
Land at Stakehill, Rochdale Road: Climate Change Adaptation & Energy Statement

Prepared on behalf of Redrow Homes Ltd and Valerie Drake, Robert Allen
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Greenwood and David Andrew Tetlow and Amanda Jane Tetlow

May 2023

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EXECUTIVE SUMMARY

This Climate Change Adaptation & Energy Statement outlines how the Development at Land at Stakehill demonstrates sustainability in line with the Rochdale Borough Council (RBC) Climate Change Adaptation SPD and the RBC Core Strategy.

The Development operational energy CO₂ emissions are 53% below the Part L 2021 baseline. These carbon emissions have been achieved through the energy hierarchy in compliance with the Rochdale Core Strategy.

This statement demonstrates that the Development is compliant with objectives set out in the RBC Climate Change Adaptation SPD and policies of the RBC Core Strategy. Full compliance can be achieved following recommended mitigation and planning conditions for the outline element of the Development.

The Development at Stakehill responds to the objectives of the SPD and contributes towards a sustainable lifestyle by providing efficient homes and low carbon energy, climate adaptation through green and blue infrastructure, sustainable urban drainage systems, access to sustainable modes of transport and commercial infrastructure.

1.0 INTRODUCTION

- 1.1 This report sets out the Climate Change Adaptation and Energy Statement for the hybrid planning application for a residential-led scheme comprising up to 1,380 new homes and green infrastructure. The Development is known as 'Land at Stakehill', in the administrative area of Rochdale Borough Council ('RBC').
- 1.2 The detailed element of the application plans to deliver 233 new homes comprising 35 affordable homes and 198 open market homes. Phase 1 comprises a range of 1-, 2-, 3-, 4-, and 5-bedroom dwellings. Of the 233 dwellings proposed, 8 units are 1-bed (3%), 16 units are 2-bed (7%), 50 units are 3-bed (21%), 135 units are 4-bed (58%), and 24 units are 5-bed (11%). The dwellings will all be 2-storeys in height, consistent with existing properties in the local area. A range of house types are proposed including terrace, semi-detached, and detached dwellings, with either dedicated external, garage, or integral garage parking provision.
- 1.3 The Climate Change Adaptation and Energy Statement outlines the approach to delivering an environmentally responsible development that is both resilience to climate change and designed efficiently to reduce the Developments impact on further climate change.
- 1.4 The Statement sets objectives for the Development at Stakehill that provide a route map to be followed as the design vision progresses to a planning application and beyond, to demonstrate how the Development would be sustainable in line with the RBC Core Strategy and the Climate Adaptation Supplementary Planning Guidance (SPD) Document. This Statement in particular focuses upon climate change mitigation and adaptation to ensure that the Development is futureproofed, adaptable and resilient to future natural and challenges.

Policy Context

- 1.5 A full policy and legislative context are provided at Appendix A. This includes all policies which interface with climate change given their extensive breadth and scope. This policy context includes those at the national level, such as the National Planning Policy Framework (NPPF).

RBC Core Strategy¹

¹ <https://www.rochdale.gov.uk/downloads/file/405/core-strategy>

- 1.6 The RBC Core Strategy was adopted in 2016 and will guide development within the Borough to 2028. Some of the key policies relevant to the strategy are outlined below, with full detail provided in Appendix A. RBC also declared a climate emergency in July 2019².

SO4 - To promote a greener environment

"To do this we will focus on:

- 1. Minimising Rochdale's contribution to climate change and mitigating and adapting to its adverse effects;*
- 2. Ensuring in particular that development is energy efficient and contributes to carbon reduction;*
- 3. Reducing the likelihood of flooding through appropriate flood risk management, especially in Rochdale town centre and parts of Littleborough and Heywood;*
- 4. Improving our urban open spaces and making them more accessible;*
- 5. Maximising the value of our green open areas and countryside to provide opportunities for recreation, amenity, biodiversity and flood management;*
- 6. Minimising and managing waste and managing minerals resources sustainably; and*
- 7. Ensuring no detriment to the conservation interests of European and other protected natural sites."*

Policy G1 - Tackling and adapting to climate change

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

- Promoting the efficient re-use of buildings, especially those of heritage value, and the recycling of construction waste;
- 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;*

² <https://www.rochdale.gov.uk/climate-change/tackling-climate-change-rochdale-borough>

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.

Policy 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:

1. 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 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.

RBC Climate Change Adaptation Supplementary Planning Document (Adopted June 2012)³

- 1.7 The purpose of the Climate Adaptation SPD is to guide developers and RBC to facilitate necessary climate change adaptation measures through plans and strategies.
- 1.8 The SPD outlines actions for developments to help climate change adaptation under eight broad headings:
- Location;
 - Layout and Orientation;
 - Materials / Structure;
 - Environmental Performance;
 - Green roofs and walls;
 - Water Efficiency;
 - Water Management; and
 - Green and Blue Infrastructure.
- 1.9 Table 5.1 below will assess the parameters of the Development and the detailed Phase 1 plans against the eight broad themes outlined above and draw conclusions as to whether the Development meets the objectives of the RBC Climate Change Adaptation SPD.

National Context

- 1.10 The UK Government has acknowledged that climate change is a threat to our way of life and the natural world. It has also acknowledged that a "green recovery" from the coronavirus pandemic is an opportunity for the UK to boost economic growth, reduce inequality and improve our environment as well as helping to mitigate the effects of climate change. Quantitative targets have been set for reducing greenhouse gas (GHG) emissions in primary legislation, which is summarised below.

Climate Change Act 2008 and 2019 Amendment (Net Zero)⁴

- 1.11 The Climate Change Act (2008) sets a legally binding target for reducing greenhouse gas (GHG) emissions, in particular carbon dioxide (CO₂), by at least 80% (on 1990 levels) by the year

³ <https://www.rochdale.gov.uk/downloads/file/550/climate-change-adaptation-spd>

⁴ The Climate Change Act 2008 (2050 Target Amendment) Order 2019.
<https://www.legislation.gov.uk/ukdsi/2019/9780111187654>

2050 in the UK, and a requirement that domestic emissions are reduced by no less than 3% each year.

- 1.12 In setting these targets, the Act established the Committee for Climate Change (CCC), which is responsible for setting binding interim targets for the Government over five-year periods. In May 2019, the CCC recommend a new emissions target for the UK: a 100% reduction ('net zero') in greenhouse gases by 2050. This change in legislation mandating a 100% reduction in CO2 emissions by 2050 was approved by the House of Commons on 24th June 2019 and the House of Lords on 26th June 2019.

National Planning Policy Framework and Planning Practice Guidance⁵

- 1.13 The National Planning Policy Framework (NPPF) which was revised in July 2021 requires developments to *"take a proactive approach to mitigating and adapting to climate change."* Section 14 of the NPPF 'Meeting the challenge of climate change, flooding and coastal change' emphasises the planning system's pivotal role in sustainable development through *"minimising vulnerability and improve resilience to the impacts of climate change"*. Paragraph 149 of the NPPF states:

"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."

- 1.14 National Planning Practice Guidance (PPG) was published in June 2014 and recognises that the planning system can *"increase resilience to climate change impact through the location, mix and design of development"*. The guidance advises how to identify suitable mitigation and adaptation measures in the planning process to address the impacts of climate change.
- 1.15 Paragraph 005 of the PPG puts forwards recommendations for Local Planning Authorities to consider:
- Identifying no or low-cost responses to climate risks that also deliver other benefits, such as green infrastructure that improves adaptation, biodiversity and amenity;

⁵ National Planning Policy Framework. <https://www.gov.uk/government/publications/national-planning-policy-framework--2>

- Building in flexibility to allow future adaptation if it is needed, such as setting back new development from rivers so that it does not make it harder to improve flood defences in the future; and
- The potential vulnerability of a development to climate change risk over its whole lifetime.

2.0 TRENDS

- 2.1 This chapter focuses on the trends relating to topics of climate change adaptation and energy demand - in order to provide context for the Climate Change and Energy Statement.

Climate Change

Current Climate Conditions

- 2.2 This section summarises current climate conditions for the local area based on historic weather data and information about extreme weather events. The information presented below presents average weather conditions along with exceptional weather occurrences. To maintain relevance to current weather trends the displayed information has been calculated using data collected over the past two decades. The climate profile is taken from the closest available data source to the Site, located at the Rochdale climate station⁶, approximately 2km north of the Site.

- 2.3 Climatic averages (1991-2020) for the weather station indicate the following:

- Average annual maximum temperature was 13.13°C;
- Warmest month on average was July (mean maximum temperatures of 20.01°C);
- Coldest month on average was February (mean minimum temperature of 1.41°C);
- Average total annual rainfall was 1197.22 mm (approximately 11% below the Regional (North West of England) average);
- Wettest month on average was December (average monthly rainfall of 138.88 mm); and
- Driest month on average was May (average monthly rainfall of 65.67 mm).

Future Climate Change Projections

- 2.4 The UK Climate Projections 2018 (UKCP18) are based on the latest climate science. They project future temperature change and precipitation for England. By the end of the 21st century, all areas of the UK are projected to be warmer, more so in summer than in winter. Low, central, and high changes across the UK are provided.
- 2.5 Table 2.1 below shows climate change projections for the 25km grid square (387500, 412500) (where the Site is located) using the Representative Concentration Pathway (RCP) 8.5 up to

⁶ <https://www.metoffice.gov.uk/research/climate/maps-and-data/uk-climate-averages/gcw2ymd6s>

2099. 2023 has been selected as a baseline, and 2038 is shown as it is the predicted year of completion for the Development.

Table 2.1: 50th Percentile Climate Projections at 25 km grid square 387500, 412500 using baseline 1981-2000 scenario RCP 8.5

Date	Climate Variable at 50th Percentile					
	Mean air temperature anomaly* at 1.5 m (°C)	Annual Precipitation rate anomaly (%)	Maximum Summer air temperature anomaly at 1.5 m (°C)	Average Summer Precipitation rate anomaly (%)	Minimum Winter air temperature anomaly at 1.5 m (°C)	Average Winter Precipitation rate anomaly (%)
2023	0.77	0.50	0.93	-7.46	0.71	2.60
2038	1.17	0.05	1.42	-10.18	1.13	2.64
2050	1.60	0.02	2.05	-16.12	1.56	5.58
2080	3.16	0.66	4.38	-31.75	2.83	13.61
2099	4.53	2.36	6.58	-45.91	4.02	21.14

- 2.6 The projections show a continuous increase in annual average air temperature over the next 80 years. Annual precipitation is also projected to increase slightly over this time.
- 2.7 The projections suggest that summers will become warmer and drier, with an expected increase in maximum summer temperatures and overall decline in summer precipitation. Natural variations may mean that some cooler and/or wetter summers will occur.
- 2.8 Winters may become milder and wetter, with an overall increase in both minimum winter temperature and winter precipitation. Natural variations may mean that some cold and/or dry winters may still occur.

