50 | 0.02 | 0.02 | Recognised Construction Detail | No |
| E4 Jamb | Independently assessed | 28.80 | 0.01 | 0.01 | Recognised Construction Detail | No |
| E5 Ground floor (normal) | Independently assessed | 20.50 | 0.07 | 0.07 | Recognised Construction Detail | No |
| E6 Intermediate floor within a dwelling | Independently assessed | 20.50 | 0.00 | 0.00 | Recognised Construction Detail | No |
| E10 Eaves (insulation at ceiling level) | Independently assessed | 18.52 | 0.06 | 0.06 | Recognised Construction Detail | No |
| E12 Gable (insulation at ceiling level) | Independently assessed | 1.98 | 0.06 | 0.06 | Recognised Construction Detail | No |
| E16 Corner (normal) | Independently assessed | 10.30 | 0.05 | 0.05 | Recognised Construction Detail | No |
| E18 Party wall between dwellings | Independently assessed | 10.30 | 0.04 | 0.04 | Recognised Construction Detail | No |
| P1 Party wall - Ground floor | Independently assessed | 9.20 | 0.10 | 0.10 | Recognised Construction Detail | No |
| P2 Party wall - Intermediate floor within a dwelling | Table K1 - Default | 9.20 | 0.00 | 0.00 | | No |
| P4 Party wall - Roof (insulation at ceiling level) | Independently assessed | 9.20 | 0.10 | 0.10 | Recognised Construction Detail | No |

| | | |
|---|---|---|
| Y-value | 0.00 | W/m²K |
| **18.0 Pressure Testing** | Yes | |
| Designed $AP_{50}$ | 5.05 | m³/(h.m²) @ 50 Pa |
| Test Method | Blower Door | |
| **19.0 Mechanical Ventilation** | | |
| **Mechanical Ventilation** | | |
| Mechanical Ventilation System Present | No | |
| **20.0 Fans, Open Fireplaces, Flues** | | |
| **21.0 Fixed Cooling System** | No | |
| **22.0 Lighting** | | |
| No Fixed Lighting | No | |

| Name | Efficacy | Power | Capacity | Count |
|---|---|---|---|---|
| Low energy Lighting | 75.00 | 15 | 1125 | 36 |

| | | |
|---|---|---|
| **24.0 Main Heating 1** | Database | |
| Description | Electric Air Source Heat Pump | |
| Percentage of Heat | 100.00 | % |
| Database Ref. No. | 106465 | |
| Fuel Type | Electricity | |
| In Winter | 0.00 | |
| In Summer | 0.00 | |
| Model Name | EDLA04EV3 | |

# Summary for Input Data

| | |
|---|---|
| Manufacturer | Daikin Europe NV |
| System Type | Heat Pump |
| Controls SAP Code | 2207 |
| PCDF Controls | 0 |
| Is MHS Pumped | Pump in heated space |
| Heating Pump Age | 2013 or later |
| Heat Emitter | Radiators |
| Flow Temperature | Enter value |
| Flow Temperature Value | 55.00 |

**25.0 Main Heating 2** — None

**26.0 Heat Networks** — None

| | Heat Source | Fuel Type | Heating Use | Efficiency | Percentage Of Heat | Heat | Heat Power Ratio | Electrical | Fuel Factor | Efficiency type |
|---|---|---|---|---|---|---|---|---|---|---|
| Heat source 1 | | | | | | | | | | |
| Heat source 2 | | | | | | | | | | |
| Heat source 3 | | | | | | | | | | |
| Heat source 4 | | | | | | | | | | |
| Heat source 5 | | | | | | | | | | |

**28.0 Water Heating**

| | |
|---|---|
| Water Heating | Main Heating 1 |
| SAP Code | 901 |
| Flue Gas Heat Recovery System | No |
| Waste Water Heat Recovery Instantaneous System 1 | No |
| Waste Water Heat Recovery Instantaneous System 2 | No |
| Waste Water Heat Recovery Storage System | No |
| Solar Panel | No |
| Water use <= 125 litres/person/day | Yes |
| Cold Water Source | From mains |
| Bath Count | 1 |
| Immersion Only Heating Hot Water | No |

**28.1 Showers**

| Description | Shower Type | Flow Rate [l/min] | Rated Power [kW] | Connected | Connected To |
|---|---|---|---|---|---|

**28.3 Waste Water Heat Recovery System**

| | | |
|---|---|---|
| **29.0 Hot Water Cylinder** | Hot Water Cylinder | |
| Cylinder Stat | Yes | |
| Cylinder In Heated Space | Yes | |
| Independent Time Control | Yes | |
| Insulation Type | Measured Loss | |
| Cylinder Volume | 180.00 | L |
| Loss | 1.39 | kWh/day |
| Pipes insulation | Fully insulated primary pipework | |
| In Airing Cupboard | No | |

**31.0 Thermal Store** — None

**Recommendations**

**Lower cost measures**

**None**

**Further measures to achieve even higher standards**

| Typical Cost | Typical savings per year | Ratings after improvement SAP rating | Environmental Impact |
|---|---|---|---|
| £4,000 - £6,000 | £47 | B 84 | A 97 |
| £3,500 - £5,500 | £196 | B 90 | A 98 |
| | | 0 | 0 |

# Thermal Bridging

| | | | |
|---|---|---|---|
| **Property Reference** | sc100235 P8 Bitterne Church | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | Semi-Detached House |
| **Property** | Plot 8, Bitterne Parish Church, Whites Lane, Southampton, Hampshire , SO19 7NP | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 83 B | **DER** | 3.91 | **TER** | 10.66 |
| **Environmental** | 97 A | **% DER < TER** | | | 63.32 |
| **$CO_2$ Emissions (t/year)** | 0.32 | **DFEE** | 35.77 | **TFEE** | 37.43 |
| **Compliance Check** | See BREL | **% DFEE < TFEE** | | | 4.44 |
| **% DPER < TPER** | 26.73 | **DPER** | 40.74 | **TPER** | 55.61 |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Philip Dudley | | |

| | Junction details | Source Type | Psi (W/mK) | Length (m) | Result | Reference |
|---|---|---|---|---|---|---|
| External wall | E2 Other lintels (including other steel lintels) | Independently assessed | 0.050 | 11.46 | 0.57 | IG or Keystone Hi Therm + |
| External wall | E3 Sill | Independently assessed | 0.018 | 10.50 | 0.19 | Recognised Construction Detail |
| External wall | E4 Jamb | Independently assessed | 0.014 | 28.80 | 0.40 | Recognised Construction Detail |
| External wall | E5 Ground floor (normal) | Independently assessed | 0.068 | 20.50 | 1.39 | Recognised Construction Detail |
| External wall | E6 Intermediate floor within a dwelling | Independently assessed | 0.001 | 20.50 | 0.02 | Recognised Construction Detail |
| External wall | E10 Eaves (insulation at ceiling level) | Independently assessed | 0.055 | 18.52 | 1.02 | Recognised Construction Detail |
| External wall | E12 Gable (insulation at ceiling level) | Independently assessed | 0.058 | 1.98 | 0.11 | Recognised Construction Detail |
| External wall | E16 Corner (normal) | Independently assessed | 0.051 | 10.30 | 0.53 | Recognised Construction Detail |
| External wall | E18 Party wall between dwellings | Independently assessed | 0.044 | 10.30 | 0.45 | Recognised Construction Detail |
| Party wall | P1 Party wall - Ground floor | Independently assessed | 0.103 | 9.20 | 0.95 | Recognised Construction Detail |
| Party wall | P2 Party wall - Intermediate floor within a dwelling | Table K1 - Default | 0.000 | 9.20 | 0.00 | |
| Party wall | P4 Party wall - Roof (insulation at ceiling level) | Independently assessed | 0.101 | 9.20 | 0.93 | Recognised Construction Detail |

Total: 160.46 W/mK:

Y-Value: 0.00 W/m²K:

# U-VALUE CALCULATOR REPORT

| | | | |
|---|---|---|---|
| **Property Reference** | sc121839 | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling Part L 2021 |
| **Project** | Plot 8, Bitterne Parish Church, Whites Lane, Bitterne, Southampton, Hampshire , SO19 7NP | | |
| **Calculation Type** | New Build (As Designed) | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 88 B | **DER** | 13.52 | **TER** | 25.39 |
| **Environmental** | 89 B | **% DER<TER** | 46.75 | | |
| **$CO_2$ Emissions (t/year)** | 1.02 | **DFEE** | 41.82 | **TFEE** | 53.06 |
| **General Requirements Compliance** | Pass | **% DFEE<TFEE** | 21.19 | | |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers, Surecalc Limited, Tel: 01243572695, mark@surecalc.co.uk | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Vivid Design Studio | | |

## Building Elements

### Roof 000002 - Pitched Roof Insulated Ceiling Vivid

**Roof Type: Pitched Roof, insulated flat ceiling**

| Layer | Description | Thickness (mm) | Conductivity (W/m²K) | Resistance (m²K/W) | Fraction (%) |
|---|---|---|---|---|---|
| **Ext surface** | | | | 0.0400 | |
| **Layer 1** | **Loft Space** | | | | |
| | Main construction | 0 | 0.0600 | 0.0600 | 100.00 |
| **Layer 2** | **Mineral wool** | | | | |
| | Main construction | 350 | 0.0440 | 7.9545 | 100.00 |
| | Corrections - Air Gap: Level 0, Fasteners: None or plastic | | | | |
| **Layer 3** | **Mineral wool quilt** | | | | |
| | Main construction | 150 | 0.0440 | 3.4091 | 93.67 |
| | Main construction | 150 | 0.1300 | 1.1538 | 6.33 |
| | Corrections - Air Gap: Level 0, Fasteners: None or plastic | | | | |
| **Layer 4** | **Plasterboard, standard** | | | | |
| | Main construction | 12.5 | 0.2100 | 0.0595 | 100.00 |
| **Int surface** | | | | 0.1000 | |

**Total resistance:** **Upper limit =** 11.449 m² K/W **Lower limit =** 11.248 m² K/W **Average =** 11.348 m² K/W

**Total correction =** 0.0030 m² K/W **U-value (unrounded) =** 0.09 W/m² K

**Unheated space:** None

**Total thickness: 513 mm** **U-value: 0.09 W/m² K** **Kappa: n/a**



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

# U-VALUE CALCULATOR REPORT

| | | | |
|---|---|---|---|
| **Property Reference** | sc121839 | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling Part L 2021 |
| **Project** | Plot 8, Bitterne Parish Church, Whites Lane, Bitterne, Southampton, Hampshire , SO19 7NP | | |
| **Calculation Type** | New Build (As Designed) | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 88 B | **DER** | 13.52 | **TER** | 25.39 |
| **Environmental** | 89 B | **% DER<TER** | 46.75 | | |
| **$CO_2$ Emissions (t/year)** | 1.02 | **DFEE** | 41.82 | **TFEE** | 53.06 |
| **General Requirements Compliance** | Pass | **% DFEE<TFEE** | 21.19 | | |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers, Surecalc Limited, Tel: 01243572695, mark@surecalc.co.uk | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Vivid Design Studio | | |

## Building Elements

### Wall 000001 - Vivid Cavity Wall 125 Knauf Supafil 34

**Wall Type: Standard Wall**

| Layer | Description | Thickness (mm) | Conductivity (W/m²K) | Resistance (m²K/W) | Fraction (%) |
|---|---|---|---|---|---|
| **Ext surface** | | | | 0.0400 | |
| **Layer 1** | **Brick, outer leaf** | | | | |
| | Main construction | 102 | 0.7700 | 0.1325 | 82.81 |
| | Main construction | 102 | 0.9407 | 0.1084 | 17.19 |
| **Layer 2** | **Knauf Supafil 34 blown Cavity Fill** | | | | |
| | Main construction | 125 | 0.0340 | 3.6765 | 100.00 |
| | Corrections - Air Gap: Level 0, Fasteners: Wall ties, Cross sectional area: 12.50 mm², Lambda: 17.000 W/m.K, per m²: 2.500 | | | | |
| **Layer 3** | **Masterblock Masterlite Ultra** | | | | |
| | Main construction | 100 | 0.2700 | 0.3704 | 93.43 |
| | Main construction | 100 | 0.8803 | 0.1136 | 6.57 |
| **Layer 4** | **airspace/plaster dabs** | | | | |
| | Main construction | 15 | 0.1000 | 0.1500 | 80.00 |
| | Main construction | 15 | 0.0882 | 0.1700 | 20.00 |
| | Corrections - Cavity Unventilated, Emissivity: Normal | | | | |
| **Layer 5** | **Plasterboard, standard** | | | | |
| | Main construction | 12.5 | 0.2100 | 0.0595 | 100.00 |
| **Int surface** | | | | 0.1300 | |

**Total resistance:** **Upper limit =** 4.541 m² K/W **Lower limit =** 4.510 m² K/W **Average =** 4.525 m² K/W

**Total correction =** 0.0018 m² K/W **U-value (unrounded) =** 0.22 W/m² K

**Unheated space:** None

**Total thickness: 355 mm** **U-value: 0.22 W/m² K** **Kappa: n/a**



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

# U-VALUE CALCULATOR REPORT

| | | | |
|---|---|---|---|
| **Property Reference** | sc121839 | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling Part L 2021 |
| **Project** | Plot 8, Bitterne Parish Church, Whites Lane, Bitterne, Southampton, Hampshire , SO19 7NP | | |
| **Calculation Type** | New Build (As Designed) | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 88 B | **DER** | 13.52 | **TER** | 25.39 |
| **Environmental** | 89 B | **% DER<TER** | 46.75 | | |
| **$CO_2$ Emissions (t/year)** | 1.02 | **DFEE** | 41.82 | **TFEE** | 53.06 |
| **General Requirements Compliance** | Pass | **% DFEE<TFEE** | 21.19 | | |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers, Surecalc Limited, Tel: 01243572695, mark@surecalc.co.uk | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Vivid Design Studio | | |

## Building Elements

### Wall 000004 - Vivid Cavity Wall 125 Knauf Supafil 34

**Wall Type: Standard Wall**

| Layer | Description | Thickness (mm) | Conductivity (W/m²K) | Resistance (m²K/W) | Fraction (%) |
|---|---|---|---|---|---|
| **Ext surface** | | | | 0.0400 | |
| **Layer 1** | **Tile Hanging** | | | | |
| | Main construction | 15 | 1.0000 | 0.0150 | 100.00 |
| **Layer 2** | **airspace/timber battens** | | | | |
| | Main construction | 22 | 0.1222 | 0.1800 | 89.63 |
| | Main construction | 22 | 0.1243 | 0.1770 | 10.37 |
| | Corrections - Cavity Unventilated, Emissivity: Normal | | | | |
| **Layer 3** | **Blockwork, medium** | | | | |
| | Main construction | 100 | 0.5700 | 0.1754 | 93.43 |
| | Main construction | 100 | 0.8803 | 0.1136 | 6.57 |
| **Layer 4** | **Knauf Supafil 34 blown Cavity Fill** | | | | |
| | Main construction | 125 | 0.0340 | 3.6765 | 100.00 |
| | Corrections - Air Gap: Level 0, Fasteners: Wall ties, Cross sectional area: 12.50 mm², Lambda: 17.000 W/m.K, per m²: 2.500 | | | | |
| **Layer 5** | **Masterblock Masterlite Ultra** | | | | |
| | Main construction | 100 | 0.2700 | 0.3704 | 93.43 |
| | Main construction | 100 | 0.8803 | 0.1136 | 6.57 |
| **Layer 6** | **airspace/plaster dabs** | | | | |
| | Main construction | 15 | 0.1000 | 0.1500 | 80.00 |
| | Main construction | 15 | 0.0882 | 0.1700 | 20.00 |
| | Corrections - Cavity Unventilated, Emissivity: Normal | | | | |
| **Layer 7** | **Plasterboard, standard** | | | | |
| | Main construction | 12.5 | 0.2100 | 0.0595 | 100.00 |
| **Int surface** | | | | 0.1300 | |

**Total resistance:** **Upper limit =** 4.779 m² K/W **Lower limit =** 4.746 m² K/W **Average =** 4.762 m² K/W

**Total correction =** 0.0016 m² K/W **U-value (unrounded) =** 0.21 W/m² K

**Unheated space:** None

**Total thickness: 390 mm** **U-value: 0.21 W/m² K** **Kappa: n/a**



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

# U-VALUE CALCULATOR REPORT

| | | | |
|---|---|---|---|
| **Property Reference** | sc121839 | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling Part L 2021 |
| **Project** | Plot 8, Bitterne Parish Church, Whites Lane, Bitterne, Southampton, Hampshire , SO19 7NP | | |
| **Calculation Type** | New Build (As Designed) | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 88 B | **DER** | 13.52 | **TER** | 25.39 |
| **Environmental** | 89 B | **% DER<TER** | 46.75 | | |
| **$CO_2$ Emissions (t/year)** | 1.02 | **DFEE** | 41.82 | **TFEE** | 53.06 |
| **General Requirements Compliance** | Pass | **% DFEE<TFEE** | 21.19 | | |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers, Surecalc Limited, Tel: 01243572695, mark@surecalc.co.uk | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Vivid Design Studio | | |

## Building Elements

### Floor 000003 - Ground Floor Beam and Block

**Floor Type: Suspended Floor**
**Area = 48.80 m², Perimeter = 20.50 m, Wall thickness = 300.00 mm, Soil: Unknown**
**Depth of underfloor space below ground:0.200 m  Floor wind shielding: Average (suburban)**
**Floor height above ground:h = 0.150 m**
**U-value of walls above ground:Uw = 0.220 m**
**Ventilation openings per perimeter length:e = 0.0015 %**
**Mean wind speed:v = 5.000 m/s**
**Resistance on solum:Rg = 0.000 m²K/W**

| Layer | Description | Thickness (mm) | Conductivity (W/m²K) | Resistance (m²K/W) | Fraction (%) |
|---|---|---|---|---|---|
| **Ext surface** | | | | 0.1700 | |
| **Layer 1** | **Blockwork** | | | | |
| | Main construction | 100 | 0.1900 | 0.5263 | 90.91 |
| | Main construction | 100 | 1.0000 | 0.1000 | 9.09 |
| **Layer 2** | **Mannok Therm Floor** | | | | |
| | Main construction | 150 | 0.0220 | 6.8182 | 100.00 |
| | Corrections - Air Gap: Level 1, Fasteners: None or plastic | | | | |
| **Layer 3** | **Screed** | | | | |
| | Main construction | 75 | 1.1500 | 0.0652 | 100.00 |
| **Int surface** | | | | 0.1700 | |

**Total resistance:** **Upper limit =** 7.709 m² K/W **Lower limit =** 7.603 m² K/W **Average =** 7.656 m² K/W

**Total correction =** 0.0079 m² K/W **U-value (unrounded) =** 0.11 W/m² K

**Unheated space:** None

**Total thickness: 325 mm** **U-value: 0.11 W/m² K** **Kappa: n/a**



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

elmhurst energy

# SAP Report Submission for Building Regulations Compliance

Client: Vivid Design Studio

Project: Plot 9, Bitterne Parish Church, Whites Lane
Bitterne, Southampton, Hampshire , SO19 7NP

Contact: Mark Rogers
Surecalc Limited
mark@surecalc.co.uk

Report Issue Date: 06/12/2023

EXCELLENCE IN ENERGY ASSESSMENT

# CODE FOR SUSTAINABLE HOMES
## Calculation Type: New Build (As Designed)

| | | | |
|---|---|---|---|
| **Property Reference** | sc121840 | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling Part L 2021 |
| **Property** | Plot 9, Bitterne Parish Church, Whites Lane, Bitterne, Southampton, Hampshire , SO19 7NP | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 88 B | **DER** | 13.19 | **TER** | 24.78 |
| **Environmental** | 89 B | **% DER<TER** | 46.78 | | |
| **$CO_2$ Emissions (t/year)** | 1.00 | **DFEE** | 39.99 | **TFEE** | 51.03 |
| **General Requirements Compliance** | Pass | **% DFEE<TFEE** | 21.63 | | |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers, Surecalc Limited, Tel: 01243572695, mark@surecalc.co.uk | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Vivid Design Studio | | |

## ENE 1 - Dwelling Emission Rate calculation

| | | | |
|---|---|---|---|
| Total floor area | 97.6 | $m^2$ | |
| DER | 13.19 | $kgCO_2/yr/m^2$ | |
| TER | 24.78 | $kgCO_2/yr/m^2$ | |
| $CO_2$ emissions offset from additional allowable electricity generation | 0.00 | $kgCO_2/yr/m^2$ | (ZC7) |
| Residual $CO_2$ emissions offset from biofuel CHP | 0.00 | $kgCO_2/yr/m^2$ | (ZC5) |
| Total $CO_2$ emissions offset from SAP Section 16 allowances | 0.00 | $kgCO_2/yr/m^2$ | |
| DER accounting for SAP Section 16 allowances | 13.19 | $kgCO_2/yr/m^2$ | |
| Reduction DER/TER | 46.78 | % | |
| CfSH ENE1 credits achieved | 5.2 | | |
| CfSH ENE1 level achieved | 4 | | |

## ENE 2 – Fabric Energy Efficiency calculation

| | | | |
|---|---|---|---|
| Dwelling type | House, Semi-Detached | | |
| Fabric energy efficiency (F.E.E.) | 39.99 | $kWh/m^2/yr$ | |
| CfSH ENE2 credits achieved | 8.5 | | |
| CfSH ENE1 and 2 overall level achieved | 4 | | |

## ENE 7 – Low and Zero Carbon Technologies calculation

**Standard case $CO_2$ emissions**

| | | | |
|---|---|---|---|
| Total floor area | 97.6 | $m^2$ | |
| DER | 18.30 | $kgCO_2/yr/m^2$ | |
| $CO_2$ emissions from electrical appliances | 15.32 | $kgCO_2/yr/m^2$ | (ZC2) |
| $CO_2$ emissions from cooking | 1.89 | $kgCO_2/yr/m^2$ | (ZC3) |
| Standard case total $CO_2$ emissions | 35.51 | $kgCO_2/yr/m^2$ | (ZC4) |
| Net Standard case $CO_2$ emissions | 35.51 | $kgCO_2/yr/m^2$ | (ZC8) |

**Actual case $CO_2$ emissions**

| | | | |
|---|---|---|---|
| DER | 16.31 | $kgCO_2/yr/m^2$ | |
| $CO_2$ emissions from electrical appliances | 15.32 | $kgCO_2/yr/m^2$ | (ZC2) |
| $CO_2$ emissions from cooking | 1.89 | $kgCO_2/yr/m^2$ | (ZC3) |
| Actual case total $CO_2$ emissions | 33.52 | $kgCO_2/yr/m^2$ | (ZC4) |
| $CO_2$ emissions from Biomass | 0.00 | $kgCO_2/yr/m^2$ | (ZC5) |
| $CO_2$ reduction from additional allowable electricity generation | 0.00 | $kgCO_2/yr/m^2$ | (ZC7) |
| Net Actual case $CO_2$ emissions | 33.52 | $kgCO_2/yr/m^2$ | (ZC8) |
| Improvement in net actual/net standard case $CO_2$ emissions | 6 | % | |



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

| | |
|---|---|
| ENE7 credits achieved | 0 |



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

# Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Array SAP 10 program, Array

**Date:** Wed 06 Dec 2023 15:28:04

| Project Information | | | |
|---|---|---|---|
| Assessed By | Mark Rogers | Building Type | House, Semi-detached |
| OCDEA Registration | EES/004179 | Assessment Date | 2023-12-06 |

| Dwelling Details | | | |
|---|---|---|---|
| Assessment Type | As designed | Total Floor Area | 98 $m^2$ |
| Site Reference | sc100236 P9 Bitterne Church | Plot Reference | 001 |
| Address | Bitterne Parish Church Plot 9 Whites Lane, Southampton, SO19 7NP | | |

| Client Details | |
|---|---|
| Name | Philip Dudley |
| Company | Vivid Design Studio |
| Address | NA, NA, NA |

**This report covers items included within the SAP calculations. It is not a complete report of regulations compliance.**

| 1a Target emission rate and dwelling emission rate | | |
|---|---|---|
| Fuel for main heating system | Electricity | |
| *Target carbon dioxide emission rate* | *10.31 $kgCO_2/m^2$* | |
| Dwelling carbon dioxide emission rate | 3.8 $kgCO_2/m^2$ | OK |
| **1b Target primary energy rate and dwelling primary energy** | | |
| *Target primary energy* | *53.76 $kWh_{PE}/m^2$* | |
| Dwelling primary energy | 39.53 $kWh_{PE}/m^2$ | OK |
| **1c Target fabric energy efficiency and dwelling fabric energy efficiency** | | |
| *Target fabric energy efficiency* | *35.8 $kWh/m^2$* | |
| Dwelling fabric energy efficiency | 34.1 $kWh/m^2$ | OK |

| 2a Fabric U-values | | | | |
|---|---|---|---|---|
| **Element** | ***Maximum permitted average U-Value [$W/m^2K$]*** | **Dwelling average U-Value [$W/m^2K$]** | **Element with highest individual U-Value** | |
| External walls | *0.26* | 0.22 | Walls (1) (0.22) | OK |
| Party walls | *0.2* | 0 | Party Wall (1) (0) | **N/A** |
| Curtain walls | *1.6* | 0 | N/A | **N/A** |
| Floors | *0.18* | 0.11 | Ground Floor (0.11) | OK |
| Roofs | *0.16* | 0.09 | Roof (1) (0.09) | OK |
| Windows, doors, and roof windows | *1.6* | 1.2 | Front East Door (1.2) | OK |
| Rooflights | *2.2* | N/A | N/A | **N/A** |

| 2b Envelope elements (better than typically expected values are flagged with a subsequent (!)) | | |
|---|---|---|
| **Name** | **Net area [$m^2$]** | **U-Value [$W/m^2K$]** |
| Exposed wall: Walls (1) | 83.28 | 0.22 |
| Exposed wall: Walls (2) | 6 | 0.21 |
| Party wall: Party Wall (1) | 47.38 | 0 **(!)** |
| Ground floor: Ground Floor, Ground Floor | 48.8 | 0.11 |
| Exposed roof: Roof (1) | 48.8 | 0.09 **(!)** |

| 2c Openings (better than typically expected values are flagged with a subsequent (!)) | | | | |
|---|---|---|---|---|
| **Name** | **Area [$m^2$]** | **Orientation** | **Frame factor** | **U-Value [$W/m^2K$]** |
| Front East Door, New Dwell Entrance Door | 2.01 | West | N/A | 1.2 |
| Front East Windows, New Dwelling DG Window | 2.73 | West | 0.7 | 1.2 |
| Front East Window, New Dwelling DG Window | 1.9 | West | 0.7 | 1.2 |
| Side South Windows, New Dwelling DG Window | 1.8 | South | 0.7 | 1.2 |
| Rear West Windows, New Dwelling DG Window | 3.94 | East | 0.7 | 1.2 |
| Rear West Windows, New Dwell DG French Doors | 3.92 | East | 0.7 | 1.2 |

| Name | Area [$m^2$] | Orientation | Frame factor | U-Value [$W/m^2K$] |
|---|---|---|---|---|

| 2d Thermal bridging (better than typically expected values are flagged with a subsequent (!)) | | | | |
|---|---|---|---|---|
| Building part **1 - Main Dwelling**: Thermal bridging calculated from linear thermal transmittances for each junction | | | | |
| **Main element** | **Junction detail** | **Source** | **Psi value [W/mK]** | **Drawing / reference** |
| External wall | E2: Other lintels (including other steel lintels) | Calculated by person with suitable expertise | 0.05 | IG or Keystone Hi Therm + |
| External wall | E3: Sill | Calculated by person with suitable expertise | 0.018 **(!)** | Recognised Construction Detail |
| External wall | E4: Jamb | Calculated by person with suitable expertise | 0.014 **(!)** | Recognised Construction Detail |
| External wall | E5: Ground floor (normal) | Calculated by person with suitable expertise | 0.068 | Recognised Construction Detail |
| External wall | E6: Intermediate floor within a dwelling | Calculated by person with suitable expertise | 0.001 **(!)** | Recognised Construction Detail |
| External wall | E10: Eaves (insulation at ceiling level) | Calculated by person with suitable expertise | 0.055 | Recognised Construction Detail |
| External wall | E12: Gable (insulation at ceiling level) | Calculated by person with suitable expertise | 0.058 | Recognised Construction Detail |
| External wall | E16: Corner (normal) | Calculated by person with suitable expertise | 0.051 | Recognised Construction Detail |
| External wall | E18: Party wall between dwellings | Calculated by person with suitable expertise | 0.044 | Recognised Construction Detail |
| Party wall | P1: Ground floor | Calculated by person with suitable expertise | 0.103 | Recognised Construction Detail |
| Party wall | P2: Intermediate floor within a dwelling | SAP table default | 0 **(!)** | |
| Party wall | P4: Roof (insulation at ceiling level) | Calculated by person with suitable expertise | 0.101 | Recognised Construction Detail |

| 3 Air permeability (better than typically expected values are flagged with a subsequent (!)) | | |
|---|---|---|
| *Maximum permitted air permeability at 50Pa* | *8 $m^3/hm^2$* | |
| Dwelling air permeability at 50Pa | 5.05 $m^3/hm^2$, Design value | **OK** |
| Air permeability test certificate reference | | |

| 4 Space heating | |
|---|---|
| **Main heating system 1**: Heat pump with radiators or underfloor heating - Electricity | |
| Efficiency | 233.7% |
| Emitter type | Radiators |
| Flow temperature | 55°C |
| System type | Heat Pump |
| Manufacturer | Daikin Europe NV |
| Model | EDLA04EV3 |
| Commissioning | |
| **Secondary heating system**: N/A | |
| Fuel | N/A |
| Efficiency | N/A |
| Commissioning | |

| 5 Hot water | | |
|---|---|---|
| **Cylinder/store** - type: Cylinder | | |
| Capacity | 180 litres | |
| Declared heat loss | 1.39 kWh/day | |
| Primary pipework insulated | Yes | |
| Manufacturer | | |
| Model | | |
| Commissioning | | |
| **Waste water heat recovery system 1** - type: N/A | | |
| Efficiency | | |
| Manufacturer | | |
| Model | | |

| 6 Controls | | |
|---|---|---|
| **Main heating 1** - type: Time and temperature zone control by arrangement of plumbing and electrical services | | |
| Function | | |
| Ecodesign class | | |
| Manufacturer | | |
| Model | | |
| **Water heating** - type: Cylinder thermostat and HW separately timed | | |
| Manufacturer | | |
| Model | | |

| 7 Lighting | | |
|---|---|---|
| *Minimum permitted light source efficacy* | *75 lm/W* | |
| Lowest light source efficacy | 75 lm/W | OK |
| External lights control | N/A | |

| 8 Mechanical ventilation | | |
|---|---|---|
| **System type:** N/A | | |
| *Maximum permitted specific fan power* | *N/A* | |
| Specific fan power | N/A | **N/A** |
| *Minimum permitted heat recovery efficiency* | *N/A* | |
| Heat recovery efficiency | N/A | **N/A** |
| Manufacturer/Model | | |
| Commissioning | | |

| 9 Local generation |
|---|
| N/A |

| 10 Heat networks |
|---|
| N/A |

| 11 Supporting documentary evidence |
|---|
| N/A |

| 12 Declarations | |
|---|---|
| **a. Assessor Declaration** | |
| This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report. | |
| Signed:<br><br>Name: | Assessor ID:<br><br>Date: |
| **b. Client Declaration** | |
| N/A | |

# Predicted Energy Assessment

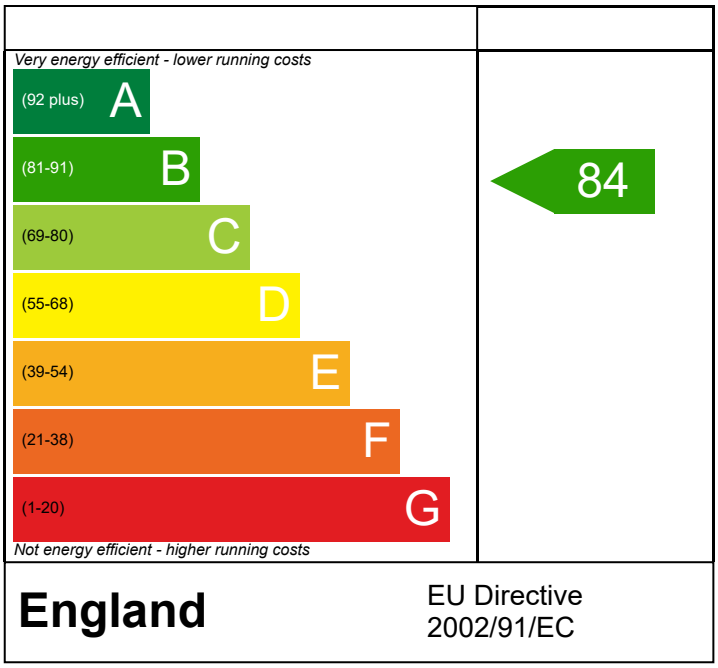
Plot 9, Bitterne Parish Church, Whites Lane,
Southampton, Hampshire , SO19 7NP

| | |
|---|---|
| Dwelling type: | House, Semi-Detached |
| Date of assessment: | 06/12/2023 |
| Produced by: | Mark Rogers |
| Total floor area: | 97.6 m² |
| DRRN: | 7207-5522-6951 |

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

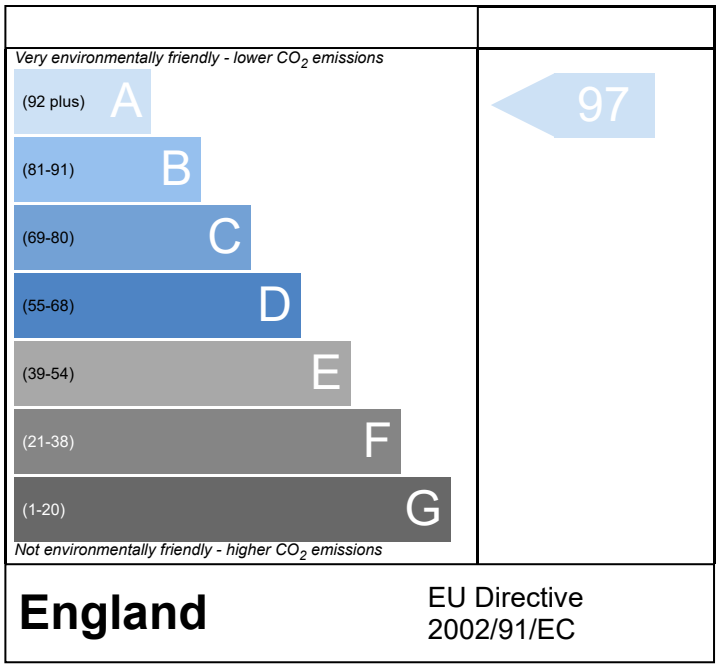
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

## Energy Efficiency Rating




The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

## Environmental Impact ($CO_2$) Rating




The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide ($CO_2$) emissions. The higher the rating the less impact it has on the environment.

