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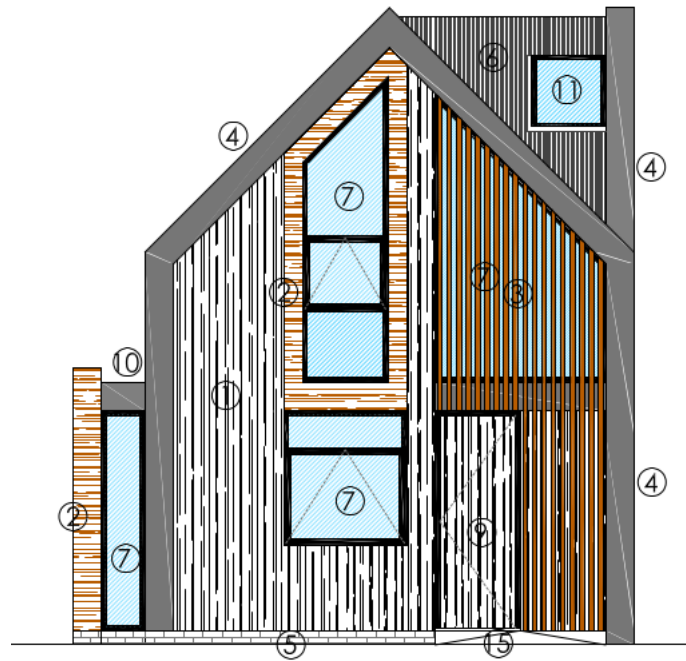


Advanced Energy Statement: Domestic Scheme

CASE REFERENCE NUMBER: T.B.A

CLIENT: Rosie Tadman

DATE: 26/01/2024



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SITE DETAILS

Site Address: 239 Barlow Moor Road, Chorlton, M21 7QL

Site Footprint: 116m²

Dwelling Footprints: Ground floor: ~32m² + First floor: ~29m² = ~61m²

Description of Proposed Development: 1x Newbuild Detached Dwelling

INTRODUCTION

This report has been completed to help meet planning policy requirements for City Centre Councils. Mantis Energy Ltd have been appointed to provide an Energy Statement to support the planning application.

If planning is permitted, the proposed development will need to comply with the most up to date requirements of Approved Documents Part L1A of the Building Regulations as the development includes a new dwelling.

The purpose of this Energy Statement is to demonstrate how Manchester City Council's local policies regarding sustainable design and construction and the wider context and understanding of sustainable development will be satisfied.

This document should be used for planning purposes only and should be reassessed and submitted if alternative building specifications or proposed systems are adopted compared to the current report.

PLANNING POLICIES

Guidance of Environment and Sustainability is contained within Manchester City's Council "Local Plan Strategy". The relevant extracts are below with key items that this report addresses:

Local Plan Strategy: Policy EN 4: Page 174-175

Policy EN 4

Reducing CO₂ Emissions by Enabling Low and Zero Carbon Development

The Council will seek to reduce fuel poverty and decouple growth in the economy, growth in CO₂ emissions, and rising fossil fuel prices, through the following actions:

- All development must follow the principle of the Energy Hierarchy, being designed:

- to reduce the need for energy through design features that provide passive heating, natural lighting and cooling
- to reduce the need for energy through energy efficient features such as improved insulation and glazing
- to meet residual energy requirements through the use of low or zero carbon energy generating technologies
- Wherever possible new development and retrofit projects, including energy generation plant, must be located and designed in a manner that allows advantage to be taken of opportunities for low and zero carbon energy supplies.
- Where possible new development and retrofit projects will be used as a mechanism to help improve energy efficiency and provide low and zero carbon energy supplies to existing buildings.
- Where appropriate new development and retrofit projects will be required to connect to and/or make contributions to low or zero carbon energy schemes and/or to incorporate provision to enable future connection to any existing / potential decentralised energy schemes.
- The use of building materials with low embodied carbon in new development and refurbishment schemes.

Local Plan Strategy: Section 12.25: Page 175

12.25 Reduction in CO₂ emissions is seen as a major component in mitigating climate change. In this regard, areas of Government policy give rise to the following three national and regional targets:

- A national reduction in CO₂ emissions by 34% in 2020 and by 80% in 2050, (from a 1990 baseline) to which buildings will need to make a proportionately higher contribution, as set out in the Climate Change Act 2008.
- 'Zero' carbon targets for all new housing by 2016 and for all new non-residential development by 2019, for which preparation will be required (See table 12.3).
- A national increase in renewable energy capacity by 15% by 2020 as set out in the UK Renewable Energy Strategy, which will require an uplift in current levels.

