



SUSTAINABILITY SERVICES

Energy Statement Trade City Sharston

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Prepared by:	Kehinde Adewumi MSc. ACIAT. LCC.NDEA	July 2025
Checked by:	Abhinaya Vittal MSc	July 2025
Verified by:	Julian Leese NDEA L5	July 2025

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CHBS

2nd floor, 28 King Street, Manchester M2 6AY

Email: info@chbs.co.uk

Tel: 0161 341 0088

Executive Summary

The proposed development comprises approximately 8,511.5 m² (GIA) of two storey Warehouse Units (Use Class B2 / B8), including ancillary offices and trade counters, with all associated works including landscaping, car parking and alterations to access arrangements.

This Energy Statement has been compiled to analyse the predicted energy consumption (regulated) & carbon dioxide emissions of the proposed development and provide recommendations to improve energy efficiency and provide renewable energy from low and zero carbon technologies.

Through application of the energy hierarchy, the proposed Energy Statement would result in an overall carbon dioxide emissions reduction of approximately **20%** (figure 1) through energy efficiency and renewable energy generation when compared to the worst allowable Building Regulations Approved Document Part L Volume 2 2021 performance.

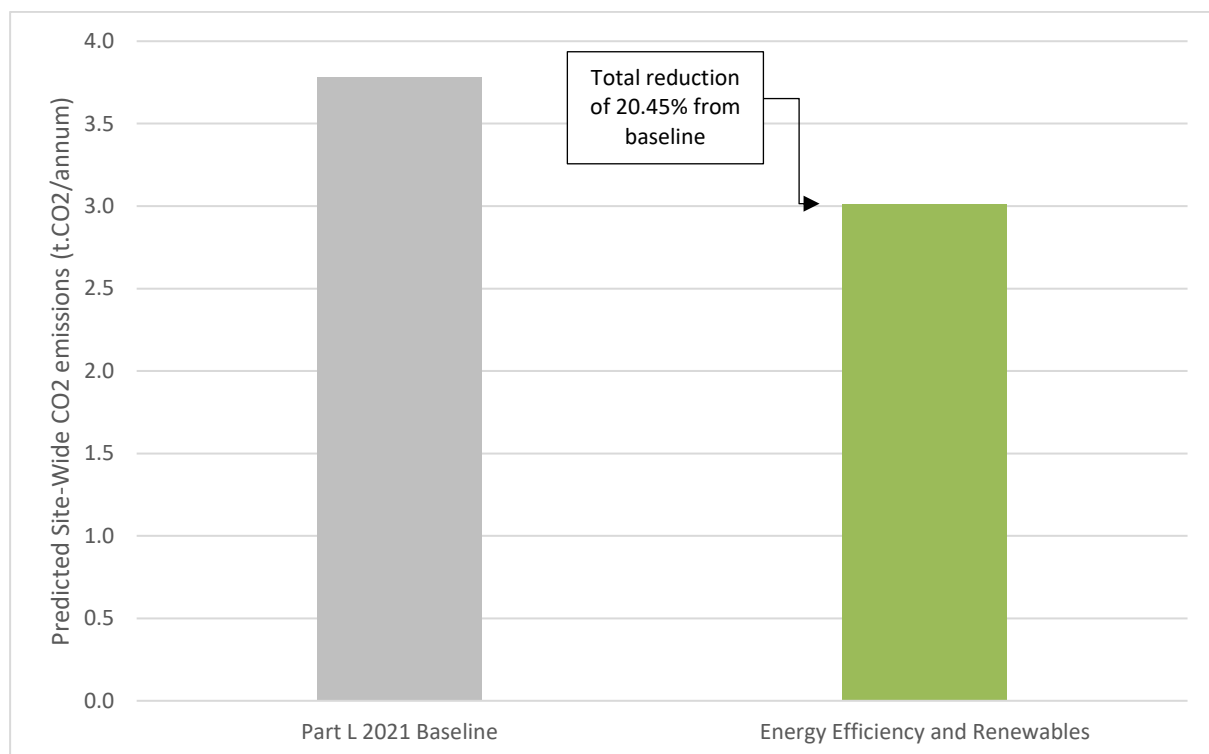


Figure 1: Predicted site-wide CO₂ emissions through application of the energy hierarchy

A renewable energy pre-feasibility study has been performed and found that Air Source Heat Pumps and Solar PV are the most appropriate renewable energy technologies for the site. Air Source Heat Pumps shall provide heating and hot water to the core area and Solar PV of a minimum site-wide capacity of 90 kWp shall provide electricity on a site wide basis.

This Energy Statement demonstrates how the proposed development follows the principle of the energy hierarchy of implementing passive design measures, energy efficiency measures and low or zero carbon technologies to ensure Policy EN4 of the Manchester City Council Core Strategy has been met.

By demonstrating how the development follows the energy hierarchy to improvement by at least 10% on Building Regulations Approved Document Part L Volume 2 2021, the requirements of the Manchester City Council Core Strategy Policy EN6 have been exceeded by virtue of a **20.45%** reduction over the Building Regulations Approved Document Part L Volume 2 2021.

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1. Introduction

This Energy Statement considers the proposed industrial warehouse units at Former Electrium Sales Ltd Site, 1934 Sharston Road, Wythenshawe.