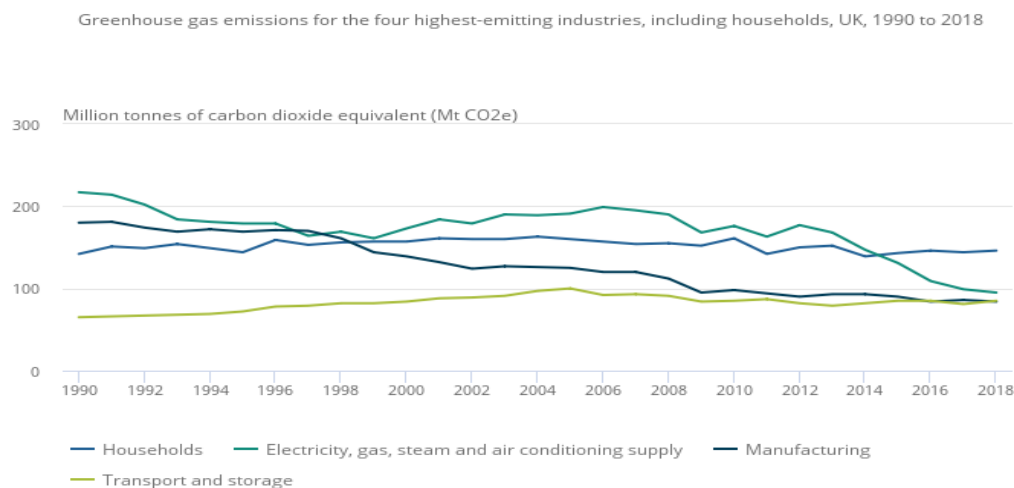
GHG Emissions

Sources of Emissions

- 2.9 Emissions have fallen across industry sectors at different rates, as the graph below from the ONS Environmental Accounts (2020) demonstrates, with households contributing the highest proportion of total emissions since 2015. Household emissions includes emissions from domestic travel (i.e. transport by private car etc). Around 46% of greenhouse gas emissions by households in 2018 related to travel, mostly from domestic car use. The transport sector

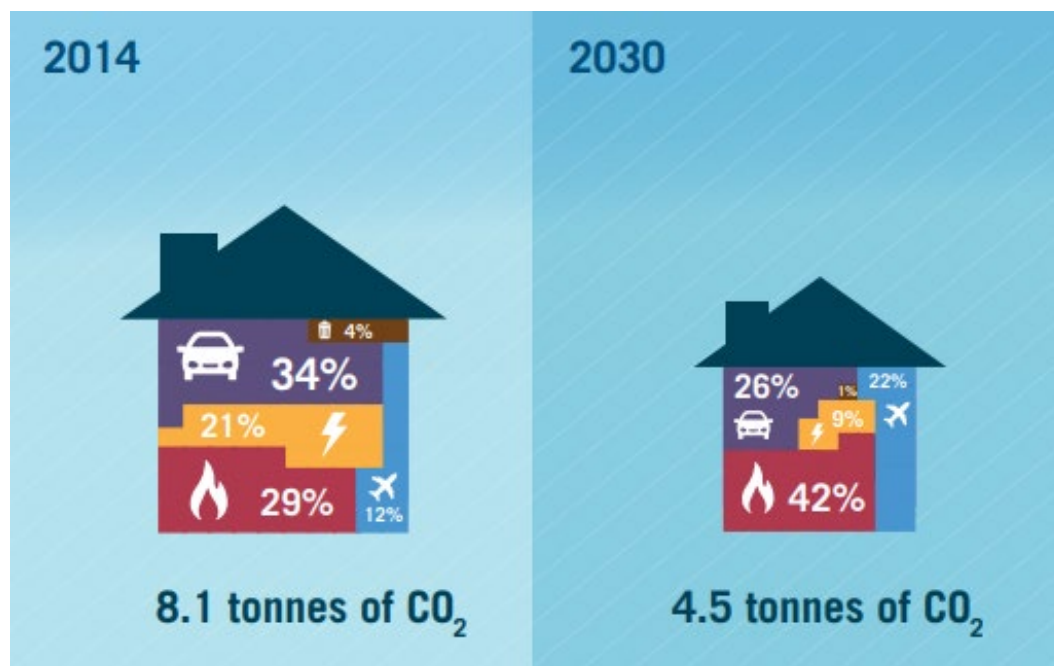
emissions have risen by 30% between 1990 and 2018. Power generation has rapidly decarbonised over the last decade or so, a trend that is set to continue, as discussed below.

Figure 2.1 Emissions from Households, Transport, Power generation, Manufacturing and Transport and Storage



Source: Office for National Statistics – UK Environmental Accounts

- 2.10 The Committee on Climate Change's (CCC) Fifth Carbon Budget covers the years 2028-2032 and provides an infographic which demonstrates the breakdown of emissions for households in 2014 and 2030 with the total average carbon footprint (as shown below). The emissions sources are heating, electricity, transport, waste and aviation. This is important to setting the objectives for the energy and climate change strategy as tackling these areas will have the most impact in climate change mitigation at the Development.
- 2.11 The CCC's Sixth Carbon Budget (December 2020), supports this infographic and states that 34% of UK emissions occur directly from households – through driving of cars and the heating of homes. Naturally, there is some year-on-year variation within the specific contributors to climate change, particularly owing to Covid-19, but these figures from the CCC remain a robust baseline to frame the routes to minimising household emissions.

Figure 2.2 Household Carbon Footprint

Source: Committee on Climate Change: The Fifth Carbon Budget – How every household can help reduce the UK's carbon footprint

Local emissions rates⁷

- 2.12 Overall, the carbon emissions have steadily declined in RBC between 2005 and 2020. This can be seen in Table 2.2 showing that the emissions produced in all Industrial, Commercial, Domestic and Transport sectors have declined over the 15-year period.
- 2.13 Data for the total emissions in RBC between 2005 and 2017 is unavailable however total emissions saw a downward trend between 2018-2020. The reduction in emissions from domestic sources in RBC between 2005 and 2020 was approximately 43%. There was also a 26% reduction in transport emissions.

Table 2.3 GHG Emissions within RBC 2005-2020

Year	Industry Total (kt CO ₂)	Commercial Total (kt CO ₂)	Domestic Total (kt CO ₂)	Transport Total (kt CO ₂)	Grand Total (CO ₂)	Population ('000s, mid-year estimate)	Per Capita Emissions (tCO ₂ e)
2005	427.6	155.2	519.2	529.5	N/A	207.2	N/A
2006	433.5	160.0	518.1	513.3	N/A	207.8	N/A
2007	417.4	153.9	499.1	514.5	N/A	208.4	N/A
2008	414.0	153.9	496.1	477.8	N/A	209.7	N/A
2009	349.1	128.6	446.0	475.8	N/A	210.2	N/A
2010	369.8	136.7	472.0	472.1	N/A	210.8	N/A
2011	322.9	120.0	415.0	472.6	N/A	211.9	N/A

⁷ UK local authority and regional greenhouse gas emissions national statistics. Link <https://www.gov.uk/government/collections/uk-local-authority-and-regional-greenhouse-gas-emissions-national-statistics>

Year	Industry Total (kt CO ₂)	Commercial Total (kt CO ₂)	Domestic Total (kt CO ₂)	Transport Total (kt CO ₂)	Grand Total (CO ₂)	Population ('000s, mid-year estimate)	Per Capita Emissions (tCO ₂ e)
2012	361.2	135.8	440.7	464.2	N/A	211.9	N/A
2013	339.1	128.7	429.8	448.8	N/A	212.1	N/A
2014	299.0	110.1	361.6	439.4	N/A	213.0	N/A
2015	272.5	96.6	356.8	445.2	N/A	214.3	N/A
2016	237.2	80.1	333.1	452.0	N/A	216.4	N/A
2017	224.9	74.8	317.5	444.9	N/A	218.5	N/A
2018	220.2	72.3	312.0	444.6	1,046.6	220.0	4.8
2019	194.6	63.5	305.1	452.2	1,024.7	222.4	4.6
2020	175.2	51.1	294.3	388.8	924.5	223.7	4.1

Biodiversity

- 2.14 The Rochdale Canal Special Area of Conservation (SAC)⁸ is within 200m of the Site. The SAC contains a botanically diverse water plant community and is designated primarily for the populations of floating water plantain (*Luronium natans*) it supports. Other important waterplants include American pondweed (*Potamogeton epihydrus*) and grasswack pondweed (*Potamogeton compressus*). The SAC extends for the majority of the Rochdale Canal within Rochdale and Oldham districts⁹.

⁸ SACs: Special Areas of Conservation are sites that have been adopted by the European Commission and formally designated by the government of each country in whose territory the site lies

⁹ <https://www.rochdale.gov.uk/downloads/file/549/biodiversity-and-development-spd>

3.0 METHODOLOGY

Climate Adaptation Statement

- 3.1 The Climate Adaptation and Energy Statement outlines how policy objectives of the RBC Climate Adaptation SPD and Core Strategy will be followed in the Development. The Climate Adaptation and Energy Statement considers key themes outlined in these policies and assesses how the Development complies with them, as shown in Table 5.1 below. A 'traffic light' system has been adopted to display compliance with the SPD, with green indicating the Development is compliant, orange indicating the Development will be with committed mitigation, and red indicating the Development could be with recommended mitigation.
- 3.2 It is critical that the statement is kept flexible given the unknowns associated with projecting far ahead into the future and the hybrid nature of the planning application.
- 3.3 The climate change mitigation and adaptation measures are deliverable and can be reviewed and adapted over time to suit the future circumstances and priorities.

Energy Strategy

- 3.4 The Energy Strategy in section 4.0 has been prepared using SAP 10.2 methodology¹⁰ to calculate the predicted regulated energy demand and associated carbon emissions for 5 of the 16 house types proposed in the detailed element of the hybrid planning application, providing an indicative sample of the Development. The selection of sample plots has been chosen to represent all proposed dwelling typologies and both affordable and open market house types.
- 3.5 The calculation methodology and information sources that have informed this report are outlined in Table 3.1.

