Concord Logistics

Applicant: Karlin VMH Ltd, c/o Global Mutual

Energy and Sustainability Statement

BY: Cudd Bentley Consulting Ltd
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ENGINEERING
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RECORD OF REVISIONS

Date.	Revision.	Author	Reviewer	Description of change.
21-11-2025	P01	HR	HM	First Issue
03-12-2025	P02	HR	HM	Updated to incorporate comments

1. EXECUTIVE SUMMARY

This report considers the energy and sustainability measures to be incorporated within the Proposed Concord House, Threapwood Way, Wythenshawe industrial development. This document reviews the requirements at both national and local level, as set out in the National Planning Policy Framework (2024), The Manchester Core Strategy Development Plan Document 2012-2027 and the Places for Everyone Development Plan (2024). The proposed measures aim to enhance environmental performance, reduce carbon emissions, and support Manchester's transition toward a low-carbon, sustainable future.

The recommended sustainability features for the Proposed Development, resulting from a Part L compliant SBEM model, will allow for a 105.35% carbon reduction from a base Part L (Volume 2) 2021 compliance build making it compliant with Policy EN4 and EN6 of the Manchester Core Strategy Development Plan Document 2012-2027. The sustainability features will allow for a 39.78 tonnes reduction in annual CO_2 emissions. For this proposed development an EPC rating of A+ has been targeted. The proposed development is compliant with the local plan through use of passive measures, an air source heat pump and 423 kWp Photovoltaic Panels which result in an overall 108.94% energy reduction. The energy and carbon savings are to be achieved through passive design, energy efficient measures incorporating design features such as energy efficient lighting, submetering of relevant areas, upgrading of 'U' values and occupancy sensing in relative areas, as well as the incorporation of an Air Source Heat Pump and Photovoltaic Panels.

To reduce the energy demand of the proposed development as well as help to conserve water resources within the local area, it is anticipated that the fit-out works will provide for sanitary fittings which will be water efficient through measures such as dual flush toilets and low flow taps.

The Proposed development will also prioritise sustainable modes of transport. It is anticipated that cycle storage facilities will be provided in order to allow for the reduction of car-based travel and transport related pollution.

The incorporation of these sustainability measures allows for the proposed development to be deemed sustainable whilst targeting compliance with local and national policy.

This report includes annualised baseline calculations which predict the likely energy consumption and associated CO_2 emissions for the entire development. The total baseline energy and carbon emissions for the entire development, taking into account regulated energy demands are:

- ***278,848.23 kWh/Annum***
- ***37.76 Tonnes CO_2/Annum***

Unregulated energy use is not covered by existing regulations and includes energy consumed by the occupants through activities and appliances; in this case it would typically be small power usage (computers, equipment, appliances *etc*.). The following unregulated energy use for the development was calculated:

- ***83,654.47 kWh/Annum***
- ***11.33 Tonnes CO_2/Annum***

The following energy hierarchy has been adhered to in order to determine the most appropriate strategy for the development:

1. Be Lean, Reduce energy and carbon emissions through the use of passive design and energy efficiency measures.
2. Be Green, Reduce energy and carbon emissions by installing Low or Zero Carbon (LZC) Technologies such as Solar panels, Photovoltaics, Wind Turbines etc.

Be Lean and Be Green Measures

In order to initially reduce carbon emissions from a base Part L 2021 compliant development, passive design and energy efficiency measures have been incorporated, such as:

- *Additional improvements to the thermal performance of the fabric of the buildings;*

- *The provision of energy efficient lighting;*
- *The provision of time and temperature zone controls.*

Further examples of the proposed measures to be provided are in Section 8.0 'Passive Design and Energy Efficiency Measures' of this report.

Also, after analysing the various renewable energy options, it is considered that the most appropriate low or zero carbon (LZC) technology is Photovoltaics (PV) panels and ASHP. Further details of the feasibility analysis of low or zero carbon technologies are detailed within Section 10.0 'Renewable Energy' of this report.

Following the inclusion of the PV and ASHP and Passive measures, the total energy consumption and carbon emissions for the Proposed Development, taking into account regulated energy demands have further reduced to:

- ***-24,932.53 kWh/Annum***
- ***-2.02 Tonnes CO_2/Annum***

Proposed Energy Strategy for the proposed development:
In summary the energy strategy comprises of:

- Passive Design and Energy Efficient Measures (Section 8.0)
- PV and Air Source Heat Pumps (Section 10.0)

The strategy takes into consideration the site layout and requirements for the building type to produce a design that incorporates the most appropriate technologies available to the site. This provides a scheme that is commercially viable whilst targeting compliance with all policies applicable to this proposed development.

This review has resulted in the formation of an Energy Strategy to be adopted for the development which involves the use of passive design and energy efficiency measures, and the use of Photovoltaics and ASHP.

The energy strategy for the development is shown in Table 1.1 below.

Development Energy Strategy	
Heating	ASHP within Office, Electric Panel heaters within WC and Circulation Spaces
Cooling	ASHP for the cooling within the Office spaces
Hot water (DHW)	Instantaneous Point of Use Electric DHW
Ventilation	Extract system provided in WC's, and MVHR within the Office spaces
Lighting	Energy efficient LED lighting where applicable

Table 1.1 Proposed Energy Strategy for the development

Tables 1.2 – 1.5, highlight the carbon and energy savings that are currently anticipated for the development from a base Part L 2021 compliant build.

Development	Predicted Energy Consumption (kWh/Annum)	
	Regulated	Unregulated
Baseline: Part L 2021 of the Building Regulations Compliant Development	235,887.22	83,654.47
After Energy Efficient Passive + ASHP + PV Measures	-24,932.53	-

Table 1.2 Predicted Energy Consumption

Development	Regulated Energy Savings	
	kWh/Annum	%
Passive + ASHP + PV Savings	303,781	108.94%

Table 1.3 Regulated Energy Savings

Development	Carbon Dioxide Emissions (Tonnes/Annum)	
	Regulated	Unregulated
Baseline: Part L 2021 of the Building Regulations Compliant Development	37.76	11.33
After Energy Efficient Passive + ASHP + PV Measures	-2.02	-

Table 1.4 Predicted Carbon Emissions

Development	Regulated Carbon Dioxide Emissions	
	Tonnes/Annum	Tonnes/Annum
Passive + ASHP + PV Savings	39.78	105.35%

Table 1.5 Regulated Carbon Emissions Savings

The development shall have an anticipated CO_2 improvement of 105.35% beyond Part L 2021, complying with local policy requirements. The energy and carbon calculations for the development at each stage (baseline, passive measures and PV), are displayed in full within Appendix C. Furthermore, sample BRUKL documents for the development are displayed in Appendix D.

2. INTRODUCTION

This report has been prepared by Cudd Bentley Consulting Ltd to investigate the issues of energy and sustainability surrounding the Concord Logistics Industrial Development.

The proposal seeks full planning permission for the development of 11,947 sq.m (128,595 sq.ft) of industrial and logistics floorspace, arranged across three two-storey warehouse units. The largest of the units (Unit 3) is located to the south-east of the Site, adjacent to Threapwood Road. Units 1 and 2 are located to the north and south-west of the Site respectively. All of the units are accessed via a single estate road directly from Threapwood Road, with dedicated parking and servicing areas provided for each unit.

The application also seeks permission for landscaping and all associated works, including the provision of significant landscaping and tree planting to the rear of Unit 2, ensuring a significant physical and visual barrier to the residential beyond.

Given the speculative nature of the proposals, provision is sought for use in Classes B2/ and or B8/and or Class E (g)(iii) in order to allow flexibility to accommodate a range of potential occupiers. In addition, each of the proposed units will include provision for ancillary office floorspace at mezzanine level, as well as an allowance for ancillary trade counters (which will only be used in connection with a tenant's primary operations).

The units will be 10m in height (to underside of haunch), and designed to the highest modern standards for industrial and logistics warehousing, aiming for BREEAM 'excellent' accreditation, EPC- A+ rating and incorporating a highly sustainable specification of development for both staff and visitors.

Government policies now require significant energy reductions from proposed buildings. Building a greener future sets a planned trajectory outlined via Part L 2021 of the Building Regulations. These commitments have been the key focus point in addressing policies and strategies to reduce energy use and carbon emissions through energy efficiency and low or zero carbon technologies (LZC).

In line with best practice the following approach has been adopted in forming the energy statement for the development:

1. To propose to improve the building fabric from minimum Part L 2021 Building Regulations requirements; (BE LEAN)
2. Investigate the feasibility of connecting into an existing district heat network and where this is not available investigate the feasibility of providing a central CHP Plant to serve the base heating and hot water requirements for the development; (BE CLEAN)
3. To propose to reduce energy consumption and carbon dioxide emissions further through the use of on-site renewable / LZC energy technologies. (BE GREEN)

The recommended strategy takes into consideration the site layout and requirements for the building to produce a design that incorporates the most appropriate technologies available to the site that are commercially viable, whilst targeting compliance with all policies applicable to this development.

The Site comprises land and buildings at Concord House, within Concord Business Park, on Threapwood Road, in Wythenshawe, outlined in red on the submitted Site Location Plan. It measures approximately 3ha, has a predominantly flat topography and is irregular in shape.

Concord House is a large floorplate office building, surrounded by areas of car parking and significant areas of landscaping. Vehicular access to the Site is made from Threapwood Road, whilst pedestrian access can be made by the same route or directly from Simonsway.

The Site is not located within a Conservation Area, nor are there any statutorily or locally listed buildings either on-site or in the local area. The Site is in Flood Zone 1 and is at low risk of flooding, and there are no TPOs in place.

The Site is bound by the Metrolink and Simonsway, to the north, areas of woodland to the east and west, Longley Lane to the north and existing industrial buildings to the east. To the south-east lies the remaining areas of Concord Business Park, whilst to the south-west lies residential dwellings on Hatchett Road and Coxton Road, which are visually separate from the Site by virtue of existing trees and landscaping.

A site plan has been prepared by The Harris Partnership and will be submitted as part of the planning application.

3. DRIVERS OF SUSTAINABILTY

The term Sustainable Development, is defined by the Department for the Environment, Food and Rural Affairs as:

'… making sure people throughout the world can satisfy their basic needs now, while making sure that future generations can also look forward to the same quality of life. It recognises that the "three pillars" – economy, society and environment – are interconnected.'

United Nations Framework Convention on Climate Change

To achieve this objective of sustainable development in any industry, sector strict regulations have been put in place that have filtered down through EU Directives from the European Climate Change Programme, to National UK Acts such as the Climate Change Act 2008, to Local Policy in the form of Core Strategies. However, there are larger drivers behind the concept of sustainable development.

Kyoto Protocol

In 1997, the Kyoto Protocol was adopted as part of the United Nations Framework Convention on Climate Change, to which the UK is a signatory. The key feature of the protocol was the binding targets that were set for industrialised countries to reduce their Green House Gas emissions by 12.5% below 1990 levels by 2008-2012.

Cancun Agreements

Since the initial adoption of the Kyoto Protocol, extensive research has been put forward as to the causes and markers of climate change from the Intergovernmental Panel on Climate Change, which has led to new targets and objectives being made. In 2012, the international community met to discuss new directions for responding to climate change by adopting new agreements. The key objectives of the Cancun Agreements are:

- *Establish clear objectives for reducing human-generated greenhouse gas emissions over time to keep the global average temperature rise below two degrees;*
- *Mobilise the development and transfer of clean technology to boost efforts to address climate change, getting it to the right place at the right time and for the best effect;*
- *Assist the particularly vulnerable people in the world to adapt to the inevitable impacts of climate change;*
- *Protect the world's forests, which are a major repository of carbon;*
- *Establish effective institutions and systems which will ensure these objectives are implemented successfully.*

COP21: Paris Global Climate Agreement

In December 2015, a global climate deal was reached in a summit involving all of the world's nations. The targets of this aimed principally to curb the dangerous levels of climate change and drive an increase low-carbon infrastructure investment. Numerous organisations and corporations also committed to helping create a greener future by making their own pledges through the course of the summit. The key elements of the agreement are:

- *To keep global temperatures "well below" 2.0°C above pre-industrial times and "endeavour to limit" them even more, to 1.5C*
- *To limit the amount of greenhouse gases emitted by human activity to the same levels that trees, soil and oceans can absorb naturally, beginning at some point between 2050 and 2100*
- *To review each country's contribution to cutting emissions every five years so they scale up to the challenge*
- *For rich countries to help poorer nations by providing "climate finance" to adapt to climate change and switch to renewable energy.*

BRE's COP21 Climate Pledge (December 2015)

"We commit to continue to drive best practice and carbon reduction, as we have through the use of BREEAM for the past 25 years. By reaching over 9,000 BREEAM rated buildings we predict emissions savings will be in excess of 900,000 tonnes of CO_2, compared to regulatory minimum performance requirements, by 2020. Saving not only carbon, but bringing wider benefits to both the owner and occupiers."