Development description

The proposed development comprises the erection of two-storey warehouse units (Use Class B2/B8), including ancillary offices and trade counters, with a total Gross Internal Area (GIA) of approximately 8,511.5 sq. m. The scheme also includes all associated works, such as landscaping, car parking, and alterations to the existing access arrangements.

It is proposed that Unit 1, 2A-2D and 3B and 3D shall be provided with first floor office spaces while 3A and 3C shall be provided with a mezzanine space overseeing the warehouse area.

The proposed site plan can be seen in Figure 2 below.

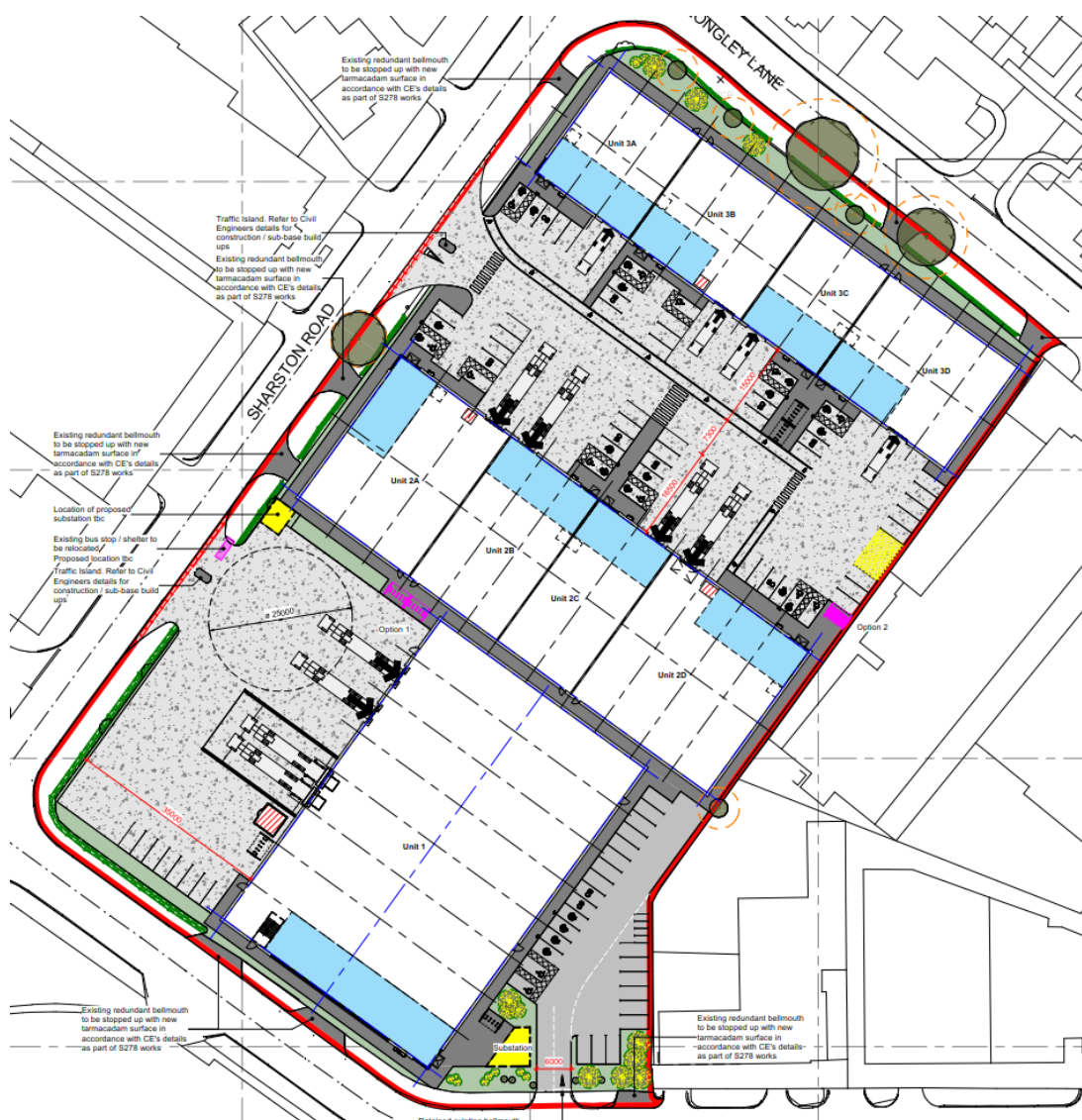


Figure 2: Proposed site plan

Purpose of the document

The purpose of this Energy Statement is to demonstrate that climate change mitigation measures shall be integrated into the scheme's design and that the proposed measures are appropriate to the site environment and energy demands of the development.

This document shall describe the policy context to which the Energy Statement responds before presenting the energy and carbon dioxide emissions and demonstrating how it is proposed to reduce this through energy efficient design; clean energy supply; and green on-site renewable energy generation.

Simplified Building Energy Model (SBEM) calculations have been performed to inform this Sustainable Energy Statement. This involves creating a three-dimensional model of the proposed building (Figure 3) and then populating the model with the building fabric and building services specification. The SBEM calculation is then run to simulate the building energy consumption and resultant carbon dioxide emissions due to the predicted operation of the building over a typical year.