Table 3.1: Calculation information sources

Information	Source
Geometry	Based on house type drawings provided by Redrow Homes
Building Specification	Based on information provided by Redrow Homes
Regulated Calculation Methodology	The Government's Standard Assessment Procedure for Energy Rating of Dwellings (SAP) Version 10.2 ¹⁰
Software Used	Elmhurst Design SAP 10

¹⁰ Government's Standard Assessment Procedure for Energy Rating of Dwellings (SAP) 10.2 methodology - [SAP10 - Standard Assessment Procedure - BRE Group](#)

- 3.6 The purpose of the calculations is to demonstrate compliance. The approved calculation methodologies prescribe design parameters for inputs such as occupancy, weather, internal temperatures, and equipment usage. Therefore, the calculations presented in this energy assessment should not be taken as a prediction of expected energy consumption and CO₂ emissions.

4.0 ENERGY STRATEGY

Introduction

- 4.1 This Energy Strategy, prepared to support the hybrid planning application for the Development, demonstrates that Rochdale Core Strategy policy G1 “Tackling and adapting to climate change” and policy G2 “Energy and new development” will be complied with. The Building Regulations and planning policies relevant to the Development are summarised in Table 4.1.

Table 4.2: Planning policy & legislation applicable to energy at the Development

Planning Policy/Legislation	Requirements/Targets
The Climate Change Act 2008 (2050 Target Amendment) Order 2019	UK targeting to reduce carbon emissions to net zero by 2050.
UK Net Zero Strategy ¹¹	Future Homes Standard¹² (FHS), expected in 2025, will require all new homes to be Net Zero Carbon Ready.
Building Regulations Approved Document Part L 2021 ¹³	Part L 2021 came into effect on 15th June 2022 and requires a 31% reduction in CO₂ emissions compared to Part L 2013. Part L 2021 encourages fabric first principles, the selection of efficient energy sources/fuels, and the reduction of regulated carbon emissions by the following targets: • Target Emission Rate (kg CO₂/m²); • Target Fabric Energy Efficiency (kWh/m²); and • Target Primary Energy (kWh/m²).
Rochdale Core Strategy, Adopted October 2016 ¹⁴ Error! Bookmark not defined.	Policy G1 states that new developments will be expected to: • Be zero carbon in line with national targets and definitions; • Adhere to the 'energy hierarchy' as outlined in policy G2; • Reduce CO₂ emissions through the use of renewable and low carbon decentralised energy technologies and networks; and • Address the impacts of climate change by incorporating comprehensive adaptation measures.
	Policy G2 states that all new development will be expected to adhere to the energy hierarchy to the extent that policy G2 reflects national policy, targets and requirements for that type of development. The energy hierarchy is show in Figure 4.1 and contains the following steps: • Demand Reduction – Achieve the maximum possible reduction in demand for energy through building design;

¹¹ Department for Business, Energy and Industrial Strategy. 2022. Build Back Greener: Net Zero Strategy. Available from: <https://www.gov.uk/government/publications/net-zero-strategy>

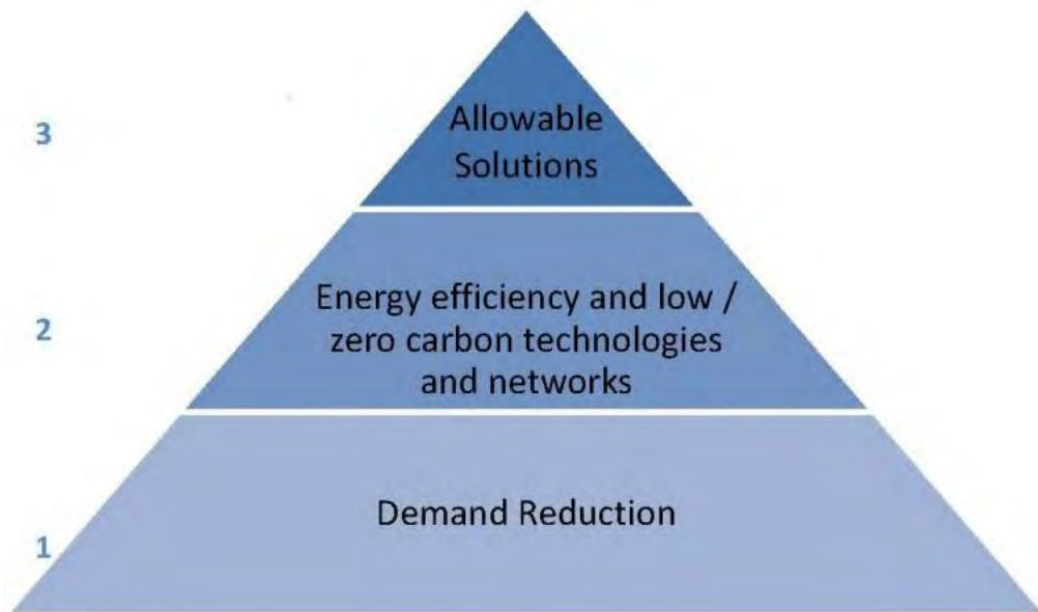
¹² Future Homes Standard Consultation, held to inform the changes to Part L and Part F required to meet the UK's net zero target by 2050 - [The Future Homes Standard: 2019 Consultation \(publishing.service.gov.uk\)](https://www.publishing.service.gov.uk/government/consultations/future-homes-standard)

¹³ Building Regulations Approved Document Part L 2021 edition - [Approved Document L, Conservation of fuel and power, Volume 1: Dwellings \(publishing.service.gov.uk\)](https://www.publishing.service.gov.uk/government/consultations/approved-document-l-conservation-of-fuel-and-power-volume-1-dwellings)

¹⁴ Rochdale Core Strategy, Adopted October 2016 - <https://www.rochdale.gov.uk/downloads/file/405/core-strategy>

	• Energy efficiency and low / zero carbon technologies and networks – Design to maximize energy efficiency and use low or zero carbon technologies; and • 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.
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Figure 4.1 - RCS Policy G2 Energy Hierarchy



- 4.2 The detailed element of the hybrid planning application is made for the construction of 233 new dwellings, comprising a mix of affordable and private houses and apartments. The proposed unit mix is shown in Figure 4.2.

Figure 4.2 - Unit Mix

Accommodation Schedule				
House Type Name	Sq.ft	No Beds	Garage	Quantity
MARKET HOUSING				
Buxton	716	02	PS	02
Bakewell	832	03	PS	01
Shrewsbury	1,159	04	ISG	21
Marlow	1,288	04	ISG	15
Oxford	1,312	04	ISG	15
Oxford Lifestyle	1,312	03	ISG	18
Overton	1,392	04	ISG	07
Leamington Lifestyle	1,412	03	DSG	18
Shaftesbury	1,423	04	DSG	13
Chester	1,449	04	ISG	24
Harrogate	1,553	04	DSG	10
Henley	1,768	04	IDG	18
Ledsham	1,841	04	IDG	12
Hampstead	1,850	05	IDG	24
Sub Total				198
AFFORDABLE HOUSING				
Buxton	716	02	PS	14
Bakewell	832	03	PS	13
Weaver GF	644	01	PS	04
Weaver FF	697	01	PS	04
Sub Total				35
TOTAL				233

SG = Detached Single Garage
 ISG = Integral Single Garage
 IDG = Integral Double Garage
 PS = Parking space(s)

Energy Hierarchy - Energy Demand Reduction

- 4.3 Demand reduction is typically a more cost-effective means of achieving carbon savings than providing low or zero carbon technologies. This is particularly true of passive measures

(achieved through architectural design), which are simpler and have greater longevity than active systems (the building services).

4.4 Policy G2 agrees with this priority of reducing energy demand through energy efficiency measures and requires for it to be carried out as the first stage of the energy hierarchy.

4.5 The following energy efficiency measures will be incorporated in the Development:

- Highly insulated building fabric with external walls, floors and roofs of low U-Values to reduce heat loss;
- Efficient double glazed windows;
- Low air permeability;
- Use of natural ventilation;
- All dwellings have been designed to allow for cross-ventilation to reduce the risk of overheating and help them stay cool in warmer conditions;
- Low energy lighting; and
- Strong continuity of insulation at building junctions to reduce thermal bridging heat loss.

4.6 Appendix B details the full list of energy efficient measures proposed.

Energy Hierarchy - Efficient Energy Supply and Low/Zero Carbon Technologies

4.7 Following the energy demand measures, the next stage of the energy hierarchy is to supply energy efficiently and to provide low or zero carbon technologies. Where a development is within a heat network development opportunity area, this may include the connection to a District Heat Network.

4.8 A Greater Manchester Spatial Energy Plan¹⁵ was undertaken by the Energy Technologies Institute in 2016 in collaboration with the Greater Manchester Combined Authority to identify areas of high heat density for heat network priority. The evidence-based study identified an area of potential heat network opportunity in Rochdale Centre, but deemed that the area south of Rochdale Centre did not present a suitable heat network opportunity area. It is therefore unlikely that a District Heat Network would be developed in the local area surrounding the Development.

4.9 The detailed element of the hybrid planning application is residential only, with no non-residential building uses which make up the highest areas of heat demand. It is therefore considered that a district heating network is not viable for the Development.

¹⁵ Greater Manchester Spatial Energy Plan (2016) <https://www.greatermanchester-ca.gov.uk/media/1277/spatial-energy-plan-nov-2016.pdf>

- 4.10 The Development will seek to supply energy efficiently by designing for the use of only electric based heating and hot water systems and ensuring that the Development will be designed to be gas-free.
- 4.11 Dwelling heat and hot water demand will be met by low carbon technology using Air Source Heat Pumps (ASHP).
- 4.12 ASHPs extract heat from the external air and condense this energy to heat a smaller space within a dwelling or non-domestic building. A pump circulates a refrigerant through a coil to absorb energy from the air. This refrigerant is then compressed to raise its temperature which can then be used for space heating and domestic hot water. They can feed either low-temperature radiators or underfloor heating and often have electric immersion heater back-up for the winter months.
- 4.13 ASHPs operate effectively in buildings with a low energy demand, as they emit low levels of energy suitable for maintaining rather than dramatically increasing internal temperatures.
- 4.14 Due to their high efficiency and extraction of energy from the ambient environment, ASHPs can be considered as renewable or low carbon technology in line with Policy G1's energy hierarchy.

Energy Hierarchy – Allowable Solutions

- 4.15 As the final stage of the energy hierarchy, policy G2 supports the use of wider energy efficiency or carbon reduction measures to reduce residual emissions down to a level compliant with policy G1's requirement for new developments to be zero carbon in line with national targets and definitions.
- 4.16 The current national definition of zero carbon for new residential buildings is the Future Homes Standard¹² (FHS), which requires new build homes to be future-proofed with low carbon heating and very high levels of energy efficiency. This means homes will not require retrofitting with any additional measures or technology to become operationally net zero as the national grid continues to decarbonise. The FHS will be introduced as an updated Building Regulations Approved Document L by 2025.
- 4.17 The FHS has been considered when specifying ASHP, as the FHS anticipates that heat pumps will become the primary heating technology for new homes as the electrification of domestic heating supply provides a route to net zero homes once the electricity grid is decarbonised.