4. NATIONAL POLICY

National Planning Policy

An effective planning system is required to contribute to achieving sustainable development. The ***National Planning Policy Framework (NPPF),*** 2024, outlines what the government deems as sustainable development in England.

Sustainable development is defined as having the following three overarching objectives which are interdependent and need to be pursued in mutually supportive ways: an economic objective, a social objective, and an environmental objective.

1. Economic objective – 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;
2. Social objective – 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 a well-designed and safe built environment, with accessible services and open spaces that reflect current and future needs and support communities' health, social and cultural well-being; and
3. Environmental objective – to contribute to protecting and enhancing our natural, built and historic environment; including making effective use of land, helping to improve biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy.

The above objectives can be described as an energy trilemma, this is demonstrated in Figure 4.1 below. Each dimension is dependent on each other and sustainable development proposals should adhere to each role. This energy statement shall ensure the proposed Development is one that contributes economically, socially and environmentally in accordance with the NPPF, 2024.

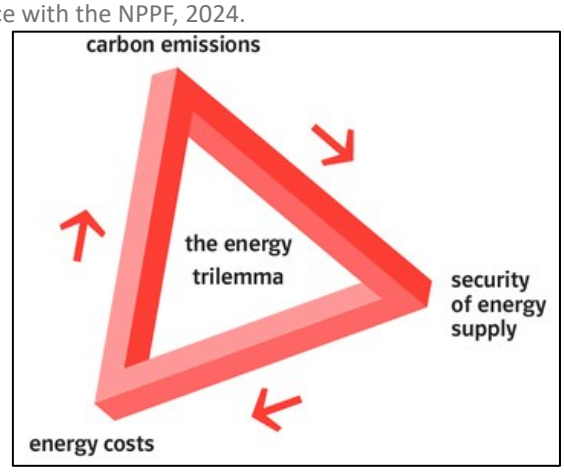


Figure 4.1 The Energy Trilemma

Guidance has been followed from the (NPPF), 2024, to provide an energy strategy which reduces energy use and carbon emissions, in line with best practice. This will provide a balanced scheme which focuses on optimal use of non-renewable resources (energy efficiency measures) whilst providing a renewable energy strategy best suited to the sites and their building uses. Below are some key extracts relevant to the development from Chapter fourteen 'Meeting the Challenge of Climate Change, Flooding & Coastal Change':

Paragraph 162

Plans should take a proactive approach to mitigating and adapting to climate change, taking into account the long-term implications for flood risk, coastal change, water supply, biodiversity and landscapes, and the risk of overheating and drought from rising temperatures . Policies should support appropriate measures to ensure the future health and resilience of communities and infrastructure to climate change impacts, such as providing

space for physical protection measures, or making provision for the possible future relocation of vulnerable development and infrastructure.

Paragraph 164

New development should be planned for in ways that:

a. avoid increased vulnerability to the range of impacts arising from climate change. When new development is brought forward in areas which are vulnerable, care should be taken to ensure that risks can be managed through suitable adaptation measures, including through incorporating green infrastructure and sustainable drainage systems; and

b. help to reduce greenhouse gas emissions, such as through its location, orientation and design. Any local requirements for the sustainability of buildings in plans should reflect the Government's policy for national technical standards.

Paragraph 165

To help increase the use and supply of renewable and low carbon energy and heat, plans should:

a. provide a positive strategy for energy from these sources, that maximises the potential for suitable development, and their future re-powering and life extension, while ensuring that adverse impacts are addressed appropriately (including cumulative landscape and visual impacts);

b. consider identifying suitable areas for renewable and low carbon energy sources, and supporting infrastructure, where this would help secure their development; and

c. identify opportunities for development to draw its energy supply from decentralised, renewable or low carbon energy supply systems and for co-locating potential heat customers and suppliers.

Paragraph 166

In determining planning applications, local planning authorities should expect new development to:

a) comply with any development plan policies on local requirements for decentralised energy supply unless it can be demonstrated by the applicant, having regard to the type of development involved and its design, that this is not feasible or viable; and

b) take account of landform, layout, building orientation, massing and landscaping to minimise energy consumption.

Paragraph 167

Local planning authorities should also give significant weight to the need to support energy efficiency and low carbon heating improvements to existing buildings, both domestic and non-domestic (including through installation of heat pumps and solar panels where these do not already benefit from permitted development rights). Where the proposals would affect conservation areas, listed buildings or other relevant designated heritage assets, local planning authorities should also apply the policies set out in chapter 16 of this Framework.

Paragraph 168

When determining planning applications for all forms of renewable and low carbon energy developments and their associated infrastructure, local planning authorities should:

a) not require applicants to demonstrate the overall need for renewable or low carbon energy, and give significant weight to the benefits associated with renewable and low carbon energy generation and the proposal's contribution to a net zero future;

b) recognise that small-scale and community-led projects provide a valuable contribution to cutting greenhouse gas emissions;

c) in the case of applications for the repowering and life-extension of existing renewable sites, give significant weight to the benefits of utilising an established site.

Paragraph 181

When determining any planning applications, local planning authorities should ensure that flood risk is not increased elsewhere. Where appropriate, applications should be supported by a site-specific flood-risk assessment. Development should only be allowed in areas at risk of flooding where, in the light of this assessment (and the sequential and exception tests, as applicable) it can be demonstrated that:

a) within the site, the most vulnerable development is located in areas of lowest flood risk, unless there are overriding reasons to prefer a different location;
b) the development is appropriately flood resistant and resilient such that, in the event of a flood, it could be quickly brought back into use without significant refurbishment;
c) it incorporates sustainable drainage systems, unless there is clear evidence that this would be inappropriate;
d) any residual risk can be safely managed; and
e) safe access and escape routes are included where appropriate, as part of an agreed emergency plan.

5. LOCAL POLICY

This section aims to highlight guidance available and the minimum requirements at local level from The Manchester Core Strategy Development Plan Document 2012-2027 which states the Council's vision, spatial strategy and policies for the future development of the area.

Core Strategy Development Plan Document 2012-2027

Policy EN 4: Reducing CO2 Emissions by Enabling Low and Zero Carbon Development

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

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

Policy EN 6: Target Framework for CO2 reductions from low or zero carbon energy supplies

Applications for residential development of 10 or more units and all other development over 1,000 sq m will be expected as a minimum to meet the target shown in Tables 12.1 or 12.2, unless this can be shown not to be viable. This should be demonstrated through an energy statement, submitted as part of the Design and Access Statement. Such a statement will be expected to set out the projected regulated energy demand and associated CO2emissions for all phases of the development.

Developments smaller than the above threshold but involving the erection of a building or substantial improvement to an existing building will also be expected to meet the minimum target, where viable, but will not be expected to submit an energy statement.

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

- Target 1 Network development areas: Locations where the proximity of new and existing buildings, the mix of uses and density of development provide the right conditions to support district heating (and cooling).
- Target 2 Electricity intense areas: Locations where the predominant building type has an all-electric fit-out such as retail units and leisure complexes.
- Target 3 Micro-generation areas: Locations where lower densities and a fragmented mix of uses tend to mean that only building scale solutions are practical.

Non-domestic CO2 emissions reduction targets:

Target	% Minimum requirement
Target 1: Network development area	CHP/district heating anchor or connection or where not feasible a 15% increase on Part L 2010
Target 2: Electricity intense buildings (Applies to commercial uses with a high proportion of emissions from electricity use (>45 kg CO2/m2)).	+10% increase on Part L 2010
Target 3: Micro generation area	+15%increase on Part L 2010

Where the CO2 emissions reduction required under any future revision to Part L of the building regulations becomes greater than the '% Minimum requirement', the reduction required under building regulations would apply.

Where the Council identifies an 'allowable solution', for example within an energy proposals plan, that would produce higher carbon reductions at no extra cost than that of achieving the '% Minimum requirement' (or required under building regulations if greater) the higher percentage reduction will be required. The cost comparison is based on the cost of incorporating the 'allowable solution' at design stage.

The energy statement will be required to be submitted at the outset of any proposed development (outline application or before). 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, subject to the energy statement incorporating evidence such as modelling to demonstrate compliance.

Guidance on what the energy statement should contain and how to decide which target applies to a development proposal is given in Appendix A.

Policy EN 8: Adaptation to Climate Change

All new development will be expected 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 rain water permeability
- Reduction in urban heat island effect through the use of Green Infrastructure such as green roofs, green walls, increased tree cover and waterways
- The need to control overheating of buildings through passive design.
- 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 EN 14: Flood Risk

- In line with the risk-based sequential approach contained within PPS25, development should 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).

- In addition to the requirements for site-specific Flood Risk Assessments (FRAs) set out in PPS25, an appropriate FRA will also be required for all development proposals, including changes of use, on sites greater than 0.5ha within Critical Drainage Areas (CDAs) and Canal Hazard Zones identified in the SFRA.
- 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 CDAs, evidence to justify the surface water run off approach / rates will be required.
- The City of Manchester contains many sections of rivers which are culverted or 'hidden'; where these are indicated in the SFRA beneath the proposed development site, further investigation will be required and the development proposal should take this into account; where feasible and appropriate development should seek to open up culverted/hidden rivers to reduce the associated flood risk and danger of collapse, taking advantage of opportunities to enhance biodiversity and Green Infrastructure.

Policy EN 15: Biodiversity and Geological Conservation

The Council will seek to maintain or enhance sites of biodiversity and geological value throughout the City. Particular consideration will be given to:

- sites with international or national designations for their biodiversity value. Manchester contains one Site of Special Scientific Interest (SSSI) (Cotteril Clough); there is a Special Area of Conservation (SAC) and an SSSI just over the border in Oldham (both on the Rochdale Canal within Oldham);
- other sites of biodiversity value, including Sites of Biological Importance (SBIs) and Local Nature Reserves (LNRs); Manchester currently has 35 SBIs (including the Rochdale and Ashton Canals) and 7 LNRs; priority habitats found within Manchester, as listed in the Manchester Biodiversity Strategy and included in the Greater Manchester Biodiversity Action Plan (GM BAP);
- protected and priority species, as listed in the Manchester Biodiversity Strategy and included in the Greater Manchester Biodiversity Action Plan (GM BAP);
- sites that are recognised for their geological importance;
- the Council's objective to protect and conserve the City's existing trees and woodlands and the aim for a net increase in trees across the City.

Policy EN 16: Air Quality

The Council will seek to improve the air quality within Manchester, and particularly within Air Quality Management Areas, located along Manchester's principal traffic routes and at Manchester Airport. 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, including from Combined Heat and Power and biomass plant.

When assessing the appropriateness of locations for new development the Council will consider the impacts on air quality, alongside other plan objectives. This includes cumulative impacts, particularly in Air Quality Management Areas.

Policy EN 17: Water Quality

With reference to the Manchester-Salford-Trafford SFRA and other relevant documents:

- Development should 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;
- 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;
- Development close to a watercourse should also ensure that waste or litter cannot enter the watercourse from the site;

- Development should, where feasible and appropriate, seek to open up any culverted or hidden watercourse beneath the site to improve the ecological status of that watercourse.

Policy EN 19: Waste

The Council will

- Work with other Districts through the Greater Manchester Joint Waste Development Plan Document (GMJWDPD) to safeguard existing sites for waste management and identify and safeguard new sites in existing areas of employment where appropriate.
- 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 of new waste management facilities within the District to plan for and, where appropriate, use sustainable modes for waste transport, including use of modes such as rail and the Manchester Ship Canal.
- 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.
- Have full regard to the economic and environmental benefits that well designed and run, waste management facilities can bring to the District, subject to any conditions required to protect the amenity of existing adjacent users. Promote the development of innovation and technological advancement within the sustainable waste management industry, aiming to achieve a closed-loop waste management system.
- Require waste management practices to have full regard to the environmental, social and economic impacts of such development and encourage long-term benefits in improving the environment, the regeneration of areas in need of investment and co-location with other employment uses where appropriate.
- Encourage communities to take responsibility for the waste they create through the provision of accessible facilities.