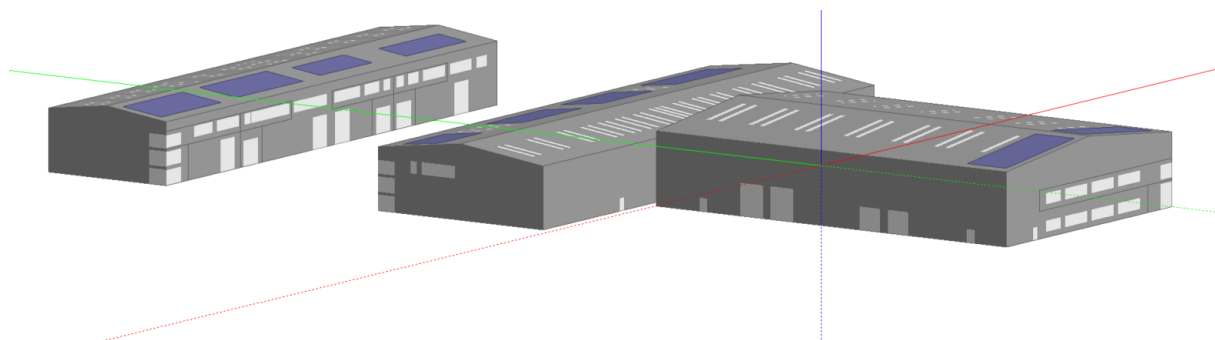


Figure 3: Proposed development modelled in DesignBuilder software

Methodology in the document

Design Stage SBEM energy modelling calculations have been performed based upon the planning drawings in order to produce the most accurate estimate of the site's energy demands.

The report is based on information provided in the following drawings by Horizon Fletcher Rae Architects. Please refer to the cover letter submitted following the planning application.

2. Shell and Core Developments

The proposed development is a shell and core development as defined within paragraphs 2.21 – 2.25 of Building Regulations Approved Document Part L Volume 2 (2021). This guidance states that the design stage SBEM submission should assume building services and efficiencies for the areas of the building that will be for fit-out by future tenants to demonstrate how the building shell could meet the energy efficiency requirements. However, at practical completion of the shell, the as-built SBEM submission shall be based only on the building and services as constructed.

The calculations within this report assume that the warehouse areas shall be heated following the tenant fit-out based on typical warehouse heating systems. The warehouse building fabric shall be designed to be sufficiently energy efficient.

It should be noted that it is only possible for the developers of a speculative shell and core building to influence the energy and carbon dioxide emissions of the building as constructed at practical completion, this is especially pertinent for speculative industrial buildings which could potentially have a wide range of fit-out specifications depending on the end user.

This Energy Statement will emphasise a fabric-first approach to energy demand reduction to ensure that the proposed development will be energy efficient regardless of the flexibility of future uses.

3. Policy background

3.1 National Planning Policy Framework

Achieving sustainable development is the main aim set in the National Planning Policy Framework (NPPF). This involves seeking improvements in the quality of the built, natural and historic environment.

There are three dimensions to sustainable development. These are:

1. Economic: Contributing to building a strong, responsive and competitive economy, by ensuring that sufficient land of the right type is available in the right places and at the right time to support growth and innovation.
2. Social: Supporting strong, vibrant and healthy communities, by providing the supply of housing required to meet the needs of present and future generations; and by creating a high quality built environment.
3. Environmental: Contributing to protecting and enhancing our natural, built and historic environment; and, as part of this, helping to improve biodiversity, use natural resources prudently, minimise waste and pollution, and mitigate and adapt to climate change including moving to a low carbon economy.

Due to compelling evidence of climate change, the government formed the Climate Change Act 2008 which targets reductions in greenhouse gas and CO₂ emissions. National Planning Policies have continued to put renewable energy at the top of the agenda in addressing climate change. Planning Policy Statement 22 'Renewable Energy' PPS 22 stresses that an increased development of renewable energy resources is vital to facilitating the delivery of the Government's commitments on both climate change and renewable energy.

3.2 Manchester Core Strategy 2012-2027

The Core Strategy was adopted by Manchester City Council on 11th July 2012. It is the key document in Manchester's Local Development Framework and covers a period of 15 years from 2012 to 2027. It describes Manchester today and outlines the Council's vision for Manchester along with the planning policies which will be used to deliver that vision.

The key policies outlined in the Manchester core strategy in terms of Sustainable Development for Non-Domestic applications are as follows:

Policy EN4: Reducing CO₂ emissions by enabling Low and Zero Carbon Development

All development must follow the principle of the Energy Hierarchy:

- 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 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 EN6: Target Framework for CO₂ reductions from low or zero carbon energy supplies

New major non-domestic development over 1000m² will be required to meet carbon emissions reduction target as set in the table 12.2 of the core strategy:

1. Developments within the network area shall be connected to a district Combined Heat and Power (CHP) or where not feasible, deliver a 15% improvement on Part L 2010.
2. Electricity Intense Buildings shall deliver a 10% improvement on Part L 2010.
3. Developments within the Micro generation area shall deliver a 15% improvement on Part L.