Local Plan Strategy: 14 Appendix A: Page 220

The developer is required to complete an energy statement (sometimes also known as a carbon budget statement) in order to demonstrate the total regulated energy that their final completed development would use (based on the development being Part L Building Regulations 2010 compliant) and the equivalent carbon emissions that this would generate. Against this baseline a developer is asked to consider renewable and decentralised energy technologies which will reduce the predicted carbon emissions in line with the relevant carbon reduction target.

Policy Approach EN6 requires an energy statement to be submitted at the outset of any proposed development (outline application or before), where the development is bigger than 10 residential units or 1,000sq m of floorspace. The level of detail required within this document is commensurate with the scale and nature of the development proposed. The following sets out the steps that should be undertaken in the preparation of an energy statement and the information that the Council will expect to see included.

Local Plan Strategy: 14 Appendix A: Part F: Page 220-223

Energy Statement Methodology

A. Set out the baseline information

The baseline information should include the following:

- Proposed mix of uses
- Schedule of floorspace for each use
- Proposed phasing and anticipated timescale for the completed development
- The proposed servicing strategy for the development, by block, site or phase

B. Calculate the total energy demand of the completed development

Using the above baseline information, set out the projected future energy demand of the development, assuming the development is compliant with Part L of the Building Regulations 2010, and including the following:

- Regulated emissions under Part L i.e. those associated with 'fixed' M&E plant such as space heating, ventilation, hot water and fixed lighting, and

C. Calculate the equivalent annual carbon emissions from the completed development

The carbon emissions should be calculated based on regulated energy use weighted to reflect the emissions factors for different fuels and energy sources.

D. Apply the appropriate carbon emissions reduction target

Use the guidance below, headed 'Which Target applies to my Development?' to identify the appropriate carbon emissions reduction target for your development. Using this calculate the extent of carbon savings that need to be made.

E. Apply the energy hierarchy

The energy hierarchy should be applied in order to identify opportunities for carbon emissions reductions through design and specification of the development. Set out the carbon savings achieved by each measure.

This should include consideration of how to minimise or even design-out electricity use associated with heating, ventilation and cooling, and how to influence energy used by future occupiers e.g. through the installation of Building Energy Management systems or smart metering.

F. Consider all appropriate low carbon, renewable and/or decentralised energy technologies

In order to achieve the overall carbon savings required, consider the range and/or mix of low carbon renewable and/or decentralised technologies that are available and appropriate for the type and location of the development. Set out the carbon savings achieved by each technology or mix of technologies and the associated cost of installing that technology.

Technologies that may be considered appropriate are listed below. This list is not exhaustive and other technologies may be identified by the developer and given consideration. Any proposed technology will need to be appropriate to the site location and surrounding uses.

- CHP/district heating - If the development falls into the category of Target 1 a CHP/district heating feasibility study, encompassing buildings that could be connected in the surrounding area will be expected as part of the consideration of potential low carbon technologies
- Solar Hot Water (SHW)
- Photovoltaics (PV)
- Wind
- Ground Source Heat Pumps (GSHP)
- Air Source Heat Pumps (ASHP)
- Biomass heating

- Gas Combined Heat and Power (Gas CHP)
- Biomass Combined Heat and Power (Biomass CHP)
- Energy from Waste (EfW)
- Deep Bore Geothermal
- Fuel Cell technologies

F. Assessment of least cost technology option

Following on from the above assessment, the identified target should be met using the technology mix which demonstrates the required carbon reductions at the least cost. Where there are no suitable local resources or opportunities, and a district heating network is not deemed viable, solutions to a shortfall in carbon reductions over and above that required to achieve 'carbon compliance' under Government proposals may be met through the use of off-site allowable solutions. (See below)

Local Plan Strategy: 14 Appendix A: Page 223

How will these targets affect the viability of my development?

The overarching aim of policy EN6 is to achieve the maximum reductions in CO₂ for the minimum cost.

It is expected that new buildings apply the energy hierarchy as a first step, with an emphasis on opportunities to design-out or reduce unnecessary energy use and, where possible, adhere to passive design principles, thereby reducing the total energy demand of any development. The residual emissions reduction should be achieved based on the concept of 'carbon compliance' and 'allowable solutions' related to near or off-site solutions.

