Climate Change Assessment.

This Climate Change Assessment is submitted in support of a Full Planning Application for a new residential dwelling on land to the rear of 175 Far Laund, Belper. Derbyshire.

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01. Introduction

This Climate Change Assessment has been prepared in support of a planning application for the construction of a new detached dwelling on land to the rear of 175 Far Laund, Belper.

The purpose of this assessment is to demonstrate how the proposed development addresses climate change mitigation and adaptation measures and accords with the requirements of Policy EN1 (Climate Change) of the Amber Valley Local Plan.

The proposed dwelling has been designed to minimise operational carbon emissions, reduce energy demand, encourage sustainable living patterns and ensure resilience to future climatic conditions.

02. Site Context

The site comprises a residential infill plot located within the urban area of Belper and is surrounded by existing residential developments, with views of open countryside to the north.

The location benefits from proximity to local services, employment opportunities, schools and public transport connections, reducing reliance on private vehicle travel and supporting sustainable patterns of development.

The proposal consists of:

- One detached two-storey dwelling.
- Integral garage/workshop.
- Private garden space.
- Associated parking and access arrangements.

03. Policy EN1 Compliance

The development has been designed to maximise opportunities to reduce greenhouse gas emissions and contribute towards national and local net-zero objectives. The proposal addresses the key themes of Policy EN1 through:

Energy Efficiency

The dwelling will be constructed to achieve energy performance significantly above the minimum requirements of current Building Regulations.
Measures include:

- High levels of wall, roof and floor insulation.
- Thermally efficient construction detailing.
- High-performance double or triple-glazed windows.
- Enhanced airtightness standards.
- Mechanical extract ventilation with low-energy fans.
- LED lighting throughout.
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These measures reduce overall energy demand and operational carbon emissions.

Low Carbon Heating

The dwelling will utilise a low-carbon heating solution.
Proposed measures include:

- Air source heat pump (ASHP).
- Low-temperature underfloor heating system.
- Smart heating controls and zoning.

The development therefore avoids dependence on fossil fuel heating systems and significantly reduces operational carbon emissions.

Renewable Energy Generation

The roof design provides opportunity for on-site renewable energy generation.
The development will incorporate:

- Roof-mounted photovoltaic (PV) panels.
- Smart inverter technology.
- Provision for battery storage.

It is anticipated that a substantial proportion of annual electricity demand can be generated on site, reducing reliance on grid electricity and supporting net-zero objectives.

Reduction in Embodied Carbon

Although the site is undeveloped, embodied carbon impacts will be minimised through:

- Efficient structural design.
- Responsible sourcing of materials.
- Use of locally sourced construction products where practicable.
- Waste minimisation during construction.
- Recycled and recyclable materials where appropriate.

A Site Waste Management Plan will be implemented during construction.

04. Climate Change Adaptation

Climate projections indicate hotter summers, more intense rainfall events and increased flood risk across the UK. Development must therefore be designed to remain resilient throughout its lifespan. (GOV.UK)

The proposed dwelling incorporates the following adaptation measures.

The proposed dwelling adopts a "Fabric First" approach whereby energy demand is reduced before considering renewable energy generation.

The dwelling has been designed with a compact building form and high-performance thermal envelope to minimise heat loss. Subject to detailed design, the building will achieve U-values significantly better than the limiting standards required by Approved Document L:

Element	Building Regulations Maximum	Proposed Target
External Walls	0.26 W/m²K	≤0.18 W/m²K
Roof	0.16 W/m²K	≤0.11 W/m²K
Ground Floor	0.18 W/m²K	≤0.13 W/m²K
Windows	1.6 W/m²K	≤1.2 W/m²K
Doors	1.6 W/m²K	≤1.0 W/m²K

Improved thermal performance reduces heating demand, lowers energy costs for future occupants and contributes to the reduction of operational carbon emissions throughout the life of the building.

Building Orientation and Passive Solar Design

The dwelling has been designed to optimise natural daylight and solar gain while limiting overheating.

The submitted plans demonstrate that principal living accommodation is concentrated around the open-plan kitchen/dining area and living room, allowing good levels of natural daylight penetration and reducing dependence on artificial lighting.

The building form and roof profile have been arranged to:

- Maximise useful winter solar gains.
- Reduce heat loss through a compact form factor.
- Allow future optimisation of photovoltaic panels.
- Promote natural ventilation through opening windows.

Passive solar principles reduce annual energy demand and improve occupant comfort without reliance on mechanical systems.

Predicted Carbon Emissions

The Future Homes Standard seeks substantial reductions in operational carbon emissions from new dwellings.
A SAP assessment will be submitted at Building Regulations stage. Based upon comparable dwellings constructed to current low-energy standards and incorporating an air source heat pump and photovoltaic array, the proposed dwelling is expected to achieve:

- Approximately 75–85% reduction in operational carbon emissions compared with a dwelling constructed to Part L 2013 standards.
- EPC Rating A or high B.
- Significant reductions in annual energy consumption relative to conventional gas-heated housing.