It is anticipated that the development will be classed as 'electricity intense'. Therefore, the target requirement for the proposed development shall be to achieve a 10% improvement on Part L 2010.

The units shall be required to pass Building Regulations Part L 2021 which is already a circa 27% improvement on the 2013 standards while part L 2013 is about 9% improvement over Part L 2010 making 36% improvement in regulated CO₂ emissions between Part L 2021 and Part L 2010 for non-domestic buildings. However, this Energy Statement shall detail energy efficiency measures and potential renewable energy sources to not only meet the requirement in Policy EN6 but also achieve a reduction on the current Part L 2021 standards.

3.3 Places for Everyone Joint Development Plan 2022 to 2039

The joint development plan, which was adopted March 2024, sets out bold plans to give people, communities and businesses hope and confidence for the future in the whole of Greater Manchester. The plans are focused on delivering the ambitions in the Greater Manchester Strategy: a good start in life for everyone; good opportunities for our young people to equip them for life; good work and the best jobs in a valuable, productive, zero carbon economy; safe, secure housing in inclusive and diverse communities; a good cultural and leisure offer for everyone; a green city-region; good health and

support for people to live fulfilling lives, with quality care for those who need it; to be a good place to grow older and to be a place where everyone is connected – socially, digitally and by a clean, integrated and accessible transport system.

The key policies outlined in the Places for Everyone Joint Development Plan in terms of Sustainable Development are as follows:

Policy JP-S1: Sustainable Development

This policy tackles the impact of development on climate change by proposing that development should aim to maximise its economic, social and environmental benefits simultaneously, minimise its adverse impacts, utilise sustainable construction techniques and actively seek opportunities to secure net gains across each of the different objectives.

This policy further emphasises on the use of brownfields site and vacant buildings to meet development needs and highlights programme of mitigation to reduce emissions including by:

- Significantly upscaling solar photovoltaic energy
- Reducing heat demand in homes
- Moving away from carbon intensive gas as the primary source of heat
- Reducing heating and cooling demand for public and commercial buildings
- Increasing biofuel use
- Enable sustainable choices for travel and decarbonise transport
- Significantly upscaling building retrofit
- Increase the delivery of nature-based solutions and biodiversity net gain

Policy JP-S2: Carbon and Energy

This policy aims to deliver a carbon neutral Greater Manchester no later than 2038, with a dramatic reduction in greenhouse gas emissions, will be supported through a range of measures including:

- Promoting the retrofitting of existing buildings with measures to improve energy efficiency and generate renewable and low carbon energy, heating and cooling
- Promoting the use of life cycle cost and carbon assessment tools to ensure the long-term impacts from development can be captured
- Taking a positive approach to renewable and low carbon energy schemes, particularly schemes that are led by, or meet the needs of local communities
- Increasing the range of nature-based solutions including carbon sequestration through the restoration of peat-based habitats, woodland management, tree planting and natural flood management techniques

Additionally, it is expected that all new build development except where proven not practicable or financially viable shall be designed to the following standards.

Additionally, the following document has also been considered in the preparation of this report

- National Planning Policy Guidance ('PPG'); and other
- adopted and emerging supplementary planning guidance.

Be net zero – it is expected that from 2025 all development shall calculate and minimise carbon emissions from unregulated emissions alongside regulated emissions. These figures shall be reported in the energy statement and in accordance with the energy hierarchy as follows.

- i. Minimise energy demand
- ii. Maximise energy efficiency
- iii. Use renewable energy
- iv. Use low carbon energy
- v. Utilise other energy sources.

It is expected that from 2025 any residual carbon emissions that cannot be fully mitigated on-site should be offset, in agreement with the relevant local planning authority through a financial contribution to a carbon offset fund.

BREEAM – All non-residential development achieves at least BREEAM excellent standard (or equivalent) for the 'Ene 01 – reduction of energy use and carbon emissions' category rising to 'BREEAM outstanding' equivalent for ENE 01 from 2028.

Other energy efficient measure to consider include

- Installation of EV charging
- minimisation of overheating risks
- appropriate measures for post occupancy evaluation
- Whole life cycle emissions where possible

4. Passive Design and Energy Efficiency

Although this report is primarily concerned with reducing overall energy & CO₂ emissions. Hence, it is imperative to consider passive design, energy efficiency and renewable energy measures.

In most cases, there are available measures that can be integrated into the design from an early stage to ensure that energy demand is reduced within the proposed development, and this can allow a much higher proportion of the building's energy demand to be met by renewable energy technologies.

If energy efficiency measures do entail an increased capital investment it can generally be demonstrated that this increased initial cost is quickly recouped through reduced operating costs throughout the building lifetime and lower capital investment in renewable energy technologies.

As a minimum to demonstrate compliance with the BREEAM requirement (Ene04 criterion 2) for passive design consideration the following measures are considered within the proposed development:

Site location

The proposed industrial warehouse units are located on the former Electrium Sales Ltd site at 1934 Sharston Road, Wythenshawe.

The immediate context of the Site is characterised predominantly by low to medium-rise industrial and commercial buildings, typically ranging from single-storey units (5–7 metres to eaves) to two-storey structures reaching up to approximately 8–10 metres in height. To the north and northeast of the site, where Sharston meets Northenden, the built form transitions to a more residential scale, with

traditional two-storey houses and small apartment blocks. These typically range between 6–9 metres in height, maintaining a suburban character.

