

ENERGY & ENVIRONMENTAL STANDARDS STATEMENT

Ref: FOBD002

Project: Proposed Wholesale Retail Complex

Address: 7 Bradstone Road
Manchester
M8 8WA

Client: FOB Design

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Revision V1.0

CONTENTS	Page
0.0 Executive Summary	3
Part 1 Energy Statement	
1.1 Introduction	4
1.2 Policy framework	4
1.3 Energy calculation process	7
1.4 Energy efficiency measures (Be Lean)	8
1.5 Energy supply (Be Clean)	10
1.6 Low Carbon Technology (Be Green)	10
1.7 Conclusion	11
Part 2 Sustainability Statement	
2.1 Introduction	12
2.2 Sustainability review	12
Appendices	
Appendix I. Site Plan	13
Appendix II. SAP 2012 Data	14

0.0 Executive Summary

The development at 7 Bradstone Road is for a new wholesale retail warehouse over three storeys. As such Manchester City Council's minimum carbon reduction target for non-domestic development, a 15% reduction over Part L 2010 Building Regulations applies.

Due to the lack of a nearby existing or proposed district heating network the intention is to make use of Microgeneration Technologies where required to achieve the target.

The estimated Target Emission Rates for the development have been calculated using SBEM 2012 (Building Regulations 2010) and are given in Appendix I.

The SBEM 2012 calculations show that across the development using the “fabric first” approach outlined in this report, allied with air source heat pumps would achieve a sitewide CO₂ reduction of at least 38% against Building Regulations Part L 2010.

This development has been designed to incorporate sustainability measures, including the following key points:

- Thermal performance of construction elements which exceeds Building Regulations in combination with low carbon technologies to further reduce energy demand (i.e. air source heat pump system) aspiring to achieve not less than 15% reduction in CO₂ emissions compared with Building Regulations;
- Internal water use to be limited through the provision of water saving fittings;
- Waste minimisation principles adopted both during construction and in the lifespan of the development;
- Use of materials in the construction process which have a low environmental impact as determined by the BRE's Green Guide
- Increasing the use of recycled and sustainably sourced building materials.

Part 1 – ENERGY STATEMENT

1.1 Introduction

The developer proposes a new wholesale retail warehouse complex over three storeys. The site occupies a plot of land at the terminus of Bradstone Road in the Cheetham Hill area to the north of Manchester city centre. The surrounding environment is typically low-rise suburban mixed residential and commercial.

1.2 Policy framework

Development Management **Policy EN 4** of Manchester City Council's Core Strategy document sets requirements for '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.*

Policy EN 5 identifies “Strategic Areas for low and zero carbon decentralised energy infrastructure” however the proposed development site lies outside any of the defined boundaries of such areas and is not considered in this report.

An Energy Statement is required by the Local Authority in line with **Policy EN6** of the Manchester Core Strategy Development Plan which sets out carbon dioxide reduction targets and states the following:

“Applications for residential development of 10 or more units and all other development over 1,000 sq m will be expected as a minimum to meet the target shown in Tables 12.1 or 12.2, unless this can be shown not to be viable. This should be demonstrated through an energy statement, submitted as part of the Design and Access Statement. Such a statement will be expected to set out the projected regulated energy demand and associated CO₂ emissions for all phases of the development.

The target framework relates to three broad development locations and their potential for low and zero carbon, decentralised energy. The areas are defined as follows.

- *Target 1 Network development areas: Locations where the proximity of new and existing buildings, the mix of uses and density of development provide the right conditions to support district heating (and cooling).*
- *Target 2 Electricity intense areas: Locations where the predominant building type has an all electric fit-out such as retail units and leisure complexes.*

- *Target 3 Micro-generation areas: Locations where lower densities and a fragmented mix of uses tend to mean that only building scale solutions are practical."*

Non-domestic CO ₂ emissions reduction targets	
Table 12.2	
Target	% Minimum requirement
Target 1: Network development area	CHP/district heating anchor or connection or where not feasible, a 15% increase on Part L 2010
Target 2: Electricity intense buildings (Applies to commercial uses with a high proportion of emissions from electricity use (>45 kg CO ₂ /m ²))	+10%increase on Part L 2010
Target 3: Micro generation area	+15% increase on Part L 2010

The site classification is assessed as Target Area 3, being low rise and low density fragmented mix of uses and not typifying any clustering of predominantly electrically heated development. As such this sets the target for CO₂ reduction at 15% beyond Part L 2010 requirements.

The Energy Statement will assess the predicted CO₂ emissions for the development and propose a strategy for a minimum 15% reduction from energy efficiency and low carbon technology in line with the policy outlined above. The Simplified Building Energy Model procedure – SBEM 2012 will be used to assess energy use and associated CO₂ emissions. Regulated energy as calculated in SBEM includes all fixed consumption inherent in the building, i.e. fixed lighting, space heating, water- heating and ventilation.

