

Waterfold Park, Bury

Client – Tritax Big Box

Energy and Sustainability Statement



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RECORD OF REVISIONS.

Date.	Revision.	Description of change.
05/10/2023	1	Issued for Comments
11/10/2023	2	Updated Site Plan

1 EXECUTIVE SUMMARY

This report considers the energy and sustainability measures to be incorporated within the proposed development in Bury. This document reviews the requirements at both national and local level, as set out in the National Planning Policy Framework and Rochdale Adopted Core Strategy (October 2016).

The recommended sustainability features for the development, resulting from a dynamic energy model, will allow for **40.64%** of regulated energy used on site sourced from renewables, and a **36.77%** reduction in carbon emission through the incorporation of Air Source Heat Pumps, Photovoltaic panels and passive energy efficiency measures. 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 Air Source Heat Pumps and **182.7 kWp** of Photovoltaic Array. To reduce the energy demand of the 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 client **Tritax** has a base build specification in which the aim is to maximise sustainability features within the developments which have been taken into consideration whilst undertaking this project. The following bullet point highlight the key factors:

- Achieving an EPC, A rating.
- PV to cover 20% of the roof area.
- EV - Min 61 Nr (10% to accessible spaces) with ductwork provision for future car charging points to all remaining spaces.

The development is located within Bury, and as such is in proximity to public transport nodes, as well as a range of primary local amenities such as a postal service, cash points and food outlets. These features 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 CO₂ emissions for the entire development. The total baseline energy and carbon emissions for the entire development, taking into account regulated energy demands are:

- 279,068 kWh/annum
- 41.19 Tonnes CO₂/annum

After the inclusion of Passive design measures, ASHP and Photovoltaic array, the total energy consumption and carbon emissions for the development, taking into account regulated energy demands have further reduced to:

- 165,667.83 kWh/annum
- 26.04 Tonnes CO₂/annum

2 INTRODUCTION

This report has been prepared by Cudd Bentley Consulting Ltd, to investigate the issues of energy and sustainability surrounding the Waterfold Park, Bury development. The development is a redevelopment of an existing premises, comprising full demolition; erection of new building for Class B8 purposes with ancillary offices; installation of external plant and gatehouse; hardstanding for servicing and parking; attenuation pond; and boundary enclosure.

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).

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 proposed development in Bury consists of 1 industrial unit with Warehouse storage spaces, WC's, circulation areas and Office spaces. The proposed development is next to Waterfold Road and the M66, which motor users can use to travel in out of North-West England.



Figure 1: Proposed Site Plan

3 DRIVERS OF SUSTAINABILITY

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 CO₂, 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), 2021, 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, 2021.

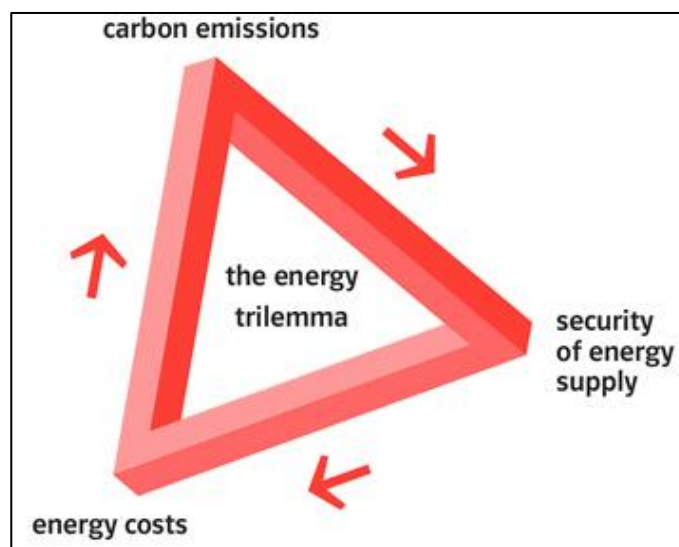


Figure 4.1 The Energy Trilemma

Guidance has been followed from the (NPPF), 2021, 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 153

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 from rising temperatures. Policies should support appropriate measures to ensure the future 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 154

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

Paragraph 155

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, while ensuring that adverse impacts are addressed satisfactorily (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 locating potential heat customers and suppliers.

Paragraph 156

Local planning authorities should support community-led initiatives for renewable and low carbon energy, including developments outside areas identified in local plans or other strategic policies that are being taken forward through neighbourhood planning.

Paragraph 157

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 158

When determining planning applications for renewable and low carbon development, local planning authorities should:

- a. not require applicants to demonstrate the overall need for renewable or low carbon energy, and recognise that even small-scale projects provide a valuable contribution to cutting greenhouse gas emissions; and
- b. approve the application if its impacts are (or can be made) acceptable. Once suitable areas for renewable and low carbon energy have been identified in plans, local planning authorities should expect subsequent applications for commercial scale projects outside these areas to demonstrate that the proposed location meets the criteria used in identifying suitable areas.

5 LOCAL POLICY

This section aims to highlight guidance available and the minimum requirements at local level from Rochdale Adopted Core Strategy, this document outlines the proposed scope of the Local Plan and provides a more refined direction for the policies it will contain, as the new local plan is currently being formed.

Rochdale Adopted Core Strategy (October 2016)

SO1 - To deliver a more prosperous economy

To do this we will focus on:

1. Identifying quality employment sites and areas to increase the number and range of jobs and employment levels;
2. Developing the rural and visitor economies particularly in the northern Pennine fringe;
3. Establishing strong thriving attractive town centres, particularly Rochdale town centre;
4. Ensuring good transport accessibility to jobs and markets within and beyond Greater Manchester;
5. Supporting provision of educational facilities to improve skills; and
6. Building on the borough's assets and improving its image to attract investment.

SO3 - To improve design, image and quality of place

To do this we will focus on:

1. Raising design quality and promoting sustainable developments;
2. Improving gateways into the borough and main transport corridors to improve the image of the borough;
3. Protecting and enhancing our heritage and natural assets, the special character of our towns, our countryside, open spaces, river valleys and water features; and
4. Creating new identity and character where it is lacking (e.g. inner areas and road corridors).

SO5 - To improve accessibility and deliver sustainable transport

To do this we will focus on:

1. Directing development to the most accessible locations or those that can be made more accessible by public transport;
2. Improving strategic transport connections including links with Manchester city centre and key destinations in and beyond Greater Manchester;
3. Improving access to the public transport network;
4. Promoting transport improvements that enhance access to town and local centres and employment areas (existing and new) within and outside the borough; and
5. Ensuring new development contributes to transport improvements and the use of public and other sustainable transport.

G1 - Tackling and adapting to climate change

We will address climate change and ensure growth does not increase CO2 emissions by:

- Locating growth in areas which are likely to minimise the need for travel and which are well served by public transport, services and infrastructure;
- Expecting all development and regeneration schemes to be well connected to surrounding areas and facilities by sustainable means of transport (Policy T2);
- Encouraging and promoting renewable energy developments, including standalone and community developments, that do not, by virtue of their scale, siting, construction or operation, cause harm to the

local area, its character and environmental assets and adjoining uses, which cannot be satisfactorily mitigated (Policy G3);

- Promoting the efficient re-use of buildings, especially those of heritage value, and the recycling of construction waste;
- Ensuring that development does not cause unacceptable harm to the borough's peatlands and woodlands, and encouraging their restoration and responsible management;
- Promoting sustainable waste management through the operation of policies in the Core Strategy and Greater Manchester Joint Waste Plan;
- Making the best use of open space to contribute to climate change mitigation and adaptation; and
- Securing planning obligations for energy infrastructure and climate change adaptation measures.

New developments will be expected to:

- a) Be zero carbon in line with national targets and definitions;
- b) Adhere to the 'energy hierarchy' as outlined in policy G2, being designed in such a way that ensures that buildings require the minimum amount of energy to function over their lifetime;
- c) Reduce CO2 emissions through the use of renewable and low carbon decentralised energy technologies and networks. This will be through both on-site provision in new developments and through connection to local networks;
- d) Address the impacts of climate change by incorporating comprehensive adaptation measures, including:
 - i. suitable measures, such as urban greening, for tackling the 'urban heat island' effect;
 - ii. where possible, the opening up of covered and culverted sections of waterways and provision of new water features, to help cooling and provide biodiversity, landscape and flood prevention benefits;
 - iii. the incorporation of appropriate water conservation and management measures, such as Sustainable Drainage Systems (SuDS), including ensuring that the rate of run-off on 'greenfield' sites is not increased and on 'brownfield' sites is significantly reduced, and avoiding the use of impermeable surfaces;
 - iv. the retention of existing trees wherever possible and the taking of all appropriate opportunities to plant trees and other suitable vegetation on site; and
 - v. the incorporation of 'green roofs' wherever possible, such as with flat roofs.

G2 - Energy and new development

All new development will be expected to adhere to the following energy hierarchy to the extent that policy G2 reflects national policy, targets and requirements for that type of development

- i. Demand Reduction – Achieve the maximum possible reduction in demand for energy through building design (i.e. the use of passive systems). At the design stage of new developments, every effort should be made to ensure that buildings use as little energy as possible throughout their lifetimes, using siting, orientation, layout, construction and landscaping to optimise use of natural passive systems such as solar gain and natural lighting, shading, ventilation and cooling to minimise heating, cooling and lighting demands. Green roofs and green walls should be incorporated into developments wherever feasible.
2. Energy efficiency and low / zero carbon technologies and networks – Design to maximize energy efficiency, and use on-site or linked low or zero carbon technologies or Rochdale Core Strategy Adopted October 2016 rochdale.gov.uk 90 direct connection to a low or zero carbon heat source (not necessarily on-site).

3. 'Allowable solutions' – use wider energy efficiency / CO2 reduction measures, which could include developer contributions, to compensate for 'residual emissions' not addressed by 1 or 2 above.

G3 - Renewable and low carbon energy developments

The Council will promote renewable, low and zero carbon energy generating developments, including wind power, biomass, Combined Heat and Power (CHP), hydro and heat pumps in order to help meet CO2 reduction targets and contribute towards energy security for Greater Manchester and the North West.

Any proposal and associated infrastructure must avoid harm to the health and safety of the public, including through nuisance or adverse impact on highway safety by conflict with or undue distraction to road users. Any harm to the following must be minimised and appropriately mitigated:

- The visual character and quality of the landscape or townscape and the physical record of the historic and cultural evolution of the landscape;
- The setting of heritage assets including Scheduled Ancient Monuments, Conservation Areas and Listed Buildings;
- Local residents and their amenity;
- Biodiversity including protected species, statutory and locally designated sites and important habitats, and geodiversity;
- The value of the borough's peatlands as an ecological and hydrological resource and as a carbon sink;
- The value of the surrounding area for relaxation and recreation;
- Water quality;
- Land which is used for water catchment purposes and which is critical to the delivery of water supply; and
- Highway safety.