Policy T 1: 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.
- Promote regeneration and economic vitality by relieving traffic congestion and improving access to jobs and services, particularly for those most in need and for those without a car.
- Improve access to transport services and facilities in order to enable disabled people and people with mobility impairments to participate fully in public life.
- Improve pedestrian routes and the pedestrian environment.
- Improve and develop further Manchester's cycle network (for example the Manchester Cycleway and the Trans Pennine Trail).
- Contribute to improvements to the extent and reliability of the public transport network through safe and attractive waiting and interchange facilities, better priority, improved services and information provision.
- Improve and develop appropriate road, rail and water freight transport routes and associated intermodal freight transport facilities in order to assist in the sustainable and efficient movement of goods.

- 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.
- Take account of the needs of road users according to a broad hierarchy consisting of, in order of priority:
    1. pedestrians and disabled people
    2. cyclists, public transport,
    3. commercial access,
    4. general off peak traffic,
    5. general peak time traffic

PLACES FOR EVERYONE DEVELOPMENT PLAN (ADOPTED MARCH 2024)

Policy JP-S1: Sustainable Development

To help tackle climate change, 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. In preparing plans, authorities should make as much use as possible of suitable previously developed (brownfield) land and vacant buildings to meet development needs. In bringing forward previously developed sites for development, particular attention will be paid to tackling land contamination and stability issues, ensuring that appropriate mitigation and remediation is implemented to enable sites to be brought back into use effectively.

Addressing Climate Change

5.5 Greater Manchester's Vision is to be at the forefront of action on climate change and to make its fair contribution to international commitments by becoming a carbon neutral city region by 2038. In acknowledgment of climate change, by 2020, all 10 districts and the Greater Manchester Combined Authority have declared a climate emergency. To support this vision a 5 Year Environment Plan18 was launched in 2019 to identify the urgent actions that are needed to ensure Greater Manchester can follow the required pathway for carbon neutrality.

5.6 To meet our carbon commitments we will need to:

- Be carbon neutral by 2038
- Hold cumulative carbon dioxide emissions to within our carbon budget
- Initiate a 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; and
- Increase the delivery of nature-based solutions and biodiversity net gain

5.18 In calculating carbon emissions from 2025, 'unregulated' emissions (e.g. those associated with cooking and small appliances) should be assessed, in addition to 'regulated' emissions. The only way that this can be deliverable will be through the use of onsite electricity generation or through carbon offsetting ('allowable solutions') as occupants' lifestyle choices are not predetermined by energy efficiency measures associated with construction standards.

5.19 By following the energy hierarchy, new development will need to achieve net zero carbon through the maximisation of on-site measures first. However, in circumstances where a development has demonstrated that the hierarchy has been followed and there are no reasonable alternatives to meet the minimum carbon

reductions, then payment to offset remaining emissions will also be required. Such payments should be expected to fund other carbon saving programmes within Greater Manchester to help meet the 5 Year Environment Plan targets (such as energy efficiency retrofit and renewable energy installations). The Mayor of Greater Manchester has developed the Greater Manchester Environment Fund, which will provide a mechanism for carbon offset payments to be made. Districts may also set up their own carbon off-setting schemes and set their own carbon price. District carbon off-set funds will need to be ring-fenced and used effectively to support local carbon reduction projects and programmes (such as retrofitting existing properties with energy efficiency measures).

Policy JP-S2: 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:

1. Promoting the retrofitting of existing buildings with measures to improve energy efficiency and generate renewable and low carbon energy, heating and cooling;
2. Promoting the use of life cycle cost and carbon assessment tools to ensure the long-term impacts from development can be captured;
3. Taking a positive approach to renewable and low carbon energy schemes, particularly schemes that are led by, or meet the needs of local communities;
4. Increasing the range of nature-based solutions including carbon sequestration through the restoration of peat-based habitats, woodland management, treeplanting and natural flood management techniques;
5. An expectation that new development will, unless it can be demonstrated that it is not practicable or financially viable;

a. Be net zero carbon which applies:

- from adoption – to regulated operational carbon emissions;
- from 2028 – to all emissions 'in construction'.

From 2025 development should also calculate and minimise carbon emissions from unregulated emissions alongside regulated emissions.

Development proposals should set out how this has been achieved in an energy statement in accordance with the energy hierarchy, which in order of importance seeks to:

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

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.

As an interim measure, development should be consistent with the 2022 Part L Building Regulations unless superseded by changes to building regulations and/or national or local planning policies.

b. Incorporate adequate electric vehicle charging points, in line with Part S of the Building Regulations, unless superseded by relevant Local Plan policies, to future proof for the likely long-term demand, taking account of the potential maximum energy demand for the site;

c. 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.

6. DEVELOPMENT APPROACH

This report adopts the following approach to provide compliance with the Local and National Planning Policies:

1. To propose to improve building fabric from minimum Part L (2021) Building Regulations requirements.
2. To propose to reduce energy consumption and carbon dioxide emissions through passive and energy efficiency measures.
3. Investigate the possibility of connection into existing District Heating / Cooling Networks.
4. To propose to reduce energy consumption and carbon dioxide emissions further through the use of on-site renewable / LZC energy technologies.

Table 6.1 below outlines the Part L Building Regulations that the proposed development shall be assessed under:

Building Element	Part L Building Regulations Applicable
Class B2/ B8/ E(g)(ii)	Part L Volume 2 (2021)

Table 6.1 Part L Building Regulations Applicable

7. ASSESSMENT OF BASELINE ENERGY

Government policies require significant energy reductions from buildings. Building a Greener Future sets a planned trajectory (delivered via Part L of the building regulations 2021) with an aspiration for all non-domestic new buildings to be zero carbon by 2020. The Climate Change Act (Nov 2008) sets the UK targets of; CO_2 reduction of 26% by 2020 and CO_2 reduction of 100% by 2050.

7.1. POLICY REVIEW

National Planning Policy Framework (2024)
Paragraph 165

To help increase the use and supply of renewable and low carbon energy and heat, plans should:

provide a positive strategy for energy from these sources, that maximises the potential for suitable development, and their future re-powering and life extension, while ensuring that adverse impacts are addressed appropriately (including cumulative landscape and visual impacts);

consider identifying suitable areas for renewable and low carbon energy sources, and supporting infrastructure, where this would help secure their development; and

identify opportunities for development to draw its energy supply from decentralised, renewable or low carbon energy supply systems and for co-locating potential heat customers and suppliers.

CORE STRATEGY DEVELOPMENT PLAN DOCUMENT:
Policy EN 4: Reducing CO2 Emissions by Enabling Low and Zero Carbon Development
The Council will seek to reduce fuel poverty and decouple growth in the economy, growth in CO2 emissions, and rising fossil fuel prices, through the following actions:

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

7.2. DEVELOPMENT SUSTAINABILITY FEATURES

The primary energy demands of the proposed development will be:

- *Heating*
- *Lighting*
- *Hot water*

- *General Power*
- *Cooling*
- *Ventilation*

To assess the preliminary energy consumption of the proposed development, calculations have been completed using approved SBEM software (OpenBuildings). The calculations generate annualised energy consumption for the buildings, from which the "carbon footprint" can be assessed.

The total baseline energy and carbon emissions for the entire proposed development, taking into account regulated energy demands are:

- ***278,848.23 kWh/Annum***
- ***37.76 Tonnes CO_2/Annum***

(A full set of calculations supporting these figures included in Appendix C of this document)

Unregulated energy use is not covered by existing regulations and includes energy consumed by the occupants through activities and appliances; in this case it would typically be small power usage (appliances, computers etc.). The following unregulated energy use for the development was calculated:

- ***83,654.47 kWh/Annum***
- ***11.33 Tonnes CO_2/Annum***

8. BE LEAN - ENERGY EFFICIENT MEASURES

The proposed development incorporates a range of passive and active design measures that will reduce the energy demand for space conditioning, hot water and lighting.

8.1. PASSIVE DESIGN MEASURES

Enhanced U-Values

The heat loss of different building fabric elements is dependent upon their U-value. A building with low U-values provides better levels of insulation and reduced heating demand during the cooler months.

The proposed development will incorporate high levels of insulation and high-performance glazing beyond Part L 2021 targets in order to reduce the demand for space heating and/or cooling.

The table 8.1 demonstrates the improved performance of the proposed building fabric beyond the Building Regulations requirements for non-domestic uses.

	Proposed
Building Element	**U-Value ($W/m^2 \cdot K$)**
External Walls	0.22
Internal Partitions	0.28
Exposed Floors	0.18
Exposed Roof	0.15
Personnel Door	1.60
Vehicle Door	1.30
Rooflights	1.30 (g= 0.45)
Glazing	1.30 (g= 0.36)
Air Permeability	4 $m^3/hr/m^2$@ 50 Pa

Table 8.1 U – Values targeted in the development.

AIR PERMEABILITY IMPROVEMENT

Heat loss may also occur due to air infiltration. Although this cannot be eliminated altogether, good construction detailing, and the use of best practice construction techniques can minimise the amount of air infiltration.

The proposed development will aim to improve upon the Part L 2021 minimum standards for air permeability by targeting air permeability rates of 4 $m^3/hr/m^2$ at 50Pa.

Reducing The Need For Artificial Lighting

The proposed development has been designed for good levels of daylight in all habitable spaces as a way of improving the health and wellbeing of its occupants.

All of the habitable areas will benefit from large areas of glazing to increase the amount of daylight within the internal spaces where possible and Warehouse storage spaces from the Rooflights. This is expected to reduce the need for artificial lighting whilst delivering pleasant, healthy spaces for occupants.

8.2. ACTIVE DESIGN MEASURES

High Efficacy Lighting

The proposed development intends to incorporate low energy lighting fittings throughout the spaces. All light fittings will be specified as low energy lighting and will accommodate LED with lighting efficacy as shown below table 8.2.

Lighting	
Lighting Type	**lumens per circuit watt**
LED	Warehouse Storage – 160 lm/w (to be installed at fitout by tenant/occupier) Office Area's – 140 lm/w WC – 110 lm/w Circulation Area's – 110 lm/W

Table 8.2 Lighting efficacy targeted in the development.

Heat Recovery Ventilation

The mechanical ventilation system will include heat recovery in order to achieve ventilation in the most energy-efficient way. The table 8.3 below shows the heat recovery efficiencies for this proposed development.

Mechanical Ventilation Heating Recovery (Typical Unit Chosen)				
Area Type	**Supply/Extract SFP (W/l/s)**	**Heat Recovery Efficiency (%)**	**Exhaust Flow Rate (l/s/m²)**	**Exhaust SFP (W/l/s)**
Office/meeting	1.1	80	x	x
WC	x	x	5	0.5

Table 8.3 Mechanical ventilation heat recovery efficiency

Comfort Cooling

An ASHP system of high energy efficiency ratios is assumed for both heating and cooling in the proposed development. Therefore, the impact of active cooling in terms of energy use and carbon emissions will be minimised.

Monitoring

In addition to the above design measures, the development will incorporate monitoring equipment and systems to enable occupiers to monitor and reduce their energy use. Smart meters will be installed to monitor the heat and electricity consumption of the development.

9. BE CLEAN – SUPPLY ENERGY EFFICIENTLY

The proposed development is located within a designated Heat and Energy Opportunity Area under the Greater Manchester Combined Authority's Places for Everyone plan. The developments in these areas are required to assess the feasibility of connecting to existing or planned heat networks, incorporate design measures that enable future connection, and prioritise low-carbon and renewable energy solutions. This approach supports Greater Manchester's ambition to achieve net zero carbon by 2038 and aligns with the UK Government's Heat and Buildings Strategy.

Connection To an Existing Heat Network

An assessment was carried out to determine the availability of existing decentralised energy networks in proximity to the proposed site, using the Department of Energy and Climate Change (DECC) CHP database. The investigation concluded that there are no suitable nearby Combined Heat and Power (CHP) systems or sources of waste heat or power to which the development could be feasibly connected.
The CHP availability map is presented in Figure 9.1 below.

