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## BUILDINGS AND BUILT ENVIRONMENT

# Proposed Industrial Development
# Dearne Valley Parkway,
# Barnsley

# Energy Statement

BWB

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# Dearne Valley Parkway,

# Barnsley

# Energy Statement

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# EXECUTIVE SUMMARY

This Energy Statement has been produced in support of a Full Planning Application for the proposed 3No. Industrial units and associated external works at Dearne Valley Parkway, Barnsley in accordance with Barnsley Metropolitan Borough Council's Local Plan (2019) Policies CC1 (climate change) and CC2 (sustainable design and construction).

This Energy Statement outlines the energy and carbon strategy for the proposed development at Dearne Valley Parkway, Barnsley. The proposed development will adopt the use of an energy hierarchy and a holistic approach to sustainability in order to meet current National best practice guidance/standards and Barnsley Council's objectives for energy, carbon dioxide and the adaptability to the likely effects of Climate Change.

This Energy Statement proposes to reduce the regulated carbon dioxide emissions of the proposed development by a total of 7.38% through efficient building design (be lean) when compared with Building Regulations Part L TER Baseline (**Figure 1**). This exceeds Barnsley Council's planning policy requirements when compared to Building Regulations Approved Document (TER) Part L2A 2013, and is in line with requirements for achieving a BREEAM scoring of Very Good.

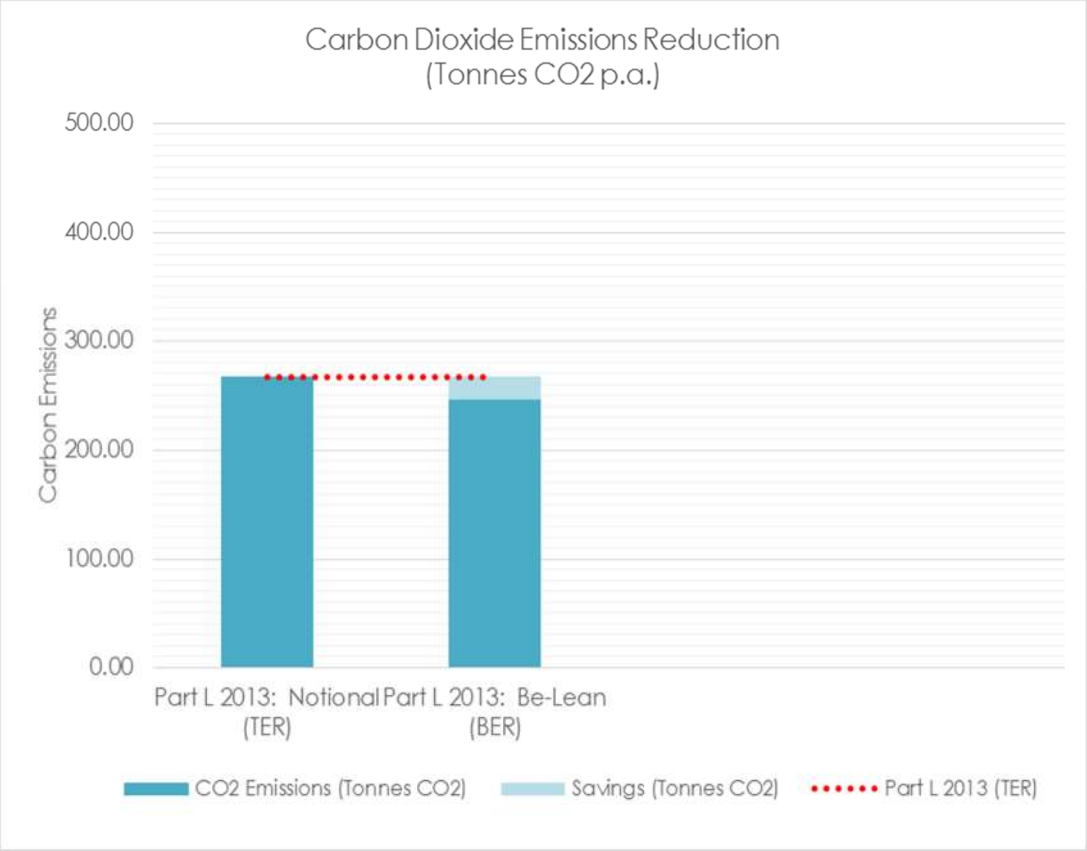


***Figure 1: Proposed Development Regulated Carbon Dioxide Emissions***

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# 1. INTRODUCTION

1.1 BWB Consulting Limited (BWB) was instructed by Greggory Properties (the Client) to carry out an Energy Statement in support of a Full Planning Application for the proposed 3No. Industrial units and associated external works at Dearne Valley Parkway, Barnsley.

## Development Description

1.2 The proposed development (**Figure 2**) consists of three industrial shell and core type units. Each unit is provided with a core comprising reception, circulation area, toilets, and an office area. The warehouse area shall be shell only for fit-out by the future occupier. The proposed development has a total floor area of 141,750 sq. ft.

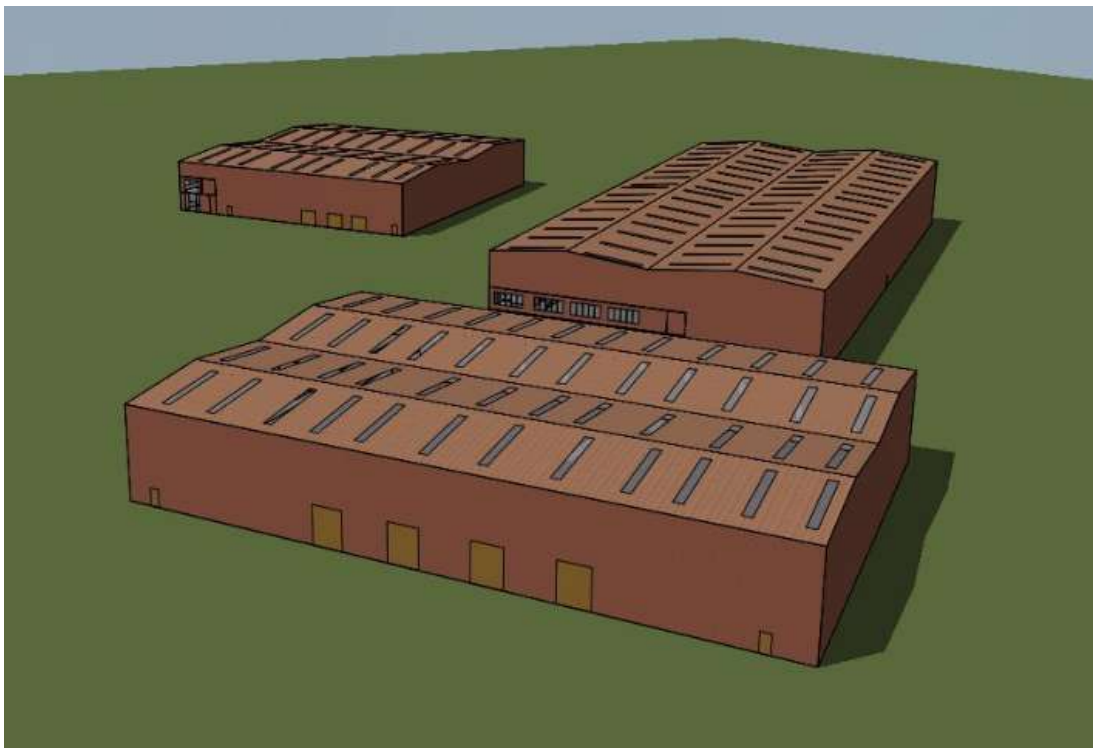

***Figure 2: Proposed development modelled in IES VE for analysis***

## Purpose of the document

1.3 The purpose of this Energy Statement is to demonstrate that the scheme's design is compliant with local planning policy and that the proposed measures are appropriate to the site environment and energy demands of the development.

1.4 This document will describe the policy context to which the Energy and Sustainability Statement responds before presenting the baseline energy and carbon dioxide emissions and demonstrating how it is proposed to reduce these through a lean energy efficient design.

1.5 This document also identifies and highlight the key sustainable practices to be incorporated into the design and construction of the development in accordance with the current national best practice, regional and local policy guidance.

## Modelling Methodology (Apache DSM)

1.6 Energy models using ApacheSim Dynamic Simulation Modelling (DSM) National Calculation Methodology (NCM) have been produced to predict the energy demands and carbon dioxide emissions from the proposed development.

1.7 DSM is one of the Government adopted methodology for calculating the energy performance of non-domestic buildings within the UK. Unlike SBEM (Simplified Building Energy Model), DSM is a much more accurate tool providing full annual simulation performed multiple times per hour using real hourly weather data.

1.8 Performing the DSM calculation involves creating a three-dimensional model of the proposed non-domestic development (**Figure 2**) and then populating the model with the fabric and services specification.

1.9 The DSM calculation is then run to simulate the proposed development energy consumption and resultant carbon dioxide emissions due to the predicted operation of the development over a typical year.

1.10 The DSM calculations have been performed to inform this Energy and Sustainability Statement and to produce the most accurate estimate of the site energy demands and carbon dioxide emissions.

1.11 The baseline regulated energy and $CO_2$ emissions are equivalent to the Building Regulations Approved Document Part L 2013 worst allowable Target Emissions Rate (TER) calculated within the DSM assessments of the proposed development.

## Information Used

1.12 The analysis detailed in this report is based on below architectural drawings and document provided in correspondence with The Harris Partnership Architects:

i. 15315 – (P)111J Site Plan-500
ii. 15315-(P)120 Unit 1 GA
iii. 15315-(P)121 Unit 1 Elevations
iv. 15315-(P)122 Unit 1 Elevations
v. 15315-(P)123 Unit 1 Roof
vi. 15315-(P)125 Unit 2 GA
vii. 15315-(P)126 Unit 2 Elevations
viii. 15315-(P)128 Unit 2 Roof
ix. 15315-(P)130 Unit 3 GA
x. 15315-(P)131 Unit 3 Elevations
xi. 15315-(P)132 Unit 3 Elevations
xii. 15315-(P)133 Unit 3 Roof

# 2. POLICY BACKGROUND

## Introduction

2.1 This section of the Energy and Sustainability Statement reviews relevant policy at the national, regional and local levels and then discusses key issues for the Statement.