As a result of these immediate features surrounding the site, it is important to consider the effect of the proposed development on the already existing development within the proposed site and understand how the proposal can affect the immediate environment and also how best to utilise the site.

Site weather

The closest weather files used are:

Central case weather data: Manchester CIBSE TRY

Extreme weather data: Manchester CIBSE DSY2 2016 2020High50 percentile & Manchester CIBSE DSY3 2016_2020High50

Microclimate

Based on the assessment of the site using Google imagery and the site location plan provided, it can be said the building will benefit from some shading from the eastern boundaries of the development. It is also expected that these existing developments shall serve as a buffer for noise reduction and reduced impact of wind on the building façade.

The Site is bound by Harper Road, to the south, Sharston Road to the west, Longley Lane to the north and existing industrial buildings to the east. To the south, east and west of the Site are predominantly commercial uses within Sharston Industrial Estate. To the north, across Longley Lane, lies residential uses, a nursery, medical centre and primary school.

Building layout and orientation

The proposed development comprises 9 warehouse units that have been carefully placed to maximise the land use.

The warehouse unit shall have an area of 7,240.1 m² plus 1271.4 m² of first floor space. The arrangement comprises one detached unit positioned south, and two terraced units located to the north of the site, making optimal use of the available footprint. The core area and first floor of Unit 1 and 3 shall benefit from sunlight from the southwest facing glazing while unit 2 shall benefit from the northeast facing glazing.

Building form

The building form and geometry have been designed to maximise the potential of the existing site and land use.

The proposed design is contemporary in design, with the elevational treatment carefully considered to provide sufficient architectural interest whilst being economical. The linear elevations are broken down by the use of contrasting cladding colours and scales.

Building fabric and Thermal mass

In order to reduce the demand for heat energy it is proposed to construct the development with a highly thermal-efficient building envelope.

The building fabric U-values and air tightness of the proposed development shall be designed to meet the minimum requirements of Building Regulations.

The thermal efficiency of the proposed development is intended to be further enhanced through the specification of improved construction details in order to reduce thermal bridging.

Building occupancy type

The building form has been carefully determined to provide for the appropriate location of each of the internal space use, especially the office spaces.

Daylighting strategy

The building shall benefit from the opportunity to leverage daylighting to the office area and roof light proposed to the warehouse areas.

Natural daylight reduces the demand for artificial and energy-consuming lighting whilst ensuring solar gains do not increase cooling requirements from overheating. This includes ensuring a suitable amount of daylight for the occupant's well-being.

Ventilation strategy

The overall ventilation strategy for the development is mechanical ventilation with heat recovery to the office spaces local mechanical extract in WC areas and natural ventilation to all other zones.

Adaptation to climate change

The impacts of climate change are expected to be characterized by more extreme weather patterns across the seasons, with predictions of milder, wetter winters and hotter, drier summers.

The building has been designed with these seasonal changes in mind, incorporating sensible strategies to enhance resilience. Further thermal comfort analysis will be conducted to assess and optimize the building's suitability under these conditions.

5. Baseline Energy Demand and Carbon Dioxide Emissions

The baseline energy demand of the proposed development is based on initial design-stage SBEM calculations. The baseline energy demand and carbon dioxide emissions are based on the 'notional emissions' that are the worst allowable under Building Regulations Approved Document Part L Volume 2 (2021).

Please note that all total figures include regulated consumption assessed within Building Regulations only, equipment energy is not calculated within Building Regulations as the developer is unable to directly influence this end-use.

SBEM calculations have been performed to generate energy demand and resultant carbon dioxide emissions for the proposed development. The results are then multiplied by the floor area of the development to give an estimate of the site-wide emissions. These calculations are shown in Table 1 below.

Carbon emissions are calculated based on the 2021 edition of the National Calculation Methodology fuel factors.

Table 1: Predicted baseline energy consumption and carbon dioxide emissions

	Energy End Use (kWh/ annum)					
	Heating	Cooling	Auxiliary	Lighting	Hot Water	PV
Total	30,788	1,204	5,418	41,882	11,610	-69,918

	Energy Use (kWh/annum)	CO ₂ Emissions (t.CO ₂ / annum)
Total	20,984	3.78

6. Energy Efficient Design Measures

Energy efficiency design measures to reduce energy demand have been considered in three stages; layout and orientation; building fabric; and building services. The proposals to reduce energy at each of these stages are described within this section.

6.1 Layout and Orientation

The proposed layout has been carefully designed to maximise the functionality of the site while maintaining clear and efficient circulation for vehicles and pedestrians. The arrangement comprises one detached unit positioned south, and two terraced units located to the north of the site, making optimal use of the available footprint. The core area and first floor of Unit 1 and 3 shall benefit from sunlight from the south west facing glazing while unit 2 shall benefit from the northeast facing glazing.

This allows for natural daylight to enter the building, reducing the reliance on artificial lighting as well as providing acceptable limits of solar gain to reduce the heating demands. It is also proposed that each unit shall have roof lights of not more than 10% of the warehouse floor area in order to maximise the availability of natural daylight and avoid overheating. This strategy reduces the demand for artificial lighting and saves energy. It also helps create a visually stimulating and productive environment for building occupants.