- 4.18 Specifying ASHP instead of traditional gas boiler heating systems allow the dwellings to track improvements in the UK electricity grid emissions in line with the government's commitment to fully decarbonise UK electricity by 2035¹⁶.
- 4.19 PV panels would be a suitable renewable technology for the Development, and will be considered as the design progresses, however due to the strong performance of the energy efficiency measures specified, additional renewable generation isn't required to meet Part L 2021, the Rochdale Core Strategy, or to achieve Net Zero Carbon Ready performance as set out in the FHS.
- 4.20 The use of Net Zero Carbon Ready technology allows the Development to achieve net zero operational carbon emissions once the grid decarbonises, which supports Rochdale to achieve its targeted pathway to Net Zero by 2038. Therefore, no further allowable solutions are proposed.

Energy Strategy Conclusion

- 4.21 The Development incorporates energy efficiency measures and net zero carbon ready technology sufficient to achieve compliance with policies G1 and G2. These include the following:
- Highly insulated building fabric with external walls, floors and roofs of low U-Values to reduce heat loss;
 - Efficient double glazed windows;
 - Low air permeability;
 - Use of natural ventilation;
 - All dwellings have been designed to allow for cross-ventilation to reduce the risk of overheating and help them stay cool in warmer conditions;
 - Low energy lighting;
 - Strong continuity of insulation at building junctions to reduce thermal bridging heat loss; and
 - Heating and hot water demand met by low carbon Air Source Heat Pumps.
- 4.22 The performance of the proposed new dwellings will be verified by 'as built' calculations of energy performance prior to each dwelling being occupied. The calculations of energy performance will be in the form of SAP assessments to Part L 2021 standards and will be

¹⁶ Department for BEIS press release - <https://www.gov.uk/government/news/plans-unveiled-to-decarbonise-uk-power-system-by-2035>

accompanied by a home user guide and Energy Performance Certificate prior the occupation of each dwelling.

- 4.23 The key metrics of the Developments compliance with Part L 2021, and the energy policies of the Rochdale Core Strategy are shown in Table 4.2, with all targets being met and exceeded by the predicted actual performance of the Development.
- 4.24 The current predicted residual regulated carbon emissions associated with the operation of the 233 new dwellings set out in the detailed element of the hybrid planning application is 149 tonnes CO₂ per annum. Due to the net zero carbon ready design, this will reduce to 134 tonnes per annum in 2025, 50 tonnes per annum in 2030 and to zero by 2038¹⁷.

Table 4.2: Development annual energy performance against regulatory and policy targets

Annual Performance Measure		Target	Actual	% Reduction
Part L 2021	CO ₂ emissions (kg CO ₂ /m ²)	11.2	3.4	69%
	Fabric Energy Efficiency (kWh/m ²)	36.4	32.5	11%
	Primary Energy (kWh/m ²)	58.9	34.2	42%
RCS Energy Hierarchy	Demand Reduction (Tonnes CO ₂)	318.0	175.9	45%
	Energy Efficiency and LZC Technologies (Tonnes CO ₂)	175.9	149.0	15%
	Allowable Solutions (Tonnes CO ₂)	149.0	149.0	0%
	Total Carbon Reduction (Tonnes CO₂)	318.0	149.0	53%

¹⁷ Based on UK decarbonisation commitments and calculated using BEIS Green Book data tables - <https://www.gov.uk/government/collections/carbon-valuation--2>

5.0 CLIMATE ADAPTATION STATEMENT

5.1 The scale of the Development at Stakehill as well as the size of land holding mean that the Development can take a holistic approach towards climate change adaptation. This approach includes:

- The Development incorporates green infrastructure and sustainable urban drainage systems (SuDS) which will enhance the resilience of the Development. Green infrastructure includes the community parkland to the south of the Development, there are SuDS attenuation ponds throughout the Development including within the community parkland, and to the west of the Development. The north and east of the Development will also comprise an area of green infrastructure, including new woodland.
- All dwellings have been designed to allow for cross-ventilation to reduce the risk of overheating and help them stay cool in warmer conditions.
- Dwellings are all designed with low-emissivity coated glazing which is designed to limit unwanted solar gains in summer.
- Most dwellings will benefit from integrated garages, which provide a thermal mass benefit by absorbing excess heat during periods of high internal temperature.
- The proposed surface water drainage strategy will seek to mimic the hydrological regime of the existing Site.
- Exceedance flood flow paths are routed away from vulnerable development and towards landscaped areas, areas of open attenuation or surrounding green/blue infrastructure.
- Aquatic habitats such as lakes and wetlands are proposed to be created in the detailed and outline phase, which will provide flood attenuation and contribute towards resilient planting during periods of heavy rainfall. Ponds will also be retained throughout the Site.

Table 5.1: Stakehill – Climate Change Adaptation SPD

Climate Objective	Adaptation SPD	Details / Evidence	Recommended Mitigation	Compliant with the SPD?
Location of new Development				
Considerations when locating development must include: The capacity of existing and potential infrastructure to serve the development, taking into account the impacts of climate change.		The Site is well connected to the local transport network, located approximately 2km to the south of Castleton and 4km to the south of Rochdale Town Centre. The Site is enclosed by existing urban development by housing, the M62, A627(M) and Manchester Road. The M62 runs between Liverpool and Hull, through Manchester and Leeds and can be accessed from the Site via Manchester Road and the A627(M). There is a restricted byway within the Site which can be used by cyclists, which runs south-east from Thornham New Road for approximately 475m through the centre of the Site. Beyond the Site, there are currently no dedicated cycling lanes or facilities on the surrounding highway network in the direct vicinity of the Site. However, National Cycle Network (NCN) route 66 runs in a north to south direction following the Rochdale Canal which runs approximately 350m east of the western Site boundary. At present, the closest railway station to the Site is Castleton Station, located approximately 1.7 km to the north of the proposed primary Site access. From the access point, the station can be accessed via a 21-minute walk, 6-minute cycle, 8-minute bus journey or 4-minute drive. The Transport chapter of the ES outlines a range of mitigation measures to be secured through a planning condition which can encourage a modal shift to more sustainable forms of transport. Measures include: • Footway widening at the signalised crossings of the A664 Manchester Road into the Site; • The Development will provide new footways and public realm through the Site for the benefit for residents and the general public; • Provision of a mix of land uses in a new local centre within the west of the Development; • The principal road infrastructure will be designed to accommodate bus services along this corridor. Bus stops would be located at appropriate intervals along the principal road infrastructure zone; and	There is no requirement for further mitigation beyond what is included in the ES.	The proposed infrastructure from the Development is compliant with the location objectives of the Climate Adaptation SPD.

Climate Objective	Adaptation SPD	Details / Evidence	Recommended Mitigation	Compliant with the SPD?
		Enhanced pedestrian and cycle paths will be provided along PRow and new off-road active travel routes. These measures will contribute to a reduction of transport related GHG emissions from the Development.		
The impact of the development on biodiversity and habitats, and on carbon sinks such as peatlands.		The Site is not considered to be a significant carbon sink and there are no peatlands on or in close proximity to the Site that will be impacted by the Development. As stated in Chapter 7 of the ES (Biodiversity) the Development will provide bird boxes attached to or integrated within new buildings or retained trees on-site, as well as provide bat boxes. The Development will incorporate a meadow flower mix for wildflower planting, hedgerow planting will improve the connectivity between existing and newly created habitats, the landscaping within the Development will be incorporate species that provide a food or shelter resource to wildlife. Ecology mitigation and long-term management for habitats and protected species will be set out in a Landscape and Ecology Management Plan (LEMP) which will be secured by planning condition. The LEMP will provide the basis to set out the range of mitigation and enhancement measures that will be agreed within the detailed design of the Development and will also specify how management will be ensured in perpetuity such that habitats are managed to maximise their biodiversity and recreation value. The provision of a LEMP for the long-term management of the habitats established at the construction stage will ensure that habitats are managed through a management plan for a minimum of 30 years. This will ensure the appropriate maintenance and success rate of biodiversity on site.	A detailed Biodiversity Net Gain (BNG) Assessment should be undertaken at the detailed design phase to demonstrate a 10% Biodiversity Net Gain. Detailed hedgerow surveys are also still required to assess the quality of hedgerows on the Site.	The Development is compliant with this policy of the SPD.
The opportunities for open space creation and enhancement.		As the current site is greenfield there are opportunities for open space creation and enhancement throughout the Site. As shown in Figure 3.1 of the ES, the parameter plan for the Development, the southern portion of the Development will be a community parkland. The parkland will include retained landscape features such as a pond and trees, as well as new landscaping, ecological enhancement, active travel routes and seating. The community parkland will likely result in biodiversity gain as well as contain walking and cycling routes, encouraging the use of open space from future residents.	The Development should incorporate features from the illustrative masterplan include multi-use games area and locally equipped play spaces.	The Development is compliant with this policy of the SPD.