## Directive 2009/28/EC

2.2 The Directive 2009/28/EC of the European Parliament and of the Council on renewable energy, implemented by Member States by December 2010, sets ambitious targets for all Member States.

2.3 The directive, which amends and repeals earlier Directives 2001/77/EC and 2003/30/EC, creates a common set of rules for the use of renewable energy in the EU so as to limit greenhouse gas (GHG) emissions.

2.4 The European Union Renewable Energy Directive (Directive 2009/28/EC) sets an overall target for 20% of the energy consumed in the European Union to come from renewable sources by 2020. This overall target is divided by country, with the UK's target being 15% by 2020.

2.5 The UK's departure from the European Union may have major implications for future UK and EU climate policy. Although the UK Government has signalled its intention to stick to its existing carbon reduction commitments it remains to be seen how the withdrawal of the United Kingdom from the European Union (Brexit) may impact on this.

## UK Sustainable Development Strategy

2.6 In 2005, the government published an updated strategy for implementing sustainable development across the UK.

2.7 This strategy acts as an overarching document from which a range of specific policies and legislation was derived. Although published in 2005, the strategy has taken a recently renewed focus in light of the government's definition of Sustainable Development in the National Planning Policy Framework (NPPF).

2.8 One of the keys aims of this strategy is to recognise the threats of climate change and ensure that the UK develops a strategy to mitigate and adapt to this phenomenon.

2.9 The document established five key principles that will underpin the national sustainable development strategy:

xiii. Living within Environmental Limits;
xiv. Ensuring a Strong, Healthy and Just Society;
xv. Achieving a Sustainable Economy;
xvi. Promoting Good Governance; and
xvii. Using sound science responsibly

2.10 The strategy will be implemented at a national level through the development of more specific strategies at a government department or sector level.

2.11 With regards to planning and the built environment, this document set the basis for the development of plans and policies that promote development that mitigates and adapts to climate change.

### Climate Change Act

2.12 The Climate Change Act (2008) sets a legally binding target for reducing UK $CO_2$ emissions by least 80% on 1990 levels by 2050.

2.13 It established the Committee on Climate Change, which is responsible for setting binding interim carbon budgets for the Government over successive five-year periods.

2.14 The fourth carbon budget announced in 2011 sets a target for a 50% reduction in $CO_2$ equivalent emissions on 1990 levels by 2025. A fifth carbon budget was also announced in 2015 and sets a target for a 57% reduction in $CO_2$ equivalent emissions on 1990 levels. It covers the period of 2028-2032 and is consistent with the UK's international commitments.

### Building Regulations

2.15 Whilst not planning policy, the Building Regulations and specifically Approved Document Part L: Conservation of Fuel and Power has relevance to the requirements for energy efficiency and carbon emissions of new buildings.

2.16 The primary mechanism for reducing carbon emissions in new domestic and non-domestic development is progressive changes to Part L aiming to deliver zero carbon buildings.

2.17 On this basis, a minimum requirement for the reduction in carbon emissions to be delivered by new buildings' is set within the Building Regulations, with each update requiring lower carbon emissions than the previous version to achieve compliance.

2.18 The latest update in 2014 required non-residential development to achieve an aggregated 9% reduction in carbon emissions over the 2010 Regulations.

2.19 This latest change aims to strike a balance between the commitment to reducing carbon emissions and improving energy efficiency and ensuring that the overall effect of regulation does not stifle growth.

2.20 These changing national regulations will drive energy efficiency and carbon reduction improvements in new buildings. The government has stated that developers will continue to have flexibility in how they meet carbon reduction targets; but that the emphasis is on using a fabric first approach.

## National Planning Policy Framework

2.21 The National Planning Policy Framework (NPPF) published 2012 and as revised from time to time sets out the Government's planning policies for England and how these should be applied. The NPPF introduced the presumption in favour of sustainable development. It states that:

> "The purpose of the planning system is to contribute to the achievement of sustainable development. At a very high level, the objective of sustainable development can be summarised as meeting the needs of the present without compromising the ability of future generations to meet their own needs.
>
> Achieving sustainable development means that the planning system has three overarching objectives, which are interdependent and need to be pursued in mutually supportive ways (so that opportunities can be taken to secure net gains across each of the different objectives):
>
> i. an economic objective: to help build a strong, responsive and competitive economy, by ensuring that sufficient land of the right types is available in the right places and at the right time to support growth, innovation and improved productivity; and by identifying and coordinating the provision of infrastructure;
>
> ii. a social objective: to support strong, vibrant and healthy communities, by ensuring that a sufficient number and range of homes can be provided to meet the needs of present and future generations; and by fostering a well-designed and safe built environment, with accessible services and open spaces that reflect current and future needs and support communities' health, social and cultural well-being; and
>
> iii. an environmental objective: to contribute to protecting and enhancing our natural, built and historic environment; including making effective use of land, helping to improve biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy."

2.22 The NPPF supports the transition to a low carbon future in a changing climate, taking full account of flood risk and coastal change. It should help to: shape places in ways that contribute to radical reductions in greenhouse gas emissions, minimise vulnerability and improve resilience; encourage the reuse of existing resources, including the conversion of existing buildings; and support renewable and low carbon energy and associated infrastructure.

2.23 For the NPPF to support the move to a low carbon future, the local planning authorities should ensure new development are planned for in ways that:

i. Avoid increased vulnerability to the range of impacts arising from climate change. When new development is brought forward in areas which are vulnerable, care should be taken to ensure that risks can be managed through suitable adaptation measures, including through the planning of green infrastructure; and
ii. Can help to reduce greenhouse gas emissions, such as through its location, orientation and design. Any local requirements for the sustainability of buildings should reflect the Government's policy for national technical standards.

2.24 For the NPPF to support the move to a low carbon future, the local planning authorities should ensure new development are planned to help increase the use and supply of renewable and low carbon energy and heat by:

i. Provide a positive strategy for energy from these sources, that maximises the potential for suitable development, while ensuring that adverse impacts are addressed satisfactorily (including cumulative landscape and visual impacts);
ii. Consider identifying suitable areas for renewable and low carbon energy sources, and supporting infrastructure, where this would help secure their development; and
iii. Identify opportunities for development to draw its energy supply from decentralised, renewable or low carbon energy supply.

2.25 For the NPPF to support the move to a low carbon future, the local planning authorities should ensure new development:

i. Comply with any development plan policies on local requirements for decentralised energy supply unless it can be demonstrated by the applicant, having regard to the type of development involved and its design, that this is not feasible or viable); and
ii. Take account of landform, layout, building orientation, massing and landscaping to minimise energy consumption; and

2.26 The key focus of the NPPF is to support local and regional planning authorities.

## Planning Policy Guidance (The Guidance)

2.27 The National Planning Practice Guidance (NPPG) published 2012 and as revised from time to time provides further advice on various planning issues associated with development, including those linked to sustainability and renewable energy and underpins the policies within the NPPF.

2.28 The Guidance states that the distribution and design of new development, and the potential for servicing sites through sustainable transport solutions, are particularly important considerations and that good design is an integral part of sustainable development to deliver a wide range of planning objectives.

## Barnsley Local Plan (2019)

2.29 Barnsley's Local Plan provides local planning policies for the future development of Barnsley up to the year 2033.

2.30 The Local Plan sets out the key elements of the planning framework for Barnsley, and the approach to its long term physical development to achieve the Council's vision of what sort of place Barnsley wants to become. Within the Local Plan the polices relating to energy and sustainability are as followed:

i. Policy CC1 Climate Change
ii. Policy CC2 Sustainable Design and Construction
iii. Policy RE1 Low Carbon and Renewable Energy

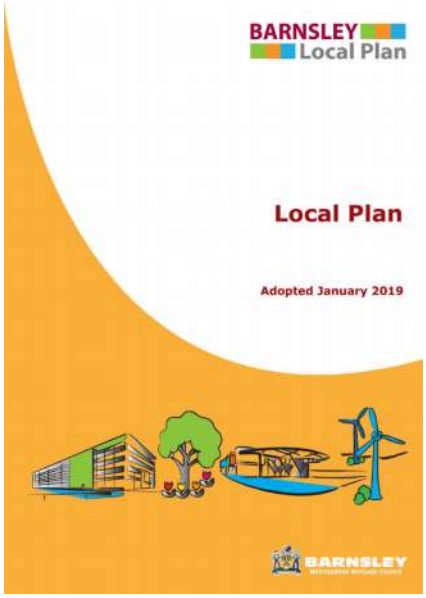


***Figure 3: Barnsley Local Plan (2019)***

## Policy CC1 - Climate Change

2.31 Policy CC1 seeks to reduce the causes of and adapt to the future impacts of climate change by:

iv. Giving preference to development of previously developed land in sustainable locations;
v. Promoting the reduction of greenhouse gas emissions through sustainable design and construction techniques;
vi. Locating and designing development to reduce the risk of flooding;
vii. Promoting the use of Sustainable Drainage Systems (SuDS);
viii. Promoting and supporting the delivery of renewable and low carbon energy; and
ix. Promoting investment in Green Infrastructure to promote and encourage biodiversity gain.

## Policy CC2 - Sustainable Design and Construction

2.32 Policy CC2 aims to minimise resource and energy consumption through the inclusion of sustainable design and construction.

2.33 All non-residential development will be expected, to achieve a minimum standard of BREEAM 'Very Good' (or any future national equivalent). This should be supported by preliminary assessments at planning application stage.

2.34 Development proposals will be expected to consider energy efficiency and sustainable design from the outset and will be required to include details of their sustainability within their Design and Access Statement.

2.35 For housing development energy efficiency is regulated by Building Regulations. We will encourage energy efficiency that exceeds those minimum standards set out in national standards and take that into account where proposed in support of a planning application.

2.36 We will use the BREEAM (British Research Establishment Assessment Method) to measure the environmental performance of all non-domestic buildings. As well as energy use and the emissions generated BREEAM deals with water use, materials and waste management, land use and ecology, pollution, health and well-being and transport.

2.37 We will encourage and plan for sustainable decentralised zero or low carbon energy generation, such as biomass-fuelled district heating or combined heat and power (CHP) schemes. Where a heat network is not available or viable, a contribution ensuring connection to a future district heating scheme is required on suitable developments. Developments not connected and unsuitable for future connection to a heat network will rely on energy generated from renewables, like solar panels, photovoltaics and heat pumps.