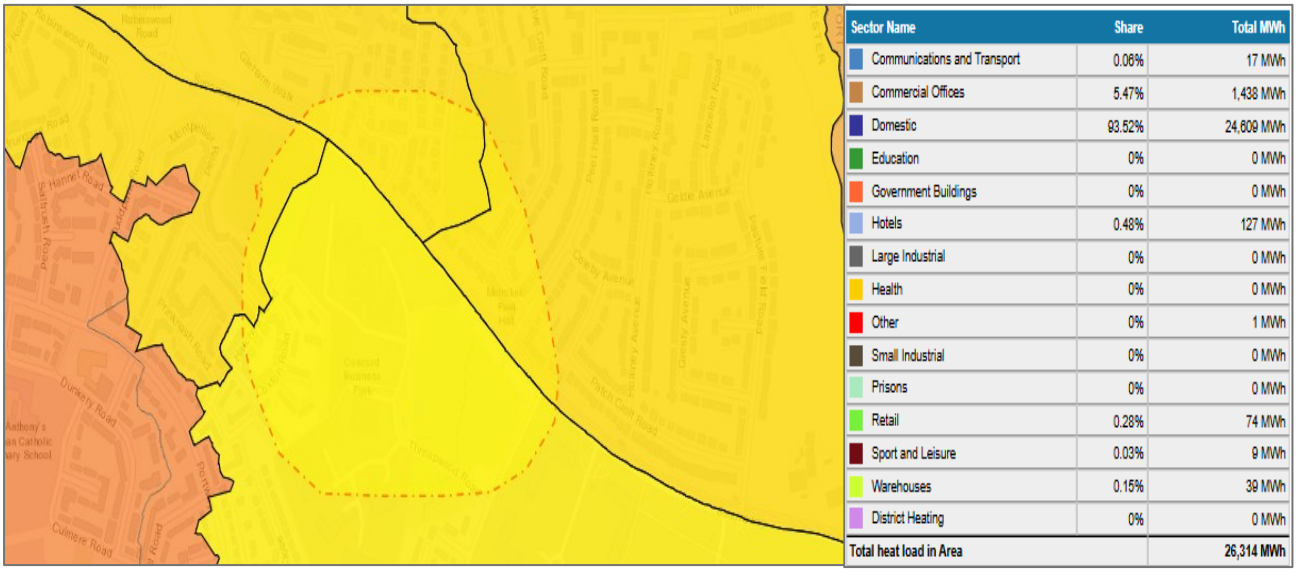


Figure 9.1 CHP availability Search Area

Estimated Heat Demand

The technical viability of installing a single site wide CHP system has been explored to deliver the heating and hot water demand of the units. It is not considered viable for the following reasons:

- In order to economically justify installing a CHP unit on any site, a minimum requirement of 4,000 hours running time per year is necessary. Based on the building types being Industrial, there is a low heating and hot water demand for a continuous period over the year, typically a maximum of circa 2,117 hours is anticipated.

Months	Load per Day (hrs)	Load per week (hrs)	Load per month (hrs)	Load for 6 months (hrs)	
April to Sept	2	14	58.8	352.8	
October to March	10	70	294	1,764.0	

	Total approximate Load for a year	2,116.8	hours
	Minimum required hours	4,000.0	hours

Table 9.2 CHP Analysis

Design Approach:
To comply with Places for Everyone greater Manchester requirements and to future-proof the development:

- **Primary Heating Solution:** Fossil fuel-free systems such as air source heat pumps (ASHPs) are proposed for the development to provide heating and cooling within office spaces.
- **Impact on local Air:** The proposed design incorporates Air Source Heat Pumps (ASHPs) and Photovoltaic Panels (PVs), both of which are recognized as clean and sustainable energy technologies. ASHPs significantly reduce reliance on fossil fuels for heating by utilizing ambient air, while PVs generate electricity without emitting pollutants. Together, these systems contribute to lower greenhouse gas emissions and reduced local air pollution,

Carbon Reduction and Efficiency:
The proposed development is designed with following measures to minimize the energy demand,

- **Fabric First Approach:** The proposed development is designed with High-performance U-values to minimise the building heat demand.
- **Renewable Integration:** ASHPs combined with photovoltaic (PV) panels for electricity generation.
- **Smart Controls:** Demand-side management and heat metering to optimise efficiency

Justification for Current Strategy:
Given the absence of an operational network at present, the development will adopt a standalone low-carbon heating solution. However, the design will maintain flexibility for future integration with a district heat network, supporting the long-term decarbonisation objectives of the Opportunity Area

10. BE GREEN - RENEWABLE ENERGY

The use of renewable and low or zero carbon (LZC) technologies within the development has been addressed and the following, Table 10.1, reviews the primary options for generation of on-site renewable / LZC energy and considers their suitability for use on the development.

Renewable Technology Feasibility Assessment		Viable?
Bio Fuel Boilers 	Bio-fuel boilers are specifically designed to burn solid biomass or liquid bio-fuel in order to heat water, or raise steam. This can then be used for space heating or Domestic Hot Water (DHW) supply. Bio-fuel boilers could potentially provide the annual space heating and DHW demand for the Units, however they are not recommended for this development for the following reasons:- 1. Biomass boilers generate increased Oxides of Nitrogen (NOx) and particulates (PM10) which would affect air quality. 2. The storage requirements for the biofuel would require a large plant space, with an auxiliary storage facility to allow for a two week period where delivery of fuel might not be available.	No
Land Use Large volumes of storage is required for fuel at ground level or basement level with sufficient vehicular access for fuel delivered. Noise Noise levels are generated by the operation of the bio-fuel boiler and associated deliveries of the bio-fuel. The plant room enclosure will have to be attenuated to acceptable levels imposed by planning and Acoustician recommendations.		

Renewable Technology Feasibility Assessment		Viable?
Wind Turbines 	Wind turbines convert the kinetic energy in the wind into mechanical energy which is then converted into electricity. Wind turbines can provide electrical power either directly to a load or via a battery system. The use of wind turbines is not recommended for this development for the following reasons:- 1. Wind turbines, of a size necessary to make a contribution to the Units renewable energy requirements are considered inappropriate on spatial, planning, aesthetic and noise grounds. Noise pollution from commercial wind turbines can be quiet significant within a few hundred metres. 2. The site is not ideal; an ideal site is a hill with a flat, clear exposure. It should be free from strong turbulence and obstructions like large trees, houses or other buildings. As the development is surrounded by industrial buildings, turbulent wind flow will be experienced across the site which is not ideal for wind turbine installations. 3. The financial viability of a small scale installation on the site would be compromised by the operational efficiency of the units (circa 30%). 4. Wind turbines, can cause electrical interference within a 2km radius. 5. Finally, the main disadvantage is down to the winds unreliability factor. The wind strength is often too low in many areas, where this site is located the wind speed is 4.4 m/s at 10m, as can be seen in the wind map presented in Appendix C, in order for the wind turbines to be feasible, wind speeds of greater than 5.5m/s are required.	No
<u>Land Use</u> There would be an adverse visual impact on the site which will be dependent on the height at which the wind turbines are located. <u>Noise</u> Noise levels are generated by the rotating blades; these noise levels will vary dependent on wind velocity and will need to be in acceptable levels imposed by planning and Acoustician recommendations.		
Ground Source Heat Pumps 	Space cooling and heating can be provided by circulating water cooled or heated directly by the ground or via subterranean water. Ground water cooling and heating through the use of aquifers makes use of the relatively stable ground/ water temperature which is available at a temperature range of 10 – 14°C. The use of Ground Source Heat Pumps is not recommended for this development for the following reasons:- 1. Cost of boreholes may be prohibitive (subject to site geological conditions). 2. Favourable ground conditions may not exist. 3. Problems can arise with boreholes silting up (open-loop).	No

Renewable Technology Feasibility Assessment		Viable?
	4. Changes in local ground conditions could affect water quality and the amount that can be extracted (open-loop).	
Land Use This installation would require Environmental Agency approval. Ground and Hydrology analysis would be required to investigate if favourable conditions exist. Noise There are no noise issues generated by this technology.		
Solar Water Heating 	Solar Water Heating systems use radiant energy from the sun to heat water. Systems comprise of a roof mounted heat collector piped to a coil located within a hot water storage cylinder.	No
Land Use Roof space is better served for the installation of Photovoltaic panels. Noise Noise levels are generated by pumps at roof level, these are insignificant so should pose no issues.		
Air Source Heat Pumps 	An Air Source Heat Pump extracts heat from the outside air in the same way that a fridge extracts heat from its inside. It can extract heat from the air even when the outside temperature is as low as minus 15°C and typically draws approximately a quarter to a third of the electricity of a standard resistance heater for the same amount of heating, reducing utility bills. This typical efficiency compares to 70-95% for a fossil-fuel powered boiler. Air Source Heat Pumps (ASHP) are proposed for use within the office areas to provide the heating and cooling requirements. The benefits of ASHP are as follows: • *They are ideally suited to serve the office areas within the development during periods when they may require heating or cooling. The times when cooling is required may differ for different space depending on their use, occupancy period and levels, the operation of individual air source heat pumps would allow individual control and can be efficiently accommodated within the building design;* • *The heat pump unit can be configured to provide internal heat reclaim from dissimilar environmental zones, reducing energy consumption and carbon emissions.*	**Yes**
Land Use Air Source Heat Pumps can be installed on ground mounted, roof mounted or wall mounted frames. When installing Air Source Heat Pumps there are various factors to consider; Heat Pumps should be positioned to provide shelter from high winds which can reduce efficiency by causing defrost problems. Noise Noise levels are generated by fans, and compressors causing vibrations. The noise levels are dependent on manufacturer and vary accordingly, these will need to be in acceptable levels imposed by planning and Acousticians recommendations.		

<table>
<tr><th colspan="2">Renewable Technology Feasibility Assessment</th><th>Viable?</th></tr>
<tr><td>Photovoltaics
</td><td>Photovoltaic (PV) modules convert sunlight directly to DC electricity. The solar cells consist of a thin piece of semiconductor material, in most cases silicon.

A 423 kWp photovoltaic array is proposed for the development to be located on the roof of the units. The PV breakdown for the units as below,
<table><tr><th></th><th>PV KWp</th></tr><tr><td>Unit 1</td><td>108</td></tr><tr><td>Unit 2</td><td>130</td></tr><tr><td>Unit 3</td><td>185</td></tr></table>1. Photovoltaic panels can be situated at roof level, east facing, to provide a source of renewable energy.
2. Panels can be grid connected to sell surplus electricity produced.
3. Low maintenance issues.
4. Visual use of renewable energy can be seen by general public.</td><td>Yes</td></tr>
<tr><td colspan="2">Land Use
There are no land issues or adverse visual impacts as the photovoltaic panels are roof mounted.
Noise
There are no noise issues generated by this technology.</td><td></td></tr>
</table>

Table 10.1 Renewable Energy Options

10.1. BE GREEN RESULTS

Following the inclusion of the PV and ASHP, the total energy consumption and carbon emissions for the Proposed Development, taking into account regulated energy demands have further reduced to:

- ***-24,932.53 kWh/Annum***
- ***-2.02 Tonnes CO_2/Annum***

The incorporation of photovoltaic panels shall provide the following contribution in renewable energy to the Development.

Site PV Requirement	Energy Generation from Renewable Energy (PV)
423 kWp system – circa 1,058 panels – Circa 2,116 sqm	346,860 kWh/annum

Table 10.2 PV Energy and Carbon Savings

The payback time for photovoltaic panels can be seen below in table 10.3.

	PV kWp	Energy Generated from PV kWh/annum	Annual Savings (32P per KWh electricity Price) £	Payback Period Yr
Proposed Development	423	3,46,860	1,10,995	2.36

Table 10.3 Payback period for renewables

The energy strategy for the development is shown in table 10.4 below.