Climate Objective	Adaptation SPD	Details / Evidence	Recommended Mitigation	Compliant with the SPD?
		There will be other areas of open space throughout the Development, as shown on the parameter plan, such as towards the south west of the Development, surrounding St John's church. This area will also include an orchard garden, enhancing the space currently at the Site. There are also areas of open space proposed towards the north east of the Development.		
Constraints on the location such as flood risk – a precautionary approach should be taken to possible increases in risk caused by a changing climate.		The Site is located entirely within Flood Zone 1, which is considered to be at the lowest (1 in 1000 chance) risk of flooding in any given year. The majority of the Site is also considered to be at a very low-low risk from other sources (i.e. surface water, groundwater, and reservoir flooding). There are small portions of the Site are identified as being at risk of surface water flooding, particularly from Thornfields farm buildings in the east to the central portion of the Site, running through the Site in a south westerly direction, following the topography of the Site. As stated in the Flood Risk Assessment (FRA), the risk of flooding from numerous sources (fluvial, tidal, surface water, groundwater and sewers) is considered to be very low or low. The entire developable area is within Flood Zone 1, which is considered to be at the lowest risk of flooding. Areas of the Site close to the lower level western boundary may be subject to flooding, this is thought to be exacerbated by culverting of the watercourse in several locations. The FRA concludes that the Development is unlikely to be at risk of flooding.	The FRA recommends that finished floors levels are set a minimum of 150mm above the local ground level in line with best practice to mitigate against the risk of surface water runoff.	The Development is compliant with this policy of the SPD.
Layout and Orientation				
Proposals for new developments will be expected to demonstrate how the overall layout and massing of the development:		The FRA states that in order to prevent flooding on site attenuation and controlled discharge will be utilised to control surface water flows to greenfield rates. These features will be designed to store the volume of water associated with a 1 in 100-year rainfall event, plus an additional 45% allowance to account for increased rainfall due to climate change. The FRA concludes that the Development of the Site should not be precluded on the grounds of flood risk.	It is recommended that finished floors levels are set a minimum of 150mm above the local ground level in line with best practice to mitigate against the risk of surface water runoff.	The Development is compliant with this policy of the SPD.
Does not increase the flood risk and where possible reduces risk.				
Utilises passive systems such as orientation and solar gain to control building temperatures.		All dwellings have been designed to allow for cross-ventilation to reduce the risk of overheating and help them stay cool in warmer conditions.	Overheating assessments should be undertaken at design stage to ensure compliance with Approved Document O: Overheating.	The Development is compliant with this policy of the SPD.
Orientates streets and open spaces in a way that takes climate change into account (e.g. maximise shading		Whilst the Development is proposed to deliver up to 1,380 homes, it will also provide green infrastructure, including a variety of public open spaces that can help to provide a robust new	The exact green spaces, planting and play space for the outline element will	The Development is compliant with

Climate Objective	Adaptation SPD	Details / Evidence	Recommended Mitigation	Compliant with the SPD?
opportunities and the need to catch breezes but to avoid heavy winds).		neighbourhood that is resistant to potential future climate changes. Across the Development, planting within streets and formal public open spaces has been chosen not only for the aesthetic and amenity value, but also for the resilience to climate change, biodiversity and low management and maintenance requirements. Naturalistic areas such as the ponds and surface water attenuation areas will incorporate native species and low intensity management practices, naturally evolving with minimal intervention apart from initial establishment. Monitoring review and management practices and targets will be undertaken to ensure the necessary management regimes are in place to ensure the amenity, biodiversity and habitat objectives are being achieved. The proposed Thornham Park will comprise an extensive naturalistic area made up of a mosaic of landscape features which will help the habitats and people adapt to potential climate changes, including open water, wetlands, reeds beds, species rich grasslands, hedgerows, scrub and new woodland.	be decided at the detailed design stages.	this policy of the SPD.
Maximises natural ventilation.		All dwellings proposed in the detailed element of the application utilise natural ventilation with openable windows. Taking a natural ventilation strategy over a continuous mechanical extract strategy provides an energy demand reduction and meets the first stage of the energy hierarchy.	It is recommended that the dwellings designed air permeability should not be lower than $5 \text{ m}^3/(\text{h}\cdot\text{m}^2)$ at 50Pa. Any dwelling with a design air permeability lower than 5 must utilise a continuous mechanical extract ventilation system.	The Development is compliant with this policy of the SPD.
Shows that the development has been designed around green space and natural vegetation / natural features, rather than vice versa.		As shown in Figure 3.1 of the ES, the north east of the Development is at a higher gradient than the remainder of the Site. Figure 3.1 of the ES shows that this area will contain green infrastructure, and is proposed to become a hilltop park, comprising of retained and new planting, open space, active travel routes and ecological enhancements. The design has also taken buildings which abut the Site into consideration. As shown in Figure 3.1 of the ES, the land surrounding St John's church will become an orchard and area of green infrastructure, an area to the north of St John's Primary School been left for a proposed extension area, or an area of inclusive open public space.	The exact green spaces and planting for the outline element will be decided at the detailed design stages.	The Development is compliant with this policy of the SPD.

Climate Objective	Adaptation SPD	Details / Evidence	Recommended Mitigation	Compliant with the SPD?
		The north and east of the Development are also areas of green infrastructure and will include new woodland planting, as these areas for the boundaries of the Site with the M62 and A627 adjacent to the Site. These areas of green infrastructure will therefore provide visual screening from the Development, as well as noise and air quality shielding. Parameter plans for the Development show that the Development has been designed around green spaces and natural features.		
Takes account of the increased risk of subsidence.		The Phase 1 Geo-Environmental Site Assessment states that the Site is at a Moderate risk of landslides. Consideration should be given to stability if changes to drainage or excavations take place. Buildings on-site will be designed and constructed to take account of the increased risk of subsidence. The exact building specification will be decided at the Reserved Matters stages of design.	A Phase 2 Geo-Environmental Site Investigation should be undertaken prior to commencement works and should be secured and agreed with RBC through an appropriately worded planning condition.	The Development will be compliant with this objective of the SPD following the implementation of additional mitigation.
Materials, Structure and Construction				
Use materials which prevent penetration of heat in summer including cool / reflective building materials on roofs and facades.		The dwellings in the detailed element of the application are all designed with low-emissivity coated glazing which is designed to limit unwanted solar gains in summer. Solar gains in winter can reduce the amount of space heating required to be delivered by the heating system. Reducing summer overheating by limiting glazing areas will impact winter solar gains and therefore increase the need for space heating. A g-value range of 0.63-0.72 has been specified which provides a balance between limiting summer solar gains and minimising winter space heating demand.	Overheating assessments should be undertaken at design stage to ensure compliance with Approved Document O: Overheating.	The Development is compliant with this policy of the SPD.
Ensure an appropriate thermal mass for the intended use and occupancy. During the summer months the thermal mass helps to maintain comfortable conditions inside the dwellings by absorbing heat during the middle of the day and then releasing it at night. Large areas of exposed thermal mass including ceilings and blockwork walls.		A detailed thermal mass calculation has been carried out as part of the sample SAP assessments. Timber construction is expected to be used for the majority of internal partition walls, ceilings and floor. Most dwelling benefit from integrated garages, which provide a thermal mass benefit by absorbing excess heat during periods of high internal temperature.	Overheating assessments should be undertaken at design stage to ensure compliance with Approved Document O: Overheating.	The Development is compliant with this policy of the SPD.

Climate Objective	Adaptation SPD	Details / Evidence	Recommended Mitigation	Compliant with the SPD?
Have foundations and structures which cope with increased subsidence on shrinking and swelling soils and in proximity to vegetation.		The Phase 1 Geo-Environmental Site Assessment states that the Site is at a Moderate risk of compressible ground. Technical advice is recommended before any drainage or de-watering of ground.	A Phase 2 Geo-Environmental Site Investigation should be undertaken prior to commencement works and should be secured and agreed with RBC through an appropriately worded planning condition.	The Development will be compliant with this objective of the SPD following the implementation of additional mitigation.
Have an external envelope which can cope with increases in driving rain and wind speeds (including cladding materials). Drainage systems and entrance thresholds should be able to cope with more intense rainfall.		The Development location is in an area of very severe exposure to driving rain, and as such the design will not utilise full fill cavity insulation, and will ensure a minimum cavity width of 50 mm.	The risk of exposure to wind driven rain should be mitigated by use of insulated cavity closures. It is recommended that finished floors levels are set a minimum of 150mm above the local ground level in line with best practice to mitigate against the risk of surface water runoff. An assessment of threshold heights should be carried out to determine the appropriate level required to provide adaptation to increased rainfall.	The Development will be compliant with this objective of the SPD following the implementation of additional mitigation.
Be able to incorporate appropriate ventilation and cooling techniques / mechanisms.		All dwellings have been designed to allow for cross-ventilation to reduce the risk of overheating and help them stay cool in warmer conditions. All dwellings will utilise openable windows to allow for purge ventilation at night to remove excess heat.	Overheating assessments should be undertaken at design stage to ensure compliance with Approved Document O: Overheating. This should include an assessment of the free area (the geometric open area of a ventilation opening) for each dwelling and each bedroom.	The Development is compliant with this policy of the SPD.
Maximise the insulation and air tightness of the building envelope.		All dwellings proposed in the detailed element of the application will be designed with an air permeability of 5 m ³ /(h·m ²) at 50Pa. A design air permeability lower than 5 must utilise a continuous mechanical extract ventilation system to ensure minimum standards of ventilation are achieved in line with Approved Document F, therefore the designed air permeability provides a balance of air tightness and natural ventilation.	Detailed thermal bridging analysis should be carried out at design stage to ensure the building junction design meets the targeted continuity of insulation.	The Development will be compliant with this objective of the SPD following the implementation

Climate Objective	Adaptation	SPD	Details / Evidence	Recommended Mitigation	Compliant with the SPD?
			Highly insulated building fabric will be specified with external walls, floors and roofs of low U-Values to reduce heat loss. Strong continuity of insulation at building junctions will be utilised to reduce thermal bridging heat loss.		of additional mitigation.
Environmental Performance (Buildings)					
Use of natural ventilation.			All dwellings proposed in the detailed element of the application utilise natural ventilation with openable windows. Taking a natural ventilation strategy over a continuous mechanical extract strategy provides an energy demand reduction and meets the first stage of the energy hierarchy.	It is recommended that the dwellings designed air permeability should not be lower than 5 m ³ /(h·m ²) at 50Pa. Any dwelling with a design air permeability lower than 5 must utilise a continuous mechanical extract ventilation system.	The Development is compliant with this policy of the SPD.
Louvres and shutter systems.			No louvres or shutters have been specified to the detailed element of the application as it is not expected to be required to meet the residential requirements of Approved Document O. They will be considered however for non-residential building types on future phases of development.	It is recommended that louvres or shutters are considered into any non-residential buildings where proven effective at reducing unwanted solar gains in summer. This may include the possible school extension.	The Development will be compliant with this objective of the SPD following the implementation of additional mitigation.
Provision of well-ventilated and cooled internal spaces.			All dwellings have been designed to allow for cross-ventilation to reduce the risk of overheating and help them stay cool in warmer conditions. All dwellings will utilise openable windows to allow for purge ventilation at night to remove excess heat.	Overheating assessments should be undertaken at design stage to ensure compliance with Approved Document O: Overheating. This should include an assessment of the free area (the geometric open area of a ventilation opening) for each dwelling and each bedroom.	The Development is compliant with this policy of the SPD.
Appropriate storage of composting and waste in hot weather.			Gardens of the proposed dwellings will have an area of hardstanding which will provide an appropriate storage area for composting and waste in period of hot weather.	The exact planting and amenity garden space for the outline element will be decided at the detailed design stages.	The Development is compliant with this policy of the SPD.
The provision of bird and bat boxes within and/or on new buildings.			As outlined in Chapter 7 (Biodiversity) of the ES, bird and bat boxes will be provided during the construction and operational phase of the Development. These will be attached to or integrated within new buildings or retained trees throughout the Development.	There is no requirement for mitigation beyond the embedded and additional mitigation that is outlined in the Biodiversity chapter of the ES.	The Development complies with this element of the