# Summary for Input Data

elmhurst energy

| | | | |
|---|---|---|---|
| **Property Reference** | sc100236 P9 Bitterne Church | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling |
| **Property** | Plot 9, Bitterne Parish Church, Whites Lane, Southampton, Hampshire , SO19 7NP | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 84 B | **DER** | 3.80 | **TER** | 10.31 |
| **Environmental** | 97 A | **% DER < TER** | | | 63.14 |
| **$CO_2$ Emissions (t/year)** | 0.31 | **DFEE** | 34.10 | **TFEE** | 35.85 |
| **Compliance Check** | See BREL | **% DFEE < TFEE** | | | 4.86 |
| **% DPER < TPER** | 26.46 | **DPER** | 39.53 | **TPER** | 53.76 |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Philip Dudley | | |

## SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

| | |
|---|---|
| **Orientation** | West |
| **Property Tenture** | ND |
| **Transaction Type** | 6 |
| **Terrain Type** | Suburban |
| **1.0 Property Type** | House, Semi-Detached |
| **2.0 Number of Storeys** | 2 |
| **3.0 Date Built** | 2023 |
| **4.0 Sheltered Sides** | 2 |
| **5.0 Sunlight/Shade** | Average or unknown |
| **6.0 Thermal Mass Parameter** | Precise calculation |
| **7.0 Electricity Tariff** | Standard |
| Smart electricity meter fitted | No |
| Smart gas meter fitted | No |

**7.0 Measurements**

| | Heat Loss Perimeter | Internal Floor Area | Average Storey Height |
|---|---|---|---|
| **Ground floor:** | 20.50 m | 48.80 m² | 2.39 m |
| **1st Storey:** | 20.50 m | 48.80 m² | 2.76 m |

**8.0 Living Area** 13.88 m²

**9.0 External Walls**

| Description | Type | Construction | U-Value (W/m²K) | Kappa (kJ/m²K) | Gross Area(m²) | Nett Area (m²) | Shelter Res | Shelter | Openings | Area Calculation Type |
|---|---|---|---|---|---|---|---|---|---|---|
| External Cavity Wall | Cavity Wall | Cavity wall; plasterboard on dabs or battens, lightweight aggregate block, filled cavity, any outside structure | 0.22 | 110.00 | 97.68 | 83.28 | 0.00 | None | 14.40 | Calculate Wall Area |
| External Tile Hung Wall | Cavity Wall | Cavity wall; plasterboard on dabs or battens, lightweight aggregate block, filled cavity, any outside structure | 0.21 | 110.00 | 7.90 | 6.00 | 0.00 | None | 1.90 | Enter Gross Area |

**9.1 Party Walls**

| Description | Type | Construction | U-Value (W/m²K) | Kappa (kJ/m²K) | Area (m²) | Shelter Res | Shelter |
|---|---|---|---|---|---|---|---|
| Party Wall | Filled Cavity with Edge Sealing | Single plasterboard on dabs both sides, lightweight aggregate blocks, cavity or cavity fill | 0.00 | 110.00 | 47.38 | | None |

**9.2 Internal Walls**

| Description | Construction | Kappa (kJ/m²K) | Area (m²) |
|---|---|---|---|
| Internal Stud Walls | Plasterboard on timber frame | 9.00 | 187.53 |

**10.0 External Roofs**

| Description | Type | Construction | U-Value (W/m²K) | Kappa (kJ/m²K) | Gross Area(m²) | Nett Area (m²) | Shelter Code | Shelter Factor | Calculation Type | Openings |
|---|---|---|---|---|---|---|---|---|---|---|
| External Pitched Roofs | External Plane Roof | Plasterboard, insulated at ceiling level | 0.09 | 9.00 | 48.80 | 48.80 | None | 0.00 | Calculate Wall Area | 0.00 |

**10.2 Internal Ceilings**

| Description | Storey | Construction | Area (m²) |
|---|---|---|---|
| Internal Ceiling | Lowest occupied | Plasterboard ceiling, carpeted chipboard floor | 48.80 |

**11.0 Heat Loss Floors**

# Summary for Input Data

elmhurst energy

| Description | Type | Storey Index | Construction | U-Value (W/m²K) | Shelter Code | Shelter Factor | Kappa (kJ/m²K) | Area (m²) |
|---|---|---|---|---|---|---|---|---|
| Ground Floor | Ground Floor - Solid | Lowest occupied | Suspended concrete floor, carpeted | 0.11 | None | 0.00 | 75.00 | 48.80 |

**11.2 Internal Floors**

| Description | Storey Index | Construction | Kappa (kJ/m²K) | Area (m²) |
|---|---|---|---|---|
| Internal Floor | | Plasterboard ceiling, carpeted chipboard floor | 9.00 | 48.80 |

**12.0 Opening Types**

| Description | Data Source | Type | Glazing | Glazing Gap | Filling Type | G-value | Frame Type | Frame Factor | U Value (W/m²K) |
|---|---|---|---|---|---|---|---|---|---|
| New Dwell Entrance Door | Manufacturer | Half Glazed Door | Double Low-E Soft 0.05 | | | 0.36 | | 0.70 | 1.20 |
| New Dwell DG French Doors | Manufacturer | Window | Double Low-E Soft 0.05 | | | 0.71 | | 0.70 | 1.20 |
| New Dwelling DG Window | Manufacturer | Window | Double Low-E Soft 0.05 | | | 0.71 | | 0.70 | 1.20 |

**13.0 Openings**

| Name | Opening Type | Location | Orientation | Area (m²) | Pitch |
|---|---|---|---|---|---|
| Front East Door | New Dwell Entrance Door | External Cavity Wall | West | 2.01 | |
| Front East Windows | New Dwelling DG Window | External Cavity Wall | West | 2.73 | |
| Front East Window | New Dwelling DG Window | External Tile Hung Wall | West | 1.90 | |
| Side South Windows | New Dwelling DG Window | External Cavity Wall | South | 1.80 | |
| Rear West Windows | New Dwelling DG Window | External Cavity Wall | East | 3.94 | |
| Rear West Windows | New Dwell DG French Doors | External Cavity Wall | East | 3.92 | |

| | | |
|---|---|---|
| **14.0 Conservatory** | None | |
| **15.0 Draught Proofing** | 100 | % |
| **16.0 Draught Lobby** | No | |
| **17.0 Thermal Bridging** | Calculate Bridges | |

**17.1 List of Bridges**

| Bridge Type | Source Type | Length | Psi | Adjusted | Reference: | Imported |
|---|---|---|---|---|---|---|
| E2 Other lintels (including other steel lintels) | Independently assessed | 11.46 | 0.05 | 0.05 | IG or Keystone Hi Therm + | No |
| E3 Sill | Independently assessed | 10.50 | 0.02 | 0.02 | Recognised Construction Detail | No |
| E4 Jamb | Independently assessed | 28.80 | 0.01 | 0.01 | Recognised Construction Detail | No |
| E5 Ground floor (normal) | Independently assessed | 20.50 | 0.07 | 0.07 | Recognised Construction Detail | No |
| E6 Intermediate floor within a dwelling | Independently assessed | 20.50 | 0.00 | 0.00 | Recognised Construction Detail | No |
| E10 Eaves (insulation at ceiling level) | Independently assessed | 18.52 | 0.06 | 0.06 | Recognised Construction Detail | No |
| E12 Gable (insulation at ceiling level) | Independently assessed | 1.98 | 0.06 | 0.06 | Recognised Construction Detail | No |
| E16 Corner (normal) | Independently assessed | 10.30 | 0.05 | 0.05 | Recognised Construction Detail | No |
| E18 Party wall between dwellings | Independently assessed | 10.30 | 0.04 | 0.04 | Recognised Construction Detail | No |
| P1 Party wall - Ground floor | Independently assessed | 9.20 | 0.10 | 0.10 | Recognised Construction Detail | No |
| P2 Party wall - Intermediate floor within a dwelling | Table K1 - Default | 9.20 | 0.00 | 0.00 | | No |
| P4 Party wall - Roof (insulation at ceiling level) | Independently assessed | 9.20 | 0.10 | 0.10 | Recognised Construction Detail | No |

| | | |
|---|---|---|
| Y-value | 0.00 | W/m²K |
| **18.0 Pressure Testing** | Yes | |
| Designed $AP_{50}$ | 5.05 | m³/(h.m²) @ 50 Pa |
| Test Method | Blower Door | |
| **19.0 Mechanical Ventilation** | | |
| **Mechanical Ventilation** | | |
| Mechanical Ventilation System Present | No | |
| **20.0 Fans, Open Fireplaces, Flues** | | |
| **21.0 Fixed Cooling System** | No | |
| **22.0 Lighting** | | |
| No Fixed Lighting | No | |

| Name | Efficacy | Power | Capacity | Count |
|---|---|---|---|---|
| Low energy Lighting | 75.00 | 15 | 1125 | 36 |

| | | |
|---|---|---|
| **24.0 Main Heating 1** | Database | |
| Description | Electric Air Source Heat Pump | |
| Percentage of Heat | 100.00 | % |
| Database Ref. No. | 106465 | |
| Fuel Type | Electricity | |
| In Winter | 0.00 | |
| In Summer | 0.00 | |
| Model Name | EDLA04EV3 | |

# Summary for Input Data

elmhurst energy

| | |
|---|---|
| Manufacturer | Daikin Europe NV |
| System Type | Heat Pump |
| Controls SAP Code | 2207 |
| PCDF Controls | 0 |
| Is MHS Pumped | Pump in heated space |
| Heating Pump Age | 2013 or later |
| Heat Emitter | Radiators |
| Flow Temperature | Enter value |
| Flow Temperature Value | 55.00 |

**25.0 Main Heating 2** — None

**26.0 Heat Networks** — None

| | Heat Source | Fuel Type | Heating Use | Efficiency | Percentage Of Heat | Heat | Heat Power Ratio | Electrical | Fuel Factor | Efficiency type |
|---|---|---|---|---|---|---|---|---|---|---|
| Heat source 1 | | | | | | | | | | |
| Heat source 2 | | | | | | | | | | |
| Heat source 3 | | | | | | | | | | |
| Heat source 4 | | | | | | | | | | |
| Heat source 5 | | | | | | | | | | |

**28.0 Water Heating**

| | |
|---|---|
| Water Heating | Main Heating 1 |
| SAP Code | 901 |
| Flue Gas Heat Recovery System | No |
| Waste Water Heat Recovery Instantaneous System 1 | No |
| Waste Water Heat Recovery Instantaneous System 2 | No |
| Waste Water Heat Recovery Storage System | No |
| Solar Panel | No |
| Water use <= 125 litres/person/day | Yes |
| Cold Water Source | From mains |
| Bath Count | 1 |
| Immersion Only Heating Hot Water | No |

**28.1 Showers**

| Description | Shower Type | Flow Rate [l/min] | Rated Power [kW] | Connected | Connected To |
|---|---|---|---|---|---|

**28.3 Waste Water Heat Recovery System**

| | | |
|---|---|---|
| **29.0 Hot Water Cylinder** | Hot Water Cylinder | |
| Cylinder Stat | Yes | |
| Cylinder In Heated Space | Yes | |
| Independent Time Control | Yes | |
| Insulation Type | Measured Loss | |
| Cylinder Volume | 180.00 | L |
| Loss | 1.39 | kWh/day |
| Pipes insulation | Fully insulated primary pipework | |
| In Airing Cupboard | No | |

**31.0 Thermal Store** — None

**Recommendations**

**Lower cost measures**

**None**

**Further measures to achieve even higher standards**

| Typical Cost | Typical savings per year | Ratings after improvement SAP rating | Environmental Impact |
|---|---|---|---|
| £4,000 - £6,000 | £47 | B 85 | A 97 |
| £3,500 - £5,500 | £196 | B 91 | A 98 |
| | | 0 | 0 |

# Thermal Bridging

| | | | |
|---|---|---|---|
| **Property Reference** | sc100236 P9 Bitterne Church | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | Semi-Detached House |
| **Property** | Plot 9, Bitterne Parish Church, Whites Lane, Southampton, Hampshire , SO19 7NP | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 84 B | **DER** | 3.80 | **TER** | 10.31 |
| **Environmental** | 97 A | **% DER < TER** | | | 63.14 |
| **$CO_2$ Emissions (t/year)** | 0.31 | **DFEE** | 34.10 | **TFEE** | 35.85 |
| **Compliance Check** | See BREL | **% DFEE < TFEE** | | | 4.86 |
| **% DPER < TPER** | 26.46 | **DPER** | 39.53 | **TPER** | 53.76 |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Philip Dudley | | |

| | Junction details | Source Type | Psi (W/mK) | Length (m) | Result | Reference |
|---|---|---|---|---|---|---|
| External wall | E2 Other lintels (including other steel lintels) | Independently assessed | 0.050 | 11.46 | 0.57 | IG or Keystone Hi Therm + |
| External wall | E3 Sill | Independently assessed | 0.018 | 10.50 | 0.19 | Recognised Construction Detail |
| External wall | E4 Jamb | Independently assessed | 0.014 | 28.80 | 0.40 | Recognised Construction Detail |
| External wall | E5 Ground floor (normal) | Independently assessed | 0.068 | 20.50 | 1.39 | Recognised Construction Detail |
| External wall | E6 Intermediate floor within a dwelling | Independently assessed | 0.001 | 20.50 | 0.02 | Recognised Construction Detail |
| External wall | E10 Eaves (insulation at ceiling level) | Independently assessed | 0.055 | 18.52 | 1.02 | Recognised Construction Detail |
| External wall | E12 Gable (insulation at ceiling level) | Independently assessed | 0.058 | 1.98 | 0.11 | Recognised Construction Detail |
| External wall | E16 Corner (normal) | Independently assessed | 0.051 | 10.30 | 0.53 | Recognised Construction Detail |
| External wall | E18 Party wall between dwellings | Independently assessed | 0.044 | 10.30 | 0.45 | Recognised Construction Detail |
| Party wall | P1 Party wall - Ground floor | Independently assessed | 0.103 | 9.20 | 0.95 | Recognised Construction Detail |
| Party wall | P2 Party wall - Intermediate floor within a dwelling | Table K1 - Default | 0.000 | 9.20 | 0.00 | |
| Party wall | P4 Party wall - Roof (insulation at ceiling level) | Independently assessed | 0.101 | 9.20 | 0.93 | Recognised Construction Detail |

Total: 160.46 W/mK:

Y-Value: 0.00 W/m²K:

# U-VALUE CALCULATOR REPORT

| | | | |
|---|---|---|---|
| **Property Reference** | sc121840 | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling Part L 2021 |
| **Project** | Plot 9, Bitterne Parish Church, Whites Lane, Bitterne, Southampton, Hampshire , SO19 7NP | | |
| **Calculation Type** | New Build (As Designed) | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 88 B | **DER** | 13.19 | **TER** | 24.78 |
| **Environmental** | 89 B | **% DER<TER** | 46.78 | | |
| **$CO_2$ Emissions (t/year)** | 1.00 | **DFEE** | 39.99 | **TFEE** | 51.03 |
| **General Requirements Compliance** | Pass | **% DFEE<TFEE** | 21.63 | | |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers, Surecalc Limited, Tel: 01243572695, mark@surecalc.co.uk | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Vivid Design Studio | | |

## Building Elements

### Roof 000002 - Pitched Roof Insulated Ceiling Vivid

**Roof Type: Pitched Roof, insulated flat ceiling**

| Layer | Description | Thickness (mm) | Conductivity (W/m²K) | Resistance (m²K/W) | Fraction (%) |
|---|---|---|---|---|---|
| **Ext surface** | | | | 0.0400 | |
| **Layer 1** | **Loft Space** | | | | |
| | Main construction | 0 | 0.0600 | 0.0600 | 100.00 |
| **Layer 2** | **Mineral wool** | | | | |
| | Main construction | 350 | 0.0440 | 7.9545 | 100.00 |
| | Corrections - Air Gap: Level 0, Fasteners: None or plastic | | | | |
| **Layer 3** | **Mineral wool quilt** | | | | |
| | Main construction | 150 | 0.0440 | 3.4091 | 93.67 |
| | Main construction | 150 | 0.1300 | 1.1538 | 6.33 |
| | Corrections - Air Gap: Level 0, Fasteners: None or plastic | | | | |
| **Layer 4** | **Plasterboard, standard** | | | | |
| | Main construction | 12.5 | 0.2100 | 0.0595 | 100.00 |
| **Int surface** | | | | 0.1000 | |

**Total resistance:** **Upper limit =** 11.449 m² K/W **Lower limit =** 11.248 m² K/W **Average =** 11.348 m² K/W

**Total correction =** 0.0030 m² K/W **U-value (unrounded) =** 0.09 W/m² K

**Unheated space:** None

**Total thickness: 513 mm** **U-value: 0.09 W/m² K** **Kappa: n/a**



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

# U-VALUE CALCULATOR REPORT

| | | | |
|---|---|---|---|
| **Property Reference** | sc121840 | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling Part L 2021 |
| **Project** | Plot 9, Bitterne Parish Church, Whites Lane, Bitterne, Southampton, Hampshire , SO19 7NP | | |
| **Calculation Type** | New Build (As Designed) | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 88 B | **DER** | 13.19 | **TER** | 24.78 |
| **Environmental** | 89 B | **% DER<TER** | 46.78 | | |
| **$CO_2$ Emissions (t/year)** | 1.00 | **DFEE** | 39.99 | **TFEE** | 51.03 |
| **General Requirements Compliance** | Pass | **% DFEE<TFEE** | 21.63 | | |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers, Surecalc Limited, Tel: 01243572695, mark@surecalc.co.uk | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Vivid Design Studio | | |

## Building Elements

### Wall 000001 - Vivid Cavity Wall 125 Knauf Supafil 34

**Wall Type: Standard Wall**

| Layer | Description | Thickness (mm) | Conductivity (W/m²K) | Resistance (m²K/W) | Fraction (%) |
|---|---|---|---|---|---|
| **Ext surface** | | | | 0.0400 | |
| **Layer 1** | **Brick, outer leaf** | | | | |
| | Main construction | 102 | 0.7700 | 0.1325 | 82.81 |
| | Main construction | 102 | 0.9407 | 0.1084 | 17.19 |
| **Layer 2** | **Knauf Supafil 34 blown Cavity Fill** | | | | |
| | Main construction | 125 | 0.0340 | 3.6765 | 100.00 |
| | Corrections - Air Gap: Level 0, Fasteners: Wall ties, Cross sectional area: 12.50 mm², Lambda: 17.000 W/m.K, per m²: 2.500 | | | | |
| **Layer 3** | **Masterblock Masterlite Ultra** | | | | |
| | Main construction | 100 | 0.2700 | 0.3704 | 93.43 |
| | Main construction | 100 | 0.8803 | 0.1136 | 6.57 |
| **Layer 4** | **airspace/plaster dabs** | | | | |
| | Main construction | 15 | 0.1000 | 0.1500 | 80.00 |
| | Main construction | 15 | 0.0882 | 0.1700 | 20.00 |
| | Corrections - Cavity Unventilated, Emissivity: Normal | | | | |
| **Layer 5** | **Plasterboard, standard** | | | | |
| | Main construction | 12.5 | 0.2100 | 0.0595 | 100.00 |
| **Int surface** | | | | 0.1300 | |

**Total resistance:** **Upper limit =** 4.541 m² K/W **Lower limit =** 4.510 m² K/W **Average =** 4.525 m² K/W

**Total correction =** 0.0018 m² K/W **U-value (unrounded) =** 0.22 W/m² K

**Unheated space:** None

**Total thickness: 355 mm** **U-value: 0.22 W/m² K** **Kappa: n/a**



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

# U-VALUE CALCULATOR REPORT

| | | | |
|---|---|---|---|
| **Property Reference** | sc121840 | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling Part L 2021 |
| **Project** | Plot 9, Bitterne Parish Church, Whites Lane, Bitterne, Southampton, Hampshire , SO19 7NP | | |
| **Calculation Type** | New Build (As Designed) | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 88 B | **DER** | 13.19 | **TER** | 24.78 |
| **Environmental** | 89 B | **% DER<TER** | 46.78 | | |
| **$CO_2$ Emissions (t/year)** | 1.00 | **DFEE** | 39.99 | **TFEE** | 51.03 |
| **General Requirements Compliance** | Pass | **% DFEE<TFEE** | 21.63 | | |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers, Surecalc Limited, Tel: 01243572695, mark@surecalc.co.uk | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Vivid Design Studio | | |

## Building Elements

### Wall 000004 - Vivid Cavity Wall 125 Knauf Supafil 34

**Wall Type: Standard Wall**

| Layer | Description | Thickness (mm) | Conductivity (W/m²K) | Resistance (m²K/W) | Fraction (%) |
|---|---|---|---|---|---|
| **Ext surface** | | | | 0.0400 | |
| **Layer 1** | **Tile Hanging** | | | | |
| | Main construction | 15 | 1.0000 | 0.0150 | 100.00 |
| **Layer 2** | **airspace/timber battens** | | | | |
| | Main construction | 22 | 0.1222 | 0.1800 | 89.63 |
| | Main construction | 22 | 0.1243 | 0.1770 | 10.37 |
| | Corrections - Cavity Unventilated, Emissivity: Normal | | | | |
| **Layer 3** | **Blockwork, medium** | | | | |
| | Main construction | 100 | 0.5700 | 0.1754 | 93.43 |
| | Main construction | 100 | 0.8803 | 0.1136 | 6.57 |
| **Layer 4** | **Knauf Supafil 34 blown Cavity Fill** | | | | |
| | Main construction | 125 | 0.0340 | 3.6765 | 100.00 |
| | Corrections - Air Gap: Level 0, Fasteners: Wall ties, Cross sectional area: 12.50 mm², Lambda: 17.000 W/m.K, per m²: 2.500 | | | | |
| **Layer 5** | **Masterblock Masterlite Ultra** | | | | |
| | Main construction | 100 | 0.2700 | 0.3704 | 93.43 |
| | Main construction | 100 | 0.8803 | 0.1136 | 6.57 |
| **Layer 6** | **airspace/plaster dabs** | | | | |
| | Main construction | 15 | 0.1000 | 0.1500 | 80.00 |
| | Main construction | 15 | 0.0882 | 0.1700 | 20.00 |
| | Corrections - Cavity Unventilated, Emissivity: Normal | | | | |
| **Layer 7** | **Plasterboard, standard** | | | | |
| | Main construction | 12.5 | 0.2100 | 0.0595 | 100.00 |
| **Int surface** | | | | 0.1300 | |

**Total resistance:** **Upper limit =** 4.779 m² K/W **Lower limit =** 4.746 m² K/W **Average =** 4.762 m² K/W

**Total correction =** 0.0016 m² K/W **U-value (unrounded) =** 0.21 W/m² K

**Unheated space:** None

**Total thickness: 390 mm** **U-value: 0.21 W/m² K** **Kappa: n/a**



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

# U-VALUE CALCULATOR REPORT

| | | | |
|---|---|---|---|
| **Property Reference** | sc121840 | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling Part L 2021 |
| **Project** | Plot 9, Bitterne Parish Church, Whites Lane, Bitterne, Southampton, Hampshire , SO19 7NP | | |
| **Calculation Type** | New Build (As Designed) | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 88 B | **DER** | 13.19 | **TER** | 24.78 |
| **Environmental** | 89 B | **% DER<TER** | 46.78 | | |
| **$CO_2$ Emissions (t/year)** | 1.00 | **DFEE** | 39.99 | **TFEE** | 51.03 |
| **General Requirements Compliance** | Pass | **% DFEE<TFEE** | 21.63 | | |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers, Surecalc Limited, Tel: 01243572695, mark@surecalc.co.uk | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Vivid Design Studio | | |

## Building Elements

### Floor 000003 - Ground Floor Beam and Block

**Floor Type: Suspended Floor**
**Area = 48.80 m², Perimeter = 20.50 m, Wall thickness = 300.00 mm, Soil: Unknown**
**Depth of underfloor space below ground:0.200 m  Floor wind shielding: Average (suburban)**
**Floor height above ground:h = 0.150 m**
**U-value of walls above ground:Uw = 0.220 m**
**Ventilation openings per perimeter length:e = 0.0015 %**
**Mean wind speed:v = 5.000 m/s**
**Resistance on solum:Rg = 0.000 m²K/W**

| Layer | Description | Thickness (mm) | Conductivity (W/m²K) | Resistance (m²K/W) | Fraction (%) |
|---|---|---|---|---|---|
| **Ext surface** | | | | 0.1700 | |
| **Layer 1** | **Blockwork** | | | | |
| | Main construction | 100 | 0.1900 | 0.5263 | 90.91 |
| | Main construction | 100 | 1.0000 | 0.1000 | 9.09 |
| **Layer 2** | **Mannok Therm Floor** | | | | |
| | Main construction | 150 | 0.0220 | 6.8182 | 100.00 |
| | Corrections - Air Gap: Level 1, Fasteners: None or plastic | | | | |
| **Layer 3** | **Screed** | | | | |
| | Main construction | 75 | 1.1500 | 0.0652 | 100.00 |
| **Int surface** | | | | 0.1700 | |

**Total resistance:** **Upper limit =** 7.709 m² K/W **Lower limit =** 7.603 m² K/W **Average =** 7.656 m² K/W

**Total correction =** 0.0079 m² K/W **U-value (unrounded) =** 0.11 W/m² K

**Unheated space:** None

**Total thickness: 325 mm** **U-value: 0.11 W/m² K** **Kappa: n/a**



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

elmhurst energy

# SAP Report Submission for Building Regulations Compliance

Client: Vivid Design Studio

Project: Plot 10, Bitterne Parish Church, Whites Lane
Bitterne, Southampton, Hampshire , SO19 7NP

Contact: Mark Rogers
Surecalc Limited
mark@surecalc.co.uk

Report Issue Date: 06/12/2023

EXCELLENCE IN ENERGY ASSESSMENT

# CODE FOR SUSTAINABLE HOMES
## Calculation Type: New Build (As Designed)

| | | | |
|---|---|---|---|
| **Property Reference** | sc121841 | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling Part L 2021 |
| **Property** | Plot 10, Bitterne Parish Church, Whites Lane, Bitterne, Southampton, Hampshire , SO19 7NP | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 88 B | **DER** | 13.43 | **TER** | 25.18 |
| **Environmental** | 89 B | **% DER<TER** | 46.67 | | |
| **$CO_2$ Emissions (t/year)** | 1.02 | **DFEE** | 41.21 | **TFEE** | 52.36 |
| **General Requirements Compliance** | Pass | **% DFEE<TFEE** | 21.30 | | |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers, Surecalc Limited, Tel: 01243572695, mark@surecalc.co.uk | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Vivid Design Studio | | |

## ENE 1 - Dwelling Emission Rate calculation

| | | | |
|---|---|---|---|
| Total floor area | 97.6 | $m^2$ | |
| DER | 13.43 | $kgCO_2/yr/m^2$ | |
| TER | 25.18 | $kgCO_2/yr/m^2$ | |
| $CO_2$ emissions offset from additional allowable electricity generation | 0.00 | $kgCO_2/yr/m^2$ | (ZC7) |
| Residual $CO_2$ emissions offset from biofuel CHP | 0.00 | $kgCO_2/yr/m^2$ | (ZC5) |
| Total $CO_2$ emissions offset from SAP Section 16 allowances | 0.00 | $kgCO_2/yr/m^2$ | |
| DER accounting for SAP Section 16 allowances | 13.43 | $kgCO_2/yr/m^2$ | |
| Reduction DER/TER | 46.67 | % | |
| CfSH ENE1 credits achieved | 5.2 | | |
| CfSH ENE1 level achieved | 4 | | |

## ENE 2 – Fabric Energy Efficiency calculation

| | | | |
|---|---|---|---|
| Dwelling type | House, Semi-Detached | | |
| Fabric energy efficiency (F.E.E.) | 41.21 | $kWh/m^2/yr$ | |
| CfSH ENE2 credits achieved | 8.2 | | |
| CfSH ENE1 and 2 overall level achieved | 4 | | |

## ENE 7 – Low and Zero Carbon Technologies calculation

**Standard case $CO_2$ emissions**

| | | | |
|---|---|---|---|
| Total floor area | 97.6 | $m^2$ | |
| DER | 18.64 | $kgCO_2/yr/m^2$ | |
| $CO_2$ emissions from electrical appliances | 15.32 | $kgCO_2/yr/m^2$ | (ZC2) |
| $CO_2$ emissions from cooking | 1.89 | $kgCO_2/yr/m^2$ | (ZC3) |
| Standard case total $CO_2$ emissions | 35.85 | $kgCO_2/yr/m^2$ | (ZC4) |
| Net Standard case $CO_2$ emissions | 35.85 | $kgCO_2/yr/m^2$ | (ZC8) |

**Actual case $CO_2$ emissions**

| | | | |
|---|---|---|---|
| DER | 16.54 | $kgCO_2/yr/m^2$ | |
| $CO_2$ emissions from electrical appliances | 15.32 | $kgCO_2/yr/m^2$ | (ZC2) |
| $CO_2$ emissions from cooking | 1.89 | $kgCO_2/yr/m^2$ | (ZC3) |
| Actual case total $CO_2$ emissions | 33.75 | $kgCO_2/yr/m^2$ | (ZC4) |
| $CO_2$ emissions from Biomass | 0.00 | $kgCO_2/yr/m^2$ | (ZC5) |
| $CO_2$ reduction from additional allowable electricity generation | 0.00 | $kgCO_2/yr/m^2$ | (ZC7) |
| Net Actual case $CO_2$ emissions | 33.75 | $kgCO_2/yr/m^2$ | (ZC8) |
| Improvement in net actual/net standard case $CO_2$ emissions | 6 | % | |



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| | |
|---|---|
| ENE7 credits achieved | 0 |



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

# Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Array SAP 10 program, Array

**Date:** Wed 06 Dec 2023 15:28:45

| Project Information | | | |
|---|---|---|---|
| Assessed By | Mark Rogers | Building Type | House, Semi-detached |
| OCDEA Registration | EES/004179 | Assessment Date | 2023-12-06 |

| Dwelling Details | | | |
|---|---|---|---|
| Assessment Type | As designed | Total Floor Area | 98 $m^2$ |
| Site Reference | sc100237 P10 Bitterne Church | Plot Reference | 001 |
| Address | Bitterne Parish Church Plot 10 Whites Lane, Southampton, SO19 7NP | | |

| Client Details | |
|---|---|
| Name | Philip Dudley |
| Company | Vivid Design Studio |
| Address | NA, NA, NA |

**This report covers items included within the SAP calculations. It is not a complete report of regulations compliance.**

| 1a Target emission rate and dwelling emission rate | | |
|---|---|---|
| Fuel for main heating system | Electricity | |
| *Target carbon dioxide emission rate* | *10.53 $kgCO_2/m^2$* | |
| Dwelling carbon dioxide emission rate | 3.87 $kgCO_2/m^2$ | OK |
| **1b Target primary energy rate and dwelling primary energy** | | |
| *Target primary energy* | *54.94 $kWh_{PE}/m^2$* | |
| Dwelling primary energy | 40.26 $kWh_{PE}/m^2$ | OK |
| **1c Target fabric energy efficiency and dwelling fabric energy efficiency** | | |
| *Target fabric energy efficiency* | *36.8 $kWh/m^2$* | |
| Dwelling fabric energy efficiency | 35.2 $kWh/m^2$ | OK |

| 2a Fabric U-values | | | | |
|---|---|---|---|---|
| **Element** | ***Maximum permitted average U-Value [$W/m^2K$]*** | **Dwelling average U-Value [$W/m^2K$]** | **Element with highest individual U-Value** | |
| External walls | *0.26* | 0.22 | Walls (1) (0.22) | OK |
| Party walls | *0.2* | 0 | Party Wall (1) (0) | **N/A** |
| Curtain walls | *1.6* | 0 | N/A | **N/A** |
| Floors | *0.18* | 0.11 | Ground Floor (0.11) | OK |
| Roofs | *0.16* | 0.09 | Roof (1) (0.09) | OK |
| Windows, doors, and roof windows | *1.6* | 1.2 | Front East Door (1.2) | OK |
| Rooflights | *2.2* | N/A | N/A | **N/A** |

| 2b Envelope elements (better than typically expected values are flagged with a subsequent (!)) | | |
|---|---|---|
| **Name** | **Net area [$m^2$]** | **U-Value [$W/m^2K$]** |
| Exposed wall: Walls (1) | 83.28 | 0.22 |
| Exposed wall: Walls (2) | 6 | 0.21 |
| Party wall: Party Wall (1) | 47.38 | 0 **(!)** |
| Ground floor: Ground Floor, Ground Floor | 48.8 | 0.11 |
| Exposed roof: Roof (1) | 48.8 | 0.09 **(!)** |

| 2c Openings (better than typically expected values are flagged with a subsequent (!)) | | | | |
|---|---|---|---|---|
| **Name** | **Area [$m^2$]** | **Orientation** | **Frame factor** | **U-Value [$W/m^2K$]** |
| Front East Door, New Dwell Entrance Door | 2.01 | West | N/A | 1.2 |
| Front East Windows, New Dwelling DG Window | 2.73 | West | 0.7 | 1.2 |
| Front East Window, New Dwelling DG Window | 1.9 | West | 0.7 | 1.2 |
| Side North Windows, New Dwelling DG Window | 1.8 | North | 0.7 | 1.2 |
| Rear West Windows, New Dwelling DG Window | 3.94 | East | 0.7 | 1.2 |
| Rear West Windows, New Dwell DG | 3.92 | East | 0.7 | 1.2 |

| Name | Area [$m^2$] | Orientation | Frame factor | U-Value [$W/m^2K$] |
|---|---|---|---|---|
| French Doors | | | | |

| 2d Thermal bridging (better than typically expected values are flagged with a subsequent (!)) | | | | |
|---|---|---|---|---|
| Building part **1 - Main Dwelling**: Thermal bridging calculated from linear thermal transmittances for each junction | | | | |
| **Main element** | **Junction detail** | **Source** | **Psi value [W/mK]** | **Drawing / reference** |
| External wall | E2: Other lintels (including other steel lintels) | Calculated by person with suitable expertise | 0.05 | IG or Keystone Hi Therm + |
| External wall | E3: Sill | Calculated by person with suitable expertise | 0.018 **(!)** | Recognised Construction Detail |
| External wall | E4: Jamb | Calculated by person with suitable expertise | 0.014 **(!)** | Recognised Construction Detail |
| External wall | E5: Ground floor (normal) | Calculated by person with suitable expertise | 0.068 | Recognised Construction Detail |
| External wall | E6: Intermediate floor within a dwelling | Calculated by person with suitable expertise | 0.001 **(!)** | Recognised Construction Detail |
| External wall | E10: Eaves (insulation at ceiling level) | Calculated by person with suitable expertise | 0.055 | Recognised Construction Detail |
| External wall | E12: Gable (insulation at ceiling level) | Calculated by person with suitable expertise | 0.058 | Recognised Construction Detail |
| External wall | E16: Corner (normal) | Calculated by person with suitable expertise | 0.051 | Recognised Construction Detail |
| External wall | E18: Party wall between dwellings | Calculated by person with suitable expertise | 0.044 | Recognised Construction Detail |
| Party wall | P1: Ground floor | Calculated by person with suitable expertise | 0.103 | Recognised Construction Detail |
| Party wall | P2: Intermediate floor within a dwelling | SAP table default | 0 **(!)** | |
| Party wall | P4: Roof (insulation at ceiling level) | Calculated by person with suitable expertise | 0.101 | Recognised Construction Detail |

| 3 Air permeability (better than typically expected values are flagged with a subsequent (!)) | | |
|---|---|---|
| *Maximum permitted air permeability at 50Pa* | *8 $m^3/hm^2$* | |
| Dwelling air permeability at 50Pa | 5.05 $m^3/hm^2$, Design value | **OK** |
| Air permeability test certificate reference | | |

| 4 Space heating | |
|---|---|
| **Main heating system 1**: Heat pump with radiators or underfloor heating - Electricity | |
| Efficiency | 233.7% |
| Emitter type | Radiators |
| Flow temperature | 55°C |
| System type | Heat Pump |
| Manufacturer | Daikin Europe NV |
| Model | EDLA04EV3 |
| Commissioning | |
| **Secondary heating system**: N/A | |
| Fuel | N/A |
| Efficiency | N/A |
| Commissioning | |

| 5 Hot water | | |
|---|---|---|
| **Cylinder/store** - type: Cylinder | | |
| Capacity | 180 litres | |
| Declared heat loss | 1.39 kWh/day | |
| Primary pipework insulated | Yes | |
| Manufacturer | | |
| Model | | |
| Commissioning | | |
| **Waste water heat recovery system 1** - type: N/A | | |
| Efficiency | | |
| Manufacturer | | |
| Model | | |

| 6 Controls | | |
|---|---|---|
| **Main heating 1** - type: Time and temperature zone control by arrangement of plumbing and electrical services | | |
| Function | | |
| Ecodesign class | | |
| Manufacturer | | |
| Model | | |
| **Water heating** - type: Cylinder thermostat and HW separately timed | | |
| Manufacturer | | |
| Model | | |

| 7 Lighting | | |
|---|---|---|
| *Minimum permitted light source efficacy* | *75 lm/W* | |
| Lowest light source efficacy | 75 lm/W | OK |
| External lights control | N/A | |

| 8 Mechanical ventilation | | |
|---|---|---|
| **System type:** N/A | | |
| *Maximum permitted specific fan power* | *N/A* | |
| Specific fan power | N/A | **N/A** |
| *Minimum permitted heat recovery efficiency* | *N/A* | |
| Heat recovery efficiency | N/A | **N/A** |
| Manufacturer/Model | | |
| Commissioning | | |

| 9 Local generation |
|---|
| N/A |

| 10 Heat networks |
|---|
| N/A |

| 11 Supporting documentary evidence |
|---|
| N/A |

| 12 Declarations | |
|---|---|
| **a. Assessor Declaration** | |
| This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report. | |
| Signed:<br><br>Name: | Assessor ID:<br><br>Date: |
| **b. Client Declaration** | |
| N/A | |

# Predicted Energy Assessment

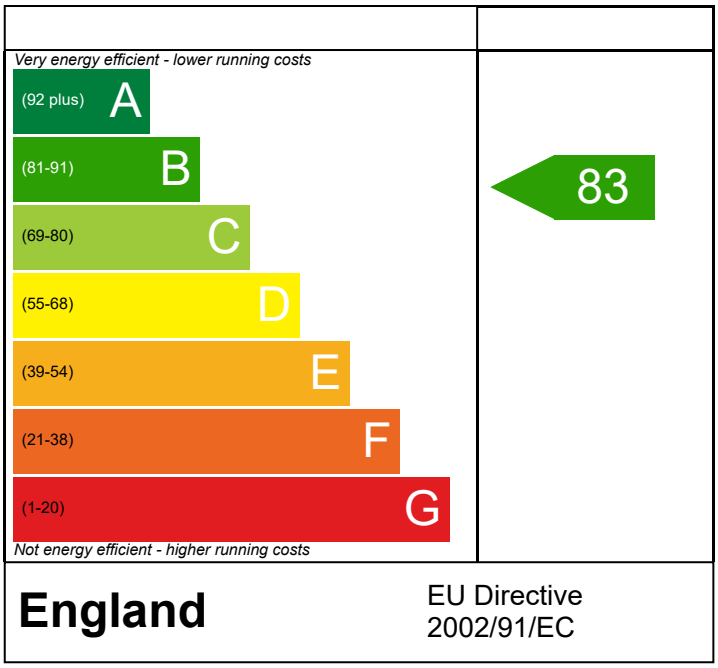
Plot 10, Bitterne Parish Church, Whites Lane,
Southampton, Hampshire , SO19 7NP

| | |
|---|---|
| Dwelling type: | House, Semi-Detached |
| Date of assessment: | 06/12/2023 |
| Produced by: | Mark Rogers |
| Total floor area: | 97.6 m² |
| DRRN: | 8207-4328-6911 |

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

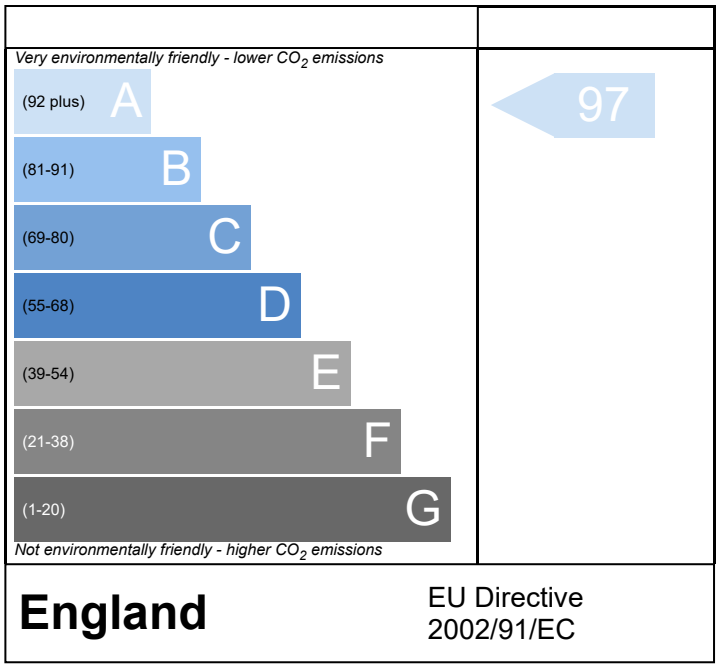
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

## Energy Efficiency Rating




The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

## Environmental Impact ($CO_2$) Rating




The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide ($CO_2$) emissions. The higher the rating the less impact it has on the environment.