The proposal therefore makes a positive contribution towards the carbon reduction objectives of Policy EN1.

Renewable Energy Strategy

The roof geometry shown on the submitted plans provides suitable opportunities for photovoltaic generation.
Subject to detailed design, a roof-mounted photovoltaic array of approximately 4–6 kWp could be accommodated.
Typical annual generation is expected to be:

PV Capacity	Annual Output
4 kWp	3,400–4,000 kWh
5 kWp	4,250–5,000 kWh
6 kWp	5,100–6,000 kWh

This level of generation would offset a substantial proportion of annual electricity demand and support operation of the proposed air source heat pump.
Battery storage technology may also be incorporated to maximise on-site consumption of generated electricity.

Air Source Heat Pump Technology

The proposed dwelling will be heated using an air source heat pump system.
Advantages include:

- Elimination of direct fossil fuel combustion.
- Lower operational carbon emissions.
- Improved energy efficiency.
- Compatibility with future decarbonisation of the electricity grid.

Modern air source heat pumps typically achieve seasonal coefficients of performance (SCOP) between 3.0 and 4.0, meaning that for every unit of electricity consumed, between three and four units of heat are produced.
This represents a significant improvement over traditional gas-fired systems.

Electric Vehicle Infrastructure

The development will incorporate electric vehicle charging infrastructure in accordance with current Building Regulations requirements.
Provision of EV charging facilities:

- Encourages uptake of low-emission vehicles.
- Reduces transport-related carbon emissions.
- Future-proofs the dwelling against changing transport technologies.

The integral garage arrangement shown on the submitted plans provides an ideal location for installation of charging equipment.

Water Conservation Measures

Climate change is expected to place increasing pressure on water resources across England. The dwelling will therefore be designed to achieve a maximum potable water consumption of 110 litres per person per day through:

- Dual-flush WCs.
- Flow-restricted taps.
- Water-efficient showers.
- Water-efficient appliances.
- Leak detection systems.

In addition, rainwater harvesting for garden irrigation will be explored during detailed design. These measures contribute to climate resilience and sustainable resource management.

Summer Overheating

To reduce overheating risk:

- High-performance glazing.
- Opening windows for natural cross ventilation.
- Solar shading from roof overhangs.
- Light-coloured external materials where appropriate.
- High levels of insulation reducing temperature fluctuations.

These measures reduce cooling demand and improve occupant comfort.

Flood Resilience and Surface Water Management

Although the site is known not to lie within a high flood risk area, sustainable drainage principles will be employed.
Measures include:

- Permeable surfacing to driveway areas.
- Soakaways subject to ground investigation.
- Rainwater attenuation where necessary.
- Controlled discharge rates.
- Landscaping to maximise infiltration.

This approach minimises runoff and contributes to local flood resilience.

05. Sustainable Transport

The site benefits from an established residential location within Belper.
Residents will have access to:

- Local shops and services.
- Schools.
- Employment opportunities.
- Public transport facilities.
- Existing walking and cycling routes.

To further support sustainable travel the development will provide:

- Secure cycle storage.
- Electric vehicle charging infrastructure.
- Home working capability through modern digital connectivity.

These measures reduce transport-related carbon emissions.

06. Biodiversity and Green Infrastructure

The proposed landscaping strategy will contribute positively to climate resilience through:

- New tree planting.
- Native shrub planting.
- Pollinator-friendly species.
- Increased permeable surfaces.
- Habitat enhancement opportunities.

Vegetation assists carbon sequestration, improves biodiversity and contributes to cooling during warmer periods.

07. Construction Phase Measures

The contractor will adopt best practice measures to reduce emissions during construction, including:

- Efficient use of materials.
- Recycling of construction waste.
- Reduced vehicle idling.
- Sustainable procurement.
- Local labour and suppliers where feasible.

These measures will minimise the carbon footprint associated with construction activities.

08. Conclusion

The proposed dwelling at land to the rear of 175 Far Laund, Belper has been designed to respond positively to climate change mitigation and adaptation objectives.
The development will:

- Deliver a highly energy-efficient dwelling.
- Utilise low-carbon heating technology.
- Incorporate renewable energy generation.
- Minimise water consumption.
- Support sustainable travel choices.
- Manage surface water sustainably.
- Enhance biodiversity and climate resilience.

Accordingly, the proposal is considered to comply with the objectives and requirements of Policy EN1 (Climate Change) of the Amber Valley Local Plan and will contribute towards local and national net-zero ambitions. (Amber Valley)