Climate Objective	Adaptation SPD	Details / Evidence	Recommended Mitigation	Compliant with the SPD?
		The ongoing monitoring for a minimum of 30 years will be outlined within the Landscape Ecology Management Plan (LEMP) for the Development, to be secured through a suitably worded planning condition at a later design stage.		environmental performance objective within the Climate Change Adaptation SPD.
Green Roofs and Walls				
There will be a presumption that roofs on any buildings over 500m ² for non-domestic buildings or any development of 5 or more residential houses will be green roofs. If it is not feasible to meet this requirement the onus is on the developer to persuade the planning authority that this is the case.		At this stage in the design process, there is not enough information on the design specifications of the buildings, and it is therefore unknown whether there will be green roofs located on the residential or commercial buildings in the Development.	Opportunities should be explored at the detailed design stages (Reserved Matters) to incorporate green roofs into the Development.	This policy of the SPD has not been achieved at this stage of the design, but there are opportunities for compliance.
Water Efficiency				
For domestic properties water consumption must be equal to or less than 90 litres/person/day as calculated by the Water Efficiency Calculator for New Dwellings.		Measures regarding domestic properties water consumption are not yet known and should be designed at the detailed design phase to be equal to or less than 90 litres/person/day.	Opportunities should be explored at the detailed design stages (Reserved Matters) to reduce domestic water consumption to be equal to or less than 90 litres/person/day.	This policy of the SPD has not been achieved at this stage of the design, but there are opportunities for compliance.
Water Management				
Sustainable Urban Drainage Systems (SUDS) must be specified to ensure no discharge to watercourses (natural or municipal). Developers should liaise with the Local Planning Authority and the Environment Agency, and SUDS should comply with national standards.		The Flood Risk Assessment does state that there is a watercourse (the Dell) located within the Site boundary which can be used to discharge surface water runoff to. The Development area of Phase 1 is shown to clearly drain to the Dell via topographic falls towards the western boundary. The surface water flow path and land drainage evidenced in this report would suggest that contributing areas to the surface water flow path from future phases also discharge to the Dell. It is recommended in the LLFA correspondence within the FRA that discharge to the Dell should be limited to the downstream extent of the cricket grounds culvert where possible due the unreliability of the culverts for flow conveyance. The FRA concludes that infiltration is unlikely to be considered a viable option as part of the drainage strategy.	SuDS in the outline phase will be designed during the detailed design stages and will be liaised with Rochdale Council LLFA and the Environment Agency.	This policy of the SPD has not been achieved at this stage of the design, but there are opportunities for compliance.

Climate Objective	Adaptation SPD	Details / Evidence	Recommended Mitigation	Compliant with the SPD?
Green and Blue Infrastructure				
All new development in the urban areas of the Borough, and new urban extensions, will therefore be expected to: Not sever or fragment the existing Green Infrastructure of the Borough.		The Development responds to existing green infrastructure on the Site by retaining, where possible trees and hedgerows throughout the Site. Where trees need to be removed, these will be replaced at a ratio of 2:1. As shown on Figure 3.1 of the ES, the northern and eastern boundaries of the Development will comprise woodland and green infrastructure. The southern portion of the Site will become a community parkland that will include retained trees, ponds and SuDS. The Biodiversity chapter concludes that there will be no significant adverse effects on species or habitats as a result of the Development. The Development results in an expansion of certain habitats such as woodland which will be beneficial to existing green infrastructure. The Biodiversity chapter of the ES shows that the Development will not have any significant effects on non-designated or designated sites in proximity to the Development. A report to Inform a Habitats Regulations Assessment has also been submitted as Appendix 7.8 of the ES, which will inform an Appropriate Assessment with RBC and Natural England on the potential effects on the Rochdale Canal SSSI and SAC.	The exact green spaces and planting for the outline element will be decided at the detailed design stages.	The Development is compliant with this policy of the SPD.
Increase the amount of Green Infrastructure. In particular, they must offer an accessible choice of shade and shelter, recognising the opportunities for people, biodiversity, flood storage and carbon management provided by multi-functional green spaces and green infrastructure networks.		As shown in Figure 3.1 of the ES, the green infrastructure for the Development provides a range of benefits. Four existing ponds on site, two located in the southern community parkland area, one to the west of the Development and one within the primary school extension area are to be retained. These will have flood attenuation and biodiversity benefits. Furthermore, there are SuDS attenuation ponds proposed in proximity to these existing ponds, providing blue infrastructure that will further alleviate flood risk on site. Trees and hedgerows are to be retained where possible, and if trees are to be removed, these will be replaced at a ratio of 2:1. The enhancement of trees on site will provide thermal cooling during heatwaves for occupants of the Development. The varied green infrastructure will comprise walking and cycling routes as well as play areas and an orchard. This provides	The exact green spaces, planting and play space for the outline element will be decided at the detailed design stages.	The Development is compliant with this policy of the SPD.

Climate Objective	Adaptation	SPD	Details / Evidence	Recommended Mitigation	Compliant with the SPD?
			recreational opportunities for all age ranged of future site users and encourages use of the open spaces. Carbon sequestration potential of the Development increases from the baseline, as shown in the Climate Change chapter of the ES. Appropriate short-long term management, through a LEMP will ensure the survival of landscaping and once planting/landscaping matures, the carbon sequestration potential will increase further.		

6.0 SUMMARY

- 6.1 This Climate Change Adaptation & Energy Statement outlines how the Development at Stakehill demonstrates energy efficiency and climate adaptation in line with the RBC Climate Adaptation Supplementary Planning Guidance (SPD) Document. This Strategy in particular focuses upon energy reduction measures as part of the Energy Statement and how the Development complies with the objectives of the RBC Climate Adaptation SPD. This is to ensure that the Development is futureproofed, adaptable and resilient to future climatic changes.
- 6.2 The Statement differentiates between the themes outlined in the Climate Adaptation SPD. Eight broad themes that are outlined in the SPD and assessed accordingly within this statement are, Location, Layout and Orientation, Materials / Structure, Environmental Performance, Green roofs and walls, Water Efficiency, Water Management, and Green and Blue Infrastructure.
- 6.3 An audit has been carried out in Section 2 of this statement with regard to themes of climate change mitigation, adaptation and energy usage.
- 6.4 Section 4 of this statement outlines the energy strategy for the Development and outlines that the Development CO₂ emissions are 53% below the Part L 2021 baseline. Table 4.2 demonstrates how these carbon emissions have been achieved through the energy hierarchy in compliance with the Rochdale Core Strategy.
- 6.5 In Table 5.1, the statement demonstrates that the Development is predominantly compliant with objectives set out in the Climate Change Adaptation SPD. Full compliance can be achieved following recommended mitigation and planning conditions for the outline element of the Development.
- 6.6 The Development responds to the objectives of the SPD and contributes towards a sustainable lifestyle by providing opportunities for a balanced community, healthy lifestyle opportunities, efficient transport options as well as efficient homes and low carbon energy.

APPENDIX A
POLICY AND LEGISLATIVE CONTEXT

APPENDIX A: POLICY AND LEGISLATIVE CONTEXT

Introduction

This appendix provides an overview of the national policy and legislative context in respect of the Development.

Policy Context

National Planning Policy Framework¹⁸

The revised NPPF published in July 2021 identifies the key principles in relation to health that local planning authorities should consider. In particular Chapter 8 of the revised NPPF 'Promoting healthy and safe communities' states that decisions should aim to achieve the following key features to a healthy and safe community:

1. *"promote social interaction, including opportunities for meetings between people who might not otherwise come into contact with each other – for example through mixed-use development, strong neighbourhood centre, street layouts that allow for easy pedestrian and cycle connections within and between neighbourhoods, and active street frontages;*
2. *are safe and accessible, so that crime and disorder, and the fear of crime, do not undermine the quality of life or community cohesion – for example through the use of clear and legible pedestrian routes, and high quality public space, which encourage the active and continual use of public areas; and*
3. *enable and support healthy lifestyles, especially where this would address identified local health and well-being needs – for example through the provision of safe and accessible green infrastructure, sports facilities, local shops, access to healthier food, allotments and layouts that encourage walking and cycling."*

The revised NPPF also includes other chapters relevant to the Sustainability Statement that are appropriately referenced in the report.

The Clean Growth Strategy¹⁹

In October 2017, the UK Government published its Clean Growth Strategy (CGS) setting out ambitious policies and proposals, through to 2032 and beyond, to reduce emissions across the

¹⁸ National Planning Policy Framework, July 2021. Link <https://www.gov.uk/government/publications/national-planning-policy-framework--2>

¹⁹ Clean Growth Strategy, October 2017. Link <https://www.gov.uk/government/publications/clean-growth-strategy>

economy and promote clean growth. The CGS provides an 'ambitious' blueprint for Britain's low carbon future, outlining how investment in green energy goes hand-in-hand with economic growth and industrial, commercial and residential strategies. Core to the strategy are actions that will cut emissions, increase efficiency and lower the amount consumers and business spent on energy. The CGS sets out actions for the six key areas that together are responsible for 100% of the UK's carbon emissions. These are:

- Improving business and industry efficiency (25% of UK emissions): Improving business and industry efficiency, improving energy productivity and commercial building standards, delivering industrial energy efficiency, investing in industrial innovation;
- Accelerating the shift to low-carbon transport (24% of UK emissions): Accelerating the shift to low – carbon transport, supporting the take – up of ultra – low emission vehicles, developing electric vehicle charging network, shifting freight from road to rail and innovation in Connected and Autonomous Vehicles and electric batteries;
- Improving our homes (13% of UK emissions): Improving our homes, upgrading energy efficiency across a million homes, strengthening building standards, rolling out heat networks, phasing out of high carbon heating;
- Enhancing the benefits and value of our natural resources (15% of UK emissions): Enhancing the benefits and value of our natural resources, supporting agriculture, a new network of forests, zero avoidable waste by 2050, managing emissions from landfill;
- Leading the public sector (2% of UK emissions): Leading in the public sector, setting a voluntary 30 percent public sector carbon reduction target by 2020 and funding for energy efficiency improvements in England; and
- Delivering clean, smart, flexible power (21% of UK emissions): Delivering clean, smart, flexible power, phasing – out of coal, developing new ways of balancing the grid through electricity storage and demand response.