# Summary for Input Data

elmhurst energy

| | | | |
|---|---|---|---|
| **Property Reference** | sc100237 P10 Bitterne Church | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling |
| **Property** | Plot 10, Bitterne Parish Church, Whites Lane, Southampton, Hampshire , SO19 7NP | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 83 B | **DER** | 3.87 | **TER** | 10.53 |
| **Environmental** | 97 A | **% DER < TER** | | | 63.25 |
| **$CO_2$ Emissions (t/year)** | 0.31 | **DFEE** | 35.18 | **TFEE** | 36.85 |
| **Compliance Check** | See BREL | **% DFEE < TFEE** | | | 4.52 |
| **% DPER < TPER** | 26.71 | **DPER** | 40.26 | **TPER** | 54.94 |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Philip Dudley | | |

## SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

| | |
|---|---|
| **Orientation** | West |
| **Property Tenture** | ND |
| **Transaction Type** | 6 |
| **Terrain Type** | Suburban |
| **1.0 Property Type** | House, Semi-Detached |
| **2.0 Number of Storeys** | 2 |
| **3.0 Date Built** | 2023 |
| **4.0 Sheltered Sides** | 2 |
| **5.0 Sunlight/Shade** | Average or unknown |
| **6.0 Thermal Mass Parameter** | Precise calculation |
| **7.0 Electricity Tariff** | Standard |
| Smart electricity meter fitted | No |
| Smart gas meter fitted | No |

**7.0 Measurements**

| | Heat Loss Perimeter | Internal Floor Area | Average Storey Height |
|---|---|---|---|
| **Ground floor:** | 20.50 m | 48.80 m² | 2.39 m |
| **1st Storey:** | 20.50 m | 48.80 m² | 2.76 m |

**8.0 Living Area** 13.88 m²

**9.0 External Walls**

| Description | Type | Construction | U-Value (W/m²K) | Kappa (kJ/m²K) | Gross Area(m²) | Nett Area (m²) | Shelter Res | Shelter | Openings | Area Calculation Type |
|---|---|---|---|---|---|---|---|---|---|---|
| External Cavity Wall | Cavity Wall | Cavity wall; plasterboard on dabs or battens, lightweight aggregate block, filled cavity, any outside structure | 0.22 | 110.00 | 97.68 | 83.28 | 0.00 | None | 14.40 | Calculate Wall Area |
| External Tile Hung Wall | Cavity Wall | Cavity wall; plasterboard on dabs or battens, lightweight aggregate block, filled cavity, any outside structure | 0.21 | 110.00 | 7.90 | 6.00 | 0.00 | None | 1.90 | Enter Gross Area |

**9.1 Party Walls**

| Description | Type | Construction | U-Value (W/m²K) | Kappa (kJ/m²K) | Area (m²) | Shelter Res | Shelter |
|---|---|---|---|---|---|---|---|
| Party Wall | Filled Cavity with Edge Sealing | Single plasterboard on dabs both sides, lightweight aggregate blocks, cavity or cavity fill | 0.00 | 110.00 | 47.38 | | None |

**9.2 Internal Walls**

| Description | Construction | Kappa (kJ/m²K) | Area (m²) |
|---|---|---|---|
| Internal Stud Walls | Plasterboard on timber frame | 9.00 | 187.53 |

**10.0 External Roofs**

| Description | Type | Construction | U-Value (W/m²K) | Kappa (kJ/m²K) | Gross Area(m²) | Nett Area (m²) | Shelter Code | Shelter Factor | Calculation Type | Openings |
|---|---|---|---|---|---|---|---|---|---|---|
| External Pitched Roofs | External Plane Roof | Plasterboard, insulated at ceiling level | 0.09 | 9.00 | 48.80 | 48.80 | None | 0.00 | Calculate Wall Area | 0.00 |

**10.2 Internal Ceilings**

| Description | Storey | Construction | Area (m²) |
|---|---|---|---|
| Internal Ceiling | Lowest occupied | Plasterboard ceiling, carpeted chipboard floor | 48.80 |

**11.0 Heat Loss Floors**

# Summary for Input Data

elmhurst energy

| Description | Type | Storey Index | Construction | U-Value (W/m²K) | Shelter Code | Shelter Factor | Kappa (kJ/m²K) | Area (m²) |
|---|---|---|---|---|---|---|---|---|
| Ground Floor | Ground Floor - Solid | Lowest occupied | Suspended concrete floor, carpeted | 0.11 | None | 0.00 | 75.00 | 48.80 |

**11.2 Internal Floors**

| Description | Storey Index | Construction | Kappa (kJ/m²K) | Area (m²) |
|---|---|---|---|---|
| Internal Floor | | Plasterboard ceiling, carpeted chipboard floor | 9.00 | 48.80 |

**12.0 Opening Types**

| Description | Data Source | Type | Glazing | Glazing Gap | Filling Type | G-value | Frame Type | Frame Factor | U Value (W/m²K) |
|---|---|---|---|---|---|---|---|---|---|
| New Dwell Entrance Door | Manufacturer | Half Glazed Door | Double Low-E Soft 0.05 | | | 0.36 | | 0.70 | 1.20 |
| New Dwell DG French Doors | Manufacturer | Window | Double Low-E Soft 0.05 | | | 0.71 | | 0.70 | 1.20 |
| New Dwelling DG Window | Manufacturer | Window | Double Low-E Soft 0.05 | | | 0.71 | | 0.70 | 1.20 |

**13.0 Openings**

| Name | Opening Type | Location | Orientation | Area (m²) | Pitch |
|---|---|---|---|---|---|
| Front East Door | New Dwell Entrance Door | External Cavity Wall | West | 2.01 | |
| Front East Windows | New Dwelling DG Window | External Cavity Wall | West | 2.73 | |
| Front East Window | New Dwelling DG Window | External Tile Hung Wall | West | 1.90 | |
| Side North Windows | New Dwelling DG Window | External Cavity Wall | North | 1.80 | |
| Rear West Windows | New Dwelling DG Window | External Cavity Wall | East | 3.94 | |
| Rear West Windows | New Dwell DG French Doors | External Cavity Wall | East | 3.92 | |

| | | |
|---|---|---|
| **14.0 Conservatory** | None | |
| **15.0 Draught Proofing** | 100 | % |
| **16.0 Draught Lobby** | No | |
| **17.0 Thermal Bridging** | Calculate Bridges | |

**17.1 List of Bridges**

| Bridge Type | Source Type | Length | Psi | Adjusted | Reference: | Imported |
|---|---|---|---|---|---|---|
| E2 Other lintels (including other steel lintels) | Independently assessed | 11.46 | 0.05 | 0.05 | IG or Keystone Hi Therm + | No |
| E3 Sill | Independently assessed | 10.50 | 0.02 | 0.02 | Recognised Construction Detail | No |
| E4 Jamb | Independently assessed | 28.80 | 0.01 | 0.01 | Recognised Construction Detail | No |
| E5 Ground floor (normal) | Independently assessed | 20.50 | 0.07 | 0.07 | Recognised Construction Detail | No |
| E6 Intermediate floor within a dwelling | Independently assessed | 20.50 | 0.00 | 0.00 | Recognised Construction Detail | No |
| E10 Eaves (insulation at ceiling level) | Independently assessed | 18.52 | 0.06 | 0.06 | Recognised Construction Detail | No |
| E12 Gable (insulation at ceiling level) | Independently assessed | 1.98 | 0.06 | 0.06 | Recognised Construction Detail | No |
| E16 Corner (normal) | Independently assessed | 10.30 | 0.05 | 0.05 | Recognised Construction Detail | No |
| E18 Party wall between dwellings | Independently assessed | 10.30 | 0.04 | 0.04 | Recognised Construction Detail | No |
| P1 Party wall - Ground floor | Independently assessed | 9.20 | 0.10 | 0.10 | Recognised Construction Detail | No |
| P2 Party wall - Intermediate floor within a dwelling | Table K1 - Default | 9.20 | 0.00 | 0.00 | | No |
| P4 Party wall - Roof (insulation at ceiling level) | Independently assessed | 9.20 | 0.10 | 0.10 | Recognised Construction Detail | No |

| | | |
|---|---|---|
| Y-value | 0.00 | W/m²K |
| **18.0 Pressure Testing** | Yes | |
| Designed $AP_{50}$ | 5.05 | m³/(h.m²) @ 50 Pa |
| Test Method | Blower Door | |
| **19.0 Mechanical Ventilation** | | |
| **Mechanical Ventilation** | | |
| Mechanical Ventilation System Present | No | |
| **20.0 Fans, Open Fireplaces, Flues** | | |
| **21.0 Fixed Cooling System** | No | |
| **22.0 Lighting** | | |
| No Fixed Lighting | No | |

| Name | Efficacy | Power | Capacity | Count |
|---|---|---|---|---|
| Low energy Lighting | 75.00 | 15 | 1125 | 36 |

| | | |
|---|---|---|
| **24.0 Main Heating 1** | Database | |
| Description | Electric Air Source Heat Pump | |
| Percentage of Heat | 100.00 | % |
| Database Ref. No. | 106465 | |
| Fuel Type | Electricity | |
| In Winter | 0.00 | |
| In Summer | 0.00 | |
| Model Name | EDLA04EV3 | |

# Summary for Input Data

| | |
|---|---|
| Manufacturer | Daikin Europe NV |
| System Type | Heat Pump |
| Controls SAP Code | 2207 |
| PCDF Controls | 0 |
| Is MHS Pumped | Pump in heated space |
| Heating Pump Age | 2013 or later |
| Heat Emitter | Radiators |
| Flow Temperature | Enter value |
| Flow Temperature Value | 55.00 |

**25.0 Main Heating 2** — None

**26.0 Heat Networks** — None

| | Heat Source | Fuel Type | Heating Use | Efficiency | Percentage Of Heat | Heat | Heat Power Ratio | Electrical | Fuel Factor | Efficiency type |
|---|---|---|---|---|---|---|---|---|---|---|
| Heat source 1 | | | | | | | | | | |
| Heat source 2 | | | | | | | | | | |
| Heat source 3 | | | | | | | | | | |
| Heat source 4 | | | | | | | | | | |
| Heat source 5 | | | | | | | | | | |

**28.0 Water Heating**

| | |
|---|---|
| Water Heating | Main Heating 1 |
| SAP Code | 901 |
| Flue Gas Heat Recovery System | No |
| Waste Water Heat Recovery Instantaneous System 1 | No |
| Waste Water Heat Recovery Instantaneous System 2 | No |
| Waste Water Heat Recovery Storage System | No |
| Solar Panel | No |
| Water use <= 125 litres/person/day | Yes |
| Cold Water Source | From mains |
| Bath Count | 1 |
| Immersion Only Heating Hot Water | No |

**28.1 Showers**

| Description | Shower Type | Flow Rate [l/min] | Rated Power [kW] | Connected | Connected To |
|---|---|---|---|---|---|

**28.3 Waste Water Heat Recovery System**

| | | |
|---|---|---|
| **29.0 Hot Water Cylinder** | Hot Water Cylinder | |
| Cylinder Stat | Yes | |
| Cylinder In Heated Space | Yes | |
| Independent Time Control | Yes | |
| Insulation Type | Measured Loss | |
| Cylinder Volume | 180.00 | L |
| Loss | 1.39 | kWh/day |
| Pipes insulation | Fully insulated primary pipework | |
| In Airing Cupboard | No | |

**31.0 Thermal Store** — None

**Recommendations**

**Lower cost measures**

**None**

**Further measures to achieve even higher standards**

| Typical Cost | Typical savings per year | Ratings after improvement SAP rating | Environmental Impact |
|---|---|---|---|
| £4,000 - £6,000 | £47 | B 85 | A 97 |
| £3,500 - £5,500 | £196 | B 90 | A 98 |
| | | 0 | 0 |

# Thermal Bridging

| | | | |
|---|---|---|---|
| **Property Reference** | sc100237 P10 Bitterne Church | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | Semi-Detached House |
| **Property** | Plot 10, Bitterne Parish Church, Whites Lane, Southampton, Hampshire , SO19 7NP | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 83 B | **DER** | 3.87 | **TER** | 10.53 |
| **Environmental** | 97 A | **% DER < TER** | | | 63.25 |
| **$CO_2$ Emissions (t/year)** | 0.31 | **DFEE** | 35.18 | **TFEE** | 36.85 |
| **Compliance Check** | See BREL | **% DFEE < TFEE** | | | 4.52 |
| **% DPER < TPER** | 26.71 | **DPER** | 40.26 | **TPER** | 54.94 |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Philip Dudley | | |

| | Junction details | Source Type | Psi (W/mK) | Length (m) | Result | Reference |
|---|---|---|---|---|---|---|
| External wall | E2 Other lintels (including other steel lintels) | Independently assessed | 0.050 | 11.46 | 0.57 | IG or Keystone Hi Therm + |
| External wall | E3 Sill | Independently assessed | 0.018 | 10.50 | 0.19 | Recognised Construction Detail |
| External wall | E4 Jamb | Independently assessed | 0.014 | 28.80 | 0.40 | Recognised Construction Detail |
| External wall | E5 Ground floor (normal) | Independently assessed | 0.068 | 20.50 | 1.39 | Recognised Construction Detail |
| External wall | E6 Intermediate floor within a dwelling | Independently assessed | 0.001 | 20.50 | 0.02 | Recognised Construction Detail |
| External wall | E10 Eaves (insulation at ceiling level) | Independently assessed | 0.055 | 18.52 | 1.02 | Recognised Construction Detail |
| External wall | E12 Gable (insulation at ceiling level) | Independently assessed | 0.058 | 1.98 | 0.11 | Recognised Construction Detail |
| External wall | E16 Corner (normal) | Independently assessed | 0.051 | 10.30 | 0.53 | Recognised Construction Detail |
| External wall | E18 Party wall between dwellings | Independently assessed | 0.044 | 10.30 | 0.45 | Recognised Construction Detail |
| Party wall | P1 Party wall - Ground floor | Independently assessed | 0.103 | 9.20 | 0.95 | Recognised Construction Detail |
| Party wall | P2 Party wall - Intermediate floor within a dwelling | Table K1 - Default | 0.000 | 9.20 | 0.00 | |
| Party wall | P4 Party wall - Roof (insulation at ceiling level) | Independently assessed | 0.101 | 9.20 | 0.93 | Recognised Construction Detail |

Total: 160.46 W/mK:

Y-Value: 0.00 W/m²K:

# U-VALUE CALCULATOR REPORT

| | | | |
|---|---|---|---|
| **Property Reference** | sc121841 | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling Part L 2021 |
| **Project** | Plot 10, Bitterne Parish Church, Whites Lane, Bitterne, Southampton, Hampshire , SO19 7NP | | |
| **Calculation Type** | New Build (As Designed) | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 88 B | **DER** | 13.43 | **TER** | 25.18 |
| **Environmental** | 89 B | **% DER<TER** | 46.67 | | |
| **$CO_2$ Emissions (t/year)** | 1.02 | **DFEE** | 41.21 | **TFEE** | 52.36 |
| **General Requirements Compliance** | Pass | **% DFEE<TFEE** | 21.30 | | |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers, Surecalc Limited, Tel: 01243572695, mark@surecalc.co.uk | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Vivid Design Studio | | |

## Building Elements

### Roof 000002 - Pitched Roof Insulated Ceiling Vivid

**Roof Type: Pitched Roof, insulated flat ceiling**

| Layer | Description | Thickness (mm) | Conductivity (W/m²K) | Resistance (m²K/W) | Fraction (%) |
|---|---|---|---|---|---|
| **Ext surface** | | | | 0.0400 | |
| **Layer 1** | **Loft Space** | | | | |
| | Main construction | 0 | 0.0600 | 0.0600 | 100.00 |
| **Layer 2** | **Mineral wool** | | | | |
| | Main construction | 350 | 0.0440 | 7.9545 | 100.00 |
| | Corrections - Air Gap: Level 0, Fasteners: None or plastic | | | | |
| **Layer 3** | **Mineral wool quilt** | | | | |
| | Main construction | 150 | 0.0440 | 3.4091 | 93.67 |
| | Main construction | 150 | 0.1300 | 1.1538 | 6.33 |
| | Corrections - Air Gap: Level 0, Fasteners: None or plastic | | | | |
| **Layer 4** | **Plasterboard, standard** | | | | |
| | Main construction | 12.5 | 0.2100 | 0.0595 | 100.00 |
| **Int surface** | | | | 0.1000 | |

**Total resistance:** **Upper limit =** 11.449 m² K/W **Lower limit =** 11.248 m² K/W **Average =** 11.348 m² K/W

**Total correction =** 0.0030 m² K/W **U-value (unrounded) =** 0.09 W/m² K

**Unheated space:** None

**Total thickness: 513 mm** **U-value: 0.09 W/m² K** **Kappa: n/a**



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

# U-VALUE CALCULATOR REPORT

| | | | |
|---|---|---|---|
| **Property Reference** | sc121841 | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling Part L 2021 |
| **Project** | Plot 10, Bitterne Parish Church, Whites Lane, Bitterne, Southampton, Hampshire , SO19 7NP | | |
| **Calculation Type** | New Build (As Designed) | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 88 B | **DER** | 13.43 | **TER** | 25.18 |
| **Environmental** | 89 B | **% DER<TER** | 46.67 | | |
| **$CO_2$ Emissions (t/year)** | 1.02 | **DFEE** | 41.21 | **TFEE** | 52.36 |
| **General Requirements Compliance** | Pass | **% DFEE<TFEE** | 21.30 | | |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers, Surecalc Limited, Tel: 01243572695, mark@surecalc.co.uk | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Vivid Design Studio | | |

## Building Elements

### Wall 000001 - Vivid Cavity Wall 125 Knauf Supafil 34

**Wall Type: Standard Wall**

| Layer | Description | Thickness (mm) | Conductivity (W/m²K) | Resistance (m²K/W) | Fraction (%) |
|---|---|---|---|---|---|
| **Ext surface** | | | | 0.0400 | |
| **Layer 1** | **Brick, outer leaf** | | | | |
| | Main construction | 102 | 0.7700 | 0.1325 | 82.81 |
| | Main construction | 102 | 0.9407 | 0.1084 | 17.19 |
| **Layer 2** | **Knauf Supafil 34 blown Cavity Fill** | | | | |
| | Main construction | 125 | 0.0340 | 3.6765 | 100.00 |
| | Corrections - Air Gap: Level 0, Fasteners: Wall ties, Cross sectional area: 12.50 mm², Lambda: 17.000 W/m.K, per m²: 2.500 | | | | |
| **Layer 3** | **Masterblock Masterlite Ultra** | | | | |
| | Main construction | 100 | 0.2700 | 0.3704 | 93.43 |
| | Main construction | 100 | 0.8803 | 0.1136 | 6.57 |
| **Layer 4** | **airspace/plaster dabs** | | | | |
| | Main construction | 15 | 0.1000 | 0.1500 | 80.00 |
| | Main construction | 15 | 0.0882 | 0.1700 | 20.00 |
| | Corrections - Cavity Unventilated, Emissivity: Normal | | | | |
| **Layer 5** | **Plasterboard, standard** | | | | |
| | Main construction | 12.5 | 0.2100 | 0.0595 | 100.00 |
| **Int surface** | | | | 0.1300 | |

**Total resistance:** **Upper limit =** 4.541 m² K/W **Lower limit =** 4.510 m² K/W **Average =** 4.525 m² K/W

**Total correction =** 0.0018 m² K/W **U-value (unrounded) =** 0.22 W/m² K

**Unheated space:** None

**Total thickness: 355 mm** **U-value: 0.22 W/m² K** **Kappa: n/a**



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

# U-VALUE CALCULATOR REPORT

| | | | |
|---|---|---|---|
| **Property Reference** | sc121841 | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling Part L 2021 |
| **Project** | Plot 10, Bitterne Parish Church, Whites Lane, Bitterne, Southampton, Hampshire , SO19 7NP | | |
| **Calculation Type** | New Build (As Designed) | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 88 B | **DER** | 13.43 | **TER** | 25.18 |
| **Environmental** | 89 B | **% DER<TER** | 46.67 | | |
| **$CO_2$ Emissions (t/year)** | 1.02 | **DFEE** | 41.21 | **TFEE** | 52.36 |
| **General Requirements Compliance** | Pass | **% DFEE<TFEE** | 21.30 | | |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers, Surecalc Limited, Tel: 01243572695, mark@surecalc.co.uk | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Vivid Design Studio | | |

## Building Elements

### Wall 000004 - Vivid Cavity Wall 125 Knauf Supafil 34

**Wall Type: Standard Wall**

| Layer | Description | Thickness (mm) | Conductivity (W/m²K) | Resistance (m²K/W) | Fraction (%) |
|---|---|---|---|---|---|
| **Ext surface** | | | | 0.0400 | |
| **Layer 1** | **Tile Hanging** | | | | |
| | Main construction | 15 | 1.0000 | 0.0150 | 100.00 |
| **Layer 2** | **airspace/timber battens** | | | | |
| | Main construction | 22 | 0.1222 | 0.1800 | 89.63 |
| | Main construction | 22 | 0.1243 | 0.1770 | 10.37 |
| | Corrections - Cavity Unventilated, Emissivity: Normal | | | | |
| **Layer 3** | **Blockwork, medium** | | | | |
| | Main construction | 100 | 0.5700 | 0.1754 | 93.43 |
| | Main construction | 100 | 0.8803 | 0.1136 | 6.57 |
| **Layer 4** | **Knauf Supafil 34 blown Cavity Fill** | | | | |
| | Main construction | 125 | 0.0340 | 3.6765 | 100.00 |
| | Corrections - Air Gap: Level 0, Fasteners: Wall ties, Cross sectional area: 12.50 mm², Lambda: 17.000 W/m.K, per m²: 2.500 | | | | |
| **Layer 5** | **Masterblock Masterlite Ultra** | | | | |
| | Main construction | 100 | 0.2700 | 0.3704 | 93.43 |
| | Main construction | 100 | 0.8803 | 0.1136 | 6.57 |
| **Layer 6** | **airspace/plaster dabs** | | | | |
| | Main construction | 15 | 0.1000 | 0.1500 | 80.00 |
| | Main construction | 15 | 0.0882 | 0.1700 | 20.00 |
| | Corrections - Cavity Unventilated, Emissivity: Normal | | | | |
| **Layer 7** | **Plasterboard, standard** | | | | |
| | Main construction | 12.5 | 0.2100 | 0.0595 | 100.00 |
| **Int surface** | | | | 0.1300 | |

**Total resistance:** **Upper limit =** 4.779 m² K/W **Lower limit =** 4.746 m² K/W **Average =** 4.762 m² K/W

**Total correction =** 0.0016 m² K/W **U-value (unrounded) =** 0.21 W/m² K

**Unheated space:** None

**Total thickness: 390 mm** **U-value: 0.21 W/m² K** **Kappa: n/a**



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

# U-VALUE CALCULATOR REPORT

| | | | |
|---|---|---|---|
| **Property Reference** | sc121841 | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling Part L 2021 |
| **Project** | Plot 10, Bitterne Parish Church, Whites Lane, Bitterne, Southampton, Hampshire , SO19 7NP | | |
| **Calculation Type** | New Build (As Designed) | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 88 B | **DER** | 13.43 | **TER** | 25.18 |
| **Environmental** | 89 B | **% DER<TER** | 46.67 | | |
| **$CO_2$ Emissions (t/year)** | 1.02 | **DFEE** | 41.21 | **TFEE** | 52.36 |
| **General Requirements Compliance** | Pass | **% DFEE<TFEE** | 21.30 | | |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers, Surecalc Limited, Tel: 01243572695, mark@surecalc.co.uk | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Vivid Design Studio | | |

## Building Elements

### Floor 000003 - Ground Floor Beam and Block

**Floor Type: Suspended Floor**
**Area = 48.80 m², Perimeter = 20.50 m, Wall thickness = 300.00 mm, Soil: Unknown**
**Depth of underfloor space below ground:0.200 m  Floor wind shielding: Average (suburban)**
**Floor height above ground:h = 0.150 m**
**U-value of walls above ground:Uw = 0.220 m**
**Ventilation openings per perimeter length:e = 0.0015 %**
**Mean wind speed:v = 5.000 m/s**
**Resistance on solum:Rg = 0.000 m²K/W**

| Layer | Description | Thickness (mm) | Conductivity (W/m²K) | Resistance (m²K/W) | Fraction (%) |
|---|---|---|---|---|---|
| **Ext surface** | | | | 0.1700 | |
| **Layer 1** | **Blockwork** | | | | |
| | Main construction | 100 | 0.1900 | 0.5263 | 90.91 |
| | Main construction | 100 | 1.0000 | 0.1000 | 9.09 |
| **Layer 2** | **Mannok Therm Floor** | | | | |
| | Main construction | 150 | 0.0220 | 6.8182 | 100.00 |
| | Corrections - Air Gap: Level 1, Fasteners: None or plastic | | | | |
| **Layer 3** | **Screed** | | | | |
| | Main construction | 75 | 1.1500 | 0.0652 | 100.00 |
| **Int surface** | | | | 0.1700 | |

**Total resistance:** **Upper limit =** 7.709 m² K/W **Lower limit =** 7.603 m² K/W **Average =** 7.656 m² K/W

**Total correction =** 0.0079 m² K/W **U-value (unrounded) =** 0.11 W/m² K

**Unheated space:** None

**Total thickness: 325 mm** **U-value: 0.11 W/m² K** **Kappa: n/a**



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

elmhurst energy

# SAP Report Submission for Building Regulations Compliance

Client: Vivid Design Studio

Project: Plot 11, Bitterne Parish Church, Whites Lane
Bitterne, Southampton, Hampshire , SO19 7NP

Contact: Mark Rogers
Surecalc Limited
mark@surecalc.co.uk

Report Issue Date: 06/12/2023

EXCELLENCE IN ENERGY ASSESSMENT

# CODE FOR SUSTAINABLE HOMES
# Calculation Type: New Build (As Designed)

| | | | |
|---|---|---|---|
| **Property Reference** | sc121842 | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling Part L 2021 |
| **Property** | Plot 11, Bitterne Parish Church, Whites Lane, Bitterne, Southampton, Hampshire , SO19 7NP | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 88 B | **DER** | 13.19 | **TER** | 24.78 |
| **Environmental** | 89 B | **% DER<TER** | 46.78 | | |
| **$CO_2$ Emissions (t/year)** | 1.00 | **DFEE** | 39.99 | **TFEE** | 51.03 |
| **General Requirements Compliance** | Pass | **% DFEE<TFEE** | 21.63 | | |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers, Surecalc Limited, Tel: 01243572695, mark@surecalc.co.uk | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Vivid Design Studio | | |

## ENE 1 - Dwelling Emission Rate calculation

| | | | |
|---|---|---|---|
| Total floor area | 97.6 | $m^2$ | |
| DER | 13.19 | $kgCO_2/yr/m^2$ | |
| TER | 24.78 | $kgCO_2/yr/m^2$ | |
| $CO_2$ emissions offset from additional allowable electricity generation | 0.00 | $kgCO_2/yr/m^2$ | (ZC7) |
| Residual $CO_2$ emissions offset from biofuel CHP | 0.00 | $kgCO_2/yr/m^2$ | (ZC5) |
| Total $CO_2$ emissions offset from SAP Section 16 allowances | 0.00 | $kgCO_2/yr/m^2$ | |
| DER accounting for SAP Section 16 allowances | 13.19 | $kgCO_2/yr/m^2$ | |
| Reduction DER/TER | 46.78 | % | |
| CfSH ENE1 credits achieved | 5.2 | | |
| CfSH ENE1 level achieved | 4 | | |

## ENE 2 – Fabric Energy Efficiency calculation

| | | | |
|---|---|---|---|
| Dwelling type | House, Semi-Detached | | |
| Fabric energy efficiency (F.E.E.) | 39.99 | $kWh/m^2/yr$ | |
| CfSH ENE2 credits achieved | 8.5 | | |
| CfSH ENE1 and 2 overall level achieved | 4 | | |

## ENE 7 – Low and Zero Carbon Technologies calculation

**Standard case $CO_2$ emissions**

| | | | |
|---|---|---|---|
| Total floor area | 97.6 | $m^2$ | |
| DER | 18.30 | $kgCO_2/yr/m^2$ | |
| $CO_2$ emissions from electrical appliances | 15.32 | $kgCO_2/yr/m^2$ | (ZC2) |
| $CO_2$ emissions from cooking | 1.89 | $kgCO_2/yr/m^2$ | (ZC3) |
| Standard case total $CO_2$ emissions | 35.51 | $kgCO_2/yr/m^2$ | (ZC4) |
| Net Standard case $CO_2$ emissions | 35.51 | $kgCO_2/yr/m^2$ | (ZC8) |

**Actual case $CO_2$ emissions**

| | | | |
|---|---|---|---|
| DER | 16.31 | $kgCO_2/yr/m^2$ | |
| $CO_2$ emissions from electrical appliances | 15.32 | $kgCO_2/yr/m^2$ | (ZC2) |
| $CO_2$ emissions from cooking | 1.89 | $kgCO_2/yr/m^2$ | (ZC3) |
| Actual case total $CO_2$ emissions | 33.52 | $kgCO_2/yr/m^2$ | (ZC4) |
| $CO_2$ emissions from Biomass | 0.00 | $kgCO_2/yr/m^2$ | (ZC5) |
| $CO_2$ reduction from additional allowable electricity generation | 0.00 | $kgCO_2/yr/m^2$ | (ZC7) |
| Net Actual case $CO_2$ emissions | 33.52 | $kgCO_2/yr/m^2$ | (ZC8) |
| Improvement in net actual/net standard case $CO_2$ emissions | 6 | % | |



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

| | |
|---|---|
| ENE7 credits achieved | 0 |



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

# Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Array SAP 10 program, Array

**Date:** Wed 06 Dec 2023 15:29:32

| Project Information | | | |
|---|---|---|---|
| Assessed By | Mark Rogers | Building Type | House, Semi-detached |
| OCDEA Registration | EES/004179 | Assessment Date | 2023-12-06 |

| Dwelling Details | | | |
|---|---|---|---|
| Assessment Type | As designed | Total Floor Area | 98 $m^2$ |
| Site Reference | sc100238 P11 Bitterne Church | Plot Reference | 001 |
| Address | Bitterne Parish Church Plot 11 Whites Lane, Southampton, SO19 7NP | | |

| Client Details | |
|---|---|
| Name | Philip Dudley |
| Company | Vivid Design Studio |
| Address | NA, NA, NA |

**This report covers items included within the SAP calculations. It is not a complete report of regulations compliance.**

| 1a Target emission rate and dwelling emission rate | | |
|---|---|---|
| Fuel for main heating system | Electricity | |
| *Target carbon dioxide emission rate* | *10.31 $kgCO_2/m^2$* | |
| Dwelling carbon dioxide emission rate | 3.8 $kgCO_2/m^2$ | OK |
| **1b Target primary energy rate and dwelling primary energy** | | |
| *Target primary energy* | *53.76 $kWh_{PE}/m^2$* | |
| Dwelling primary energy | 39.53 $kWh_{PE}/m^2$ | OK |
| **1c Target fabric energy efficiency and dwelling fabric energy efficiency** | | |
| *Target fabric energy efficiency* | *35.8 $kWh/m^2$* | |
| Dwelling fabric energy efficiency | 34.1 $kWh/m^2$ | OK |

| 2a Fabric U-values | | | | |
|---|---|---|---|---|
| **Element** | ***Maximum permitted average U-Value [$W/m^2K$]*** | **Dwelling average U-Value [$W/m^2K$]** | **Element with highest individual U-Value** | |
| External walls | *0.26* | 0.22 | Walls (1) (0.22) | OK |
| Party walls | *0.2* | 0 | Party Wall (1) (0) | **N/A** |
| Curtain walls | *1.6* | 0 | N/A | **N/A** |
| Floors | *0.18* | 0.11 | Ground Floor (0.11) | OK |
| Roofs | *0.16* | 0.09 | Roof (1) (0.09) | OK |
| Windows, doors, and roof windows | *1.6* | 1.2 | Front East Door (1.2) | OK |
| Rooflights | *2.2* | N/A | N/A | **N/A** |

| 2b Envelope elements (better than typically expected values are flagged with a subsequent (!)) | | |
|---|---|---|
| **Name** | **Net area [$m^2$]** | **U-Value [$W/m^2K$]** |
| Exposed wall: Walls (1) | 83.28 | 0.22 |
| Exposed wall: Walls (2) | 6 | 0.21 |
| Party wall: Party Wall (1) | 47.38 | 0 **(!)** |
| Ground floor: Ground Floor, Ground Floor | 48.8 | 0.11 |
| Exposed roof: Roof (1) | 48.8 | 0.09 **(!)** |

| 2c Openings (better than typically expected values are flagged with a subsequent (!)) | | | | |
|---|---|---|---|---|
| **Name** | **Area [$m^2$]** | **Orientation** | **Frame factor** | **U-Value [$W/m^2K$]** |
| Front East Door, New Dwell Entrance Door | 2.01 | West | N/A | 1.2 |
| Front East Windows, New Dwelling DG Window | 2.73 | West | 0.7 | 1.2 |
| Front East Window, New Dwelling DG Window | 1.9 | West | 0.7 | 1.2 |
| Side South Windows, New Dwelling DG Window | 1.8 | South | 0.7 | 1.2 |
| Rear West Windows, New Dwelling DG Window | 3.94 | East | 0.7 | 1.2 |
| Rear West Windows, New Dwell DG | 3.92 | East | 0.7 | 1.2 |

| Name | Area [$m^2$] | Orientation | Frame factor | U-Value [$W/m^2K$] |
|---|---|---|---|---|
| French Doors | | | | |

| 2d Thermal bridging (better than typically expected values are flagged with a subsequent (!)) | | | | |
|---|---|---|---|---|
| Building part **1 - Main Dwelling**: Thermal bridging calculated from linear thermal transmittances for each junction | | | | |
| **Main element** | **Junction detail** | **Source** | **Psi value [W/mK]** | **Drawing / reference** |
| External wall | E2: Other lintels (including other steel lintels) | Calculated by person with suitable expertise | 0.05 | IG or Keystone Hi Therm + |
| External wall | E3: Sill | Calculated by person with suitable expertise | 0.018 **(!)** | Recognised Construction Detail |
| External wall | E4: Jamb | Calculated by person with suitable expertise | 0.014 **(!)** | Recognised Construction Detail |
| External wall | E5: Ground floor (normal) | Calculated by person with suitable expertise | 0.068 | Recognised Construction Detail |
| External wall | E6: Intermediate floor within a dwelling | Calculated by person with suitable expertise | 0.001 **(!)** | Recognised Construction Detail |
| External wall | E10: Eaves (insulation at ceiling level) | Calculated by person with suitable expertise | 0.055 | Recognised Construction Detail |
| External wall | E12: Gable (insulation at ceiling level) | Calculated by person with suitable expertise | 0.058 | Recognised Construction Detail |
| External wall | E16: Corner (normal) | Calculated by person with suitable expertise | 0.051 | Recognised Construction Detail |
| External wall | E18: Party wall between dwellings | Calculated by person with suitable expertise | 0.044 | Recognised Construction Detail |
| Party wall | P1: Ground floor | Calculated by person with suitable expertise | 0.103 | Recognised Construction Detail |
| Party wall | P2: Intermediate floor within a dwelling | SAP table default | 0 **(!)** | |
| Party wall | P4: Roof (insulation at ceiling level) | Calculated by person with suitable expertise | 0.101 | Recognised Construction Detail |

| 3 Air permeability (better than typically expected values are flagged with a subsequent (!)) | | |
|---|---|---|
| *Maximum permitted air permeability at 50Pa* | *8 $m^3/hm^2$* | |
| Dwelling air permeability at 50Pa | 5.05 $m^3/hm^2$, Design value | **OK** |
| Air permeability test certificate reference | | |

| 4 Space heating | |
|---|---|
| **Main heating system 1**: Heat pump with radiators or underfloor heating - Electricity | |
| Efficiency | 233.7% |
| Emitter type | Radiators |
| Flow temperature | 55°C |
| System type | Heat Pump |
| Manufacturer | Daikin Europe NV |
| Model | EDLA04EV3 |
| Commissioning | |
| **Secondary heating system**: N/A | |
| Fuel | N/A |
| Efficiency | N/A |
| Commissioning | |

| 5 Hot water | | |
|---|---|---|
| **Cylinder/store** - type: Cylinder | | |
| Capacity | 180 litres | |
| Declared heat loss | 1.39 kWh/day | |
| Primary pipework insulated | Yes | |
| Manufacturer | | |
| Model | | |
| Commissioning | | |
| **Waste water heat recovery system 1** - type: N/A | | |
| Efficiency | | |
| Manufacturer | | |
| Model | | |

| 6 Controls | | |
|---|---|---|
| **Main heating 1** - type: Time and temperature zone control by arrangement of plumbing and electrical services | | |
| Function | | |
| Ecodesign class | | |
| Manufacturer | | |
| Model | | |
| **Water heating** - type: Cylinder thermostat and HW separately timed | | |
| Manufacturer | | |
| Model | | |

| 7 Lighting | | |
|---|---|---|
| *Minimum permitted light source efficacy* | *75 lm/W* | |
| Lowest light source efficacy | 75 lm/W | OK |
| External lights control | N/A | |

| 8 Mechanical ventilation | | |
|---|---|---|
| **System type:** N/A | | |
| *Maximum permitted specific fan power* | *N/A* | |
| Specific fan power | N/A | **N/A** |
| *Minimum permitted heat recovery efficiency* | *N/A* | |
| Heat recovery efficiency | N/A | **N/A** |
| Manufacturer/Model | | |
| Commissioning | | |

| 9 Local generation |
|---|
| N/A |

| 10 Heat networks |
|---|
| N/A |

| 11 Supporting documentary evidence |
|---|
| N/A |

| 12 Declarations | |
|---|---|
| **a. Assessor Declaration** | |
| This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report. | |
| Signed:<br><br>Name: | Assessor ID:<br><br>Date: |
| **b. Client Declaration** | |
| N/A | |

# Predicted Energy Assessment

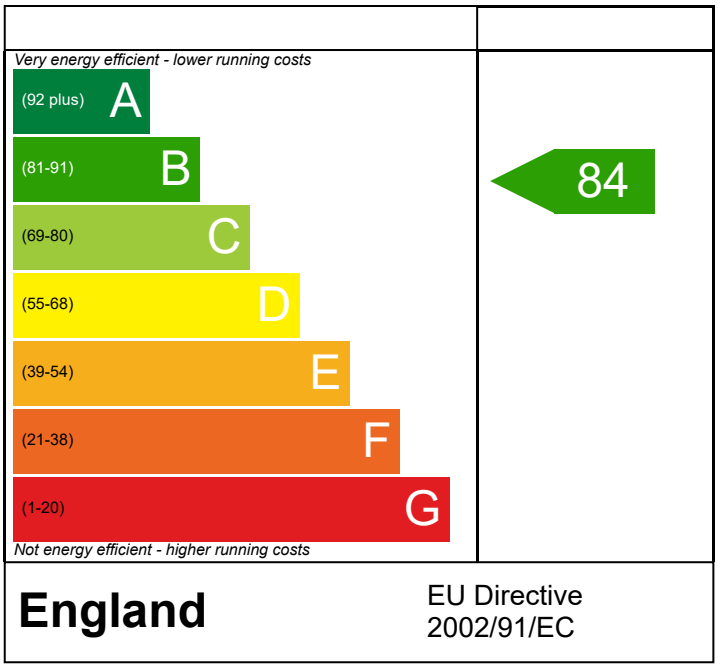
Plot 11, Bitterne Parish Church, Whites Lane,
Southampton, Hampshire , SO19 7NP

| | |
|---|---|
| Dwelling type: | House, Semi-Detached |
| Date of assessment: | 06/12/2023 |
| Produced by: | Mark Rogers |
| Total floor area: | 97.6 m² |
| DRRN: | 9207-7023-6925 |

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

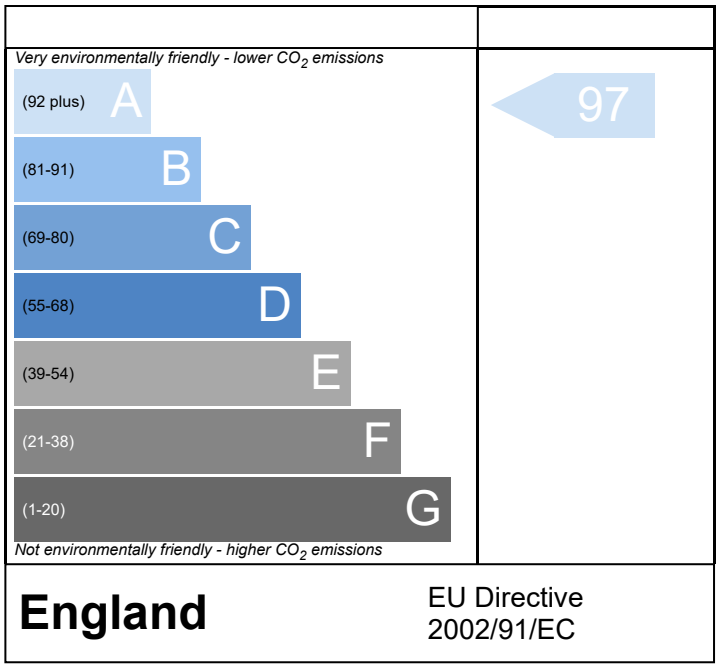
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

## Energy Efficiency Rating




The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

## Environmental Impact ($CO_2$) Rating




The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide ($CO_2$) emissions. The higher the rating the less impact it has on the environment.

