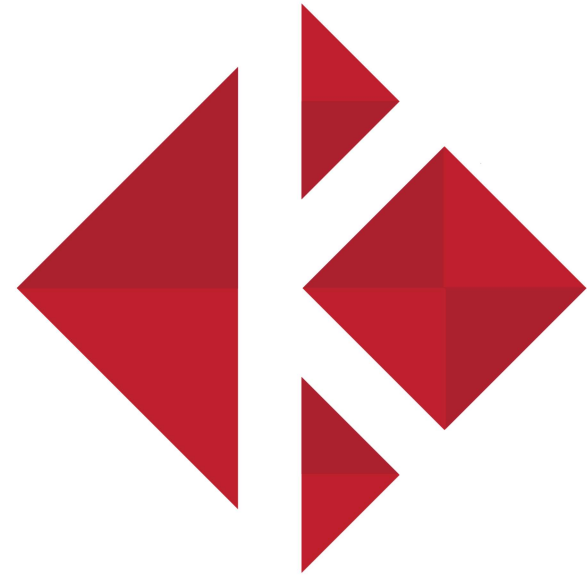




Project:

JD Sports Phase 2 Pavillion

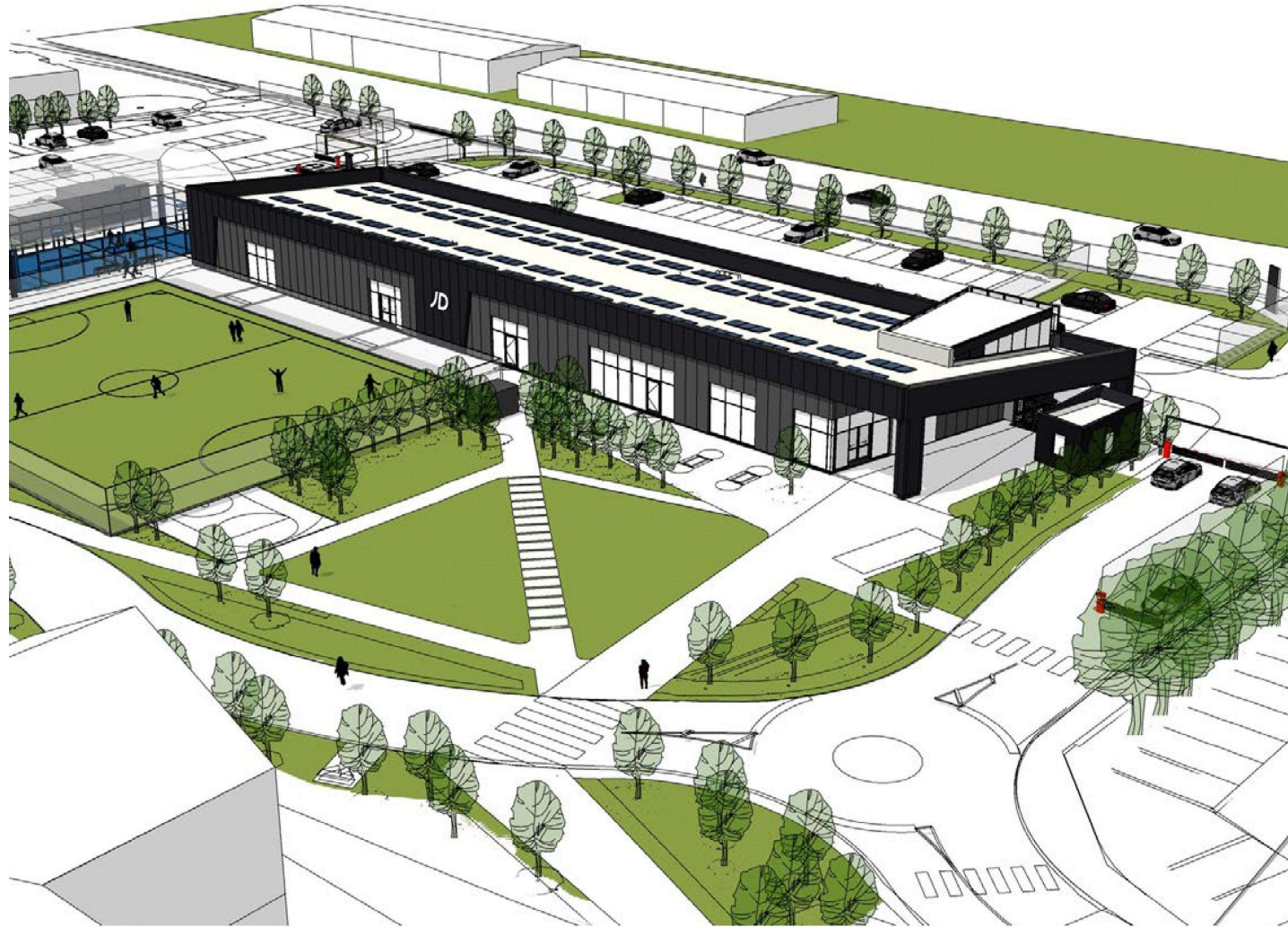
Report Title:

