ELMSTEAD ENERGY ASSESSMENTS AND BUILDING SERVICES

# 613-615 Green Lanes, Palmers Green

# Enfield

# Energy and Sustainability Statement

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**Disclaimer**

## Contents

## Figures



## Tables



## Appendices

## 1.0 Executive Summary

EEABS (Elmstead Energy Assessments & Building Services) were instructed to produce an Energy and Sustainability Statement for the proposed development of 8 No. low energy and sustainable dwellings located at 613-615 Green Lanes, Palmers Green, Enfield.

This energy and sustainability statement can be used as a supporting document to the planning application to demonstrate that the carbon emissions, and overall energy and sustainability strategy of the proposed development will meet the requirements set out by Enfield Planning Policy and Part L 2021 Building Regulations.

**Relevant Planning Policies**

The assessment of the development against policy targets has been carried out using the very latest Part L 2021 benchmarks. The Part L 2021 targets represent approximately a 30% reduction in carbon emissions in comparison to the Part L 2013 target.

The development is considered to be a material change of use under the Part L Regulations and as such the guidance within paragraphs 11.5 to 11.8 should be followed.

Paragraph 11.8 states that the SAP methodology can be used to compare the proposed dwelling design to a reference dwelling design following the guidance. Providing the proposed dwelling has lower CO2 emissions and lower primary energy usage than the reference building it would satisfy the requirements.

A pre-application report provided by Enfield (ref. 22/03889/PREAPP) stated that they required a minimum of an 8% improvement in CO2 emissions over Building Regulations.

As stated above the default CO2 emissions for Building Regulations would follow the guidance in paragraph 11.7, the proposed design should therefore improve upon this value by at least 8%.

**Assessment Methodology**

To calculate the estimated carbon emissions of the development we have used Design SAP 10.2 software which is approved by Building Regulations. The default CO2 emissions for Building Regulations would be calculated following the guidance in paragraph 11.7 of Part L, the proposed design should therefore improve upon this value by at least 8% to meet the planning requirement.

The appraisals within this strategy are based on the Building Regulations Part L (2021) methodology and should not be understood as a predictive assessment of likely future energy requirements.

**Be Lean**

Savings have been made at the Be Lean stage thanks to increased performance of the building's air permeability.

Further savings have also been realised through the use of efficient lighting systems, as well as through the use of natural ventilation.

**Be Clean**

Due to the small size of the development the possibility of connecting to an Area Wide Heat Network, other secondary heat source, or using a combined heat and power system (CHP) have all been deemed technically unfeasible.

**Be Green**

From brief assessment of the various renewable technologies available we can see that Solar PV Panels would be the most feasible renewable technology to install. The amount of solar PV provided for each flat has been calculated to achieve at least the 8% CO2 emissions improvement overall.

The total amount of PV panels required would be a 11.20 kW system. Assuming 400-Watt Panels were used this would require 28 solar panels in total to be installed on the roof of the development.

**Overall Energy Assessment Results**

The results below show total carbon emissions in kgCO2/m2 and tonnes CO2 for the development as described throughout the energy hierarchy.

**Table 1 - Overall Carbon Emission Results**

| Unit | Total Baseline CO2 Emissions (Tonnes of CO2) | Total Design CO2 Emissions (Tonnes of CO2) | Carbon Emissions Savings (%) |
|---|---|---|---|
| **Unit 1** | 1.47 | 1.34 | 9.10% |
| **Unit 2** | 1.19 | 1.07 | 10.47% |
| **Unit 3** | 1.19 | 1.07 | 10.47% |
| **Unit 4** | 0.93 | 0.83 | 10.99% |
| **Unit 5** | 0.90 | 0.80 | 11.46% |
| **Unit 6** | 1.30 | 1.18 | 8.64% |
| **Unit 7** | 1.18 | 1.04 | 11.90% |
| **Unit 8** | 1.27 | 1.16 | 9.06% |
| **Total** | **9.44** | **8.48** | **10.14%** |

The results show that by implementing the energy strategy as described within this report the carbon emissions would 8.48 Tonnes CO2, this can be compared to 9.44 Tonnes CO2 for the Baseline.

This would be an overall improvement of 10.14%, therefore comfortably satisfying the requirements of Part L 2021 Building Regulations for a material change of use and the 8% minimum on-site reduction required by Enfield Planning.

Each of the proposed units would also receive a very good EPC rating of around a high B to a low A, indicating that the units will have affordable running costs to the future occupants.

The SAP Calculation sheets for the development can be found within Appendix A.

**Sustainability Measures**

In collaboration with the Energy Assessment of the development, an analysis of the overheating strategy within the building has also been carried out.

The cooling hierarchy indicates that there should be minimal overheating risk to the new dwellings. A full Building Regulations Part O Overheating assessment will be carried out at later design stages to prove this.

It is the design team's intention to minimise waste during the construction process through careful consideration of materials and construction methodology. The dwelling, wherever possible, will use BRE Green Guide 'A' rated materials and manufacturers will be chosen that can demonstrate their products are sustainably sourced and manufactured.

The water usage for the dwellings will not exceed a maximum of 110 litres/person/day as required by Part G of the Building Regulations. Calculations to prove this can be carried out at later design stages once sanitaryware has been selected.

Any demolition will be recycled where possible. A demolition audit will be carried out before any works progress on site to identify which materials can be recycled. The development will also consider the concept of the waste hierarchy in both the demolition of existing buildings and when constructing the proposed building.

The extent of possible flooding on the site has also been analysed using data from the government flood warning information service. The flood map shows that the proposed development site is within Flood Zone 1.

The surface water flood map shows that the proposed site sits within an area of High risk from surface water flooding. The final drainage design should ensure that peak flow and volume of water run-off for the proposed site will be no worse than that of the site prior to development. A specialist SUDs design will be carried out by others if required.

The proposed development will have no on-site combustion of fossil fuels. It will also include for the provision of at least 1 cycle storage space per unit. This will encourage the use of zero-emission transport and help to further improve local air quality.

**Conclusion**

This energy and sustainability statement has shown that the proposed development of 8 No. low energy and sustainable dwellings located at 613-615 Green Lanes, Palmers Green, Enfield would comfortably satisfy the energy and sustainability requirements of Part L 2021 Building Regulations and Enfield Council Local Planning Policies.

## 2.0 Introduction

EEABS (Elmstead Energy Assessments & Building Services) were instructed to produce an Energy and Sustainability Statement for the proposed development of 8 No. low energy and sustainable dwellings located at 613-615 Green Lanes, Palmers Green, Enfield.

This energy and sustainability statement can be used as a supporting document to the planning application to demonstrate that the carbon emissions, and overall energy and sustainability strategy of the proposed development will meet the requirements set out by Enfield Planning Policy and Part L 2021 Building Regulations.

The planning application is for the construction of 8 No. residential units. The 2 No. commercial units at the ground floor front of the site are being retained. A site plan, as well as Existing and Proposed 3D Views can be seen below.