25 Year Environment Plan²⁰ and the Environment Act²¹

Building on the proposals set out in the CGS, the UK outlined its plans to improve the environment in 'A Green Future: Our 25 Year Plan to Improve the Environment' (2018). The 25 Year Environment Plan was published in January 2018 and sets out the UK's approach to

²⁰ 25 Year Environment Plan, last updated October 2021. Link <https://www.gov.uk/government/publications/25-year-environment-plan>

²¹ Environment Act 2021. Link <https://www.legislation.gov.uk/ukpga/2021/30/contents/enacted>

deliver on our ambition to leave our environment in a better state than we inherited, and to fully seize the opportunities of clean growth. At a glance, the key proponents of the 25 Year Plan are:

- Embedding an 'environment net gain' principle for development, including housing and infrastructure: reforming developer contributions and tariffs to limit environmental damage and secure investment in natural capital.
- Clean Air: meeting legally binding targets to reduce emissions of five damaging air pollutants; this should halve the effects of air pollution on health by 2030 and maintaining the continuous improvement in industrial emissions by building on existing good practice and the successful regulatory framework.
- Reducing the risks of harm from environmental hazards: We will reduce the risk of harm to people, the environment and the economy from natural hazards including flooding, drought and coastal erosion.
- Increasing resource efficiency and reducing pollution and waste: achieving zero avoidable waste by 2050 and eliminating avoidable plastic waste by 2042 and reducing food chain emissions and wastage as well as improving the management of residual waste.
- Using resources from nature more sustainably and efficiently: ensure that resources from nature, such as timber, are used more sustainably and efficiently.
- Enhancing beauty, heritage and engagement with the natural environment: making sure that there are high quality, accessible, natural spaces close to where people live and work, particularly in urban areas, and encouraging more people to spend time in them to benefit their health and wellbeing.
- Mitigating and adapting to climate change: Take all possible action to mitigate climate change, while adapting to reduce its impact.

The Environment Act became law in 2021 and sets long-term targets in respect of any matter which relates to:

- The natural environment, or
- People's enjoyment of the natural environment.

The priority areas within the Act are:

- Air quality;
-

-
- Water;
 - Biodiversity; and
 - Resource efficiency and waste reduction.

Planning Practice Guidance²²

The PPG on climate change (Paragraph 007) also recognises that every area will have different challenges and opportunities for reducing carbon emissions from new development such as homes, businesses, energy, transport and agricultural related development:

- Robust evaluation of future emissions will require consideration of different emission sources, likely trends taking into account requirements set in national legislation, and a range of development scenarios;
- The distribution of new development and the potential for servicing sites through sustainable transport solutions, are particularly important considerations that affect transport emissions; and
- Different sectors may have different options for mitigation. For example, measures for reducing emissions in agricultural related development include anaerobic digestion, improve slurry and manure storage and improvements to buildings. In more energy intensive sectors, energy efficiency and generation of renewable energy can make a significant contribution to emissions reduction.

Further detailed guidance is also provided with regards to specific considerations for climate change. For example, the PPG companion document to the NPPF sets out the required approach to climate change for the assessment of flood risk. It provides recommendations for sensitivity ranges and allowances for future increases in rainfall, sea levels, river flows and tidal effects such as wind speed and wave height. For example, paragraphs 155 and 156 of the NPPF state:

"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. Strategic policies should be informed by a strategic flood risk assessment and should manage flood risk from all sources. They should consider cumulative impacts in, or affecting, local areas susceptible to flooding, and take account of advice from the Environment Agency and other relevant flood risk management authorities, such as lead local flood authorities and internal drainage boards."

²² National Planning Policy Framework. <https://www.gov.uk/government/publications/national-planning-policy-framework--2>

APPENDIX B

ENERGY EFFICIENCY MEASURES

Energy Efficiency Measures

The energy performance specification of the Development is summarised in Table B.1.

Table B.1: Building energy performance specification

Element or system	Specification	Notes
Climate data		UK average
Size and shape	As designed	Drawings provided by Redrow Homes
Opening areas (windows, roof windows and doors)	As designed	Drawings provided by Redrow Homes
External walls	$U = 0.21 \text{ W/m}^2\text{K}$	Minimum 50mm cavity
Party walls	$U = 0.00 \text{ W/m}^2\text{K}$	Fully insulated cavity
Ground Floors	$U = 0.18 \text{ W/m}^2\text{K}$	
Roof	$U = 0.12 \text{ W/m}^2\text{K}$	Insulated at joists
Opaque door (<30% glazed area)	$U = 1.2 \text{ W/m}^2\text{K}$	
Semi-glazed door (30%-60% glazed area)	$U = 1.2 \text{ W/m}^2\text{K}$	Double glazed
Windows and glazed doors with >60% glazed area	$U = 1.2 \text{ W/m}^2\text{K}$ Frame factor = 0.75 Solar energy transmittance (g-value) = 0.63-0.72	Double glazed, Low E Orientation same as designed (actual dwelling) Overshading average or unknown
Allowance for thermal bridging	Calculated based on BRE Certified Thermal Details and Products scheme.	Bespoke Psi Value calculations should be carried out to achieve the equivalent performance
Ventilation system	Natural ventilation.	Standard extracts to Part F.
Air permeability	$5.0 \text{ m}^3/\text{h.m}^2$ at 50 Pa	Every dwelling will be tested
Chimneys	None	
Open flues	None	
Main heating fuel (space and water)	Electricity	
Heating system	Air Source Heat Pump Mitsubishi PUZ-WM112YAA	Based on typical product.
Heating system controls	Time and temperature zone control by suitable arrangement of plumbing and electrical services.	
Hot water system	Separate time control for space and water heating.	
Hot water cylinder	Storage of 250L assumed.	Max 1 kWh per day heat loss.

Element or system	Specification	Notes
Primary water heating losses	Fully insulated pipework Cylinder temperature controlled by thermostat Cylinder in heated space	
Showers	Houses – connected to unvented hot water system. Flow = 11L/min Flats – electric instantaneous at point of use. Power = 9.3 kW	
Waste Water Heat Recovery	None	
Water use limited to 125 litres per person per day	Yes	Additional SPD target to be met = 90 litres per person per day
Secondary space heating	None	
Lighting	100% Low energy Power 6 W Capacity 450 lm Efficacy 75 lm/W	
Air conditioning	None	

**SAMPLE SAPS – BUILDING REGULATIONS ENGLAND PART L (BREL) COMPLIANCE
APPENDIX C
REPORTS**

Summary for Input Data

Property Reference	Bakewell Buxton Left End	Issued on Date	04/05/2023
Assessment Reference	Bakewell Buxton	Prop Type Ref	
Property	M24 2UD		

SAP Rating	78 C	DER	5.09	TER	10.82
Environmental	96 A	% DER < TER			52.96
CO ₂ Emissions (t/year)	0.45	DFEE	35.51	TFEE	35.63
Compliance Check	See BREL	% DFEE < TFEE			0.33
% DPER < TPER	5.38	DPER	53.42	TPER	56.46

Assessor Details	Ms. Rhiannon Smith	Assessor ID	BA07-0001
Client			

SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	South
Property Tenture	ND
Transaction Type	6
Terrain Type	Suburban
1.0 Property Type	Maisonette, End-Terrace
Position of Flat	Ground-floor flat
Which Floor	0
2.0 Number of Storeys	2
3.0 Date Built	2025
3.0 Property Age Band	L
4.0 Sheltered Sides	0
5.0 Sunlight/Shade	Average or unknown
6.0 Thermal Mass Parameter	Precise calculation
Thermal Mass	N/A
7.0 Electricity Tariff	Standard
Smart electricity meter fitted	Yes
Smart gas meter fitted	Yes

kJ/m²K

7.0 Measurements	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	1.00 m	45.90 m ²	2.45 m
1st Storey:	1.00 m	45.90 m ²	2.45 m
2nd Storey:	0.00 m	0.00 m ²	0.00 m
3rd Storey:	0.00 m	0.00 m ²	0.00 m
4th Storey:	0.00 m	0.00 m ²	0.00 m
5th Storey:	0.00 m	0.00 m ²	0.00 m
6th Storey:	0.00 m	0.00 m ²	0.00 m
7th Storey:	0.00 m	0.00 m ²	0.00 m

8.0 Living Area	31.46	m ²
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9.0 External Walls	Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Res	Shelter	Openings	Area Calculation Type
	External Wall	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.21	70.00	92.06	75.87	0.00	None	16.19	Enter Gross Area

9.1 Party Walls	Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Area (m ²)	Shelter Res	Shelter
	Party Wall	Filled Cavity with Edge Sealing	Plasterboard on dabs mounted on cement render on both sides, AAC blocks, cavity	0.00	45.00	40.20	0.00	None

9.2 Internal Walls	Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
	Garage wall	Plasterboard on timber frame	9.00	20.15

10.0 External Roofs

Summary for Input Data

Property Reference	Chester	Issued on Date	04/05/2023
Assessment Reference	Chester	Prop Type Ref	
Property	M24 2UD		

SAP Rating	79 C	DER	4.27	TER	10.03
Environmental	96 A	% DER < TER			57.43
CO ₂ Emissions (t/year)	0.63	DFEE	36.00	TFEE	42.49
Compliance Check	See BREL	% DFEE < TFEE			15.28
% DPER < TPER	15.29	DPER	44.56	TPER	52.60

Assessor Details	Ms. Rhiannon Smith	Assessor ID	BA07-0001
Client			

SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	South	
Property Tenture	ND	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	House, Detached	
2.0 Number of Storeys	2	
3.0 Date Built	2025	
3.0 Property Age Band	L	
4.0 Sheltered Sides	0	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	N/A	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	Yes	
Smart gas meter fitted	Yes	

7.0 Measurements	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	1.00 m	73.50 m²	2.62 m
1st Storey:	1.00 m	78.60 m²	2.62 m
2nd Storey:	0.00 m	0.00 m²	0.00 m
3rd Storey:	0.00 m	0.00 m²	0.00 m
4th Storey:	0.00 m	0.00 m²	0.00 m
5th Storey:	0.00 m	0.00 m²	0.00 m
6th Storey:	0.00 m	0.00 m²	0.00 m
7th Storey:	0.00 m	0.00 m²	0.00 m

8.0 Living Area	34.90	m²
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9.0 External Walls	Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
	Ground Floor Ext	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.18	70.00	83.25	72.47	0.00	None	10.78	Enter Gross Area
	Grage Wall Ext	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.18	70.00	33.30	33.30	0.00	None	0.00	Enter Gross Area
	First Floor Ext	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.18	70.00	69.43	53.98	0.00	None	15.45	Enter Gross Area

9.2 Internal Walls	Description	Construction	Kappa (kJ/m²K)	Area (m²)
	Garage wall	Plasterboard on timber frame	9.00	16.87