The site shall be sheltered by the existing buildings surrounding the site. These buildings will provide significant shelter from prevailing winds and protection to the proposed development.

6.2 Building Fabric Analysis

Building U-values

In order to reduce the demand for heat energy it is proposed to construct the development with a highly thermal efficient building envelope.

It is proposed to improve the building fabric U-values and air tightness significantly upon the minimum requirements of Building Regulations; the scale of improvements is demonstrated in Table 2.

Table 2: Proposed U-values and improvements over worst allowable Building Regulations performance.

Element	Proposed	Worst Allowable L2 2021	% improvement over Part L
Roof	0.16 W/m ² .K	0.18 W/m ² .K	11.11%
External Wall	0.18 W/m ² .K	0.26 W/m ² .K	30.77%
Floor	0.15 W/m ² .K	0.18 W/m ² .K	16.66%
Window Glazing	1.40 W/m ² .K Proposed g-value is 0.30	1.60 W/m ² .K	12.5%
Rooflights	1.0 W/m ² .K Proposed g-value is 0.43	2.20 W/m ² .K	54.55%
Pedestrian Doors (Glazed)	1.40 W/m ² .K	1.60 W/m ² .K	12.5%
Vehicle Access Doors	1.3 W/m ² .K	1.30 W/m ² .K	0.00%
Air Permeability	3m ³ /(hr. m ²)	8 m3/(hr. m ²)	62.5 %

Beneficial solar gains & Natural lighting

The building has been designed and orientated to utilise solar gain (with no risk of overheating) and to take maximum advantage of the sun's potential energy. The core area and first floor of Unit1 and 3 shall benefit from sunlight from the southwest facing glazing while unit 2 shall benefit from the northeast facing glazing. This provides an appropriate balance of beneficial solar gains while encouraging the admission of natural daylighting; direct sunlight and diffuse skylight in order to reduce electric lighting, thus reducing energy demand. This also helps create a visually stimulating and productive environment for building occupants.

Measures Taken to Reduce the Impact of Solar Gain on the Development and Prevent Overheating:

1. Rooflight Limitation: The total area of rooflights in the warehouse has been restricted to a maximum of 10% of the warehouse floor area. This measure is aimed at minimizing solar gain and reducing internal heat buildup.
2. Overheating Mitigation in Units 1, 3B and C Office Space: Initial simulations, as indicated in the BRUKL report, identified potential overheating in the Units 1, 3B and C Office Space. To address this, internal blinds have been proposed for this zone. These blinds will have a solar transmission factor not exceeding 0.8 and medium translucency to help limit the amount of solar radiation entering the space.

Thermal bridges

Thermal bridges are junctions between thermal elements where irregular heat losses occur due to gaps in the insulation layer. Continuity of insulation should be designed into the construction details in order to minimise thermal bridging.

The thermal efficiency of the proposed development is intended to be further enhanced through the specification of improved construction details in order to reduce thermal bridging.

The developers will work closely with the metal cladding system manufacturers, as in some cases they can provide enhanced construction details that limit heat loss further than can be assumed at concept design stage.

Psi-values (Ψ) are the rates of heat loss along the length of a thermal bridge measured in W/m.K.

The following Ψ -values shown in Table 4 were used within the SBEM model. These values are based on figures achieved in similar industrial developments.

Table 4: Ψ -values based on similar developments

Junction involving metal cladding	Cladding Ψ -value (W/m.K)	Notional Ψ -value (W/m.K)	Default Ψ -value (W/m.K)
Roof – Wall (average verge/eaves)	0.09	0.28	0.42
Wall – Ground Floor (drip sill)	0.06	1.00	1.73
Wall – Wall (corner)	0.24	0.20	0.38
Wall – Floor (not ground)	0.00	0.00	0.04
Lintel (all openings)	0.8	1.00	1.91
Sill (all relevant openings)	0.1	0.95	1.91
Jamb (all openings)	0.17	0.95	1.91

It is necessary to ensure that construction details are not only designed to meet a sufficient psi-value in accordance with Table 4, but that there is a procedure in place to check the junction constructions on-site are built in accordance with the design.

6.3 Building Services Analysis

Further energy savings can be achieved through specification of energy efficient building services.

The following building services specification at handover is assumed to be as follows:

Space Heating & Domestic Hot Water

It is proposed that all zones shall be served by an energy efficient air source heat pump (ASHP). Same systems shall also provide Hot water to the units with a Coefficient of Performance of 3.4 and storage loss of 1.15 kwh/day.

Cooling

Unit 1 office space has been proposed to be served by an energy efficient VRF system of 5.5 SEER.

Ventilation

The WC areas shall be provided by extract ventilation with fans selected to have a specific fan power (SFP) of no greater than 0.3 W/(l/s) while the office area has been proposed to be served by a Mechanical ventilation with heat recovery Of 80% and specific fan power (SFP) of 1.1 W/(l/s). all other zones within the development shall be naturally ventilated.

