



ELEMENT
SUSTAINABILITY

GREEN BROW NURSERY, STOCKPORT ENVIRONMENTAL STANDARDS STATEMENT

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1. INTRODUCTION

Element Sustainability has been commissioned by Stockport Development Limited to review the sustainability performance of the proposed residential scheme on the existing Clever Clowns Nursery site in Wythenshawe.

The purpose of this Environmental Standards Statement is to summarise the relevant planning policy background and requirements of Manchester City Council, and to demonstrate the ways in which these policy aims are to be met.

Having briefly described the development proposals, the relevant planning policies have been reviewed along with the requirements of the regulatory framework appropriate for this scheme. The statement details those features of the design and specification which will be integrated within the properties in order to contribute to effective energy demand and carbon dioxide emissions reductions.

A technical assessment of the development proposal is included, using Standard Assessment Procedure (SAP 10 domestic energy demand model) calculations. These calculations will serve to demonstrate how the council's energy demand and carbon dioxide emission reduction targets may be achieved.

This report is intended to support the planning application for this development and therefore, establishes an approach which meets the criteria outlined by the council that the developer commits to implement at the site.



2. DEVELOPMENT PROPOSALS

2.1 Development Site Description

The proposed development site is currently occupied by Clever Clowns Nursery which will be demolished as part of the proposed scheme. Surrounding the site there are areas of hardstanding used for car parking, with green space to the rear. The site is located within a predominantly residential area south of Wythenshawe and is therefore surrounded by other residential properties and gardens, with Greenbrow Road running parallel to the southern boundary.

The site is not within a designated conservation area and there are no existing watercourses on site.

Figure 2.1- Pre-Existing Site

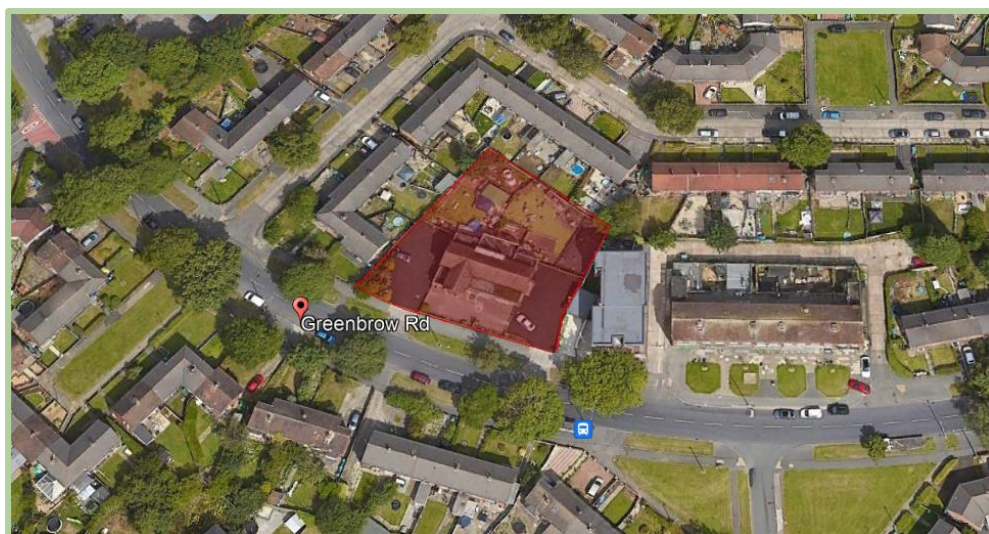


Figure 2.2 - Proposed Site Plan



2.2 Development Proposals

The development proposals comprise the construction of a single three-storey apartment block, to include twenty affordable apartments and associated car parking.

Table 2.1 presents the accommodation schedule for the proposed scheme.

Table 2.1 – Accommodation Schedule Summary

Floor	1 Bedroom Apartment	2 Bedroom Apartment
Ground	5	1
First	6	1
Second	6	1
Total	17	3

Figures 2.3 to 2.7 present the site layout as well as a sample of the plans and elevations of the proposed residential development.

Figure 2.3 – Proposed Front Elevation



Figure 2.4 – Proposed Rear Elevation



Figure 2.5 – Proposed General Arrangement Plan – Level 0*Figure 2.6 – Proposed General Arrangement Plan – Level 1*

Figure 2.7 – Proposed General Arrangement Plan – Level 2

3. POLICY REVIEW

3.1 National Planning Policy

The National Planning Policy Framework was revised in response to the Levelling-up and Regeneration Bill: reforms to national planning policy consultation on 19th December 2023 and sets out the government's planning policies for England and how these are expected to be applied.

The purpose of the planning system is to contribute to the achievement of sustainable development. The planning system has three overarching objectives, which are interdependent and need to be pursued in mutually supportive ways, as set out below:

An economic role – to help build a strong, responsive and competitive economy, by ensuring that sufficient land of the right types is available in the right places and at the right time to support growth, innovation and improved productivity; and by identifying and coordinating the provision of infrastructure;

A social role – to support strong, vibrant and healthy communities, by ensuring that a sufficient number and range of homes can be provided to meet the needs of present and future generations, and by fostering well-designed, beautiful and safe places, with accessible services and open spaces that reflect current and future needs and support communities' health, social and cultural well-being; and

An environmental role – to protect and enhance our natural, built and historic environment, including making effective use of land, improving biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy.

These objectives should be delivered through the preparation and implementation of plans and the application of the policies in this Framework. Planning policies and decisions should play an active role in guiding development towards sustainable solutions, but in doing so should take local circumstances into account, to reflect the character, needs and opportunities of each area.

3.2 Local Planning Policy

3.2.1 Manchester Core Strategy

Manchester's Core Strategy was adopted on the 11th July 2012 and remains the key document in the adopted Manchester Local Plan. It sets the out the long-term strategic policies for Manchester's future development and will form the framework that planning applications will be assessed against.

The following policies are therefore relevant to the scheme:

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; and,
- To meet residual energy requirements using low or zero carbon energy generating technologies.

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 6 - Target Framework for CO₂ Reductions from Low or Zero Carbon Energy Supplies: The council requires applications for residential development of ten or more units and all other development over one thousand square metres to meet, as a minimum, the targets shown in the tables below, unless unviable.

Table 3.1 – Policy EN6 Domestic CO₂ Emissions Reduction Targets

Target	% Minimum Requirements
Target One: Network development area	CHP/District heating anchor or connection or where not feasible a 15% increase on Part L 2010
Target Two: Electricity intense buildings	+15% increase on Part L 2010
Target Three: Micro generation area	+15% increase on Part L 2010

The scheme will be specified and constructed to comply with Building Regulations Part L, Approved Document Volume 1 (2021). Therefore, the scheme will significantly improve upon the minimum requirements stipulated in Policy EN6 which requests a 15% improvement upon 2010 regulations.

Policy EN 8 – Adaption to Climate Change: All new development to be adaptable to climate change in terms of the design, layout, siting and function of both buildings and associated external spaces. In achieving developments which are adaptable to climate change developers should have regard to the following, although this is not an exhaustive list:

- Minimisation of flood risk by appropriate siting, drainage, and treatment of surface areas to ensure rainwater permeability;
- Reduction in urban heat island effect using green infrastructure such as green roofs, green walls, increased tree cover and waterways;
- The need to control overheating of buildings through passive design; and,



- The opportunity to provide linked and diverse green space to enhance natural habitats which will assist species adaptation.

Developers will be permitted to use green infrastructure elements such as green roofs, green walls, street trees and waterways to contribute to compliance with CO₂ mitigation under Policy EN6, subject to sufficient evidence to quantify their contribution to compliance.

Policy EN9 - Green Infrastructure: New development will be expected to maintain existing green infrastructure in terms of its quantity, quality and multiple function. Where the opportunity arises, and in accordance with current green infrastructure strategies, the council will encourage developers to enhance the quality and quantity of green infrastructure, improve the performance of its functions and create and improve linkages to and between areas of green infrastructure. Where the benefits of a proposed development are considered to outweigh the loss of an existing element of green infrastructure, the developer will be required to demonstrate how this loss will be mitigated in terms of quantity, quality, function and future management.