Development Energy Strategy	
Heating	ASHP within Office, Electric Panel heaters within WC and Circulation Spaces
Cooling	ASHP for the cooling within the Office spaces
Hot water (DHW)	Instantaneous Point of Use Electric DHW
Ventilation	Extract system provided in WC's, and MVHR within the Office spaces
Lighting	Energy efficient LED lighting where applicable

Table 10.4 Proposed Energy Strategy for the development

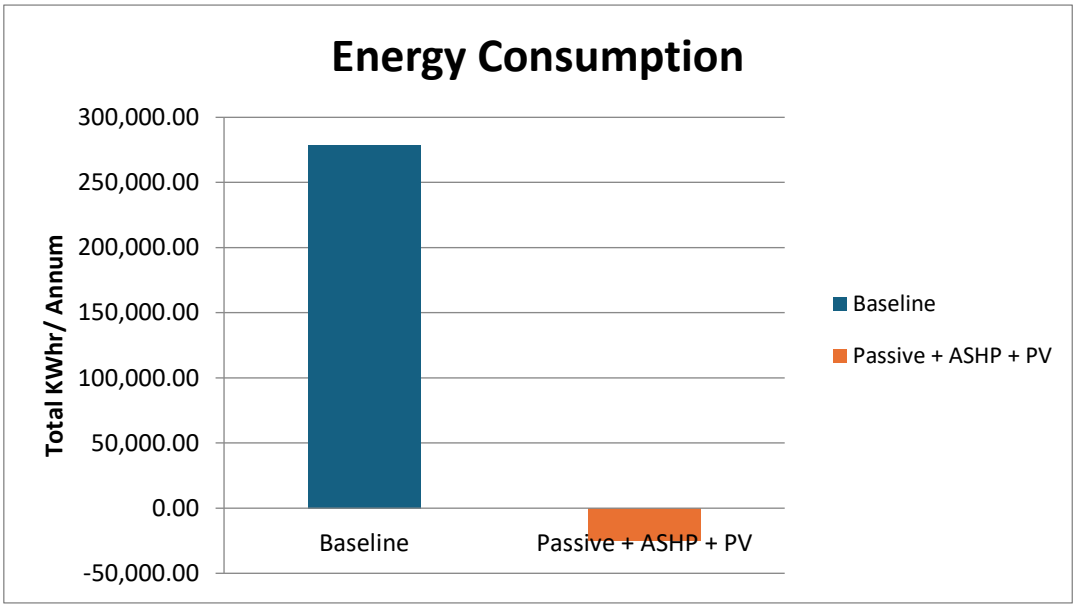


Figure 10.1 Annual Energy Consumption for the development

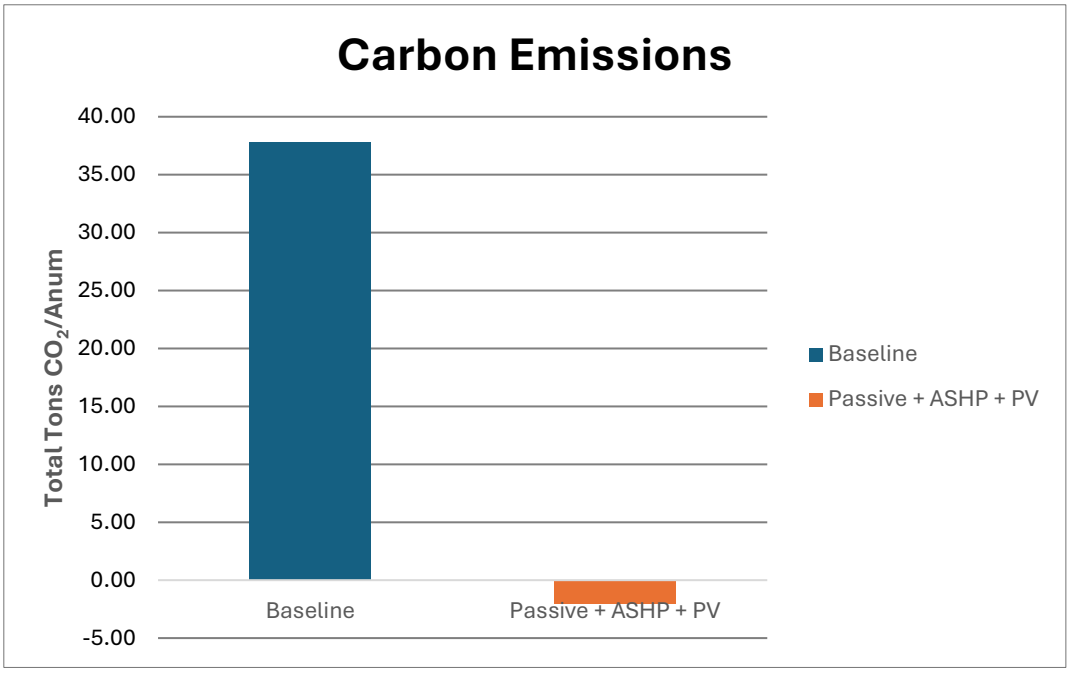


Figure 10.2 Annual Carbon Emissions for the development

The proposed development shall have an anticipated CO_2 improvement of 105.35% beyond Part L 2021.

11. WATER CONSUMPTION

The ever-increasing impacts of climate change are continuously inflating demand for water, as well as increasing a need for awareness towards water usage. The UK is already under a large amount of pressure regarding water resources. To contribute towards mitigating this issue, the proposed development will consider various means of being economical with water consumption.

11.1. POLICY REVIEW

Core Strategy Development Plan Document:

Policy EN 17: Water Quality

With reference to the Manchester-Salford-Trafford SFRA and other relevant documents:

- Development should 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;
- 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;
- Development close to a watercourse should also ensure that waste or litter cannot enter the watercourse from the site;
- Development should, where feasible and appropriate, seek to open up any culverted or hidden watercourse beneath the site to improve the ecological status of that watercourse.

11.2. DEVELOPMENT SUSTAINABILITY FEATURES

In order to ensure the reduction and management of water consumption within the proposed industrial units, it is anticipated that various measures shall be undertaken, and specific features installed during the fit out works to minimise the building's potable water consumption.

It is anticipated that improvements in the consumption of potable water will be achieved through the specification of water efficient components within sanitary areas during the fit out works. Such features include the specification of low flow taps as well as dual flush toilets with reduced flush volumes.

11.3. SUMMARY

To ensure the sustainability of the development it is anticipated that water efficient fixtures will be incorporated into the design, such as low flow taps and dual flush toilets with reduced effective flush volumes.

To be further sustainable, it is anticipated that pulsed water meters will be installed on the mains water supply, to effectively monitor water consumption. The inclusion of the above sustainability features allows for the development to be deemed sustainable with regard to water consumption.

12. TRANSPORT

Transport produces a large proportion of the country's greenhouse gas emissions, something which government at both national and local level are striving to combat, especially through planning frameworks for new developments. Solutions to transport issues are to be incorporated into the design of the development.

12.1. POLICY REVIEW

National Planning Policy Framework (2024)
Section 9 - Promoting Sustainable Transport
Paragraph 109
Transport issues should be considered from the earliest stages of plan-making and development proposals, using a vision-led approach to identify transport solutions that deliver well-designed, sustainable and popular places. This should involve:

a) making transport considerations an important part of early engagement with local communities;

b) ensuring patterns of movement, streets, parking and other transport considerations are integral to the design of schemes, and contribute to making high quality places;

c) understanding and addressing the potential impacts of development on transport networks;

d) realising opportunities from existing or proposed transport infrastructure, and changing transport technology and usage – for example in relation to the scale, location or density of development that can be accommodated;

e) identifying and pursuing opportunities to promote walking, cycling and public transport use; and

f) identifying, assessing and taking into account the environmental impacts of traffic and transport infrastructure – including appropriate opportunities for avoiding and mitigating any adverse effects, and for net environmental gains.

Core Strategy Development Plan Document:

Policy T 1: 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.
- Promote regeneration and economic vitality by relieving traffic congestion and improving access to jobs and services, particularly for those most in need and for those without a car.
- Improve access to transport services and facilities in order to enable disabled people and people with mobility impairments to participate fully in public life.
- Improve pedestrian routes and the pedestrian environment.
- 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.
- Take account of the needs of road users according to a broad hierarchy consisting of, in order of priority:
    1. pedestrians and disabled people
    2. cyclists, public transport,
    3. general peak time traffic

12.2. DEVELOPMENT SUSTAINABILITY FEATURES

The site is in close proximity to Simonsway that connects onto M56, A555 (Manchester Airport Relief Road) is accessed via Shadowmoss Road. Vehicular access to the site is via Threapwood Road. There are also several pedestrian links and public footpaths in close proximity to the site from Simonsway, Hatchett Road and Threapwood Road. Simonsway also features a national cycle path route. The site location is 4-minute walk from the nearest Tram stop (Peel Hall) which can be used to commute to work.

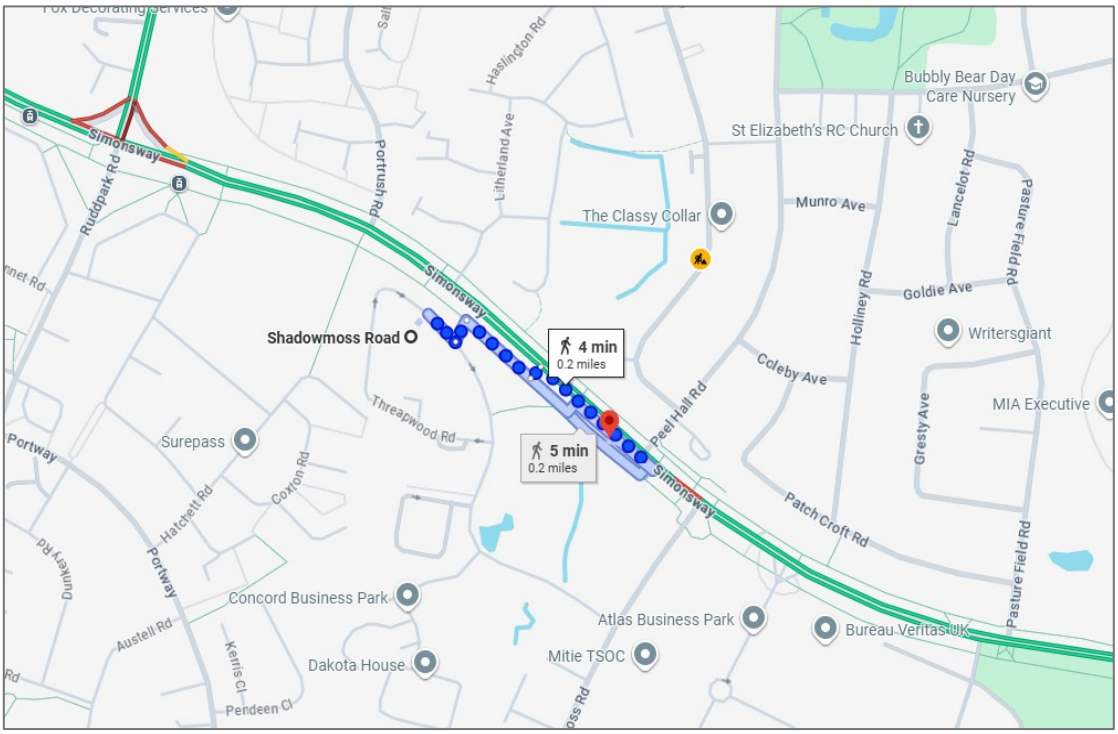


Figure 12.1 Public Transport Links

In order to encourage sustainable means of transport rather than commuting in private vehicles it is anticipated there will be the provision of cycle storage facilities within the site, which will be sheltered and secure.

12.3. SUMMARY

The above provisions aim to make the proposed development easier to access for all building users, as well as offering a sustainable means of commuting rather than using a private vehicle.

The proposed development is located in Wythenshawe within 9 miles from Manchester city centre. The site has easy access to Peel Hall Metrolink bus stop. The inclusion of the above sustainability features allows for the proposed to be deemed sustainable with regard to transport. For more details regarding transport, please refer to the transport assessment prepared by Stantec, which will be submitted as part of the planning application.

13. CONSTRUCTION SITE MANAGEMENT

The requirement for new materials needs to be minimised, by re-using existing buildings and materials where possible and providing a Site Waste Management Plan for all construction sites. This responsibility lies with the contractor and needs to be clarified at an early design stage. It is becoming a greater requirement now to construct buildings that are flexible and can be re-used.

13.1. POLICY REVIEW

National Planning Policy Framework (2024)
Paragraph 20
Strategic policies should set out an overall strategy for the pattern, scale and design quality of places and make sufficient provision for:
b) infrastructure for transport, telecommunications, security, waste management, water supply, wastewater, flood risk and coastal change management, and the provision of minerals and energy (including heat)

Core Strategy Development Plan Document:

Policy EN 19: Waste

The Council will

- Work with other Districts through the Greater Manchester Joint Waste Development Plan Document (GMJWDPD) to safeguard existing sites for waste management and identify and safeguard new sites in existing areas of employment where appropriate.
- 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 of new waste management facilities within the District to plan for and, where appropriate, use sustainable modes for waste transport, including use of modes such as rail and the Manchester Ship Canal.
- 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.
- Have full regard to the economic and environmental benefits that well designed and run, waste management facilities can bring to the District, subject to any conditions required to protect the amenity of existing adjacent users. Promote the development of innovation and technological advancement within the sustainable waste management industry, aiming to achieve a closed-loop waste management system.
- Require waste management practices to have full regard to the environmental, social and economic impacts of such development and encourage long-term benefits in improving the environment, the regeneration of areas in need of investment and co-location with other employment uses where appropriate.
- Encourage communities to take responsibility for the waste they create through the provision of accessible facilities

13.2. DEVELOPMENT SUSTAINABILITY FEATURES

In order to comply with national and local policy in regard to construction site management, it is anticipated that certain measures will be put into place for this proposed development. It is expected the main contractor will comply with best standards as set out in the Considerate Constructors Scheme, achieving a score which is considered as exceeding compliance with the criteria of the scheme.