Policy RE1 - Low Carbon and Renewable Energy

2.38 All developments will be expected to seek to incorporate initially appropriate design measures, and thereafter decentralised, renewable or low carbon energy sources in order to reduce carbon dioxide emissions and should at least achieve the appropriate carbon compliance targets as defined in the Building Regulations.

2.39 We will allow development that produces renewable energy as long as there is no material harm upon:

x. The character of the landscape and appearance of the area;
xi. Living conditions;
xii. Biodiversity, Geodiversity and water quality;
xiii. Heritage assets, their settings and cultural features and areas;
xiv. Key views of, from or to scenic landmarks or landscape features;
xv. Highway safety, or
xvi. Infrastructure including radar.

2.40 In assessing effect, we will consider appropriate mitigation which could reduce harm to an acceptable level.

2.41 Proposals will be expected to include information regarding their efficiency.

2.42 Proposals must be accompanied by information that shows how the local environment will be protected, and that the site will be restored when production ends.

2.43 Taking into account the energy hierarchy, new buildings and conversions should in the first instance be designed and constructed to be energy efficient in particular through using the principles of passive design, including high insulation levels, solar heating, natural lighting and ventilation, thermal mass and passive cooling. Thereafter, decentralised, renewable or low carbon energy sources should be considered for use in order to reduce carbon dioxide emissions.

2.44 The domestic and industrial sectors are responsible for a majority of Barnsley's total emissions and this policy aims to create a framework that promotes and encourages a reduction in emissions.

2.45 The Council's energy strategy 2015-2025 sets out the low carbon goals for the borough. The wider use of renewable energy is a key component of the strategy which contains an ambition for 20% of the energy consumed by the borough to be derived from renewable sources by 2025.

2.46 In addition, our Housing Strategy 2014-2033 includes the Strategic Objective 'to ensure the design and delivery of new high quality, desirable and sustainable homes', and includes the key ambition 'to achieve 15% renewable energy on new build developments'

# 3. BASELINE: TARGET ENERGY & CARBON DIOXIDE EMISSIONS

3.1 The baseline energy demand and $CO_2$ emissions due to end-uses regulated by Building Regulations have been calculated using the National Calculation Methodology (NCM) ApacheSim Dynamic Simulation Modelling (DSM) 2013.

3.2 Unlike SBEM (Simplified Building Energy Model), DSM is a much more accurate tool providing full annual simulation performed multiple times per hour using real hourly weather data.

Baseline Energy and Carbon Dioxide Emissions (TER)

3.3 The baseline regulated energy and $CO_2$ emissions are equivalent to the Building Regulations Approved Document Part L worst allowable Target Emissions Rate (TER) calculated within the DSM assessments of the proposed development.

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

3.5 DSM calculations have been performed to generate energy demand and resultant carbon dioxide emissions for the proposed development. The results are then multiplied by the floor area of the development to give an estimate of the site-wide emissions / energy usage.

3.6 **Table 1** and **Table 2** shows the baseline energy demand and carbon dioxide emissions through regulated end uses, based on the notional Target Emission Rate (TER) from approved software.

***Table 1: Baseline Energy Demand (TER)***

| **BASELINE (TER): ENERGY DEMAND** | | |
|---|---|---|
| | Energy Demand (MWh/year) | Energy Demand Reduction (%) |
| Part L 2013 Baseline (TER) | 440.10 | |
| **TOTAL BASELINE (TER)** | **440.10** | |

***Table 2: Baseline Carbon Dioxide Emissions (TER)***

| **BASELINE (TER): CARBON DIOXIDE EMISSIONS** | | |
|---|---|---|
| | $CO_2$ Emissions (Tonnes/year) | $CO_2$ Emissions Reduction (%) |
| Part L 2013 Baseline (TER) | 266.56 | |
| **TOTAL BASELINE (TER)** | **266.56** | |

# 4. ENERGY AND $CO_2$ REDUCTION STRATEGY METHODOLOGY

4.1 The design of the proposed development at Dearne Valley Parkway, Barnsley has been developed to reduce its annual energy consumption, provide energy in an environmentally friendly way, and to minimise its annual $CO_2$ footprint.

4.2 To achieve this, the development will adopt an energy hierarchy (**Figure 4**) approach for carbon emissions reduction and sustainable design:

i. Use Less Energy (**Be Lean**); then
ii. Supply Energy Efficiently (**Be Clean**); and finally
iii. Use Renewable Energy (**Be Green**).

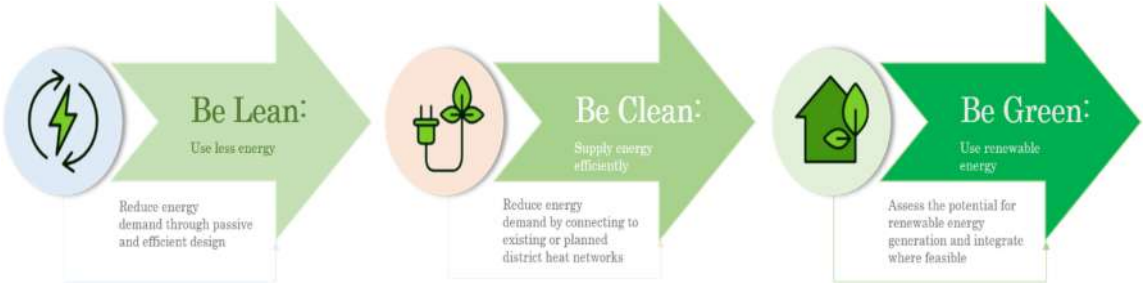


***Figure 4: Energy Hierarchy***

4.3 Energy saving measures following the Fabric First Approach is encouraged and is the basis of this scheme proposal. This will reduce energy demand and consequently the energy bills by investing in improving the building fabric's thermal properties and using efficient building services. This is often referred to as 'Be Lean'.

4.4 The fabric first approach provides protection against fluctuations in both gas and electricity supply tariffs by inherently reducing energy consumption and expands the number of suitable energy generation and delivery options.

4.5 Further improvements in building services, over and above the minimum requirements to comply with Building Regulations Part L, can reduce energy demand further and shall be described within the 'Be Clean' section. This includes identifying the proposed development site heat demand, investigating existing / planned decentralised energy and heat network, and the potential for a new heat district network as part of the proposed development works.

4.6 The use of renewable energy (be green) is not currently proposed to be researched, as the scheme meets with local planning policy guidance.

# 5. BE LEAN: ENERGY EFFICIENT DESIGN MEASURES

5.1 Energy demand and $CO_2$ reduction has been considered in three stages: layout and orientation; building fabric; and building services. The proposals to reduce energy at each of these stages are described within this section.

Layout and Orientation Analysis

5.2 The opportunities for orientation and layout of this site have been maximised. The offices are orientated such that the glazing shall be on either the north, north-east, north-west, west and south façade. These orientations are ideal for office areas as they provide an optimum balance between beneficial solar gains, diffuse/natural lighting whilst avoiding the risks of overheating (for example, via the entrance overhang feature).

5.3 Furthermore, the site is moderately sheltered by trees to the East (**Figure 5**). These are likely to provide minimal protection from winds, including prevailing winds, hence passively reducing the proposed development heating demand.

5.4 Shelter from wind is especially important in industrial warehouse buildings with vehicle access loading doors, as this can significantly reduce the ingress of cold external air when the loading doors are opened.


***Figure 5: Proposed Development Site Aerial Map (for illustration purpose only)***

5.5 It is also proposed that the warehouse areas shall have roof lights in order to maximise the availability of natural daylight. This strategy will help reduce the demand for artificial lighting and saves energy. It will also help to create a visually stimulating and productive environment for building occupants.

## Building Fabric Analysis

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

5.7 To meet Building Regulations Approved Document Part L2A, the development shall be well insulated with measures taken to achieve a high degree of air tightness.

5.8 The development fabric elements making up the envelope shall be specified to exceed the minimum standards set in Part L2A to ensure energy consumption via space heating is reduced.

5.9 **Table 3** shows the proposed level of performance in comparison with the worst allowable standards for each element.

***Table 3: Proposed Fabric Specification***

| Element | Proposed U-values | Worst Allowable U-values | Percentage Improvement (%) |
|---|---|---|---|
| Ground Floor | 0.22 W/m$^2$.K | 0.25 W/m$^2$.K | 12.00 % |
| External Wall | 0.24 W/m$^2$.K | 0.35 W/m$^2$.K | 31.43 % |
| Roof | 0.17 W/m$^2$.K | 0.25 W/m$^2$.K | 32.00 % |
| Glazed Window/Door | 1.40 W/m$^2$.K | 2.20 W/m$^2$.K | 36.00 % |
| Rooflights | 1.80 W/m$^2$.K | 2.20 W/m$^2$.K | 18.00 % |
| Pedestrian Door | 1.60 W/m$^2$.K | 2.20 W/m$^2$.K | 27.00 % |
| Vehicle Access Door | 1.50 W/m$^2$.K | 1.50 W/m$^2$.K | 0 % |
| Air Permeability | 4.00 m$^3$/(hr.m$^2$) | 10.00 m$^3$/(hr.m$^2$) | 60.00 % |

5.10 Light and Solar Transmittance are factors that measure the amount of light and solar energy that pass through glazed openings. They are important as they affect the control of solar gains and availability of natural light into the building.

5.11 **Table 4** shows the proposed light and solar transmittance values recommended for the proposed development.

***Table 4: Proposed Light and Solar Transmittance values***

| Element | Description/ Notes | Proposed Solar Transmittance | Proposed Light Transmission |
|---|---|---|---|
| Glazed Window/Door | Double-glazing specification | 0.40 | 0.71 |

5.12 In addition to the proposed development improved envelope u-values, a key area of construction which could result in a significant reduction in heating demand are junction details where two elements of the development envelop meet (thermal bridging).

5.13 The proposed development has been modelled using ApacheSim Dynamic Simulation Modelling (DSM). For DSM software, the non-repeating thermal bridge [Psi (Ψ)] heat losses for each element (including windows etc) is automatically allowed for by adding 10% to the standard area weighted average U-values – this is consistently applied to both Actual and Notional building.

5.14 Consequently, for the proposed development DSM analysis, an additional 10% heat loss is automatically added to make an allowance for the extra conduction via non-repeating thermal bridges. As such, an Alpha value of 10% in the Technical Data Sheet within the BRUKL document can be observed. Consequently, It is recommended that the details between different envelope elements should be carefully designed/constructed in order to maintain continuity of insulation.

Building Services Analysis

5.15 The following services are assumed for the proposed development in order to reduce energy consumption through energy efficient equipment and services strategy (lean scenario).