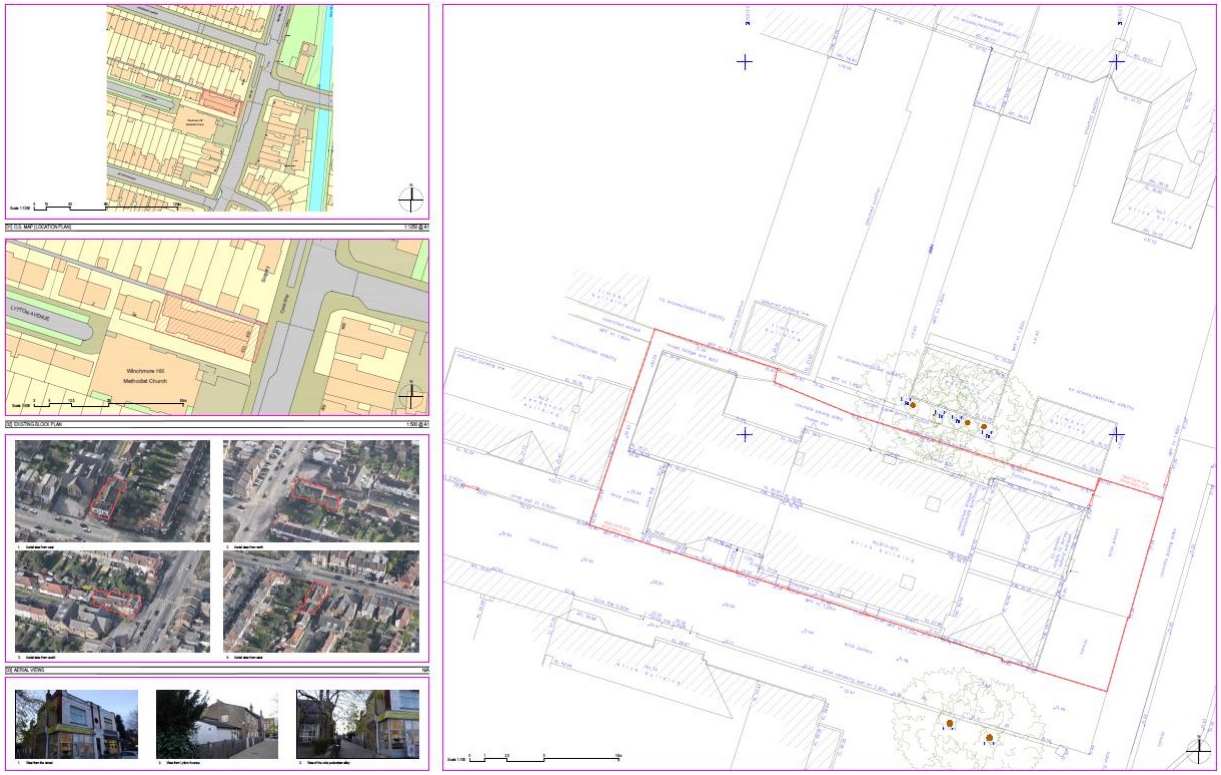


**Figure 1 - Site Plan**

**Figure 2 - Existing (Left) and Proposed (Right) 3D Views**

## 2.1 Planning Policy Context

Numerous policies that relate to the energy efficiency and carbon emissions of the development have been considered in preparation of this energy assessment.

### 2.1.1 National Planning Policy Framework

The National Planning Policy Framework encourages local planning authorities to adopt proactive strategies to mitigate and adapt to climate change.

They should plan for new development in ways which reduce greenhouse gas emissions; actively support energy efficiency improvements to existing buildings; and set local sustainability requirements which are consistent with the government's policies and standards.

### 2.1.2 Building Regulations Part L 2021

The assessment of the development against policy targets has been carried out using the very latest Part L 2021 benchmarks. The Part L 2021 targets represent approximately a 30% reduction in carbon emissions in comparison to the Part L 2013 target.

The development is considered to be a material change of use under the Part L Regulations and as such the guidance within paragraphs 11.5 to 11.8 should be followed.

> **11.8** As an alternative to paragraph 11.7, in buildings that contain more than one dwelling, the Standard Assessment Procedure may be used to show that the dwelling primary energy usage and total $CO_2$ emissions from all dwellings in the building, after completion of the building work, would be no greater than if each dwelling had been improved following the guidance in paragraph 11.7.

**Figure 3 - Part L Guidance for a Material Change of Use**

Paragraph 11.8 states that the SAP methodology can be used to compare the proposed dwelling design to a reference dwelling design following the guidance. Providing the proposed dwelling has lower CO2 emissions and lower primary energy usage than the reference building it would satisfy the requirements.

### 2.1.3 Enfield Planning Policy

A pre-application report provided by Enfield (ref. 22/03889/PREAPP) stated that they required a minimum of an 8% improvement in CO2 emissions over Building Regulations.

As stated above the default CO2 emissions for Building Regulations would follow the guidance in paragraph 11.7, the proposed design should therefore improve upon this value by at least 8%.

## 3.0 Assessment Methodology

The energy strategy of the development has been produced by following an Energy Hierarchy shown below taking a fabric first approach.

- Be Lean: use less energy
- Be Clean: supply energy efficiently
- Be Green: use renewable energy

The following methodology has been used to calculate the CO2 emissions for the development.

### 3.1 Part L 2021 SAP 10.2

To calculate the estimated carbon emissions of the development we have used Design SAP 10.2 software which is approved by Building Regulations. The default CO2 emissions for Building Regulations would be calculated following the guidance in paragraph 11.7 of Part L, the proposed design should therefore improve upon this value by at least 8% to meet the planning requirement.

### 3.2 Limitations

The appraisals within this strategy are based on the Building Regulations Part L (2021) calculation methodology and should not be understood as a predictive assessment of likely future energy requirements or otherwise.

Occupants may operate their systems differently, and/or the weather may be different from the assumptions made by Part L approved calculation methods, leading to differing energy requirements once the development is in operation.

## 4.0 Energy Assessment

The following sections describe how each stage of the Energy Hierarchy have been modelled and how their associated Carbon Emissions have been calculated.

### 4.1 Baseline Target

The default CO2 emissions for Building Regulations have been calculated following the guidance in paragraph 11.7 of Part L.

**Table 2 - Baseline Carbon Emission Results**

| Unit | Area (m2) | CO2 Emission Rate (kgCO2/m2) | Total CO2 Emissions (Tonnes of CO2) |
|---|---|---|---|
| **Unit 1** | 87 | 16.92 | 1.47 |
| **Unit 2** | 77 | 15.48 | 1.19 |
| **Unit 3** | 77 | 15.48 | 1.19 |
| **Unit 4** | 77 | 12.10 | 0.93 |
| **Unit 5** | 70 | 12.92 | 0.90 |
| **Unit 6** | 56 | 23.14 | 1.30 |
| **Unit 7** | 49 | 24.04 | 1.18 |
| **Unit 8** | 62 | 20.53 | 1.27 |
| | | **Total** | **9.44** |

The results show that the total Target CO2 emissions for the development is estimated to be 9.44 Tonnes of CO2 per annum.

The proposed design should therefore improve upon this value by at least 8% to meet the Enfield planning requirement.

## 4.2 Be Lean

The following section describes the passive design and energy efficiency measures that have been considered and implemented within the proposed development.

### 4.2.1 Passive Design Measures

Passive design measures are those which reduce the initial energy demand of the building through passive means, for example wall insulation once installed requires no other means of operation and its performance is also unlikely to deteriorate.

Where possible the development has taken a fabric first approach to reducing the initial energy demand by the following methods:

**Glazing Performance**

Windows and glazed doors are be highly efficient double glazing and will have a low U-value of 1.40 W/$m^2$.K, helping to reduce the amount of heat loss through the glazing.

**Thermal Envelope**

The inclusion of high levels of thermal insulation not only helps to reduce the buildings overall energy demand and therefore carbon emissions, but it also plays a vital role in securing the occupant's thermal comfort. It also helps to reduce the buildings peak heating and cooling loads required meaning that smaller plant equipment can be sized, helping to further improve not only carbon emissions but also the cost of the development.

The proposed walls, floor, and roof will provide significant savings over the Part L limiting fabric parameters.

**Thermal Bridging**

Thermal bridges are junctions between parts of the build through which heat can escape, for example the junction where a roof and wall construction meet. To reduce heat loss through these areas all thermal bridges should use the Recognised Construction Details where possible. More details regarding the Psi values assumed can be found within the appendices.

**Air Permeability**

The air permeability of the development is a measure of how much volume of air can penetrate through its fabric. Therefore, a well built, highly sealed building would result in less unwanted heat loss, and therefore provide a more efficient building.

Part L Building Regulations have a maximum limit of 8 $m^3/h.m^2$ that must be achieved, the proposed dwelling will target a value of 5 $m^3/h.m^2$.

**Summary of Passive Design Measures**

The table below shows a summary of the passive design measures included for within the development and how they compare against the Part L requirements.

**Table 3 - Summary Table of Passive Design Measures**

| Parameter | Part L Default Values | Development Proposal |
|---|---|---|
| **U-Values** | | |
| **Walls** | 0.18 W/m$^2$.K | 0.18 W/m$^2$.K |
| **Floors** | 0.18 W/m$^2$.K | 0.18 W/m$^2$.K |
| **Roofs** | 0.15 W/m$^2$.K | 0.15 W/m$^2$.K |
| **Glazing** | 1.40 W/m$^2$.K | 1.40 W/m$^2$.K |
| | | |
| **Air Permeability** | 8.00 m$^3$/h.m$^2$ | 5.00 m$^3$/h.m$^2$ |

The summary of passive measures shows that the proposed development will meet or better the Part L default fabric parameters for U-Values of new fabric elements in existing dwellings.

### 4.2.2 Energy Efficiency Measures

Energy efficiency measures are those which seek to supply the remaining demand for energy, after the initial demand has been lowered through passive means, in the most efficient way.

The following energy efficiency measures have been incorporated within the proposed development:

**Heating and Hot Water**

Heating and hot water is proposed to be provided by a gas combi boiler system with a minimum seasonal efficiency of at least 92%. In line with the Part L requirement.

**Lighting**

The lighting for the development will consist of low energy LED lighting throughout with a minimum efficacy of at least 80 lumens/watt. Beter than the Part L requirement of only 75 lumens/watt.

**Ventilation**

The ventilation is assumed to be natural through the use of opening windows, this reduces energy costs and carbon emissions in comparison with whole house mechanical ventilation systems. Wet rooms and kitchen areas will have local mechanical intermittent extract ventilation.