Policy EN14 – Flood Risk: The council requires developments to:

- Be directed away from sites at the greatest risk of flooding, and towards sites with little or no risk of flooding. This should take account of all sources of flooding identified in the Manchester-Salford-Trafford Strategic Flood Risk Assessment (SFRA); and
- All new development should minimise surface water run-off, including through Sustainable Drainage Systems (SUDS) and the appropriate use of green infrastructure. Developers should have regard to the surface water run-off rates in the SFRA User Guide. In critical drainage areas, evidence to justify the surface water run-off approach / rates will be required.

Policy EN15 – Biodiversity and Geological Conservation: The council will seek to maintain or enhance sites of biodiversity and geological value throughout the city.

Developers will be expected to identify and implement reasonable opportunities to enhance, restore or create new biodiversity, either on-site or adjacent to the site, contributing to linkages between valuable or potentially valuable habitat areas where appropriate, with reference to:

- The Manchester Biodiversity Strategy, which provides further details of priority habitats within Manchester and opportunities for biodiversity enhancement including corridors such as the Mersey, Medlock and Irk River valleys, the canals and disused railway lines, and areas of managed greenspace particularly in parks;
- The Green Infrastructure Framework for Greater Manchester, which encompasses an ecological framework that seeks to guide and inform habitat creation and repair, including identifying large 'biodiversity opportunity areas' including the Moston Brook Corridor and Nutsford Vale;
- Manchester's Climate Change Action Plan;
- The Strategic Flood Risk Assessment (SFRA) for Manchester;
- The River Basin Management Plan for the Northwest; and,
- The Manchester Tree Strategy.



Any adverse impacts on biodiversity will need to be justified against the wider benefits of the proposal, assessed against other Local Development Framework policies. Where adverse impacts are unavoidable, developers will be required to provide appropriate mitigation and / or compensation. Development should, wherever possible, seek to maintain, enhance or restore existing geology.

Policy EN16 – Air Quality: The council will seek to improve the air quality within Manchester, and particularly within Air Quality Management Areas. Developers will be expected to take measures to minimise and mitigate the local impact of emissions from traffic generated by the development, as well as emissions created by the use of the development itself.

Policy EN17 – Water Quality: The council require:

- New developments to avoid any adverse impact on water quality, including during the construction phase, and wherever possible should seek to enhance water quality, both chemical and ecological; and,
- Development should minimise surface water run-off from development and associated roads, and maximise the use of appropriate sustainable drainage systems, to minimise groundwater contamination, and to avoid pollutants reaching watercourses.

Policy EN19 – Waste: The council will:

- Require all developers, including those of new waste management facilities within the district, to demonstrate the proposal's consistency with the principles of the waste hierarchy (prevention, reduction, re-use, recycling/composting, energy recovery, final disposal);
- Require all developers to submit a waste management plan to demonstrate how both construction and demolition waste will be minimised, and recycled on site wherever possible, and how the sustainable waste management needs of the end user will be met; and,
- Encourage communities to take responsibility for the waste they create through the provision of accessible facilities.

Policy DM1 – Development Management: All development should have regard to the following specific issues, for which more detailed guidance may be given within a supplementary planning document:

- Accessibility: buildings and neighbourhoods fully accessible to disabled people, access to new development by sustainable transport modes;
- Community safety and crime prevention;
- Design for health;
- Adequacy of internal accommodation and external amenity space;
- Refuse storage and collection;
- Effects relating to biodiversity, landscape, archaeological or built heritage;
- Green infrastructure including open space, both public and private;
- The use of alternatives to peat-based products in landscaping/gardens within development schemes;
- Flood risk and drainage.

Subject to scheme viability, developers will be required to demonstrate that new development incorporates sustainable construction techniques (In terms of energy targets this policy should be read alongside policy EN6 and the higher target will apply).



Policy T1 – Sustainable Transport: To deliver a sustainable, high quality, integrated transport system to encourage modal shift away from car travel to public transport, cycling and walking, to support the needs of residents and businesses and to prepare for carbon free modes of transport, the Council will support proposals that:

- Improve choice by developing alternatives to the car;
- Facilitate modes of transport that reduce carbon emissions, e.g. by incorporating charging points for electric vehicles, subject to their appropriate design and location;
- Would reduce the negative impacts of road traffic, for example, congestion, air pollution and road accident casualties; and,
- Take account of the needs of road users according to a broad hierarchy consisting of, in order of priority:
 - Pedestrians and disabled people,
 - Cyclists, public transport,
 - Commercial access,
 - General off-peak traffic,
 - General peak time traffic.

3.3 Guide to Development in Manchester, Supplementary Planning Document

Manchester's Core Strategy requires that all new residential developments should accord with the design guidance set out in the Supplementary Planning Documents (SPD). The Guide to Development in Manchester SPD was adopted on 11th April 2007 and supports and enhances the ongoing shaping of the city by providing a set of reasoned principles which will guide developers, designers and residents. These principles include a number of environmental standards, and includes the following categories which are identified in the SPD:

- | | |
|--|----------------------------|
| • Energy efficiency; | • Waste management; |
| • Renewable energy; | • Construction management; |
| • Environmental design; | • Biodiversity; and, |
| • Water management and weather resilience; | • Waterways. |

3.4 Manchester's Great Outdoors

The Green and Blue Infrastructure Strategy for Manchester aims to invest in the city's green and blue infrastructure over the next ten years (by 2025). Four objectives have been established to enable the vision to be achieved:

1. Improve the quality and function of existing green and blue Infrastructure, to maximise the benefits it delivers;
2. Use appropriate green and blue infrastructure as a key component of new developments to help create successful neighbourhoods and support the city's growth;
3. Improve connectivity and accessibility to green and blue infrastructure within the city and beyond; and,



4. Improve and promote a wider understanding and awareness of the benefits that green and blue infrastructure provides to residents, the economy and the local environment.

3.5 Climate Emergency

On 10th July 2019, a motion asking Manchester City Council (MCC) to formally declare a climate emergency was unanimously agreed. The motion declares that climate change is a serious risk to Manchester's future. Manchester is committed to embedding the issue as an integral part of council decision-making – making sure that all key decisions are taken with the city's target of becoming zero-carbon by 2038 in mind. The council has agreed the following:

- To deliver the 2038 zero carbon target and determine if an earlier target can be possible;
- Make climate breakdown and the environment an integral part of activity throughout the council, including all decision making, ensuring key decisions take into account the impact on achieving the zero-carbon target;
- Investigate and introduce measures to help reach domestic zero carbon levels, including addressing fuel poverty and retrofitting existing homes; and
- Investigate ways to ensure that future local plans place a mandatory requirement for all new development to be net zero carbon by the earliest possible date.

In March 2020 the Executive adopted the Manchester Climate Change Framework 2020-2025. The five-year framework sets out measures that MCC will take in order to reduce carbon emissions from its buildings, energy use and transport. Measures include retrofitting buildings to improve energy efficiency, increasing the use of electric vehicles, and seeking 100% renewable energy. Whilst this has also not been formally adopted into planning policy, it is a key consideration for future development proposals.

3.6 Emerging Policies

3.6.1 Places for everyone

The Draft 'Places for Everyone' (PfE) Plan is a new long-term plan of nine Greater Manchester districts (Bolton, Bury, Manchester, Oldham, Rochdale, Salford, Tameside, Trafford and Wigan) for jobs, new homes, and sustainable growth. It has been prepared by the Greater Manchester Combined Authority on behalf of the nine districts.

The Draft Plan will determine the kind of development that takes place across the city-region, maximising the use of brownfield land and urban spaces while protecting green belt land from the risk of unplanned development. It will also ensure all new developments are sustainably integrated into Greater Manchester's transport network or supported by new infrastructure.

On 11th August 2023 inspectors appointed by the Secretary of State (Levelling Up, Housing and Communities) confirmed that the Places for Everyone plan is ready to move to the next stage of the process and it is likely to be adopted in 2024.

The Places for Everyone plan which was submitted to the Secretary of State included the following relevant policies:

Policy JP-S 2 Carbon and Energy: The aim of delivering 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;
- Keeping fossil fuels in the ground;
- Planning for a balanced and smart electricity grid by identifying geographical locations which could support energy assets;
- Development of Local Area Energy plans to develop cost effective pathways to achieve carbon targets;
- An expectation that new development will:
 - Be net zero carbon from 2028 by following the energy hierarchy (with any residual carbon emissions offset), which in order of importance seeks to:
 - Minimise energy demand;
 - Maximise energy efficiency
 - Utilise renewable energy
 - Utilise low carbon energy
 - Utilise other energy sources

With an interim requirement that all new dwellings should seek a minimum 19% carbon reduction against Part L of the 2013 Building Regulations.