Any proposal must demonstrate the best use of location, topography, siting, design and colour to minimise its visual and other impacts, including any cumulative impacts. Any ancillary structures and access roads should employ sensitive design and the use of local materials to respect the character and appearance of the setting. The visual impact of infrastructure associated with renewable energy developments should be satisfactorily addressed, including by routing power lines underground wherever possible. All proposals should seek to minimise the length of cable connection in order to reduce the visual impact of such structures when sited above ground. It must be demonstrated that the proposal will not result in electro-magnetic interference with local television reception and specialist radio communication networks.

All the above issues, where relevant, will have to be addressed in a detailed statement of environmental effects submitted with the application.

Planning permission will be subject to a condition that if a wind turbine generator, or other redundant plant or infrastructure, is not producing electricity for six months or more, it shall be removed and the site fully restored to a use and condition appropriate to its surroundings in accordance with this plan. In the case of wind power developments, in addition to the above criteria the following will also apply.

Planning permission will only be granted if:

- The development site is in an area identified as suitable for wind energy development in a Local or Neighbourhood Plan; and
- Following consultation, it can be demonstrated that the planning impacts identified by affected local communities have been fully addressed and therefore the proposal has their backing.

G8 - Managing water resources and flood risk

We will ensure that new development (including flood risk mitigation measures) does not lead to any form of increased flooding locally or further downstream, does not impede natural water and flood risk management, is

not detrimental to existing or potential flood storage areas, contributes where possible to alleviating existing flood risk, is itself well protected from flood risk and ensures prudent use of water resources. We will require:

- a) Compliance with a 'sequential' approach to new development and flood risk, directing development away from areas of high risk, in accordance with the National Planning Policy Framework;
- b) Full regard to and compliance with the advice of the Environment Agency (or equivalent agency) and the objectives and priorities for flood risk management set out in the Local Flood Risk Management Strategy, including any mitigation measures recommended for particular sites;
- c) Full regard to the published evidence of local flood risk and its significance as included in Strategic Flood Risk Assessments, Surface Water Management Plans and other recognised sources of flood risk data and the production of additional Flood Risk Assessments (FRAs) as appropriate;
- d) Incorporation of appropriate measures for the management of surface and flood water, including flood storage areas, Sustainable Urban Drainage Systems (SUDS) and the protection of 'overland flow paths';
- e) Compliance with any Surface Water Management Plan or drainage strategies produced, such as for the identified critical drainage areas of Littleborough and Heywood;
- f) The avoidance of culverting, and support the opening up of existing culverts wherever possible;
- g) The incorporation of measures for the conservation of water to minimise potable water consumption, including rainwater collection measures, which should be integral to the design of buildings and spaces;
- h) Development that does not directly or indirectly lead to pollution of existing water resources such as watercourses and groundwater or the derogation of the quantity of groundwater;
- i) The incorporation of measures to improve water quality; and
- j) The taking of opportunities to improve the habitat value of watercourses and water bodies. In addition, we will identify additional flood storage areas which will be protected from development.

G9 - Reducing the impact of pollution, contamination and land instability

We will reduce all forms of pollution, contamination and land instability in the borough, by:

- a) Focusing on measures that reduce air pollution in Air Quality Management Areas, and other areas where pollution levels are unacceptable, particularly around motorways and main roads;
- b) Requiring that development does not have impacts that lead to an unacceptable increase in air, water, noise, light or other pollution;
- c) Ensuring sensitive new developments such as housing, schools and hospitals are not adversely affected by existing sources of pollution such as roads and certain types of industry;
- d) Requiring a Low Emissions Strategy (LES) where development requires a Transport Assessment, and in other circumstances as appropriate;
- e) Requiring that any risks arising from contaminated land or land instability, and appropriate actions to address these risks, are identified prior to any development taking place on that land and the identified actions taken;
- f) Requiring that any risk to surface water and ground water resources from the disturbance of contaminated land be ascertained and preventative measures devised and carried out; and g. Using planning conditions or obligations to control pollution from new development, or the impact of pollution on new development.

G11 - Managing waste

We will support sustainable waste management and ensure that Rochdale borough makes an appropriate contribution towards Greater Manchester's waste management needs.

We will, therefore:

- a) Require all developers of new waste management facilities within the Borough to demonstrate the proposal's conformity with the principles of the waste hierarchy (prevention first, then preparing for re-use, recycling/composting, other waste recovery and final disposal);
- b) Support waste management development in the areas identified through the Greater Manchester Joint Waste Development Plan Document (GMJWDPD), subject to compliance with the details of that Plan and all relevant Core Strategy and other relevant national and local policies;
- c) Encourage the sustainable transport of waste, including by use of modes such as rail where possible;
- d) Promote the use of site waste management plans in major construction projects within the borough;
- e) Expect new waste management facilities proposed within the borough to balance environmental, social and economic impacts, including having scope for securing longterm benefits in improving the local environment; and
- f) Require that proposals for new waste management facilities within the borough do not, through their impact, undermine or discourage the regeneration of areas and strategic sites identified for investment in the Core Strategy.

T1 - Delivering sustainable transport

We will work with relevant agencies to secure strategic, borough-wide and local transport improvements that support our overall spatial strategy. This programme of sustainable transport proposals will ensure accessibility for all users (prioritising low and non-carbon modes of travel in line with our Accessibility Hierarchy) focusing particularly on town centres, economic growth corridors and regeneration areas. It will also meet borough responsibilities to reduce pollution (NOx and PM10) and climate change (CO2) emissions from traffic to meet GM and national targets. We will do this by:

- 1. Improving inter and sub-regional links to neighbouring centres including Manchester City Centre and strategic destinations (e.g. Manchester Airport) through:
 - a) Enhanced Quality Bus Corridors between urban centres and key destinations particularly Middleton and Manchester and key orbital Quality Bus Corridors (QBC's) linking subregional centres; and
 - c) Increased passenger capacity and line speeds on the Calder Valley Railway line between Manchester, Leeds and the borough's Railway Stations (including delivering the Northern Hub proposals in their entirety and Network Rail's strategies to develop the network);
- 2. Improving access to the public transport network and interchange / hub facilities including
 - e) Enhancing facilities at Heywood Station and provide a new station at Broadfield (to access new and existing development south of Heywood) on East Lancashire Railway;
 - f) Providing a focal point for bus interchange in Heywood Town Centre and supporting traffic management measures to enhance the area for shoppers and visitors; and
 - g) Enhanced pedestrian (including people with impaired mobility) and cycle links to key transport hubs / interchanges (Bus and Railway stations as well as Metrolink stops).
- 3. Providing access for all to development focus areas and town centres including:
 - b) Cycle network improvements to establish an attractive continuous network within and through the Borough, linking the township centres, key trip generators (employment areas, education and health facilities) as well as neighbouring centres, beyond the Connect 2 programme;
- 4. Reducing the need to travel and make best use of the existing transport infrastructure by:
 - a) Making best use of the borough's transport assets (roads, footways / cycleways, structures, drainage and verges etc);
 - b) Increased use of intelligent transport systems and advancing technology (urban traffic management systems, satellite navigation, real time information, variable message signing, vehicle charging points etc) where it enhances network operation, information and journey reliability. This includes increasing

- ability to electronically communicate information, that supports reduced use of the transport network at times when it is constrained or congested;
- c) Ensuring the transport network continues to become safer and more secure for all users, meeting the borough's responsibilities in contributing to achieving GMLTP Key Performance Indicator casualty / accident reduction targets;
 - d) Strengthening requirements for travel plans, implemented to deliver agreed outcomes, including "smarter choices" and behavioural change initiatives, to encourage less car travel, enhance sustainable access to local employment, education and NHS facilities and assist in meeting health improvement objectives;
 - e) Capitalising on opportunities to provide bus priority measures, including where possible utilising existing or providing additional capacity to enhance bus journey reliability and patronage; and
 - f) Working with communities, interest groups, logistics and freight operators informally or through freight quality partnerships to minimise impact of commercial traffic on local communities. Proposals to transport freight by rail and waterways will be supported in principle, as will schemes to establish consolidation or freight distribution centres in appropriate locations in the Borough.

T2 – Improving accessibility

We will improve accessibility by locating development where good access to public transport is available or can be provided, backed by measures to reduce the need for travel and effective provision for cyclists, pedestrians and people with impaired mobility. Development will be appropriately located to minimise the need to travel by car and the number and length of car trips made to access local amenities. Transport improvements will focus access to priority regeneration areas, e.g. town centres, housing regeneration areas and economic growth corridors. We will do this by:

- a) Requiring development and infrastructure proposals to satisfy the Council's accessibility hierarchy. This requires transport user needs to be considered and addressed in the following priority order:
 - i) People with impaired mobility and pedestrians;
 - ii) Cyclists;
 - iii) Public transport (Bus, Heavy and Light Rail) and "clean fuelled" vehicles;
 - iv) Taxi, private hire vehicles;
 - v) Powered two wheeled vehicles;
 - vi) Commercial traffic for local access;
 - vii) Shopping, visitors / tourist and off peak traffic; and
 - viii) Long stay and peak time commuter traffic.

In all circumstances, the safety, accessibility and amenity of those who live or have business in the area will have priority, while providing reliable journey times for those travelling through. A home zone approach, with 20mph zones installed where feasible, around schools, colleges, local community facilities and in residential areas to provide safer routes and access for vulnerable road users, improving safety in residential communities. Initiatives will incorporate "smarter choice" measures to provide incentives to change travel behaviour, through reallocation of road space, parking policies / control and fiscal measures in favour of sustainable travel.