### 4.2.3 Regulated and Unregulated Energy Sources

Regulated energy sources are those that fall under the Building Regulations such as Space Heating, Hot Water, Space Cooling, Lighting and Auxiliary Loads (Pumps, Fans, and Controls). Unregulated energy sources such as small power, are not a part of the Part L Assessment however every effort should be made in order to reduce the consumption from unregulated sources.

To reduce the demand from unregulated sources the following is recommended:

- Any White Goods installed should be at least A/A+ rated.
- Occupants should be encouraged to turn TVs, computers etc. off at night when not in use.

## 4.3 Be Clean

The following sections discuss the infrastructure and clean energy supply measures that have been considered for the Development to further reduce regulated CO2 emissions.

### 4.3.1 Heating Hierarchy

Due to the small size of the development the possibility of connecting to an Area Wide Heat Network, other secondary heat source, or using a combined heat and power system (CHP) have all been deemed technically unfeasible.

Better results can be more easily achieved through the use of renewable technologies.

## 4.4 Be Green

The following sections discuss the low carbon and renewable technologies that have been considered for the development.

### 4.4.1 Assessment of Renewable / Low Carbon Technologies

The table below provides a brief analysis of the different renewables and low carbon technologies considered for the site and comments on their overall feasibility.

**Table 4 - Low Carbon and Renewable Technologies Analysis**

| Low Carbon or Renewable Technology | Comments | Feasible |
|---|---|---|
| **Air Source Heat Pumps** | ASHPs can be used to provide both heating and hot water. With a high Seasonal Coefficient of Performance (SCOP) the benefit of a providing heating from an ASHP could outweigh the use of a gas boiler. ASHP require an external condenser, which could impact the visual amenity of the site and may produce excessive noise. | No |
| **Ground Source Heat Pumps** | Ground Source Heat Pumps are usually more efficient than ASHP as the temperature of the ground is more stable throughout the year. However, the installation of Ground Source is complex and would not be economically or practically feasible for this project. | No |
| **Photovoltaic Solar Panels** | PV panels are a simple to install technology that can produce green electricity with very little ongoing maintenance. The roof space should be utilized as much as possible for solar PV Panels. | Yes |
| **Solar Hot Water Panels** | Solar Hot Water Panels would also need to be installed on the roof of the development. The amount of free space is limited and would be better utilized by Solar PV panels. | No |
| **Biomass Boiler** | A biomass boiler uses wood chips/pellets and would need a constant supply. A large storage area would be required to store the fuel on the site. There are also concerns with local air quality. | No |
| **Wind Turbines** | Large wind turbines would be required to produce any significant electrical savings. As the development is close to existing buildings the installation of any such turbine would be unfeasible. | No |

From brief assessment of the various renewable technologies available we can see that Solar PV Panels would be the most feasible renewable technology to install. The amount of solar PV provided for each flat has been calculated to achieve at least the 8% CO2 emissions improvement overall.

**Table 5 - Solar PV Required for Each Unit**

| Unit | Solar PV (kW) |
|---|---|
| **Unit 1** | 1.20 |
| **Unit 2** | 1.60 |
| **Unit 3** | 1.60 |
| **Unit 4** | 1.20 |
| **Unit 5** | 1.20 |
| **Unit 6** | 1.60 |
| **Unit 7** | 1.20 |
| **Unit 8** | 1.60 |
| **Total** | 11.20 |

The total amount of PV panels required would be an 11.20 kW system. Assuming 400-Watt Panels were used this would require 28 solar panels in total to be installed on the roof of the development.

**Figure 4 - Proposed PV Layout Shown in Plan and Elevation**

## 4.5 Proposed Design Energy Assessment Results

The results below show total carbon emissions in kgCO2/m2 and tonnes CO2 for the development as described throughout the energy hierarchy.

**Table 6 - Proposed Design Carbon Emission Results**

| Unit | Area (m2) | CO2 Emission Rate (kgCO2/m2) | Total CO2 Emissions (Tonnes of CO2) |
|---|---|---|---|
| **Unit 1** | 87 | 15.38 | 1.34 |
| **Unit 2** | 77 | 13.86 | 1.07 |
| **Unit 3** | 77 | 13.86 | 1.07 |
| **Unit 4** | 77 | 10.77 | 0.83 |
| **Unit 5** | 70 | 11.44 | 0.80 |
| **Unit 6** | 56 | 21.14 | 1.18 |
| **Unit 7** | 49 | 21.18 | 1.04 |
| **Unit 8** | 62 | 18.67 | 1.16 |
| | | **Total** | **8.48** |

The results show that by implementing the energy strategy as described within this report the carbon emissions would 8.48 Tonnes CO2, this can be compared to 9.44 Tonnes CO2 for the Baseline.

This would be an overall improvement of 10.14%, therefore comfortably satisfying the requirements of Part L 2021 Building Regulations for a material change of use and the 8% minimum on-site reduction required by Enfield Planning.

Each of the proposed units would also receive a very good EPC rating of around a high B to a low A, indicating that the units will have affordable running costs to the future occupants.

The SAP Calculation sheets for the development can be found within Appendix A.

## 5.0 Sustainability

### 5.1 Overheating

In collaboration with the Energy Assessment of the development, an analysis of the overheating strategy within the building has also been carried out.

**1. Minimise Internal Heat Gains**

To minimise internal heat gains low energy lighting will be used throughout the development. Any new heating pipework will also be well insulated, white goods and computer equipment should also be of the highest efficiency.

**2. Reduce the Amount of Heat Entering the Building**

Highly efficient windows will reduce the amount of solar gain entering the apartments.

**3. Use of Thermal Mass and High Ceilings to Manage Heat within the Building**

The building will have a medium thermal mass and it will be well insulated with an improved air permeability value to stop heat from first entering the building.

**4. Passive Ventilation**

Windows will be openable to allow for fresh air when required.

**5. Mechanical Ventilation**

A whole house Mechanical supply and extract ventilation system has not been proposed at this stage in order to keep energy consumption to as low as possible. One could be considered further into the detailed design stage if required.

The cooling hierarchy described above indicates that there should be minimal overheating risk to the new dwellings. A full Building Regulations Part O Overheating assessment will be carried out at later design stages to prove this.

### 5.2 Materials Use

It is the design team's intention to minimise waste during the construction process through careful consideration of materials and construction methodology. The dwelling, wherever possible, will use BRE Green Guide 'A' rated materials and manufacturers will be chosen that can demonstrate their products are sustainably sourced and manufactured.

### 5.3 Water Efficiency

All taps, toilets and showers will be specified that are considered to be low water use.

The water usage for the dwelling will not exceed a maximum of 110 litres/person/day as required by Part G of the Building Regulations. Calculations to prove this can be carried out at later design stages once sanitaryware has been selected.

## 5.4 Land Use and Waste

Any demolition will be recycled where possible. A demolition audit will be carried out before any works progress on site to identify which materials can be recycled. The development will also consider the concept of the waste hierarchy shown below in both the demolition of existing buildings and when constructing the proposed building.

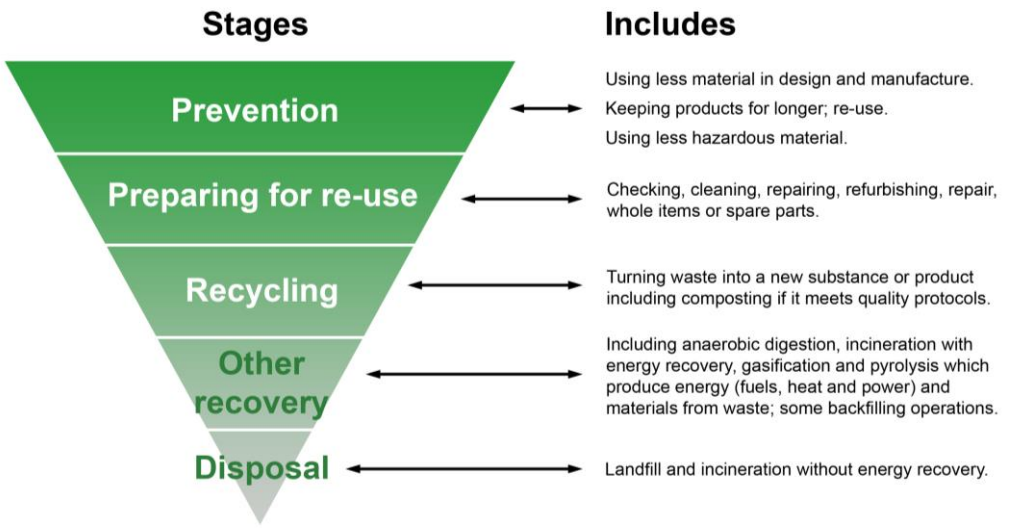



**Figure 5 - Waste Hierarchy Diagram**

## 5.5 Flood Risk

The extent of possible flooding on the site has also been analysed using data from the government flood warning information service. The flood map shows that the proposed development site is within Flood Zone 1.