Lighting

The installation of energy-efficient lighting and controls in the proposed development will contribute significantly to reducing overall energy consumption. As a minimum, the lighting installation will comply with the Part L 2021 requirements, ensuring a minimum efficiency of 95 lumens per circuit watt. To further enhance energy performance, the installation of photoelectric dimming and PIR (passive infrared) sensors will provide occupancy and daylight control in the warehouse, first-floor offices, and mezzanine areas. This will ensure artificial lighting is only used when natural light is insufficient or when the spaces are occupied. Additionally, the installation of PIR sensors in WCs and other core areas to deliver automatic on/off control shall ensure that lighting operates only when these spaces are in use.

These measures collectively support the development's aim to reduce unnecessary energy use and promote operational efficiency.

Metering

The electricity supply will be metered to end-uses as appropriate to satisfy the requirements of paragraph 5.17 of the Approved Document L Volume 2 2021.

Power Factor Correction

A power factor correction device can adjust the wavelength of the electricity supply to ensure that minimal electrical energy is wasted within the building.

A power factor correction system will maintain the power factor >0.95.

6.4 Assumed Fit-Out Building Services

Although the units shall be handed over to the occupier with no fixed services within the shell areas, the calculations used within this report have assumed that these areas are unheated and have lighting.

The figures used are based upon the worst allowable figures found in the Non-Domestic Building Services Compliance Guide.

6.5 BREEAM Pre-Assessment

In addition to the significant environmental and economic benefits of energy efficient design and services, there are a host of other areas of sustainability, and these are considered in more detail within the BREEAM Pre-Assessment by CHB Sustainability.

7. Renewable Energy Technologies

The options available for the inclusion of Low and Zero Carbon (LZC) technologies in the proposed development are discussed in the renewable energy technical feasibility matrix shown in Table 5.

Table 5: Renewable energy technical feasibility matrix.

Technology	Pre-Feasibility
Solar	
Solar Hot Water	There is sufficient solar resource and suitable shade free facing roof available for this technology. However, the proposed development is expected to have a low demand for domestic hot water.
Solar Photovoltaic	There is suitable shade free roof space available and sufficient electricity demand for the proposed development.
Water	
Small Scale Hydro Power	No potential hydro resource on-site.
Wave and Tidal Power	Site not located in a coastal location.
Wind	
Wind Turbine	The average wind speed in the area of the proposed development is 4.8m/s at 10m hub height (NOABL Wind Map). This is less than 5 m/s minimum required for further Investigation.
Biomass	
Biomass Boiler	Due to the lack of plant space and speculative nature of the development, this technology would not be suitable. There would also be a requirement for personnel to administer and maintain the biomass boilers which is not a practical solution for the proposed development.
Combined Heat and Power CHP	
CHP	This technology requires a predictable and constant heat demand with high operational hours, such as a swimming pool. The office and amenity areas of the proposed development annual baseload heat demands are not considered sufficient for combined heat and power generation.
District Heating	
Biomass Community Heating Scheme	There are no nearby biomass heating schemes. In addition, the anticipated heating and hot water demand means other technologies would deliver greater energy savings and carbon emissions reductions.
CHP Community Heating Scheme	There are no potential heat sources for district heating networks. In addition, the anticipated heating and hot water demand means other technologies would deliver greater energy savings and carbon emissions reductions.
Heat Pumps	

Water Source Heat Pump	The site is not situated in close proximity to water source. In addition, water source heat pumps are generally complex systems to install and are better suited to bespoke developments. Cooling towers are prone to freezing and require additional maintenance in winter months. The high maintenance requirement of such systems makes them less appealing to possible tenants.
Ground Source Heat Pump	Ground source heat pumps could provide heating, hot water and cooling (<i>if required</i>) to the office and amenity areas of the proposed development by using the relatively stable temperature in the ground. However, due to high installation costs, it is only economically feasible for larger office areas with a greater energy demand.
Geothermal	The proposed development shall not have heating and hot water demands to benefit from this source of energy. Exploratory investigation would incur high costs due to drilling to the required depths and therefore, this is not considered to be a feasible option.
Air Source Heat Pump (ASHP)	Air source heat pumps could provide space heating and hot water to the core areas of the proposed development. There are no technical feasibility restraints to this technology.
Variable Refrigerant Flow (VRF) with Heat Recovery	VRF is a type of ASHP system that can provide simultaneously heating and cooling (<i>if required</i>) in different parts of the building at very high efficiencies by using the heat from areas where is not needed to the areas where there is a heating demand.
Others	
Waste Heat	The proposed development will not involve processes which generate waste heat. Also, there are no potential high-grade heat sources known.
Transpired Solar Air Collectors	Transpired solar collectors could be used to pre-heat the building. However, due to the proposed openings on the south-east and south-west sides of the building and shading from the proposed landscape buffer there is minimal available south facing wall available.
Hydrogen Fuel Cell	Hydrogen is an energy storage medium and environmental benefits are only found where hydrogen is generated from renewable energy sources. However, there is limited market available, high capital and maintenance costs and life expected from fuel stacks is less than 10 years.

8.1 Proposed Technologies

The following technologies have been proposed and would be assessed in more detail within the later section of this report.

1. Solar PV
2. Air source heat pumps

Photovoltaic (PV) solar panels, convert sunlight into electricity, which can then be used to meet the demands for the proposed development due to appliances and lighting. This technology would be suited to the proposed development as there are no technical feasibility restraints.