To ensure the sustainable construction of the development, the project will consider the concept of the waste hierarchy as seen in Figure 13.1 below. The waste hierarchy recognises the need for waste to be considered for a variety of waste streams before being sent to land fill as a last resort. The hierarchy is as follows:

- *Waste minimisation;*
- *Reusing or waste or up cycling;*
- *Recycling of all applicable materials;*
- *Recovery of energy from waste (anaerobic digestion plants);*
- *Waste is sent to landfill.*

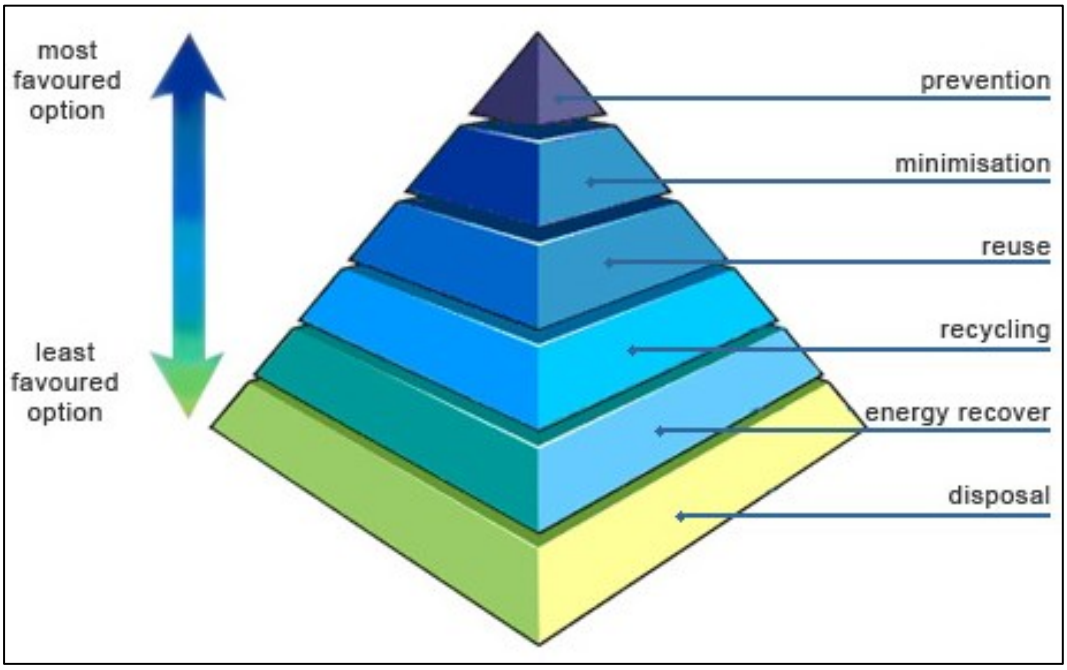


Figure 13.1 Waste Hierarchy Diagram

13.3. SUMMARY

It is anticipated that this proposed development will produce a Site Waste Management Plan, highlighting key refurbishment materials and the correct waste streams for recycling these materials.

The proposed development should adhere to a Considerate Constructors Scheme, achieving a targeted score which exceeds 'compliance' with the criteria of the scheme. As a result of these measures, the development may be deemed sustainable as regards to construction site management.

14. SUSTAINABLE DESIGN

Good urban design is essential in providing a varied and sustainable environment, which can facilitate opportunities for positive contributions within communities. As part of sustainable design for developments, it is essential that suitable design principles are followed to maximise opportunities for energy reduction through design as well as ensuring buildings follow or enhance the character of an area. Developments should also give further consideration to the level of security and comfort that is provided for future building users, including thermal and visual comfort, inclusivity and safe access.

14.1. POLICY REVIEW

National Planning Policy Framework (2024)
Section 12- Achieving Well-Designed Places
Paragraph 131
The creation of high quality, beautiful and sustainable buildings and places is fundamental to what the planning and development process should achieve. Good design is a key aspect of sustainable development, creates better places in which to live and work and helps make development acceptable to communities. Being clear about design expectations, and how these will be tested, is essential for achieving this. So too is effective engagement between applicants, communities, local planning authorities and other interests throughout the process.

Core Strategy Development Plan Document:

Policy EN 8: Adaptation to Climate Change

All new development will be expected 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 rain water permeability
- Reduction in urban heat island effect through the use of Green Infrastructure such as green roofs, green walls, increased tree cover and waterways
- The need to control overheating of buildings through passive design.
- 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.

d) Making sure the design of new development actively responds to other properties in the vicinity ensuring no unacceptable impacts on residential amenity occur.

e) Not resulting in unacceptable harm to the amenities of existing and proposed buildings, particularly with regard to privacy, outlook, daylight and sunlight.

14.2. DEVELOPMENT SUSTAINABILITY FEATURES

The proposed development shall include a variety of features which are regarded as having a good sustainable design. It is anticipated that any external lighting specified will be designed to reduce unnecessary light pollution during nighttime hours.

To ensure the risk of potential overheating is minimised building modelling of the units are expected to have blinds to mitigate the risk of occupied spaces being affected from excessive solar gains; this is also being achieved through use of glazing with a low shading coefficient. Additionally, to ensure that overheating will not occur during summer months and the building is suitably insulated as well as allowing for adaptation due to the effects of climate change, it is anticipated that the proposed development will use building fabrics with enhanced 'U' values which go beyond the minimum requirements of Part L (2021), as seen within Table 14.1. Further to this the energy efficiency measures discussed within Section 8.0 will be incorporated into the design of the proposed development. It is anticipated that such measures will lower the building's energy requirements making its operation feasible and practical for years to come.

Element	Part L Requirement	U Value Specified	% Improvement
Wall	0.26	0.22	15.38%
Roof	0.16	0.15	6.25%
Floor	0.18	0.18	N/A
Glazing	1.6	1.4	12.5%

Table 14.1 U Value Improvements

To provide a fully sustainable development it is also anticipated that the materials used for the following main elements of the development shall be rated under the Green Guide to Specification targeting ratings between A+ and D:

- *External walls;*
- *Ground floor;*
- *Roof;*
- *Windows.*

To provide a development which remains sustainable during its operation phase, it is anticipated that space will be provided for the provision of waste storage facilities with additional space of recyclable waste streams. This is to enable building users to sort waste before collection and minimise the quantity of waste that may end up at landfill.

The proposed development incorporates thoughtful landscaping improvements to enhance biodiversity and the overall environmental quality of the site. These include mixed planting and grassland areas strategically located in the site, contributing to a greener, more sustainable environment.

14.3. SUMMARY

In order to comply with national and local policies, the proposed development shall strive to provide both to building users and the local community a building of sustainable design.

Measures should be taken to ensure the thermal comfort of future building users, through efforts such as ensuring no occupied areas will result in excessive solar gains and in turn over heating.

External lighting except safety and security lighting should be designed to be switched off automatically through the use of timers of day light sensors as well as the specification of cut off luminaires to reduce any potential light spill on to neighbouring properties as covered in the lighting assessment.

The above design features allow for the proposed development to be of sustainable design.

15. FLOOD RISK

To prevent an increase in surface water run off through development of a site, it is imperative that consideration is given to the reduction of over land flow during storm events as well as the impact of development in potential flood risk areas.

15.1. POLICY REVIEW

National Planning Policy Framework (2024)
Section 14- Meeting the Challenge of Climate Change, Flooding and Coastal Change
Paragraph 170
Inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk (whether existing or future). Where development is necessary in such areas, the development should be made safe for its lifetime without increasing flood risk elsewhere.

Core Strategy Development Plan Document:

Policy EN 14: Flood Risk

- In line with the risk-based sequential approach contained within PPS25, development should 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).
- In addition to the requirements for site-specific Flood Risk Assessments (FRAs) set out in PPS25, an appropriate FRA will also be required for all development proposals, including changes of use, on sites greater than 0.5ha within Critical Drainage Areas (CDAs) and Canal Hazard Zones identified in the SFRA.
- 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 CDAs, evidence to justify the surface water run off approach / rates will be required.
- The City of Manchester contains many sections of rivers which are culverted or 'hidden'; where these are indicated in the SFRA beneath the proposed development site, further investigation will be required and the development proposal should take this into account; where feasible and appropriate development should seek to open up culverted/hidden rivers to reduce the associated flood risk and danger of collapse, taking advantage of opportunities to enhance biodiversity and Green Infrastructure.

15.2. DEVELOPMENT SUSTAINABILITY FEATURES

The flood risk maps within figures 15.1 & 15.2 confirm that the proposed site is located within Flood Zone 1, indicating a very low risk of flooding. The proposed development works will not increase flood risk, and the site is considered safe, requiring no specific flood mitigation measures.

A flood risk assessment has been completed by the HTA consulting which includes more details related to flood. Please refer to that for further details.



Figure 15.1: Rivers and sea Flooding (Sourced from Flood Warning Information Service)

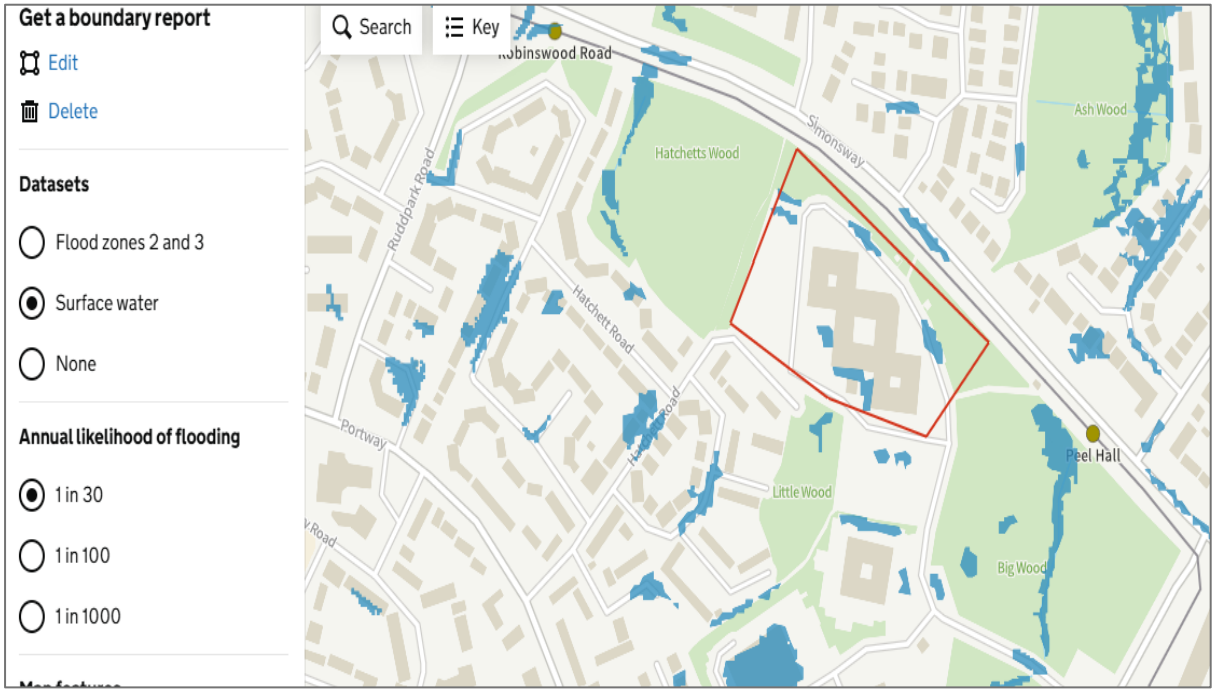


Figure 15.2: Surface Water Flooding (Sourced from Flood Warning Information Service)

15.3. SUMMARY

As shown in the flood maps (Figures 15.1 and 15.2), the site is located within Flood Zone 1 and is not at risk of flooding. The location is therefore considered sustainable and safe in terms of flood risk.

16. ECOLOGY

Ecology is essential within many communities, with the mix of flora and fauna facilitating benefits such as flood alleviation and pollution amelioration. In addition to this, areas with a wealth of green spaces and an abundance of biodiversity are seen to provide a positive contribution to a community.