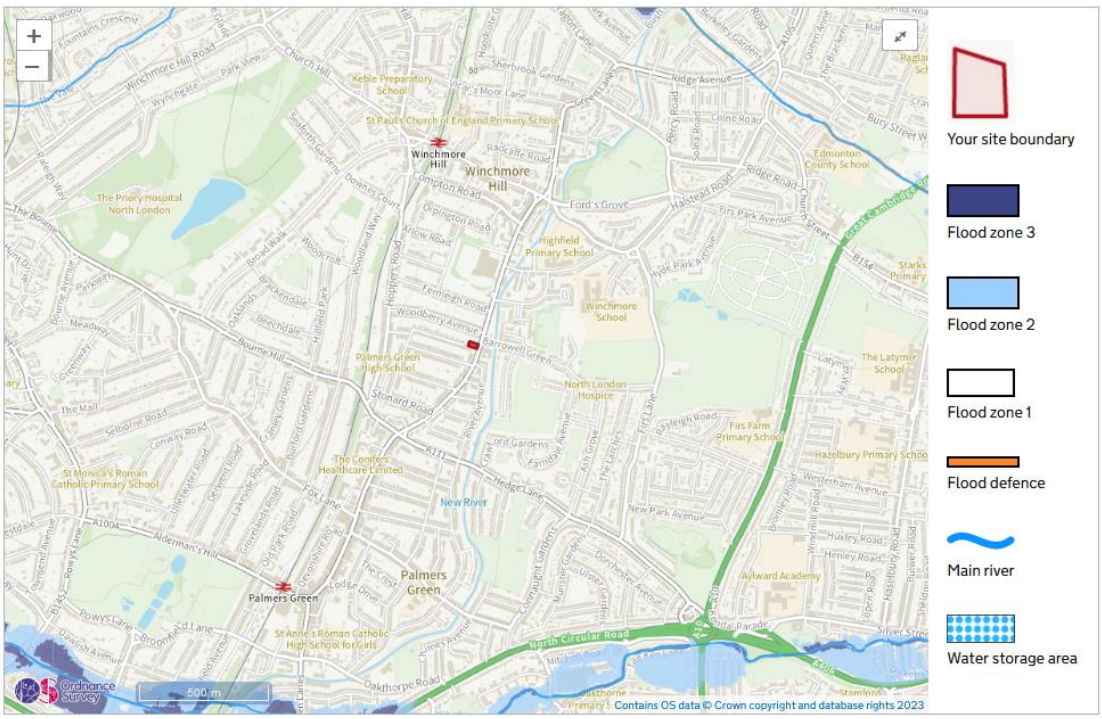



**Figure 6 - Flood Risk Map for the Site**

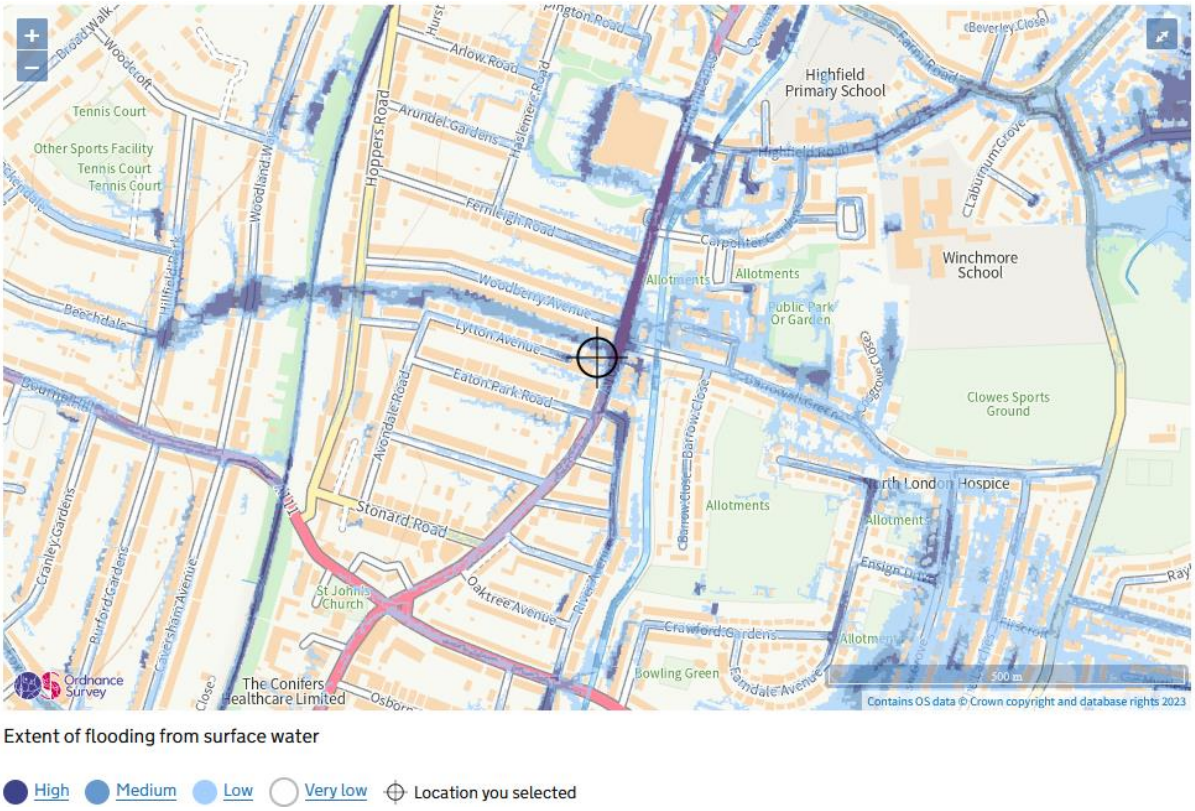



**Figure 7 - Surface Water Map for the Site**

The surface water flood map shows that the proposed site sits within an area of High risk from surface water flooding. The final drainage design should ensure that peak flow and volume of water run-off for the proposed site will be no worse than that of the site prior to development. A specialist SUDs design will be carried out by others if required.

## 5.6 Air Quality

The development will include for the provision of at least 1 cycle storage space per unit. This will encourage the use of zero-emission transport and help to improve local air quality.

## Appendix A - SAP 2021 Calculation Sheets and Predicted Energy Assessments

# Block Compliance

| | | | |
|---|---|---|---|
| **Block Reference** | Greenlanes | **Issued on Date** | 15/11/2023 |
| **Block Name** | | | |
| **Calculation Type** | New Build (As Designed) | | |
| **Assessor Details** | Mr. Darren Coham | **Assessor ID** | R789-0001 |
| **Client** | -, -, -, -, -, -, - | | |

## Block Compliance Report - DER

| **Block Reference: Greenlanes** | **Block Name:** | | | |
|---|---|---|---|---|
| **Property-Assessment Reference** | **Floor area ($m^2$)** | **DER ($kgCO_2/m^2$)** | **TER ($kgCO_2/m^2$)** | **% DER/TER** |
| Unit 1 - Unit 1_reference | 87.17 | 16.92 | 12.53 | -35.04 % |
| Unit 2 - Unit 2_reference | 76.75 | 15.48 | 13.04 | -18.71 % |
| Unit 3 - Unit 3_reference | 76.75 | 15.48 | 13.04 | -18.71 % |
| Unit 4 - Unit 4_reference | 76.75 | 12.10 | 10.35 | -16.91 % |
| Unit 5 - Unit 5_reference | 69.50 | 12.92 | 11.14 | -15.98 % |
| Unit 6 - Unit 6_reference | 55.72 | 23.14 | 19.88 | -16.40 % |
| Unit 7 - Unit 7_reference | 48.68 | 24.04 | 20.89 | -15.08 % |
| Unit 8 - Unit 8_reference | 61.62 | 20.53 | 17.46 | -17.58 % |
| Totals: | 552.94 | 140.61 | 118.33 | |
| Average DER = 17.00 $kgCO_2/m^2$ | **% DER/TER** | FAIL | | |
| Average TER = 14.22 $kgCO_2/m^2$ | -19.58 % | | | |