Energy, Carbon and Sustainability Statement

Client: JD Sports PLC

Revision Date: 17/12/2025

Doc Ref: 250715-KRD-XX-XX-T-Z-0202-REV--



Contents

1 Document History and Validation.....3

1.1 Revision History3

1.2 Document Validation (Latest Issue)3

2 Introduction4

2.1 Design Philosophy and Sustainability Objectives.....4

2.2 Development Overview5

2.3 Sustainability Aspirations.....5

3 Regulations, Policy and Guidance.....6

3.1 Building Regulations (Part L 2021)6

3.2 Planning Policy6

3.3 Key Sustainability Commitments for This Project6

4 Design Considerations7

4.1 Building Regulations Part L Compliance7

4.2 Optimising Energy Use.....7

4.3 Energy Efficiency Measures7

4.4 Summary of Design Intent8

5 Energy Strategy.....9

5.1 Energy Hierarchy.....9

5.2 Demand Reduction – Be Lean9

5.3 Low & Zero Carbon Technologies – Be Green10

5.4 Summary of Energy Strategy10

6 Carbon Reduction Strategy12

6.1 Operational Carbon Reduction12

6.2 Net Zero Carbon in Operation12

6.3 Embodied Carbon Reduction12

6.4 Alignment with Policy12

6.5 Summary of Carbon Reduction Measures12

7 Embodied Carbon Strategy13

7.1 Approach During Design Stage13

7.2 Principal Contractor Responsibility.....13

7.3 Policy Alignment13

7.4 Summary.....13

8 Whole Life Carbon and Circular Economy Principles14

8.1 Whole Life Carbon Approach14

8.2 Circular Economy Principles.....14

8.3 Policy Alignment14

8.4 Summary.....14

9 Energy Assessment15

9.1 Calculation Methodology.....15

9.2 Building Fabric15

9.3 MEP Systems.....15

9.4 Energy Model Inputs.....16

9.5 Results.....16

10 Sustainability Outcomes and Planning Compliance Summary18

10.1 Key Sustainability Outcomes.....18

10.2 Policy Compliance Summary.....18

10.3 Planning Statement18

1 Document History and Validation

1.1 Revision History

Revision	Issue Date	Reason for Issue
Rev-	17 December 2025	Planning Submission

1.2 Document Validation (Latest Issue)


Principal Author
MERIN DENCIL


Checked By
IAN CROOK


Verified By
DILON HILTON

2 Introduction

Kennedy Redford has been appointed by JD Sports Fashion PLC (hereafter referred to as JD) to provide Mechanical, Electrical, and Public Health (MEP) Engineering Consultancy services for the proposed Pavilion Building within JD's existing headquarters campus at Pilsworth, Bury, Greater Manchester. The development site is a brownfield area forming part of JD's broader masterplan. Phase 1 of the masterplan delivered access roads and partial car parking infrastructure, which will be retained and integrated into the Phase 2 scheme. The current proposal seeks to complete the remaining undeveloped portion of the site.

This document sets out the Energy and Carbon Strategy and the Basis of Design currently being developed to RIBA Stage 4 level of detail, forming part of the Planning Application submission to Bury Council. It outlines the sustainability principles, energy efficiency measures, and carbon reduction strategies that underpin the design approach.