# Summary for Input Data

elmhurst energy

| | | | |
|---|---|---|---|
| **Property Reference** | sc100238 P11 Bitterne Church | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling |
| **Property** | Plot 11, Bitterne Parish Church, Whites Lane, Southampton, Hampshire , SO19 7NP | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 84 B | **DER** | 3.80 | **TER** | 10.31 |
| **Environmental** | 97 A | **% DER < TER** | | | 63.14 |
| **$CO_2$ Emissions (t/year)** | 0.31 | **DFEE** | 34.10 | **TFEE** | 35.85 |
| **Compliance Check** | See BREL | **% DFEE < TFEE** | | | 4.86 |
| **% DPER < TPER** | 26.46 | **DPER** | 39.53 | **TPER** | 53.76 |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Philip Dudley | | |

## SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

| | |
|---|---|
| **Orientation** | West |
| **Property Tenture** | ND |
| **Transaction Type** | 6 |
| **Terrain Type** | Suburban |
| **1.0 Property Type** | House, Semi-Detached |
| **2.0 Number of Storeys** | 2 |
| **3.0 Date Built** | 2023 |
| **4.0 Sheltered Sides** | 2 |
| **5.0 Sunlight/Shade** | Average or unknown |
| **6.0 Thermal Mass Parameter** | Precise calculation |
| **7.0 Electricity Tariff** | Standard |
| Smart electricity meter fitted | No |
| Smart gas meter fitted | No |

**7.0 Measurements**

| | Heat Loss Perimeter | Internal Floor Area | Average Storey Height |
|---|---|---|---|
| **Ground floor:** | 20.50 m | 48.80 m² | 2.39 m |
| **1st Storey:** | 20.50 m | 48.80 m² | 2.76 m |

**8.0 Living Area** 13.88 m²

**9.0 External Walls**

| Description | Type | Construction | U-Value (W/m²K) | Kappa (kJ/m²K) | Gross Area(m²) | Nett Area (m²) | Shelter Res | Shelter | Openings | Area Calculation Type |
|---|---|---|---|---|---|---|---|---|---|---|
| External Cavity Wall | Cavity Wall | Cavity wall; plasterboard on dabs or battens, lightweight aggregate block, filled cavity, any outside structure | 0.22 | 110.00 | 97.68 | 83.28 | 0.00 | None | 14.40 | Calculate Wall Area |
| External Tile Hung Wall | Cavity Wall | Cavity wall; plasterboard on dabs or battens, lightweight aggregate block, filled cavity, any outside structure | 0.21 | 110.00 | 7.90 | 6.00 | 0.00 | None | 1.90 | Enter Gross Area |

**9.1 Party Walls**

| Description | Type | Construction | U-Value (W/m²K) | Kappa (kJ/m²K) | Area (m²) | Shelter Res | Shelter |
|---|---|---|---|---|---|---|---|
| Party Wall | Filled Cavity with Edge Sealing | Single plasterboard on dabs both sides, lightweight aggregate blocks, cavity or cavity fill | 0.00 | 110.00 | 47.38 | | None |

**9.2 Internal Walls**

| Description | Construction | Kappa (kJ/m²K) | Area (m²) |
|---|---|---|---|
| Internal Stud Walls | Plasterboard on timber frame | 9.00 | 187.53 |

**10.0 External Roofs**

| Description | Type | Construction | U-Value (W/m²K) | Kappa (kJ/m²K) | Gross Area(m²) | Nett Area (m²) | Shelter Code | Shelter Factor | Calculation Type | Openings |
|---|---|---|---|---|---|---|---|---|---|---|
| External Pitched Roofs | External Plane Roof | Plasterboard, insulated at ceiling level | 0.09 | 9.00 | 48.80 | 48.80 | None | 0.00 | Calculate Wall Area | 0.00 |

**10.2 Internal Ceilings**

| Description | Storey | Construction | Area (m²) |
|---|---|---|---|
| Internal Ceiling | Lowest occupied | Plasterboard ceiling, carpeted chipboard floor | 48.80 |

**11.0 Heat Loss Floors**

# Summary for Input Data

elmhurst energy

| Description | Type | Storey Index | Construction | U-Value (W/m²K) | Shelter Code | Shelter Factor | Kappa (kJ/m²K) | Area (m²) |
|---|---|---|---|---|---|---|---|---|
| Ground Floor | Ground Floor - Solid | Lowest occupied | Suspended concrete floor, carpeted | 0.11 | None | 0.00 | 75.00 | 48.80 |

**11.2 Internal Floors**

| Description | Storey Index | Construction | Kappa (kJ/m²K) | Area (m²) |
|---|---|---|---|---|
| Internal Floor | | Plasterboard ceiling, carpeted chipboard floor | 9.00 | 48.80 |

**12.0 Opening Types**

| Description | Data Source | Type | Glazing | Glazing Gap | Filling Type | G-value | Frame Type | Frame Factor | U Value (W/m²K) |
|---|---|---|---|---|---|---|---|---|---|
| New Dwell Entrance Door | Manufacturer | Half Glazed Door | Double Low-E Soft 0.05 | | | 0.36 | | 0.70 | 1.20 |
| New Dwell DG French Doors | Manufacturer | Window | Double Low-E Soft 0.05 | | | 0.71 | | 0.70 | 1.20 |
| New Dwelling DG Window | Manufacturer | Window | Double Low-E Soft 0.05 | | | 0.71 | | 0.70 | 1.20 |

**13.0 Openings**

| Name | Opening Type | Location | Orientation | Area (m²) | Pitch |
|---|---|---|---|---|---|
| Front East Door | New Dwell Entrance Door | External Cavity Wall | West | 2.01 | |
| Front East Windows | New Dwelling DG Window | External Cavity Wall | West | 2.73 | |
| Front East Window | New Dwelling DG Window | External Tile Hung Wall | West | 1.90 | |
| Side South Windows | New Dwelling DG Window | External Cavity Wall | South | 1.80 | |
| Rear West Windows | New Dwelling DG Window | External Cavity Wall | East | 3.94 | |
| Rear West Windows | New Dwell DG French Doors | External Cavity Wall | East | 3.92 | |

| | | |
|---|---|---|
| **14.0 Conservatory** | None | |
| **15.0 Draught Proofing** | 100 | % |
| **16.0 Draught Lobby** | No | |
| **17.0 Thermal Bridging** | Calculate Bridges | |

**17.1 List of Bridges**

| Bridge Type | Source Type | Length | Psi | Adjusted | Reference: | Imported |
|---|---|---|---|---|---|---|
| E2 Other lintels (including other steel lintels) | Independently assessed | 11.46 | 0.05 | 0.05 | IG or Keystone Hi Therm + | No |
| E3 Sill | Independently assessed | 10.50 | 0.02 | 0.02 | Recognised Construction Detail | No |
| E4 Jamb | Independently assessed | 28.80 | 0.01 | 0.01 | Recognised Construction Detail | No |
| E5 Ground floor (normal) | Independently assessed | 20.50 | 0.07 | 0.07 | Recognised Construction Detail | No |
| E6 Intermediate floor within a dwelling | Independently assessed | 20.50 | 0.00 | 0.00 | Recognised Construction Detail | No |
| E10 Eaves (insulation at ceiling level) | Independently assessed | 18.52 | 0.06 | 0.06 | Recognised Construction Detail | No |
| E12 Gable (insulation at ceiling level) | Independently assessed | 1.98 | 0.06 | 0.06 | Recognised Construction Detail | No |
| E16 Corner (normal) | Independently assessed | 10.30 | 0.05 | 0.05 | Recognised Construction Detail | No |
| E18 Party wall between dwellings | Independently assessed | 10.30 | 0.04 | 0.04 | Recognised Construction Detail | No |
| P1 Party wall - Ground floor | Independently assessed | 9.20 | 0.10 | 0.10 | Recognised Construction Detail | No |
| P2 Party wall - Intermediate floor within a dwelling | Table K1 - Default | 9.20 | 0.00 | 0.00 | | No |
| P4 Party wall - Roof (insulation at ceiling level) | Independently assessed | 9.20 | 0.10 | 0.10 | Recognised Construction Detail | No |

| | | |
|---|---|---|
| Y-value | 0.00 | W/m²K |
| **18.0 Pressure Testing** | Yes | |
| Designed $AP_{50}$ | 5.05 | m³/(h.m²) @ 50 Pa |
| Test Method | Blower Door | |
| **19.0 Mechanical Ventilation** | | |
| **Mechanical Ventilation** | | |
| Mechanical Ventilation System Present | No | |
| **20.0 Fans, Open Fireplaces, Flues** | | |
| **21.0 Fixed Cooling System** | No | |
| **22.0 Lighting** | | |
| No Fixed Lighting | No | |

| Name | Efficacy | Power | Capacity | Count |
|---|---|---|---|---|
| Low energy Lighting | 75.00 | 15 | 1125 | 36 |

| | | |
|---|---|---|
| **24.0 Main Heating 1** | Database | |
| Description | Electric Air Source Heat Pump | |
| Percentage of Heat | 100.00 | % |
| Database Ref. No. | 106465 | |
| Fuel Type | Electricity | |
| In Winter | 0.00 | |
| In Summer | 0.00 | |
| Model Name | EDLA04EV3 | |

# Summary for Input Data

elmhurst energy

| | |
|---|---|
| Manufacturer | Daikin Europe NV |
| System Type | Heat Pump |
| Controls SAP Code | 2207 |
| PCDF Controls | 0 |
| Is MHS Pumped | Pump in heated space |
| Heating Pump Age | 2013 or later |
| Heat Emitter | Radiators |
| Flow Temperature | Enter value |
| Flow Temperature Value | 55.00 |

**25.0 Main Heating 2** — None

**26.0 Heat Networks** — None

| | Heat Source | Fuel Type | Heating Use | Efficiency | Percentage Of Heat | Heat | Heat Power Ratio | Electrical | Fuel Factor | Efficiency type |
|---|---|---|---|---|---|---|---|---|---|---|
| Heat source 1 | | | | | | | | | | |
| Heat source 2 | | | | | | | | | | |
| Heat source 3 | | | | | | | | | | |
| Heat source 4 | | | | | | | | | | |
| Heat source 5 | | | | | | | | | | |

**28.0 Water Heating**

| | |
|---|---|
| Water Heating | Main Heating 1 |
| SAP Code | 901 |
| Flue Gas Heat Recovery System | No |
| Waste Water Heat Recovery Instantaneous System 1 | No |
| Waste Water Heat Recovery Instantaneous System 2 | No |
| Waste Water Heat Recovery Storage System | No |
| Solar Panel | No |
| Water use <= 125 litres/person/day | Yes |
| Cold Water Source | From mains |
| Bath Count | 1 |
| Immersion Only Heating Hot Water | No |

**28.1 Showers**

| Description | Shower Type | Flow Rate [l/min] | Rated Power [kW] | Connected | Connected To |
|---|---|---|---|---|---|

**28.3 Waste Water Heat Recovery System**

| | | |
|---|---|---|
| **29.0 Hot Water Cylinder** | Hot Water Cylinder | |
| Cylinder Stat | Yes | |
| Cylinder In Heated Space | Yes | |
| Independent Time Control | Yes | |
| Insulation Type | Measured Loss | |
| Cylinder Volume | 180.00 | L |
| Loss | 1.39 | kWh/day |
| Pipes insulation | Fully insulated primary pipework | |
| In Airing Cupboard | No | |

**31.0 Thermal Store** — None

**Recommendations**

**Lower cost measures**

**None**

**Further measures to achieve even higher standards**

| Typical Cost | Typical savings per year | Ratings after improvement SAP rating | Environmental Impact |
|---|---|---|---|
| £4,000 - £6,000 | £47 | B 85 | A 97 |
| £3,500 - £5,500 | £196 | B 91 | A 98 |
| | | 0 | 0 |

# Thermal Bridging

| | | | |
|---|---|---|---|
| **Property Reference** | sc100238 P11 Bitterne Church | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | Semi-Detached House |
| **Property** | Plot 11, Bitterne Parish Church, Whites Lane, Southampton, Hampshire , SO19 7NP | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 84 B | **DER** | 3.80 | **TER** | 10.31 |
| **Environmental** | 97 A | **% DER < TER** | | | 63.14 |
| **$CO_2$ Emissions (t/year)** | 0.31 | **DFEE** | 34.10 | **TFEE** | 35.85 |
| **Compliance Check** | See BREL | **% DFEE < TFEE** | | | 4.86 |
| **% DPER < TPER** | 26.46 | **DPER** | 39.53 | **TPER** | 53.76 |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Philip Dudley | | |

| | Junction details | Source Type | Psi (W/mK) | Length (m) | Result | Reference |
|---|---|---|---|---|---|---|
| External wall | E2 Other lintels (including other steel lintels) | Independently assessed | 0.050 | 11.46 | 0.57 | IG or Keystone Hi Therm + |
| External wall | E3 Sill | Independently assessed | 0.018 | 10.50 | 0.19 | Recognised Construction Detail |
| External wall | E4 Jamb | Independently assessed | 0.014 | 28.80 | 0.40 | Recognised Construction Detail |
| External wall | E5 Ground floor (normal) | Independently assessed | 0.068 | 20.50 | 1.39 | Recognised Construction Detail |
| External wall | E6 Intermediate floor within a dwelling | Independently assessed | 0.001 | 20.50 | 0.02 | Recognised Construction Detail |
| External wall | E10 Eaves (insulation at ceiling level) | Independently assessed | 0.055 | 18.52 | 1.02 | Recognised Construction Detail |
| External wall | E12 Gable (insulation at ceiling level) | Independently assessed | 0.058 | 1.98 | 0.11 | Recognised Construction Detail |
| External wall | E16 Corner (normal) | Independently assessed | 0.051 | 10.30 | 0.53 | Recognised Construction Detail |
| External wall | E18 Party wall between dwellings | Independently assessed | 0.044 | 10.30 | 0.45 | Recognised Construction Detail |
| Party wall | P1 Party wall - Ground floor | Independently assessed | 0.103 | 9.20 | 0.95 | Recognised Construction Detail |
| Party wall | P2 Party wall - Intermediate floor within a dwelling | Table K1 - Default | 0.000 | 9.20 | 0.00 | |
| Party wall | P4 Party wall - Roof (insulation at ceiling level) | Independently assessed | 0.101 | 9.20 | 0.93 | Recognised Construction Detail |

Total: 160.46 W/mK:

Y-Value: 0.00 W/m²K:

# U-VALUE CALCULATOR REPORT

| | | | |
|---|---|---|---|
| **Property Reference** | sc121842 | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling Part L 2021 |
| **Project** | Plot 11, Bitterne Parish Church, Whites Lane, Bitterne, Southampton, Hampshire , SO19 7NP | | |
| **Calculation Type** | New Build (As Designed) | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 88 B | **DER** | 13.19 | **TER** | 24.78 |
| **Environmental** | 89 B | **% DER<TER** | 46.78 | | |
| **$CO_2$ Emissions (t/year)** | 1.00 | **DFEE** | 39.99 | **TFEE** | 51.03 |
| **General Requirements Compliance** | Pass | **% DFEE<TFEE** | 21.63 | | |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers, Surecalc Limited, Tel: 01243572695, mark@surecalc.co.uk | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Vivid Design Studio | | |

## Building Elements

### Roof 000002 - Pitched Roof Insulated Ceiling Vivid

**Roof Type: Pitched Roof, insulated flat ceiling**

| Layer | Description | Thickness (mm) | Conductivity (W/m²K) | Resistance (m²K/W) | Fraction (%) |
|---|---|---|---|---|---|
| **Ext surface** | | | | 0.0400 | |
| **Layer 1** | **Loft Space** | | | | |
| | Main construction | 0 | 0.0600 | 0.0600 | 100.00 |
| **Layer 2** | **Mineral wool** | | | | |
| | Main construction | 350 | 0.0440 | 7.9545 | 100.00 |
| | Corrections - Air Gap: Level 0, Fasteners: None or plastic | | | | |
| **Layer 3** | **Mineral wool quilt** | | | | |
| | Main construction | 150 | 0.0440 | 3.4091 | 93.67 |
| | Main construction | 150 | 0.1300 | 1.1538 | 6.33 |
| | Corrections - Air Gap: Level 0, Fasteners: None or plastic | | | | |
| **Layer 4** | **Plasterboard, standard** | | | | |
| | Main construction | 12.5 | 0.2100 | 0.0595 | 100.00 |
| **Int surface** | | | | 0.1000 | |

**Total resistance:** **Upper limit =** 11.449 m² K/W **Lower limit =** 11.248 m² K/W **Average =** 11.348 m² K/W

**Total correction =** 0.0030 m² K/W **U-value (unrounded) =** 0.09 W/m² K

**Unheated space:** None

**Total thickness: 513 mm** **U-value: 0.09 W/m² K** **Kappa: n/a**



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

# U-VALUE CALCULATOR REPORT

| | | | |
|---|---|---|---|
| **Property Reference** | sc121842 | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling Part L 2021 |
| **Project** | Plot 11, Bitterne Parish Church, Whites Lane, Bitterne, Southampton, Hampshire , SO19 7NP | | |
| **Calculation Type** | New Build (As Designed) | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 88 B | **DER** | 13.19 | **TER** | 24.78 |
| **Environmental** | 89 B | **% DER<TER** | 46.78 | | |
| **$CO_2$ Emissions (t/year)** | 1.00 | **DFEE** | 39.99 | **TFEE** | 51.03 |
| **General Requirements Compliance** | Pass | **% DFEE<TFEE** | 21.63 | | |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers, Surecalc Limited, Tel: 01243572695, mark@surecalc.co.uk | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Vivid Design Studio | | |

## Building Elements

### Wall 000001 - Vivid Cavity Wall 125 Knauf Supafil 34

**Wall Type: Standard Wall**

| Layer | Description | Thickness (mm) | Conductivity (W/m²K) | Resistance (m²K/W) | Fraction (%) |
|---|---|---|---|---|---|
| **Ext surface** | | | | 0.0400 | |
| **Layer 1** | **Brick, outer leaf** | | | | |
| | Main construction | 102 | 0.7700 | 0.1325 | 82.81 |
| | Main construction | 102 | 0.9407 | 0.1084 | 17.19 |
| **Layer 2** | **Knauf Supafil 34 blown Cavity Fill** | | | | |
| | Main construction | 125 | 0.0340 | 3.6765 | 100.00 |
| | Corrections - Air Gap: Level 0, Fasteners: Wall ties, Cross sectional area: 12.50 mm², Lambda: 17.000 W/m.K, per m²: 2.500 | | | | |
| **Layer 3** | **Masterblock Masterlite Ultra** | | | | |
| | Main construction | 100 | 0.2700 | 0.3704 | 93.43 |
| | Main construction | 100 | 0.8803 | 0.1136 | 6.57 |
| **Layer 4** | **airspace/plaster dabs** | | | | |
| | Main construction | 15 | 0.1000 | 0.1500 | 80.00 |
| | Main construction | 15 | 0.0882 | 0.1700 | 20.00 |
| | Corrections - Cavity Unventilated, Emissivity: Normal | | | | |
| **Layer 5** | **Plasterboard, standard** | | | | |
| | Main construction | 12.5 | 0.2100 | 0.0595 | 100.00 |
| **Int surface** | | | | 0.1300 | |

**Total resistance:** **Upper limit =** 4.541 m² K/W **Lower limit =** 4.510 m² K/W **Average =** 4.525 m² K/W

**Total correction =** 0.0018 m² K/W **U-value (unrounded) =** 0.22 W/m² K

**Unheated space:** None

**Total thickness: 355 mm** **U-value: 0.22 W/m² K** **Kappa: n/a**



Regs Region: England
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# U-VALUE CALCULATOR REPORT

| | | | |
|---|---|---|---|
| **Property Reference** | sc121842 | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling Part L 2021 |
| **Project** | Plot 11, Bitterne Parish Church, Whites Lane, Bitterne, Southampton, Hampshire , SO19 7NP | | |
| **Calculation Type** | New Build (As Designed) | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 88 B | **DER** | 13.19 | **TER** | 24.78 |
| **Environmental** | 89 B | **% DER<TER** | 46.78 | | |
| **$CO_2$ Emissions (t/year)** | 1.00 | **DFEE** | 39.99 | **TFEE** | 51.03 |
| **General Requirements Compliance** | Pass | **% DFEE<TFEE** | 21.63 | | |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers, Surecalc Limited, Tel: 01243572695, mark@surecalc.co.uk | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Vivid Design Studio | | |

## Building Elements

### Wall 000004 - Vivid Cavity Wall 125 Knauf Supafil 34

**Wall Type: Standard Wall**

| Layer | Description | Thickness (mm) | Conductivity (W/m²K) | Resistance (m²K/W) | Fraction (%) |
|---|---|---|---|---|---|
| **Ext surface** | | | | 0.0400 | |
| **Layer 1** | **Tile Hanging** | | | | |
| | Main construction | 15 | 1.0000 | 0.0150 | 100.00 |
| **Layer 2** | **airspace/timber battens** | | | | |
| | Main construction | 22 | 0.1222 | 0.1800 | 89.63 |
| | Main construction | 22 | 0.1243 | 0.1770 | 10.37 |
| | Corrections - Cavity Unventilated, Emissivity: Normal | | | | |
| **Layer 3** | **Blockwork, medium** | | | | |
| | Main construction | 100 | 0.5700 | 0.1754 | 93.43 |
| | Main construction | 100 | 0.8803 | 0.1136 | 6.57 |
| **Layer 4** | **Knauf Supafil 34 blown Cavity Fill** | | | | |
| | Main construction | 125 | 0.0340 | 3.6765 | 100.00 |
| | Corrections - Air Gap: Level 0, Fasteners: Wall ties, Cross sectional area: 12.50 mm², Lambda: 17.000 W/m.K, per m²: 2.500 | | | | |
| **Layer 5** | **Masterblock Masterlite Ultra** | | | | |
| | Main construction | 100 | 0.2700 | 0.3704 | 93.43 |
| | Main construction | 100 | 0.8803 | 0.1136 | 6.57 |
| **Layer 6** | **airspace/plaster dabs** | | | | |
| | Main construction | 15 | 0.1000 | 0.1500 | 80.00 |
| | Main construction | 15 | 0.0882 | 0.1700 | 20.00 |
| | Corrections - Cavity Unventilated, Emissivity: Normal | | | | |
| **Layer 7** | **Plasterboard, standard** | | | | |
| | Main construction | 12.5 | 0.2100 | 0.0595 | 100.00 |
| **Int surface** | | | | 0.1300 | |

**Total resistance:** **Upper limit =** 4.779 m² K/W **Lower limit =** 4.746 m² K/W **Average =** 4.762 m² K/W

**Total correction =** 0.0016 m² K/W **U-value (unrounded) =** 0.21 W/m² K

**Unheated space:** None

**Total thickness: 390 mm** **U-value: 0.21 W/m² K** **Kappa: n/a**



Regs Region: England
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# U-VALUE CALCULATOR REPORT

| | | | |
|---|---|---|---|
| **Property Reference** | sc121842 | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling Part L 2021 |
| **Project** | Plot 11, Bitterne Parish Church, Whites Lane, Bitterne, Southampton, Hampshire , SO19 7NP | | |
| **Calculation Type** | New Build (As Designed) | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 88 B | **DER** | 13.19 | **TER** | 24.78 |
| **Environmental** | 89 B | **% DER<TER** | 46.78 | | |
| **$CO_2$ Emissions (t/year)** | 1.00 | **DFEE** | 39.99 | **TFEE** | 51.03 |
| **General Requirements Compliance** | Pass | **% DFEE<TFEE** | 21.63 | | |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers, Surecalc Limited, Tel: 01243572695, mark@surecalc.co.uk | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Vivid Design Studio | | |

## Building Elements

### Floor 000003 - Ground Floor Beam and Block

**Floor Type: Suspended Floor**
**Area = 48.80 m², Perimeter = 20.50 m, Wall thickness = 300.00 mm, Soil: Unknown**
**Depth of underfloor space below ground:0.200 m  Floor wind shielding: Average (suburban)**
**Floor height above ground:h = 0.150 m**
**U-value of walls above ground:Uw = 0.220 m**
**Ventilation openings per perimeter length:e = 0.0015 %**
**Mean wind speed:v = 5.000 m/s**
**Resistance on solum:Rg = 0.000 m²K/W**

| Layer | Description | Thickness (mm) | Conductivity (W/m²K) | Resistance (m²K/W) | Fraction (%) |
|---|---|---|---|---|---|
| **Ext surface** | | | | 0.1700 | |
| **Layer 1** | **Blockwork** | | | | |
| | Main construction | 100 | 0.1900 | 0.5263 | 90.91 |
| | Main construction | 100 | 1.0000 | 0.1000 | 9.09 |
| **Layer 2** | **Mannok Therm Floor** | | | | |
| | Main construction | 150 | 0.0220 | 6.8182 | 100.00 |
| | Corrections - Air Gap: Level 1, Fasteners: None or plastic | | | | |
| **Layer 3** | **Screed** | | | | |
| | Main construction | 75 | 1.1500 | 0.0652 | 100.00 |
| **Int surface** | | | | 0.1700 | |

**Total resistance:** **Upper limit =** 7.709 m² K/W **Lower limit =** 7.603 m² K/W **Average =** 7.656 m² K/W

**Total correction =** 0.0079 m² K/W **U-value (unrounded) =** 0.11 W/m² K

**Unheated space:** None

**Total thickness: 325 mm** **U-value: 0.11 W/m² K** **Kappa: n/a**



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

elmhurst energy

# SAP Report Submission for Building Regulations Compliance

Client: Vivid Design Studio

Project: Plot 12, Bitterne Parish Church, Whites Lane
Bitterne, Southampton, Hampshire , SO19 7NP

Contact: Mark Rogers
Surecalc Limited
mark@surecalc.co.uk

Report Issue Date: 06/12/2023

EXCELLENCE IN ENERGY ASSESSMENT

# CODE FOR SUSTAINABLE HOMES
# Calculation Type: New Build (As Designed)

| | | | |
|---|---|---|---|
| **Property Reference** | sc121843 | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling Part L 2021 |
| **Property** | Plot 12, Bitterne Parish Church, Whites Lane, Bitterne, Southampton, Hampshire , SO19 7NP | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 85 B | **DER** | 15.54 | **TER** | 25.39 |
| **Environmental** | 86 B | **% DER<TER** | 38.79 | | |
| **$CO_2$ Emissions (t/year)** | 1.53 | **DFEE** | 46.47 | **TFEE** | 57.72 |
| **General Requirements Compliance** | Pass | **% DFEE<TFEE** | 19.50 | | |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers, Surecalc Limited, Tel: 01243572695, mark@surecalc.co.uk | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Vivid Design Studio | | |

## ENE 1 - Dwelling Emission Rate calculation

| | | | |
|---|---|---|---|
| Total floor area | 122.1 | $m^2$ | |
| DER | 15.54 | $kgCO_2/yr/m^2$ | |
| TER | 25.39 | $kgCO_2/yr/m^2$ | |
| $CO_2$ emissions offset from additional allowable electricity generation | 0.00 | $kgCO_2/yr/m^2$ | (ZC7) |
| Residual $CO_2$ emissions offset from biofuel CHP | 0.00 | $kgCO_2/yr/m^2$ | (ZC5) |
| Total $CO_2$ emissions offset from SAP Section 16 allowances | 0.00 | $kgCO_2/yr/m^2$ | |
| DER accounting for SAP Section 16 allowances | 15.54 | $kgCO_2/yr/m^2$ | |
| Reduction DER/TER | 38.79 | % | |
| CfSH ENE1 credits achieved | 4.5 | | |
| CfSH ENE1 level achieved | 4 | | |

## ENE 2 – Fabric Energy Efficiency calculation

| | | | |
|---|---|---|---|
| Dwelling type | House, Detached | | |
| Fabric energy efficiency (F.E.E.) | 46.47 | $kWh/m^2/yr$ | |
| CfSH ENE2 credits achieved | 6.8 | | |
| CfSH ENE1 and 2 overall level achieved | 4 | | |

## ENE 7 – Low and Zero Carbon Technologies calculation

**Standard case $CO_2$ emissions**

| | | | |
|---|---|---|---|
| Total floor area | 122.1 | $m^2$ | |
| DER | 18.94 | $kgCO_2/yr/m^2$ | |
| $CO_2$ emissions from electrical appliances | 13.97 | $kgCO_2/yr/m^2$ | (ZC2) |
| $CO_2$ emissions from cooking | 1.54 | $kgCO_2/yr/m^2$ | (ZC3) |
| Standard case total $CO_2$ emissions | 34.45 | $kgCO_2/yr/m^2$ | (ZC4) |
| Net Standard case $CO_2$ emissions | 34.45 | $kgCO_2/yr/m^2$ | (ZC8) |

**Actual case $CO_2$ emissions**

| | | | |
|---|---|---|---|
| DER | 15.76 | $kgCO_2/yr/m^2$ | |
| $CO_2$ emissions from electrical appliances | 13.97 | $kgCO_2/yr/m^2$ | (ZC2) |
| $CO_2$ emissions from cooking | 1.54 | $kgCO_2/yr/m^2$ | (ZC3) |
| Actual case total $CO_2$ emissions | 31.27 | $kgCO_2/yr/m^2$ | (ZC4) |
| $CO_2$ emissions from Biomass | 0.00 | $kgCO_2/yr/m^2$ | (ZC5) |
| $CO_2$ reduction from additional allowable electricity generation | 0.00 | $kgCO_2/yr/m^2$ | (ZC7) |
| Net Actual case $CO_2$ emissions | 31.27 | $kgCO_2/yr/m^2$ | (ZC8) |
| Improvement in net actual/net standard case $CO_2$ emissions | 9 | % | |



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Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

| | |
|---|---|
| ENE7 credits achieved | 0 |



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

# Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Array SAP 10 program, Array

**Date:** Wed 06 Dec 2023 15:30:19

| Project Information | | | |
|---|---|---|---|
| Assessed By | Mark Rogers | Building Type | House, Detached |
| OCDEA Registration | EES/004179 | Assessment Date | 2023-12-06 |

| Dwelling Details | | | |
|---|---|---|---|
| Assessment Type | As designed | Total Floor Area | 122 $m^2$ |
| Site Reference | sc100239 P12 Bitterne Church | Plot Reference | 001 |
| Address | Bitterne Parish Church Plot 12 Whites Lane, Southampton, SO19 7NP | | |

| Client Details | |
|---|---|
| Name | Philip Dudley |
| Company | Vivid Design Studio |
| Address | NA, NA, NA |

**This report covers items included within the SAP calculations. It is not a complete report of regulations compliance.**

| 1a Target emission rate and dwelling emission rate | | |
|---|---|---|
| Fuel for main heating system | Electricity | |
| *Target carbon dioxide emission rate* | *10.62 $kgCO_2/m^2$* | |
| Dwelling carbon dioxide emission rate | 3.88 $kgCO_2/m^2$ | OK |
| **1b Target primary energy rate and dwelling primary energy** | | |
| *Target primary energy* | *55.6 $kWh_{PE}/m^2$* | |
| Dwelling primary energy | 40.29 $kWh_{PE}/m^2$ | OK |
| **1c Target fabric energy efficiency and dwelling fabric energy efficiency** | | |
| *Target fabric energy efficiency* | *41.6 $kWh/m^2$* | |
| Dwelling fabric energy efficiency | 40.4 $kWh/m^2$ | OK |

| 2a Fabric U-values | | | | |
|---|---|---|---|---|
| **Element** | ***Maximum permitted average U-Value [$W/m^2K$]*** | **Dwelling average U-Value [$W/m^2K$]** | **Element with highest individual U-Value** | |
| External walls | *0.26* | 0.22 | Walls (1) (0.22) | OK |
| Party walls | *0.2* | N/A | N/A | **N/A** |
| Curtain walls | *1.6* | N/A | N/A | **N/A** |
| Floors | *0.18* | 0.12 | Ground Floor (0.12) | OK |
| Roofs | *0.16* | 0.09 | Roof (1) (0.09) | OK |
| Windows, doors, and roof windows | *1.6* | 1.2 | Front West Door (1.2) | OK |
| Rooflights | *2.2* | N/A | N/A | **N/A** |

| 2b Envelope elements (better than typically expected values are flagged with a subsequent (!)) | | |
|---|---|---|
| **Name** | **Net area [$m^2$]** | **U-Value [$W/m^2K$]** |
| Exposed wall: Walls (1) | 137.21 | 0.22 |
| Exposed wall: Walls (2) | 8.59 | 0.21 |
| Ground floor: Ground Floor, Ground Floor | 61.05 | 0.12 |
| Exposed roof: Roof (1) | 61.05 | 0.09 **(!)** |

| 2c Openings (better than typically expected values are flagged with a subsequent (!)) | | | | |
|---|---|---|---|---|
| **Name** | **Area [$m^2$]** | **Orientation** | **Frame factor** | **U-Value [$W/m^2K$]** |
| Front West Door, New Dwell Entrance Door | 2.01 | West | N/A | 1.2 |
| Front West Windows, New Dwelling DG Window | 4.41 | West | 0.7 | 1.2 |
| Front West Window, New Dwelling DG Window | 1.9 | West | 0.7 | 1.2 |
| Side North Windows, New Dwelling DG Window | 1.8 | North | 0.7 | 1.2 |
| Rear East Windows, New Dwelling DG Window | 4.92 | East | 0.7 | 1.2 |
| Rear West Windows, New Dwell DG French Doors | 3.35 | East | 0.7 | 1.2 |

| Name | Area [$m^2$] | Orientation | Frame factor | U-Value [$W/m^2K$] |
|---|---|---|---|---|
| Side North Door, New Dwell Entrance Door | 1.95 | North | N/A | 1.2 |

| 2d Thermal bridging (better than typically expected values are flagged with a subsequent (!)) | | | | |
|---|---|---|---|---|
| Building part **1 - Main Dwelling**: Thermal bridging calculated from linear thermal transmittances for each junction | | | | |
| **Main element** | **Junction detail** | **Source** | **Psi value [W/mK]** | **Drawing / reference** |
| External wall | E2: Other lintels (including other steel lintels) | Calculated by person with suitable expertise | 0.05 | IG or Keystone Hi Therm + |
| External wall | E3: Sill | Calculated by person with suitable expertise | 0.018 **(!)** | Recognised Construction Detail |
| External wall | E4: Jamb | Calculated by person with suitable expertise | 0.014 **(!)** | Recognised Construction Detail |
| External wall | E5: Ground floor (normal) | Calculated by person with suitable expertise | 0.068 | Recognised Construction Detail |
| External wall | E6: Intermediate floor within a dwelling | Calculated by person with suitable expertise | 0.001 **(!)** | Recognised Construction Detail |
| External wall | E10: Eaves (insulation at ceiling level) | Calculated by person with suitable expertise | 0.055 | Recognised Construction Detail |
| External wall | E12: Gable (insulation at ceiling level) | Calculated by person with suitable expertise | 0.058 | Recognised Construction Detail |
| External wall | E16: Corner (normal) | Calculated by person with suitable expertise | 0.051 | Recognised Construction Detail |
| External wall | E17: Corner (inverted - internal area greater than external area) | Calculated by person with suitable expertise | -0.1 | Recognised Construction Detail |

| 3 Air permeability (better than typically expected values are flagged with a subsequent (!)) | | |
|---|---|---|
| *Maximum permitted air permeability at 50Pa* | *8 $m^3/hm^2$* | |
| Dwelling air permeability at 50Pa | 5.05 $m^3/hm^2$, Design value | OK |
| Air permeability test certificate reference | | |

| 4 Space heating | |
|---|---|
| **Main heating system 1**: Heat pump with radiators or underfloor heating - Electricity | |
| Efficiency | 241.8% |
| Emitter type | Radiators |
| Flow temperature | 55°C |
| System type | Heat Pump |
| Manufacturer | Daikin Europe NV |
| Model | EDLA06EV3 |
| Commissioning | |
| **Secondary heating system**: N/A | |
| Fuel | N/A |
| Efficiency | N/A |
| Commissioning | |

| 5 Hot water | |
|---|---|
| **Cylinder/store** - type: Cylinder | |
| Capacity | 210 litres |
| Declared heat loss | 1.5 kWh/day |
| Primary pipework insulated | Yes |
| Manufacturer | |
| Model | |
| Commissioning | |
| **Waste water heat recovery system 1** - type: N/A | |
| Efficiency | |
| Manufacturer | |
| Model | |

| 6 Controls | | |
|---|---|---|
| **Main heating 1** - type: Time and temperature zone control by arrangement of plumbing and electrical services | | |
| Function | | |
| Ecodesign class | | |
| Manufacturer | | |
| Model | | |
| **Water heating** - type: Cylinder thermostat and HW separately timed | | |
| Manufacturer | | |
| Model | | |

| 7 Lighting | | |
|---|---|---|
| *Minimum permitted light source efficacy* | *75 lm/W* | |
| Lowest light source efficacy | 75 lm/W | **OK** |
| External lights control | N/A | |

| 8 Mechanical ventilation | | |
|---|---|---|
| **System type:** N/A | | |
| *Maximum permitted specific fan power* | *N/A* | |
| Specific fan power | N/A | **N/A** |
| *Minimum permitted heat recovery efficiency* | *N/A* | |
| Heat recovery efficiency | N/A | **N/A** |
| Manufacturer/Model | | |
| Commissioning | | |

| 9 Local generation |
|---|
| N/A |

| 10 Heat networks |
|---|
| N/A |

| 11 Supporting documentary evidence |
|---|
| N/A |

| 12 Declarations | |
|---|---|
| **a. Assessor Declaration** | |
| This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report. | |
| Signed:<br><br>Name: | Assessor ID:<br><br>Date: |
| **b. Client Declaration** | |
| N/A | |