## Block Compliance Report - DFEE

| **Block Reference: Greenlanes** | **Block Name:** | | | |
|---|---|---|---|---|
| **Property-Assessment Reference** | **Floor area ($m^2$)** | **DFEE ($kWh/m^2/yr$)** | **TFEE ($kWh/m^2/yr$)** | **% DFEE/TFEE** |
| Unit 1 - Unit 1_reference | 87.17 | 44.60 | 42.17 | -5.75 % |
| Unit 2 - Unit 2_reference | 76.75 | 36.78 | 35.42 | -3.83 % |
| Unit 3 - Unit 3_reference | 76.75 | 36.78 | 35.42 | -3.83 % |
| Unit 4 - Unit 4_reference | 76.75 | 23.61 | 23.74 | 0.54 % |
| Unit 5 - Unit 5_reference | 69.50 | 24.31 | 25.32 | 3.99 % |
| Unit 6 - Unit 6_reference | 55.72 | 60.44 | 59.57 | -1.46 % |
| Unit 7 - Unit 7_reference | 48.68 | 61.04 | 61.28 | 0.40 % |

# Block Compliance

| | | | | |
|---|---|---|---|---|
| Unit 8 - Unit 8_reference | 61.62 | 55.13 | 51.50 | -7.05 % |
| Totals: | 552.94 | 342.69 | 334.43 | |
| Average DFEE = 41.18 kgCO₂/m² | % DFEE/TFEE | FAIL | | |
| Average TFEE = 40.10 kgCO₂/m² | -2.71 % | | | |

**Block Compliance Report - DPER**

| Block Reference: Greenlanes | Block Name: | | | |
|---|---|---|---|---|
| **Property-Assessment Reference** | **Floor area ($m^2$)** | **DPER (kWh/$m^2$/yr)** | **TPER (kWh/$m^2$/yr)** | **% DPER/TPER** |
| Unit 1 - Unit 1_reference | 87.17 | 93.52 | 65.60 | -42.56 % |
| Unit 2 - Unit 2_reference | 76.75 | 85.96 | 68.62 | -25.27 % |
| Unit 3 - Unit 3_reference | 76.75 | 85.96 | 68.62 | -25.27 % |
| Unit 4 - Unit 4_reference | 76.75 | 67.74 | 54.15 | -25.10 % |
| Unit 5 - Unit 5_reference | 69.50 | 72.27 | 58.43 | -23.69 % |
| Unit 6 - Unit 6_reference | 55.72 | 127.60 | 105.64 | -20.79 % |
| Unit 7 - Unit 7_reference | 48.68 | 132.63 | 111.15 | -19.33 % |
| Unit 8 - Unit 8_reference | 61.62 | 113.38 | 92.49 | -22.59 % |
| Totals: | 552.94 | 779.06 | 624.70 | |
| Average DPER = 94.26 kgCO₂/m² | % DPER/TPER | FAIL | | |
| Average TPER = 74.99 kgCO₂/m² | -25.70 % | | | |

# Block Compliance

| | | | |
|---|---|---|---|
| **Block Reference** | Greenlanes | **Issued on Date** | 15/11/2023 |
| **Block Name** | | | |
| **Calculation Type** | New Build (As Designed) | | |
| **Assessor Details** | Mr. Darren Coham | **Assessor ID** | R789-0001 |
| **Client** | -, -, -, -, -, -, - | | |

## Block Compliance Report - DER

| **Block Reference: Greenlanes** | **Block Name:** | | | |
|---|---|---|---|---|
| **Property-Assessment Reference** | **Floor area ($m^2$)** | **DER ($kgCO_2/m^2$)** | **TER ($kgCO_2/m^2$)** | **% DER/TER** |
| Unit 1 - Unit 1 | 87.17 | 15.38 | 12.53 | -22.75 % |
| Unit 2 - Unit 2 | 76.75 | 13.86 | 13.04 | -6.29 % |
| Unit 3 - Unit 3 | 76.75 | 13.86 | 13.04 | -6.29 % |
| Unit 4 - Unit 4 | 76.75 | 10.77 | 10.35 | -4.06 % |
| Unit 5 - Unit 5 | 69.50 | 11.44 | 11.14 | -2.69 % |
| Unit 6 - Unit 6 | 55.72 | 21.14 | 19.88 | -6.34 % |
| Unit 7 - Unit 7 | 48.68 | 21.18 | 20.59 | -2.87 % |
| Unit 8 - Unit 8 | 61.62 | 18.67 | 17.46 | -6.93 % |
| Totals: | 552.94 | 126.30 | 118.03 | |
| Average DER = 15.28 $kgCO_2/m^2$ | **% DER/TER** | FAIL | | |
| Average TER = 14.19 $kgCO_2/m^2$ | -7.66 % | | | |

## Block Compliance Report - DFEE

| **Block Reference: Greenlanes** | **Block Name:** | | | |
|---|---|---|---|---|
| **Property-Assessment Reference** | **Floor area ($m^2$)** | **DFEE ($kWh/m^2/yr$)** | **TFEE ($kWh/m^2/yr$)** | **% DFEE/TFEE** |
| Unit 1 - Unit 1 | 87.17 | 44.60 | 42.17 | -5.75 % |
| Unit 2 - Unit 2 | 76.75 | 36.78 | 35.42 | -3.83 % |
| Unit 3 - Unit 3 | 76.75 | 36.78 | 35.42 | -3.83 % |
| Unit 4 - Unit 4 | 76.75 | 23.61 | 23.74 | 0.54 % |
| Unit 5 - Unit 5 | 69.50 | 24.31 | 25.32 | 3.99 % |
| Unit 6 - Unit 6 | 55.72 | 60.44 | 59.57 | -1.46 % |
| Unit 7 - Unit 7 | 48.68 | 61.04 | 61.28 | 0.40 % |

# Block Compliance

| | | | | |
|---|---|---|---|---|
| Unit 8 - Unit 8 | 61.62 | 55.13 | 51.50 | -7.05 % |
| Totals: | 552.94 | 342.69 | 334.43 | |
| Average DFEE = 41.18 kgCO₂/m² | **% DFEE/TFEE** | FAIL | | |
| Average TFEE = 40.10 kgCO₂/m² | -2.71 % | | | |

**Block Compliance Report - DPER**

| **Block Reference: Greenlanes** | **Block Name:** | | | |
|---|---|---|---|---|
| **Property-Assessment Reference** | **Floor area ($m^2$)** | **DPER ($kWh/m^2/yr$)** | **TPER ($kWh/m^2/yr$)** | **% DPER/TPER** |
| Unit 1 - Unit 1 | 87.17 | 81.61 | 65.60 | -24.41 % |
| Unit 2 - Unit 2 | 76.75 | 72.91 | 68.62 | -6.25 % |
| Unit 3 - Unit 3 | 76.75 | 72.91 | 68.62 | -6.25 % |
| Unit 4 - Unit 4 | 76.75 | 56.68 | 54.15 | -4.67 % |
| Unit 5 - Unit 5 | 69.50 | 60.15 | 58.43 | -2.94 % |
| Unit 6 - Unit 6 | 55.72 | 111.95 | 105.64 | -5.97 % |
| Unit 7 - Unit 7 | 48.68 | 110.34 | 109.55 | -0.72 % |
| Unit 8 - Unit 8 | 61.62 | 98.67 | 92.49 | -6.68 % |
| Totals: | 552.94 | 665.22 | 623.10 | |
| Average DPER = 80.53 kgCO₂/m² | **% DPER/TPER** | FAIL | | |
| Average TPER = 74.85 kgCO₂/m² | -7.58 % | | | |

# Predicted Energy Assessment

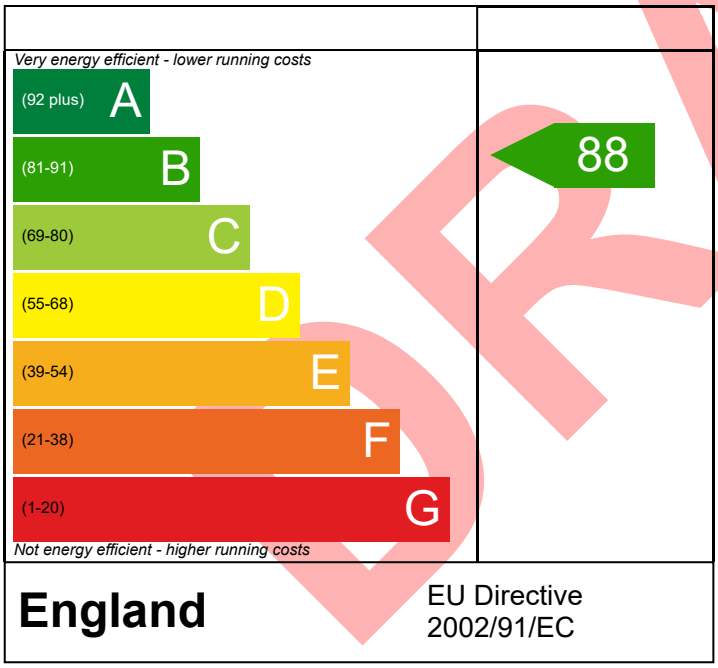
Unit 1, 613-615, Green Lanes, Palmer Green, London, N13 4EP

| | |
|---|---|
| Dwelling type: | House, Semi-Detached |
| Date of assessment: | 15/11/2023 |
| Produced by: | Darren Coham |
| Total floor area: | 87.17 m² |
| DRRN: | |

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.