The approach as set out in this energy statement and in line with **Policies EN4 & EN6** is to follow the energy hierarchy and show how compliance with the targets can be achieved. The energy hierarchy will be applied as follows:

- Use less energy through an efficient building fabric
- Supply energy efficiently
- Use renewable energy generated on site

1.3 Calculation Process

The current Simplified Building Energy Model (SBEM 2012) is used for assessing non-domestic buildings falling under the current Building regulations. SAP considers various parameters to calculate the energy performance of a dwelling by calculating a building regulations Part L compliance threshold, the Target Emission Rate (TER) against which the as-designed Building Emission Rate (BER) is measured. The calculation includes but is not limited to:

- Location
- Orientation
- Exposure
- Size
- Zoned activities
- Building fabric construction
- Thermal bridging
- Solar gain
- Ventilation
- Air leakage
- Building services energy demand and heat gains
- Space heating design & water heating design
- Lighting

The building has been fully modelled in SBEM 2012.

1.4 Energy Efficiency Measures (Be Lean)

The core energy strategy for the proposed development is to produce a design that will positively influence the overall predicted energy supply and demand. The aim is to create a development which use less energy and for the energy supply to be clean and efficient and with enough generation by low carbon technology to result in at least a 15% reduction in CO₂ over Part L targets.

Natural daylight

The windows will generate passive **solar gain**, thus reducing some of the requirement for heating. **'A'-rated windows** can provide a net energy input into dwellings. In addition to creating a pleasant living environment and reducing heating demand through solar gain the glazing characteristics will help to reduce the lighting load and therefore electricity consumption.

Building fabric

Fundamental to energy efficiency best practice is a **'fabric first' approach**. This is underpinned by the notion that it is much better to ensure less energy is needed in the first place so that, regardless of how energy is generated and supplied, a building requires less of it. This means that if less renewable technology is implemented e.g. due to development budgets and/or should future owners remove any technology, e.g. if it reaches the end of its serviceable life, then the latent energy demand will be lower than otherwise.

The **thermally efficient glazing** is to be specified with an overall **u-value of 1.3 Wm²K** combined for the frame and glass. This will provide a balance between maximising solar gain and light levels into the internal spaces whilst keeping heat loss down and retaining a reasonable range of product choice.

An **air permeability test target of 5.00** has been set and is 50% lower than the building regulations requirement but without being so low as to create unfavourable air quality

conditions with the potential for mould growth and implications for respiratory health without the intervention of mechanical ventilation which consumes energy.

Insulation and resultant u-values are to be specified as better than current (Part L 2021) building regulations. Table 3.2a below sets out the proposed fabric standards in the context of the current building regulations standards.

Analysis of heat loss goes further than basic elemental insulation and u-values, consideration should also be given to limiting the effects of thermal bridging. This is where heat loss occurs through 'junctions' in the construction which bridge the insulation layer.

Fig 3.2a – Comparative building fabric specification

	Proposed	Part L 2021 Compliance
Roof	0.15	0.18
Walls	0.20	0.26
Floors	0.15	0.18
Windows	1.3	1.6
Air Permeability	5.00	8.00

Lighting

The proposed development will make use of **low energy LED lighting** with a minimum efficiency of 95 luminaire lumens per circuit-watt throughout including any fixed display lighting in the retail spaces. Any security lighting will have appropriate wattage, **sensors and controls** to ensure efficient operation.

1.5 Energy Supply (Be Clean)

Heating & hot water fuel

The proposed development will be fuelled by grid electricity and thus will not be wholly or directly dependent on fossil fuels. Grid electricity is less carbon intense than when SBEM 2012 was released and the government has published new carbon factors to reflect this and these are incorporated in the new Part L now in effect and to which this development will need to adhere. As such, reported carbon in the energy model will in fact be even lower in reality

1.6 Low Carbon Technology (Be Green)

The building has been modelled in SBEM 2012 software incorporating the specification elements detailed within this report, the client's brief and our recommendations.

Air Source Heat Pumps

The key low carbon technology to be implemented will be air source heat pumps to provide space heating. These operate at a higher efficiency than standard electric heating and can generate over 3kW of heat energy for every 1kW of grid electricity consumed. The SCOP (Part L heating efficiency) assumed in the model is 4.5 and the SEER (Part L cooling efficiency) is 5.00.

Emissions Reduction

The development will be subject to the new Part L 2021 which came into force in June this year, and so the proposals have been modelled in the new software in order to demonstrate feasibility of compliance. This specification has then been run in the SBEM 2012 model. The SBEM 2012 calculation indicates a Part L 2010 baseline target total annual CO₂ emission rate of **162,462 kg CO₂**, and so to meet the requirement for a 15% reduction, a saving through energy efficient design and on-site renewable generation of **24,369 kg CO₂** is required.

The calculations demonstrate that the proposed fabric and services specifications as outlined above would reduce sitewide CO₂ emissions by approximately **61,447kg (38%)** per annum beyond Part L 2010 targets.

1.7 Conclusion

In conclusion, the proposed fabric-first and energy efficient services design approach incorporating low carbon air source heat pump technology will achieve a **38% reduction in CO₂** emissions over Part L 2010 targets as required by the local authority in line with Policies EN4 and EN6 of the Local Plan. The proposals will also comply with the new more stringent requirements of Part L 2021 now in place.