- Where practicable, prioritise connection to a renewable energy/heating/cooling network in the first instance or a low carbon energy/heating/cooling network that is adaptable to non-fossil fuels at a later date;
- Achieve energy demand reductions for residential development in terms of space heat demand, hot water energy demand and the delivery of on-site renewable energy generation.

For renewable energy generation priority should be given to PV installation where technically feasible, alternative technologies will be appropriate where the equivalent generation is evidenced.

- Include a detailed energy statement to demonstrate via site relevant evidence how the development has sought to maximize reductions in carbon emissions in line with relevant policy targets, including the minimisation of overheating risks and appropriate measures for post occupancy evaluation.

District Local Plans may set out specific carbon emission reduction targets, particularly if carbon neutral targets have been set sooner than 2038 or promote other measures through which energy efficiency of buildings and renewable energy generation can be achieved.



3.7 Regulatory Framework

Building Regulations, Part L - Conservation of Fuel and Power: Sets the compliance standards for energy demand and carbon dioxide emissions from buildings. Guidance on how to meet the requirements of this regulation is provided within a number of approved documents. The relevant document is referenced below:

Approved Document Volume 1: Dwellings: Gives guidance on how to comply with Part L of Schedule 1 to the Building Regulations and the energy efficiency requirements for dwellings.

The minimum energy performance requirements shall be approved and expressed in accordance with the methodology for:

- New buildings, in the form of target CO₂ emission rates;
- New buildings, in the form of target fabric efficiency rates; and,
- New buildings in the form of target primary energy rates.

3.8 Applicable Targets

Based upon a review of relevant planning policy requirements, legislative drivers, and client priorities, the following list provides a brief precis of the key criteria that should be targeted for this development:

Manchester Core Strategy

- | | |
|---|---|
| • Policy EN 4 - Reducing CO ₂ Emissions by Enabling Low and Zero Carbon Development | • Policy EN9 - Green Infrastructure |
| • Policy EN 5 - Strategic Areas for low and zero carbon decentralised energy infrastructure | • Policy EN14 – Flood Risk |
| • Policy EN 6 - Target Framework for CO ₂ Reductions from Low or Zero | • Policy EN15 – Biodiversity and Geological Conservation |
| • Policy EN 8 – Adaption to Climate Change | • Policy EN16 – Air Quality |
| | • Policy EN19 – Waste |
| | • Policy DM1 – Development Management |
| | • Policy T1 - Sustainable Transport |

Guide to Development in Manchester, Supplementary Planning Document

The Green and Blue Infrastructure Strategy for Manchester

Places for Everyone

Manchester City Council Climate Emergency Declaration

Building Regulations, Part L

Approved Document Volume 1: Dwellings



4. SUSTAINABILITY STATEMENT

This section provides an appraisal of the proposals and details the specific approach, design features and specifications which will contribute to reducing the environmental impact of the scheme.

4.1 Energy Performance

In order to limit energy demand and carbon dioxide (CO₂) emissions from the operation of the building, a number of design features will be integrated that will collectively contribute towards the emissions reduction target for the scheme.

Detailed measures are presented in Section 5 of this report, but in essence, the energy strategy proposed is an enhanced 'fabric led' solution coupled with the inclusion of an energy efficient servicing provision to maximise the buildings' performance.

The reduction in energy demand to meet the carbon reduction targets will be achieved through the following design measures and low carbon technology options:

- Enhanced thermal insulation;
- A low air permeability;
- Efficient Kitchen Energy Recovery System and,
- Low energy lighting.

These measures will secure the carbon reduction targets sought by the local planning authority and **Building Regulations Part L: Approved Document Volume 2 (2021 edition)**.

4.2 Flood Risk and Surface Water Management

Data obtained from the Environment Agency was used to determine which flood zone the site is located within and the potential flood risks onsite. Figure 4.1 below presents the latest Environment Agency (EA) Flood Zone Map data which demonstrates that the site is located wholly within Flood Zone 1, demonstrating a low probability of flooding from rivers.

In addition to this, a Drainage Management Strategy has been prepared by Betts Hydro Consulting Engineers and from this the following conclusions can be drawn:

- Opportunities will be taken to provide soft landscaping where at all possible on site to assist in minimising surface water run-off,
- Permeable surfacing and bio-filtration measures (such as tree pits) are recommended where at all feasible across the site to assist with managing run-off generated;
- The post-development discharge rate is to be restricted to 10.3l/s, which is a 30% betterment on the existing brownfield rate generated by the current impermeable areas on the site; and,
- The development will be designed to cater for the surface water run-off generated in the events up to and including the one in one-hundred-year event with allowances for climate change;



In addition, Figure 4.2, below, demonstrates that the site is in an area with a very low risk of surface water flooding.

Figure 4.1 – Environment Agency Flood Risk Map

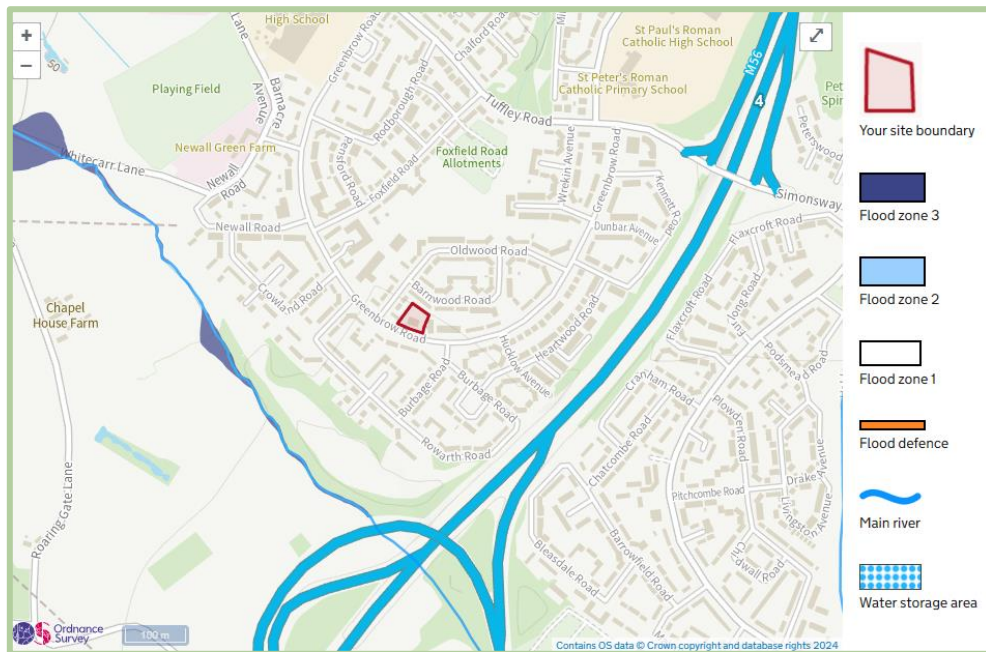
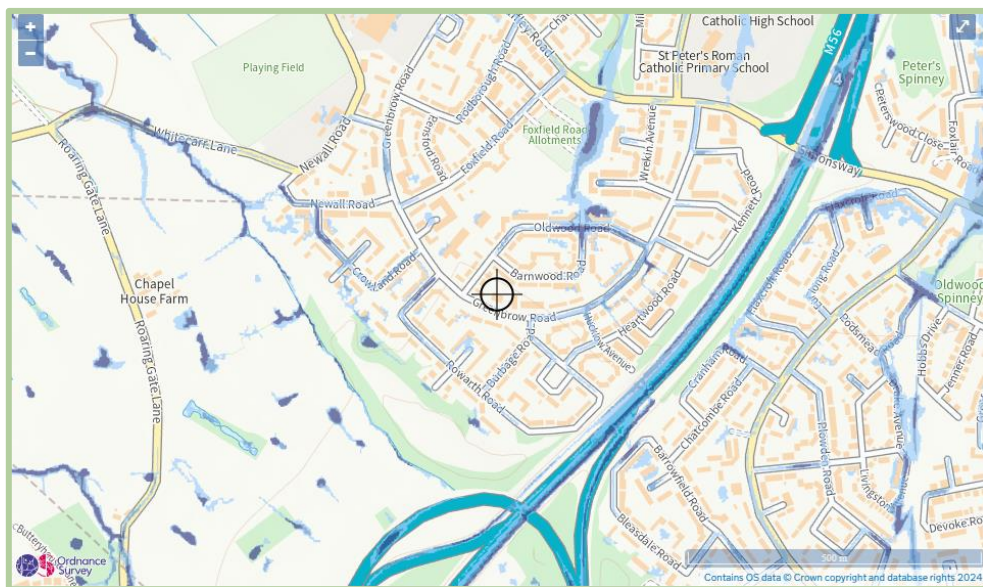