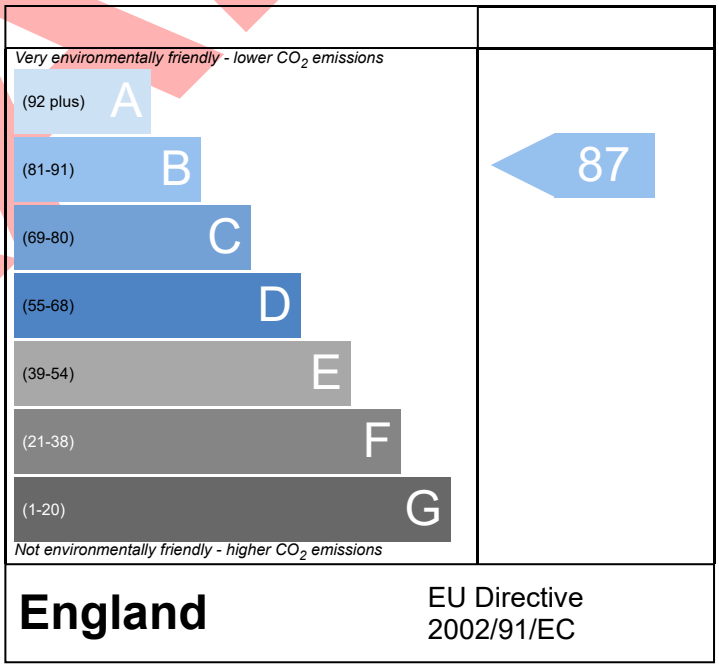
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

## 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.

# Predicted Energy Assessment

Unit 2, 613-615, Green Lanes, Palmer Green, London, N13 4EP

| | |
|---|---|
| Dwelling type: | Flat, Mid-Terrace |
| Date of assessment: | 15/11/2023 |
| Produced by: | Darren Coham |
| Total floor area: | 76.75 m² |
| DRRN: | |

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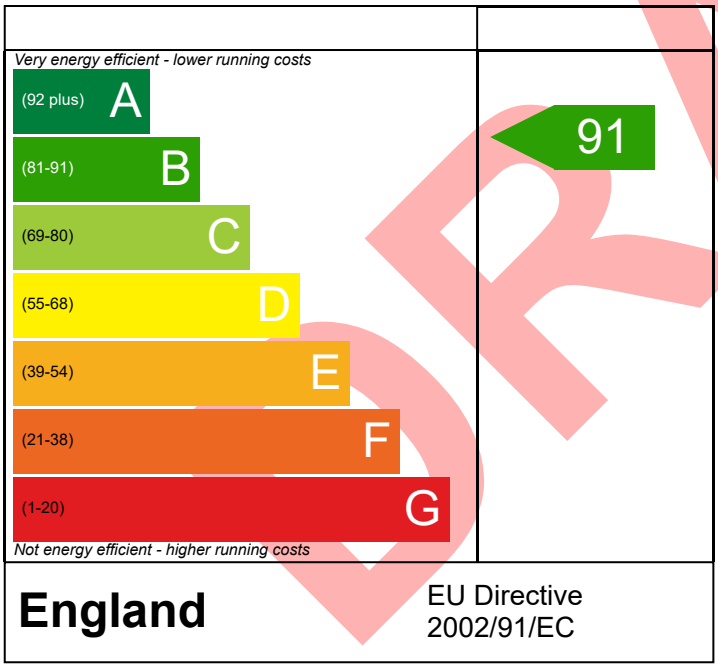
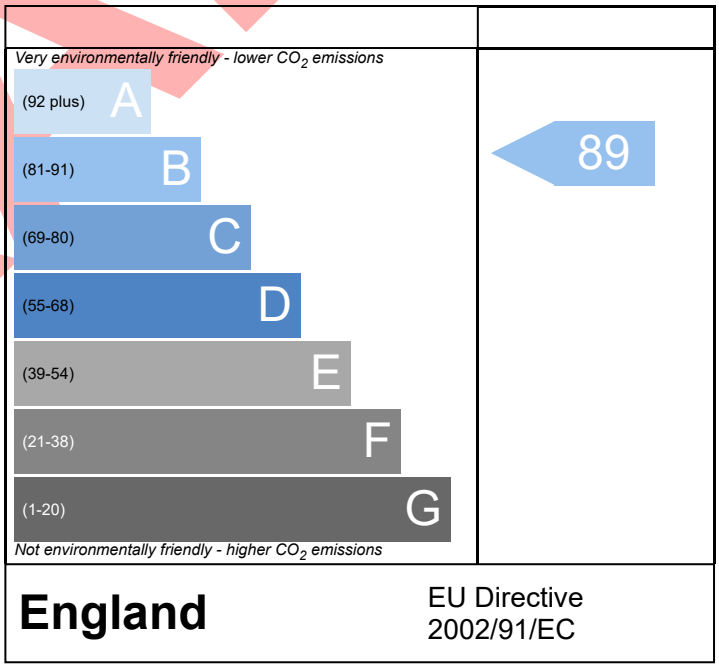
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

## 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.

# Predicted Energy Assessment

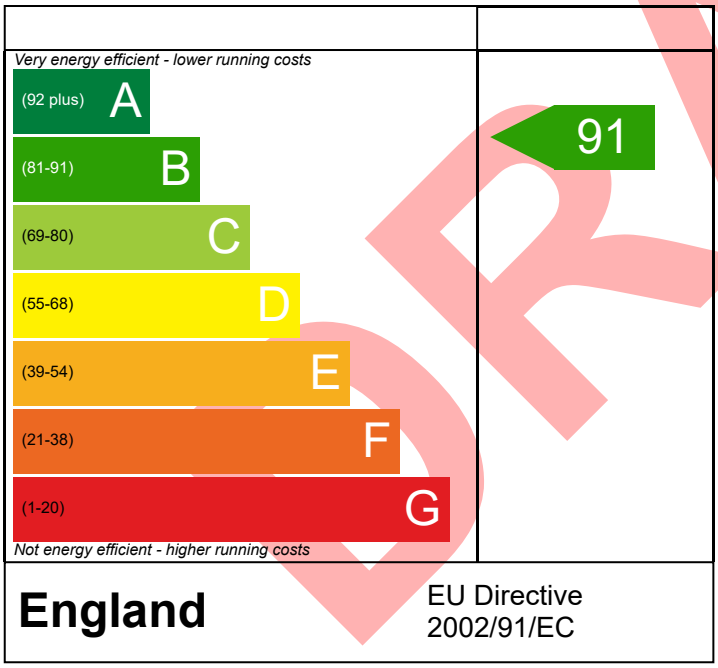
Unit 3, 613-615, Green Lanes, Palmer Green, London, N13 4EP

| | |
|---|---|
| Dwelling type: | Flat, Mid-Terrace |
| Date of assessment: | 15/11/2023 |
| Produced by: | Darren Coham |
| Total floor area: | 76.75 m² |
| DRRN: | |

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.

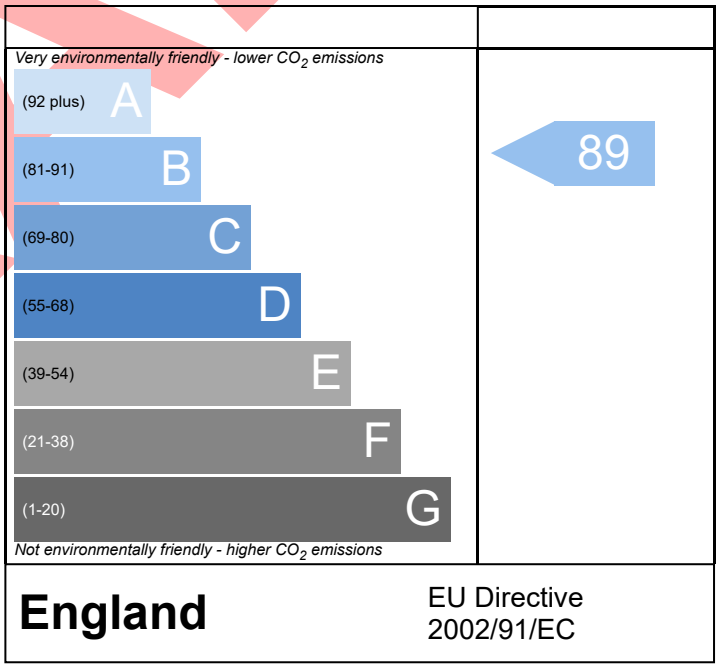
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