DM1 - General development requirements

All development proposals, including changes of use of land and buildings, extensions and alterations, will be expected to demonstrate that they:

- b) Are of high quality design and take the opportunity to enhance the quality of the area;
- c) Are compatible with surrounding land uses, both in terms of its impact upon those uses and the impact of the surrounding land uses upon the amenities of future residents / users;

- d) Do not adversely affect the amenity of residents or users through visual intrusion, overbearing impact, overshadowing or loss of privacy;
- e) Mitigate against any impacts due to noise, air, dust, light and odour pollution, traffic generation or inadequate access, where such mitigation is identified as being necessary; Rochdale Core Strategy Adopted October 2016 rochdale.gov.uk 120
- f) Provide satisfactory vehicular access with adequate parking, manoeuvring, and servicing arrangements taking into account of the proposed use and location;
- g) Do not have an adverse impact on health, through its impact or the effect of existing problems e.g. land contamination, or poor air quality; g. Provide, or demonstrate the availability of, the service and community infrastructure necessary to meet local needs e.g. local shops, community, leisure and sport facilities and provision of open space;
- h) Minimise opportunities for crime against people or property;
- i) Take account of ground conditions including unstable or contaminated land - where a potential risk exists, a survey should be carried out and any necessary remedial measures identified and carried out;
- j) Incorporate, where appropriate, high quality landscape schemes;
- k) Have assessed whether the development may be affected by ground instability;
- l) Have considered the availability of water and wastewater infrastructure, and any need for additional capacity; and
- m) Do not lead to impacts detrimental to the conservation interests of European Protected Sites

G9 - Reducing the impact of pollution, contamination and land instability

We will reduce all forms of pollution, contamination and land instability in the borough, by:

- b) Requiring that development does not have impacts that lead to an unacceptable increase in air, water, noise, light or other pollution;

6 ENERGY USAGE AND CARBON EMISSIONS

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; CO₂ reduction of 26% by 2020 and CO₂ reduction of 80% by 2050.

6.1 POLICY REVIEW

National Planning Policy Framework (2021)

Section 14 – Meeting the Challenge of Climate Change, Flooding and Coastal Change

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, while ensuring that adverse impacts are addressed satisfactorily (including cumulative landscape and visual impacts);
- b. consider identifying suitable areas for renewable 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 collocating potential heat customers and suppliers.

Rochdale Adopted Core Strategy (October 2016)

G2 - Energy and new development

All new development will be expected to adhere to the following energy hierarchy to the extent that policy G2 reflects national policy, targets and requirements for that type of development

- i. Demand Reduction – Achieve the maximum possible reduction in demand for energy through building design (i.e. the use of passive systems). At the design stage of new developments, every effort should be made to ensure that buildings use as little energy as possible throughout their lifetimes, using siting, orientation, layout, construction and landscaping to optimise use of natural passive systems such as solar gain and natural lighting, shading, ventilation and cooling to minimise heating, cooling and lighting demands. Green roofs and green walls should be incorporated into developments wherever feasible.
2. Energy efficiency and low / zero carbon technologies and networks – Design to maximize energy efficiency, and use on-site or linked low or zero carbon technologies or Rochdale Core Strategy Adopted October 2016 rochdale.gov.uk 90 direct connection to a low or zero carbon heat source (not necessarily on-site).
3. 'Allowable solutions' – use wider energy efficiency / CO₂ reduction measures, which could include developer contributions, to compensate for 'residual emissions' not addressed by 1 or 2 above.

G3 - Renewable and low carbon energy developments

The Council will promote renewable, low and zero carbon energy generating developments, including wind power, biomass, Combined Heat and Power (CHP), hydro and heat pumps in order to help meet CO₂ reduction targets and contribute towards energy security for Greater Manchester and the North West.

6.2 DEVELOPEMENT SUSTAINABILITY FEATURES

Energy modelling has been undertaken which adopts the following hierarchy for reducing carbon emissions for the development; Be Lean, Be Clean, Be Green.

The total baseline energy and carbon emissions for the development (built to Part L 2021), taking into account regulated energy demands are:

- 279,068 kWh/annum
- 41.19 Tonnes CO₂/annum

The primary energy demands of the development will be:

- Lighting;
- General power;
- Heating and ventilation;
- Cooling
- Hot water supply.

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:

- 124,666 kWh/annum
- 64.70 Tonnes CO₂/annum

Be Lean

To provide energy and carbon saving further to a base Part L (2021) build; targeting compliance with local and national policies, the following passive design and energy efficiency measures are recommended.

The following 'U' values shall be incorporated within the development, in accordance with Part L2 (2021):

- External Walls - $U = 0.22 \text{ W/m}^2\text{.K}$;
- Exposed Floors - $U = 0.18 \text{ W/m}^2\text{.K}$;
- Exposed Roofs - $U = 0.15 \text{ W/m}^2\text{.K}$;
- Glazing - $U = 1.2 \text{ W/m}^2\text{.K}$;
- Roof Lights - $U = 1.6 \text{ W/m}^2\text{.K}$;
- Personal Doors - $U = 1.6 \text{ W/m}^2\text{.K}$;
- Vehicle Doors - $U = 1.3 \text{ W/m}^2\text{.K}$;
- Air Permeability - $5 \text{ m}^3/\text{hr/m}^2 @ 50 \text{ Pa}$.

Together with the above passive design measures, the proposed energy strategy includes the following energy efficiency measures throughout the development:

- The provision of energy efficient lighting (PIR controls and occupancy sensing in relevant areas);
- The provision of zonal thermal and lighting controls;
- The provision of variable speed pumps and fans;
- The enhancement of pipework and ductwork, thermal insulation;

- *Specific Fan Powers improved beyond Part L requirements.*

Be Clean

It was investigated to establish if there were any existing decentralised energy networks near the proposed site using the Department of Energy and Climate Change CHP database. It has been concluded that there are no suitable existing nearby CHP systems to which a connection may be possible.

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 as shown below in table.

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 6.1 CHP Analysis

Be Green

Further means of reducing energy and carbon emissions for the development have been explored, through the use of renewable technologies. The following, Table 6.2, reviews the primary options for generation of on-site renewable/ Low or Zero Carbon (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 Unit, 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
<u>Land Use</u> Large volumes of storage is required for fuel at ground level or basement level with sufficient vehicular access for fuel delivered. <u>Noise</u> 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 Unit renewable energy requirements are considered inappropriate on spatial, planning, aesthetic and noise grounds. Noise pollution from commercial wind turbines can be quite 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 unit (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 4.3 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
Land Use There would be an adverse visual impact on the site which will be dependent on the height at which the wind turbines are located. Noise 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). 4. Changes in local ground conditions could affect water quality and the amount that can be extracted (open-loop).	No

Renewable Technology Feasibility Assessment		Viable?
<u>Land Use</u> This installation would require Environmental Agency approval. Ground and Hydrology analysis would be required to investigate if favourable conditions exist. <u>Noise</u> 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
<u>Land Use</u> Roof space is better served for the installation of Photovoltaic panels. <u>Noise</u> 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: 1. 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; 2. The heat pump unit can be configured to provide internal heat reclaim from dissimilar environmental zones, reducing energy consumption and carbon emissions.	Yes
<u>Land Use</u> 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. <u>Noise</u> 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.		

Renewable Technology Feasibility Assessment		Viable?
Photovoltaics 	Photovoltaic (PV) modules convert sunlight directly to DC electricity. The solar cells consist of a thin piece of semiconductor material, in most cases silicon. The industrial unit will be provided with 182.7 kWp of PV energy.	Yes
<u>Land Use</u> There are no land issues or adverse visual impacts as the photovoltaic panels are roof mounted. <u>Noise</u> There are no noise issues generated by this technology.		

6.3 SUMMARY

By applying the above passive design measures the savings generated are displayed in Table 6.3, and Figures 6.1 – 6.2. The full calculations can be seen in Appendix D.

	Carbon Dioxide Emissions (Tonnes CO ₂ per annum)	
	Regulated	Unregulated
Baseline: Part L 2021 of the Building Regulations Compliant Development	41.19	64.70
After Energy Efficient, Passive Measures ASHP and PV	26.04	It is anticipated that a circa 3% saving can be achieved through the use of energy efficient fittings, for example A or A+ appliances. This would reduce the unregulated carbon emissions to: 62.76
Total Cumulative Saving	15.14 (36.77%)	1.94 (3%)