Space Heating:

5.16 Space heating to the office and reception area (core area) in the 'lean scenario' (for comparison) is provided via a system boiler with a seasonal efficiency of 94%.

5.17 In order to further reduce the energy demand, all heating system would be provided with central time, local time and local temperature control.

5.18 The calculation assumes space heating shall also be provided to the warehouse area (shell) via Radiant Heater with a heating efficiency of 86% and a radiant efficiency of 55% in accordance with the Non-domestic building services compliance guide (NDBSCG); one of the advantages of this system is that duct instalments which would otherwise need to be cleaned and maintained is avoided.

Domestic Hot Water:

5.19 Domestic hot water to the core areas of the building is assumed to be supplied by the gas fired combi boiler serving the core area heating, set at 94% efficient.

5.20 Domestic hot water to the warehouse area (shell) is assumed to be provided via an instantaneous electric water heater in accordance with the NDBSCG.

Ventilation:

5.21 Ventilation to the office areas are provided via a mechanical ventilation with 85.00% efficient heat recovery.

5.22 Such mechanical ventilation with heat recovery (MVHR) system can significantly reduce the winter heat demand by pre-heating supply air with extract air. The system shall therefore be selected to have a specific fan power (SFP) of no greater than 1.50 W/(l/s).

5.23 Extract ventilation to the WCs area shall be selected to have a specific fan power (SFP) of no greater than 0.40 W/(l/s) with an air change rate of 10ac.h assumed.

Lighting:

5.24 All areas within the proposed development are proposed to be served by energy efficient LED lightings.

5.25 Lighting to the office areas are proposed to be served by LED lightings with efficacy of no less than 120 lumens per circuit Watt.

5.26 Lighting to the reception areas are proposed to be served by LED lightings with efficacy of no less than 120 lumens per circuit Watt.

5.27 Lighting to the WCs and circulation areas are proposed to be served by LED lightings with efficacy of no less than 90 lumens per circuit Watt.

5.28 Lighting to the lifts and warehouse area (shell) are proposed to be served by LED lightings with efficacy of no less than 60 lumens per circuit Watt in accordance with the NDBSCG.

5.29 It is proposed that lighting to the office areas shall be provided with photoelectric dimming and PIR (passive infra-red) sensors to provide auto-on-off control with a parasitic power of no greater than 0.10 W/$m^2$. This is to ensure that artificial lightings shall not be fully utilised when there is sufficient natural light or space is unoccupied.

5.30 It is proposed that lighting to the reception areas shall be provided with dimmable control gear (i.e. photoelectric dimming sensors) with a parasitic power of no greater than 0.10 W/$m^2$. This is to ensure that artificial lightings shall not be fully utilised when there is sufficient natural light.

5.31 It is proposed that lighting to the WCs, and circulation areas shall be provided with PIR (passive infra-red) sensors to provide auto on-off control with a parasitic power of no greater than 0.10 W/$m^2$. This is to ensure that artificial lightings shall not be utilised when spaces are unoccupied.

5.32 It is assumed that lighting to the warehouse area (shell) shall be provided with photoelectric dimming and PIR (passive infra-red) sensors to provide auto-on-off control. This is to ensure that artificial lightings shall not be fully utilised when there is sufficient natural light or space is unoccupied in accordance with the NDBSCG.

Metering:

5.33 It is assumed that all proposed services shall be fitted with metering (i.e. provision for metering) which will communicate meaningful information, enabling the building occupier to address and adjust the system to satisfy the requirements of paragraph 2.47 and 2.48 of Approved Document Part L2A (ADL2A).

5.34 A power factor correction device can adjust the wavelength of the electricity supply to ensure that minimal electrical energy is wasted within the building. However, no power factor correction system has been assumed/proposed.

## Be Lean (Energy Efficiency) Measures Results

5.35 **Table 5** and **6** shows the reduction in energy and $CO_2$ emissions due to the energy efficiency measures, and this is compared with the baseline energy and $CO_2$ emissions. Refer to **Appendix 1** for the BRUKL documents.

5.36 As the Be Lean results identify, Building Regulations and local planning policies are met through the introduction of these measures. No further betterment than compliance with Building Regulations and the energy efficiency measures required to achieve BREEAM Very Good are proposed.

***Table 5: Be-Lean (Energy Efficiency) Energy Demand (BER)***

| **BE-LEAN (BER): ENERGY DEMAND** | | |
|---|---|---|
| | Energy Demand (MWh/year) | Energy Demand Reduction (%) |
| Part L 2013 Baseline (TER) | 440.10 | |
| **Part L 2013 Be-Lean (BER)** | **324.51** | **26.26%** |

***Table 6: Be-Lean (Energy Efficiency) Carbon Dioxide Emissions (BER)***

| **BE-LEAN (BER): CARBON DIOXIDE EMISSIONS** | | |
|---|---|---|
| | $CO_2$ Emissions (Tonnes/year) | $CO_2$ Emissions Reduction (%) |
| Part L 2013 Baseline (TER) | 266.56 | |
| **Part L 2013 Be-Lean (BER)** | **246.89** | **7.38%** |

## Climate Change Adaptation: Overheating

5.37 Through energy efficiency measures such as solar control glazing with low g-value, the risk of summer overheating is minimised.

5.38 Non-domestic buildings under Part L of the Building Regulations assesses overheating by performing a limiting solar gain check. That is, the amount of solar gain experienced through a buildings glazing is compared to that of a 'notional' building. If the proposed building is lower, then it passes this criterion and if it is higher, it fails.

5.39 Whilst the amount of glazing proposed to each unit's reception is anticipated to be slightly higher than the notional, each tested SBEM model identifies a low risk of overheating.

# 6. CONCLUSION

6.1 This Energy Statement has been produced in support of a Full Planning Application for the proposed 3No. Industrial units and associated external works at Dearne Valley Parkway, Barnsley in accordance with Barnsley Metropolitan Borough Council's Local Plan (2019) Policies CC1 (climate change) and CC2 (sustainable design and construction).

6.2 In order to accurately assess the energy demands and carbon dioxide emissions of the proposed development, DSM calculations have been performed.

6.3 This Energy Statement outlines the energy and carbon strategy for the proposed development at Dearne Valley Parkway, Barnsley. The proposed development will adopt the use of an energy hierarchy and a holistic approach to sustainability in order to meet current National best practice guidance/standards and Barnsley Council's objectives for energy, carbon dioxide and the adaptability to the likely effects of Climate Change.

6.4 The proposed development energy efficient measures include the specification of building envelope and services in excess of the minimum standards stipulated in Part L2A and the Non-Domestic Building Services Compliance Guide. This is to ensure carbon dioxide emissions is reduced via a 'fabric first' approach and the integration of highly efficient building services system.

6.5 This Energy Statement proposes to reduce the regulated carbon dioxide emissions of the proposed development by a total of 7.38% through efficient building design (be lean) when compared with Building Regulations Part L TER Baseline (Figure 1). This exceeds Barnsley Council's planning policy requirements when compared to Building Regulations Approved Document (TER) Part L2A 2013, and is in line with requirements for achieving a BREEAM scoring of Very Good.

# 7. APPENDICES

# APPENDIX 1: Be-Lean BRUKL's

# BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2013

**Project name** **Shell and Core**

## LDA2634 Barnsley Rockingham Junction - Unit 1 (Be Lean)

As designed

**Date:** Thu Mar 11 17:58:28 2021

## Administrative information

### Building Details

**Address:** Dearne Valley Parkway, Barnsley, Postcode

### Certification tool

**Calculation engine:** Apache

**Calculation engine version:** 7.0.13

**Interface to calculation engine:** IES Virtual Environment

**Interface to calculation engine version:** 7.0.13

**BRUKL compliance check version:** v5.6.b.0

### Certifier details

**Name:** Name

**Telephone number:** Phone

**Address:** Street Address, City, Postcode

## Criterion 1: The calculated $CO_2$ emission rate for the building must not exceed the target

| | |
|---|---|
| $CO_2$ emission rate from the notional building, $kgCO_2/m^2.annum$ | 18.5 |
| Target $CO_2$ emission rate (TER), $kgCO_2/m^2.annum$ | 18.5 |
| Building $CO_2$ emission rate (BER), $kgCO_2/m^2.annum$ | 17 |
| Are emissions from the building less than or equal to the target? | BER =< TER |
| Are as built details the same as used in the BER calculations? | Separate submission |

## Criterion 2: The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

**Values which do not achieve the standards in the Non-Domestic Building Services Compliance Guide and Part L are displayed in red.**

### Building fabric

| Element | $U_{a\text{-}Limit}$ | $U_{a\text{-}Calc}$ | $U_{i\text{-}Calc}$ | Surface where the maximum value occurs* |
|---|---|---|---|---|
| Wall** | 0.35 | 0.24 | 0.24 | SH000003:Surf[1] |
| Floor | 0.25 | 0.22 | 0.22 | SH000005:Surf[0] |
| Roof | 0.25 | 0.17 | 0.17 | WR000000:Surf[20] |
| Windows***, roof windows, and rooflights | 2.2 | 1.49 | 1.5 | WR000000:Surf[11] |
| Personnel doors | 2.2 | 1.6 | 1.6 | WR000000:Surf[0] |
| Vehicle access & similar large doors | 1.5 | 1.5 | 1.5 | WR000000:Surf[7] |
| High usage entrance doors | 3.5 | - | - | No High usage entrance doors in building |

$U_{a\text{-}Limit}$ = Limiting area-weighted average U-values [$W/(m^2K)$]
$U_{a\text{-}Calc}$ = Calculated area-weighted average U-values [$W/(m^2K)$] $U_{i\text{-}Calc}$ = Calculated maximum individual element U-values [$W/(m^2K)$]

* There might be more than one surface where the maximum U-value occurs.
** Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows.
*** Display windows and similar glazing are excluded from the U-value check.
N.B.: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.

| Air Permeability | Worst acceptable standard | This building |
|---|---|---|
| $m^3/(h.m^2)$ at 50 Pa | 10 | 4 |

## Building services

**The standard values listed below are minimum values for efficiencies and maximum values for SFPs. Refer to the Non-Domestic Building Services Compliance Guide for details.**