# Predicted Energy Assessment

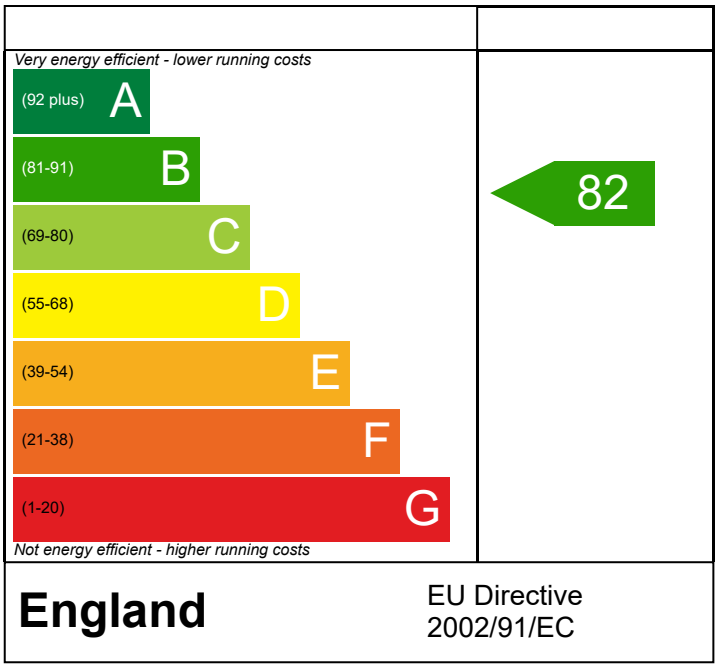
Plot 12, Bitterne Parish Church, Whites Lane,
Southampton, Hampshire , SO19 7NP

| | |
|---|---|
| Dwelling type: | House, Detached |
| Date of assessment: | 06/12/2023 |
| Produced by: | Mark Rogers |
| Total floor area: | 122.1 m² |
| DRRN: | 0207-8321-6995 |

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

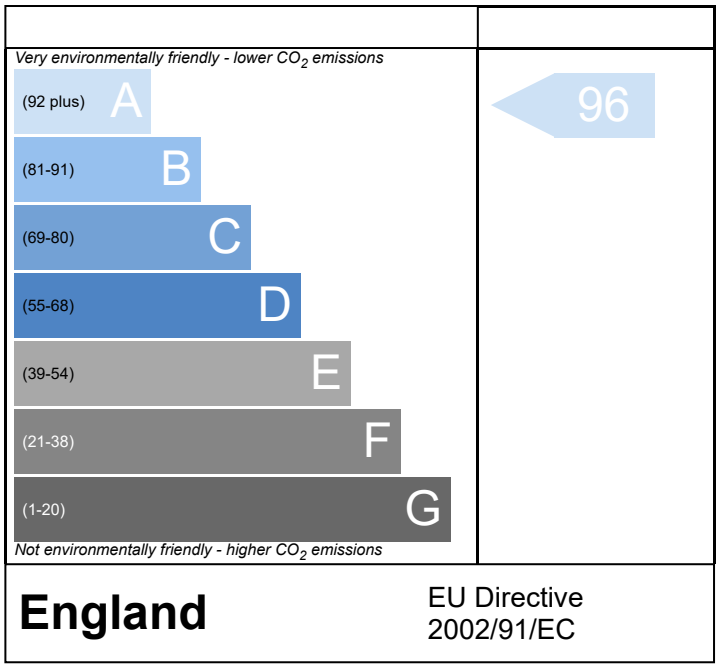
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

## Energy Efficiency Rating




The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

## Environmental Impact ($CO_2$) Rating




The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide ($CO_2$) emissions. The higher the rating the less impact it has on the environment.

# Summary for Input Data

elmhurst energy

| | | | |
|---|---|---|---|
| **Property Reference** | sc100239 P12 Bitterne Church | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling |
| **Property** | Plot 12, Bitterne Parish Church, Whites Lane, Southampton, Hampshire , SO19 7NP | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 82 B | **DER** | 3.88 | **TER** | 10.62 |
| **Environmental** | 96 A | **% DER < TER** | | | 63.47 |
| **$CO_2$ Emissions (t/year)** | 0.39 | **DFEE** | 40.42 | **TFEE** | 41.61 |
| **Compliance Check** | See BREL | **% DFEE < TFEE** | | | 2.87 |
| **% DPER < TPER** | 27.53 | **DPER** | 40.29 | **TPER** | 55.60 |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Philip Dudley | | |

## SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

| | |
|---|---|
| **Orientation** | West |
| **Property Tenture** | ND |
| **Transaction Type** | 6 |
| **Terrain Type** | Suburban |
| **1.0 Property Type** | House, Detached |
| **2.0 Number of Storeys** | 2 |
| **3.0 Date Built** | 2023 |
| **4.0 Sheltered Sides** | 2 |
| **5.0 Sunlight/Shade** | Average or unknown |
| **6.0 Thermal Mass Parameter** | Precise calculation |
| **7.0 Electricity Tariff** | Standard |
| Smart electricity meter fitted | No |
| Smart gas meter fitted | No |

**7.0 Measurements**

| | Heat Loss Perimeter | Internal Floor Area | Average Storey Height |
|---|---|---|---|
| **Ground floor:** | 32.26 m | 61.05 m² | 2.39 m |
| **1st Storey:** | 32.26 m | 61.05 m² | 2.76 m |

**8.0 Living Area** 15.46 m²

**9.0 External Walls**

| Description | Type | Construction | U-Value (W/m²K) | Kappa (kJ/m²K) | Gross Area(m²) | Nett Area (m²) | Shelter Res | Shelter | Openings | Area Calculation Type |
|---|---|---|---|---|---|---|---|---|---|---|
| External Cavity Wall | Cavity Wall | Cavity wall; plasterboard on dabs or battens, lightweight aggregate block, filled cavity, any outside structure | 0.22 | 110.00 | 155.65 | 137.21 | 0.00 | None | 18.44 | Calculate Wall Area |
| External Tile Hung Wall | Cavity Wall | Cavity wall; plasterboard on dabs or battens, lightweight aggregate block, filled cavity, any outside structure | 0.21 | 110.00 | 10.49 | 8.59 | 0.00 | None | 1.90 | Enter Gross Area |

**9.1 Party Walls**

| Description | Type | Construction | U-Value (W/m²K) | Kappa (kJ/m²K) | Area (m²) | Shelter Res | Shelter |
|---|---|---|---|---|---|---|---|
| Party Wall | Filled Cavity with Edge Sealing | Single plasterboard on dabs both sides, lightweight aggregate blocks, cavity or cavity fill | 0.00 | 110.00 | 47.38 | | None |

**9.2 Internal Walls**

| Description | Construction | Kappa (kJ/m²K) | Area (m²) |
|---|---|---|---|
| Internal Stud Walls | Plasterboard on timber frame | 9.00 | 180.27 |
| Internal Block Walls | Dense block, plasterboard on dabs | 75.00 | 68.12 |

**10.0 External Roofs**

| Description | Type | Construction | U-Value (W/m²K) | Kappa (kJ/m²K) | Gross Area(m²) | Nett Area (m²) | Shelter Code | Shelter Factor | Calculation Type | Openings |
|---|---|---|---|---|---|---|---|---|---|---|
| External Pitched Roofs | External Plane Roof | Plasterboard, insulated at ceiling level | 0.09 | 9.00 | 61.05 | 61.05 | None | 0.00 | Calculate Wall Area | 0.00 |

**10.2 Internal Ceilings**

| Description | Storey | Construction | Area (m²) |
|---|---|---|---|
| Internal Ceiling | Lowest occupied | Plasterboard ceiling, carpeted chipboard floor | 61.05 |

# Summary for Input Data

elmhurst energy

### 11.0 Heat Loss Floors

| Description | Type | Storey Index | Construction | U-Value (W/m²K) | Shelter Code | Shelter Factor | Kappa (kJ/m²K) | Area (m²) |
|---|---|---|---|---|---|---|---|---|
| Ground Floor | Ground Floor - Solid | Lowest occupied | Suspended concrete floor, carpeted | 0.12 | None | 0.00 | 75.00 | 61.05 |

### 11.2 Internal Floors

| Description | Storey Index | Construction | Kappa (kJ/m²K) | Area (m²) |
|---|---|---|---|---|
| Internal Floor | | Plasterboard ceiling, carpeted chipboard floor | 9.00 | 61.05 |

### 12.0 Opening Types

| Description | Data Source | Type | Glazing | Glazing Gap | Filling Type | G-value | Frame Type | Frame Factor | U Value (W/m²K) |
|---|---|---|---|---|---|---|---|---|---|
| New Dwell Entrance Door | Manufacturer | Half Glazed Door | Double Low-E Soft 0.05 | | | 0.36 | | 0.70 | 1.20 |
| New Dwell DG French Doors | Manufacturer | Window | Double Low-E Soft 0.05 | | | 0.71 | | 0.70 | 1.20 |
| New Dwelling DG Window | Manufacturer | Window | Double Low-E Soft 0.05 | | | 0.71 | | 0.70 | 1.20 |

### 13.0 Openings

| Name | Opening Type | Location | Orientation | Area (m²) | Pitch |
|---|---|---|---|---|---|
| Front West Door | New Dwell Entrance Door | External Cavity Wall | West | 2.01 | |
| Front West Windows | New Dwelling DG Window | External Cavity Wall | West | 4.41 | |
| Front West Window | New Dwelling DG Window | External Tile Hung Wall | West | 1.90 | |
| Side North Windows | New Dwelling DG Window | External Cavity Wall | North | 1.80 | |
| Rear East Windows | New Dwelling DG Window | External Cavity Wall | East | 4.92 | |
| Rear West Windows | New Dwell DG French Doors | External Cavity Wall | East | 3.35 | |
| Side North Door | New Dwell Entrance Door | External Cavity Wall | North | 1.95 | |

| | | |
|---|---|---|
| **14.0 Conservatory** | None | |
| **15.0 Draught Proofing** | 100 | % |
| **16.0 Draught Lobby** | No | |

| | | |
|---|---|---|
| **17.0 Thermal Bridging** | Calculate Bridges | |

### 17.1 List of Bridges

| Bridge Type | Source Type | Length | Psi | Adjusted | Reference: | Imported |
|---|---|---|---|---|---|---|
| E2 Other lintels (including other steel lintels) | Independently assessed | 14.53 | 0.05 | 0.05 | IG or Keystone Hi Therm + | No |
| E3 Sill | Independently assessed | 13.57 | 0.02 | 0.02 | Recognised Construction Detail | No |
| E4 Jamb | Independently assessed | 33.30 | 0.01 | 0.01 | Recognised Construction Detail | No |
| E5 Ground floor (normal) | Independently assessed | 32.26 | 0.07 | 0.07 | Recognised Construction Detail | No |
| E6 Intermediate floor within a dwelling | Independently assessed | 32.26 | 0.00 | 0.00 | Recognised Construction Detail | No |
| E10 Eaves (insulation at ceiling level) | Independently assessed | 29.36 | 0.06 | 0.06 | Recognised Construction Detail | No |
| E12 Gable (insulation at ceiling level) | Independently assessed | 2.90 | 0.06 | 0.06 | Recognised Construction Detail | No |
| E16 Corner (normal) | Independently assessed | 25.38 | 0.05 | 0.05 | Recognised Construction Detail | No |
| E17 Corner (inverted – internal area greater than external area) | Independently assessed | 4.78 | -0.10 | -0.10 | Recognised Construction Detail | No |

| | | |
|---|---|---|
| Y-value | 0.00 | W/m²K |

| | | |
|---|---|---|
| **18.0 Pressure Testing** | Yes | |
| Designed $AP_{50}$ | 5.05 | m³/(h.m²) @ 50 Pa |
| Test Method | Blower Door | |

**19.0 Mechanical Ventilation**

**Mechanical Ventilation**

| | | |
|---|---|---|
| Mechanical Ventilation System Present | No | |

**20.0 Fans, Open Fireplaces, Flues**

| | | |
|---|---|---|
| **21.0 Fixed Cooling System** | No | |

**22.0 Lighting**

| | | |
|---|---|---|
| No Fixed Lighting | No | |

| Name | Efficacy | Power | Capacity | Count |
|---|---|---|---|---|
| Low energy Lighting | 75.00 | 15 | 1125 | 36 |

| | | |
|---|---|---|
| **24.0 Main Heating 1** | Database | |
| Description | Electric Air Source Heat Pump | |
| Percentage of Heat | 100.00 | % |
| Database Ref. No. | 106473 | |
| Fuel Type | Electricity | |
| In Winter | 0.00 | |
| In Summer | 0.00 | |
| Model Name | EDLA06EV3 | |

# Summary for Input Data

elmhurst energy

| | |
|---|---|
| Manufacturer | Daikin Europe NV |
| System Type | Heat Pump |
| Controls SAP Code | 2207 |
| PCDF Controls | 0 |
| Is MHS Pumped | Pump in heated space |
| Heating Pump Age | 2013 or later |
| Heat Emitter | Radiators |
| Flow Temperature | Enter value |
| Flow Temperature Value | 55.00 |

**25.0 Main Heating 2** — None

**26.0 Heat Networks** — None

| | Heat Source | Fuel Type | Heating Use | Efficiency | Percentage Of Heat | Heat | Heat Power Ratio | Electrical | Fuel Factor | Efficiency type |
|---|---|---|---|---|---|---|---|---|---|---|
| Heat source 1 | | | | | | | | | | |
| Heat source 2 | | | | | | | | | | |
| Heat source 3 | | | | | | | | | | |
| Heat source 4 | | | | | | | | | | |
| Heat source 5 | | | | | | | | | | |

**28.0 Water Heating**

| | |
|---|---|
| Water Heating | Main Heating 1 |
| SAP Code | 901 |
| Flue Gas Heat Recovery System | No |
| Waste Water Heat Recovery Instantaneous System 1 | No |
| Waste Water Heat Recovery Instantaneous System 2 | No |
| Waste Water Heat Recovery Storage System | No |
| Solar Panel | No |
| Water use <= 125 litres/person/day | Yes |
| Cold Water Source | From mains |
| Bath Count | 1 |
| Immersion Only Heating Hot Water | No |

**28.1 Showers**

| Description | Shower Type | Flow Rate [l/min] | Rated Power [kW] | Connected | Connected To |
|---|---|---|---|---|---|

**28.3 Waste Water Heat Recovery System**

| | | |
|---|---|---|
| **29.0 Hot Water Cylinder** | Hot Water Cylinder | |
| Cylinder Stat | Yes | |
| Cylinder In Heated Space | Yes | |
| Independent Time Control | Yes | |
| Insulation Type | Measured Loss | |
| Cylinder Volume | 210.00 | L |
| Loss | 1.50 | kWh/day |
| Pipes insulation | Fully insulated primary pipework | |
| In Airing Cupboard | No | |

**31.0 Thermal Store** — None

**Recommendations**

**Lower cost measures**

**None**

**Further measures to achieve even higher standards**

| Typical Cost | Typical savings per year | Ratings after improvement SAP rating | Environmental Impact |
|---|---|---|---|
| £4,000 - £6,000 | £48 | B 83 | A 96 |
| £3,500 - £5,500 | £206 | B 88 | A 97 |
| | | 0 | 0 |

# Thermal Bridging

elmhurst energy

| | | | |
|---|---|---|---|
| **Property Reference** | sc100239 P12 Bitterne Church | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | Detached House |
| **Property** | Plot 12, Bitterne Parish Church, Whites Lane, Southampton, Hampshire , SO19 7NP | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 82 B | **DER** | 3.88 | **TER** | 10.62 |
| **Environmental** | 96 A | **% DER < TER** | | | 63.47 |
| **$CO_2$ Emissions (t/year)** | 0.39 | **DFEE** | 40.42 | **TFEE** | 41.61 |
| **Compliance Check** | See BREL | **% DFEE < TFEE** | | | 2.87 |
| **% DPER < TPER** | 27.53 | **DPER** | 40.29 | **TPER** | 55.60 |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Philip Dudley | | |

| | Junction details | Source Type | Psi (W/mK) | Length (m) | Result | Reference |
|---|---|---|---|---|---|---|
| External wall | E2 Other lintels (including other steel lintels) | Independently assessed | 0.050 | 14.53 | 0.73 | IG or Keystone Hi Therm + |
| External wall | E3 Sill | Independently assessed | 0.018 | 13.57 | 0.24 | Recognised Construction Detail |
| External wall | E4 Jamb | Independently assessed | 0.014 | 33.30 | 0.47 | Recognised Construction Detail |
| External wall | E5 Ground floor (normal) | Independently assessed | 0.068 | 32.26 | 2.19 | Recognised Construction Detail |
| External wall | E6 Intermediate floor within a dwelling | Independently assessed | 0.001 | 32.26 | 0.03 | Recognised Construction Detail |
| External wall | E10 Eaves (insulation at ceiling level) | Independently assessed | 0.055 | 29.36 | 1.61 | Recognised Construction Detail |
| External wall | E12 Gable (insulation at ceiling level) | Independently assessed | 0.058 | 2.90 | 0.17 | Recognised Construction Detail |
| External wall | E16 Corner (normal) | Independently assessed | 0.051 | 25.38 | 1.29 | Recognised Construction Detail |
| External wall | E17 Corner (inverted – internal area greater than external area) | Independently assessed | -0.100 | 4.78 | -0.48 | Recognised Construction Detail |

Total: 188.34 W/mK:

Y-Value: 0.00 W/m²K:

# U-VALUE CALCULATOR REPORT

| | | | |
|---|---|---|---|
| **Property Reference** | sc121843 | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling Part L 2021 |
| **Project** | Plot 12, Bitterne Parish Church, Whites Lane, Bitterne, Southampton, Hampshire , SO19 7NP | | |
| **Calculation Type** | New Build (As Designed) | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 85 B | **DER** | 15.54 | **TER** | 25.39 |
| **Environmental** | 86 B | **% DER<TER** | 38.79 | | |
| **$CO_2$ Emissions (t/year)** | 1.53 | **DFEE** | 46.47 | **TFEE** | 57.72 |
| **General Requirements Compliance** | Pass | **% DFEE<TFEE** | 19.50 | | |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers, Surecalc Limited, Tel: 01243572695, mark@surecalc.co.uk | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Vivid Design Studio | | |

## Building Elements

### Roof 000002 - Pitched Roof Insulated Ceiling Vivid

**Roof Type: Pitched Roof, insulated flat ceiling**

| Layer | Description | Thickness (mm) | Conductivity (W/m²K) | Resistance (m²K/W) | Fraction (%) |
|---|---|---|---|---|---|
| **Ext surface** | | | | 0.0400 | |
| **Layer 1** | **Loft Space** | | | | |
| | Main construction | 0 | 0.0600 | 0.0600 | 100.00 |
| **Layer 2** | **Mineral wool** | | | | |
| | Main construction | 350 | 0.0440 | 7.9545 | 100.00 |
| | Corrections - Air Gap: Level 0, Fasteners: None or plastic | | | | |
| **Layer 3** | **Mineral wool quilt** | | | | |
| | Main construction | 150 | 0.0440 | 3.4091 | 93.67 |
| | Main construction | 150 | 0.1300 | 1.1538 | 6.33 |
| | Corrections - Air Gap: Level 0, Fasteners: None or plastic | | | | |
| **Layer 4** | **Plasterboard, standard** | | | | |
| | Main construction | 12.5 | 0.2100 | 0.0595 | 100.00 |
| **Int surface** | | | | 0.1000 | |

**Total resistance:** **Upper limit =** 11.449 m² K/W **Lower limit =** 11.248 m² K/W **Average =** 11.348 m² K/W

**Total correction =** 0.0030 m² K/W **U-value (unrounded) =** 0.09 W/m² K

**Unheated space:** None

**Total thickness: 513 mm** **U-value: 0.09 W/m² K** **Kappa: n/a**



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

# U-VALUE CALCULATOR REPORT

| | | | |
|---|---|---|---|
| **Property Reference** | sc121843 | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling Part L 2021 |
| **Project** | Plot 12, Bitterne Parish Church, Whites Lane, Bitterne, Southampton, Hampshire , SO19 7NP | | |
| **Calculation Type** | New Build (As Designed) | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 85 B | **DER** | 15.54 | **TER** | 25.39 |
| **Environmental** | 86 B | **% DER<TER** | 38.79 | | |
| **$CO_2$ Emissions (t/year)** | 1.53 | **DFEE** | 46.47 | **TFEE** | 57.72 |
| **General Requirements Compliance** | Pass | **% DFEE<TFEE** | 19.50 | | |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers, Surecalc Limited, Tel: 01243572695, mark@surecalc.co.uk | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Vivid Design Studio | | |

## Building Elements

### Wall 000001 - Vivid Cavity Wall 125 Knauf Supafil 34

**Wall Type: Standard Wall**

| Layer | Description | Thickness (mm) | Conductivity (W/m²K) | Resistance (m²K/W) | Fraction (%) |
|---|---|---|---|---|---|
| **Ext surface** | | | | 0.0400 | |
| **Layer 1** | **Brick, outer leaf** | | | | |
| | Main construction | 102 | 0.7700 | 0.1325 | 82.81 |
| | Main construction | 102 | 0.9407 | 0.1084 | 17.19 |
| **Layer 2** | **Knauf Supafil 34 blown Cavity Fill** | | | | |
| | Main construction | 125 | 0.0340 | 3.6765 | 100.00 |
| | Corrections - Air Gap: Level 0, Fasteners: Wall ties, Cross sectional area: 12.50 mm², Lambda: 17.000 W/m.K, per m²: 2.500 | | | | |
| **Layer 3** | **Masterblock Masterlite Ultra** | | | | |
| | Main construction | 100 | 0.2700 | 0.3704 | 93.43 |
| | Main construction | 100 | 0.8803 | 0.1136 | 6.57 |
| **Layer 4** | **airspace/plaster dabs** | | | | |
| | Main construction | 15 | 0.1000 | 0.1500 | 80.00 |
| | Main construction | 15 | 0.0882 | 0.1700 | 20.00 |
| | Corrections - Cavity Unventilated, Emissivity: Normal | | | | |
| **Layer 5** | **Plasterboard, standard** | | | | |
| | Main construction | 12.5 | 0.2100 | 0.0595 | 100.00 |
| **Int surface** | | | | 0.1300 | |

**Total resistance:** **Upper limit =** 4.541 m² K/W **Lower limit =** 4.510 m² K/W **Average =** 4.525 m² K/W

**Total correction =** 0.0018 m² K/W **U-value (unrounded) =** 0.22 W/m² K

**Unheated space:** None

**Total thickness: 355 mm** **U-value: 0.22 W/m² K** **Kappa: n/a**



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

# U-VALUE CALCULATOR REPORT

| | | | |
|---|---|---|---|
| **Property Reference** | sc121843 | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling Part L 2021 |
| **Project** | Plot 12, Bitterne Parish Church, Whites Lane, Bitterne, Southampton, Hampshire , SO19 7NP | | |
| **Calculation Type** | New Build (As Designed) | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 85 B | **DER** | 15.54 | **TER** | 25.39 |
| **Environmental** | 86 B | **% DER<TER** | 38.79 | | |
| **$CO_2$ Emissions (t/year)** | 1.53 | **DFEE** | 46.47 | **TFEE** | 57.72 |
| **General Requirements Compliance** | Pass | **% DFEE<TFEE** | 19.50 | | |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers, Surecalc Limited, Tel: 01243572695, mark@surecalc.co.uk | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Vivid Design Studio | | |

## Building Elements

### Wall 000004 - Vivid Cavity Wall 125 Knauf Supafil 34

**Wall Type: Standard Wall**

| Layer | Description | Thickness (mm) | Conductivity (W/m²K) | Resistance (m²K/W) | Fraction (%) |
|---|---|---|---|---|---|
| **Ext surface** | | | | 0.0400 | |
| **Layer 1** | **Tile Hanging** | | | | |
| | Main construction | 15 | 1.0000 | 0.0150 | 100.00 |
| **Layer 2** | **airspace/timber battens** | | | | |
| | Main construction | 22 | 0.1222 | 0.1800 | 89.63 |
| | Main construction | 22 | 0.1243 | 0.1770 | 10.37 |
| | Corrections - Cavity Unventilated, Emissivity: Normal | | | | |
| **Layer 3** | **Blockwork, medium** | | | | |
| | Main construction | 100 | 0.5700 | 0.1754 | 93.43 |
| | Main construction | 100 | 0.8803 | 0.1136 | 6.57 |
| **Layer 4** | **Knauf Supafil 34 blown Cavity Fill** | | | | |
| | Main construction | 125 | 0.0340 | 3.6765 | 100.00 |
| | Corrections - Air Gap: Level 0, Fasteners: Wall ties, Cross sectional area: 12.50 mm², Lambda: 17.000 W/m.K, per m²: 2.500 | | | | |
| **Layer 5** | **Masterblock Masterlite Ultra** | | | | |
| | Main construction | 100 | 0.2700 | 0.3704 | 93.43 |
| | Main construction | 100 | 0.8803 | 0.1136 | 6.57 |
| **Layer 6** | **airspace/plaster dabs** | | | | |
| | Main construction | 15 | 0.1000 | 0.1500 | 80.00 |
| | Main construction | 15 | 0.0882 | 0.1700 | 20.00 |
| | Corrections - Cavity Unventilated, Emissivity: Normal | | | | |
| **Layer 7** | **Plasterboard, standard** | | | | |
| | Main construction | 12.5 | 0.2100 | 0.0595 | 100.00 |
| **Int surface** | | | | 0.1300 | |

**Total resistance:** **Upper limit =** 4.779 m² K/W **Lower limit =** 4.746 m² K/W **Average =** 4.762 m² K/W

**Total correction =** 0.0016 m² K/W **U-value (unrounded) =** 0.21 W/m² K

**Unheated space:** None

**Total thickness: 390 mm** **U-value: 0.21 W/m² K** **Kappa: n/a**



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

# U-VALUE CALCULATOR REPORT

| | | | |
|---|---|---|---|
| **Property Reference** | sc121843 | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling Part L 2021 |
| **Project** | Plot 12, Bitterne Parish Church, Whites Lane, Bitterne, Southampton, Hampshire , SO19 7NP | | |
| **Calculation Type** | New Build (As Designed) | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 85 B | **DER** | 15.54 | **TER** | 25.39 |
| **Environmental** | 86 B | **% DER<TER** | 38.79 | | |
| **$CO_2$ Emissions (t/year)** | 1.53 | **DFEE** | 46.47 | **TFEE** | 57.72 |
| **General Requirements Compliance** | Pass | **% DFEE<TFEE** | 19.50 | | |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers, Surecalc Limited, Tel: 01243572695, mark@surecalc.co.uk | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Vivid Design Studio | | |

## Building Elements

### Floor 000003 - Ground Floor Beam and Block

**Floor Type: Suspended Floor**
**Area = 61.05 m², Perimeter = 32.26 m, Wall thickness = 300.00 mm, Soil: Unknown**
**Depth of underfloor space below ground:0.200 m  Floor wind shielding: Average (suburban)**
**Floor height above ground:h = 0.150 m**
**U-value of walls above ground:Uw = 0.220 m**
**Ventilation openings per perimeter length:e = 0.0015 %**
**Mean wind speed:v = 5.000 m/s**
**Resistance on solum:Rg = 0.000 m²K/W**

| Layer | Description | Thickness (mm) | Conductivity (W/m²K) | Resistance (m²K/W) | Fraction (%) |
|---|---|---|---|---|---|
| **Ext surface** | | | | 0.1700 | |
| **Layer 1** | **Blockwork** | | | | |
| | Main construction | 100 | 0.1900 | 0.5263 | 90.91 |
| | Main construction | 100 | 1.0000 | 0.1000 | 9.09 |
| **Layer 2** | **Mannok Therm Floor** | | | | |
| | Main construction | 150 | 0.0220 | 6.8182 | 100.00 |
| | Corrections - Air Gap: Level 1, Fasteners: None or plastic | | | | |
| **Layer 3** | **Screed** | | | | |
| | Main construction | 75 | 1.1500 | 0.0652 | 100.00 |
| **Int surface** | | | | 0.1700 | |

**Total resistance:** **Upper limit =** 7.709 m² K/W **Lower limit =** 7.603 m² K/W **Average =** 7.656 m² K/W

**Total correction =** 0.0079 m² K/W **U-value (unrounded) =** 0.12 W/m² K

**Unheated space:** None

**Total thickness: 325 mm** **U-value: 0.12 W/m² K** **Kappa: n/a**



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

elmhurst energy

# SAP Report Submission for Building Regulations Compliance

Client: Vivid Design Studio

Project: Plot 13, Bitterne Parish Church, Whites Lane
Bitterne, Southampton, Hampshire , SO19 7NP

Contact: Mark Rogers
Surecalc Limited
mark@surecalc.co.uk

Report Issue Date: 06/12/2023

EXCELLENCE IN ENERGY ASSESSMENT

# CODE FOR SUSTAINABLE HOMES
## Calculation Type: New Build (As Designed)

| | | | |
|---|---|---|---|
| **Property Reference** | sc121844 | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling Part L 2021 |
| **Property** | Plot 13, Bitterne Parish Church, Whites Lane, Bitterne, Southampton, Hampshire , SO19 7NP | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 85 B | **DER** | 15.35 | **TER** | 25.05 |
| **Environmental** | 86 B | **% DER<TER** | 38.73 | | |
| **$CO_2$ Emissions (t/year)** | 1.52 | **DFEE** | 45.42 | **TFEE** | 56.60 |
| **General Requirements Compliance** | Pass | **% DFEE<TFEE** | 19.77 | | |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers, Surecalc Limited, Tel: 01243572695, mark@surecalc.co.uk | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Vivid Design Studio | | |

## ENE 1 - Dwelling Emission Rate calculation

| | | | |
|---|---|---|---|
| Total floor area | 122.1 | $m^2$ | |
| DER | 15.35 | $kgCO_2/yr/m^2$ | |
| TER | 25.05 | $kgCO_2/yr/m^2$ | |
| $CO_2$ emissions offset from additional allowable electricity generation | 0.00 | $kgCO_2/yr/m^2$ | (ZC7) |
| Residual $CO_2$ emissions offset from biofuel CHP | 0.00 | $kgCO_2/yr/m^2$ | (ZC5) |
| Total $CO_2$ emissions offset from SAP Section 16 allowances | 0.00 | $kgCO_2/yr/m^2$ | |
| DER accounting for SAP Section 16 allowances | 15.35 | $kgCO_2/yr/m^2$ | |
| Reduction DER/TER | 38.73 | % | |
| CfSH ENE1 credits achieved | 4.5 | | |
| CfSH ENE1 level achieved | 4 | | |

## ENE 2 – Fabric Energy Efficiency calculation

| | | | |
|---|---|---|---|
| Dwelling type | House, Detached | | |
| Fabric energy efficiency (F.E.E.) | 45.42 | $kWh/m^2/yr$ | |
| CfSH ENE2 credits achieved | 7.1 | | |
| CfSH ENE1 and 2 overall level achieved | 4 | | |

## ENE 7 – Low and Zero Carbon Technologies calculation

**Standard case $CO_2$ emissions**

| | | | |
|---|---|---|---|
| Total floor area | 122.1 | $m^2$ | |
| DER | 18.64 | $kgCO_2/yr/m^2$ | |
| $CO_2$ emissions from electrical appliances | 13.97 | $kgCO_2/yr/m^2$ | (ZC2) |
| $CO_2$ emissions from cooking | 1.54 | $kgCO_2/yr/m^2$ | (ZC3) |
| Standard case total $CO_2$ emissions | 34.15 | $kgCO_2/yr/m^2$ | (ZC4) |
| Net Standard case $CO_2$ emissions | 34.15 | $kgCO_2/yr/m^2$ | (ZC8) |

**Actual case $CO_2$ emissions**

| | | | |
|---|---|---|---|
| DER | 15.56 | $kgCO_2/yr/m^2$ | |
| $CO_2$ emissions from electrical appliances | 13.97 | $kgCO_2/yr/m^2$ | (ZC2) |
| $CO_2$ emissions from cooking | 1.54 | $kgCO_2/yr/m^2$ | (ZC3) |
| Actual case total $CO_2$ emissions | 31.07 | $kgCO_2/yr/m^2$ | (ZC4) |
| $CO_2$ emissions from Biomass | 0.00 | $kgCO_2/yr/m^2$ | (ZC5) |
| $CO_2$ reduction from additional allowable electricity generation | 0.00 | $kgCO_2/yr/m^2$ | (ZC7) |
| Net Actual case $CO_2$ emissions | 31.07 | $kgCO_2/yr/m^2$ | (ZC8) |
| Improvement in net actual/net standard case $CO_2$ emissions | 9 | % | |



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| | |
|---|---|
| ENE7 credits achieved | 0 |



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

# Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Array SAP 10 program, Array

**Date:** Wed 06 Dec 2023 15:30:58

| Project Information | | | |
|---|---|---|---|
| Assessed By | Mark Rogers | Building Type | House, Detached |
| OCDEA Registration | EES/004179 | Assessment Date | 2023-12-06 |

| Dwelling Details | | | |
|---|---|---|---|
| Assessment Type | As designed | Total Floor Area | 122 $m^2$ |
| Site Reference | sc100240 P13 Bitterne Church | Plot Reference | 001 |
| Address | Bitterne Parish Church Plot 13 Whites Lane, Southampton, SO19 7NP | | |

| Client Details | |
|---|---|
| Name | Philip Dudley |
| Company | Vivid Design Studio |
| Address | NA, NA, NA |