Table 6.3 Carbon Dioxide Emissions

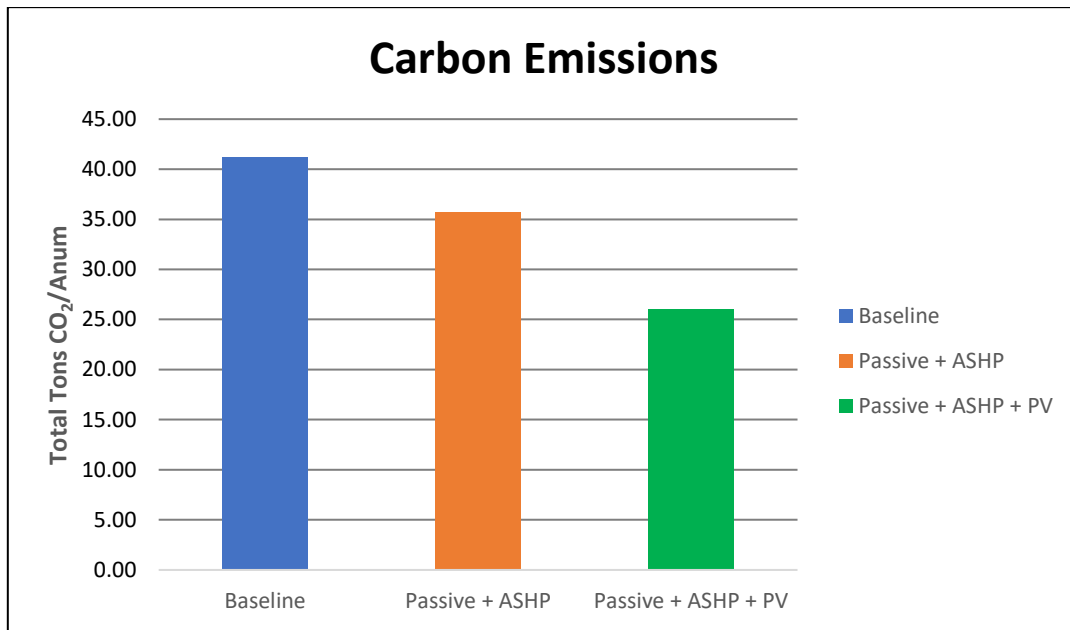


Figure 6.1 Site Carbon Emissions

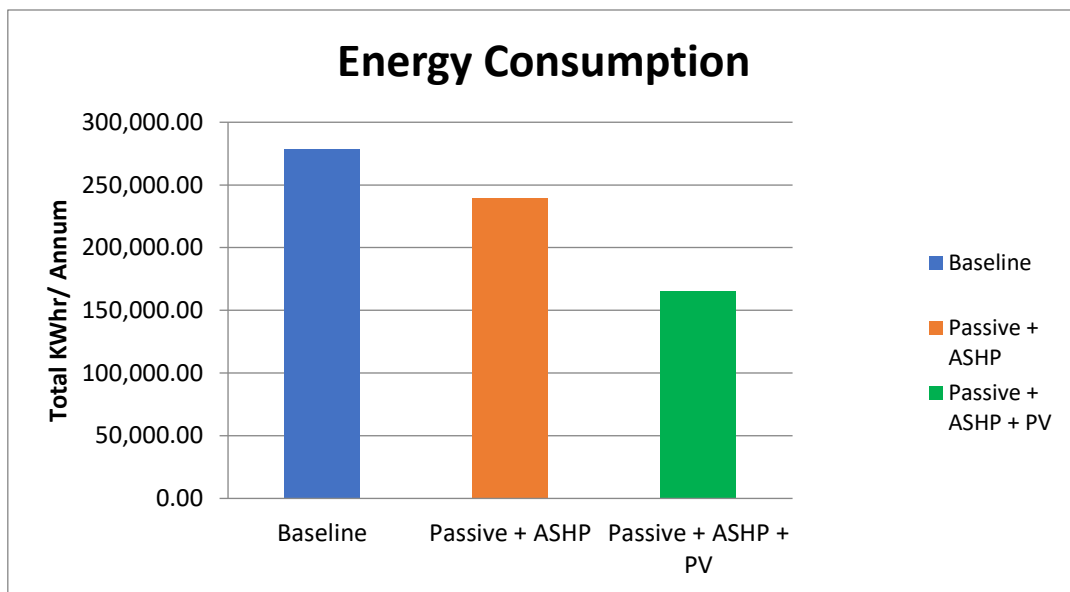


Figure 6.2 Site Energy Consumption

The above review has resulted in the formulation of an Energy Strategy that may be adopted for the development involving the use of passive design and energy efficiency measures aimed at achieving the targets and recommendations set out by Rochdale Council. The current energy strategy for the development includes the use of Air Source Heat Pump and Photovoltaic Array.

The recommended schemes take into consideration the most appropriate technologies available to the site, which provides a scheme that is commercially viable whilst keeping in compliance with National and Local Policies. The use of further/emerging technologies may be included for use within this development if their feasibility increases in the future, in accordance with best practice.

The energy strategy for the development is shown in table 6.4 below.

Development Energy Strategy	
Heating	ASHP for the office spaces, panel heaters for the circulation areas and WC's.
Hot water (DHW)	High Efficiency Electric point of use boilers.
Cooling	ASHP for the Office areas
Ventilation	Extract system provided in WC's
Lighting	Energy efficient LED lighting where applicable

Table 6.4 Proposed Energy Strategy for the development

The development shall have an anticipated CO₂ improvement of 36.77% beyond Part L 2021. The energy and carbon calculations for the development are displayed in full within Appendix D. Furthermore, sample BRUKL documents for the development are displayed in Appendix E.

7 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.

7.1 POLICY REVIEW

Rochdale Adopted Core Strategy (October 2016)

- g) The incorporation of measures for the conservation of water to minimise potable water consumption, including rainwater collection measures, which should be integral to the design of buildings and spaces;
- h) Development that does not directly or indirectly lead to pollution of existing water resources such as watercourses and groundwater or the derogation of the quantity of groundwater;
- i) The incorporation of measures to improve water quality; and
- j) The taking of opportunities to improve the habitat value of watercourses and water bodies.

7.2 DEVELOPMENT SUSTAINABILITY FEATURES

In order to ensure the reduction and management of water consumption within the proposed industrial unit, 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.

7.3 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.

8 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.

8.1 POLICY REVIEW

National Planning Policy Framework (2021)

Section 9 – Promoting Sustainable Transport

Transport issues should be considered from the earliest stages of plan-making and development proposals, so that:

- a) the potential impacts of development on transport networks can be addressed;
- b) opportunities from existing or proposed transport infrastructure, and changing transport technology and usage, are realised – for example in relation to the scale, location or density of development that can be accommodated;
- c) opportunities to promote walking, cycling and public transport use are identified and pursued;

Rochdale Adopted Core Strategy (October 2016)

T1 - Delivering sustainable transport

We will work with relevant agencies to secure strategic, borough-wide and local transport improvements that support our overall spatial strategy. This programme of sustainable transport proposals will ensure accessibility for all users (prioritising low and non-carbon modes of travel in line with our Accessibility Hierarchy) focusing particularly on town centres, economic growth corridors and regeneration areas. It will also meet borough responsibilities to reduce pollution (NO_x and PM₁₀) and climate change (CO₂) emissions from traffic to meet GM and national targets. We will do this by:

- 1. Improving inter and sub-regional links to neighbouring centres including Manchester City Centre and strategic destinations (e.g. Manchester Airport) through:
 - a) Enhanced Quality Bus Corridors between urban centres and key destinations particularly Middleton and Manchester and key orbital Quality Bus Corridors (QBC's) linking subregional centres; and
 - c) Increased passenger capacity and line speeds on the Calder Valley Railway line between Manchester, Leeds and the borough's Railway Stations (including delivering the Northern Hub proposals in their entirety and Network Rail's strategies to develop the network);
- 2. Improving access to the public transport network and interchange / hub facilities including
 - a) Enhancing facilities at Heywood Station and provide a new station at Broadfield (to access new and existing development south of Heywood) on East Lancashire Railway;
 - b) Providing a focal point for bus interchange in Heywood Town Centre and supporting traffic management measures to enhance the area for shoppers and visitors; and
 - c) Enhanced pedestrian (including people with impaired mobility) and cycle links to key transport hubs / interchanges (Bus and Railway stations as well as Metrolink stops).

3. Providing access for all to development focus areas and town centres including:
 - b) Cycle network improvements to establish an attractive continuous network within and though the Borough, linking the township centres, key trip generators (employment areas, education and health facilities) as well as neighbouring centres, beyond the Connect 2 programme;
4. Reducing the need to travel and make best use of the existing transport infrastructure by:
 - a) Making best use of the borough's transport assets (roads, footways / cycleways, structures, drainage and verges etc);
 - b) Increased use of intelligent transport systems and advancing technology (urban traffic management systems, satellite navigation, real time information, variable message signing, vehicle charging points etc) where it enhances network operation, information and journey reliability. This includes increasing ability to electronically communicate information, that supports reduced use of the transport network at times when it is constrained or congested;
 - c) Ensuring the transport network continues to become safer and more secure for all users, meeting the borough's responsibilities in contributing to achieving GMLTP Key Performance Indicator casualty / accident reduction targets;
 - d) Strengthening requirements for travel plans, implemented to deliver agreed outcomes, including "smarter choices" and behavioural change initiatives, to encourage less car travel, enhance sustainable access to local employment, education and NHS facilities and assist in meeting health improvement objectives;
 - e) Capitalising on opportunities to provide bus priority measures, including where possible utilising existing or providing additional capacity to enhance bus journey reliability and patronage; and
 - f) Working with communities, interest groups, logistics and freight operators informally or through freight quality partnerships to minimise impact of commercial traffic on local communities. Proposals to transport freight by rail and waterways will be supported in principle, as will schemes to establish consolidation or freight distribution centres in appropriate locations in the Borough.

SO5 - To improve accessibility and deliver sustainable transport

To do this we will focus on:

1. Directing development to the most accessible locations or those that can be made more accessible by public transport;
2. Improving strategic transport connections including links with Manchester city centre and key destinations in and beyond Greater Manchester;
3. Improving access to the public transport network;
4. Promoting transport improvements that enhance access to town and local centres and employment areas (existing and new) within and outside the borough; and
5. Ensuring new development contributes to transport improvements and the use of public and other sustainable transport.

8.2 DEVELOPMENT SUSTAINABILITY FEATURES

The proposed development is located in Bury, next to the Waterfold Road. The proposed development is walking distance from multiple bus routes as shown in Figure 8.1 below and some leisure as well as a number of primary amenities including food outlets are available nearby.

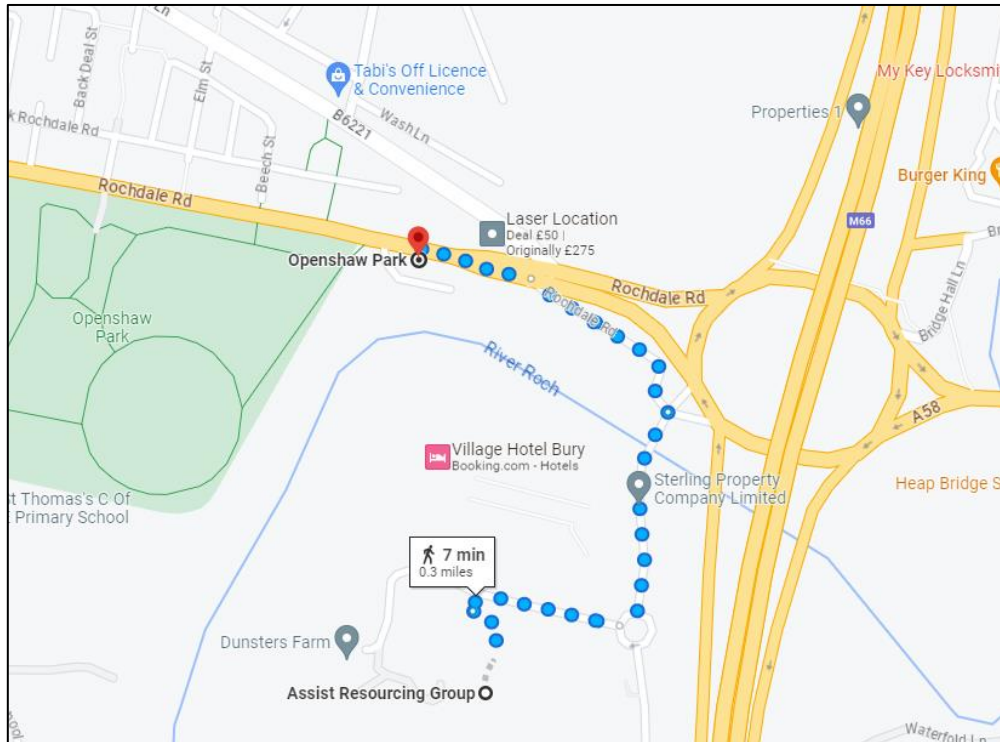


Figure 8.1 Bus Stops and Transport availability

8.3 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 Bury. The nearest bus stop (Openshaw Park) is at walking distance to the development which allows for a fair provision of public transport. The proposed development is located within some primary amenities including food outlets are nearby. The inclusion of the above sustainability features allows for the proposed to be deemed sustainable with regard to transport.