Figure 4.2 – Environment Agency Surface Water Flood Risk Map



In accordance with **Manchester Core Strategy Policy EN 14 – Flood Risk** the scheme is located within **Flood Risk Zone 1** and therefore in an **area with little or no risk of flooding** and **surface water will be managed on-site using SUDs where feasible.**



4.3 Materials

The proposed development will contribute towards making more efficient use of non-renewable materials resources, and to reducing the lifecycle impact of materials used. This is demonstrated by:

- Materials with associated Environmental Performance Declarations (EPDs) will be favoured;
- Responsibly sourced materials from suppliers operating an Environmental Management System and procuring timber verified by either the Forest Stewardship Council (FSC) or Programme for the Endorsement of Forest Certification standard (PEFC) will be prioritised;
- Material selection will be carefully considered to avoid the use of toxic materials, such as Volatile Organic Compounds (VOCs) and contribute towards creating a healthy indoor environment;

Local sourcing of construction materials where feasible will minimise the impact of carbon dioxide emissions associated with the transportation of materials. In addition to this, **materials with low levels of embodied carbon will be prioritised in accordance with Policy EN4.**

4.4 Water Efficiency

The proposed development will be designed to reduce mains / potable water consumption and will include the following water efficient designs and equipment:

- A water efficiency strategy will be determined for the site and will include for the provision of 'A' rated appliances as a minimum;
- In order to reduce water demand, the sanitary fixtures will be specified to achieve a calculated daily consumption of <110 litres/person/day; and,
- A water meter on the mains water supply to the building will be specified to monitor and manage consumption.

Efficient water fixtures will be specified throughout the building such as low flow taps and dual flush WCs in order to reduce water consumption.

4.5 Ecology and Biodiversity

An Ecology and Biodiversity Net Gain Assessment has been carried out by Kingdom Ecology limited. This identified the ecological constraints onsite which should be considered during the proposed works. From this the following conclusions can be drawn:

- The proposed development should include provision for roosting bats and breeding birds. This can be achieved through the installation of bat boxes and bird boxes at the site.
- The proposals will also aim to maximise the biodiversity of landscaping proposals at the site;



- Four new trees are proposed as part of the landscape proposals. Figure 4.3 below presents the proposed landscape general arrangement; and,

The baseline biodiversity units (i.e. the site's pre-development condition) have been calculated at 0.04 Habitat Units and zero Hedgerow Units. Following the planned development proposal, the on-site biodiversity units have been calculated at 0.09 Habitat Units and 0.11 Hedgerow Units. As a result there will be a biodiversity net gain of 0.04 Habitat Units representing a 106.35% biodiversity net gain.

Figure 4.3 – Landscape General Arrangement



In accordance with **Manchester Core Strategy Policy EN15 - Biodiversity and Geological Conservation** and **Manchester Core Strategy Policy EN9 - Green Infrastructure**, the proposed development will enhance the biodiversity value of the site and enhance the quality and quantity of green infrastructure.

4.6 Waste Management

4.6.1 Construction Waste

Best practice techniques to prevent and minimise waste during the design and construction phase of the development will be adopted, as follows:

- Prior to commencement of the above ground construction phase, a site waste management plan (SWMP) will be produced by the developer to limit the on and off-site environmental impacts of construction:



- The SWMP will detail:
 - Recycled and secondary materials;
 - Waste reduction;
 - Waste segregation;
 - Waste recovery; and,
 - Waste disposal.
- This development will promote the minimisation of waste arising and seek to maximise the use of recycled materials in construction.

The **principal contractor will implement sound environmental management practices** and consideration for neighbouring sites during their activities on-site.

4.6.2 Operational Waste

The operational waste strategy for the scheme focuses on the segregation of waste at source, in order to maximise the potential for the residents to recycle. All residents will be informed on collection frequency, as well as guidance on local recycling facilities to assist with the management and storage of waste.

The proposed waste management strategy has been developed in compliance with the policies of Manchester City Council to optimise recycling rates:

- Waste will be segregated at source with the help of split bins to receive multiple streams of waste – general, recyclables and compost; and,
- Residents will have their waste collected by the building management company and transferred to the designated refuse area, to be collected by refuse operators on the designated collection day.

The proposed development will seek to **minimise waste and promote recycling**, during both construction and occupation.

4.7 Pollution

To reduce the schemes impact on the surrounding communities and environments, the proposals will include the following:

- The external lighting strategy will be designed to reduce unnecessary light pollution through effective design, energy consumption and nuisance to neighbouring properties;
- Pollution Prevention Guidance will be adhered to in respects of air (dust) and water (ground and surface) pollution during the demolition and construction phase; and,



- Dust suppression measures will also be put in place as part of the Main Contractor's Environmental Management Plan, such that any potential risks to watercourses or the neighbouring properties are minimised.

The principal contractor will put measures in place to ensure that the surrounding area will not be polluted as a direct result of the activities on site during the construction phase.

4.8 Health and Wellbeing

To enable the occupants of the proposed development to lead lower impact lifestyles and enhance their quality of life, the following measures will be delivered:

- Residents will have access to open green space which surrounds the proposed development, allowing them to connect with nature which is known to boost mental and physical health; and,
- The proposed design will create a close community allowing residents to socialise.

Good levels of natural day lighting will be achieved within each unit. This will provide a good quality of life for the occupants and reduce the need for energy to light proposed development.

4.9 Transport

A transport Statement has been produced by SK Transport Planning Limited and a review of the most appropriate and sustainable modes of transport has been conducted, in order to assess the feasibility of each transport option available to the future occupiers of the proposed car free development. The conclusions that can be drawn from this appraisal are as follows:

4.9.1 Public transport

- Greenbrow Road is a bus route corridor, and the nearest bus stops to the site are located outside the site, which is approximately thirty-five metres away for westbound services and one hundred and eighty metres away for eastbound services.
- The bus services can be used to access the nearest tram stop at Roundthorn which is approximately one point six kilometres away. The tram services can also be accessed by bike, and is served by trams on the Manchester Airport to Victoria Station Line.

4.9.2 Cycling and Walking

- A cycle store will be provided with room for eight bikes. Six cycle stands will also be provided externally to the rear of the building.
- The Department for Transport states that cycle trips of eight kilometres also have the potential to replace car trips. Therefore, an eight-kilometre catchment from the site covers an area that includes all of Wythenshawe, Altrincham, Manchester Airport, Handforth, Cheadle, Ashton upon Mersey, West Didsbury, and Sale.



The assessment shows that the site has a Greater Manchester Accessibility Level index of five which is a good level of accessibility in a suburban area.

Due to the site's proximity to local amenities and the presence of public transport services within easy walking distance, the site is considered to be well located to encourage trips to be made on foot, bicycle or via public transport **in accordance with Manchester Core Strategy Policy T1 – Sustainable Transport.**



5. ENERGY STRATEGY

The energy strategy for this development prioritises an enhanced 'fabric led' solution coupled with 'full electric' servicing provision. An enhanced building fabric specification throughout the scheme allied to efficient servicing and controls will achieve compliance with the new build carbon dioxide emission reduction and fabric energy efficiency targets stipulated by Building Regulation, Part L Approved Document Volume 1 (2021) and Manchester City Council's adopted planning policies.

Details of the proposed energy strategy are presented below.

5.1 Build Fabric and Thermal Performance

The standard measurement of heat transfer through a given building material or construction type is the U-value ($\text{W/m}^2\text{K}$). The lower the U-value, the more slowly heat transfers and is lost out of a building. In buildings, heat loss generally occurs through the following main areas and elements of the construction:

- Ground floor;
- External walls;
- Roofs;
- Doors and windows;
- Thermal bridging; and,
- Uncontrolled ventilation.