It is expected that strategic investment decisions by the public and private sector are based around the need to strengthen the business case of energy investments and therefore attract long-term investment in the infrastructure required.

Summary

Although the development is smaller than 10 dwellings and does not need to abide by Policies EN6, the property will be applying the following CO₂ reductions:

- Reduce total predicted carbon dioxide emissions to achieve at least 10% less than building regulations Target Emissions Rate.
- Delivery of energy from low and zero carbon technologies.

ENERGY AND DESIGN CONSIDERATIONS

Several improved energy efficiency standards are proposed for each dwelling which represents an improvement on the minimum requirements of Part L1A.

The following energy efficiency measures will be considered for inclusion in the development during a full SAP assessment:

- Increased levels of floor, wall and roof insulation.
- Energy efficient windows and doors.
- Enhanced draught proofing of new structure.
- 100% use of LED Low Energy Lighting.
- Fully insulated pipework for heating and hot water piping.
- South/Southwest orientation of glazing to maximise solar gain.
- Eco flush toilets resulting in low water use.
- Eco shower heads resulting in low water use.
- Fitting of Eco Smart taps, /aerators resulting in low water use.
- Electric vehicle charging point.
- Energy efficient appliances throughout (A Rated under new rating scheme)
- Electric smart meters
- High Efficiency Natural Gas Combi Boiler
- Solar PV.

The below building standards in table 1 show how development will have reduced carbon emissions compared to the minimum requirements of Part L1A.

Table 1: Improved Fabric Elements		
Building Elements	L1A Min Standard	Min Planned Improvements
Ground Floor	0.18 W/m ² K	0.13 W/(m ² K)
External Wall	0.26 W/m ² K	0.18 W/(m ² K)
Roof	0.16 W/(m ² K)	0.11 W/(m ² K)
Windows	1.60 W/(m ² K)	1.20 W/(m ² K)
Rooflights	2.20 W/(m ² K)	1.70 W/(m ² K)
Doors	1.60 W/(m ² K)	1.00 W/(m ² K)
Thermal Bridging	Standard Details	Construction Details (ECD)
Air Leakage	8.0 m ³ / (h.m ²) at 50Pa	5.0 m ³ / (h.m ²) at 50Pa
Low Energy Lighting	75% Low Energy Lighting	100% Low Energy Lighting

The results of the predicted SAP calculations are summarised within Table 2 below, with full DER calculation sheets attached separately in Appendix 1 and 2:

Table 2: Annual CO2 Emissions Estimate				
Type of Dwelling	Floor Area (m ²)	Emission Rate (TER / DER)	% CO2 Emissions	SAP Result
Target Dwelling	61	15.31	-	77C
Standard Dwelling		21.50	35.48%	
Target Dwelling		15.31	-	84B
Proposed Dwelling		14.58	-11.69%	

Summary: Based on the above it is apparent that the proposed development will achieve an overall minimum reduction in carbon dioxide emissions of at least **11.69%** per annum in comparison to the standard requirements of Part L1A of the Building Regulations. A high efficiency combi gas boiler has been proposed as the primary heating, and hot water system for the dwelling and Solar PV has been proposed for on-site renewable generation. A Mechanical Ventilation with Heat Recovery Unit (MVHR) could be considered to further reduce emissions.

LOW & ZERO CARBON TECHNOLOGIES

Typical guidance received from Councils: All technologies should be considered for their technical feasibility. If they are NOT technically feasible nothing further needs to be stated, except for evidence of why they are not technically feasible.

The following fuel emissions factors have been used as per the [UK Governments emission conversion factors](#) as of 20th September 2022:

	kg CO ₂ e
Electricity generated	0.19338
Transmission & Distribution	0.01769
Natural gas	0.18254

Below is a summary of all the technologies in terms of technical and commercial feasibility as well as overall suitability for the development.

Technology	Technically Feasible	Commercially Feasible	Suitable for Development
Solar Photovoltaics (PV)	YES	N/A	YES
Wind Turbines	YES	N/A	NO
Micro Hydropower	NO	N/A	NO
District Heating	NO	N/A	NO
Solar Thermal	YES	N/A	NO
Air Source Heat Pump	YES	N/A	YES
Ground Source Heat Pump	NO	N/A	NO
Biomass Heating	NO	N/A	NO

Any selected technologies are to be calculated / incorporated into the L1A SAP calculations undertaken as per building regulations.