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

1- Office - Combi Boiler (NAT)

| | Heating efficiency | Cooling efficiency | Radiant efficiency | SFP [W/(l/s)] | HR efficiency |
|---|---|---|---|---|---|
| **This system** | 0.94 | - | 0.3 | 0 | - |
| **Standard value** | 0.91* | N/A | N/A | N/A | N/A |
| **Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system** | | | | | NO |
| * Standard shown is for gas single boiler systems <=2 MW output. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82. | | | | | |

2- Shell - Radiant Heater

| | Heating efficiency | Cooling efficiency | Radiant efficiency | SFP [W/(l/s)] | HR efficiency |
|---|---|---|---|---|---|
| **This system** | 0.86 | - | 0.55 | 0 | - |
| **Standard value** | 0.86 | N/A | 0.55 | N/A | N/A |
| **Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system** | | | | | NO |

3- Office - Combi Boiler (MVHR)

| | Heating efficiency | Cooling efficiency | Radiant efficiency | SFP [W/(l/s)] | HR efficiency |
|---|---|---|---|---|---|
| **This system** | 0.94 | - | 0.3 | 0 | 0.85 |
| **Standard value** | 0.91* | N/A | N/A | N/A | 0.5 |
| **Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system** | | | | | NO |
| * Standard shown is for gas single boiler systems <=2 MW output. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82. | | | | | |

1- INstantenous Hot Water

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

### Local mechanical ventilation, exhaust, and terminal units

| ID | System type in Non-domestic Building Services Compliance Guide |
|---|---|
| A | Local supply or extract ventilation units serving a single area |
| B | Zonal supply system where the fan is remote from the zone |
| C | Zonal extract system where the fan is remote from the zone |
| D | Zonal supply and extract ventilation units serving a single room or zone with heating and heat recovery |
| E | Local supply and extract ventilation system serving a single area with heating and heat recovery |
| F | Other local ventilation units |
| G | Fan-assisted terminal VAV unit |
| H | Fan coil units |
| I | Zonal extract system where the fan is remote from the zone with grease filter |

| Zone name | SFP [W/(l/s)] | | | | | | | | | HR efficiency | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **ID of system type** | **A** | **B** | **C** | **D** | **E** | **F** | **G** | **H** | **I** | | |
| **Standard value** | 0.3 | 1.1 | 0.5 | 1.9 | 1.6 | 0.5 | 1.1 | 0.5 | 1 | **Zone** | **Standard** |
| Unit 1 - GF - Disabled WC | - | - | 0.4 | - | - | - | - | - | - | - | N/A |
| Unit 1 - GF - WC | - | - | 0.4 | - | - | - | - | - | - | - | N/A |

| Zone name | SFP [W/(l/s)] | | | | | | | | | HR efficiency | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ID of system type | A | B | C | D | E | F | G | H | I | | |
| Standard value | 0.3 | 1.1 | 0.5 | 1.9 | 1.6 | 0.5 | 1.1 | 0.5 | 1 | Zone | Standard |
| Unit 1 - GF - WC | - | - | 0.4 | - | - | - | - | - | - | - | N/A |
| Unit 1 - FF - Open Plan Office | - | - | - | 1.5 | - | - | - | - | - | - | N/A |

**Shell and core configuration**

| Zone | Assumed shell? |
|---|---|
| Unit 1 - GF - Disabled WC | NO |
| Unit 1 - GF - Plantroom | NO |
| Unit 1 - GF - WC | NO |
| Unit 1 - GF - WC | NO |
| Unit 1 - GF - Cupboard | NO |
| Unit 1 - Warehouse Space | YES |
| Unit 1 - Lift | NO |
| Unit 1 - FF - Open Plan Office | NO |
| Unit 1 - GF - Reception | NO |
| Unit 1 - GF - Stairway | NO |
| Unit 1 - FF - Circulation Area | NO |
| Unit 1 - FF - Stairway | NO |

**General lighting and display lighting**

| Zone name | Luminous efficacy [lm/W] | | | |
|---|---|---|---|---|
| | Luminaire | Lamp | Display lamp | General lighting [W] |
| Standard value | 60 | 60 | 22 | |
| Unit 1 - GF - Disabled WC | - | 90 | - | 51 |
| Unit 1 - GF - Plantroom | 80 | - | - | 67 |
| Unit 1 - GF - WC | - | 90 | - | 25 |
| Unit 1 - GF - WC | - | 90 | - | 24 |
| Unit 1 - GF - Cupboard | 80 | - | - | 11 |
| Unit 1 - Warehouse Space | 60 | - | - | 26065 |
| Unit 1 - Lift | - | 60 | - | 22 |
| Unit 1 - FF - Open Plan Office | 120 | - | - | 809 |
| Unit 1 - GF - Reception | - | 120 | 120 | 141 |
| Unit 1 - GF - Stairway | - | 90 | - | 18 |
| Unit 1 - FF - Circulation Area | - | 90 | - | 31 |
| Unit 1 - FF - Stairway | - | 90 | - | 52 |

## Criterion 3: The spaces in the building should have appropriate passive control measures to limit solar gains

| Zone | Solar gain limit exceeded? (%) | Internal blinds used? |
|---|---|---|
| Unit 1 - Warehouse Space | NO (-19.1%) | NO |
| Unit 1 - FF - Open Plan Office | NO (-11.4%) | NO |
| Unit 1 - GF - Reception | NO (-32.8%) | NO |

## Criterion 4: The performance of the building, as built, should be consistent with the calculated BER

Separate submission

## Criterion 5: The necessary provisions for enabling energy-efficient operation of the building should be in place

Separate submission

## EPBD (Recast): Consideration of alternative energy systems

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

# Technical Data Sheet (Actual vs. Notional Building)

## Building Global Parameters

| | Actual | Notional |
|---|---|---|
| Area [$m^2$] | 3778.8 | 3778.8 |
| External area [$m^2$] | 9467.2 | 9467.2 |
| Weather | LEE | LEE |
| Infiltration [$m^3/hm^2$@ 50Pa] | 4 | 5 |
| Average conductance [W/K] | 2729.89 | 2982.42 |
| Average U-value [$W/m^2K$] | 0.29 | 0.32 |
| Alpha value* [%] | 17.6 | 10 |

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

## Building Use

| % Area | Building Type |
|---|---|
| | A1/A2 Retail/Financial and Professional services |
| | A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways |
| | B1 Offices and Workshop businesses |
| | B2 to B7 General Industrial and Special Industrial Groups |
| **100** | **B8 Storage or Distribution** |
| | C1 Hotels |
| | C2 Residential Institutions: Hospitals and Care Homes |
| | C2 Residential Institutions: Residential schools |
| | C2 Residential Institutions: Universities and colleges |
| | C2A Secure Residential Institutions |
| | Residential spaces |
| | D1 Non-residential Institutions: Community/Day Centre |
| | D1 Non-residential Institutions: Libraries, Museums, and Galleries |
| | D1 Non-residential Institutions: Education |
| | D1 Non-residential Institutions: Primary Health Care Building |
| | D1 Non-residential Institutions: Crown and County Courts |
| | D2 General Assembly and Leisure, Night Clubs, and Theatres |
| | Others: Passenger terminals |
| | Others: Emergency services |
| | Others: Miscellaneous 24hr activities |
| | Others: Car Parks 24 hrs |
| | Others: Stand alone utility block |

## Energy Consumption by End Use [$kWh/m^2$]

| | Actual | Notional |
|---|---|---|
| Heating | 33.23 | 37.86 |
| Cooling | 0 | 0 |
| Auxiliary | 0.49 | 0.32 |
| Lighting | 14.29 | 17.32 |
| Hot water | 4.21 | 4.6 |
| Equipment* | 30.56 | 30.56 |
| **TOTAL**** | **52.22** | **60.09** |

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

## Energy Production by Technology [$kWh/m^2$]

| | Actual | Notional |
|---|---|---|
| Photovoltaic systems | 0 | 0 |
| Wind turbines | 0 | 0 |
| CHP generators | 0 | 0 |
| Solar thermal systems | 0 | 0 |

## Energy & $CO_2$ Emissions Summary

| | Actual | Notional |
|---|---|---|
| Heating + cooling demand [$MJ/m^2$] | 96.26 | 117.51 |
| Primary energy* [$kWh/m^2$] | 98.37 | 104.07 |
| Total emissions [$kg/m^2$] | 17 | 18.5 |

* Primary energy is net of any electrical energy displaced by CHP generators, if applicable.

## HVAC Systems Performance

| System Type | | Heat dem MJ/m2 | Cool dem MJ/m2 | Heat con kWh/m2 | Cool con kWh/m2 | Aux con kWh/m2 | Heat SSEEF | Cool SSEER | Heat gen SEFF | Cool gen SEER |
|---|---|---|---|---|---|---|---|---|---|---|
| **[ST] Central heating using water: radiators, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity** | | | | | | | | | | |
| | **Actual** | 58.1 | 0 | 19.2 | 0 | 8.9 | 0.84 | 0 | 0.94 | 0 |
| | **Notional** | 72.2 | 0 | 23.3 | 0 | 4.8 | 0.86 | 0 | –– | –– |
| **[ST] Unflued radiant heater, [HS] Unflued radiant heater, [HFT] Natural Gas, [CFT] Electricity** | | | | | | | | | | |
| | **Actual** | 97.6 | 0 | 33.8 | 0 | 0 | 0.8 | 0 | 0.86 | 0 |
| | **Notional** | 119.5 | 0 | 38.5 | 0 | 0 | 0.86 | 0 | –– | –– |
| **[ST] Central heating using water: radiators, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity** | | | | | | | | | | |
| | **Actual** | 108 | 0 | 35.8 | 0 | 4.9 | 0.84 | 0 | 0.94 | 0 |
| | **Notional** | 118 | 0 | 38 | 0 | 4.6 | 0.86 | 0 | –– | –– |

### Key to terms

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

# Key Features

**The Building Control Body is advised to give particular attention to items whose specifications are better than typically expected.**

### Building fabric

| Element | $U_{i\text{-}Typ}$ | $U_{i\text{-}Min}$ | Surface where the minimum value occurs* |
|---|---|---|---|
| Wall | 0.23 | 0.24 | SH000003:Surf[1] |
| Floor | 0.2 | 0.22 | SH000005:Surf[0] |
| Roof | 0.15 | 0.17 | WR000000:Surf[20] |
| Windows, roof windows, and rooflights | 1.5 | 1.4 | FF000001:Surf[0] |
| Personnel doors | 1.5 | 1.6 | WR000000:Surf[0] |
| Vehicle access & similar large doors | 1.5 | 1.5 | WR000000:Surf[7] |
| High usage entrance doors | 1.5 | - | No High usage entrance doors in building |