The proposed material specification that will be incorporated throughout the scheme to limit heat loss and ensure efficient operation of the dwellings is presented in Table 5.1.

Table 5.1 – Proposed Fabric Specification

Item	Specification
External Wall	$U=0.18 \text{ W/m}^2\text{K}$
Party Wall	$U=0.00 \text{ W/m}^2\text{K}$ (full fill & seal)
Ground Floor	$U=0.13 \text{ W/m}^2\text{K}$
Roof	$U=0.11 \text{ W/m}^2\text{K}$
Windows	$U=1.20 \text{ W/m}^2\text{K}$ $g=0.50$
Air Permeability	$4.00 \text{ m}^3/\text{hm}^2$ (@50Pa.)
Cold Bridge	Bespoke Details & Psi values

This enhanced material specification and design will provide the following benefits:

- **High performance thermal insulation** will ensure low U-values for all heat loss elements and will minimise heat loss through the building's thermal envelope;
- **Thermally efficient, 'A' rated, double glazed windows** will be specified with argon gas fill and low emissivity coatings to limit heat loss through the pane. Thermal breaks will be incorporated within the frames of the windows to further limit heat loss. The glazing g value will be specified to optimise beneficial solar gains but limit the propensity for the dwellings to overheat;



- **Low air tightness** (design air permeability targeting 4.00m³/hm²) will minimise uncontrolled ventilation. This will reduce heat losses and provide high levels of occupant comfort;
- **Efficient Form** – residential blocks, as proposed for this scheme, are an inherently efficient form of construction, both in terms of the materials required to build the dwellings and the ongoing heat energy demand. This is a result of relatively low areas of external heat loss elements associated with such layouts which enhance the energy efficiency of the dwellings and guarantees low energy demand throughout their occupation; and,
- **Improved cold bridging junctions** will significantly improve the emission rate of the dwellings through the provision of insulation, limiting heat losses that occur at the junctions between building elements and around openings. 'Bespoke' psi values will be used to achieve a low ψ -value, thus minimising heat loss through cold bridge junctions.

This enhanced fabric specification will **deliver a Building Regulation, Part L Approved Document Volume 1 (2021) compliant scheme for all aspects of the proposed development**. It ensures an inherently energy efficient development, focussing upon limiting demand side reductions in accordance with the energy hierarchy.

5.2 Building Services

The proposed mechanical and electrical specification that will be incorporated to ensure efficient servicing of these dwellings is presented in Table 5.2.

Table 5.2 – Proposed Mechanical and Electrical Specification

Item	Specification
Lighting	120lm/W (100% LED)
Ventilation	Kitchen Energy Recovery System (KERS) Mechanical Ventilation Heat Recovery W230
Space Heating	Electric Panel Heaters
Water Heating	Kitchen Energy Recovery System (KERS) Mechanical Ventilation Heat Recovery W230
Heating Controls	Programmer and Appliance Thermostats

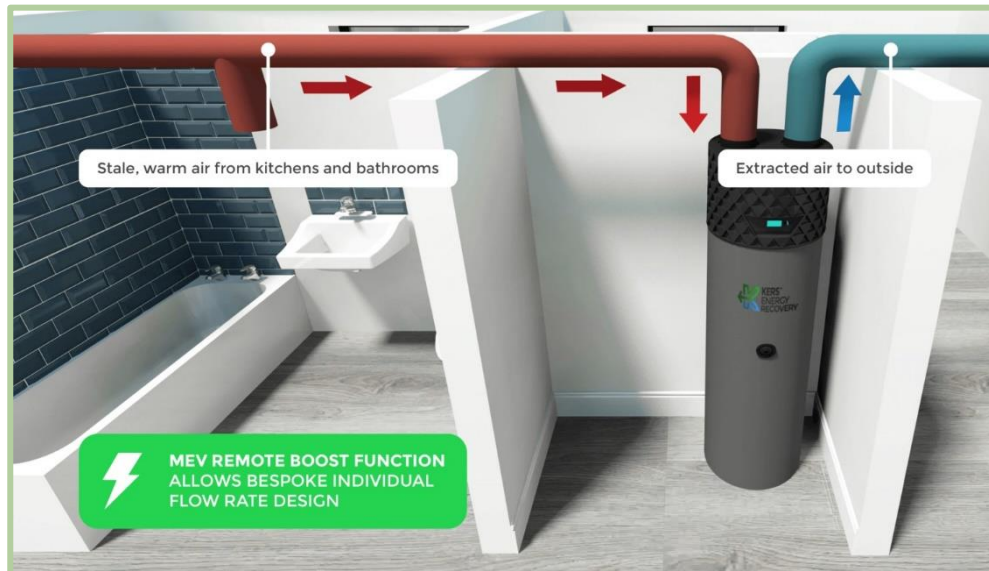
The mechanical and electrical specification will provide the following benefits:

- **Low energy and LED lighting** will be specified throughout the development in order to maximise operational efficiencies and lifespan of the fittings. LEDs operate with an estimated energy efficiency of up to 90% when compared to traditional lighting and conventional light bulbs. This means that about c.90% of the electrical energy is converted to light, rather than wasted heat as in conventional bulbs.
- **Kitchen Energy Recovery System (KERS) MVHR** systems will be specified in each apartment unit to maintain a healthy living environment. This will further reduce the heat losses and the energy demand of the apartments. KERS MEV is a combined heat recovery, hot water heat pump and



MEV system coupled with a high efficiency storage cylinder (see Figure 5.1). The system actively converts excess waste heat energy from kitchens and bathrooms to low cost, renewable hot water;

Figure 5.1 – Example KERS System



Source: KERS Energy Recovery

- **Electrical panel heating** is 100% efficient at the point of consumption. It generates a reduced overheating potential – electric space heating delivers virtually instantaneous heating at the location it is required. Unlike a ‘wet system’ associated with communal gas boilers which inherently have a long lag time for the heat to be generated and then dissipated when no longer needed. This lag time can lead to the dwellings overheating as the hot water remains in the radiators for a considerable time after the heat demand is required;
- **Sophisticated heating controls** including programmer and appliance thermostats will ensure the efficient delivery of heat to further reduce the dwellings energy demand; and,
- **Intermittent extract ventilation** will be specified in the dwellings, which will draw moisture laden, stale air out of the rooms and maintain a healthy living environment.

This mechanical and electrical specification **will deliver a Building Regulation Part L Approved Document Volume 1 (2021) compliant scheme** for all aspects of the proposed development.



6. PROPOSED RENEWABLE ENERGY SOLUTION

An analysis of the most appropriate renewable energy options has been undertaken to ensure compliance with Building Regulation Part L.

A number of renewable energy technologies have been considered for this site, including:

- Solar Hot Water;
- Photovoltaics (PV);
- Wind;
- Air Source Heat Pumps;
- Ground Source Heat Pumps; and,
- Biomass Heating.

A review of the development proposals and site location concludes that Air Source Heat Pumps (ASHP) are feasible for this scheme, as detailed below in Table 6.1:

Table 6.1 – Renewable Technologies Review

Technology	Description	Advantages & Limitations	Feasibility
Solar Hot Water	Solar Hot Water utilises the energy in sunlight and diffuse daylight to heat water for use in buildings. The main component of any solar water heating system is the collector, which absorbs the radiant energy of the sun and converts it to heat energy.	<ul style="list-style-type: none"> ✓ Low maintenance. ✓ Feasible for small scale developments. 	No - This technology is not considered to be a feasible option for this site as these solar thermal technologies make only a relatively limited contribution to reducing the building's energy demand and carbon dioxide emissions. Furthermore, there are potential problems associated with routing the pipework through the dwellings.
		<ul style="list-style-type: none"> ✗ Panels ideally facing south at 30° tilt for optimum efficiency. 	
Photovoltaics (PV)	Photovoltaic (PV) panels harness solar thermal energy and convert it into electricity which can then be used within a building. The panels may be roof or floor mounted and orientated in a southerly direction to enable this technology to operate efficiently.	<ul style="list-style-type: none"> ✓ Low maintenance. ✓ Easy to integrate into buildings design. ✓ Cost of PV is constantly dropping. 	No – Although feasible, Photovoltaics are not required to achieve compliance with Building Regulations Part L 2021.
		<ul style="list-style-type: none"> ✗ Panels ideally facing south at 30° tilt for optimum efficiency. ✗ Overshadowing will reduce performance. ✗ Can require significant roof space. 	