**This report covers items included within the SAP calculations. It is not a complete report of regulations compliance.**

| 1a Target emission rate and dwelling emission rate | | |
|---|---|---|
| Fuel for main heating system | Electricity | |
| *Target carbon dioxide emission rate* | *10.43 $kgCO_2/m^2$* | |
| Dwelling carbon dioxide emission rate | 3.82 $kgCO_2/m^2$ | OK |
| **1b Target primary energy rate and dwelling primary energy** | | |
| *Target primary energy* | *54.56 $kWh_{PE}/m^2$* | |
| Dwelling primary energy | 39.67 $kWh_{PE}/m^2$ | OK |
| **1c Target fabric energy efficiency and dwelling fabric energy efficiency** | | |
| *Target fabric energy efficiency* | *40.7 $kWh/m^2$* | |
| Dwelling fabric energy efficiency | 39.5 $kWh/m^2$ | OK |

| 2a Fabric U-values | | | | |
|---|---|---|---|---|
| **Element** | ***Maximum permitted average U-Value [$W/m^2K$]*** | **Dwelling average U-Value [$W/m^2K$]** | **Element with highest individual U-Value** | |
| External walls | *0.26* | 0.22 | Walls (1) (0.22) | OK |
| Party walls | *0.2* | N/A | N/A | **N/A** |
| Curtain walls | *1.6* | N/A | N/A | **N/A** |
| Floors | *0.18* | 0.12 | Ground Floor (0.12) | OK |
| Roofs | *0.16* | 0.09 | Roof (1) (0.09) | OK |
| Windows, doors, and roof windows | *1.6* | 1.2 | Front West Door (1.2) | OK |
| Rooflights | *2.2* | N/A | N/A | **N/A** |

| 2b Envelope elements (better than typically expected values are flagged with a subsequent (!)) | | |
|---|---|---|
| **Name** | **Net area [$m^2$]** | **U-Value [$W/m^2K$]** |
| Exposed wall: Walls (1) | 137.21 | 0.22 |
| Exposed wall: Walls (2) | 8.59 | 0.21 |
| Ground floor: Ground Floor, Ground Floor | 61.05 | 0.12 |
| Exposed roof: Roof (1) | 61.05 | 0.09 **(!)** |

| 2c Openings (better than typically expected values are flagged with a subsequent (!)) | | | | |
|---|---|---|---|---|
| **Name** | **Area [$m^2$]** | **Orientation** | **Frame factor** | **U-Value [$W/m^2K$]** |
| Front West Door, New Dwell Entrance Door | 2.01 | West | N/A | 1.2 |
| Front West Windows, New Dwelling DG Window | 4.41 | West | 0.7 | 1.2 |
| Front West Window, New Dwelling DG Window | 1.9 | West | 0.7 | 1.2 |
| Side South Windows, New Dwelling DG Window | 1.8 | South | 0.7 | 1.2 |
| Rear East Windows, New Dwelling DG Window | 4.92 | East | 0.7 | 1.2 |
| Rear West Windows, New Dwell DG French Doors | 3.35 | East | 0.7 | 1.2 |

| Name | Area [$m^2$] | Orientation | Frame factor | U-Value [$W/m^2K$] |
|---|---|---|---|---|
| Side South Door, New Dwell Entrance Door | 1.95 | South | N/A | 1.2 |

| 2d Thermal bridging (better than typically expected values are flagged with a subsequent (!)) | | | | |
|---|---|---|---|---|
| Building part **1 - Main Dwelling**: Thermal bridging calculated from linear thermal transmittances for each junction | | | | |
| **Main element** | **Junction detail** | **Source** | **Psi value [W/mK]** | **Drawing / reference** |
| External wall | E2: Other lintels (including other steel lintels) | Calculated by person with suitable expertise | 0.05 | IG or Keystone Hi Therm + |
| External wall | E3: Sill | Calculated by person with suitable expertise | 0.018 **(!)** | Recognised Construction Detail |
| External wall | E4: Jamb | Calculated by person with suitable expertise | 0.014 **(!)** | Recognised Construction Detail |
| External wall | E5: Ground floor (normal) | Calculated by person with suitable expertise | 0.068 | Recognised Construction Detail |
| External wall | E6: Intermediate floor within a dwelling | Calculated by person with suitable expertise | 0.001 **(!)** | Recognised Construction Detail |
| External wall | E10: Eaves (insulation at ceiling level) | Calculated by person with suitable expertise | 0.055 | Recognised Construction Detail |
| External wall | E12: Gable (insulation at ceiling level) | Calculated by person with suitable expertise | 0.058 | Recognised Construction Detail |
| External wall | E16: Corner (normal) | Calculated by person with suitable expertise | 0.051 | Recognised Construction Detail |
| External wall | E17: Corner (inverted - internal area greater than external area) | Calculated by person with suitable expertise | -0.1 | Recognised Construction Detail |

| 3 Air permeability (better than typically expected values are flagged with a subsequent (!)) | | |
|---|---|---|
| *Maximum permitted air permeability at 50Pa* | *8 $m^3/hm^2$* | |
| Dwelling air permeability at 50Pa | 5.05 $m^3/hm^2$, Design value | OK |
| Air permeability test certificate reference | | |

| 4 Space heating | |
|---|---|
| **Main heating system 1**: Heat pump with radiators or underfloor heating - Electricity | |
| Efficiency | 241.8% |
| Emitter type | Radiators |
| Flow temperature | 55°C |
| System type | Heat Pump |
| Manufacturer | Daikin Europe NV |
| Model | EDLA06EV3 |
| Commissioning | |
| **Secondary heating system**: N/A | |
| Fuel | N/A |
| Efficiency | N/A |
| Commissioning | |

| 5 Hot water | |
|---|---|
| **Cylinder/store** - type: Cylinder | |
| Capacity | 210 litres |
| Declared heat loss | 1.5 kWh/day |
| Primary pipework insulated | Yes |
| Manufacturer | |
| Model | |
| Commissioning | |
| **Waste water heat recovery system 1** - type: N/A | |
| Efficiency | |
| Manufacturer | |
| Model | |

| 6 Controls | | |
|---|---|---|
| **Main heating 1** - type: Time and temperature zone control by arrangement of plumbing and electrical services | | |
| Function | | |
| Ecodesign class | | |
| Manufacturer | | |
| Model | | |
| **Water heating** - type: Cylinder thermostat and HW separately timed | | |
| Manufacturer | | |
| Model | | |

| 7 Lighting | | |
|---|---|---|
| *Minimum permitted light source efficacy* | *75 lm/W* | |
| Lowest light source efficacy | 75 lm/W | **OK** |
| External lights control | N/A | |

| 8 Mechanical ventilation | | |
|---|---|---|
| **System type:** N/A | | |
| *Maximum permitted specific fan power* | *N/A* | |
| Specific fan power | N/A | **N/A** |
| *Minimum permitted heat recovery efficiency* | *N/A* | |
| Heat recovery efficiency | N/A | **N/A** |
| Manufacturer/Model | | |
| Commissioning | | |

| 9 Local generation |
|---|
| N/A |

| 10 Heat networks |
|---|
| N/A |

| 11 Supporting documentary evidence |
|---|
| N/A |

| 12 Declarations | |
|---|---|
| **a. Assessor Declaration** | |
| This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report. | |
| Signed:<br><br>Name: | Assessor ID:<br><br>Date: |
| **b. Client Declaration** | |
| N/A | |

# Predicted Energy Assessment

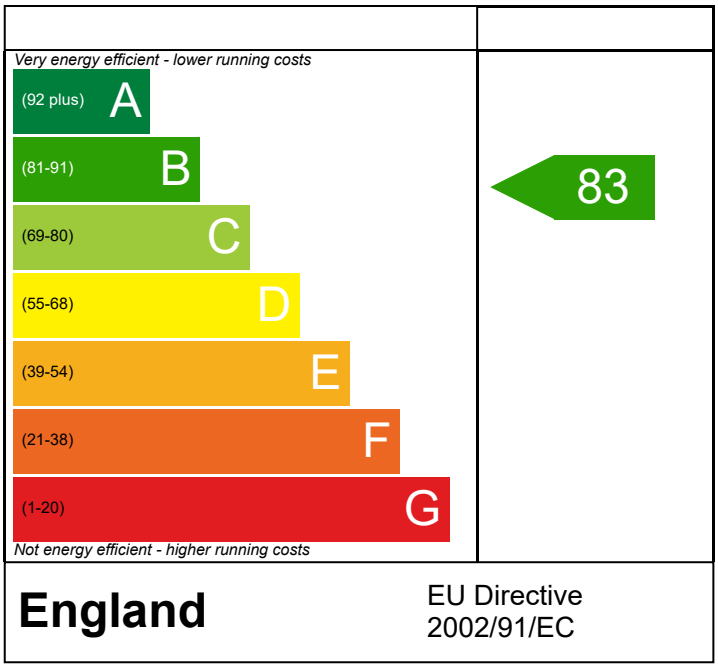
Plot 13, Bitterne Parish Church, Whites Lane,
Southampton, Hampshire , SO19 7NP

| | |
|---|---|
| Dwelling type: | House, Detached |
| Date of assessment: | 06/12/2023 |
| Produced by: | Mark Rogers |
| Total floor area: | 122.1 m² |
| DRRN: | 6207-1128-6981 |

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

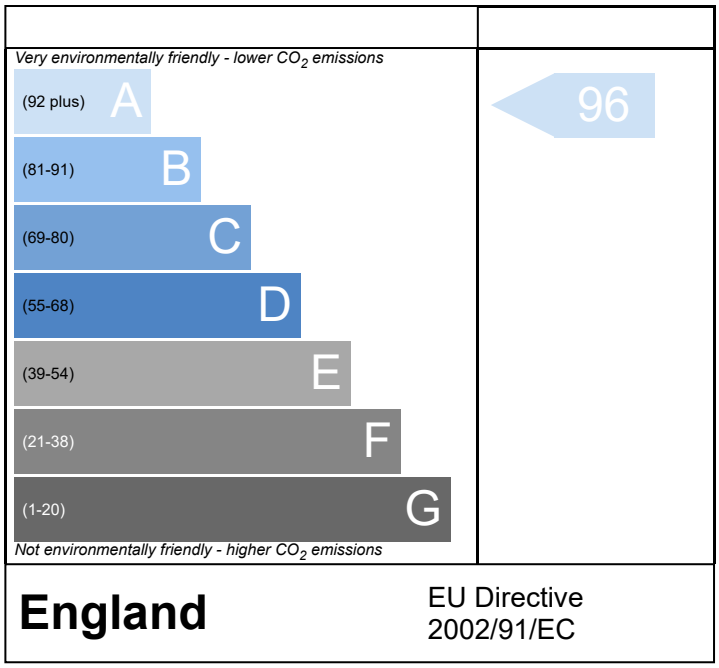
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

## Energy Efficiency Rating




The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

## Environmental Impact ($CO_2$) Rating




The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide ($CO_2$) emissions. The higher the rating the less impact it has on the environment.

# Summary for Input Data

elmhurst energy

| | | | |
|---|---|---|---|
| **Property Reference** | sc100240 P13 Bitterne Church | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling |
| **Property** | Plot 13, Bitterne Parish Church, Whites Lane, Southampton, Hampshire , SO19 7NP | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 83 B | **DER** | 3.82 | **TER** | 10.43 |
| **Environmental** | 96 A | **% DER < TER** | | | 63.37 |
| **$CO_2$ Emissions (t/year)** | 0.39 | **DFEE** | 39.46 | **TFEE** | 40.73 |
| **Compliance Check** | See BREL | **% DFEE < TFEE** | | | 3.13 |
| **% DPER < TPER** | 27.30 | **DPER** | 39.67 | **TPER** | 54.56 |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Philip Dudley | | |

## SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

| | |
|---|---|
| **Orientation** | West |
| **Property Tenture** | ND |
| **Transaction Type** | 6 |
| **Terrain Type** | Suburban |
| **1.0 Property Type** | House, Detached |
| **2.0 Number of Storeys** | 2 |
| **3.0 Date Built** | 2023 |
| **4.0 Sheltered Sides** | 2 |
| **5.0 Sunlight/Shade** | Average or unknown |
| **6.0 Thermal Mass Parameter** | Precise calculation |
| **7.0 Electricity Tariff** | Standard |
| Smart electricity meter fitted | No |
| Smart gas meter fitted | No |

**7.0 Measurements**

| | Heat Loss Perimeter | Internal Floor Area | Average Storey Height |
|---|---|---|---|
| **Ground floor:** | 32.26 m | 61.05 m² | 2.39 m |
| **1st Storey:** | 32.26 m | 61.05 m² | 2.76 m |

**8.0 Living Area** 15.46 m²

**9.0 External Walls**

| Description | Type | Construction | U-Value (W/m²K) | Kappa (kJ/m²K) | Gross Area(m²) | Nett Area (m²) | Shelter Res | Shelter | Openings | Area Calculation Type |
|---|---|---|---|---|---|---|---|---|---|---|
| External Cavity Wall | Cavity Wall | Cavity wall; plasterboard on dabs or battens, lightweight aggregate block, filled cavity, any outside structure | 0.22 | 110.00 | 155.65 | 137.21 | 0.00 | None | 18.44 | Calculate Wall Area |
| External Tile Hung Wall | Cavity Wall | Cavity wall; plasterboard on dabs or battens, lightweight aggregate block, filled cavity, any outside structure | 0.21 | 110.00 | 10.49 | 8.59 | 0.00 | None | 1.90 | Enter Gross Area |

**9.1 Party Walls**

| Description | Type | Construction | U-Value (W/m²K) | Kappa (kJ/m²K) | Area (m²) | Shelter Res | Shelter |
|---|---|---|---|---|---|---|---|
| Party Wall | Filled Cavity with Edge Sealing | Single plasterboard on dabs both sides, lightweight aggregate blocks, cavity or cavity fill | 0.00 | 110.00 | 47.38 | | None |

**9.2 Internal Walls**

| Description | Construction | Kappa (kJ/m²K) | Area (m²) |
|---|---|---|---|
| Internal Stud Walls | Plasterboard on timber frame | 9.00 | 180.27 |
| Internal Block Walls | Dense block, plasterboard on dabs | 75.00 | 68.12 |

**10.0 External Roofs**

| Description | Type | Construction | U-Value (W/m²K) | Kappa (kJ/m²K) | Gross Area(m²) | Nett Area (m²) | Shelter Code | Shelter Factor | Calculation Type | Openings |
|---|---|---|---|---|---|---|---|---|---|---|
| External Pitched Roofs | External Plane Roof | Plasterboard, insulated at ceiling level | 0.09 | 9.00 | 61.05 | 61.05 | None | 0.00 | Calculate Wall Area | 0.00 |

**10.2 Internal Ceilings**

| Description | Storey | Construction | Area (m²) |
|---|---|---|---|
| Internal Ceiling | Lowest occupied | Plasterboard ceiling, carpeted chipboard floor | 61.05 |

# Summary for Input Data

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### 11.0 Heat Loss Floors

| Description | Type | Storey Index | Construction | U-Value (W/m²K) | Shelter Code | Shelter Factor | Kappa (kJ/m²K) | Area (m²) |
|---|---|---|---|---|---|---|---|---|
| Ground Floor | Ground Floor - Solid | Lowest occupied | Suspended concrete floor, carpeted | 0.12 | None | 0.00 | 75.00 | 61.05 |

### 11.2 Internal Floors

| Description | Storey Index | Construction | Kappa (kJ/m²K) | Area (m²) |
|---|---|---|---|---|
| Internal Floor | | Plasterboard ceiling, carpeted chipboard floor | 9.00 | 61.05 |

### 12.0 Opening Types

| Description | Data Source | Type | Glazing | Glazing Gap | Filling Type | G-value | Frame Type | Frame Factor | U Value (W/m²K) |
|---|---|---|---|---|---|---|---|---|---|
| New Dwell Entrance Door | Manufacturer | Half Glazed Door | Double Low-E Soft 0.05 | | | 0.36 | | 0.70 | 1.20 |
| New Dwell DG French Doors | Manufacturer | Window | Double Low-E Soft 0.05 | | | 0.71 | | 0.70 | 1.20 |
| New Dwelling DG Window | Manufacturer | Window | Double Low-E Soft 0.05 | | | 0.71 | | 0.70 | 1.20 |

### 13.0 Openings

| Name | Opening Type | Location | Orientation | Area (m²) | Pitch |
|---|---|---|---|---|---|
| Front West Door | New Dwell Entrance Door | External Cavity Wall | West | 2.01 | |
| Front West Windows | New Dwelling DG Window | External Cavity Wall | West | 4.41 | |
| Front West Window | New Dwelling DG Window | External Tile Hung Wall | West | 1.90 | |
| Side South Windows | New Dwelling DG Window | External Cavity Wall | South | 1.80 | |
| Rear East Windows | New Dwelling DG Window | External Cavity Wall | East | 4.92 | |
| Rear West Windows | New Dwell DG French Doors | External Cavity Wall | East | 3.35 | |
| Side South Door | New Dwell Entrance Door | External Cavity Wall | South | 1.95 | |

| | | |
|---|---|---|
| **14.0 Conservatory** | None | |
| **15.0 Draught Proofing** | 100 | % |
| **16.0 Draught Lobby** | No | |

| | | |
|---|---|---|
| **17.0 Thermal Bridging** | Calculate Bridges | |

### 17.1 List of Bridges

| Bridge Type | Source Type | Length | Psi | Adjusted | Reference: | Imported |
|---|---|---|---|---|---|---|
| E2 Other lintels (including other steel lintels) | Independently assessed | 14.53 | 0.05 | 0.05 | IG or Keystone Hi Therm + | No |
| E3 Sill | Independently assessed | 13.57 | 0.02 | 0.02 | Recognised Construction Detail | No |
| E4 Jamb | Independently assessed | 33.30 | 0.01 | 0.01 | Recognised Construction Detail | No |
| E5 Ground floor (normal) | Independently assessed | 32.26 | 0.07 | 0.07 | Recognised Construction Detail | No |
| E6 Intermediate floor within a dwelling | Independently assessed | 32.26 | 0.00 | 0.00 | Recognised Construction Detail | No |
| E10 Eaves (insulation at ceiling level) | Independently assessed | 29.36 | 0.06 | 0.06 | Recognised Construction Detail | No |
| E12 Gable (insulation at ceiling level) | Independently assessed | 2.90 | 0.06 | 0.06 | Recognised Construction Detail | No |
| E16 Corner (normal) | Independently assessed | 25.38 | 0.05 | 0.05 | Recognised Construction Detail | No |
| E17 Corner (inverted – internal area greater than external area) | Independently assessed | 4.78 | -0.10 | -0.10 | Recognised Construction Detail | No |

| | | |
|---|---|---|
| Y-value | 0.00 | W/m²K |

| | | |
|---|---|---|
| **18.0 Pressure Testing** | Yes | |
| Designed $AP_{50}$ | 5.05 | m³/(h.m²) @ 50 Pa |
| Test Method | Blower Door | |

**19.0 Mechanical Ventilation**

**Mechanical Ventilation**

| | | |
|---|---|---|
| Mechanical Ventilation System Present | No | |

**20.0 Fans, Open Fireplaces, Flues**

| | | |
|---|---|---|
| **21.0 Fixed Cooling System** | No | |

**22.0 Lighting**

| | | |
|---|---|---|
| No Fixed Lighting | No | |

| Name | Efficacy | Power | Capacity | Count |
|---|---|---|---|---|
| Low energy Lighting | 75.00 | 15 | 1125 | 36 |

| | | |
|---|---|---|
| **24.0 Main Heating 1** | Database | |
| Description | Electric Air Source Heat Pump | |
| Percentage of Heat | 100.00 | % |
| Database Ref. No. | 106473 | |
| Fuel Type | Electricity | |
| In Winter | 0.00 | |
| In Summer | 0.00 | |
| Model Name | EDLA06EV3 | |

# Summary for Input Data

elmhurst energy

| | |
|---|---|
| Manufacturer | Daikin Europe NV |
| System Type | Heat Pump |
| Controls SAP Code | 2207 |
| PCDF Controls | 0 |
| Is MHS Pumped | Pump in heated space |
| Heating Pump Age | 2013 or later |
| Heat Emitter | Radiators |
| Flow Temperature | Enter value |
| Flow Temperature Value | 55.00 |

**25.0 Main Heating 2** — None

**26.0 Heat Networks** — None

| | Heat Source | Fuel Type | Heating Use | Efficiency | Percentage Of Heat | Heat | Heat Power Ratio | Electrical | Fuel Factor | Efficiency type |
|---|---|---|---|---|---|---|---|---|---|---|
| Heat source 1 | | | | | | | | | | |
| Heat source 2 | | | | | | | | | | |
| Heat source 3 | | | | | | | | | | |
| Heat source 4 | | | | | | | | | | |
| Heat source 5 | | | | | | | | | | |

**28.0 Water Heating**

| | |
|---|---|
| Water Heating | Main Heating 1 |
| SAP Code | 901 |
| Flue Gas Heat Recovery System | No |
| Waste Water Heat Recovery Instantaneous System 1 | No |
| Waste Water Heat Recovery Instantaneous System 2 | No |
| Waste Water Heat Recovery Storage System | No |
| Solar Panel | No |
| Water use <= 125 litres/person/day | Yes |
| Cold Water Source | From mains |
| Bath Count | 1 |
| Immersion Only Heating Hot Water | No |

**28.1 Showers**

| Description | Shower Type | Flow Rate [l/min] | Rated Power [kW] | Connected | Connected To |
|---|---|---|---|---|---|

**28.3 Waste Water Heat Recovery System**

| | | |
|---|---|---|
| **29.0 Hot Water Cylinder** | Hot Water Cylinder | |
| Cylinder Stat | Yes | |
| Cylinder In Heated Space | Yes | |
| Independent Time Control | Yes | |
| Insulation Type | Measured Loss | |
| Cylinder Volume | 210.00 | L |
| Loss | 1.50 | kWh/day |
| Pipes insulation | Fully insulated primary pipework | |
| In Airing Cupboard | No | |

**31.0 Thermal Store** — None

**Recommendations**

**Lower cost measures**

**None**

**Further measures to achieve even higher standards**

| Typical Cost | Typical savings per year | Ratings after improvement SAP rating | Environmental Impact |
|---|---|---|---|
| £4,000 - £6,000 | £48 | B 84 | A 97 |
| £3,500 - £5,500 | £206 | B 89 | A 98 |
| | | 0 | 0 |

# Thermal Bridging

| | | | |
|---|---|---|---|
| **Property Reference** | sc100240 P13 Bitterne Church | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | Detached House |
| **Property** | Plot 13, Bitterne Parish Church, Whites Lane, Southampton, Hampshire , SO19 7NP | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 83 B | **DER** | 3.82 | **TER** | 10.43 |
| **Environmental** | 96 A | **% DER < TER** | | | 63.37 |
| **$CO_2$ Emissions (t/year)** | 0.39 | **DFEE** | 39.46 | **TFEE** | 40.73 |
| **Compliance Check** | See BREL | **% DFEE < TFEE** | | | 3.13 |
| **% DPER < TPER** | 27.30 | **DPER** | 39.67 | **TPER** | 54.56 |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Philip Dudley | | |

| | Junction details | Source Type | Psi (W/mK) | Length (m) | Result | Reference |
|---|---|---|---|---|---|---|
| External wall | E2 Other lintels (including other steel lintels) | Independently assessed | 0.050 | 14.53 | 0.73 | IG or Keystone Hi Therm + |
| External wall | E3 Sill | Independently assessed | 0.018 | 13.57 | 0.24 | Recognised Construction Detail |
| External wall | E4 Jamb | Independently assessed | 0.014 | 33.30 | 0.47 | Recognised Construction Detail |
| External wall | E5 Ground floor (normal) | Independently assessed | 0.068 | 32.26 | 2.19 | Recognised Construction Detail |
| External wall | E6 Intermediate floor within a dwelling | Independently assessed | 0.001 | 32.26 | 0.03 | Recognised Construction Detail |
| External wall | E10 Eaves (insulation at ceiling level) | Independently assessed | 0.055 | 29.36 | 1.61 | Recognised Construction Detail |
| External wall | E12 Gable (insulation at ceiling level) | Independently assessed | 0.058 | 2.90 | 0.17 | Recognised Construction Detail |
| External wall | E16 Corner (normal) | Independently assessed | 0.051 | 25.38 | 1.29 | Recognised Construction Detail |
| External wall | E17 Corner (inverted – internal area greater than external area) | Independently assessed | -0.100 | 4.78 | -0.48 | Recognised Construction Detail |

Total: 188.34 W/mK:

Y-Value: 0.00 W/m²K:

# U-VALUE CALCULATOR REPORT

| | | | |
|---|---|---|---|
| **Property Reference** | sc121844 | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling Part L 2021 |
| **Project** | Plot 13, Bitterne Parish Church, Whites Lane, Bitterne, Southampton, Hampshire , SO19 7NP | | |
| **Calculation Type** | New Build (As Designed) | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 85 B | **DER** | 15.35 | **TER** | 25.05 |
| **Environmental** | 86 B | **% DER<TER** | 38.73 | | |
| **$CO_2$ Emissions (t/year)** | 1.52 | **DFEE** | 45.42 | **TFEE** | 56.60 |
| **General Requirements Compliance** | Pass | **% DFEE<TFEE** | 19.77 | | |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers, Surecalc Limited, Tel: 01243572695, mark@surecalc.co.uk | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Vivid Design Studio | | |

## Building Elements

### Roof 000002 - Pitched Roof Insulated Ceiling Vivid

**Roof Type: Pitched Roof, insulated flat ceiling**

| Layer | Description | Thickness (mm) | Conductivity (W/m²K) | Resistance (m²K/W) | Fraction (%) |
|---|---|---|---|---|---|
| **Ext surface** | | | | 0.0400 | |
| **Layer 1** | **Loft Space** | | | | |
| | Main construction | 0 | 0.0600 | 0.0600 | 100.00 |
| **Layer 2** | **Mineral wool** | | | | |
| | Main construction | 350 | 0.0440 | 7.9545 | 100.00 |
| | Corrections - Air Gap: Level 0, Fasteners: None or plastic | | | | |
| **Layer 3** | **Mineral wool quilt** | | | | |
| | Main construction | 150 | 0.0440 | 3.4091 | 93.67 |
| | Main construction | 150 | 0.1300 | 1.1538 | 6.33 |
| | Corrections - Air Gap: Level 0, Fasteners: None or plastic | | | | |
| **Layer 4** | **Plasterboard, standard** | | | | |
| | Main construction | 12.5 | 0.2100 | 0.0595 | 100.00 |
| **Int surface** | | | | 0.1000 | |

**Total resistance:** **Upper limit =** 11.449 m² K/W **Lower limit =** 11.248 m² K/W **Average =** 11.348 m² K/W

**Total correction =** 0.0030 m² K/W **U-value (unrounded) =** 0.09 W/m² K

**Unheated space:** None

**Total thickness: 513 mm** **U-value: 0.09 W/m² K** **Kappa: n/a**



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

# U-VALUE CALCULATOR REPORT

| | | | |
|---|---|---|---|
| **Property Reference** | sc121844 | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling Part L 2021 |
| **Project** | Plot 13, Bitterne Parish Church, Whites Lane, Bitterne, Southampton, Hampshire , SO19 7NP | | |
| **Calculation Type** | New Build (As Designed) | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 85 B | **DER** | 15.35 | **TER** | 25.05 |
| **Environmental** | 86 B | **% DER<TER** | 38.73 | | |
| **$CO_2$ Emissions (t/year)** | 1.52 | **DFEE** | 45.42 | **TFEE** | 56.60 |
| **General Requirements Compliance** | Pass | **% DFEE<TFEE** | 19.77 | | |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers, Surecalc Limited, Tel: 01243572695, mark@surecalc.co.uk | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Vivid Design Studio | | |

## Building Elements

### Wall 000001 - Vivid Cavity Wall 125 Knauf Supafil 34

**Wall Type: Standard Wall**

| Layer | Description | Thickness (mm) | Conductivity (W/m²K) | Resistance (m²K/W) | Fraction (%) |
|---|---|---|---|---|---|
| **Ext surface** | | | | 0.0400 | |
| **Layer 1** | **Brick, outer leaf** | | | | |
| | Main construction | 102 | 0.7700 | 0.1325 | 82.81 |
| | Main construction | 102 | 0.9407 | 0.1084 | 17.19 |
| **Layer 2** | **Knauf Supafil 34 blown Cavity Fill** | | | | |
| | Main construction | 125 | 0.0340 | 3.6765 | 100.00 |
| | Corrections - Air Gap: Level 0, Fasteners: Wall ties, Cross sectional area: 12.50 mm², Lambda: 17.000 W/m.K, per m²: 2.500 | | | | |
| **Layer 3** | **Masterblock Masterlite Ultra** | | | | |
| | Main construction | 100 | 0.2700 | 0.3704 | 93.43 |
| | Main construction | 100 | 0.8803 | 0.1136 | 6.57 |
| **Layer 4** | **airspace/plaster dabs** | | | | |
| | Main construction | 15 | 0.1000 | 0.1500 | 80.00 |
| | Main construction | 15 | 0.0882 | 0.1700 | 20.00 |
| | Corrections - Cavity Unventilated, Emissivity: Normal | | | | |
| **Layer 5** | **Plasterboard, standard** | | | | |
| | Main construction | 12.5 | 0.2100 | 0.0595 | 100.00 |
| **Int surface** | | | | 0.1300 | |

**Total resistance:** **Upper limit =** 4.541 m² K/W **Lower limit =** 4.510 m² K/W **Average =** 4.525 m² K/W

**Total correction =** 0.0018 m² K/W **U-value (unrounded) =** 0.22 W/m² K

**Unheated space:** None

**Total thickness: 355 mm** **U-value: 0.22 W/m² K** **Kappa: n/a**



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

# U-VALUE CALCULATOR REPORT

| | | | |
|---|---|---|---|
| **Property Reference** | sc121844 | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling Part L 2021 |
| **Project** | Plot 13, Bitterne Parish Church, Whites Lane, Bitterne, Southampton, Hampshire , SO19 7NP | | |
| **Calculation Type** | New Build (As Designed) | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 85 B | **DER** | 15.35 | **TER** | 25.05 |
| **Environmental** | 86 B | **% DER<TER** | 38.73 | | |
| **$CO_2$ Emissions (t/year)** | 1.52 | **DFEE** | 45.42 | **TFEE** | 56.60 |
| **General Requirements Compliance** | Pass | **% DFEE<TFEE** | 19.77 | | |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers, Surecalc Limited, Tel: 01243572695, mark@surecalc.co.uk | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Vivid Design Studio | | |

## Building Elements

### Wall 000004 - Vivid Cavity Wall 125 Knauf Supafil 34

**Wall Type: Standard Wall**

| Layer | Description | Thickness (mm) | Conductivity (W/m²K) | Resistance (m²K/W) | Fraction (%) |
|---|---|---|---|---|---|
| **Ext surface** | | | | 0.0400 | |
| **Layer 1** | **Tile Hanging** | | | | |
| | Main construction | 15 | 1.0000 | 0.0150 | 100.00 |
| **Layer 2** | **airspace/timber battens** | | | | |
| | Main construction | 22 | 0.1222 | 0.1800 | 89.63 |
| | Main construction | 22 | 0.1243 | 0.1770 | 10.37 |
| | Corrections - Cavity Unventilated, Emissivity: Normal | | | | |
| **Layer 3** | **Blockwork, medium** | | | | |
| | Main construction | 100 | 0.5700 | 0.1754 | 93.43 |
| | Main construction | 100 | 0.8803 | 0.1136 | 6.57 |
| **Layer 4** | **Knauf Supafil 34 blown Cavity Fill** | | | | |
| | Main construction | 125 | 0.0340 | 3.6765 | 100.00 |
| | Corrections - Air Gap: Level 0, Fasteners: Wall ties, Cross sectional area: 12.50 mm², Lambda: 17.000 W/m.K, per m²: 2.500 | | | | |
| **Layer 5** | **Masterblock Masterlite Ultra** | | | | |
| | Main construction | 100 | 0.2700 | 0.3704 | 93.43 |
| | Main construction | 100 | 0.8803 | 0.1136 | 6.57 |
| **Layer 6** | **airspace/plaster dabs** | | | | |
| | Main construction | 15 | 0.1000 | 0.1500 | 80.00 |
| | Main construction | 15 | 0.0882 | 0.1700 | 20.00 |
| | Corrections - Cavity Unventilated, Emissivity: Normal | | | | |
| **Layer 7** | **Plasterboard, standard** | | | | |
| | Main construction | 12.5 | 0.2100 | 0.0595 | 100.00 |
| **Int surface** | | | | 0.1300 | |

**Total resistance:** **Upper limit =** 4.779 m² K/W **Lower limit =** 4.746 m² K/W **Average =** 4.762 m² K/W

**Total correction =** 0.0016 m² K/W **U-value (unrounded) =** 0.21 W/m² K

**Unheated space:** None

**Total thickness: 390 mm** **U-value: 0.21 W/m² K** **Kappa: n/a**



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

# U-VALUE CALCULATOR REPORT

| | | | |
|---|---|---|---|
| Property Reference | sc121844 | Issued on Date | 06/12/2023 |
| Assessment Reference | 001 | Prop Type Ref | New Dwelling Part L 2021 |
| Project | Plot 13, Bitterne Parish Church, Whites Lane, Bitterne, Southampton, Hampshire , SO19 7NP | | |
| Calculation Type | New Build (As Designed) | | |

| | | | | | |
|---|---|---|---|---|---|
| SAP Rating | 85 B | DER | 15.35 | TER | 25.05 |
| Environmental | 86 B | % DER<TER | 38.73 | | |
| $CO_2$ Emissions (t/year) | 1.52 | DFEE | 45.42 | TFEE | 56.60 |
| General Requirements Compliance | Pass | % DFEE<TFEE | 19.77 | | |

| | | | |
|---|---|---|---|
| Assessor Details | Mr. Mark Rogers, Surecalc Limited, Tel: 01243572695, mark@surecalc.co.uk | Assessor ID | A320-0001 |
| Client | Vivid Design Studio, Vivid Design Studio | | |

## Building Elements

### Floor 000003 - Ground Floor Beam and Block

**Floor Type: Suspended Floor**
**Area = 61.05 m², Perimeter = 32.26 m, Wall thickness = 300.00 mm, Soil: Unknown**
**Depth of underfloor space below ground:0.200 m  Floor wind shielding: Average (suburban)**
**Floor height above ground:h = 0.150 m**
**U-value of walls above ground:Uw = 0.220 m**
**Ventilation openings per perimeter length:e = 0.0015 %**
**Mean wind speed:v = 5.000 m/s**
**Resistance on solum:Rg = 0.000 m²K/W**

| Layer | Description | Thickness (mm) | Conductivity (W/m²K) | Resistance (m²K/W) | Fraction (%) |
|---|---|---|---|---|---|
| Ext surface | | | | 0.1700 | |
| Layer 1 | **Blockwork** | | | | |
| | Main construction | 100 | 0.1900 | 0.5263 | 90.91 |
| | Main construction | 100 | 1.0000 | 0.1000 | 9.09 |
| Layer 2 | **Mannok Therm Floor** | | | | |
| | Main construction | 150 | 0.0220 | 6.8182 | 100.00 |
| | Corrections - Air Gap: Level 1, Fasteners: None or plastic | | | | |
| Layer 3 | **Screed** | | | | |
| | Main construction | 75 | 1.1500 | 0.0652 | 100.00 |
| Int surface | | | | 0.1700 | |

**Total resistance:** **Upper limit =** 7.709 m² K/W **Lower limit =** 7.603 m² K/W **Average =** 7.656 m² K/W

**Total correction =** 0.0079 m² K/W **U-value (unrounded) =** 0.12 W/m² K

**Unheated space:** None

**Total thickness: 325 mm** **U-value: 0.12 W/m² K** **Kappa: n/a**



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

elmhurst energy

# SAP Report Submission for Building Regulations Compliance

Client: Vivid Design Studio

Project: Plot 14, Bitterne Parish Church, Whites Lane
Bitterne, Southampton, Hampshire , SO19 7NP

Contact: Mark Rogers
Surecalc Limited
mark@surecalc.co.uk

Report Issue Date: 06/12/2023

EXCELLENCE IN ENERGY ASSESSMENT

# CODE FOR SUSTAINABLE HOMES
## Calculation Type: New Build (As Designed)

| | | | |
|---|---|---|---|
| **Property Reference** | sc121845 | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling Part L 2021 |
| **Property** | Plot 14, Bitterne Parish Church, Whites Lane, Bitterne, Southampton, Hampshire , SO19 7NP | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 85 B | **DER** | 15.48 | **TER** | 25.26 |
| **Environmental** | 86 B | **% DER<TER** | 38.72 | | |
| **$CO_2$ Emissions (t/year)** | 1.53 | **DFEE** | 46.06 | **TFEE** | 57.33 |
| **General Requirements Compliance** | Pass | **% DFEE<TFEE** | 19.67 | | |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers, Surecalc Limited, Tel: 01243572695, mark@surecalc.co.uk | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Vivid Design Studio | | |

## ENE 1 - Dwelling Emission Rate calculation

| | | | |
|---|---|---|---|
| Total floor area | 122.1 | $m^2$ | |
| DER | 15.48 | $kgCO_2/yr/m^2$ | |
| TER | 25.26 | $kgCO_2/yr/m^2$ | |
| $CO_2$ emissions offset from additional allowable electricity generation | 0.00 | $kgCO_2/yr/m^2$ | (ZC7) |
| Residual $CO_2$ emissions offset from biofuel CHP | 0.00 | $kgCO_2/yr/m^2$ | (ZC5) |
| Total $CO_2$ emissions offset from SAP Section 16 allowances | 0.00 | $kgCO_2/yr/m^2$ | |
| DER accounting for SAP Section 16 allowances | 15.48 | $kgCO_2/yr/m^2$ | |
| Reduction DER/TER | 38.72 | % | |
| CfSH ENE1 credits achieved | 4.5 | | |
| CfSH ENE1 level achieved | 4 | | |

## ENE 2 – Fabric Energy Efficiency calculation

| | | | |
|---|---|---|---|
| Dwelling type | House, Detached | | |
| Fabric energy efficiency (F.E.E.) | 46.06 | $kWh/m^2/yr$ | |
| CfSH ENE2 credits achieved | 6.9 | | |
| CfSH ENE1 and 2 overall level achieved | 4 | | |

## ENE 7 – Low and Zero Carbon Technologies calculation

**Standard case $CO_2$ emissions**

| | | | |
|---|---|---|---|
| Total floor area | 122.1 | $m^2$ | |
| DER | 18.85 | $kgCO_2/yr/m^2$ | |
| $CO_2$ emissions from electrical appliances | 13.97 | $kgCO_2/yr/m^2$ | (ZC2) |
| $CO_2$ emissions from cooking | 1.54 | $kgCO_2/yr/m^2$ | (ZC3) |
| Standard case total $CO_2$ emissions | 34.36 | $kgCO_2/yr/m^2$ | (ZC4) |
| Net Standard case $CO_2$ emissions | 34.36 | $kgCO_2/yr/m^2$ | (ZC8) |

**Actual case $CO_2$ emissions**

| | | | |
|---|---|---|---|
| DER | 15.70 | $kgCO_2/yr/m^2$ | |
| $CO_2$ emissions from electrical appliances | 13.97 | $kgCO_2/yr/m^2$ | (ZC2) |
| $CO_2$ emissions from cooking | 1.54 | $kgCO_2/yr/m^2$ | (ZC3) |
| Actual case total $CO_2$ emissions | 31.21 | $kgCO_2/yr/m^2$ | (ZC4) |
| $CO_2$ emissions from Biomass | 0.00 | $kgCO_2/yr/m^2$ | (ZC5) |
| $CO_2$ reduction from additional allowable electricity generation | 0.00 | $kgCO_2/yr/m^2$ | (ZC7) |
| Net Actual case $CO_2$ emissions | 31.21 | $kgCO_2/yr/m^2$ | (ZC8) |
| Improvement in net actual/net standard case $CO_2$ emissions | 9 | % | |



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

| | |
|---|---|
| ENE7 credits achieved | 0 |



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

# Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Array SAP 10 program, Array

**Date:** Wed 06 Dec 2023 15:31:34

| Project Information | | | |
|---|---|---|---|
| Assessed By | Mark Rogers | Building Type | House, Detached |
| OCDEA Registration | EES/004179 | Assessment Date | 2023-12-06 |

| Dwelling Details | | | |
|---|---|---|---|
| Assessment Type | As designed | Total Floor Area | 122 $m^2$ |
| Site Reference | sc100241 P14 Bitterne Church | Plot Reference | 001 |
| Address | Bitterne Parish Church Plot 14 Whites Lane, Southampton, SO19 7NP | | |

| Client Details | |
|---|---|
| Name | Philip Dudley |
| Company | Vivid Design Studio |
| Address | NA, NA, NA |