## 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.

# Predicted Energy Assessment

Unit 4, 613-615, Green Lanes, Palmer Green, London, N13 4EP

| | |
|---|---|
| Dwelling type: | Flat, Mid-Terrace |
| Date of assessment: | 15/11/2023 |
| Produced by: | Darren Coham |
| Total floor area: | 76.75 m² |
| DRRN: | |

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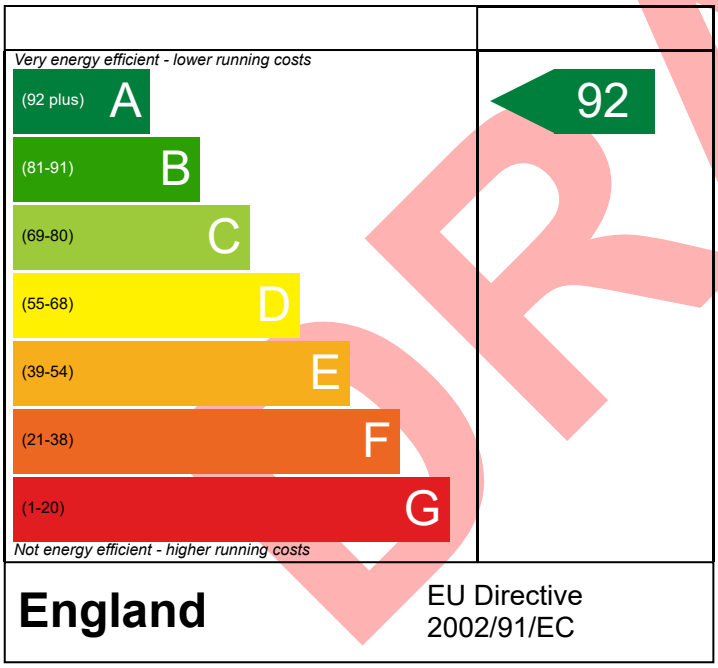
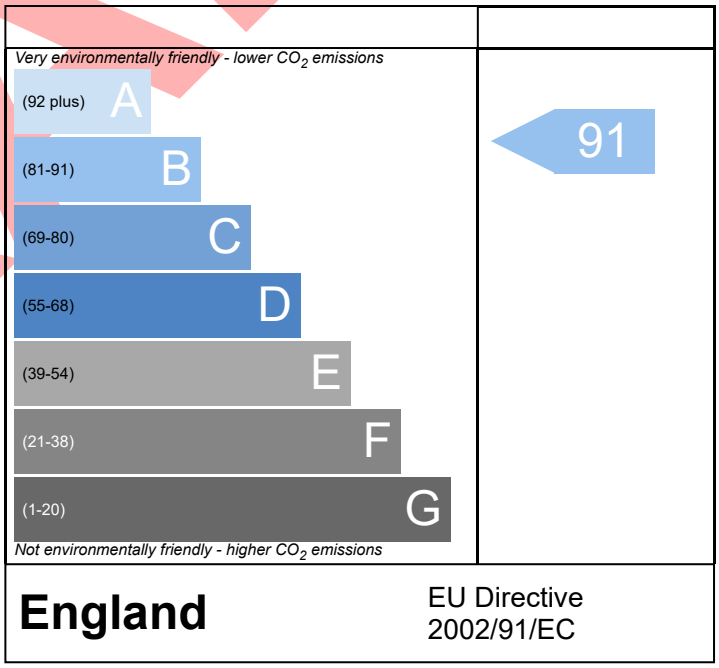
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

## 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.

# Predicted Energy Assessment

Unit 5, 613-615, Green Lanes, Palmer Green, London, N13 4EP

| | |
|---|---|
| Dwelling type: | Flat, Mid-Terrace |
| Date of assessment: | 15/11/2023 |
| Produced by: | Darren Coham |
| Total floor area: | 69.5 m² |
| DRRN: | |

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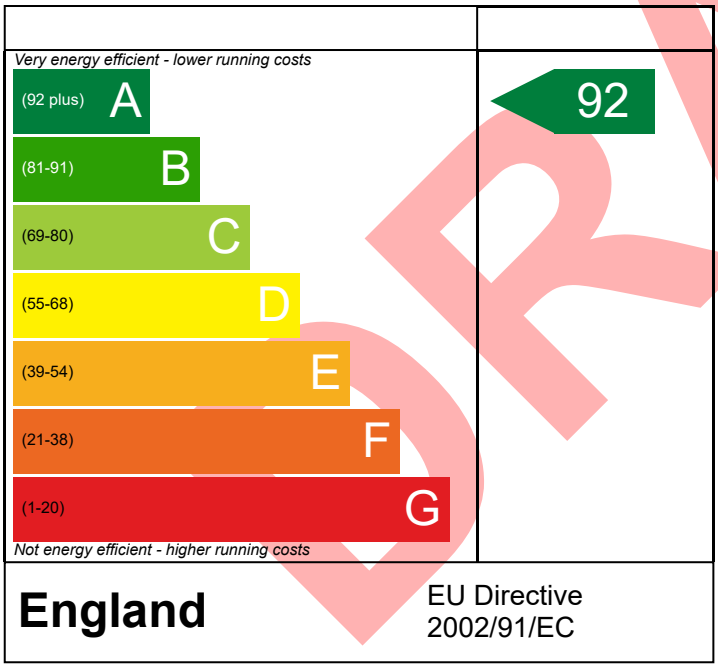
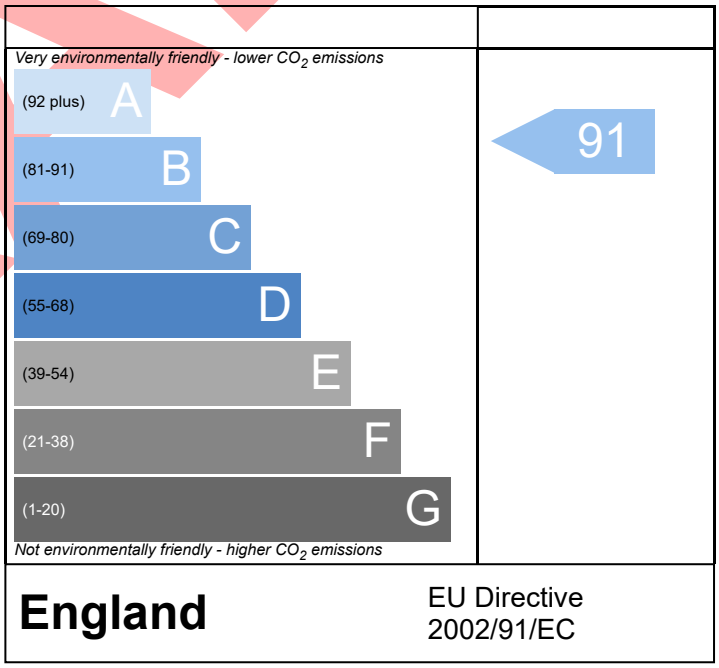
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

## 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.

# Predicted Energy Assessment

Unit 6, 613-615, Green Lanes, Palmer Green, London, N13 4EP

| | |
|---|---|
| Dwelling type: | Flat, End-Terrace |
| Date of assessment: | 15/11/2023 |
| Produced by: | Darren Coham |
| Total floor area: | 55.72 m² |
| DRRN: | |