Technology	Description	Advantages & Limitations	Feasibility
Wind Turbines	Wind generation equipment harness the wind to turn a propeller and in doing so, drive an alternator to generate electricity. The turbines may be pole or roof mounted.	<ul style="list-style-type: none"> ✓ Low maintenance. ✓ Excess electricity can be exported to the grid. ✓ Vertical Axis Turbines can operate at wind speeds as low as 2m/s. ✗ A wind speed of at least 6m/s is typically required for traditional turbines to operate efficiently. ✗ Visual and noise impact risk. 	No – Wind turbines are considered unsuitable for this site due to a poor wind resource and lack of space to locate the turbines. Integrating these systems at height on the roof is not considered feasible due to the associated noise, vibration, and structural stresses upon the buildings. Furthermore, there are planning issues and perceived safety concerns with this technology.
Ground Source Heat Pumps	Ground source heat pumps collect low-grade heat from the ground to supply useful heat for space and water heating requirements. By applying additional energy input (in the form of electricity), it is possible to raise the temperature of the source heat to the temperature required.	<ul style="list-style-type: none"> ✓ Highly tested and efficient technology ✓ Can be used for space and water heating. ✓ Lifespan of 20-25 years. ✗ Excavation works required for buried piping to be installed. ✗ Planning permission potentially required for installation. 	No – This technology is considered unsuitable for this site due to an insufficient area (based upon the proposed densities) to install a horizontal ground collector and the prohibitive costs and technical constraint of installing vertical boreholes.
Air Source Heat Pump	Air source heat pumps collect low-grade heat from the air to supply useful heat for space and/or water heating requirements. They operate in the same way as a ground source heat pump, by applying additional energy input (in the form of electricity), it is possible to raise the temperature of the source heat to the temperature required.	<ul style="list-style-type: none"> ✓ Can be used for space and water heating. ✓ Highly tested and efficient technology ✓ Low maintenance. ✓ Lifespan of 20-25 years. ✗ Reduced efficiency in cold conditions. ✗ Requires a unit on the outside of the building 	Yes – The incorporation of ASHPs is a feasible option for this development. The proposed KERS units incorporate an air source heat pump to heat the dwellings' potable water.
Biomass Heating	Biomass boilers typically burn wood chips or pellets as fuel to provide space heating and hot water.	<ul style="list-style-type: none"> ✓ Almost a carbon neutral technology. ✗ Frequent and large fuel deliveries. ✗ Large fuel store required. ✗ Regular maintenance. 	No – This technology is considered inappropriate for this type of development due to the need for a large fuel storage facility and frequent, large fuel deliveries combined with regular maintenance.



6.1 Air Source Heat Pumps

The proposed packaged KERS system that will serve this development is an intelligent system that provides both ventilation with heat recovery and hot water very efficiently.

The basic components of this air source heat pump package comprise extractor fan heat recovery unit and a heat pump linked to a hot water cylinder incorporating an immersion heating coil. This solution would provide the following benefits:

- Highly energy efficient water heating system, thus limiting electrical energy demand and associated carbon dioxide (CO₂) emissions;
- This technology benefits from a low 'carbon footprint' due to the inherent efficiency of the heat pump process. It is a well-established technology with an anticipated long lifespan - with proper care they can be operational for up to twenty years;
- Omission of fossil fuel connection from the proposed scheme will enable the development to track the decarbonisations of the UK electricity grid over time and reduce operational carbon emissions as a consequence; and,
- There are no fuel storage issues associated with heat pumps.

The KERS provides a high specification of energy efficiency (COP = 3.1) to ensure the system operates efficiently and to reduce peak electricity demand.



7. CARBON DIOXIDE EMISSIONS CALCULATIONS

In order to demonstrate the environmental benefits associated with the energy strategy for the proposed dwellings, approved SAP 10 software has been used to generate representative energy demand models for the development. SAP software calculates the regulated energy demand and associated carbon dioxide emissions in accordance with the requirements of Building Regulations, Part L Approved Document Volume 1 (2021) that this development will be constructed in compliance with.

7.1 Regulated Energy Performance Calculations

Representative SAP models have been calculated for the first floor of the development. This level was selected for assessment as it represents the most common unit types across the proposed scheme. Therefore, this sample provides a robust indication of the overall performance of the development proposals.

Table 7.1 below presents a summary of the results, which show the dwelling emission rate and (regulated) energy demand performance associated with the proposed energy strategy for the representative dwellings.

Table 7.1 – Calculated Regulated Dwelling Emission Rates

	Green Brow
Dwelling DER (kgCO ₂ /m ² /yr.)	5.49
Dwelling TER (kgCO ₂ /m ² /yr.)	13.03
% DER Reduction over AD: Volume 1 (2021)	57.84
Dwelling DPER (kWh/m ² /yr.)	56.97
Dwelling TPER (kWh/m ² /yr.)	68.96
% DPER Reduction over AD: Volume 1 (2021)	17.39
Dwelling DFEE (kWh/m ² /yr.)	28.26
Dwelling TFEE (kWh/m ² /yr.)	28.85
% DFEE Reduction over AD: Volume 1 (2021)	2.05

The development will incorporate an enhanced material specification along with high quality design and construction standards, in order to improve the energy efficiency of the dwellings through a 'fabric led' energy strategy, allied to efficient mechanical and electrical systems.

This proposed material specification coupled with the proposed renewable technologies will improve upon the minimum compliance under Volume 1: Dwellings Approved Document L (2021) fabric and primary energy targets by a minimum of 2.05% and 17.39% respectively.

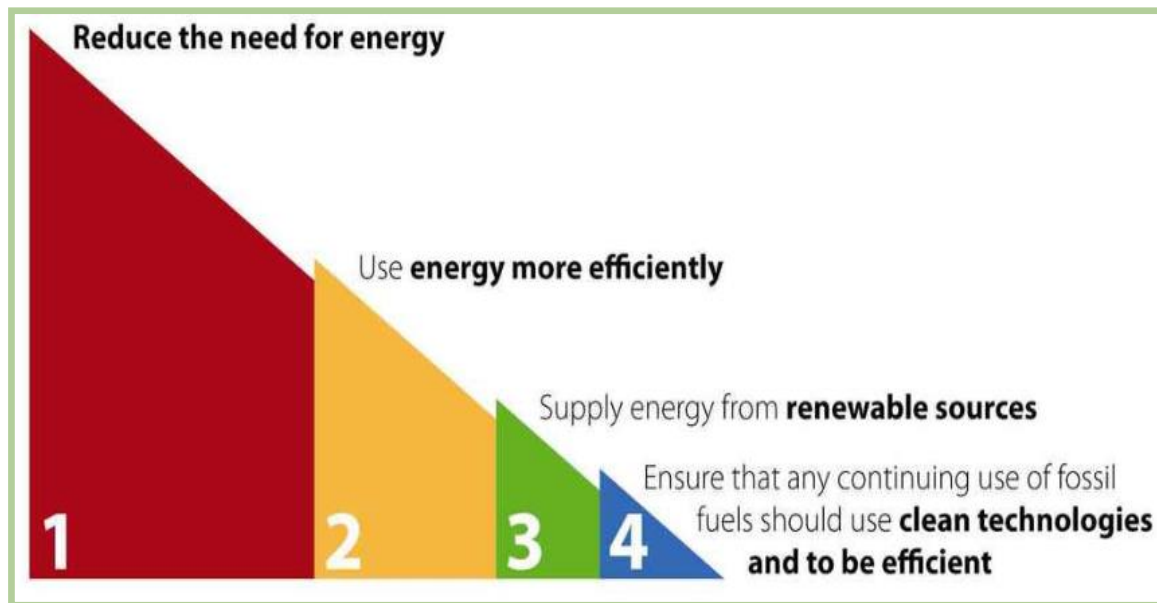
The proposed development **has the potential to secure a minimum carbon dioxide reduction rate of 57.84%**, thereby significantly improving upon current Part L Volume 1 (2021) requirements and the requirements stipulated **by Manchester City Council**.