16.1. POLICY REVIEW

National Planning Policy Framework (2024)
Section 15- Conserving and Enhancing the Natural Environment
Paragraph 187
Planning policies and decisions should contribute to and enhance the natural and local environment by:

a) protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan)

Core Strategy Development Plan Document:

Policy EN 15: Biodiversity and Geological Conservation

The Council will seek to maintain or enhance sites of biodiversity and geological value throughout the City. Particular consideration will be given to:

- sites with international or national designations for their biodiversity value. Manchester contains one Site of Special Scientific Interest (SSSI) (Cotteril Clough); there is a Special Area of Conservation (SAC) and an SSSI just over the border in Oldham (both on the Rochdale Canal within Oldham);
- other sites of biodiversity value, including Sites of Biological Importance (SBIs) and Local Nature Reserves (LNRs); Manchester currently has 35 SBIs (including the Rochdale and Ashton Canals) and 7 LNRs; priority habitats found within Manchester, as listed in the Manchester Biodiversity Strategy and included in the Greater Manchester Biodiversity Action Plan (GM BAP);
- sites that are recognised for their geological importance;

16.2. DEVELOPMENT SUSTAINABILITY FEATURES

An ecology conservation map (sourced from MAGIC) highlights there is no Site of Special Scientific Interest (SSSI) in the vicinity of the proposed development. Figure 16.1 below shows that the nearest SSSI (Cotteril Clough) is approximately 3.10 km from the proposed development.

For further details please refer to the PEA/ Bat Survey/ BNG Assessment undertaken by the Envance consulting which will be submitted with the planning application.

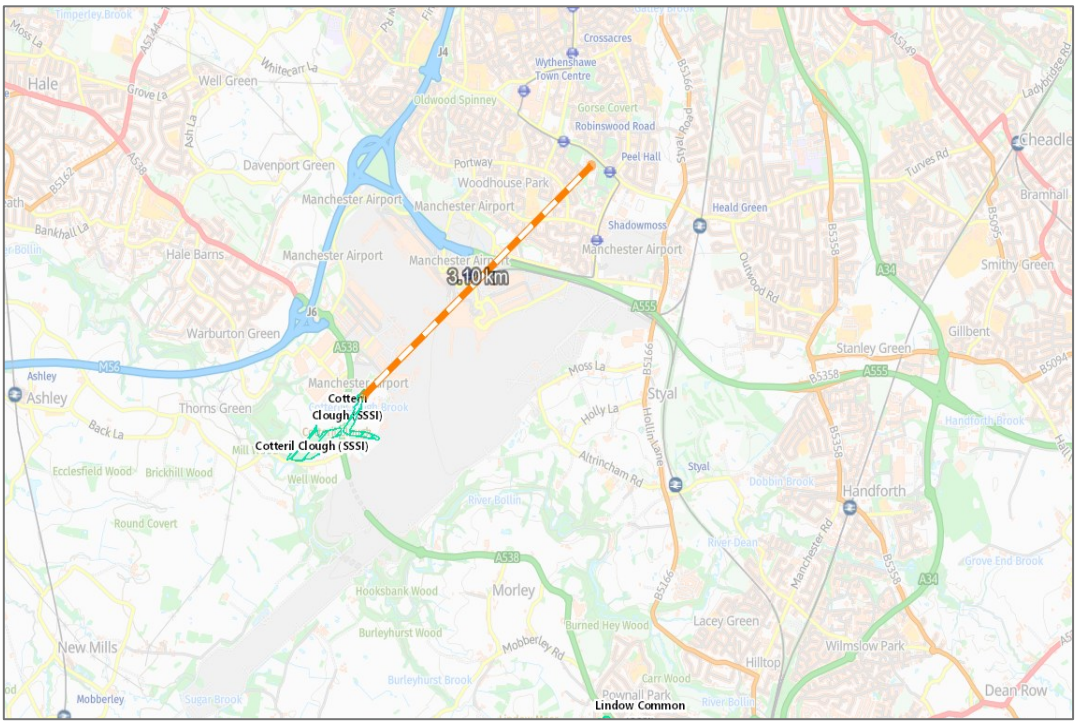


Figure 16.1 Ecological Sensitivity (Sourced from MAGIC)

16.3. SUMMARY

An Ecology conservation map (sourced from MAGIC) highlights there are no Sites of Special Scientific Interest (SSSI) in the vicinity of the proposed development, as the nearest SSSI is far enough to have an impact on the development.

17. LZC FOR BREEAM

LZC Section for BREEAM:

1. **Energy generated from LZC energy source per year**

Table 10.2 within section 10.1 of this statement provides the energy generated from LZC, which is equal to 3,46,860 kWh/Annum.

2. **Carbon dioxide savings from LZC energy source per year**

Refer to table 1.5 within section 1.0.

3. **Life cycle cost of the potential specification, accounting for payback**

Refer to table 10.3 within section 10.1.

4. **Local planning criteria, including land use and noise**

Please refer to section 5.0 which includes all local planning policies relevant to the energy and sustainability side of the development.

5. **Feasibility of exporting heat or electricity from the system**

During off peak hours, energy generated on site is expected to be exported to Grid.

6. **Any available grants**

No grants are currently available.

7. **All technologies appropriate to the site**

Refer to section 10, and table 10.1

8. **Reasons for excluding other technologies**

Refer to section 10, and table 10.1

9. **Energy storage Feasibility**

Energy storage is not proposed for the industrial units because of low energy demand, and renewable energy systems like photovoltaics (PV) and air source heat pumps (ASHP) can directly supply energy when needed.

Energy Modeller Qualification:

The Energy Modelling (SBEM) was carried out by Hasnaat Mahmood and his qualifications and CV can be seen below in figure 17.1 and 17.2.

Mahmood,Hasnaat Shahid
(0.56) Miles

Cudd Bentley Consulting
Ashurst Manor, Church Lane
Sunninghill, Ascot
SL5 7DD
United Kingdom
Email: hasnaat.mahmood@cuddbentley.co.uk
Tel: 01344628821

LCC: **LCC Building Design; LCC Simulation;**

LCEA: **LCEA EPC Level 3 and 4 EW&NI;**

Figure 17.1 Energy Modeller Qualifications

HASNAAT MAHMOOD

TITLE: Senior Sustainability Engineer

QUALIFICATIONS:
BEng Mechanical Engineering
MSc Renewable Energy Systems
Part L Level 3/4 Energy Assessor
Hevacomp Part L Competent

EXPERIENCE:
Hasnaat joined Cudd Bentley in 2021 and is mainly involved in undertaking Energy and Sustainability assessments, Building Regulation compliance, SBEM/SAP modelling and ensuring local and national planning policy requirements are met for various projects. He has a MSc degree in Renewable Energy Systems from University of Surrey. He has experience in residential, industrial and mixed-use developments and since joining Cudd Bentley he has gained extensive experience within the sustainability sector and has been promoted from graduate to sustainability engineer.

Publications
Managing for Energy Performance – A Guiding Framework for Property Management

WOOLWICH PHASE 3 & PHASE 4
Part L compliance, Energy Statement, Sustainability Statement, Feasibility Study, Overheating Assessment

POYLE INDUSTRIAL DEVELOPMENT
Energy and Sustainability Statement, Feasibility Statement, BREEAM Assessment

Sainsbury's Ilford
The scheme consists of 7 multi-purpose blocks with over 1200 residential units with one block to serve student accommodation. Took the lead role in sustainability ensuring the best energy solution has been proposed in order to comply with the GLA planning policies. Worked on the Energy Statement, Sustainability Statement, Whole Life Cycle and GHG report.

West Midlands Interchange
The scheme consists of industrial warehouses (the largest in West Midlands) with office spaces on the ground and first floor. Worked on the net-zero report, in which a pathway was identified and proposed to make the building completely net zero in terms of operational energy and embodied carbon.

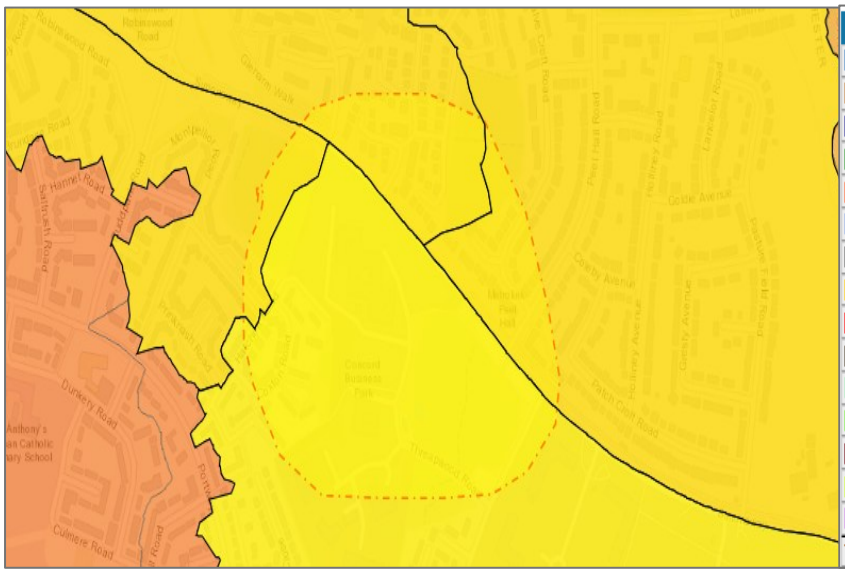
Thames Road
Produced an overheating assessment for the residential development in London and proposed mitigation measures in order to comply with CIBSE TM59 criteria.

Laporte Way, Luton
Worked on the Energy and Sustainability Statement for this industrial development for planning. Also, produced a net-zero carbon report in which solutions were proposed to make the development a net-zero building.

Unit Q West, Heathrow
This project consists of re-development of an existing building by changing the internal layouts and some building fabric. Worked on the operational energy calculation to determine amount of PV required to make building net-zero for operational use and offset embodied carbon.

Figure 17.2 Energy Modeller CV

APPENDIX A – CHP SEARCH



Sector Name	Share	Total MWh
Communications and Transport	0.06%	17 MWh
Commercial Offices	5.47%	1,438 MWh
Domestic	93.52%	24,609 MWh
Education	0%	0 MWh
Government Buildings	0%	0 MWh
Hotels	0.48%	127 MWh
Large Industrial	0%	0 MWh
Health	0%	0 MWh
Other	0%	1 MWh
Small Industrial	0%	0 MWh
Prisons	0%	0 MWh
Retail	0.28%	74 MWh
Sport and Leisure	0.03%	9 MWh
Warehouses	0.15%	39 MWh
District Heating	0%	0 MWh
Total heat load in Area		**26,314 MWh**

CHP availability Search Area

APPENDIX B – WIND MAP



Chart C.1 Wind Velocity Chart for the Development Site

APPENDIX C – ENERGY AND CARBON CALCULATIONS

Baseline Energy

kWh/m²/annum Baseline											
Typical Unit	Area	Heating	Cooling	Auxillary	Lighting	Hotwater	Total	kWh/Annum	kgCO2/m²/ Annum	Total kgCO2/ Annum	Total TonsCO2/ Annum
Unit 1	3279.50m²	4.09	1.27	0.42	11.26	4.08	21.12	69263.0	2.54	8329.93	8.33
Unit 2	3995.10m²	4.29	0.96	0.43	10.96	4.12	20.76	82938.3	2.59	10347.31	10.35
Unit 3	4793.60m²	3.62	0.48	0.68	17.36	4.28	26.42	126646.9	3.98	19078.53	19.08
Total	12068.20	12.00	2.71	1.53	39.58	12.48	68.30	278,848.23			37.76

Be Lean + Green Energy

kWh/m²/annum Baseline + Passive + PV												
Typical Unit	Area	Heating	Cooling	Auxillary	Lighting	Hotwater	Total	kWh/Annum	kgCO2/m²/ Annum	Total kgCO2/ Annum	Total TonsCO2/ Annum	PV
Unit 1	3279.50m²	4.09	1.27	0.42	11.26	4.08	-3.89	-12757.26	-0.19	-623.105	-0.62	25.01
Unit 2	3995.10m²	2.83	0.55	0.49	17.26	4.28	1.08	4314.71	-0.17	-679.167	-0.68	24.33
Unit 3	4793.60m²	2.89	1.3	0.44	17.08	4.16	-3.44	-16489.98	-0.15	-719.04	-0.72	29.31
Total	12068.20	9.81	3.12	1.35	45.60	12.52	-6.25	-24,932.53			-2.02	78.65