PROPOSED FEASIBLE TECHNOLOGIES SUMMARY

The following technologies have been considered for inclusion in the development and the findings are reflected in the table below:

Technology	Technical Feasibility	Carbon Savings	Estimated Costs	Financial Viability
Solar Photovoltaics (PV)	Dwelling has a Pitched Roof on the Southwest side offering options for solar. Room for 0.68kw PV Panels.	96kg CO2 equivalent per annum for dwelling will be saved based on the proposed PV Panel system and design analysis.	Based on benchmarking data, the proposed installation should cost £850	The expected energy savings from the PV system will be £123 per annum with smart export tariff of £16 per annum.
Wind Turbines	Average wind speeds on site according to EST Wind Speed Predication Toll is 4.5 m/s .	To be technically feasible local wind speeds need to be a minimum of 5m/s therefore this site is not feasible for wind.	N/A	N/A
Micro Hydropower	There is no capacity for micro hydro on this site and local water courses.	N/A	N/A	N/A
District Heating	There are no council opportunity plans showing existing or planned networks to facilitate connection at this stage.	N/A	N/A	N/A
Solar Thermal (Hot Water)	Dwelling has a Pitched Roof on the Southwest side offering options for solar hot water system and requires space for hot water tank.	102kg CO2 equivalent per annum per dwelling will be saved based on <u>Energy Saving Trust Guidance</u>	Based on benchmarking data the proposed installation should cost ~£4,000	The expected energy savings will be ~£22 per annum. The RHI Scheme has now closed.

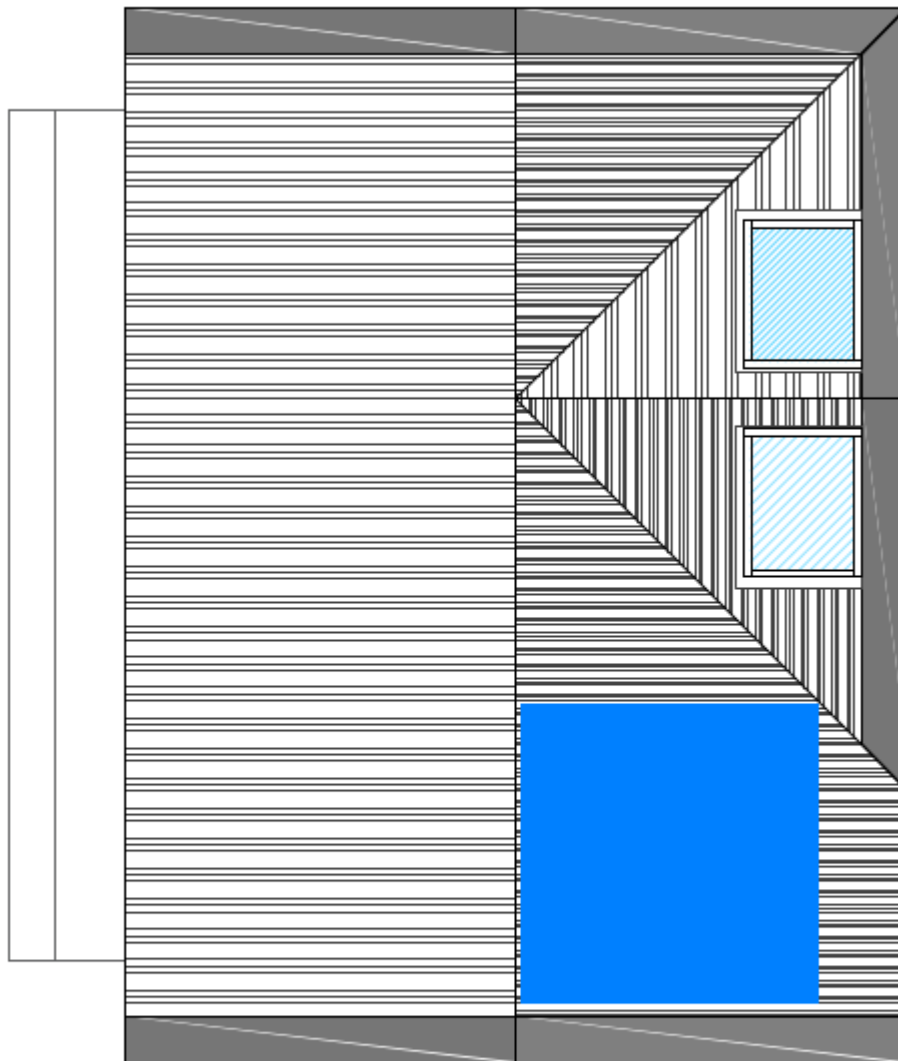
Technology	Technical Feasibility	Carbon Savings	Estimated Costs	Financial Viability
Air Source Heat Pump	Outdoor unit would have to be installed outside of dwelling and sound power level requirement will need to be checked. Re-design of building required with oversized underfloor heating or oversized radiators.	Compared to a modern Gas Boiler. The following saving would be achieved per year based on the proposed system and design analysis: ~824kg CO2	Based on benchmarking data the proposed installation should cost: ~£9,500	The expected energy cost savings will be ~£6 per annum compared to a Gas boiler. The RHI Scheme has now closed. The Boiler Upgrade Scheme (BUS) will deduct £7,500 off the cost and installation.
Ground Source Heat Pumps	Not Technically Feasible due to limited available space	N/A	N/A	N/A
Biomass Heating	There is no space to install a biomass boiler due to type of dwelling and available land and there is little storage space for fuel.	N/A	N/A	N/A