9 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.

9.1 POLICY REVIEW

National Planning Policy Framework (2021)

Local plans should set out strategic priorities for the area; this should include strategic policies to deliver the provision of infrastructure for waste management, water supply and wastewater.

Rochdale Adopted Core Strategy (October 2016)

G11 - Managing waste

We will support sustainable waste management and ensure that Rochdale borough makes an appropriate contribution towards Greater Manchester's waste management needs.

We will, therefore:

- a) Require all developers of new waste management facilities within the Borough to demonstrate the proposal's conformity with the principles of the waste hierarchy (prevention first, then preparing for re-use, recycling/composting, other waste recovery and final disposal);
- b) Support waste management development in the areas identified through the Greater Manchester Joint Waste Development Plan Document (GMJWDPD), subject to compliance with the details of that Plan and all relevant Core Strategy and other relevant national and local policies;
- c) Encourage the sustainable transport of waste, including by use of modes such as rail where possible;
- d) Promote the use of site waste management plans in major construction projects within the borough;
- e) Expect new waste management facilities proposed within the borough to balance environmental, social and economic impacts, including having scope for securing longterm benefits in improving the local environment; and
- f) Require that proposals for new waste management facilities within the borough do not, through their impact, undermine or discourage the regeneration of areas and strategic sites identified for investment in the Core Strategy.

9.2 DEVELOPMENT SUSTAINABILITY FEATURES

In order to comply with national and local policy, it is anticipated that certain measures will be put into place for this development, such as a Site Waste Management Plan which monitors the site energy and water consumption and ensures that that site timber is legally and responsibly sourced in accordance with the UK Government's Timber Procurement Policy. Further to this the Site Waste Management Plan should also monitor the resource efficiency of the development construction works as well as the percentage of non-hazardous materials, excavation and construction, which have been diverted from landfill.

It is expected that the main contractor will also set targets and monitor site consumption data for water consumption, energy consumption as well as fuel from deliveries and collection of waste and materials to and from site. Monitoring of such actions can encourage contractors to become more resource efficient to meet given targets.

Additionally, 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 9.1 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.*

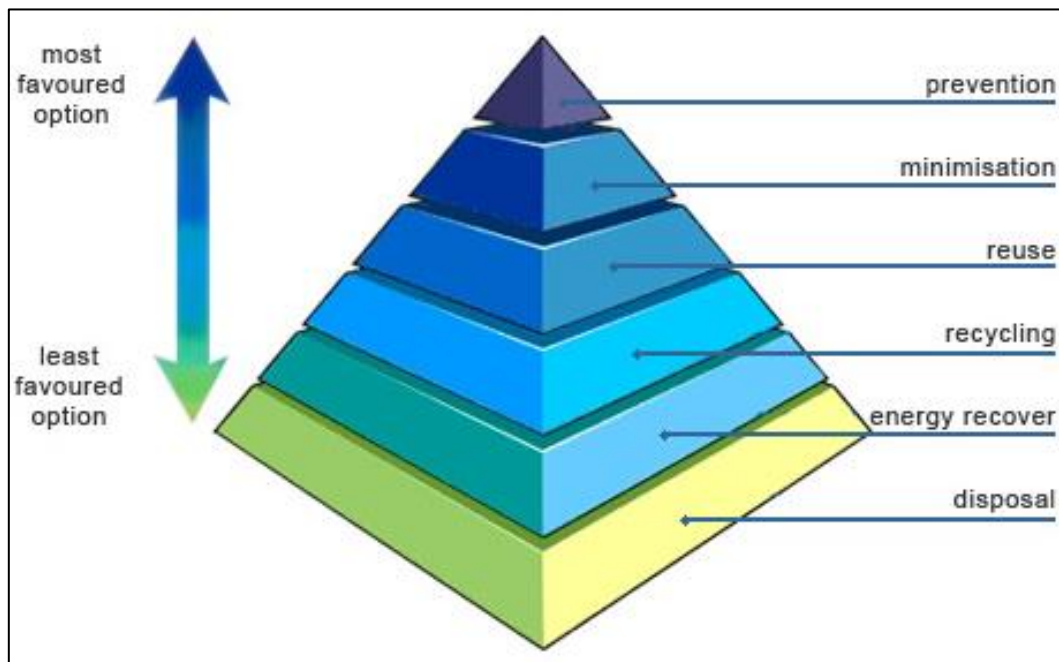


Figure 9.1 Waste Hierarchy Diagram

9.3 SUMMARY

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

The 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.

10 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.

10.1 POLICY REVIEW

National Planning Policy Framework (2021)

Section 12- Achieving Well-Designed Places

The creation of high-quality 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.

Rochdale Adopted Core Strategy (October 2016)

DM1 - General development requirements

All development proposals, including changes of use of land and buildings, extensions and alterations, will be expected to demonstrate that they:

- a) Are of high quality design and take the opportunity to enhance the quality of the area;
- b) Are compatible with surrounding land uses, both in terms of its impact upon those uses and the impact of the surrounding land uses upon the amenities of future residents / users;
- c) Do not adversely affect the amenity of residents or users through visual intrusion, overbearing impact, overshadowing or loss of privacy;
- d) Mitigate against any impacts due to noise, air, dust, light and odour pollution, traffic generation or inadequate access, where such mitigation is identified as being necessary; Rochdale Core Strategy Adopted October 2016 rochdale.gov.uk 120
- e) Provide satisfactory vehicular access with adequate parking, manoeuvring, and servicing arrangements taking into account of the proposed use and location;
- f) Do not have an adverse impact on health, through its impact or the effect of existing problems e.g. land contamination, or poor air quality; g. Provide, or demonstrate the availability of, the service and community infrastructure necessary to meet local needs e.g. local shops, community, leisure and sport facilities and provision of open space;
- g) Minimise opportunities for crime against people or property;
- h) Take account of ground conditions including unstable or contaminated land - where a potential risk exists, a survey should be carried out and any necessary remedial measures identified and carried out;
- i) Incorporate, where appropriate, high quality landscape schemes;
- j) Have assessed whether the development may be affected by ground instability;
- k) Have considered the availability of water and wastewater infrastructure, and any need for additional capacity; and
- l) Do not lead to impacts detrimental to the conservation interests of European Protected Sites

10.2 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 night time hours, a lighting assessment has been undertaken to ensure this.

To ensure the risk of potential overheating is minimised building modelling of the unit has confirmed that no occupied space is at risk from excessive solar gains; this 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 development will use building fabrics with enhanced 'U' values which go beyond the minimum requirements of Part L2 (2021), as seen within Table 10.1. Further to this the energy efficiency measures discussed within Section 6.0 will be incorporated into the design of the 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 L2 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	1.2	25%

Table 10.1 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.

10.3 SUMMARY

In order to comply with national and local policies, the 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.

11 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.

11.1 POLICY REVIEW

National Planning Policy Framework (2021)

Section 14- Meeting the Challenge of Climate Change, Flooding and Coastal Change

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.

Rochdale Adopted Core Strategy (October 2016)

G8 - Managing water resources and flood risk

We will ensure that new development (including flood risk mitigation measures) does not lead to any form of increased flooding locally or further downstream, does not impede natural water and flood risk management, is not detrimental to existing or potential flood storage areas, contributes where possible to alleviating existing flood risk, is itself well protected from flood risk and ensures prudent use of water resources. We will require:

- a) Compliance with a 'sequential' approach to new development and flood risk, directing development away from areas of high risk, in accordance with the National Planning Policy Framework;
- b) Full regard to and compliance with the advice of the Environment Agency (or equivalent agency) and the objectives and priorities for flood risk management set out in the Local Flood Risk Management Strategy, including any mitigation measures recommended for particular sites;
- c) Full regard to the published evidence of local flood risk and its significance as included in Strategic Flood Risk Assessments, Surface Water Management Plans and other recognised sources of flood risk data and the production of additional Flood Risk Assessments (FRAs) as appropriate;
- d) Incorporation of appropriate measures for the management of surface and flood water, including flood storage areas, Sustainable Urban Drainage Systems (SUDS) and the protection of 'overland flow paths';
- e) Compliance with any Surface Water Management Plan or drainage strategies produced, such as for the identified critical drainage areas of Littleborough and Heywood;
- f) The avoidance of culverting, and support the opening up of existing culverts wherever possible;

11.2 DEVELOPMENT SUSTAINABILITY FEATURES

The flood map sourced from The Government Flood Warning Information Service seen below in Figure 11.1, demonstrates that the proposed site is predominantly located within Flood Zone 1 and as such is not at risk of flooding from fluvial or reservoir sources.

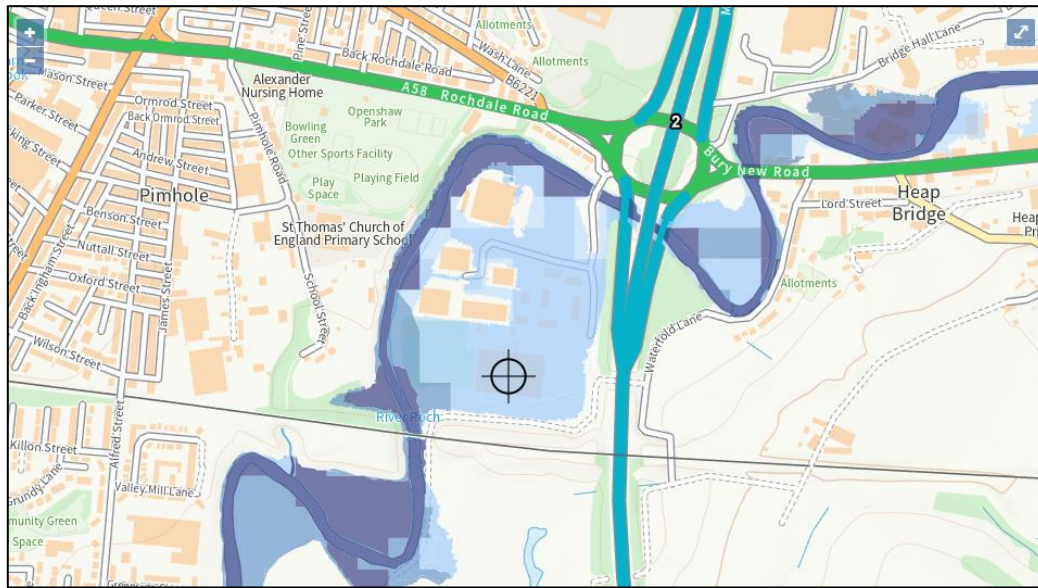


Figure 11.1: Fluvial Flooding (Sourced from Flood Warning Information Service)