**This report covers items included within the SAP calculations. It is not a complete report of regulations compliance.**

| 1a Target emission rate and dwelling emission rate | | |
|---|---|---|
| Fuel for main heating system | Electricity | |
| *Target carbon dioxide emission rate* | *10.56 $kgCO_2/m^2$* | |
| Dwelling carbon dioxide emission rate | 3.87 $kgCO_2/m^2$ | OK |
| **1b Target primary energy rate and dwelling primary energy** | | |
| *Target primary energy* | *55.28 $kWh_{PE}/m^2$* | |
| Dwelling primary energy | 40.12 $kWh_{PE}/m^2$ | OK |
| **1c Target fabric energy efficiency and dwelling fabric energy efficiency** | | |
| *Target fabric energy efficiency* | *41.3 $kWh/m^2$* | |
| Dwelling fabric energy efficiency | 40.1 $kWh/m^2$ | OK |

| 2a Fabric U-values | | | | |
|---|---|---|---|---|
| **Element** | ***Maximum permitted average U-Value [$W/m^2K$]*** | **Dwelling average U-Value [$W/m^2K$]** | **Element with highest individual U-Value** | |
| External walls | *0.26* | 0.22 | Walls (1) (0.22) | OK |
| Party walls | *0.2* | N/A | N/A | **N/A** |
| Curtain walls | *1.6* | N/A | N/A | **N/A** |
| Floors | *0.18* | 0.12 | Ground Floor (0.12) | OK |
| Roofs | *0.16* | 0.09 | Roof (1) (0.09) | OK |
| Windows, doors, and roof windows | *1.6* | 1.2 | Front West Door (1.2) | OK |
| Rooflights | *2.2* | N/A | N/A | **N/A** |

| 2b Envelope elements (better than typically expected values are flagged with a subsequent (!)) | | |
|---|---|---|
| **Name** | **Net area [$m^2$]** | **U-Value [$W/m^2K$]** |
| Exposed wall: Walls (1) | 137.21 | 0.22 |
| Exposed wall: Walls (2) | 8.59 | 0.21 |
| Ground floor: Ground Floor, Ground Floor | 61.05 | 0.12 |
| Exposed roof: Roof (1) | 61.05 | 0.09 **(!)** |

| 2c Openings (better than typically expected values are flagged with a subsequent (!)) | | | | |
|---|---|---|---|---|
| **Name** | **Area [$m^2$]** | **Orientation** | **Frame factor** | **U-Value [$W/m^2K$]** |
| Front West Door, New Dwell Entrance Door | 2.01 | East | N/A | 1.2 |
| Front West Windows, New Dwelling DG Window | 4.41 | East | 0.7 | 1.2 |
| Front West Window, New Dwelling DG Window | 1.9 | East | 0.7 | 1.2 |
| Side South Windows, New Dwelling DG Window | 1.8 | South | 0.7 | 1.2 |
| Rear East Windows, New Dwelling DG Window | 4.92 | West | 0.7 | 1.2 |
| Rear West Windows, New Dwell DG French Doors | 3.35 | West | 0.7 | 1.2 |

| Name | Area [$m^2$] | Orientation | Frame factor | U-Value [$W/m^2K$] |
|---|---|---|---|---|
| Side South Door, New Dwell Entrance Door | 1.95 | South | N/A | 1.2 |

| 2d Thermal bridging (better than typically expected values are flagged with a subsequent (!)) | | | | |
|---|---|---|---|---|
| Building part **1 - Main Dwelling**: Thermal bridging calculated from linear thermal transmittances for each junction | | | | |
| **Main element** | **Junction detail** | **Source** | **Psi value [W/mK]** | **Drawing / reference** |
| External wall | E2: Other lintels (including other steel lintels) | Calculated by person with suitable expertise | 0.05 | IG or Keystone Hi Therm + |
| External wall | E3: Sill | Calculated by person with suitable expertise | 0.018 **(!)** | Recognised Construction Detail |
| External wall | E4: Jamb | Calculated by person with suitable expertise | 0.014 **(!)** | Recognised Construction Detail |
| External wall | E5: Ground floor (normal) | Calculated by person with suitable expertise | 0.068 | Recognised Construction Detail |
| External wall | E6: Intermediate floor within a dwelling | Calculated by person with suitable expertise | 0.001 **(!)** | Recognised Construction Detail |
| External wall | E10: Eaves (insulation at ceiling level) | Calculated by person with suitable expertise | 0.055 | Recognised Construction Detail |
| External wall | E12: Gable (insulation at ceiling level) | Calculated by person with suitable expertise | 0.058 | Recognised Construction Detail |
| External wall | E16: Corner (normal) | Calculated by person with suitable expertise | 0.051 | Recognised Construction Detail |
| External wall | E17: Corner (inverted - internal area greater than external area) | Calculated by person with suitable expertise | -0.1 | Recognised Construction Detail |

| 3 Air permeability (better than typically expected values are flagged with a subsequent (!)) | | |
|---|---|---|
| *Maximum permitted air permeability at 50Pa* | *8 $m^3/hm^2$* | |
| Dwelling air permeability at 50Pa | 5.05 $m^3/hm^2$, Design value | OK |
| Air permeability test certificate reference | | |

| 4 Space heating | |
|---|---|
| **Main heating system 1**: Heat pump with radiators or underfloor heating - Electricity | |
| Efficiency | 242.1% |
| Emitter type | Radiators |
| Flow temperature | 55°C |
| System type | Heat Pump |
| Manufacturer | Daikin Europe NV |
| Model | EDLA06EV3 |
| Commissioning | |
| **Secondary heating system**: N/A | |
| Fuel | N/A |
| Efficiency | N/A |
| Commissioning | |

| 5 Hot water | |
|---|---|
| **Cylinder/store** - type: Cylinder | |
| Capacity | 210 litres |
| Declared heat loss | 1.5 kWh/day |
| Primary pipework insulated | Yes |
| Manufacturer | |
| Model | |
| Commissioning | |
| **Waste water heat recovery system 1** - type: N/A | |
| Efficiency | |
| Manufacturer | |
| Model | |

| 6 Controls | | |
|---|---|---|
| **Main heating 1** - type: Time and temperature zone control by arrangement of plumbing and electrical services | | |
| Function | | |
| Ecodesign class | | |
| Manufacturer | | |
| Model | | |
| **Water heating** - type: Cylinder thermostat and HW separately timed | | |
| Manufacturer | | |
| Model | | |

| 7 Lighting | | |
|---|---|---|
| *Minimum permitted light source efficacy* | *75 lm/W* | |
| Lowest light source efficacy | 75 lm/W | **OK** |
| External lights control | N/A | |

| 8 Mechanical ventilation | | |
|---|---|---|
| **System type:** N/A | | |
| *Maximum permitted specific fan power* | *N/A* | |
| Specific fan power | N/A | **N/A** |
| *Minimum permitted heat recovery efficiency* | *N/A* | |
| Heat recovery efficiency | N/A | **N/A** |
| Manufacturer/Model | | |
| Commissioning | | |

| 9 Local generation |
|---|
| N/A |

| 10 Heat networks |
|---|
| N/A |

| 11 Supporting documentary evidence |
|---|
| N/A |

| 12 Declarations | |
|---|---|
| **a. Assessor Declaration** | |
| This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report. | |
| Signed:<br><br>Name: | Assessor ID:<br><br>Date: |
| **b. Client Declaration** | |
| N/A | |

# Predicted Energy Assessment

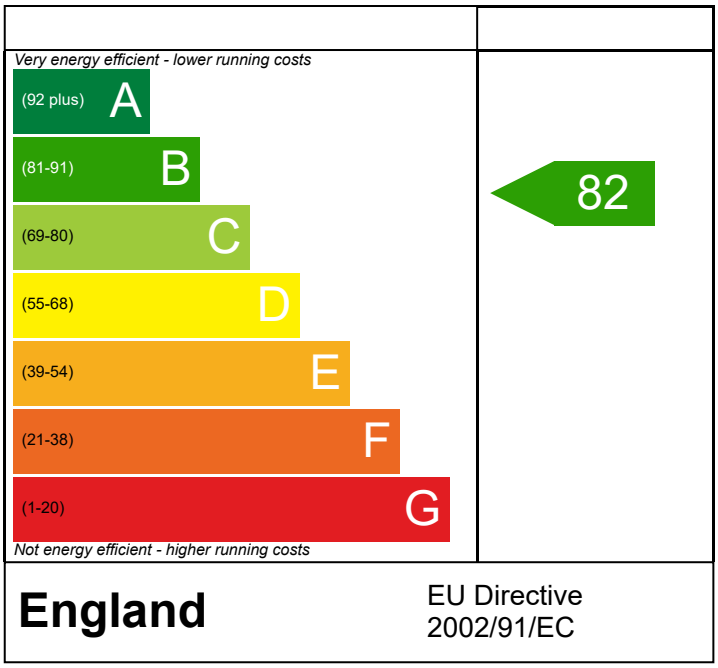
Plot 14, Bitterne Parish Church, Whites Lane,
Southampton, Hampshire , SO19 7NP

| | |
|---|---|
| Dwelling type: | House, Detached |
| Date of assessment: | 06/12/2023 |
| Produced by: | Mark Rogers |
| Total floor area: | 122.1 m² |
| DRRN: | 1866-2492-0874 |

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

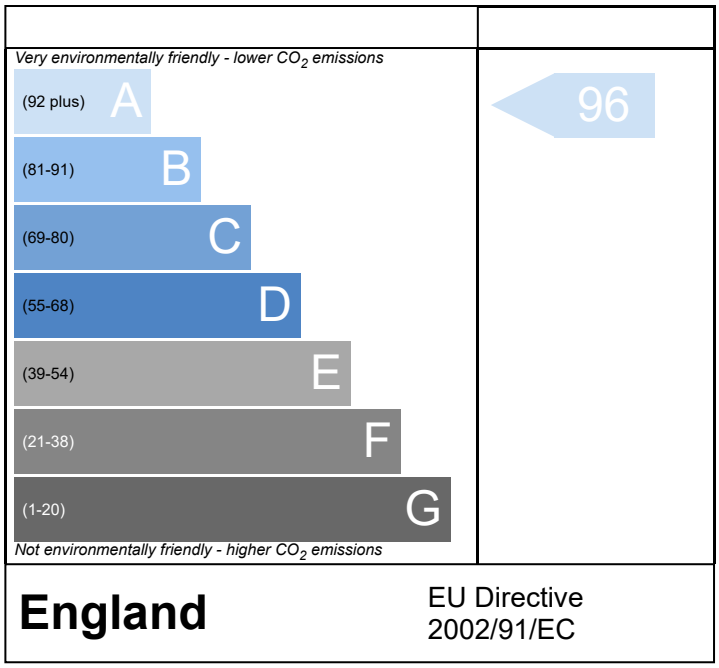
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

## Energy Efficiency Rating




The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

## Environmental Impact ($CO_2$) Rating




The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide ($CO_2$) emissions. The higher the rating the less impact it has on the environment.

# Summary for Input Data

elmhurst energy

| | | | |
|---|---|---|---|
| **Property Reference** | sc100241 P14 Bitterne Church | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling |
| **Property** | Plot 14, Bitterne Parish Church, Whites Lane, Southampton, Hampshire , SO19 7NP | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 82 B | **DER** | 3.87 | **TER** | 10.56 |
| **Environmental** | 96 A | **% DER < TER** | | | 63.35 |
| **$CO_2$ Emissions (t/year)** | 0.39 | **DFEE** | 40.08 | **TFEE** | 41.35 |
| **Compliance Check** | See BREL | **% DFEE < TFEE** | | | 3.07 |
| **% DPER < TPER** | 27.42 | **DPER** | 40.12 | **TPER** | 55.28 |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Philip Dudley | | |

## SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

| | |
|---|---|
| **Orientation** | East |
| **Property Tenture** | ND |
| **Transaction Type** | 6 |
| **Terrain Type** | Suburban |
| **1.0 Property Type** | House, Detached |
| **2.0 Number of Storeys** | 2 |
| **3.0 Date Built** | 2023 |
| **4.0 Sheltered Sides** | 1 |
| **5.0 Sunlight/Shade** | Average or unknown |
| **6.0 Thermal Mass Parameter** | Precise calculation |
| **7.0 Electricity Tariff** | Standard |
| Smart electricity meter fitted | No |
| Smart gas meter fitted | No |

**7.0 Measurements**

| | Heat Loss Perimeter | Internal Floor Area | Average Storey Height |
|---|---|---|---|
| **Ground floor:** | 32.26 m | 61.05 m² | 2.39 m |
| **1st Storey:** | 32.26 m | 61.05 m² | 2.76 m |

**8.0 Living Area** 15.46 m²

**9.0 External Walls**

| Description | Type | Construction | U-Value (W/m²K) | Kappa (kJ/m²K) | Gross Area(m²) | Nett Area (m²) | Shelter Res | Shelter | Openings | Area Calculation Type |
|---|---|---|---|---|---|---|---|---|---|---|
| External Cavity Wall | Cavity Wall | Cavity wall; plasterboard on dabs or battens, lightweight aggregate block, filled cavity, any outside structure | 0.22 | 110.00 | 155.65 | 137.21 | 0.00 | None | 18.44 | Calculate Wall Area |
| External Tile Hung Wall | Cavity Wall | Cavity wall; plasterboard on dabs or battens, lightweight aggregate block, filled cavity, any outside structure | 0.21 | 110.00 | 10.49 | 8.59 | 0.00 | None | 1.90 | Enter Gross Area |

**9.1 Party Walls**

| Description | Type | Construction | U-Value (W/m²K) | Kappa (kJ/m²K) | Area (m²) | Shelter Res | Shelter |
|---|---|---|---|---|---|---|---|
| Party Wall | Filled Cavity with Edge Sealing | Single plasterboard on dabs both sides, lightweight aggregate blocks, cavity or cavity fill | 0.00 | 110.00 | 47.38 | | None |

**9.2 Internal Walls**

| Description | Construction | Kappa (kJ/m²K) | Area (m²) |
|---|---|---|---|
| Internal Stud Walls | Plasterboard on timber frame | 9.00 | 180.27 |
| Internal Block Walls | Dense block, plasterboard on dabs | 75.00 | 68.12 |

**10.0 External Roofs**

| Description | Type | Construction | U-Value (W/m²K) | Kappa (kJ/m²K) | Gross Area(m²) | Nett Area (m²) | Shelter Code | Shelter Factor | Calculation Type | Openings |
|---|---|---|---|---|---|---|---|---|---|---|
| External Pitched Roofs | External Plane Roof | Plasterboard, insulated at ceiling level | 0.09 | 9.00 | 61.05 | 61.05 | None | 0.00 | Calculate Wall Area | 0.00 |

**10.2 Internal Ceilings**

| Description | Storey | Construction | Area (m²) |
|---|---|---|---|
| Internal Ceiling | Lowest occupied | Plasterboard ceiling, carpeted chipboard floor | 61.05 |

# Summary for Input Data

elmhurst energy

### 11.0 Heat Loss Floors

| Description | Type | Storey Index | Construction | U-Value (W/m²K) | Shelter Code | Shelter Factor | Kappa (kJ/m²K) | Area (m²) |
|---|---|---|---|---|---|---|---|---|
| Ground Floor | Ground Floor - Solid | Lowest occupied | Suspended concrete floor, carpeted | 0.12 | None | 0.00 | 75.00 | 61.05 |

### 11.2 Internal Floors

| Description | Storey Index | Construction | Kappa (kJ/m²K) | Area (m²) |
|---|---|---|---|---|
| Internal Floor | | Plasterboard ceiling, carpeted chipboard floor | 9.00 | 61.05 |

### 12.0 Opening Types

| Description | Data Source | Type | Glazing | Glazing Gap | Filling Type | G-value | Frame Type | Frame Factor | U Value (W/m²K) |
|---|---|---|---|---|---|---|---|---|---|
| New Dwell Entrance Door | Manufacturer | Half Glazed Door | Double Low-E Soft 0.05 | | | 0.36 | | 0.70 | 1.20 |
| New Dwell DG French Doors | Manufacturer | Window | Double Low-E Soft 0.05 | | | 0.71 | | 0.70 | 1.20 |
| New Dwelling DG Window | Manufacturer | Window | Double Low-E Soft 0.05 | | | 0.71 | | 0.70 | 1.20 |

### 13.0 Openings

| Name | Opening Type | Location | Orientation | Area (m²) | Pitch |
|---|---|---|---|---|---|
| Front West Door | New Dwell Entrance Door | External Cavity Wall | East | 2.01 | |
| Front West Windows | New Dwelling DG Window | External Cavity Wall | East | 4.41 | |
| Front West Window | New Dwelling DG Window | External Tile Hung Wall | East | 1.90 | |
| Side South Windows | New Dwelling DG Window | External Cavity Wall | South | 1.80 | |
| Rear East Windows | New Dwelling DG Window | External Cavity Wall | West | 4.92 | |
| Rear West Windows | New Dwell DG French Doors | External Cavity Wall | West | 3.35 | |
| Side South Door | New Dwell Entrance Door | External Cavity Wall | South | 1.95 | |

| | | |
|---|---|---|
| **14.0 Conservatory** | None | |
| **15.0 Draught Proofing** | 100 | % |
| **16.0 Draught Lobby** | No | |
| **17.0 Thermal Bridging** | Calculate Bridges | |

### 17.1 List of Bridges

| Bridge Type | Source Type | Length | Psi | Adjusted | Reference: | Imported |
|---|---|---|---|---|---|---|
| E2 Other lintels (including other steel lintels) | Independently assessed | 14.53 | 0.05 | 0.05 | IG or Keystone Hi Therm + | No |
| E3 Sill | Independently assessed | 13.57 | 0.02 | 0.02 | Recognised Construction Detail | No |
| E4 Jamb | Independently assessed | 33.30 | 0.01 | 0.01 | Recognised Construction Detail | No |
| E5 Ground floor (normal) | Independently assessed | 32.26 | 0.07 | 0.07 | Recognised Construction Detail | No |
| E6 Intermediate floor within a dwelling | Independently assessed | 32.26 | 0.00 | 0.00 | Recognised Construction Detail | No |
| E10 Eaves (insulation at ceiling level) | Independently assessed | 29.36 | 0.06 | 0.06 | Recognised Construction Detail | No |
| E12 Gable (insulation at ceiling level) | Independently assessed | 2.90 | 0.06 | 0.06 | Recognised Construction Detail | No |
| E16 Corner (normal) | Independently assessed | 25.38 | 0.05 | 0.05 | Recognised Construction Detail | No |
| E17 Corner (inverted – internal area greater than external area) | Independently assessed | 4.78 | -0.10 | -0.10 | Recognised Construction Detail | No |

| | | |
|---|---|---|
| Y-value | 0.00 | W/m²K |
| **18.0 Pressure Testing** | Yes | |
| Designed $AP_{50}$ | 5.05 | m³/(h.m²) @ 50 Pa |
| Test Method | Blower Door | |
| **19.0 Mechanical Ventilation** | | |
| **Mechanical Ventilation** | | |
| Mechanical Ventilation System Present | No | |
| **20.0 Fans, Open Fireplaces, Flues** | | |
| **21.0 Fixed Cooling System** | No | |
| **22.0 Lighting** | | |
| No Fixed Lighting | No | |

| Name | Efficacy | Power | Capacity | Count |
|---|---|---|---|---|
| Low energy Lighting | 75.00 | 15 | 1125 | 36 |

| | | |
|---|---|---|
| **24.0 Main Heating 1** | Database | |
| Description | Electric Air Source Heat Pump | |
| Percentage of Heat | 100.00 | % |
| Database Ref. No. | 106473 | |
| Fuel Type | Electricity | |
| In Winter | 0.00 | |
| In Summer | 0.00 | |
| Model Name | EDLA06EV3 | |

# Summary for Input Data

elmhurst energy

| | |
|---|---|
| Manufacturer | Daikin Europe NV |
| System Type | Heat Pump |
| Controls SAP Code | 2207 |
| PCDF Controls | 0 |
| Is MHS Pumped | Pump in heated space |
| Heating Pump Age | 2013 or later |
| Heat Emitter | Radiators |
| Flow Temperature | Enter value |
| Flow Temperature Value | 55.00 |

**25.0 Main Heating 2** — None

**26.0 Heat Networks** — None

| | Heat Source | Fuel Type | Heating Use | Efficiency | Percentage Of Heat | Heat | Heat Power Ratio | Electrical | Fuel Factor | Efficiency type |
|---|---|---|---|---|---|---|---|---|---|---|
| Heat source 1 | | | | | | | | | | |
| Heat source 2 | | | | | | | | | | |
| Heat source 3 | | | | | | | | | | |
| Heat source 4 | | | | | | | | | | |
| Heat source 5 | | | | | | | | | | |

**28.0 Water Heating**

| | |
|---|---|
| Water Heating | Main Heating 1 |
| SAP Code | 901 |
| Flue Gas Heat Recovery System | No |
| Waste Water Heat Recovery Instantaneous System 1 | No |
| Waste Water Heat Recovery Instantaneous System 2 | No |
| Waste Water Heat Recovery Storage System | No |
| Solar Panel | No |
| Water use <= 125 litres/person/day | Yes |
| Cold Water Source | From mains |
| Bath Count | 1 |
| Immersion Only Heating Hot Water | No |

**28.1 Showers**

| Description | Shower Type | Flow Rate [l/min] | Rated Power [kW] | Connected | Connected To |
|---|---|---|---|---|---|

**28.3 Waste Water Heat Recovery System**

| | | |
|---|---|---|
| **29.0 Hot Water Cylinder** | Hot Water Cylinder | |
| Cylinder Stat | Yes | |
| Cylinder In Heated Space | Yes | |
| Independent Time Control | Yes | |
| Insulation Type | Measured Loss | |
| Cylinder Volume | 210.00 | L |
| Loss | 1.50 | kWh/day |
| Pipes insulation | Fully insulated primary pipework | |
| In Airing Cupboard | No | |

**31.0 Thermal Store** — None

**Recommendations**

**Lower cost measures**

**None**

**Further measures to achieve even higher standards**

| Typical Cost | Typical savings per year | Ratings after improvement SAP rating | Environmental Impact |
|---|---|---|---|
| £4,000 - £6,000 | £48 | B 83 | A 96 |
| £3,500 - £5,500 | £206 | B 89 | A 97 |
| | | 0 | 0 |

# Thermal Bridging

| | | | |
|---|---|---|---|
| **Property Reference** | sc100241 P14 Bitterne Church | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | Detached House |
| **Property** | Plot 14, Bitterne Parish Church, Whites Lane, Southampton, Hampshire , SO19 7NP | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 82 B | **DER** | 3.87 | **TER** | 10.56 |
| **Environmental** | 96 A | **% DER < TER** | | | 63.35 |
| **$CO_2$ Emissions (t/year)** | 0.39 | **DFEE** | 40.08 | **TFEE** | 41.35 |
| **Compliance Check** | See BREL | **% DFEE < TFEE** | | | 3.07 |
| **% DPER < TPER** | 27.42 | **DPER** | 40.12 | **TPER** | 55.28 |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Philip Dudley | | |

| | Junction details | Source Type | Psi (W/mK) | Length (m) | Result | Reference |
|---|---|---|---|---|---|---|
| External wall | E2 Other lintels (including other steel lintels) | Independently assessed | 0.050 | 14.53 | 0.73 | IG or Keystone Hi Therm + |
| External wall | E3 Sill | Independently assessed | 0.018 | 13.57 | 0.24 | Recognised Construction Detail |
| External wall | E4 Jamb | Independently assessed | 0.014 | 33.30 | 0.47 | Recognised Construction Detail |
| External wall | E5 Ground floor (normal) | Independently assessed | 0.068 | 32.26 | 2.19 | Recognised Construction Detail |
| External wall | E6 Intermediate floor within a dwelling | Independently assessed | 0.001 | 32.26 | 0.03 | Recognised Construction Detail |
| External wall | E10 Eaves (insulation at ceiling level) | Independently assessed | 0.055 | 29.36 | 1.61 | Recognised Construction Detail |
| External wall | E12 Gable (insulation at ceiling level) | Independently assessed | 0.058 | 2.90 | 0.17 | Recognised Construction Detail |
| External wall | E16 Corner (normal) | Independently assessed | 0.051 | 25.38 | 1.29 | Recognised Construction Detail |
| External wall | E17 Corner (inverted – internal area greater than external area) | Independently assessed | -0.100 | 4.78 | -0.48 | Recognised Construction Detail |

Total: 188.34 W/mK:

Y-Value: 0.00 W/m²K:

# U-VALUE CALCULATOR REPORT

| | | | |
|---|---|---|---|
| **Property Reference** | sc121845 | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling Part L 2021 |
| **Project** | Plot 14, Bitterne Parish Church, Whites Lane, Bitterne, Southampton, Hampshire , SO19 7NP | | |
| **Calculation Type** | New Build (As Designed) | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 85 B | **DER** | 15.48 | **TER** | 25.26 |
| **Environmental** | 86 B | **% DER<TER** | 38.72 | | |
| **$CO_2$ Emissions (t/year)** | 1.53 | **DFEE** | 46.06 | **TFEE** | 57.33 |
| **General Requirements Compliance** | Pass | **% DFEE<TFEE** | 19.67 | | |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers, Surecalc Limited, Tel: 01243572695, mark@surecalc.co.uk | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Vivid Design Studio | | |

## Building Elements

### Roof 000002 - Pitched Roof Insulated Ceiling Vivid

**Roof Type: Pitched Roof, insulated flat ceiling**

| Layer | Description | Thickness (mm) | Conductivity (W/m²K) | Resistance (m²K/W) | Fraction (%) |
|---|---|---|---|---|---|
| **Ext surface** | | | | 0.0400 | |
| **Layer 1** | **Loft Space** | | | | |
| | Main construction | 0 | 0.0600 | 0.0600 | 100.00 |
| **Layer 2** | **Mineral wool** | | | | |
| | Main construction | 350 | 0.0440 | 7.9545 | 100.00 |
| | Corrections - Air Gap: Level 0, Fasteners: None or plastic | | | | |
| **Layer 3** | **Mineral wool quilt** | | | | |
| | Main construction | 150 | 0.0440 | 3.4091 | 93.67 |
| | Main construction | 150 | 0.1300 | 1.1538 | 6.33 |
| | Corrections - Air Gap: Level 0, Fasteners: None or plastic | | | | |
| **Layer 4** | **Plasterboard, standard** | | | | |
| | Main construction | 12.5 | 0.2100 | 0.0595 | 100.00 |
| **Int surface** | | | | 0.1000 | |

**Total resistance:** **Upper limit =** 11.449 m² K/W **Lower limit =** 11.248 m² K/W **Average =** 11.348 m² K/W

**Total correction =** 0.0030 m² K/W **U-value (unrounded) =** 0.09 W/m² K

**Unheated space:** None

**Total thickness: 513 mm** **U-value: 0.09 W/m² K** **Kappa: n/a**



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

# U-VALUE CALCULATOR REPORT

| | | | |
|---|---|---|---|
| **Property Reference** | sc121845 | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling Part L 2021 |
| **Project** | Plot 14, Bitterne Parish Church, Whites Lane, Bitterne, Southampton, Hampshire , SO19 7NP | | |
| **Calculation Type** | New Build (As Designed) | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 85 B | **DER** | 15.48 | **TER** | 25.26 |
| **Environmental** | 86 B | **% DER<TER** | 38.72 | | |
| **$CO_2$ Emissions (t/year)** | 1.53 | **DFEE** | 46.06 | **TFEE** | 57.33 |
| **General Requirements Compliance** | Pass | **% DFEE<TFEE** | 19.67 | | |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers, Surecalc Limited, Tel: 01243572695, mark@surecalc.co.uk | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Vivid Design Studio | | |

## Building Elements

### Wall 000001 - Vivid Cavity Wall 125 Knauf Supafil 34

**Wall Type: Standard Wall**

| Layer | Description | Thickness (mm) | Conductivity (W/m²K) | Resistance (m²K/W) | Fraction (%) |
|---|---|---|---|---|---|
| **Ext surface** | | | | 0.0400 | |
| **Layer 1** | **Brick, outer leaf** | | | | |
| | Main construction | 102 | 0.7700 | 0.1325 | 82.81 |
| | Main construction | 102 | 0.9407 | 0.1084 | 17.19 |
| **Layer 2** | **Knauf Supafil 34 blown Cavity Fill** | | | | |
| | Main construction | 125 | 0.0340 | 3.6765 | 100.00 |
| | Corrections - Air Gap: Level 0, Fasteners: Wall ties, Cross sectional area: 12.50 mm², Lambda: 17.000 W/m.K, per m²: 2.500 | | | | |
| **Layer 3** | **Masterblock Masterlite Ultra** | | | | |
| | Main construction | 100 | 0.2700 | 0.3704 | 93.43 |
| | Main construction | 100 | 0.8803 | 0.1136 | 6.57 |
| **Layer 4** | **airspace/plaster dabs** | | | | |
| | Main construction | 15 | 0.1000 | 0.1500 | 80.00 |
| | Main construction | 15 | 0.0882 | 0.1700 | 20.00 |
| | Corrections - Cavity Unventilated, Emissivity: Normal | | | | |
| **Layer 5** | **Plasterboard, standard** | | | | |
| | Main construction | 12.5 | 0.2100 | 0.0595 | 100.00 |
| **Int surface** | | | | 0.1300 | |

**Total resistance:** **Upper limit =** 4.541 m² K/W **Lower limit =** 4.510 m² K/W **Average =** 4.525 m² K/W

**Total correction =** 0.0018 m² K/W **U-value (unrounded) =** 0.22 W/m² K

**Unheated space:** None

**Total thickness: 355 mm** **U-value: 0.22 W/m² K** **Kappa: n/a**



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

# U-VALUE CALCULATOR REPORT

| | | | |
|---|---|---|---|
| **Property Reference** | sc121845 | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling Part L 2021 |
| **Project** | Plot 14, Bitterne Parish Church, Whites Lane, Bitterne, Southampton, Hampshire , SO19 7NP | | |
| **Calculation Type** | New Build (As Designed) | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 85 B | **DER** | 15.48 | **TER** | 25.26 |
| **Environmental** | 86 B | **% DER<TER** | 38.72 | | |
| **$CO_2$ Emissions (t/year)** | 1.53 | **DFEE** | 46.06 | **TFEE** | 57.33 |
| **General Requirements Compliance** | Pass | **% DFEE<TFEE** | 19.67 | | |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers, Surecalc Limited, Tel: 01243572695, mark@surecalc.co.uk | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Vivid Design Studio | | |

## Building Elements

### Wall 000004 - Vivid Cavity Wall 125 Knauf Supafil 34

**Wall Type: Standard Wall**

| Layer | Description | Thickness (mm) | Conductivity (W/m²K) | Resistance (m²K/W) | Fraction (%) |
|---|---|---|---|---|---|
| **Ext surface** | | | | 0.0400 | |
| **Layer 1** | **Tile Hanging** | | | | |
| | Main construction | 15 | 1.0000 | 0.0150 | 100.00 |
| **Layer 2** | **airspace/timber battens** | | | | |
| | Main construction | 22 | 0.1222 | 0.1800 | 89.63 |
| | Main construction | 22 | 0.1243 | 0.1770 | 10.37 |
| | Corrections - Cavity Unventilated, Emissivity: Normal | | | | |
| **Layer 3** | **Blockwork, medium** | | | | |
| | Main construction | 100 | 0.5700 | 0.1754 | 93.43 |
| | Main construction | 100 | 0.8803 | 0.1136 | 6.57 |
| **Layer 4** | **Knauf Supafil 34 blown Cavity Fill** | | | | |
| | Main construction | 125 | 0.0340 | 3.6765 | 100.00 |
| | Corrections - Air Gap: Level 0, Fasteners: Wall ties, Cross sectional area: 12.50 mm², Lambda: 17.000 W/m.K, per m²: 2.500 | | | | |
| **Layer 5** | **Masterblock Masterlite Ultra** | | | | |
| | Main construction | 100 | 0.2700 | 0.3704 | 93.43 |
| | Main construction | 100 | 0.8803 | 0.1136 | 6.57 |
| **Layer 6** | **airspace/plaster dabs** | | | | |
| | Main construction | 15 | 0.1000 | 0.1500 | 80.00 |
| | Main construction | 15 | 0.0882 | 0.1700 | 20.00 |
| | Corrections - Cavity Unventilated, Emissivity: Normal | | | | |
| **Layer 7** | **Plasterboard, standard** | | | | |
| | Main construction | 12.5 | 0.2100 | 0.0595 | 100.00 |
| **Int surface** | | | | 0.1300 | |

**Total resistance:** **Upper limit =** 4.779 m² K/W **Lower limit =** 4.746 m² K/W **Average =** 4.762 m² K/W

**Total correction =** 0.0016 m² K/W **U-value (unrounded) =** 0.21 W/m² K

**Unheated space:** None

**Total thickness: 390 mm** **U-value: 0.21 W/m² K** **Kappa: n/a**



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

# U-VALUE CALCULATOR REPORT

| | | | |
|---|---|---|---|
| **Property Reference** | sc121845 | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling Part L 2021 |
| **Project** | Plot 14, Bitterne Parish Church, Whites Lane, Bitterne, Southampton, Hampshire , SO19 7NP | | |
| **Calculation Type** | New Build (As Designed) | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 85 B | **DER** | 15.48 | **TER** | 25.26 |
| **Environmental** | 86 B | **% DER<TER** | 38.72 | | |
| **$CO_2$ Emissions (t/year)** | 1.53 | **DFEE** | 46.06 | **TFEE** | 57.33 |
| **General Requirements Compliance** | Pass | **% DFEE<TFEE** | 19.67 | | |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers, Surecalc Limited, Tel: 01243572695, mark@surecalc.co.uk | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Vivid Design Studio | | |

## Building Elements

### Floor 000003 - Ground Floor Beam and Block

**Floor Type: Suspended Floor**
**Area = 61.05 m², Perimeter = 32.26 m, Wall thickness = 300.00 mm, Soil: Unknown**
**Depth of underfloor space below ground:0.200 m  Floor wind shielding: Average (suburban)**
**Floor height above ground:h = 0.150 m**
**U-value of walls above ground:Uw = 0.220 m**
**Ventilation openings per perimeter length:e = 0.0015 %**
**Mean wind speed:v = 5.000 m/s**
**Resistance on solum:Rg = 0.000 m²K/W**

| Layer | Description | Thickness (mm) | Conductivity (W/m²K) | Resistance (m²K/W) | Fraction (%) |
|---|---|---|---|---|---|
| **Ext surface** | | | | 0.1700 | |
| **Layer 1** | **Blockwork** | | | | |
| | Main construction | 100 | 0.1900 | 0.5263 | 90.91 |
| | Main construction | 100 | 1.0000 | 0.1000 | 9.09 |
| **Layer 2** | **Mannok Therm Floor** | | | | |
| | Main construction | 150 | 0.0220 | 6.8182 | 100.00 |
| | Corrections - Air Gap: Level 1, Fasteners: None or plastic | | | | |
| **Layer 3** | **Screed** | | | | |
| | Main construction | 75 | 1.1500 | 0.0652 | 100.00 |
| **Int surface** | | | | 0.1700 | |

**Total resistance:** **Upper limit =** 7.709 m² K/W **Lower limit =** 7.603 m² K/W **Average =** 7.656 m² K/W

**Total correction =** 0.0079 m² K/W **U-value (unrounded) =** 0.12 W/m² K

**Unheated space:** None

**Total thickness: 325 mm** **U-value: 0.12 W/m² K** **Kappa: n/a**



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

elmhurst energy

# SAP Report Submission for Building Regulations Compliance

Client: Vivid Design Studio

Project: Plot 15, Bitterne Parish Church, Whites Lane
Bitterne, Southampton, Hampshire , SO19 7NP

Contact: Mark Rogers
Surecalc Limited
mark@surecalc.co.uk

Report Issue Date: 06/12/2023

EXCELLENCE IN ENERGY ASSESSMENT

# CODE FOR SUSTAINABLE HOMES
# Calculation Type: New Build (As Designed)

| | | | |
|---|---|---|---|
| **Property Reference** | sc121846 | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling Part L 2021 |
| **Property** | Plot 15, Bitterne Parish Church, Whites Lane, Bitterne, Southampton, Hampshire , SO19 7NP | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 84 B | **DER** | 15.68 | **TER** | 25.60 |
| **Environmental** | 86 B | **% DER<TER** | 38.75 | | |
| **$CO_2$ Emissions (t/year)** | 1.55 | **DFEE** | 47.11 | **TFEE** | 58.45 |
| **General Requirements Compliance** | Pass | **% DFEE<TFEE** | 19.40 | | |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers, Surecalc Limited, Tel: 01243572695, mark@surecalc.co.uk | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Vivid Design Studio | | |

## ENE 1 - Dwelling Emission Rate calculation

| | | | |
|---|---|---|---|
| Total floor area | 122.1 | $m^2$ | |
| DER | 15.68 | $kgCO_2/yr/m^2$ | |
| TER | 25.60 | $kgCO_2/yr/m^2$ | |
| $CO_2$ emissions offset from additional allowable electricity generation | 0.00 | $kgCO_2/yr/m^2$ | (ZC7) |
| Residual $CO_2$ emissions offset from biofuel CHP | 0.00 | $kgCO_2/yr/m^2$ | (ZC5) |
| Total $CO_2$ emissions offset from SAP Section 16 allowances | 0.00 | $kgCO_2/yr/m^2$ | |
| DER accounting for SAP Section 16 allowances | 15.68 | $kgCO_2/yr/m^2$ | |
| Reduction DER/TER | 38.75 | % | |
| CfSH ENE1 credits achieved | 4.5 | | |
| CfSH ENE1 level achieved | 4 | | |

## ENE 2 – Fabric Energy Efficiency calculation

| | | | |
|---|---|---|---|
| Dwelling type | House, Detached | | |
| Fabric energy efficiency (F.E.E.) | 47.11 | $kWh/m^2/yr$ | |
| CfSH ENE2 credits achieved | 6.6 | | |
| CfSH ENE1 and 2 overall level achieved | 4 | | |

## ENE 7 – Low and Zero Carbon Technologies calculation

**Standard case $CO_2$ emissions**

| | | | |
|---|---|---|---|
| Total floor area | 122.1 | $m^2$ | |
| DER | 19.14 | $kgCO_2/yr/m^2$ | |
| $CO_2$ emissions from electrical appliances | 13.97 | $kgCO_2/yr/m^2$ | (ZC2) |
| $CO_2$ emissions from cooking | 1.54 | $kgCO_2/yr/m^2$ | (ZC3) |
| Standard case total $CO_2$ emissions | 34.65 | $kgCO_2/yr/m^2$ | (ZC4) |
| Net Standard case $CO_2$ emissions | 34.65 | $kgCO_2/yr/m^2$ | (ZC8) |