Air source heat pumps - can provide space heating and domestic hot water with efficiencies of well over 300% by capturing ambient heat within the atmosphere. This technology would be suited to the proposed development as there are no technical feasibility restraints.

It is proposed that the air source heat pumps with a SCOP of 3.4 shall be used to provide heating and hot water to the units. In addition, solar PV arrays with a minimum site-wide capacity of 90 kWp capacity have also been proposed.

The proposed indicative PV locations can be seen in the image below. The final PV design must be carried out by an MCS-accredited person in association with the design team to account for access, roof loading, wind loads, etc.

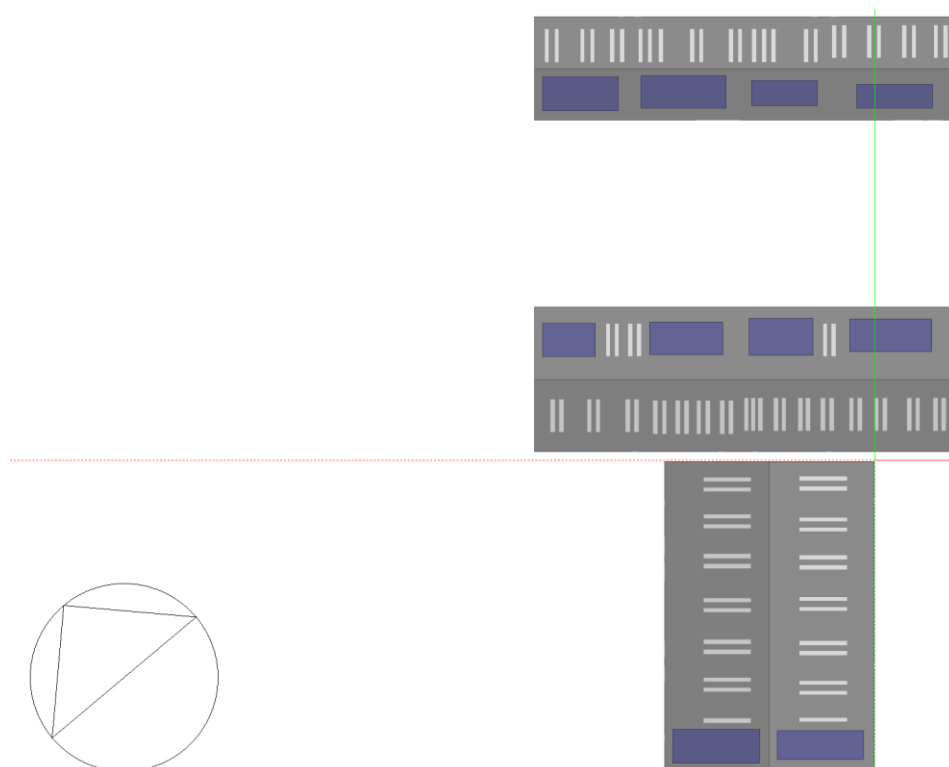


Figure 3: Proposed PV orientation and distribution

**Note that the PV layout as show on the model is a graphical representation for guidance only and should not be taken as the as designed layout. Additionally, please note that the indicative PV locations assume a low pitch roof (6°)*

8. Energy Demand and Carbon Dioxide Emissions after Renewables

Table 6 shows the reduction in energy and carbon dioxide emissions due to the proposals to incorporate energy efficiency measures and renewable technology, and this is compared against the residual energy and carbon dioxide emissions.

Table 6: Predicted site-wide energy consumption by end-use

	Energy End Use (kWh/ annum)					
	Heating	Cooling	Auxiliary	Lighting	Hot Water	PV
Total	23,650	1,204	4,988	36,636	10,406	-62,522

	Energy Use (kWh/annum)	CO ₂ Emissions (t.CO ₂ / annum)
Total	14,362	3.01
Reduction on baseline	31.56%	20.45%

The results show that a total reduction in energy and carbon dioxide emissions of 22.90% and 15.38% respectively can be achieved against the baseline building through the implementation of energy efficiency measures and renewable energy technology.

9. Concluding Summary

This Energy Statement demonstrates that the development is committed to sustainable development principles.

In order to accurately assess the energy demands of the site design stage SBEM calculations have been performed. All energy end-uses are considered in the calculations except for any end-uses unregulated by the Building Regulations, such as equipment energy.

The development has been designed to maximise available opportunities for reducing energy demand and carbon emissions through layout and orientation for passive energy reduction. The building fabric and services shall be specified to achieve further reductions in energy demand.

A renewable energy pre-feasibility study has been performed and found that Solar PV and Air Source Heat Pumps are the most appropriate renewable energy technologies for the site. The Air Source Heat Pumps shall provide heating and domestic hot water to the core areas while a Solar PV array with a minimum site-wide capacity of 90 kWp has been proposed.

This strategy would result in an overall site-wide energy demand and carbon dioxide emissions reduction of approximately of **31.56% and 20.45%** through energy efficiency and renewable energy generation when compared to the worst allowable Building Regulations Approved Document Part L Volume 2 2021 performance.

By implementing the energy hierarchy this Energy Statement confirms that the proposed development shall meet the requirements of Manchester City Council's Core Strategy Policy EN4 and Policy EN6.