JD's aspiration for this development is to significantly enhance the existing HQ facilities while aligning with its Environmental, Social, and Governance (ESG) commitments and corporate climate action objectives. The Pavilion will provide high-quality amenities for staff and visitors, supporting health, wellbeing, and operational efficiency.

2.1 Design Philosophy and Sustainability Objectives

The project team has adopted a fabric-first approach, prioritising passive design measures to minimise energy demand before considering active systems. The key principles guiding the design include:

- Commercial viability and lifecycle sustainability
- High-performance building envelope to reduce heat loss and solar gain.
- Energy-efficient building services systems, designed to exceed regulatory minimums.
- Responsible material selection, favouring durability and low embodied carbon.
- Integration of locally sourced materials and suppliers where feasible
- Alignment with JD's ESG strategy, aiming to exceed current industry standards.
- Consideration of recognised sustainability standards, such as BREEAM and NABERS UK, where relevant and commercially viable

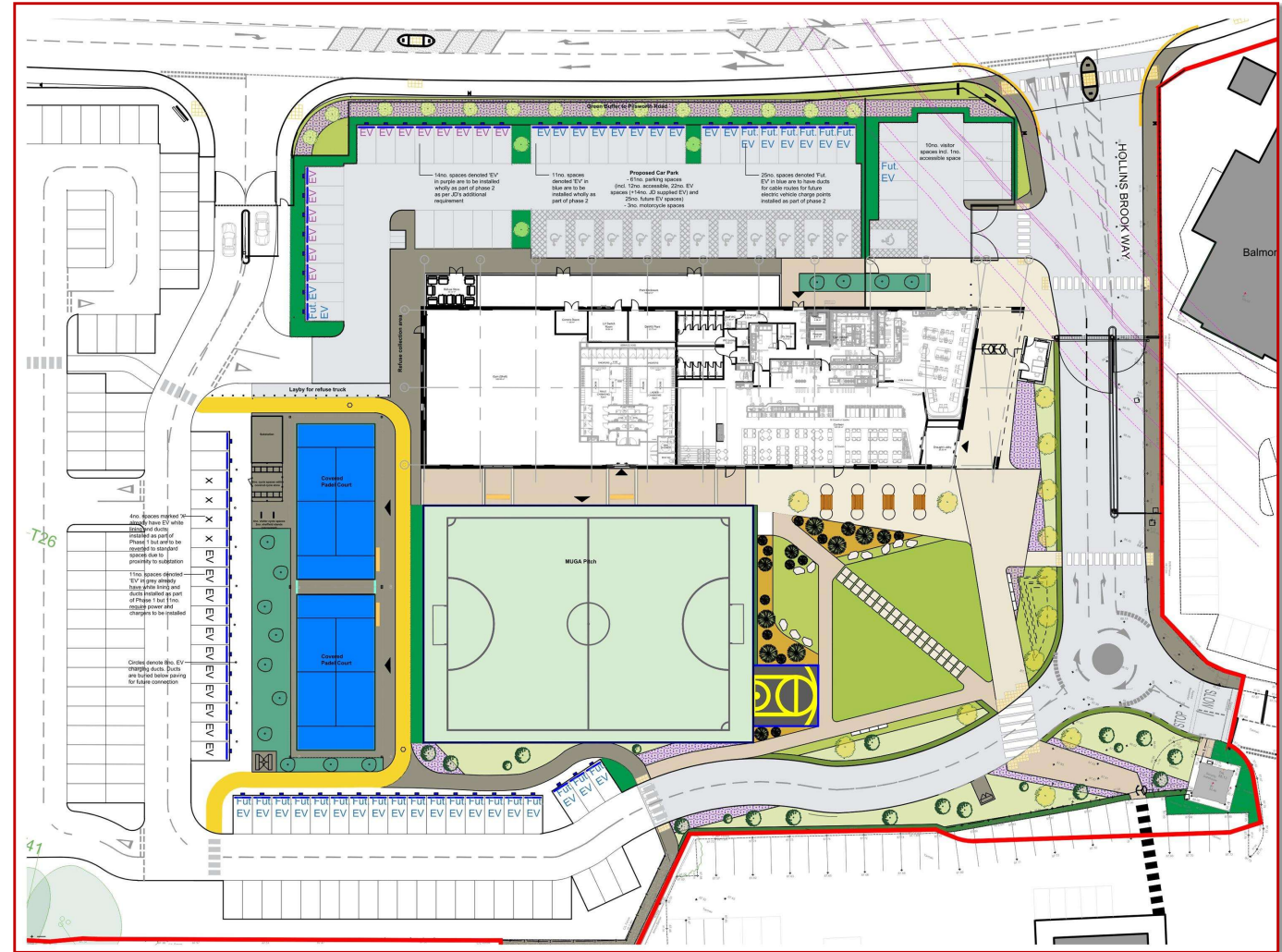


Figure 1 - Developed Site Layout

- Commitment to approach GMCA sustainability objectives as closely as possible, while acknowledging that full compliance with GMCA standards is not a project requirement.
- Assessment against Building Regulations Part L 2021 edition incorporating 2023 amendments, demonstrating improvement over both Target Emission Rate (TER) and Target Primary Energy Rate (TPER)

2.2 Development Overview

The Pavilion will be a single storey building with an internal footprint of approximately 1,370 m², accommodating:

- A fully equipped gymnasium with changing rooms and shower facilities
- A canteen with a commercial grade catering kitchen, supporting full meal preparation and service.

External works will include:

- Additional car parking bays to supplement existing provision.
- Multi-Use Games Area (MUGA) and Padel courts, promoting health and wellbeing.
- Soft and hard landscaping, enhancing site aesthetics, accessibility, and biodiversity.

2.3 Sustainability Aspirations

JD's vision is to deliver a sustainable, low-carbon, low-energy building, with aspirations toward Net Zero Carbon in operation for Scope 1 and Scope 2 emissions only, limited to the Pavilion building covered by this planning application. This commitment reflects JD's corporate responsibility to reduce energy consumption and carbon emissions, benefiting its workforce and supporting wider sustainability objectives. While the Pavilion is located within a private site, JD continues to maintain a public right of way and has historically undertaken highway improvement works, demonstrating a responsible approach to local infrastructure and accessibility.