$U_{i\text{-}Typ}$ = Typical individual element U-values [W/(m²K)] $U_{i\text{-}Min}$ = Minimum individual element U-values [W/(m²K)]

* There might be more than one surface where the minimum U-value occurs.

| Air Permeability | Typical value | This building |
|---|---|---|
| $m^3/(h.m^2)$ at 50 Pa | 5 | 4 |

# BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2013

**Project name** **Shell and Core**

## LDA2634 Barnsley Rockingham Junction - Unit 2 (Be Lean)

As designed

**Date:** Thu Mar 11 16:43:28 2021

## Administrative information

### Building Details

**Address:** Dearne Valley Parkway, Barnsley, Postcode

### Certification tool

**Calculation engine:** Apache

**Calculation engine version:** 7.0.13

**Interface to calculation engine:** IES Virtual Environment

**Interface to calculation engine version:** 7.0.13

**BRUKL compliance check version:** v5.6.b.0

### Certifier details

**Name:** Name

**Telephone number:** Phone

**Address:** Street Address, City, Postcode

## Criterion 1: The calculated $CO_2$ emission rate for the building must not exceed the target

| | |
|---|---|
| $CO_2$ emission rate from the notional building, $kgCO_2/m^2.annum$ | 18.9 |
| Target $CO_2$ emission rate (TER), $kgCO_2/m^2.annum$ | 18.9 |
| Building $CO_2$ emission rate (BER), $kgCO_2/m^2.annum$ | 17.6 |
| Are emissions from the building less than or equal to the target? | BER =< TER |
| Are as built details the same as used in the BER calculations? | Separate submission |

## Criterion 2: The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

**Values which do not achieve the standards in the Non-Domestic Building Services Compliance Guide and Part L are displayed in red.**

### Building fabric

| Element | $U_{a\text{-}Limit}$ | $U_{a\text{-}Calc}$ | $U_{i\text{-}Calc}$ | Surface where the maximum value occurs* |
|---|---|---|---|---|
| Wall** | 0.35 | 0.24 | 0.24 | NT000003:Surf[0] |
| Floor | 0.25 | 0.22 | 0.22 | NT000010:Surf[0] |
| Roof | 0.25 | 0.17 | 0.17 | RF000000:Surf[16] |
| Windows***, roof windows, and rooflights | 2.2 | 1.49 | 1.5 | RF000000:Surf[0] |
| Personnel doors | 2.2 | 1.6 | 1.6 | NT000010:Surf[1] |
| Vehicle access & similar large doors | 1.5 | 1.5 | 1.5 | RF000000:Surf[89] |
| High usage entrance doors | 3.5 | - | - | No High usage entrance doors in building |

$U_{a\text{-}Limit}$ = Limiting area-weighted average U-values [$W/(m^2K)$]
$U_{a\text{-}Calc}$ = Calculated area-weighted average U-values [$W/(m^2K)$]
$U_{i\text{-}Calc}$ = Calculated maximum individual element U-values [$W/(m^2K)$]

* There might be more than one surface where the maximum U-value occurs.
** Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows.
*** Display windows and similar glazing are excluded from the U-value check.
N.B.: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.

| Air Permeability | Worst acceptable standard | This building |
|---|---|---|
| $m^3/(h.m^2)$ at 50 Pa | 10 | 4 |

## Building services

**The standard values listed below are minimum values for efficiencies and maximum values for SFPs. Refer to the Non-Domestic Building Services Compliance Guide for details.**

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

1- Office - Combi Boiler (NAT)

| | Heating efficiency | Cooling efficiency | Radiant efficiency | SFP [W/(l/s)] | HR efficiency |
|---|---|---|---|---|---|
| **This system** | 0.94 | - | 0.3 | 0 | - |
| **Standard value** | 0.91* | N/A | N/A | N/A | N/A |
| **Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system** | | | | | NO |
| * Standard shown is for gas single boiler systems <=2 MW output. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82. | | | | | |

2- Office - Combi Boiler (MVHR)

| | Heating efficiency | Cooling efficiency | Radiant efficiency | SFP [W/(l/s)] | HR efficiency |
|---|---|---|---|---|---|
| **This system** | 0.94 | - | 0.3 | 0 | 0.85 |
| **Standard value** | 0.91* | N/A | N/A | N/A | 0.5 |
| **Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system** | | | | | NO |
| * Standard shown is for gas single boiler systems <=2 MW output. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82. | | | | | |

3- Shell - Radiant Heater

| | Heating efficiency | Cooling efficiency | Radiant efficiency | SFP [W/(l/s)] | HR efficiency |
|---|---|---|---|---|---|
| **This system** | 0.86 | - | 0.55 | 0 | - |
| **Standard value** | 0.86 | N/A | 0.55 | N/A | N/A |
| **Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system** | | | | | NO |

1- INstantenous Hot Water

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

## Local mechanical ventilation, exhaust, and terminal units

| ID | System type in Non-domestic Building Services Compliance Guide |
|---|---|
| A | Local supply or extract ventilation units serving a single area |
| B | Zonal supply system where the fan is remote from the zone |
| C | Zonal extract system where the fan is remote from the zone |
| D | Zonal supply and extract ventilation units serving a single room or zone with heating and heat recovery |
| E | Local supply and extract ventilation system serving a single area with heating and heat recovery |
| F | Other local ventilation units |
| G | Fan-assisted terminal VAV unit |
| H | Fan coil units |
| I | Zonal extract system where the fan is remote from the zone with grease filter |

| Zone name | SFP [W/(l/s)] | | | | | | | | | HR efficiency | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **ID of system type** | **A** | **B** | **C** | **D** | **E** | **F** | **G** | **H** | **I** | | |
| **Standard value** | 0.3 | 1.1 | 0.5 | 1.9 | 1.6 | 0.5 | 1.1 | 0.5 | 1 | **Zone** | **Standard** |
| Unit 2 - FF - Open Plan Office | - | - | - | 1.5 | - | - | - | - | - | - | N/A |

## Shell and core configuration

| Zone | Assumed shell? |
|---|---|
| Unit 2 - FF - Stairway | NO |

**Shell and core configuration**

| Zone | Assumed shell? |
|---|---|
| Unit 2 - GF - Stairway | NO |
| Unit 2 - GF - Cupboard | NO |
| Unit 2 - GF - Cupboard | NO |
| Unit 2 - GF - Plant Room | NO |
| Unit 2 - GF - Stairway | NO |
| Unit 2 - FF - Open Plan Office | NO |
| Unit 2 - FF - Stairways | NO |
| Unit 2 - Warehouse | YES |
| Unit 2 - FF - Circulation Area | NO |
| Unit 2 - Lift | NO |
| Unit 2 - GF - Reception | NO |
| Unit 2 - FF - Lift | NO |

**General lighting and display lighting**

| | Luminous efficacy [lm/W] | | | |
|---|---|---|---|---|
| Zone name | Luminaire | Lamp | Display lamp | General lighting [W] |
| Standard value | 60 | 60 | 22 | |
| Unit 2 - FF - Stairway | - | 80 | - | 48 |
| Unit 2 - GF - Stairway | - | 80 | - | 53 |
| Unit 2 - GF - Cupboard | 80 | - | - | 15 |
| Unit 2 - GF - Cupboard | - | 80 | - | 18 |
| Unit 2 - GF - Plant Room | 80 | - | - | 64 |
| Unit 2 - GF - Stairway | - | 80 | - | 26 |
| Unit 2 - FF - Open Plan Office | 120 | - | - | 1246 |
| Unit 2 - FF - Stairways | - | 80 | - | 49 |
| Unit 2 - Warehouse | 60 | - | - | 43549 |
| Unit 2 - FF - Circulation Area | - | 80 | - | 27 |
| Unit 2 - Lift | - | 60 | - | 22 |
| Unit 2 - GF - Reception | - | 120 | - | 58 |
| Unit 2 - FF - Lift | - | 60 | - | 77 |

## Criterion 3: The spaces in the building should have appropriate passive control measures to limit solar gains

| Zone | Solar gain limit exceeded? (%) | Internal blinds used? |
|---|---|---|
| Unit 2 - FF - Open Plan Office | NO (-21%) | NO |
| Unit 2 - Warehouse | NO (-28.4%) | NO |

## Criterion 4: The performance of the building, as built, should be consistent with the calculated BER

Separate submission

## Criterion 5: The necessary provisions for enabling energy-efficient operation of the building should be in place

Separate submission

## EPBD (Recast): Consideration of alternative energy systems

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

# Technical Data Sheet (Actual vs. Notional Building)

## Building Global Parameters

| | Actual | Notional |
|---|---|---|
| Area [$m^2$] | 6263.5 | 6263.5 |
| External area [$m^2$] | 15823.9 | 15823.9 |
| Weather | LEE | LEE |
| Infiltration [$m^3/hm^2$@ 50Pa] | 4 | 5 |
| Average conductance [W/K] | 4483.18 | 5011.27 |
| Average U-value [$W/m^2K$] | 0.28 | 0.32 |
| Alpha value* [%] | 16.69 | 10 |

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

## Building Use

| % Area | Building Type |
|---|---|
| | A1/A2 Retail/Financial and Professional services |
| | A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways |
| | B1 Offices and Workshop businesses |
| | B2 to B7 General Industrial and Special Industrial Groups |
| **100** | **B8 Storage or Distribution** |
| | C1 Hotels |
| | C2 Residential Institutions: Hospitals and Care Homes |
| | C2 Residential Institutions: Residential schools |
| | C2 Residential Institutions: Universities and colleges |
| | C2A Secure Residential Institutions |
| | Residential spaces |
| | D1 Non-residential Institutions: Community/Day Centre |
| | D1 Non-residential Institutions: Libraries, Museums, and Galleries |
| | D1 Non-residential Institutions: Education |
| | D1 Non-residential Institutions: Primary Health Care Building |
| | D1 Non-residential Institutions: Crown and County Courts |
| | D2 General Assembly and Leisure, Night Clubs, and Theatres |
| | Others: Passenger terminals |
| | Others: Emergency services |
| | Others: Miscellaneous 24hr activities |
| | Others: Car Parks 24 hrs |
| | Others: Stand alone utility block |

## Energy Consumption by End Use [$kWh/m^2$]

| | Actual | Notional |
|---|---|---|
| Heating | 34.17 | 40.65 |
| Cooling | 0 | 0 |
| Auxiliary | 0.4 | 0.21 |
| Lighting | 15.2 | 16.96 |
| Hot water | 4.19 | 4.58 |
| Equipment* | 30.32 | 30.32 |
| **TOTAL**** | **53.96** | **62.4** |

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

## Energy Production by Technology [$kWh/m^2$]

| | Actual | Notional |
|---|---|---|
| Photovoltaic systems | 0 | 0 |
| Wind turbines | 0 | 0 |
| CHP generators | 0 | 0 |
| Solar thermal systems | 0 | 0 |

## Energy & $CO_2$ Emissions Summary

| | Actual | Notional |
|---|---|---|
| Heating + cooling demand [$MJ/m^2$] | 98.93 | 126.17 |
| Primary energy* [$kWh/m^2$] | 102.07 | 106.06 |
| Total emissions [$kg/m^2$] | 17.6 | 18.9 |

* Primary energy is net of any electrical energy displaced by CHP generators, if applicable.