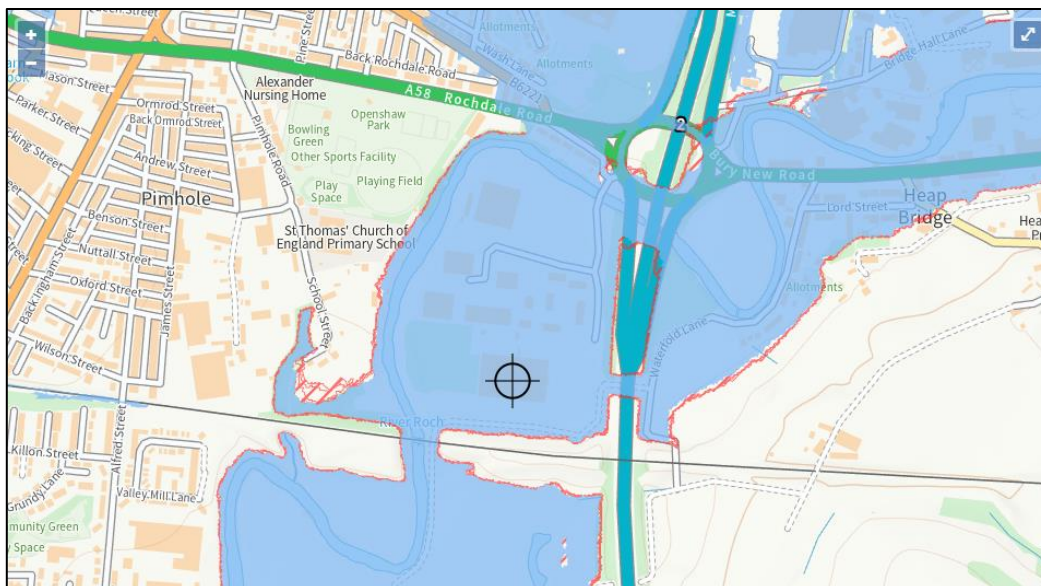


Figure 11.2: Reservoir Flooding (Sourced from Flood Warning Information Service)

11.3 SUMMARY

The above maps confirm that the site is located within Flood Zone 1 and is not at risk from fluvial or reservoir flooding.

12 NOISE

Noise is a subjective concept that can affect people differently, however there are set standards as to acceptable levels of noise, for different areas and times of day. In this instance, the proposed development would be subject to potential noise pollution from road sources.

POLICY REVIEW

National Planning Policy Framework (2021)

Section 15- Conserving and Enhancing the Natural Environment

Planning policies and decisions should contribute to and enhance the natural and local environment by:

- a) *preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability.*

Rochdale Adopted Core Strategy (October 2016)

G9 - Reducing the impact of pollution, contamination and land instability

We will reduce all forms of pollution, contamination and land instability in the borough, by:

- b) Requiring that development does not have impacts that lead to an unacceptable increase in air, water, noise, light or other pollution;

12.1 DEVELOPMENT SUSTAINABILITY FEATURES

The proposed development is near to Waterfold Park and A1189 but are not subject to extreme noise pollution from road and rail sources, as can be seen in figure 12.1 and 12.2. It should be noted that the noise levels are 'A' weighted and as such only demonstrate sounds on a frequency that would affect human populations, it does not consider noise on frequencies that may affect any local habitats.

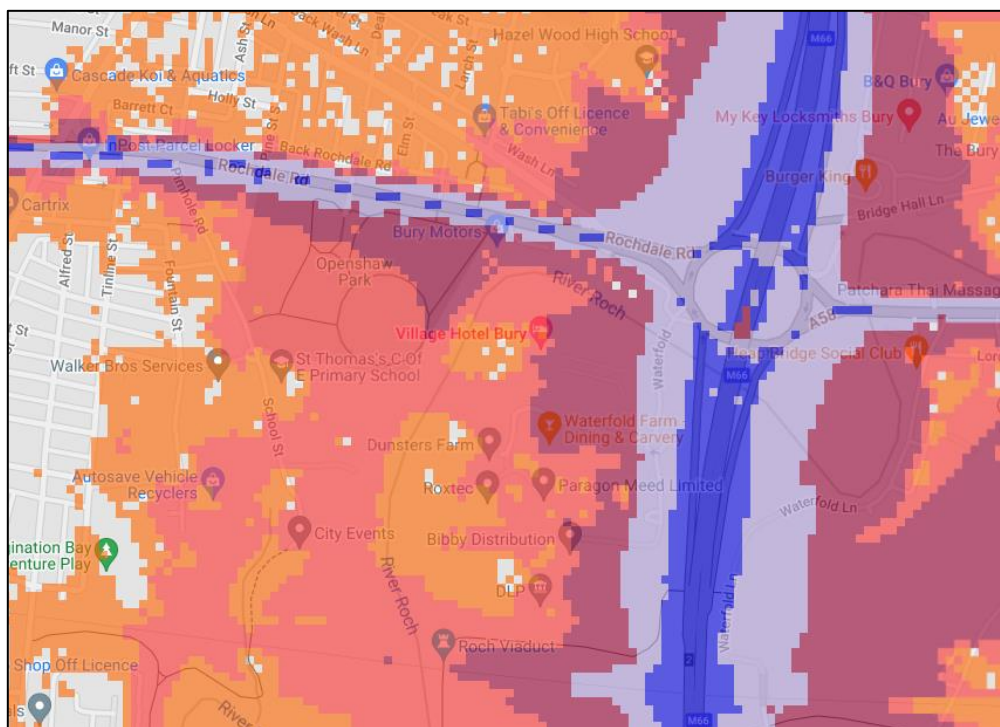


Figure 12.1: Road Noise Data Map (Postal Code Analysis, Sourced from Extrium)

The proposed development is situated between similar industrial buildings and therefore it is anticipated that the scheme will not become a source of noise pollution to the surrounding buildings.

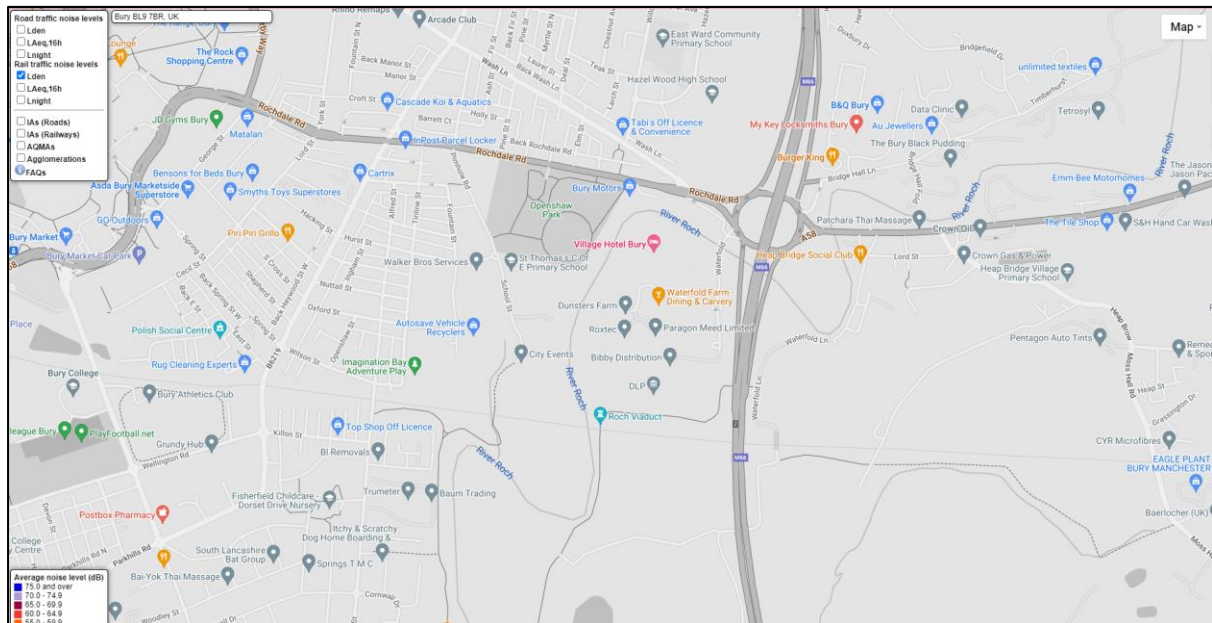


Figure 12.2 Rail Noise Data Map (Postal Code Analysis, Sourced from Extrium)

12.2 SUMMARY

The development would not be subject to sources of noise pollution from rail sources. It is anticipated that any plant equipment installed will not have an impact on the local area and as such the proposed development may be deemed sustainable with regard to noise.

13 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.

13.1 POLICY REVIEW

National Planning Policy Framework (2021)

Section 15- Conserving and Enhancing the Natural Environment

The planning system should protect and enhance valued landscapes, minimise impacts on biodiversity.

Rochdale Adopted Core Strategy (October 2016)

DM1 - General development requirements

- m) Do not lead to impacts detrimental to the conservation interests of European Protected Sites

13.2 DEVELOPMENT SUSTAINABILITY FEATURES

An ecology conservation map (sourced from MAGIC) highlights there are two Site of Special Scientific Interest (SSSI) approximately 2 km away from the development however they are far away to have an impact on the development.

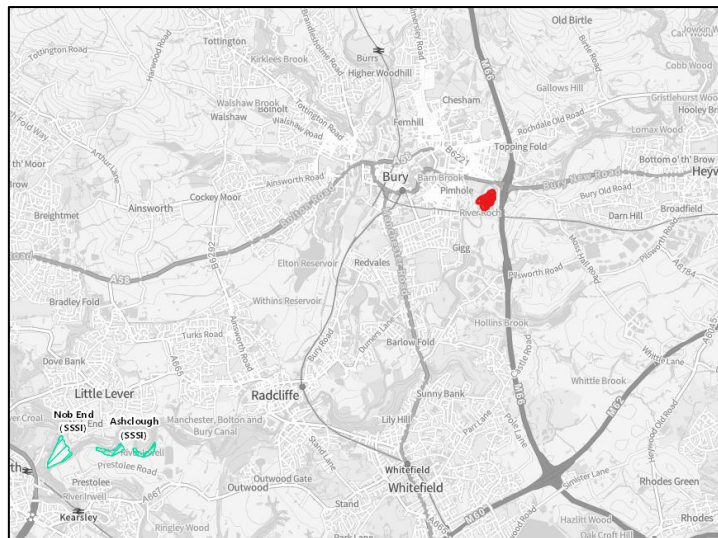


Figure 13.1 Ecological Sensitivity (Sourced from MAGIC)

13.3 SUMMARY

An Ecology conservation map (sourced from MAGIC) highlights there is one Site of Special Scientific Interest (SSSI) in the vicinity of the site development.