**Actual case $CO_2$ emissions**

| | | | |
|---|---|---|---|
| DER | 15.89 | $kgCO_2/yr/m^2$ | |
| $CO_2$ emissions from electrical appliances | 13.97 | $kgCO_2/yr/m^2$ | (ZC2) |
| $CO_2$ emissions from cooking | 1.54 | $kgCO_2/yr/m^2$ | (ZC3) |
| Actual case total $CO_2$ emissions | 31.40 | $kgCO_2/yr/m^2$ | (ZC4) |
| $CO_2$ emissions from Biomass | 0.00 | $kgCO_2/yr/m^2$ | (ZC5) |
| $CO_2$ reduction from additional allowable electricity generation | 0.00 | $kgCO_2/yr/m^2$ | (ZC7) |
| Net Actual case $CO_2$ emissions | 31.40 | $kgCO_2/yr/m^2$ | (ZC8) |
| Improvement in net actual/net standard case $CO_2$ emissions | 9 | % | |



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| | |
|---|---|
| ENE7 credits achieved | 0 |



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# Building Regulations England Part L (BREL) Compliance Report

Approved Document L1 2021 Edition, England assessed by Array SAP 10 program, Array

**Date:** Wed 06 Dec 2023 15:32:15

| Project Information | | | |
|---|---|---|---|
| Assessed By | Mark Rogers | Building Type | House, Detached |
| OCDEA Registration | EES/004179 | Assessment Date | 2023-12-06 |

| Dwelling Details | | | |
|---|---|---|---|
| Assessment Type | As designed | Total Floor Area | 122 $m^2$ |
| Site Reference | sc100242 P15 Bitterne Church | Plot Reference | 001 |
| Address | Bitterne Parish Church Plot 15 Whites Lane, Southampton, SO19 7NP | | |

| Client Details | |
|---|---|
| Name | Philip Dudley |
| Company | Vivid Design Studio |
| Address | NA, NA, NA |

**This report covers items included within the SAP calculations. It is not a complete report of regulations compliance.**

| 1a Target emission rate and dwelling emission rate | | |
|---|---|---|
| Fuel for main heating system | Electricity | |
| *Target carbon dioxide emission rate* | *10.86 $kgCO_2/m^2$* | |
| Dwelling carbon dioxide emission rate | 3.82 $kgCO_2/m^2$ | OK |
| **1b Target primary energy rate and dwelling primary energy** | | |
| *Target primary energy* | *56.87 $kWh_{PE}/m^2$* | |
| Dwelling primary energy | 39.61 $kWh_{PE}/m^2$ | OK |
| **1c Target fabric energy efficiency and dwelling fabric energy efficiency** | | |
| *Target fabric energy efficiency* | *42.2 $kWh/m^2$* | |
| Dwelling fabric energy efficiency | 41.0 $kWh/m^2$ | OK |

| 2a Fabric U-values | | | | |
|---|---|---|---|---|
| **Element** | ***Maximum permitted average U-Value [$W/m^2K$]*** | **Dwelling average U-Value [$W/m^2K$]** | **Element with highest individual U-Value** | |
| External walls | *0.26* | 0.22 | Walls (1) (0.22) | OK |
| Party walls | *0.2* | N/A | N/A | **N/A** |
| Curtain walls | *1.6* | N/A | N/A | **N/A** |
| Floors | *0.18* | 0.12 | Ground Floor (0.12) | OK |
| Roofs | *0.16* | 0.09 | Roof (1) (0.09) | OK |
| Windows, doors, and roof windows | *1.6* | 1.2 | Front West Door (1.2) | OK |
| Rooflights | *2.2* | N/A | N/A | **N/A** |

| 2b Envelope elements (better than typically expected values are flagged with a subsequent (!)) | | |
|---|---|---|
| **Name** | **Net area [$m^2$]** | **U-Value [$W/m^2K$]** |
| Exposed wall: Walls (1) | 137.21 | 0.22 |
| Exposed wall: Walls (2) | 8.59 | 0.21 |
| Ground floor: Ground Floor, Ground Floor | 61.05 | 0.12 |
| Exposed roof: Roof (1) | 61.05 | 0.09 **(!)** |

| 2c Openings (better than typically expected values are flagged with a subsequent (!)) | | | | |
|---|---|---|---|---|
| **Name** | **Area [$m^2$]** | **Orientation** | **Frame factor** | **U-Value [$W/m^2K$]** |
| Front West Door, New Dwell Entrance Door | 2.01 | East | N/A | 1.2 |
| Front West Windows, New Dwelling DG Window | 4.41 | East | 0.7 | 1.2 |
| Front West Window, New Dwelling DG Window | 1.9 | East | 0.7 | 1.2 |
| Side North Windows, New Dwelling DG Window | 1.8 | North | 0.7 | 1.2 |
| Rear East Windows, New Dwelling DG Window | 4.92 | West | 0.7 | 1.2 |
| Rear West Windows, New Dwell DG French Doors | 3.35 | West | 0.7 | 1.2 |

| Name | Area [$m^2$] | Orientation | Frame factor | U-Value [$W/m^2K$] |
|---|---|---|---|---|
| Side North Door, New Dwell Entrance Door | 1.95 | North | N/A | 1.2 |

| 2d Thermal bridging (better than typically expected values are flagged with a subsequent (!)) | | | | |
|---|---|---|---|---|
| Building part **1 - Main Dwelling**: Thermal bridging calculated from linear thermal transmittances for each junction | | | | |
| **Main element** | **Junction detail** | **Source** | **Psi value [W/mK]** | **Drawing / reference** |
| External wall | E2: Other lintels (including other steel lintels) | Calculated by person with suitable expertise | 0.05 | IG or Keystone Hi Therm + |
| External wall | E3: Sill | Calculated by person with suitable expertise | 0.018 **(!)** | Recognised Construction Detail |
| External wall | E4: Jamb | Calculated by person with suitable expertise | 0.014 **(!)** | Recognised Construction Detail |
| External wall | E5: Ground floor (normal) | Calculated by person with suitable expertise | 0.068 | Recognised Construction Detail |
| External wall | E6: Intermediate floor within a dwelling | Calculated by person with suitable expertise | 0.001 **(!)** | Recognised Construction Detail |
| External wall | E10: Eaves (insulation at ceiling level) | Calculated by person with suitable expertise | 0.055 | Recognised Construction Detail |
| External wall | E12: Gable (insulation at ceiling level) | Calculated by person with suitable expertise | 0.058 | Recognised Construction Detail |
| External wall | E16: Corner (normal) | Calculated by person with suitable expertise | 0.051 | Recognised Construction Detail |
| External wall | E17: Corner (inverted - internal area greater than external area) | Calculated by person with suitable expertise | -0.1 | Recognised Construction Detail |

| 3 Air permeability (better than typically expected values are flagged with a subsequent (!)) | | |
|---|---|---|
| *Maximum permitted air permeability at 50Pa* | *8 $m^3/hm^2$* | |
| Dwelling air permeability at 50Pa | 5.05 $m^3/hm^2$, Design value | OK |
| Air permeability test certificate reference | | |

| 4 Space heating | |
|---|---|
| **Main heating system 1**: Heat pump with radiators or underfloor heating - Electricity | |
| Efficiency | 242.1% |
| Emitter type | Radiators |
| Flow temperature | 55°C |
| System type | Heat Pump |
| Manufacturer | Daikin Europe NV |
| Model | EDLA06EV3 |
| Commissioning | |
| **Secondary heating system**: N/A | |
| Fuel | N/A |
| Efficiency | N/A |
| Commissioning | |

| 5 Hot water | |
|---|---|
| **Cylinder/store** - type: Cylinder | |
| Capacity | 210 litres |
| Declared heat loss | 1.5 kWh/day |
| Primary pipework insulated | Yes |
| Manufacturer | |
| Model | |
| Commissioning | |
| **Waste water heat recovery system 1** - type: N/A | |
| Efficiency | |
| Manufacturer | |
| Model | |

| 6 Controls | | |
|---|---|---|
| **Main heating 1** - type: Time and temperature zone control by arrangement of plumbing and electrical services | | |
| Function | | |
| Ecodesign class | | |
| Manufacturer | | |
| Model | | |
| **Water heating** - type: Cylinder thermostat and HW separately timed | | |
| Manufacturer | | |
| Model | | |

| 7 Lighting | | |
|---|---|---|
| *Minimum permitted light source efficacy* | *75 lm/W* | |
| Lowest light source efficacy | 75 lm/W | **OK** |
| External lights control | N/A | |

| 8 Mechanical ventilation | | |
|---|---|---|
| **System type:** N/A | | |
| *Maximum permitted specific fan power* | *N/A* | |
| Specific fan power | N/A | **N/A** |
| *Minimum permitted heat recovery efficiency* | *N/A* | |
| Heat recovery efficiency | N/A | **N/A** |
| Manufacturer/Model | | |
| Commissioning | | |

| 9 Local generation |
|---|
| N/A |

| 10 Heat networks |
|---|
| N/A |

| 11 Supporting documentary evidence |
|---|
| N/A |

| 12 Declarations | |
|---|---|
| **a. Assessor Declaration** | |
| This declaration by the assessor is confirmation that the contents of this BREL Compliance Report are a true and accurate reflection based upon the design information submitted for this dwelling for the purpose of carrying out the "As designed" assessment, and that the supporting documentary evidence (SAP Conventions, Appendix 1 (documentary evidence) schedules the minimum documentary evidence required) has been reviewed in the course of preparing this BREL Compliance Report. | |
| Signed:<br><br>Name: | Assessor ID:<br><br>Date: |
| **b. Client Declaration** | |
| N/A | |

# Predicted Energy Assessment

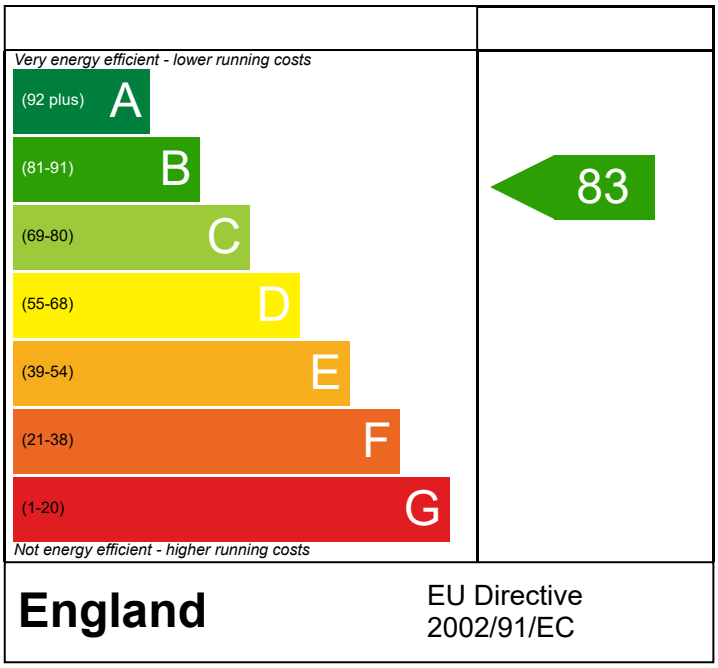
Plot 15, Bitterne Parish Church, Whites Lane,
Southampton, Hampshire , SO19 7NP

| | |
|---|---|
| Dwelling type: | House, Detached |
| Date of assessment: | 06/12/2023 |
| Produced by: | Mark Rogers |
| Total floor area: | 122.1 m² |
| DRRN: | 7056-2992-0270 |

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

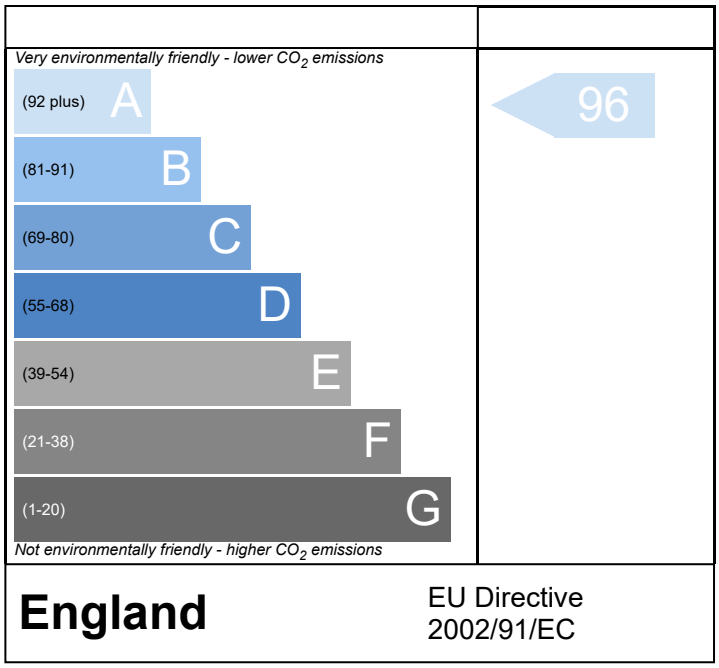
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

## Energy Efficiency Rating




The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

## Environmental Impact ($CO_2$) Rating




The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide ($CO_2$) emissions. The higher the rating the less impact it has on the environment.

# Summary for Input Data

elmhurst energy

| | | | |
|---|---|---|---|
| **Property Reference** | sc100242 P15 Bitterne Church | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling |
| **Property** | Plot 15, Bitterne Parish Church, Whites Lane, Southampton, Hampshire , SO19 7NP | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 83 B | **DER** | 3.82 | **TER** | 10.86 |
| **Environmental** | 96 A | **% DER < TER** | | | 64.83 |
| **$CO_2$ Emissions (t/year)** | 0.38 | **DFEE** | 41.04 | **TFEE** | 42.23 |
| **Compliance Check** | See BREL | **% DFEE < TFEE** | | | 2.82 |
| **% DPER < TPER** | 30.36 | **DPER** | 39.61 | **TPER** | 56.87 |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Philip Dudley | | |

## SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

| | |
|---|---|
| **Orientation** | East |
| **Property Tenture** | ND |
| **Transaction Type** | 6 |
| **Terrain Type** | Suburban |
| **1.0 Property Type** | House, Detached |
| **2.0 Number of Storeys** | 2 |
| **3.0 Date Built** | 2023 |
| **4.0 Sheltered Sides** | 1 |
| **5.0 Sunlight/Shade** | Average or unknown |
| **6.0 Thermal Mass Parameter** | Precise calculation |
| **7.0 Electricity Tariff** | Standard |
| Smart electricity meter fitted | No |
| Smart gas meter fitted | No |

**7.0 Measurements**

| | Heat Loss Perimeter | Internal Floor Area | Average Storey Height |
|---|---|---|---|
| **Ground floor:** | 32.26 m | 61.05 m² | 2.39 m |
| **1st Storey:** | 32.26 m | 61.05 m² | 2.76 m |

**8.0 Living Area** 15.46 m²

**9.0 External Walls**

| Description | Type | Construction | U-Value (W/m²K) | Kappa (kJ/m²K) | Gross Area(m²) | Nett Area (m²) | Shelter Res | Shelter | Openings | Area Calculation Type |
|---|---|---|---|---|---|---|---|---|---|---|
| External Cavity Wall | Cavity Wall | Cavity wall; plasterboard on dabs or battens, lightweight aggregate block, filled cavity, any outside structure | 0.22 | 110.00 | 155.65 | 137.21 | 0.00 | None | 18.44 | Calculate Wall Area |
| External Tile Hung Wall | Cavity Wall | Cavity wall; plasterboard on dabs or battens, lightweight aggregate block, filled cavity, any outside structure | 0.21 | 110.00 | 10.49 | 8.59 | 0.00 | None | 1.90 | Enter Gross Area |

**9.1 Party Walls**

| Description | Type | Construction | U-Value (W/m²K) | Kappa (kJ/m²K) | Area (m²) | Shelter Res | Shelter |
|---|---|---|---|---|---|---|---|
| Party Wall | Filled Cavity with Edge Sealing | Single plasterboard on dabs both sides, lightweight aggregate blocks, cavity or cavity fill | 0.00 | 110.00 | 47.38 | | None |

**9.2 Internal Walls**

| Description | Construction | Kappa (kJ/m²K) | Area (m²) |
|---|---|---|---|
| Internal Stud Walls | Plasterboard on timber frame | 9.00 | 180.27 |
| Internal Block Walls | Dense block, plasterboard on dabs | 75.00 | 68.12 |

**10.0 External Roofs**

| Description | Type | Construction | U-Value (W/m²K) | Kappa (kJ/m²K) | Gross Area(m²) | Nett Area (m²) | Shelter Code | Shelter Factor | Calculation Type | Openings |
|---|---|---|---|---|---|---|---|---|---|---|
| External Pitched Roofs | External Plane Roof | Plasterboard, insulated at ceiling level | 0.09 | 9.00 | 61.05 | 61.05 | None | 0.00 | Calculate Wall Area | 0.00 |

**10.2 Internal Ceilings**

| Description | Storey | Construction | Area (m²) |
|---|---|---|---|
| Internal Ceiling | Lowest occupied | Plasterboard ceiling, carpeted chipboard floor | 61.05 |

# Summary for Input Data

elmhurst energy

### 11.0 Heat Loss Floors

| Description | Type | Storey Index | Construction | U-Value (W/m²K) | Shelter Code | Shelter Factor | Kappa (kJ/m²K) | Area (m²) |
|---|---|---|---|---|---|---|---|---|
| Ground Floor | Ground Floor - Solid | Lowest occupied | Suspended concrete floor, carpeted | 0.12 | None | 0.00 | 75.00 | 61.05 |

### 11.2 Internal Floors

| Description | Storey Index | Construction | Kappa (kJ/m²K) | Area (m²) |
|---|---|---|---|---|
| Internal Floor | | Plasterboard ceiling, carpeted chipboard floor | 9.00 | 61.05 |

### 12.0 Opening Types

| Description | Data Source | Type | Glazing | Glazing Gap | Filling Type | G-value | Frame Type | Frame Factor | U Value (W/m²K) |
|---|---|---|---|---|---|---|---|---|---|
| New Dwell Entrance Door | Manufacturer | Half Glazed Door | Double Low-E Soft 0.05 | | | 0.36 | | 0.70 | 1.20 |
| New Dwell DG French Doors | Manufacturer | Window | Double Low-E Soft 0.05 | | | 0.71 | | 0.70 | 1.20 |
| New Dwelling DG Window | Manufacturer | Window | Double Low-E Soft 0.05 | | | 0.71 | | 0.70 | 1.20 |

### 13.0 Openings

| Name | Opening Type | Location | Orientation | Area (m²) | Pitch |
|---|---|---|---|---|---|
| Front West Door | New Dwell Entrance Door | External Cavity Wall | East | 2.01 | |
| Front West Windows | New Dwelling DG Window | External Cavity Wall | East | 4.41 | |
| Front West Window | New Dwelling DG Window | External Tile Hung Wall | East | 1.90 | |
| Side North Windows | New Dwelling DG Window | External Cavity Wall | North | 1.80 | |
| Rear East Windows | New Dwelling DG Window | External Cavity Wall | West | 4.92 | |
| Rear West Windows | New Dwell DG French Doors | External Cavity Wall | West | 3.35 | |
| Side North Door | New Dwell Entrance Door | External Cavity Wall | North | 1.95 | |

| | | |
|---|---|---|
| **14.0 Conservatory** | None | |
| **15.0 Draught Proofing** | 100 | % |
| **16.0 Draught Lobby** | No | |
| **17.0 Thermal Bridging** | Calculate Bridges | |

### 17.1 List of Bridges

| Bridge Type | Source Type | Length | Psi | Adjusted | Reference: | Imported |
|---|---|---|---|---|---|---|
| E2 Other lintels (including other steel lintels) | Independently assessed | 14.53 | 0.05 | 0.05 | IG or Keystone Hi Therm + | No |
| E3 Sill | Independently assessed | 13.57 | 0.02 | 0.02 | Recognised Construction Detail | No |
| E4 Jamb | Independently assessed | 33.30 | 0.01 | 0.01 | Recognised Construction Detail | No |
| E5 Ground floor (normal) | Independently assessed | 32.26 | 0.07 | 0.07 | Recognised Construction Detail | No |
| E6 Intermediate floor within a dwelling | Independently assessed | 32.26 | 0.00 | 0.00 | Recognised Construction Detail | No |
| E10 Eaves (insulation at ceiling level) | Independently assessed | 29.36 | 0.06 | 0.06 | Recognised Construction Detail | No |
| E12 Gable (insulation at ceiling level) | Independently assessed | 2.90 | 0.06 | 0.06 | Recognised Construction Detail | No |
| E16 Corner (normal) | Independently assessed | 25.38 | 0.05 | 0.05 | Recognised Construction Detail | No |
| E17 Corner (inverted – internal area greater than external area) | Independently assessed | 4.78 | -0.10 | -0.10 | Recognised Construction Detail | No |

| | | |
|---|---|---|
| Y-value | 0.00 | W/m²K |
| **18.0 Pressure Testing** | Yes | |
| Designed $AP_{50}$ | 5.05 | m³/(h.m²) @ 50 Pa |
| Test Method | Blower Door | |
| **19.0 Mechanical Ventilation** | | |
| **Mechanical Ventilation** | | |
| Mechanical Ventilation System Present | No | |
| **20.0 Fans, Open Fireplaces, Flues** | | |
| **21.0 Fixed Cooling System** | No | |
| **22.0 Lighting** | | |
| No Fixed Lighting | No | |

| Name | Efficacy | Power | Capacity | Count |
|---|---|---|---|---|
| Low energy Lighting | 75.00 | 15 | 1125 | 36 |

| | | |
|---|---|---|
| **24.0 Main Heating 1** | Database | |
| Description | Electric Air Source Heat Pump | |
| Percentage of Heat | 100.00 | % |
| Database Ref. No. | 106473 | |
| Fuel Type | Electricity | |
| In Winter | 0.00 | |
| In Summer | 0.00 | |
| Model Name | EDLA06EV3 | |

# Summary for Input Data

elmhurst energy

| | | |
|---|---|---|
| Manufacturer | Daikin Europe NV | |
| System Type | Heat Pump | |
| Controls SAP Code | 2207 | |
| PCDF Controls | 0 | |
| Is MHS Pumped | Pump in heated space | |
| Heating Pump Age | 2013 or later | |
| Heat Emitter | Radiators | |
| Flow Temperature | Enter value | |
| Flow Temperature Value | 55.00 | |
| **25.0 Main Heating 2** | None | |
| **26.0 Heat Networks** | None | |

| | Heat Source | Fuel Type | Heating Use | Efficiency | Percentage Of Heat | Heat | Heat Power Ratio | Electrical | Fuel Factor | Efficiency type |
|---|---|---|---|---|---|---|---|---|---|---|
| Heat source 1 | | | | | | | | | | |
| Heat source 2 | | | | | | | | | | |
| Heat source 3 | | | | | | | | | | |
| Heat source 4 | | | | | | | | | | |
| Heat source 5 | | | | | | | | | | |

**28.0 Water Heating**

| | | |
|---|---|---|
| Water Heating | Main Heating 1 | |
| SAP Code | 901 | |
| Flue Gas Heat Recovery System | No | |
| Waste Water Heat Recovery Instantaneous System 1 | No | |
| Waste Water Heat Recovery Instantaneous System 2 | No | |
| Waste Water Heat Recovery Storage System | No | |
| Solar Panel | No | |
| Water use <= 125 litres/person/day | Yes | |
| Cold Water Source | From mains | |
| Bath Count | 1 | |
| Immersion Only Heating Hot Water | No | |
| **28.3 Waste Water Heat Recovery System** | | |
| **29.0 Hot Water Cylinder** | Hot Water Cylinder | |
| Cylinder Stat | Yes | |
| Cylinder In Heated Space | Yes | |
| Independent Time Control | Yes | |
| Insulation Type | Measured Loss | |
| Cylinder Volume | 210.00 | L |
| Loss | 1.50 | kWh/day |
| Pipes insulation | Fully insulated primary pipework | |
| In Airing Cupboard | No | |
| **31.0 Thermal Store** | None | |

**Recommendations**

**Lower cost measures**

**None**

**Further measures to achieve even higher standards**

| | Typical Cost | Typical savings per year | Ratings after improvement SAP rating | Environmental Impact |
|---|---|---|---|---|
| | £4,000 - £6,000 | £46 | B 84 | A 97 |
| | £3,500 - £5,500 | £205 | B 89 | A 97 |
| | | | 0 | 0 |

# Thermal Bridging

elmhurst energy

| | | | |
|---|---|---|---|
| **Property Reference** | sc100242 P15 Bitterne Church | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | Detached House |
| **Property** | Plot 15, Bitterne Parish Church, Whites Lane, Southampton, Hampshire , SO19 7NP | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 83 B | **DER** | 3.82 | **TER** | 10.86 |
| **Environmental** | 96 A | **% DER < TER** | | | 64.83 |
| **$CO_2$ Emissions (t/year)** | 0.38 | **DFEE** | 41.04 | **TFEE** | 42.23 |
| **Compliance Check** | See BREL | **% DFEE < TFEE** | | | 2.82 |
| **% DPER < TPER** | 30.36 | **DPER** | 39.61 | **TPER** | 56.87 |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Philip Dudley | | |

| | Junction details | Source Type | Psi (W/mK) | Length (m) | Result | Reference |
|---|---|---|---|---|---|---|
| External wall | E2 Other lintels (including other steel lintels) | Independently assessed | 0.050 | 14.53 | 0.73 | IG or Keystone Hi Therm + |
| External wall | E3 Sill | Independently assessed | 0.018 | 13.57 | 0.24 | Recognised Construction Detail |
| External wall | E4 Jamb | Independently assessed | 0.014 | 33.30 | 0.47 | Recognised Construction Detail |
| External wall | E5 Ground floor (normal) | Independently assessed | 0.068 | 32.26 | 2.19 | Recognised Construction Detail |
| External wall | E6 Intermediate floor within a dwelling | Independently assessed | 0.001 | 32.26 | 0.03 | Recognised Construction Detail |
| External wall | E10 Eaves (insulation at ceiling level) | Independently assessed | 0.055 | 29.36 | 1.61 | Recognised Construction Detail |
| External wall | E12 Gable (insulation at ceiling level) | Independently assessed | 0.058 | 2.90 | 0.17 | Recognised Construction Detail |
| External wall | E16 Corner (normal) | Independently assessed | 0.051 | 25.38 | 1.29 | Recognised Construction Detail |
| External wall | E17 Corner (inverted – internal area greater than external area) | Independently assessed | -0.100 | 4.78 | -0.48 | Recognised Construction Detail |

Total: 188.34 W/mK:

Y-Value: 0.00 W/m²K:

# U-VALUE CALCULATOR REPORT

| | | | |
|---|---|---|---|
| **Property Reference** | sc121846 | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling Part L 2021 |
| **Project** | Plot 15, Bitterne Parish Church, Whites Lane, Bitterne, Southampton, Hampshire , SO19 7NP | | |
| **Calculation Type** | New Build (As Designed) | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 84 B | **DER** | 15.68 | **TER** | 25.60 |
| **Environmental** | 86 B | **% DER<TER** | 38.75 | | |
| **$CO_2$ Emissions (t/year)** | 1.55 | **DFEE** | 47.11 | **TFEE** | 58.45 |
| **General Requirements Compliance** | Pass | **% DFEE<TFEE** | 19.40 | | |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers, Surecalc Limited, Tel: 01243572695, mark@surecalc.co.uk | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Vivid Design Studio | | |

## Building Elements

### Roof 000002 - Pitched Roof Insulated Ceiling Vivid

**Roof Type: Pitched Roof, insulated flat ceiling**

| Layer | Description | Thickness (mm) | Conductivity (W/m²K) | Resistance (m²K/W) | Fraction (%) |
|---|---|---|---|---|---|
| **Ext surface** | | | | 0.0400 | |
| **Layer 1** | **Loft Space** | | | | |
| | Main construction | 0 | 0.0600 | 0.0600 | 100.00 |
| **Layer 2** | **Mineral wool** | | | | |
| | Main construction | 350 | 0.0440 | 7.9545 | 100.00 |
| | Corrections - Air Gap: Level 0, Fasteners: None or plastic | | | | |
| **Layer 3** | **Mineral wool quilt** | | | | |
| | Main construction | 150 | 0.0440 | 3.4091 | 93.67 |
| | Main construction | 150 | 0.1300 | 1.1538 | 6.33 |
| | Corrections - Air Gap: Level 0, Fasteners: None or plastic | | | | |
| **Layer 4** | **Plasterboard, standard** | | | | |
| | Main construction | 12.5 | 0.2100 | 0.0595 | 100.00 |
| **Int surface** | | | | 0.1000 | |

**Total resistance:** **Upper limit =** 11.449 m² K/W **Lower limit =** 11.248 m² K/W **Average =** 11.348 m² K/W

**Total correction =** 0.0030 m² K/W **U-value (unrounded) =** 0.09 W/m² K

**Unheated space:** None

**Total thickness: 513 mm** **U-value: 0.09 W/m² K** **Kappa: n/a**



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

# U-VALUE CALCULATOR REPORT

| | | | |
|---|---|---|---|
| **Property Reference** | sc121846 | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling Part L 2021 |
| **Project** | Plot 15, Bitterne Parish Church, Whites Lane, Bitterne, Southampton, Hampshire , SO19 7NP | | |
| **Calculation Type** | New Build (As Designed) | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 84 B | **DER** | 15.68 | **TER** | 25.60 |
| **Environmental** | 86 B | **% DER<TER** | 38.75 | | |
| **$CO_2$ Emissions (t/year)** | 1.55 | **DFEE** | 47.11 | **TFEE** | 58.45 |
| **General Requirements Compliance** | Pass | **% DFEE<TFEE** | 19.40 | | |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers, Surecalc Limited, Tel: 01243572695, mark@surecalc.co.uk | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Vivid Design Studio | | |

## Building Elements

### Wall 000001 - Vivid Cavity Wall 125 Knauf Supafil 34

**Wall Type: Standard Wall**

| Layer | Description | Thickness (mm) | Conductivity (W/m²K) | Resistance (m²K/W) | Fraction (%) |
|---|---|---|---|---|---|
| **Ext surface** | | | | 0.0400 | |
| **Layer 1** | **Brick, outer leaf** | | | | |
| | Main construction | 102 | 0.7700 | 0.1325 | 82.81 |
| | Main construction | 102 | 0.9407 | 0.1084 | 17.19 |
| **Layer 2** | **Knauf Supafil 34 blown Cavity Fill** | | | | |
| | Main construction | 125 | 0.0340 | 3.6765 | 100.00 |
| | Corrections - Air Gap: Level 0, Fasteners: Wall ties, Cross sectional area: 12.50 mm², Lambda: 17.000 W/m.K, per m²: 2.500 | | | | |
| **Layer 3** | **Masterblock Masterlite Ultra** | | | | |
| | Main construction | 100 | 0.2700 | 0.3704 | 93.43 |
| | Main construction | 100 | 0.8803 | 0.1136 | 6.57 |
| **Layer 4** | **airspace/plaster dabs** | | | | |
| | Main construction | 15 | 0.1000 | 0.1500 | 80.00 |
| | Main construction | 15 | 0.0882 | 0.1700 | 20.00 |
| | Corrections - Cavity Unventilated, Emissivity: Normal | | | | |
| **Layer 5** | **Plasterboard, standard** | | | | |
| | Main construction | 12.5 | 0.2100 | 0.0595 | 100.00 |
| **Int surface** | | | | 0.1300 | |

**Total resistance:** **Upper limit =** 4.541 m² K/W **Lower limit =** 4.510 m² K/W **Average =** 4.525 m² K/W

**Total correction =** 0.0018 m² K/W **U-value (unrounded) =** 0.22 W/m² K

**Unheated space:** None

**Total thickness: 355 mm** **U-value: 0.22 W/m² K** **Kappa: n/a**



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

# U-VALUE CALCULATOR REPORT

| | | | |
|---|---|---|---|
| **Property Reference** | sc121846 | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling Part L 2021 |
| **Project** | Plot 15, Bitterne Parish Church, Whites Lane, Bitterne, Southampton, Hampshire , SO19 7NP | | |
| **Calculation Type** | New Build (As Designed) | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 84 B | **DER** | 15.68 | **TER** | 25.60 |
| **Environmental** | 86 B | **% DER<TER** | 38.75 | | |
| **$CO_2$ Emissions (t/year)** | 1.55 | **DFEE** | 47.11 | **TFEE** | 58.45 |
| **General Requirements Compliance** | Pass | **% DFEE<TFEE** | 19.40 | | |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers, Surecalc Limited, Tel: 01243572695, mark@surecalc.co.uk | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Vivid Design Studio | | |

## Building Elements

### Wall 000004 - Vivid Cavity Wall 125 Knauf Supafil 34

**Wall Type: Standard Wall**

| Layer | Description | Thickness (mm) | Conductivity (W/m²K) | Resistance (m²K/W) | Fraction (%) |
|---|---|---|---|---|---|
| **Ext surface** | | | | 0.0400 | |
| **Layer 1** | **Tile Hanging** | | | | |
| | Main construction | 15 | 1.0000 | 0.0150 | 100.00 |
| **Layer 2** | **airspace/timber battens** | | | | |
| | Main construction | 22 | 0.1222 | 0.1800 | 89.63 |
| | Main construction | 22 | 0.1243 | 0.1770 | 10.37 |
| | Corrections - Cavity Unventilated, Emissivity: Normal | | | | |
| **Layer 3** | **Blockwork, medium** | | | | |
| | Main construction | 100 | 0.5700 | 0.1754 | 93.43 |
| | Main construction | 100 | 0.8803 | 0.1136 | 6.57 |
| **Layer 4** | **Knauf Supafil 34 blown Cavity Fill** | | | | |
| | Main construction | 125 | 0.0340 | 3.6765 | 100.00 |
| | Corrections - Air Gap: Level 0, Fasteners: Wall ties, Cross sectional area: 12.50 mm², Lambda: 17.000 W/m.K, per m²: 2.500 | | | | |
| **Layer 5** | **Masterblock Masterlite Ultra** | | | | |
| | Main construction | 100 | 0.2700 | 0.3704 | 93.43 |
| | Main construction | 100 | 0.8803 | 0.1136 | 6.57 |
| **Layer 6** | **airspace/plaster dabs** | | | | |
| | Main construction | 15 | 0.1000 | 0.1500 | 80.00 |
| | Main construction | 15 | 0.0882 | 0.1700 | 20.00 |
| | Corrections - Cavity Unventilated, Emissivity: Normal | | | | |
| **Layer 7** | **Plasterboard, standard** | | | | |
| | Main construction | 12.5 | 0.2100 | 0.0595 | 100.00 |
| **Int surface** | | | | 0.1300 | |

**Total resistance:** **Upper limit =** 4.779 m² K/W **Lower limit =** 4.746 m² K/W **Average =** 4.762 m² K/W

**Total correction =** 0.0016 m² K/W **U-value (unrounded) =** 0.21 W/m² K

**Unheated space:** None

**Total thickness: 390 mm** **U-value: 0.21 W/m² K** **Kappa: n/a**



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19

# U-VALUE CALCULATOR REPORT

| | | | |
|---|---|---|---|
| **Property Reference** | sc121846 | **Issued on Date** | 06/12/2023 |
| **Assessment Reference** | 001 | **Prop Type Ref** | New Dwelling Part L 2021 |
| **Project** | Plot 15, Bitterne Parish Church, Whites Lane, Bitterne, Southampton, Hampshire , SO19 7NP | | |
| **Calculation Type** | New Build (As Designed) | | |

| | | | | | |
|---|---|---|---|---|---|
| **SAP Rating** | 84 B | **DER** | 15.68 | **TER** | 25.60 |
| **Environmental** | 86 B | **% DER<TER** | 38.75 | | |
| **$CO_2$ Emissions (t/year)** | 1.55 | **DFEE** | 47.11 | **TFEE** | 58.45 |
| **General Requirements Compliance** | Pass | **% DFEE<TFEE** | 19.40 | | |

| | | | |
|---|---|---|---|
| **Assessor Details** | Mr. Mark Rogers, Surecalc Limited, Tel: 01243572695, mark@surecalc.co.uk | **Assessor ID** | A320-0001 |
| **Client** | Vivid Design Studio, Vivid Design Studio | | |

## Building Elements

### Floor 000003 - Ground Floor Beam and Block

**Floor Type: Suspended Floor**
**Area = 61.05 m², Perimeter = 32.26 m, Wall thickness = 300.00 mm, Soil: Unknown**
**Depth of underfloor space below ground:0.200 m  Floor wind shielding: Average (suburban)**
**Floor height above ground:h = 0.150 m**
**U-value of walls above ground:Uw = 0.220 m**
**Ventilation openings per perimeter length:e = 0.0015 %**
**Mean wind speed:v = 5.000 m/s**
**Resistance on solum:Rg = 0.000 m²K/W**

| Layer | Description | Thickness (mm) | Conductivity (W/m²K) | Resistance (m²K/W) | Fraction (%) |
|---|---|---|---|---|---|
| **Ext surface** | | | | 0.1700 | |
| **Layer 1** | **Blockwork** | | | | |
| | Main construction | 100 | 0.1900 | 0.5263 | 90.91 |
| | Main construction | 100 | 1.0000 | 0.1000 | 9.09 |
| **Layer 2** | **Mannok Therm Floor** | | | | |
| | Main construction | 150 | 0.0220 | 6.8182 | 100.00 |
| | Corrections - Air Gap: Level 1, Fasteners: None or plastic | | | | |
| **Layer 3** | **Screed** | | | | |
| | Main construction | 75 | 1.1500 | 0.0652 | 100.00 |
| **Int surface** | | | | 0.1700 | |

**Total resistance:** **Upper limit =** 7.709 m² K/W **Lower limit =** 7.603 m² K/W **Average =** 7.656 m² K/W

**Total correction =** 0.0079 m² K/W **U-value (unrounded) =** 0.12 W/m² K

**Unheated space:** None

**Total thickness: 325 mm** **U-value: 0.12 W/m² K** **Kappa: n/a**



Regs Region: England
Elmhurst Energy Systems SAP2012 Calculator (Design System) version 4.14r19