## HVAC Systems Performance

| System Type | | Heat dem MJ/m2 | Cool dem MJ/m2 | Heat con kWh/m2 | Cool con kWh/m2 | Aux con kWh/m2 | Heat SSEEF | Cool SSEER | Heat gen SEFF | Cool gen SEER |
|---|---|---|---|---|---|---|---|---|---|---|
| [ST] Central heating using water: radiators, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity | | | | | | | | | | |
| | Actual | 49 | 0 | 16.2 | 0 | 8.9 | 0.84 | 0 | 0.94 | 0 |
| | Notional | 63.8 | 0 | 20.6 | 0 | 4.8 | 0.86 | 0 | –– | –– |
| [ST] Unflued radiant heater, [HS] Unflued radiant heater, [HFT] Natural Gas, [CFT] Electricity | | | | | | | | | | |
| | Actual | 100.2 | 0 | 34.7 | 0 | 0 | 0.8 | 0 | 0.86 | 0 |
| | Notional | 128.1 | 0 | 41.3 | 0 | 0 | 0.86 | 0 | –– | –– |
| [ST] Central heating using water: radiators, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity | | | | | | | | | | |
| | Actual | 134.4 | 0 | 44.5 | 0 | 2.5 | 0.84 | 0 | 0.94 | 0 |
| | Notional | 158.5 | 0 | 51.1 | 0 | 1.2 | 0.86 | 0 | –– | –– |

### Key to terms

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

# Key Features

**The Building Control Body is advised to give particular attention to items whose specifications are better than typically expected.**

### Building fabric

| Element | $U_{i\text{-}Typ}$ | $U_{i\text{-}Min}$ | Surface where the minimum value occurs* |
|---|---|---|---|
| Wall | 0.23 | 0.24 | NT000003:Surf[0] |
| Floor | 0.2 | 0.22 | NT000010:Surf[0] |
| Roof | 0.15 | 0.17 | RF000000:Surf[16] |
| Windows, roof windows, and rooflights | 1.5 | 1.4 | NT00000E:Surf[1] |
| Personnel doors | 1.5 | 1.6 | NT000010:Surf[1] |
| Vehicle access & similar large doors | 1.5 | 1.5 | RF000000:Surf[89] |
| High usage entrance doors | 1.5 | - | No High usage entrance doors in building |

$U_{i\text{-}Typ}$ = Typical individual element U-values [W/(m²K)] $U_{i\text{-}Min}$ = Minimum individual element U-values [W/(m²K)]

* There might be more than one surface where the minimum U-value occurs.

| Air Permeability | Typical value | This building |
|---|---|---|
| $m^3/(h.m^2)$ at 50 Pa | 5 | 4 |

# BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2013

**Project name** **Shell and Core**

## LDA2634 Barnsley Rockingham Junction - Unit 3 (Be Lean)

As designed

**Date:** Thu Mar 11 16:41:30 2021

## Administrative information

### Building Details

**Address:** Dearne Valley Parkway, Barnsley, Postcode

### Certification tool

**Calculation engine:** Apache

**Calculation engine version:** 7.0.13

**Interface to calculation engine:** IES Virtual Environment

**Interface to calculation engine version:** 7.0.13

**BRUKL compliance check version:** v5.6.b.0

### Certifier details

**Name:** Name

**Telephone number:** Phone

**Address:** Street Address, City, Postcode

## Criterion 1: The calculated $CO_2$ emission rate for the building must not exceed the target

| | |
|---|---|
| $CO_2$ emission rate from the notional building, $kgCO_2/m^2.annum$ | 18.7 |
| Target $CO_2$ emission rate (TER), $kgCO_2/m^2.annum$ | 18.7 |
| Building $CO_2$ emission rate (BER), $kgCO_2/m^2.annum$ | 17.3 |
| Are emissions from the building less than or equal to the target? | BER =< TER |
| Are as built details the same as used in the BER calculations? | Separate submission |

## Criterion 2: The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

**Values which do not achieve the standards in the Non-Domestic Building Services Compliance Guide and Part L are displayed in red.**

### Building fabric

| Element | $U_{a\text{-}Limit}$ | $U_{a\text{-}Calc}$ | $U_{i\text{-}Calc}$ | Surface where the maximum value occurs* |
|---|---|---|---|---|
| Wall** | 0.35 | 0.24 | 0.24 | NT000006:Surf[1] |
| Floor | 0.25 | 0.22 | 0.22 | NT000006:Surf[0] |
| Roof | 0.25 | 0.17 | 0.17 | RF000001:Surf[12] |
| Windows***, roof windows, and rooflights | 2.2 | 1.49 | 1.5 | RF000001:Surf[0] |
| Personnel doors | 2.2 | 1.6 | 1.6 | RF000001:Surf[57] |
| Vehicle access & similar large doors | 1.5 | 1.5 | 1.5 | RF000001:Surf[53] |
| High usage entrance doors | 3.5 | - | - | No High usage entrance doors in building |

$U_{a\text{-}Limit}$ = Limiting area-weighted average U-values [$W/(m^2K)$]
$U_{a\text{-}Calc}$ = Calculated area-weighted average U-values [$W/(m^2K)$] $U_{i\text{-}Calc}$ = Calculated maximum individual element U-values [$W/(m^2K)$]

* There might be more than one surface where the maximum U-value occurs.
** Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows.
*** Display windows and similar glazing are excluded from the U-value check.
N.B.: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.

| Air Permeability | Worst acceptable standard | This building |
|---|---|---|
| $m^3/(h.m^2)$ at 50 Pa | 10 | 4 |

## Building services

**The standard values listed below are minimum values for efficiencies and maximum values for SFPs. Refer to the Non-Domestic Building Services Compliance Guide for details.**

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

1- Office - Combi Boiler (NAT)

| | Heating efficiency | Cooling efficiency | Radiant efficiency | SFP [W/(l/s)] | HR efficiency |
|---|---|---|---|---|---|
| **This system** | 0.94 | - | 0.3 | 0 | - |
| **Standard value** | 0.91* | N/A | N/A | N/A | N/A |
| **Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system** | | | | | NO |
| * Standard shown is for gas single boiler systems <=2 MW output. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82. | | | | | |

2- Office - Combi Boiler (MVHR)

| | Heating efficiency | Cooling efficiency | Radiant efficiency | SFP [W/(l/s)] | HR efficiency |
|---|---|---|---|---|---|
| **This system** | 0.94 | - | 0.3 | 0 | 0.85 |
| **Standard value** | 0.91* | N/A | N/A | N/A | 0.5 |
| **Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system** | | | | | NO |
| * Standard shown is for gas single boiler systems <=2 MW output. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82. | | | | | |

3- Shell - Radiant Heater

| | Heating efficiency | Cooling efficiency | Radiant efficiency | SFP [W/(l/s)] | HR efficiency |
|---|---|---|---|---|---|
| **This system** | 0.86 | - | 0.55 | 0 | - |
| **Standard value** | 0.86 | N/A | 0.55 | N/A | N/A |
| **Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system** | | | | | NO |

1- INstantenous Hot Water

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

### Local mechanical ventilation, exhaust, and terminal units

| ID | System type in Non-domestic Building Services Compliance Guide |
|---|---|
| A | Local supply or extract ventilation units serving a single area |
| B | Zonal supply system where the fan is remote from the zone |
| C | Zonal extract system where the fan is remote from the zone |
| D | Zonal supply and extract ventilation units serving a single room or zone with heating and heat recovery |
| E | Local supply and extract ventilation system serving a single area with heating and heat recovery |
| F | Other local ventilation units |
| G | Fan-assisted terminal VAV unit |
| H | Fan coil units |
| I | Zonal extract system where the fan is remote from the zone with grease filter |

| Zone name | SFP [W/(l/s)] | | | | | | | | | HR efficiency | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **ID of system type** | **A** | **B** | **C** | **D** | **E** | **F** | **G** | **H** | **I** | | |
| **Standard value** | 0.3 | 1.1 | 0.5 | 1.9 | 1.6 | 0.5 | 1.1 | 0.5 | 1 | **Zone** | **Standard** |
| Unit 3 - GF - WC | - | - | 0.4 | - | - | - | - | - | - | - | N/A |
| Unit 3 - FF - Open Plan Office | - | - | - | 1.5 | - | - | - | - | - | - | N/A |

**Shell and core configuration**

| Zone | Assumed shell? |
|---|---|
| Unit 3- GF - Cupboard | NO |
| Unit 3 - GF - Cupboard | NO |
| Unit 3 - GF - WC | NO |
| Unit 3 - GF - Plant Room | NO |
| Unit 3 - FF - Open Plan Office | NO |
| Unit 3 - FF - Circulation Area | NO |
| Unit 3 - FF Stairway | NO |
| Unit 3 - Warehouse | YES |
| Unit 3 - GF - Reception | NO |
| Unit 3 - GF - Stairway | NO |
| Unit 3 - Lift | NO |

**General lighting and display lighting**

| | Luminous efficacy [lm/W] | | | |
|---|---|---|---|---|
| **Zone name** | **Luminaire** | **Lamp** | **Display lamp** | **General lighting [W]** |
| **Standard value** | 60 | 60 | 22 | |
| Unit 3- GF - Cupboard | 80 | - | - | 15 |
| Unit 3 - GF - Cupboard | 80 | - | - | 9 |
| Unit 3 - GF - WC | - | 90 | - | 74 |
| Unit 3 - GF - Plant Room | 80 | - | - | 69 |
| Unit 3 - FF - Open Plan Office | 120 | - | - | 888 |
| Unit 3 - FF - Circulation Area | - | 90 | - | 24 |
| Unit 3 - FF Stairway | - | 90 | - | 44 |
| Unit 3 - Warehouse | 60 | - | - | 28970 |
| Unit 3 - GF - Reception | - | 120 | 120 | 118 |
| Unit 3 - GF - Stairway | - | 90 | - | 23 |
| Unit 3 - Lift | - | 60 | - | 22 |