14 CLIMATE ADAPTION

Climate change is causing unprecedented levels of heat, drought, and extreme weather events, which are causing buildings to overheat. The increase in global temperatures has led to a scorching heatwave, which has greatly impacted urban settings. Urban areas with buildings and concrete structures retain heat, leading to the 'urban heat island effect'. This concept refers to the excess heat absorbed and retained in areas where buildings and pavements are counted. This effect also raises the temperature inside buildings, making them uncomfortable and even dangerous for occupants.

The ongoing trend of global warming has been taken into consideration and has been the priority of the design team to ensure this proposed building is resilient when it comes to climate change. The self-storage unit has been designed to become more energy-efficient, with measures such as effective ventilation systems that can keep the indoor air quality at optimum levels. In addition to that, using green building technologies such as photovoltaic cells (PV) can help reduce thermal energy demand and support sustainable building practices. Currently, the storage unit has installed 182.7 kWp of PV which helps the development to achieve an EPC A.

Energy efficiency is significant in reducing carbon footprints. The proposed self-storage building has renewable energy sources like solar panels and heat pumps. These renewable sources can power the heating, cooling, and lighting needs of the building. Additionally, the installation of temperature and lighting controls in individual rooms ensures mechanical equipment runs only when needed, thus saving energy.

The following measures have been taken to ensure climate resilience is being achieved for this proposed building:

- Highly efficient mechanical ventilation system has been proposed to ensure overheating does not occur during the summer period (May-Sep).
- Use of passive ventilation strategy such as natural ventilation to allow for fresh air when temperature outside is lower than indoor temperature.
- Thermal comfort analysis to be undertaken to ensure compliance with TM52 CIBSE guidance.
- Use of energy efficient lighting across the building to ensure minimum heat gain occurs.
- The Adoption of renewable energy sources like solar and ASHP to reduce the carbon footprint of the building.

A landscape strategy has also been created for the project which will be used to help to respond to the redevelopment of the car park. The following key features have been incorporated within the landscape strategy to help respond to the redevelopment of the car park:

- Planting of locally native trees and plant species to complement the existing landscape, with an emphasis on providing support for local wildlife whilst simultaneously encouraging biodiversity and pollinators to thrive.

- Hiring of qualified specialist contractors to remove all Schedule 9 Plants and Invasive Species (Marestail and Horsetail), as well as refuse reestablishment of these species.
- Provision of trees, shrubs, hedges, herbaceous plants, wildflowers, and grassland to help provide an aesthetically pleasing setting for the office and circulation access zones.
- Integration of landscapes features to support the sustainable drainage and water storage on site such as a proposal of a drainage basin with soft landscaping features, enabling the development to cope with wet conditions. For this development, this will be in the form of wetland grass mixes and aquatic planting.

APPENDIX A – FLOOD RISK MAP

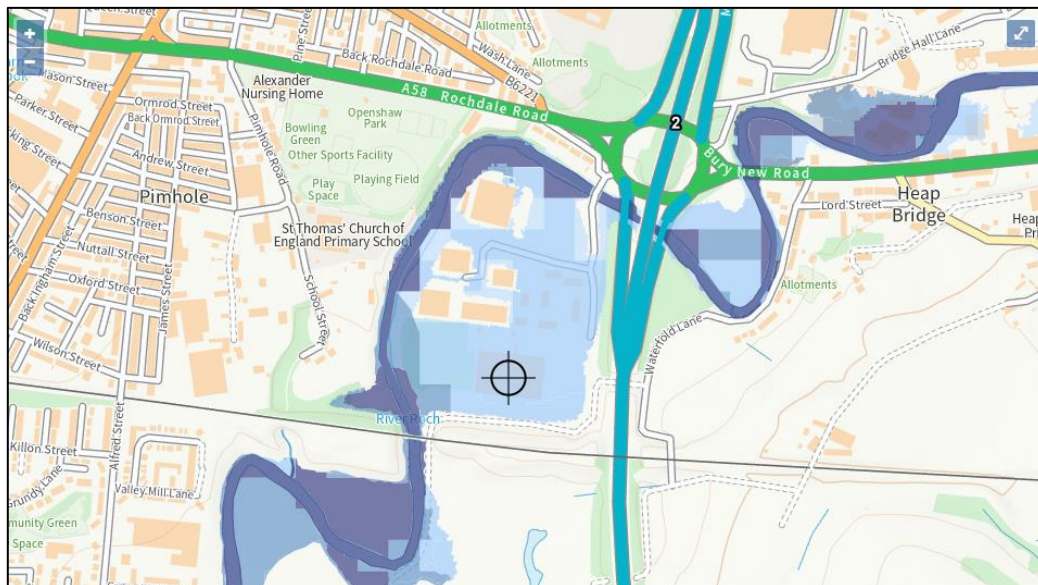


Figure 11.1: Fluvial Flooding (Sourced from Flood Warning Information Service)

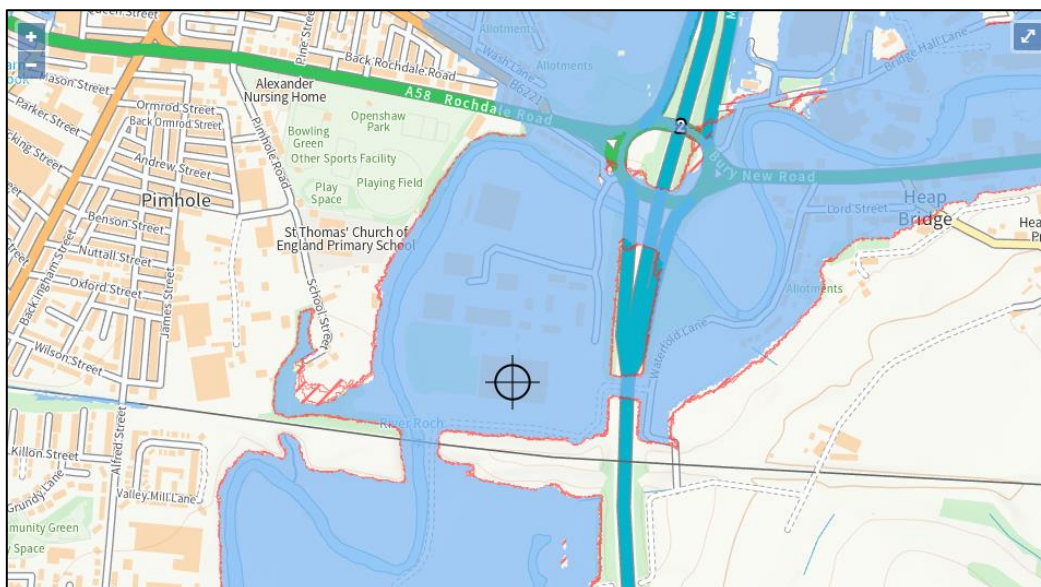
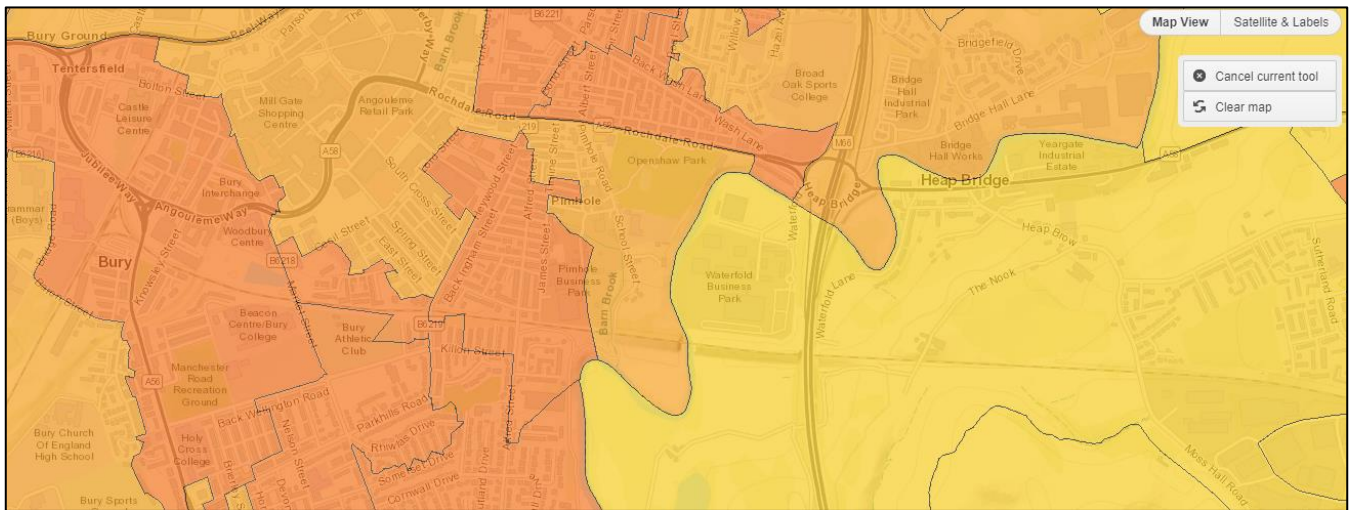


Figure 11.2: Reservoir Flooding (Sourced from Flood Warning Information Service)

APPENDIX B – CHP SEARCH



CHP availability Search Area

Sector Name	Share	Total MWh
Communications and Transport	0.09%	36 MWh
Commercial Offices	0.57%	222 MWh
Domestic	73.53%	28,422 MWh
Education	0.73%	284 MWh
Government Buildings	0%	0 MWh
Hotels	0.23%	88 MWh
Large Industrial	0%	0 MWh
Health	0.46%	178 MWh
Other	0.08%	31 MWh
Small Industrial	15.15%	5,858 MWh
Prisons	0%	0 MWh
Retail	2.33%	902 MWh
Sport and Leisure	5.11%	1,975 MWh
Warehouses	1.71%	659 MWh
District Heating	0%	0 MWh
Total heat load in Area		38,655 MWh