7.2 Energy Hierarchy

The Energy Hierarchy has been used as a framework to guide this energy strategy to achieve practical and cost-effective carbon emission reductions. It is intended that the construction, design and specification proposed for this scheme will deliver dwellings that are inherently efficient and cost-effective during occupation. The hierarchy prioritises such demand-side activities to reduce wastage and improve efficiency (see Figure 7.1).

Figure 7.1 – The Energy Hierarchy



First Principle

The development will benefit from a material and design specification that is aligned with Building Regulation standards and includes numerous efficiency measures designed to reduce heat losses and minimise energy demand, including:

- ✓ High performance U - values;
- ✓ Reduced thermal bridge heat losses;
- ✓ Efficient form of construction, limiting heat loss areas; and,
- ✓ Low design air permeability target.

This 'fabric led' approach to minimising energy demand and associated carbon dioxide emissions through the performance of the thermal envelope is aligned with the first principle of the energy hierarchy, which states that reduction in energy demand should be achieved initially by energy efficiency.

Second Principle

100% low energy and LED lighting provision and sophisticated control systems for the space and water heating will boost the operational efficiency of the dwellings as per the second principle of the Energy Hierarchy. The KERS unit captures heat within extracted, stale air from the properties and re-uses this energy to efficiently heat hot water.



Third Principle

The KERS MEV indoor heat pump is a combined hot water, heat recovery and MEV system with storage cylinder. It converts waste heat energy from bathrooms and kitchens to low-cost renewable hot water and has an operating efficiency of over 300%.

Fourth Principle

The space heating demand of the dwellings will be met by efficient electric panel heaters. The use of electric panel heaters will ensure that fossil fuels converted and distributed through the National Grid as electrical energy will be consumed cleanly and efficiently.

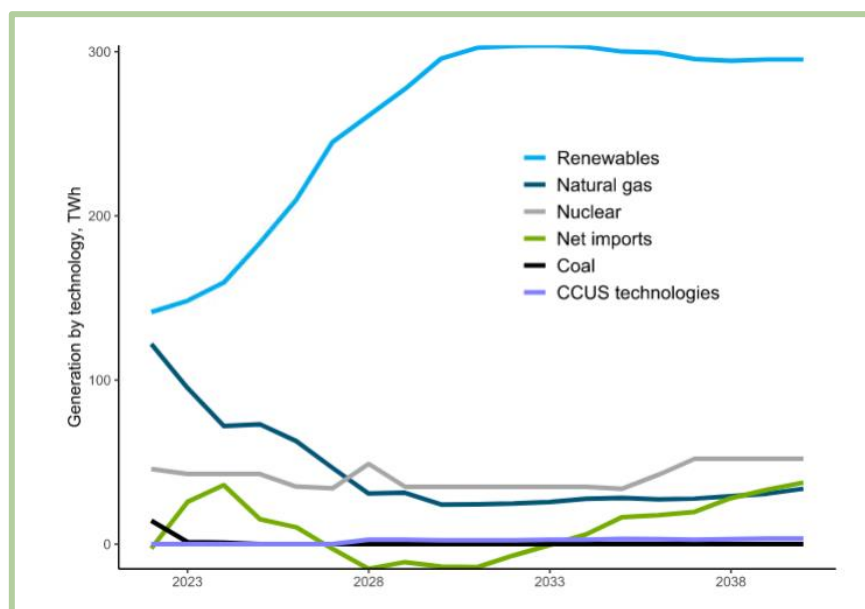
Furthermore, as the UK electricity grids' CO₂ footprint continues to improve, so too would the carbon dioxide emissions associated with the operational phase of the proposed scheme which benefits from a 'full electric' energy strategy.

7.3 Decarbonisation

As the UK electricity grid's CO₂ footprint continues to improve, so too would the carbon dioxide emissions associated with the operational phase of the proposed scheme, which benefits from a 'full electric' energy strategy.

Electricity will experience a steep reduction in emissions by 2035, with the carbon intensity of electricity generation falling by 93% between 2020 and 2035. This is due to the progressive shift away from fossil fuels as demonstrated in Figure 7.2 below.

Figure 7.2 - Electricity generation by Fuel Source, TWh



The energy strategy proposed for the scheme uses a combination of a KERS heat pump system and electric panel heaters. These are highly efficient systems that utilise grid electricity to provide space and water heating within each apartment. Electricity is recognised as a less carbon intensive fuel source than mains gas and other fossil fuels, which is only likely to improve as the percentage of electricity generation from renewable technologies increases.



8. CLIMATE CHANGE EMERGENCY

On 10th July 2019, a motion asking Manchester City Council (MCC) to formally declare a climate emergency was unanimously agreed. The motion declares that climate change is a serious risk to Manchester's future. Manchester is committed to embedding the issue as an integral part of council decision-making – making sure that all key decisions are taken with the city's target of becoming zero-carbon by 2038 in mind. The council has agreed the following:

In support of this, the developer wishes to highlight the following measures that will form part of the specification of this proposed development:

- An energy strategy that complies with both adopted and emerging planning policies and exceeds Building Regulations Part L requirements.
 - In securing compliance with Building Regulation Part L, 2021 targets, a commitment is made to construct a high specification, energy efficient thermal envelope thereby minimising demand side energy loads – in accordance with the principles of the Energy Hierarchy;
 - An expected 57.84% reduction in the building emission rate;
 - As the UK electricity grid carbon dioxide (CO₂) footprint continues to reduce, so too will the carbon dioxide emissions associated with this 'fully electric' building services energy strategy;
 - Furthermore, 'electric' strategies supply heat on demand, are 100% efficient and only use the power as required which reduces overheating potential of the buildings; and,
 - Air source heat pumps (KERS) will be utilised for water heating requirements, delivering high efficient water heating.
- The buildings are designed to incorporate features that will serve to reduce energy demand, and in turn, carbon emissions arising from the buildings:
 - Mechanical ventilation (KERS) will be specified throughout the development to maintain a healthy environment and further reduce the heat losses and the energy demand of the dwellings; and,
 - The scheme will benefit from a very low air tightness of 4.00 m³/hm², this will reduce uncontrolled ventilation throughout the building.
- The design proposals will also benefit from:
 - Materials with low levels of embodied carbon will be prioritised;
 - A biodiversity net gain of 0.04 Habitat Units, representing a 106.35% biodiversity net gain onsite;
 - The site has a Greater Manchester Accessibility Level index of five, which is a good level of accessibility in a suburban area and will provide eight bikes parking spaces and six cycle stands externally to the rear of the building.

These commitments, in combination, seek to work towards the carbon reduction target of no more than 1.5°C global temperature increase and assist Manchester City Council in meeting their Climate Change Emergency objectives.



9. CONCLUSION

This statement has reviewed the energy performance of the proposed residential development on Green Brow Road, Manchester against national and local planning policies. The conclusions that can be drawn from the review are as per the following:

The development will be designed and specified in accordance with **the principles of the energy hierarchy** and exceed the **targets and guidance set by Manchester City Council**.

- The focus is on reducing the demand for energy by **limiting heat gains and losses through the building fabric** which includes an enhanced material specification, well beyond the regulatory requirement.
- The scheme will integrate highly efficient mechanical and electrical systems, including **efficient electric panel heater** for space heating, **Kitchen Energy Recovery Systems** for water heating, **low energy lighting** and **programmer and appliance thermostatic controls**;
- Based on these specifications, the proposed scheme will secure compliance with **Building Regulations Part L Volume 1 (2021)**;
 - The proposed dwellings have the **potential to secure a minimum carbon dioxide reduction rate of 57.84%**, thereby improving upon current Part L Volume 1 (2021) and the requirements stipulated within **Manchester Core Strategy Policy EN6 - Target Framework for CO₂ Reductions from Low or Zero Carbon Energy Supplies**.
- In accordance with **Manchester Core Strategy Policy EN 14 – Flood Risk** the scheme is located within **Flood Risk Zone 1** and therefore in an **area with little or no risk of flooding** and **surface water will be managed using SUDs where feasible**.
- Local sourcing of construction materials where feasible and viable will minimise the impact of carbon dioxide emissions associated with the transportation of materials. In addition to this, **materials with low levels of embodied carbon will be prioritised in accordance with Manchester Core Strategy Policy EN4 - Reducing CO₂ Emissions by Enabling Low and Zero Carbon Development**.
- The scheme is predicted to achieve a **biodiversity net gain of 0.04 Habitat Units representing a 106.35% biodiversity net gain** in accordance with **Manchester Core Strategy Policy EN15 – Biodiversity and Geological Conservation**.
- In line with **Manchester Core Strategy Policy EN9 - Green Infrastructure** future residents will have **access to open green space** which will also improve linkages to and between other areas of green infrastructure.
- The proposed development will seek to **minimise waste and promote recycling**, during both construction and occupation.