## Criterion 3: The spaces in the building should have appropriate passive control measures to limit solar gains

| Zone | Solar gain limit exceeded? (%) | Internal blinds used? |
|---|---|---|
| Unit 3 - FF - Open Plan Office | NO (-43.4%) | NO |
| Unit 3 - Warehouse | NO (-20%) | NO |
| Unit 3 - GF - Reception | NO (-10.6%) | NO |

## Criterion 4: The performance of the building, as built, should be consistent with the calculated BER

Separate submission

## Criterion 5: The necessary provisions for enabling energy-efficient operation of the building should be in place

Separate submission

## EPBD (Recast): Consideration of alternative energy systems

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

# Technical Data Sheet (Actual vs. Notional Building)

## Building Global Parameters

| | Actual | Notional |
|---|---|---|
| Area [$m^2$] | 4185.7 | 4185.7 |
| External area [$m^2$] | 10520.4 | 10520.4 |
| Weather | LEE | LEE |
| Infiltration [$m^3/hm^2$@ 50Pa] | 4 | 5 |
| Average conductance [W/K] | 3044.77 | 3337.05 |
| Average U-value [$W/m^2K$] | 0.29 | 0.32 |
| Alpha value* [%] | 17.39 | 10 |

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

## Building Use

| % Area | Building Type |
|---|---|
| | A1/A2 Retail/Financial and Professional services |
| | A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways |
| | B1 Offices and Workshop businesses |
| | B2 to B7 General Industrial and Special Industrial Groups |
| **100** | **B8 Storage or Distribution** |
| | C1 Hotels |
| | C2 Residential Institutions: Hospitals and Care Homes |
| | C2 Residential Institutions: Residential schools |
| | C2 Residential Institutions: Universities and colleges |
| | C2A Secure Residential Institutions |
| | Residential spaces |
| | D1 Non-residential Institutions: Community/Day Centre |
| | D1 Non-residential Institutions: Libraries, Museums, and Galleries |
| | D1 Non-residential Institutions: Education |
| | D1 Non-residential Institutions: Primary Health Care Building |
| | D1 Non-residential Institutions: Crown and County Courts |
| | D2 General Assembly and Leisure, Night Clubs, and Theatres |
| | Others: Passenger terminals |
| | Others: Emergency services |
| | Others: Miscellaneous 24hr activities |
| | Others: Car Parks 24 hrs |
| | Others: Stand alone utility block |

## Energy Consumption by End Use [$kWh/m^2$]

| | Actual | Notional |
|---|---|---|
| Heating | 33.89 | 39.02 |
| Cooling | 0 | 0 |
| Auxiliary | 0.43 | 0.23 |
| Lighting | 14.64 | 17.19 |
| Hot water | 4.22 | 4.6 |
| Equipment* | 30.57 | 30.57 |
| **TOTAL**** | **53.17** | **61.05** |

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

## Energy Production by Technology [$kWh/m^2$]

| | Actual | Notional |
|---|---|---|
| Photovoltaic systems | 0 | 0 |
| Wind turbines | 0 | 0 |
| CHP generators | 0 | 0 |
| Solar thermal systems | 0 | 0 |

## Energy & $CO_2$ Emissions Summary

| | Actual | Notional |
|---|---|---|
| Heating + cooling demand [$MJ/m^2$] | 98.12 | 121.1 |
| Primary energy* [$kWh/m^2$] | 100.09 | 104.84 |
| Total emissions [$kg/m^2$] | 17.3 | 18.7 |

* Primary energy is net of any electrical energy displaced by CHP generators, if applicable.

## HVAC Systems Performance

| System Type | | Heat dem MJ/m2 | Cool dem MJ/m2 | Heat con kWh/m2 | Cool con kWh/m2 | Aux con kWh/m2 | Heat SSEEF | Cool SSEER | Heat gen SEFF | Cool gen SEER |
|---|---|---|---|---|---|---|---|---|---|---|
| [ST] Central heating using water: radiators, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity | | | | | | | | | | |
| | Actual | 49.1 | 0 | 16.3 | 0 | 8.9 | 0.84 | 0 | 0.94 | 0 |
| | Notional | 73 | 0 | 23.5 | 0 | 4.8 | 0.86 | 0 | –– | —- |
| [ST] Unflued radiant heater, [HS] Unflued radiant heater, [HFT] Natural Gas, [CFT] Electricity | | | | | | | | | | |
| | Actual | 99.7 | 0 | 34.5 | 0 | 0 | 0.8 | 0 | 0.86 | 0 |
| | Notional | 122.6 | 0 | 39.5 | 0 | 0 | 0.86 | 0 | –– | —- |
| [ST] Central heating using water: radiators, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity | | | | | | | | | | |
| | Actual | 121.8 | 0 | 40.4 | 0 | 2.6 | 0.84 | 0 | 0.94 | 0 |
| | Notional | 146.6 | 0 | 47.2 | 0 | 1.4 | 0.86 | 0 | –– | —- |

### Key to terms

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

# Key Features

**The Building Control Body is advised to give particular attention to items whose specifications are better than typically expected.**

### Building fabric

| Element | $U_{i\text{-}Typ}$ | $U_{i\text{-}Min}$ | Surface where the minimum value occurs* |
|---|---|---|---|
| Wall | 0.23 | 0.24 | NT000006:Surf[1] |
| Floor | 0.2 | 0.22 | NT000006:Surf[0] |
| Roof | 0.15 | 0.17 | RF000001:Surf[12] |
| Windows, roof windows, and rooflights | 1.5 | 1.4 | NT00000D:Surf[1] |
| Personnel doors | 1.5 | 1.6 | RF000001:Surf[57] |
| Vehicle access & similar large doors | 1.5 | 1.5 | RF000001:Surf[53] |
| High usage entrance doors | 1.5 | - | No High usage entrance doors in building |

$U_{i\text{-}Typ}$ = Typical individual element U-values [W/(m²K)] $U_{i\text{-}Min}$ = Minimum individual element U-values [W/(m²K)]

* There might be more than one surface where the minimum U-value occurs.

| Air Permeability | Typical value | This building |
|---|---|---|
| $m^3/(h.m^2)$ at 50 Pa | 5 | 4 |

# APPENDIX 2: Site Plan Layout

NORTH

DESIGN SECTION B

DESIGN SECTION A

DEARNE VALLEY PARKWAY

Existing Pub

Existing Rockingham Roundabout

Existing Roundabout

Existing Roundabout

Existing Roundabout

SHEFFIELD ROAD

CROSS KEYS LANE

Existing Dwellings

Drainage Easement

Retaining Wall

FFL - 135.5

FFL - 135.850

FFL - 136.400

FFL - 137.00

FE

Service

Service Yard

25m service spin

40m

Gates

Ent.

Office

Unit 1

**Total GIA -** **36,750 sqft 3,414.2 sqm**
Footprint - 35,000 sqft 3,251.6 sqm
Offices @ 1st 1,750 sqft 162.6 sqm

Unit 2

**Total GIA -** **63,000 sqft 5,852.9 sqm**
Footprint - 60,000 sqft 5,574.2 sqm
Offices @ 1st 3,000 sqft 278.8 sqm

Unit 3

**Total GIA -** **42,000 sqft 3,901.9 sqm**
Footprint - 40,000 sqft 3,716.1 sqm
Offices @ 1st 2,000 sqft 185.8 sqm

Car Parking
67 no. spaces
(inc 3no. Disabled / 2 no. Charging)

Car Parking
46 no. spaces
(inc 2no. Disabled / 2 no. Charging)

Car Parking
54 no. spaces
(inc 2no. Disabled / 4 no. Charging)

Proposed Sub Station

Footpath

Footpath / Cycle Route

Access Road

Turning Head

Existing Access Retained

Existing Access

Existing Egress

3m Easement strip for future services

Attenuation pond

Pond

Existing Brook

Existing Breakers Yard

Public Rights of Way
Taken from Barnsley MBC Definitive Map

**Note:**
Information is based on OS map and received information and is subject to full topographical and building survey.
Assumed site boundary and site constraints subject to confirmation.
All Legal easements and extent of existing underground services locations are subject to confirmation.

0 5 10 15 20 25m
SCALE 1:500

| Rev | Date | Description | Rev By | Chk'd By |
|---|---|---|---|---|
| J. | 12.03.21 | Cut and fill Updated | NBB | PSM |
| H. | 04.03.21 | Sub Station Added | NBB | PSM |
| G. | 25.02.21 | Upadated for planning submission | NBB | PSM |
| F. | 19.02.21 | Upadated inline with discussions | NBB | PSM |
| E. | 20.01.21 | Redline adjusted & public footpaths added | NBB | PSM |
| D. | 16.11.20 | Upadated | NBB | PSM |
| C. | 02.11.20 | Upadated | NBB | PSM |
| B. | 20.10.20 | Added size Road | AL | PSM |
| A. | 21.07.20 | Upadated | NBB | PSM |

| | |
|---|---|
| Project Title | PROPOSED INDUSTRIAL DEVELOPMENT<br>Dearne Valley Parkway<br>Barnsley |
| Client | Gregory Properties |
| Status | FOR PLANNING |
| Scale | 1:500 — Drawing Size A1 |
| Date | 07.2020 — Drawn By NBB — Checked PSM |
| Drawing Title | PROPOSED SITE PLAN |
| Job+Dwg No | 15315 - (P)111 — Rev J |

2.51, Johns North, Wakefield, WF1 3QA
t. 01924 291800
Carvers Warehouse, 77 Dale Street, Manchester, M1 2HG
t. 0161 2388555
The Old Rectory, 79 High Street, Newport Pagnell, MK16 8AB
t. 01908 211577
101 London Road, Reading, RG1 5BY
t. 0118 9507700
10 Gees Court, St Christophers Place, London, W1U 1JJ
t. 0207 4091215
THE HARRIS PARTNERSHIP ARCHITECTS
www.harrispartnership.com

CAD file reference

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