As the development is to be offered to market as a Shell & Core it will be incumbent on whoever is responsible for the fit out to ensure building services compliance with Part L. As demonstrated in this report, the level of specification required to achieve this will likely exceed the planning policy targets applicable.

Part 2 – SUSTAINABILITY STATEMENT

2.1 Introduction

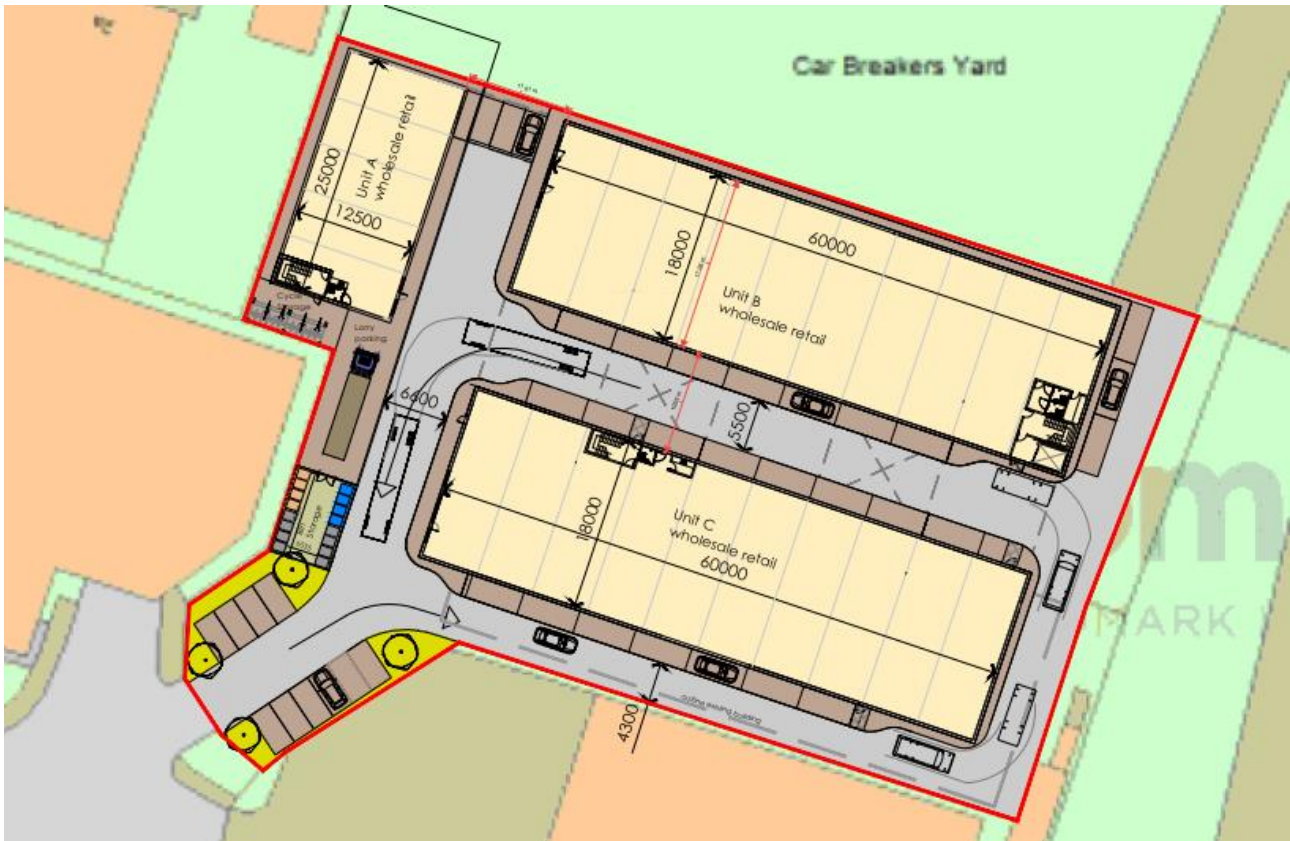
This Sustainability Statement has been prepared in order to suggest sustainable design and construction measures which may be included in the proposals for the development of the site to meet the requirements of the Local Planning Authority.

2.2 Sustainability review

The following list is a summary of the relevant aspects of sustainable design and practice to be included in the proposals.

- Aspiring to exceed Building Regulations carbon emission toward the levels required under local planning policy.
- Specifying low water use sanitary features.
- Implementing a Site Waste Management Plan to include procedures for the minimisation of waste production according to defined groups, and the diversion of not less than 50% of recyclable construction waste away from landfill.
- Promoting a Considerate Constructors Scheme and endeavouring to achieve not less than a best practice score as a means of demonstrating exceptional construction practice.
- Use of 'A' or 'A+' rated elements for the building envelope in accordance with the BRE Green Guide.
- A flood risk assessment has been or will be commissioned to ensure adequate consideration of site flood risk and drainage options.

Appendix I – Site Plan



Appendix II – SBEM data output for Energy Statement calculations

See next page