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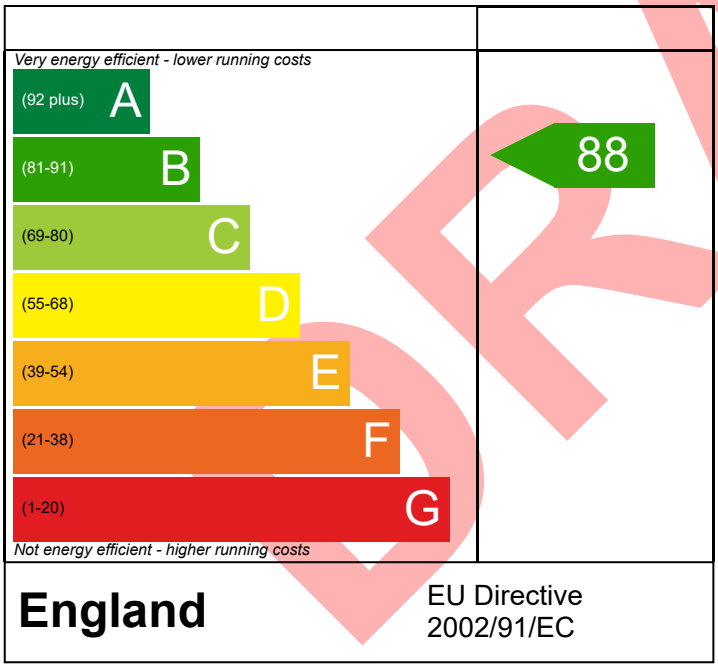
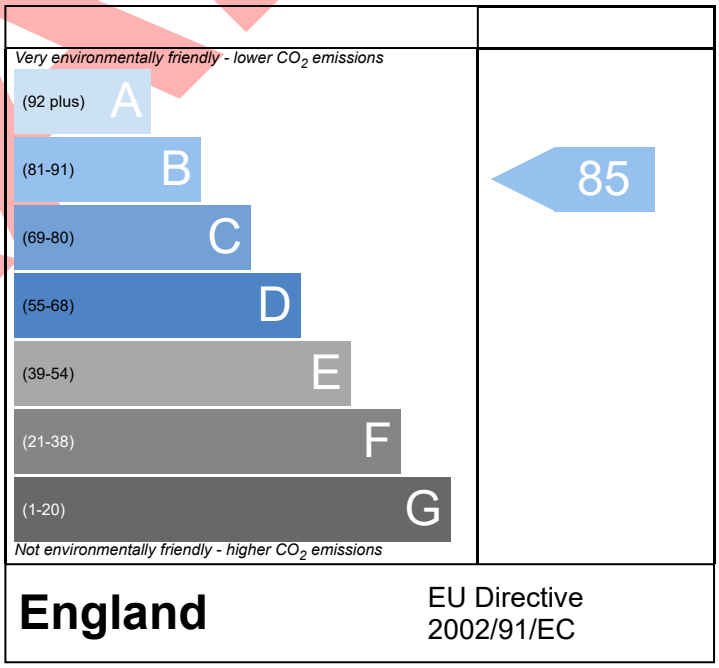
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

## 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.

# Predicted Energy Assessment

Unit 7, 613-615, Green Lanes, Palmer Green, London, N13 4EP

| | |
|---|---|
| Dwelling type: | Flat, Mid-Terrace |
| Date of assessment: | 15/11/2023 |
| Produced by: | Darren Coham |
| Total floor area: | 48.68 m² |
| DRRN: | |

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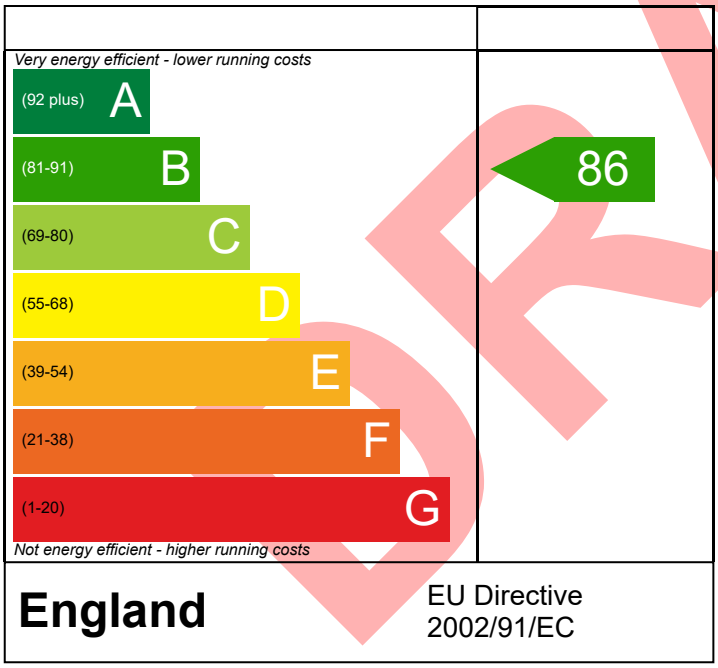
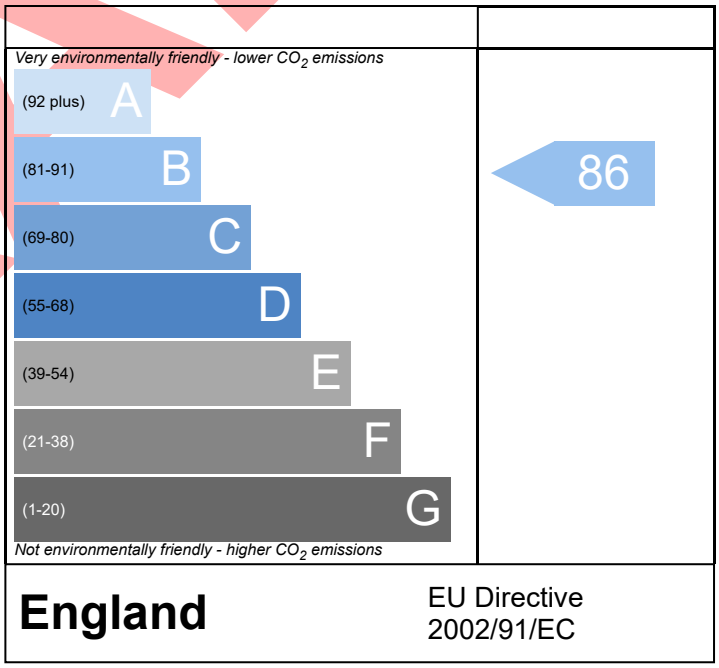
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

## 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.

# Predicted Energy Assessment

Unit 8, 613-615, Green Lanes, Palmer Green, London, N13 4EP

| | |
|---|---|
| Dwelling type: | Flat, End-Terrace |
| Date of assessment: | 15/11/2023 |
| Produced by: | Darren Coham |
| Total floor area: | 61.62 m² |
| DRRN: | |

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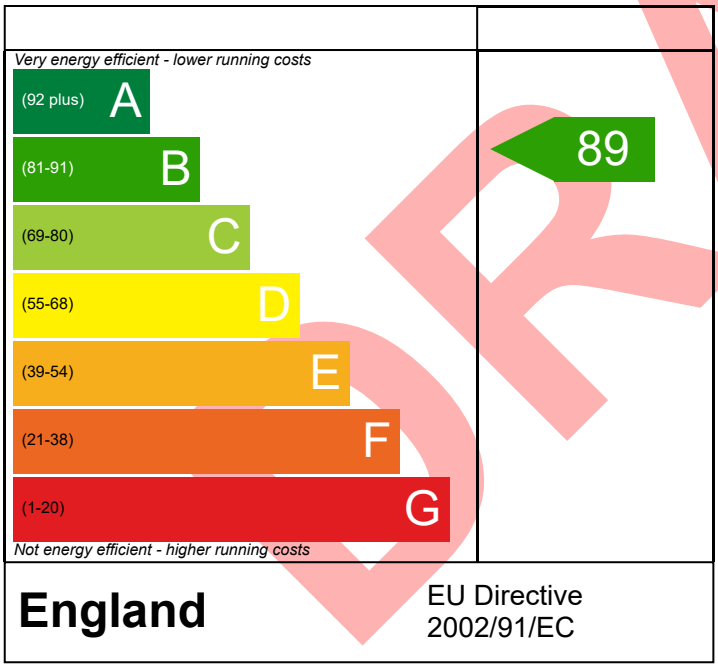
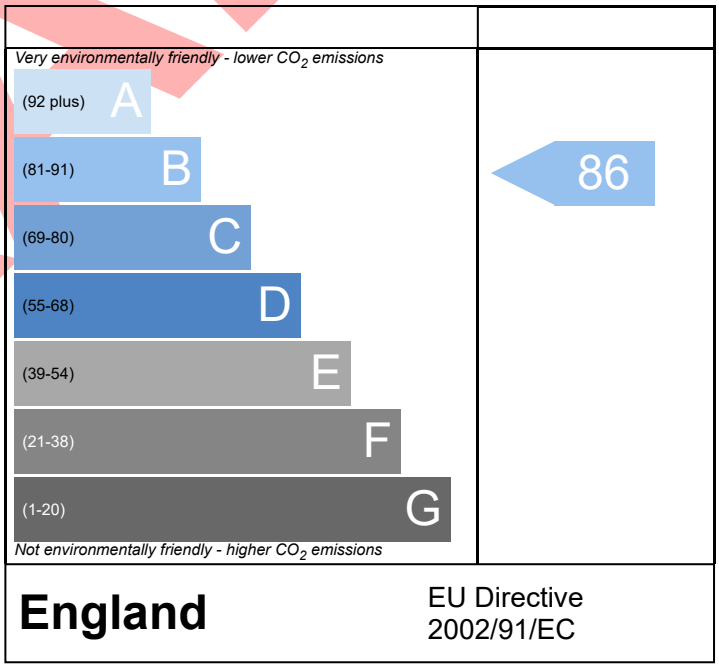
The energy performance has been assessed using the Government approved SAP 10 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO2) emissions.

## 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.