10.0 External Roofs	Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Code	Shelter Factor	Calculation Type	Openings
	Roof	External Plane Roof	Plasterboard, insulated at ceiling level	0.12	9.00	94.40	0.00	None	0.00	Enter Gross Area	0.00

11.0 Heat Loss Floors

Summary for Input Data

Property Reference	Bakewell Buxton Mid Right	Issued on Date	04/05/2023
Assessment Reference	Bakewell Buxton	Prop Type Ref	
Property	M24 2UD		

SAP Rating	81 B	DER	4.46	TER	9.48
Environmental	96 A	% DER < TER			52.95
CO ₂ Emissions (t/year)	0.39	DFEE	28.88	TFEE	29.03
Compliance Check	See BREL	% DFEE < TFEE			0.50
% DPER < TPER	4.95	DPER	46.89	TPER	49.33

Assessor Details	Ms. Rhiannon Smith	Assessor ID	BA07-0001
Client			

SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	South	
Property Tenture	ND	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	Maisonette, End-Terrace	
Position of Flat	Ground-floor flat	
Which Floor	0	
2.0 Number of Storeys	2	
3.0 Date Built	2025	
3.0 Property Age Band	L	
4.0 Sheltered Sides	0	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	N/A	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	Yes	
Smart gas meter fitted	Yes	

7.0 Measurements	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground floor:	1.00 m	45.90 m ²	2.45 m
1st Storey:	1.00 m	45.90 m ²	2.45 m
2nd Storey:	0.00 m	0.00 m ²	0.00 m
3rd Storey:	0.00 m	0.00 m ²	0.00 m
4th Storey:	0.00 m	0.00 m ²	0.00 m
5th Storey:	0.00 m	0.00 m ²	0.00 m
6th Storey:	0.00 m	0.00 m ²	0.00 m
7th Storey:	0.00 m	0.00 m ²	0.00 m

8.0 Living Area	31.46	m ²
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9.0 External Walls	Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Res	Shelter	Openings	Area Calculation Type
	External Wall	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.21	70.00	43.61	30.27	0.00	None	13.34	Enter Gross Area

9.1 Party Walls	Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Area (m ²)	Shelter Res	Shelter
	Party Wall	Filled Cavity with Edge Sealing	Plasterboard on dabs mounted on cement render on both sides, AAC blocks, cavity	0.00	45.00	84.77	0.00	None

10.0 External Roofs	Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Code	Shelter Factor	Calculation Type	Openings
	Roof	External Plane Roof	Plasterboard, insulated at ceiling level	0.12	9.00	45.90	0.00	None	0.00	Enter Gross Area	0.00

11.0 Heat Loss Floors

Summary for Input Data

Property Reference	Shrewsbury	Issued on Date	04/05/2023
Assessment Reference	Shrewsbury_Copy	Prop Type Ref	4 bed
Property	Shrewsbury, Plot 4, M24 2SA		

SAP Rating	76 C	DER	5.40	TER	11.18
Environmental	95 A	% DER < TER			51.70
CO ₂ Emissions (t/year)	0.56	DFEE	40.58	TFEE	43.41
Compliance Check	See BREL	% DFEE < TFEE			6.52
% DPER < TPER	3.41	DPER	56.56	TPER	58.55

Assessor Details	Ms. Rhannon Smith	Assessor ID	BA07-0001
Client			

SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	South	
Property Tenture	ND	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	House, Detached	
Which Floor	0	
2.0 Number of Storeys	2	
3.0 Date Built	2025	
4.0 Sheltered Sides	2	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	N/A	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	Yes	
Smart gas meter fitted	Yes	

7.0 Measurements	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Basement:	0.00 m	0.00 m²	0.00 m
Ground floor:	31.10 m	60.60 m²	2.60 m
1st Storey:	8.00 m	45.20 m²	2.40 m
2nd Storey:	0.00 m	0.00 m²	0.00 m
3rd Storey:	0.00 m	0.00 m²	0.00 m
4th Storey:	0.00 m	0.00 m²	0.00 m
5th Storey:	0.00 m	0.00 m²	0.00 m
6th Storey:	0.00 m	0.00 m²	0.00 m
7th Storey:	0.00 m	0.00 m²	0.00 m

8.0 Living Area	20.10	m²
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9.0 External Walls	Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Res	Shelter	Openings	Area Calculation Type
	External Wall 1	Cavity Wall	Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure	0.18	60.00	134.70	112.34	0.00	None	22.36	Enter Gross Area
	Garage Wall	Cavity Wall	Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure	0.18	60.00	21.06	21.06	0.70	Garage Single 1 Inside	0.00	Enter Gross Area

10.0 External Roofs	Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area(m²)	Nett Area (m²)	Shelter Code	Shelter Factor	Calculation Type	Openings
	Main roof	External Plane Roof	Plasterboard, insulated at ceiling level	0.12	9.00	60.60	0.00	None	0.00	Enter Gross Area	0.00

11.0 Heat Loss Floors	Description	Type	Storey Index	Construction	U-Value (W/m²K)	Shelter Code	Shelter Factor	Kappa (kJ/m²K)	Area (m²)
	Ground	Ground Floor - Solid	Lowest occupied	Suspended concrete floor, carpeted	0.12	None	0.00	75.00	45.20
	Over garage	Exposed Floor - Timber	+1	Timber exposed floor, insulation between joists	0.18	Garage Single 1 Inside	0.70	20.00	15.40

12.0 Opening Types

Summary for Input Data

Property Reference	Oxford Lifestyle	Issued on Date	04/05/2023
Assessment Reference	Oxford Lifestyle	Prop Type Ref	
Property	M24 2UD		

SAP Rating	77 C	DER	4.77	TER	10.50
Environmental	95 A	% DER < TER			54.57
CO ₂ Emissions (t/year)	0.61	DFEE	37.50	TFEE	44.22
Compliance Check	See BREL	% DFEE < TFEE			15.19
% DPER < TPER	9.83	DPER	49.71	TPER	55.13

Assessor Details	Ms. Rhiannon Smith	Assessor ID	BA07-0001
Client			

SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	South	
Property Tenture	ND	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	House, Detached	
2.0 Number of Storeys	2	
3.0 Date Built	2025	
3.0 Property Age Band	L	
4.0 Sheltered Sides	0	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	N/A	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	Yes	
Smart gas meter fitted	Yes	

7.0 Measurements	Heat Loss Perimeter	Internal Floor Area	Unheated Space Floor Area	Average Storey Height
Ground floor:	1.00 m	58.55 m ²	15.35 m ²	2.62 m
1st Storey:	1.00 m	73.90 m ²		2.52 m
2nd Storey:	0.00 m	0.00 m ²		0.00 m
3rd Storey:	0.00 m	0.00 m ²		0.00 m
4th Storey:	0.00 m	0.00 m ²		0.00 m
5th Storey:	0.00 m	0.00 m ²		0.00 m
6th Storey:	0.00 m	0.00 m ²		0.00 m
7th Storey:	0.00 m	0.00 m ²		0.00 m

8.0 Living Area	39.10	m ²
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9.0 External Walls	Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Res	Shelter	Openings	Area Calculation Type
	Ground Floor Ext	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.18	70.00	74.01	64.70	0.00	None	9.31	Enter Gross Area
	Grage Wall Ext	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.18	70.00	29.55	29.55	0.00	None	0.00	Enter Gross Area
	First Floor Ext	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.18	70.00	92.99	76.13	0.00	None	16.86	Enter Gross Area

9.2 Internal Walls	Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
	Garage wall	Plasterboard on timber frame	9.00	19.93

10.0 External Roofs	Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Code	Shelter Factor	Calculation Type	Openings
	Roof	External Plane Roof	Plasterboard, insulated at ceiling level	0.12	9.00	84.81	0.00	None	0.00	Enter Gross Area	0.00

11.0 Heat Loss Floors

Summary for Input Data

Property Reference	Hampstead	Issued on Date	04/05/2023
Assessment Reference	Hampstead	Prop Type Ref	
Property	M24 2UD		

SAP Rating	79 C	DER	4.15	TER	8.27
Environmental	96 A	% DER < TER			49.82
CO ₂ Emissions (t/year)	0.82	DFEE	41.03	TFEE	41.18
Compliance Check	See BREL	% DFEE < TFEE			0.35
% DPER < TPER	1.75	DPER	43.09	TPER	43.86

Assessor Details	Ms. Rhiannon Smith	Assessor ID	BA07-0001
Client			

SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	South	
Property Tenture	ND	
Transaction Type	6	
Terrain Type	Suburban	
1.0 Property Type	House, Detached	
2.0 Number of Storeys	2	
3.0 Date Built	2025	
3.0 Property Age Band	L	
4.0 Sheltered Sides	0	
5.0 Sunlight/Shade	Average or unknown	
6.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	N/A	kJ/m²K
7.0 Electricity Tariff	Standard	
Smart electricity meter fitted	Yes	
Smart gas meter fitted	Yes	

7.0 Measurements	Heat Loss Perimeter	Internal Floor Area	Unheated Space Floor Area	Average Storey Height
Ground floor:	1.00 m	88.30 m ²	28.00 m ²	2.62 m
1st Storey:	1.00 m	114.60 m ²		2.34 m
2nd Storey:	0.00 m	0.00 m ²		0.00 m
3rd Storey:	0.00 m	0.00 m ²		0.00 m
4th Storey:	0.00 m	0.00 m ²		0.00 m
5th Storey:	0.00 m	0.00 m ²		0.00 m
6th Storey:	0.00 m	0.00 m ²		0.00 m
7th Storey:	0.00 m	0.00 m ²		0.00 m

8.0 Living Area	56.49	m ²
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9.0 External Walls	Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Res	Shelter	Openings	Area Calculation Type
	Ground Floor Ext	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.21	70.00	90.10	64.91	0.00	None	25.19	Enter Gross Area
	Grage Wall Ext	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.21	70.00	35.71	35.71	0.00	None	0.00	Enter Gross Area
	First Floor Ext	Cavity Wall	Cavity wall : dense plaster, AAC block, filled cavity, any outside structure	0.21	70.00	109.28	100.55	0.00	None	8.73	Enter Gross Area

9.2 Internal Walls	Description	Construction	Kappa (kJ/m ² K)	Area (m ²)
	Garage wall	Plasterboard on timber frame	9.00	20.15

10.0 External Roofs	Description	Type	Construction	U-Value (W/m ² K)	Kappa (kJ/m ² K)	Gross Area(m ²)	Nett Area (m ²)	Shelter Code	Shelter Factor	Calculation Type	Openings
	Roof	External Plane Roof	Plasterboard, insulated at ceiling level	0.12	9.00	116.30	0.00	None	0.00	Enter Gross Area	0.00

10.1 Party Ceilings