Energy Savings

Energy Calculations (Regulated Energy Demands) Energy							
Typical Unit	Total Area	Energy Baseline (kWh/annum)	Total Energy with Passive/Energy Efficiency Measures (kWh /annum)	Total Energy after CHP (kWh/annum)	Total Energy with Passive + PV measures (kWh /annum)	Total Displaced Energy from Baseline (kWh/annum)	Total % kwh/annum displaced
Unit 1	3279.50m²	69263.04	56407.40		-12757.26	82020.30	118.4%
Unit 2	3995.10m²	82938.276	68555.92		4314.71	78623.57	94.8%
Unit 3	4793.60m²	126646.912	110923.90		-16489.98	143136.90	113.0%
Total	12,068	278,848	235,887		-24,933	303,781	108.94%

Carbon Savings

Carbon Calculations (Regulated Energy Demands) Carbon								
Typical Unit	Total Area	Carbon Baseline kgCO2/annum	Improved Emissions after Passive/Energy Efficiency (kgCO2 /annum)	Improved Emissions after CHP (kgCO2/annum)	Improved Emissions after Passive + PV (kgCO2 /annum)	Total kgCO2/ annum displaced	Total TonsCO2/ annum displaced	Total % TonsCO2/ annum displaced
Unit 1	3279.50m²	8329.93	6575.476208		-623.11	8953.04	8.95	107.48%
Unit 2	3995.10m²	10347.309	8338.255669		-679.17	11026.48	11.03	106.56%
Unit 3	4793.60m²	19078.528	13363.21306		-719.04	19797.57	19.80	103.77%
Total	12,068	37,756	28,277		-2,021	39,777	39.78	105.35%

APPENDIX D – SAMPLE BRUKL REPORT

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2021

Project name

Unit 3 - Virgin House - Be Green As designed

Date: Wed Nov 19 10:42:34 2025

Administrative information

Building Details

Address: Unit 3, Virgin House, Manchester,

Certifier details

Name: Hasnaat Mahmood

Telephone number: 01344 628821

Address: Cudd Bentley, Ashurst Manor, Sunninghill, SL5 7DD

Certification tool

Calculation engine: SBEM

Calculation engine version: v6.1.e.0

Interface to calculation engine: Energy Simulator

Interface to calculation engine version: 24.0.2.45

BRUKL compliance module version: v6.1.e.0

Foundation area [m²]: 278

The CO_2 emission and primary energy rates of the building must not exceed the targets

Target CO_2 emission rate (TER), $kgCO_2/m^2.annum$	3.98	
Building CO_2 emission rate (BER), $kgCO_2/m^2.annum$	-0.15	
Target primary energy rate (TPER), $kWh_{PE}/m^2.annum$	43.11	
Building primary energy rate (BPER), $kWh_{PE}/m^2.annum$	-3.87	
Do the building's emission and primary energy rates exceed the targets?	BER =< TER	BPER =< TPER

The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

Fabric element	$U_{a\text{-Limit}}$	$U_{a\text{-Calc}}$	$U_{i\text{-Calc}}$	First surface with maximum value
Walls*	0.26	0.25	0.28	Partition 2
Floors	0.18	0.18	0.18	Exposed Floor 1
Pitched roofs	0.16	-	-	No heat loss pitched roofs
Flat roofs	0.18	0.15	0.15	Exposed Roof 1
Windows** and roof windows	1.6	1.3	1.3	Window 1
Rooflights***	2.2	-	-	No external rooflights
Personnel doors^	1.6	-	-	No external personnel doors
Vehicle access & similar large doors	1.3	-	-	No external vehicle access doors
High usage entrance doors	3	-	-	No external high usage entrance doors

$U_{a\text{-Limit}}$ = Limiting area-weighted average U-values [W/(m²K)] $U_{i\text{-Calc}}$ = Calculated maximum individual element U-values [W/(m²K)]

$U_{a\text{-Calc}}$ = Calculated area-weighted average U-values [W/(m²K)]

* Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows.

** Display windows and similar glazing are excluded from the U-value check. *** Values for rooflights refer to the horizontal position.

^ For fire doors, limiting U-value is 1.8 W/m²K

NB: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.

Air permeability	Limiting standard	This building
$m^3/(h.m^2)$ at 50 Pa	8	4

Page 1 of 5

Building services

For details on the standard values listed below, system-specific guidance, and additional regulatory requirements, refer to the Approved Documents.

Whole building lighting automatic monitoring & targeting with alarms for out-of-range values	NO
Whole building electric power factor achieved by power factor correction	<0.9

1- Office-ASHP

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.5	5	-	-	-
Standard value	2.5*	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO

* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.

2- WC-EPH

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	1	-	-	-	-
Standard value	N/A	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO

3- Circulation-EPH

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	1	-	-	-	-
Standard value	N/A	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO

1- Default DHW

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	1	-
Standard value	1	N/A

Zone-level mechanical ventilation, exhaust, and terminal units

ID	System type in the Approved Documents
A	Local supply or extract ventilation units
B	Zonal supply system where the fan is remote from the zone
C	Zonal extract system where the fan is remote from the zone
D	Zonal balanced supply and extract ventilation system
E	Local balanced supply and extract ventilation units
F	Other local ventilation units
G	Fan assisted terminal variable air volume units
H	Fan coil units
I	Kitchen extract with the fan remote from the zone and a grease filter

NB: Limiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.

Zone name	SFP [W/(l/s)]									HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I		
Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1	Zone	Standard
U3.1F.OFF	-	-	-	-	1.1	-	-	-	-	0.8	N/A
U3.GF.WC1	-	-	0.5	-	-	-	-	-	-	-	N/A

General lighting and display lighting	General luminaire	Display light source	
Zone name	Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m²]
Standard value	95	80	0.3
U3.GF.UM	160	-	-
U3.GF.WH	160	-	-
U3.1F.OFF	140	-	-
U3.GF.WC1	110	-	-
U3.1F.CIR2	110	-	-
U3.GF.ENT	110	-	-
U3.1F.CIR1	110	-	-
U3.1F.LIFT	110	-	-
U3.GF.LIFT	110	-	-

The spaces in the building should have appropriate passive control measures to limit solar gains in summer

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
U3.GF.UM	N/A	N/A
U3.GF.WH	N/A	N/A
U3.1F.OFF	NO (-2.5%)	NO

Regulation 25A: Consideration of high efficiency alternative energy systems

Were alternative energy systems considered and analysed as part of the design process?	YES
Is evidence of such assessment available as a separate submission?	YES
Are any such measures included in the proposed design?	YES

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Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Floor area [m²]	4793.6	4793.6
External area [m²]	4641.9	4641.9
Weather	MAN	MAN
Infiltration [m³/hm²@ 50Pa]	4	5
Average conductance [W/K]	1294.77	1339.14
Average U-value [W/m²K]	0.28	0.29
Alpha value* [%]	14.63	22.08

* Percentage of the building's average heat transfer coefficient which is due to thermal bridging

Building Use

% Area	Building Type
	Retail/Financial and Professional Services
	Restaurants and Cafes/Drinking Establishments/Takeaways
	Offices and Workshop Businesses
	General Industrial and Special Industrial Groups
100	**Storage or Distribution**
	Hotels
	Residential Institutions: Hospitals and Care Homes
	Residential Institutions: Residential Schools
	Residential Institutions: Universities and Colleges
	Secure Residential Institutions
	Residential Spaces
	Non-residential Institutions: Community/Day Centre
	Non-residential Institutions: Libraries, Museums, and Galleries
	Non-residential Institutions: Education
	Non-residential Institutions: Primary Health Care Building
	Non-residential Institutions: Crown and County Courts
	General Assembly and Leisure, Night Clubs, and Theatres
	Others: Passenger Terminals
	Others: Emergency Services
	Others: Miscellaneous 24hr Activities
	Others: Car Parks 24 hrs
	Others: Stand Alone Utility Block

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	2.89	1.89
Cooling	1.3	0.91
Auxiliary	0.44	0.37
Lighting	17.08	25.14
Hot water	4.16	4.16
Equipment*	30.87	30.87
TOTAL**	**25.88**	**32.46**

* Energy used by equipment does not count towards the total for consumption or calculating emissions.
** Total is net of any electrical energy displaced by CHP generators, if applicable.

Energy Production by Technology [kWh/m²]

	Actual	Notional
Photovoltaic systems	29.31	3.28
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
Displaced electricity	*29.31*	*3.28*

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m²]	132.54	128.99
Primary energy [kWh_{PE}/m²]	-3.87	43.11
Total emissions [kg/m²]	-0.15	3.98

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HVAC Systems Performance

System Type		Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEEF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] No Heating or Cooling										
	Actual	38.4	78.5	0	0	0	0	0	0	0
	Notional	27.6	87.1	0	0	0	0	0	----	----
[ST] Split or multi-split system, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
	Actual	27	178.5	2.3	14	4.6	3.26	3.55	3.5	5
	Notional	32.8	154.6	3.5	9.8	3.8	2.64	4.4	----	----
[ST] Other local room heater - unfanned, [HS] Direct or storage electric heater, [HFT] Electricity, [CFT] Electricity										
	Actual	392.3	0	136.2	0	11	0.8	0	1	0
	Notional	196.2	12.3	40.7	0	13.1	1.34	0	----	----
[ST] Other local room heater - unfanned, [HS] Direct or storage electric heater, [HFT] Electricity, [CFT] Electricity										
	Actual	339	90.3	117.7	0	0	0.8	0	1	0
	Notional	345.7	49.8	71.7	0	0	1.34	0	----	----
[ST] No Heating or Cooling										
	Actual	167.1	27.7	0	0	0	0	0	0	0
	Notional	320.1	76.8	0	0	0	0	0	----	----

Key to terms

Heat dem [MJ/m2]	= Heating energy demand
Cool dem [MJ/m2]	= Cooling energy demand
Heat con [kWh/m2]	= Heating energy consumption
Cool con [kWh/m2]	= Cooling energy consumption
Aux con [kWh/m2]	= Auxiliary energy consumption
Heat SSEFF	= Heating system seasonal efficiency (for notional building, value depends on activity glazing class)
Cool SSEER	= Cooling system seasonal energy efficiency ratio
Heat gen SSEFF	= Heating generator seasonal efficiency
Cool gen SSEER	= Cooling generator seasonal energy efficiency ratio
ST	= System type
HS	= Heat source
HFT	= Heating fuel type
CFT	= Cooling fuel type

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APPENDIX E – MODELLING INPUTS DETAILED

Heating & Cooling		
System Type	**Efficiency/(S)COP**	**Efficiency /(S)EER**
Air Source Heat Pump	3.5	5

Hot Water System	
Type	**Fuel**
Instantaneous Point of Use	Electric

Mechanical Ventilation Heating Recovery (Typical Unit Chosen)				
Area Type	**Supply/Extract SFP (W/l/s)**	**Heat Recovery Efficiency (%)**	**Exhaust Flow Rate (l/s/m²)**	**Exhaust SFP (W/l/s)**
Offices Area's	1.1	80	x	x
WC's	x	x	5	0.5

Building Fabric	
Element	**U-value (W/m²K)**
Ground Floor	0.18
External Wall (Cavity wall)	0.22
Roof	0.15
Windows (Double Glazed)	1.3 (g-value of 0.36)
Personal Doors	1.6
Vehicle Door	1.3

Air Permeability Rate – 4	
Renewables (Required for Net-Zero Target)	
PV Total Installed Capacity (KWp)	**PV Inclination**
423	South-Facing 30-degree inclination
Other Renewables (please specify details below): N/A	

Lighting	
Lighting Type	**lumens per circuit watt**
LED	Warehouse Areas – 160 lm/w Office Area's – 140 lm/w Circulation Area's – 110 lm/W WC's – 110 lm/W

Thermal Bridging – PSI Values

Junction Detail	W/mK
Below are Junctions involving Metal Cladding	
Roof-Wall	0.14
Wall-Ground Floor	0.6
Wall-Wall (Corner)	0.13
Wall-floor (Not Ground Floor)	0
Lintel above Door or Window	0.65
Sill Below Window	0.65
Jamb at Window or Door	0.65
Below are Junctions NOT involving Metal Cladding	
Roof-Wall	0.06
Wall-Ground Floor	0.08
Wall-Wall (Corner)	0.05
Wall-floor (Not Ground Floor)	0.04
Lintel above Door or Window	0.15
Sill Below Window	0.02
Jamb at Window or Door	0.03



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