Total Heat Load Distribution

APPENDIX C – WIND MAP



Chart C.1 Wind Velocity Chart for the Development Site

APPENDIX D – ENERGY CALCULATIONS

Baseline

kWh/m ² /annum Baseline											
Typical Unit	Area	Heating	Cooling	Lighting	Hotwater	Total	kWh/Annum	kgCO ₂ /m ² /Annum	Total kgCO ₂ /Annum	Total TonsCO ₂ /Annum	PV
Unit 1	18469.10m ²	2.44	0.48	11.55	4.14	19	279068.10	2.23	41186.09	41.19	3.89
Total	18,469						279,068		41,186	41.19	

Be Lean

kWh/m ² /annum Baseline with Passive/Energy Efficiency Measures											
Typical Unit	Area	Heating	Cooling	Lighting	Hotwater	Total	kWh/Annum	kgCO ₂ /m ² /Annum	Total kgCO ₂ /Annum	Total TonsCO ₂ /Annum	PV
Unit 1	18469.10m ²	2.55	0.46	9.34	4.14	16.87	239728.92	1.93	35645.363	35.65	3.89
Total	18,469						239,729		35,645	35.65	

Be Green

kWh/m ² /annum Baseline with Passive/Energy Efficiency Measures + CHP											
Typical Unit	Area	Heating	Cooling	Lighting	Hotwater	Total	kWh/Annum	kgCO ₂ /m ² /Annum	Total kgCO ₂ /Annum	Total TonsCO ₂ /Annum	PV
Hotel	18469.10m ²	2.55	0.46	9.34	4.14	16.87	165667.83	1.41	26041.43	26.04	7.90
Total	18,469						165,667.83		26,041	26.04	

Unregulated Energy

Unregulated Energy Demand							
Typical Unit	Total Area	Energy from Equipment kWh/m ² /Annum	Total Energy kWh/annum		KgCO ₂ /m ²	Total KgCO ₂ /annum	Total TonsCO ₂ /annum
Unit 1	18469.10m ²	6.75	124666.43		3.50	64701.87	64.70
Total	18,469		124,666.43			64,702	64.70

Carbon Emissions

Energy Calculations (Regulated Energy Demands) Carbon							
Typical Unit	Total Area	Carbon Baseline kgCO ₂ /annum	Improved Emissions after Passive/Energy Efficiency (kgCO ₂ /annum)	Be Green	Total kgCO ₂ /annum displaced	Total TonsCO ₂ /annum displaced	Total % TonsCO ₂ /annum displaced
Unit 1	18469.10m ²	41186.09	35645.363	26041.43	15144.66	15.14	36.77130045
Total	18,469	41,186	35,645	26,041	15,145	15.14	36.77

Energy Demand

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 Be Green (kWh/annum)	Total Displaced Energy from Baseline (kWh/annum)	Total % kwh/annum displaced
Unit 1	18469.10m ²	279068.10	239728.92	165667.83	113400.27	40.64
Total	18,469	279,068.10	239,729	165,668	113,400	40.64

APPENDIX E – SAMPLE BRUKL

BRUKL Output Document **HM Government**
 Compliance with England Building Regulations Part L 2021

Project name

Be Green
As designed

Date: Wed Oct 04 08:36:49 2023

Administrative information

Building Details

Address:

Certifier details

Name:

Telephone number: 01344 628821

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

Certification tool

Calculation engine: SBEM

Calculation engine version: v6.1.d.0

Interface to calculation engine: Energy Simulator

Interface to calculation engine version: 10.10.1.151

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

Foundation area [m²]: 501.87

The CO₂ emission and primary energy rates of the building must not exceed the targets

Target CO ₂ emission rate (TER), kgCO ₂ /m²·annum	2.23
Building CO ₂ emission rate (BER), kgCO ₂ /m²·annum	1.41
Target primary energy rate (TPER), kWh/m²·annum	23.53
Building primary energy rate (BPER), kWh/m²·annum	14.23
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 _{o-Limit}	U _{o-Cal}	U _{o-Cal}	First surface with maximum value
Walls*	0.26	0.22	0.22	Wall 1
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	1.2	1.2	Window 1
Rooflights***	2.2	-	-	No external rooflights
Personnel doors^	1.6	1.6	1.6	Door 1 (Personnel Door)
Vehicle access & similar large doors	1.3	-	-	No external vehicle access doors
High usage entrance doors	3	-	-	No external high usage entrance doors

U_{o-Limit} = Limiting area-weighted average U-values [W/(m²K)] U_{o-Cal} = Calculated maximum individual element U-values [W/(m²K)]

U_{o-Cal} = 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
m³/(h.m²) at 50 Pa	8	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

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	4	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- circulation

	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- wcs

	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	Zone	Standard
FF.OFF.1	Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1	0.85	N/A
FF.OFF.2		-	-	-	-	1.5	-	-	-	-	0.85	N/A
GF.OFF.1		-	-	-	-	1.5	-	-	-	-	0.85	N/A

Zone name	SFP [W/(l/s)]										HR efficiency	
	ID of system type	A	B	C	D	E	F	G	H	I	Zone	Standard
	Standard value	0,3	1,1	0,5	2,3	2	0,5	0,5	0,4	1		
SF.MEET.1		-	-	-	-	1,5	-	-	-	-	0,85	N/A
SF.MEET.2		-	-	-	-	1,5	-	-	-	-	0,85	N/A
SF.OFF.1		-	-	-	-	1,5	-	-	-	-	0,85	N/A
FF.WCS.1		-	-	0,3	-	-	-	-	-	-	-	N/A
FF.WCS.2		-	-	0,3	-	-	-	-	-	-	-	N/A
FF.WCS.3		-	-	0,3	-	-	-	-	-	-	-	N/A
FF.WCS.4		-	-	0,3	-	-	-	-	-	-	-	N/A
GF.WCS.1		-	-	0,3	-	-	-	-	-	-	-	N/A
GF.WCS.2		-	-	0,3	-	-	-	-	-	-	-	N/A
GF.WCS.3		-	-	0,3	-	-	-	-	-	-	-	N/A
SF.WCS.1		-	-	0,3	-	-	-	-	-	-	-	N/A
SF.WCS.2		-	-	0,3	-	-	-	-	-	-	-	N/A
SF.WCS.3		-	-	0,3	-	-	-	-	-	-	-	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
FF.OFF.1		120	-	-
FF.OFF.2		120	-	-
GF.OFF.1		120	-	-
SF.MEET.1		120	-	-
SF.MEET.2		120	-	-
SF.OFF.1		120	-	-
FF.CIRC.1		120	-	-
FF.CIRC.2		120	-	-
FF.CIRC.3		120	-	-
FF.CIRC.4		120	-	-
FF.CIRC.5		120	-	-
FF.CIRC.6		120	-	-
GF.CIRC.1		120	-	-
GF.CIRC.2		120	-	-
GF.CIRC.3		120	-	-
GF.CIRC.4		120	-	-
GF.CIRC.5		120	-	-
GF.CIRC.6		120	-	-
SF.CIRC.1		120	-	-
SF.CIRC.2		120	-	-
SF.CIRC.3		120	-	-
SF.CIRC.4		120	-	-
FF.WCS.1		120	-	-
FF.WCS.2		120	-	-
FF.WCS.3		120	-	-
FF.WCS.4		120	-	-

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
GF.WCS.1		120		-	-
GF.WCS.2		120		-	-
GF.WCS.3		120		-	-
SF.WCS.1		120		-	-
SF.WCS.2		120		-	-
SF.WCS.3		120		-	-
FF.PLANT.1		120		-	-
FF.STOR.1		120		-	-
FF.STOR.2		120		-	-
GF.STOR.1		120		-	-
GF.STOR.2		120		-	-
GF.STOR.3		120		-	-
GF.WH.1		120		-	-
SF.PLANT.1		120		-	-
SF.PLANT.2		120		-	-
SF.STOR.1		120		-	-

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?
FF.OFF.1	NO (-70.5%)	NO
FF.OFF.2	NO (-53%)	NO
GF.OFF.1	NO (-49.5%)	NO
SF.MEET.1	NO (-13.8%)	NO
SF.MEET.2	NO (-8.8%)	NO
SF.OFF.1	NO (-59.5%)	NO
GF.WH.1	NO (-7.5%)	NO
SF.PLANT.2	N/A	N/A

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?	NO
Are any such measures included in the proposed design?	YES



Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters			Building Use	
	Actual	Notional	% Area	Building Type
Floor area [m ²]	18469.1	18469.1		Retail Financial and Professional Services
External area [m ²]	45646.2	45646.2		Restaurants and Cafes/Drinking Establishments/Takeaways
Weather	LON	LON		Offices and Workshop Businesses
Infiltration [m ³ /hm ² @ 50Pa]	5	5		General Industrial and Special Industrial Groups
Average conductance [W/K]	15360.9	13298.8	100	Storage or Distribution
Average U-value [W/m ² K]	0.34	0.29		Hotels
Alpha value* [%]	29.09	22.09		Residential Institutions: Hospitals and Care Homes
* Percentage of the building's average heat transfer coefficient which is due to thermal bridging				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	2.55	1.84
Cooling	0.46	0.49
Auxiliary	0.39	0.29
Lighting	9.34	10.63
Hot water	4.14	4.14
Equipment*	30.58	30.58
TOTAL**	16.87	17.4

* 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	7.9	1.66
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
Displaced electricity	7.9	1.66

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	269.33	242.51
Primary energy [kWh/m ²]	14.23	23.53
Total emissions [kg/m ²]	1.41	2.23

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 SSEFF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Split or multi-split system, [HS] ASHP, [HFT] Electricity, [CFT] Electricity									
Actual	132.1	105.2	9.8	8.2	6.3	3.73	3.55	4	5
Notional	102.6	138.8	10.8	8.8	3.8	2.64	4.4	—	—
[ST] Other local room heater - unfanned, [HS] Direct or storage electric heater, [HFT] Electricity, [CFT] Electricity									
Actual	263.3	48.4	91.4	0	0	0.8	0	1	0
Notional	235.6	48.2	48.8	0	0	1.34	0	—	—
[ST] Other local room heater - unfanned, [HS] Direct or storage electric heater, [HFT] Electricity, [CFT] Electricity									
Actual	106.4	52.2	37	0	6.6	0.8	0	1	0
Notional	226.6	80.3	47	0	13.1	1.34	0	—	—
[ST] No Heating or Cooling									
Actual	183.7	87.5	0	0	0	0	0	0	0
Notional	128	113.3	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