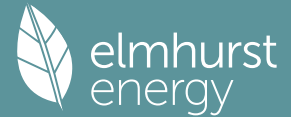
In conclusion, the proposals reviewed within this statement will deliver a highly energy efficient and sustainable scheme, providing a quality development that accords with the guidance provided within the Manchester City Councils adopted planning policies.



Appendix A – SAP Block Compliance



Block Compliance



Block Reference	2023.305 Green Brow	Issued on Date	15/03/2024
Block Name	2023.215 RGV Gateway Building		
Calculation Type	New Build (As Designed)		

Assessor Details	Mr. Laurie Wills	Assessor ID	H367-0001
Client	CWC, CWC, 17, Marble Street, Manchester, M2 3AW		

Block Compliance Report - DER				
Block Reference: 2023.305 Green Brow		Block Name: 2023.215 RGV Gateway Building		
Property-Assessment Reference	Floor area (m ²)	DER (kgCO ₂ /m ²)	TER (kgCO ₂ /m ²)	% DER/TER
GB - 01 - 01 - 001	71.12	5.36	11.53	53.51 %
GB - 01 - 02 - 001	48.00	4.32	11.61	62.79 %
GB - 01 - 03 - 001	48.00	5.27	12.99	59.43 %
GB - 01 - 04 - 001	48.00	4.63	12.10	61.74 %
GB - 01 - 05 - 001	48.00	3.78	10.92	65.38 %
GB - 01 - 06 - 001	48.00	3.78	10.92	65.38 %
GB - 01 - 07 - 001	48.00	5.02	12.64	60.28 %
GB - 01 - 01 - 001_Copy	71.12	6.90	13.73	49.75 %
GB - 01 - 02 - 001_Copy	48.00	5.88	13.72	57.14 %
GB - 01 - 03 - 001_Copy	48.00	6.44	15.22	57.69 %
GB - 01 - 04 - 001_Copy	48.00	5.76	14.21	59.47 %
GB - 01 - 05 - 001_Copy	48.00	5.25	12.85	59.14 %
GB - 01 - 06 - 001_Copy	48.00	5.25	12.85	59.14 %
GB - 01 - 07 - 001_Copy	48.00	6.13	14.73	58.38 %
GB - 02 - 01 - 001_Copy	71.12	6.60	13.29	50.34 %
GB - 02 - 02 - 001_Copy	48.00	5.76	13.56	57.52 %
GB - 02 - 03 - 001_Copy	48.00	6.60	14.83	55.50 %
GB - 02 - 07 - 001_Copy	48.00	5.34	13.06	59.11 %
GB - 02 - 04 - 001_Copy	48.00	5.90	13.83	57.34 %
GB - 02 - 05 - 001_Copy	48.00	5.13	12.68	59.54 %
GB - 02 - 06 - 001_Copy	48.00	5.13	12.68	59.54 %
Totals:	1077.36	114.23	273.95	

Block Compliance

Average DER = 5.49 kgCO ₂ /m ²	% DER/TER	PASS
Average TER = 13.03 kgCO ₂ /m ²	57.84 %	

Block Compliance Report - DFEE				
Block Reference: 2023.305 Green Brow		Block Name: 2023.215 RGV Gateway Building		
Property-Assessment Reference	Floor area (m ²)	DFEE (kWh/m ² /yr)	TFEE (kWh/m ² /yr)	% DFEE/TFEE
GB - 01 - 01 - 001	71.12	29.24	29.78	1.84 %
GB - 01 - 02 - 001	48.00	19.83	20.20	1.84 %
GB - 01 - 03 - 001	48.00	26.63	27.09	1.70 %
GB - 01 - 04 - 001	48.00	22.32	22.46	0.63 %
GB - 01 - 05 - 001	48.00	16.19	16.31	0.76 %
GB - 01 - 06 - 001	48.00	16.19	16.31	0.76 %
GB - 01 - 07 - 001	48.00	25.63	25.83	0.77 %
GB - 01 - 01 - 001_Copy	71.12	39.25	39.70	1.13 %
GB - 01 - 02 - 001_Copy	48.00	29.94	30.20	0.86 %
GB - 01 - 03 - 001_Copy	48.00	34.18	37.42	8.65 %
GB - 01 - 04 - 001_Copy	48.00	29.65	32.43	8.57 %
GB - 01 - 05 - 001_Copy	48.00	25.77	25.73	-0.15 %
GB - 01 - 06 - 001_Copy	48.00	25.77	25.73	-0.15 %
GB - 01 - 07 - 001_Copy	48.00	32.73	35.46	7.70 %
GB - 02 - 01 - 001_Copy	71.12	37.24	37.71	1.23 %
GB - 02 - 02 - 001_Copy	48.00	29.20	29.46	0.90 %
GB - 02 - 03 - 001_Copy	48.00	35.24	35.61	1.03 %
GB - 02 - 07 - 001_Copy	48.00	27.64	27.80	0.57 %
GB - 02 - 04 - 001_Copy	48.00	30.63	30.65	0.06 %
GB - 02 - 05 - 001_Copy	48.00	25.02	24.99	-0.13 %
GB - 02 - 06 - 001_Copy	48.00	25.02	24.99	-0.13 %
Totals:	1077.36	583.31	595.87	

Block Compliance

Average DFEE = 28.26 kgCO ₂ /m ²	% DFEE/TFEE	PASS
Average TFEE = 28.85 kgCO ₂ /m ²	2.05 %	

Block Compliance Report - DPER				
Block Reference: 2023.305 Green Brow		Block Name: 2023.215 RGV Gateway Building		
Property-Assessment Reference	Floor area (m ²)	DPER (kWh/m ² /yr)	TPER (kWh/m ² /yr)	% DPER/TPER
GB - 01 - 01 - 001	71.12	55.39	60.63	8.64 %
GB - 01 - 02 - 001	48.00	45.04	61.41	26.66 %
GB - 01 - 03 - 001	48.00	54.72	68.82	20.49 %
GB - 01 - 04 - 001	48.00	48.13	64.05	24.86 %
GB - 01 - 05 - 001	48.00	39.62	57.69	31.32 %
GB - 01 - 06 - 001	48.00	39.62	57.69	31.32 %
GB - 01 - 07 - 001	48.00	52.12	66.80	21.98 %
GB - 01 - 01 - 001_Copy	71.12	71.21	72.47	1.74 %
GB - 01 - 02 - 001_Copy	48.00	60.98	72.75	16.18 %
GB - 01 - 03 - 001_Copy	48.00	66.67	80.82	17.51 %
GB - 01 - 04 - 001_Copy	48.00	59.66	75.39	20.86 %
GB - 01 - 05 - 001_Copy	48.00	54.56	68.05	19.82 %
GB - 01 - 06 - 001_Copy	48.00	54.56	68.05	19.82 %
GB - 01 - 07 - 001_Copy	48.00	63.41	78.01	18.72 %
GB - 02 - 01 - 001_Copy	71.12	68.12	70.08	2.80 %
GB - 02 - 02 - 001_Copy	48.00	59.77	71.86	16.82 %
GB - 02 - 03 - 001_Copy	48.00	68.35	78.69	13.14 %
GB - 02 - 07 - 001_Copy	48.00	55.30	69.03	19.89 %
GB - 02 - 04 - 001_Copy	48.00	61.13	73.32	16.63 %
GB - 02 - 05 - 001_Copy	48.00	53.25	67.17	20.72 %
GB - 02 - 06 - 001_Copy	48.00	53.25	67.17	20.72 %
Totals:	1077.36	1184.86	1449.95	

Block Compliance

Average DPER = 56.97 kgCO ₂ /m ²	% DPER/TPER	PASS
Average TPER = 68.96 kgCO ₂ /m ²	17.39 %	