Based on the above assessment, the technically feasible technologies for this project are solar photovoltaics and an air source heat pump. In terms of project viability, solar photovoltaics and heat pumps have the capacity to contribute to reducing the carbon emissions of the site without impacting on the likelihood of the development going forward in terms of project costs.

TECHNOLOGY DESIGN ANALYSIS

Solar Photovoltaics (PV) & Solar Thermal

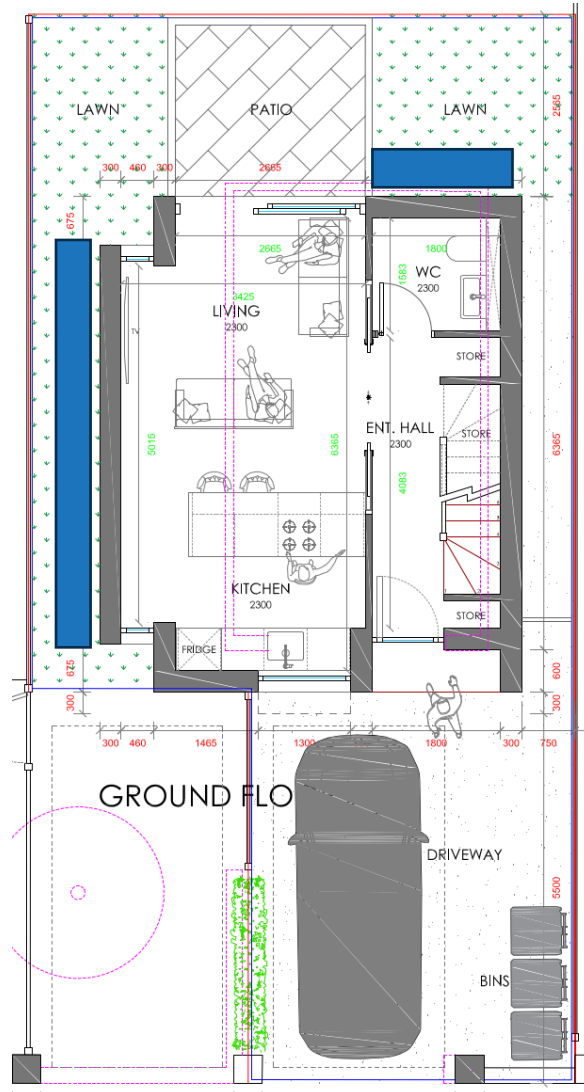
The following solar panel arrangement can be installed on the first-floor roof. The solar arrangement is shown on the pitched Southwest side roof. The layout consists of 2 x High Output panels. A solar thermal panel would require approx. 3m² of panels which can be installed on the 1st floor roof.



ROOF PLAN

Air Source Heat Pump

A suitable location for the internal heat pump equipment (hot water cylinder, buffer cylinder, control unit) would be the plant room or utility room however other locations can be considered.



District Heating

Given the small scale of the development and the very limited heat density in the area the option for district heating has been deemed unviable as the infrastructure costs alone to install a connection to this site would be very high relative to the total build cost.

End of Report:
If you have any questions, please contact us.
Thank you.



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