The design incorporates measures to reduce operational energy demand beyond Building Regulations compliance, supported by on-site renewable energy technologies (detailed in subsequent sections). These strategies will contribute to a transformational working environment, prioritising staff wellbeing and environmental stewardship through innovative, sustainable design solutions.

3 Regulations, Policy and Guidance

3.1 Building Regulations (Part L 2021)

The proposed Pavilion development will be fully compliant with United Kingdom Building Regulations Part L2A: Conservation of Fuel and Power in New Buildings Other Than Dwellings (2021 edition incorporating 2023 amendments).

An energy assessment will be undertaken in accordance with Part L2A (2021 edition incorporating 2023 amendments) requirements, using the National Calculation Methodology (NCM) and Government-approved software. The assessment will follow CIBSE AM11 guidance for energy modelling and will demonstrate compliance with both the Target Emission Rate (TER) and Target Primary Energy Rate (TPER) as required under Part L 2021 edition incorporating 2023 amendments.

3.2 Planning Policy

The project will be designed and constructed to meet national and local planning policies, including:

- National Planning Policy Framework (NPPF, 2021) and supporting National Planning Practice Guidance (PPG)
- Local Plan Core Strategy (2016)
- Saved policies of the Bury Unitary Development Plan (UDP)

3.2.1 National Planning Policy

The National Planning Policy Framework (NPPF, 2021) sets out the Government's planning policies for England and requires all Local and Neighbourhood Plans to align with its principles.

The NPPF defines sustainable development through three interdependent pillars:

- Economic
- Social
- Environmental

The Pavilion development aligns with these principles by delivering a commercially viable, socially beneficial, and environmentally responsible scheme.

3.2.2 Local Planning Policy

The Bury Council Planning Guidance (SDP16) outlines sustainability requirements for new developments, including:

- Non-residential developments should aim for a BREEAM rating of "Very Good."
- Provision of 10% of predicted energy demand from on-site or near-site low-carbon sources, unless demonstrated to be unfeasible.

- Evidence of on-site energy provision within the BREEAM assessment

Project Approach:

- The Pavilion will consider BREEAM and NABERS UK standards where relevant and commercially viable, although formal certification is not a client requirement.
- The design will incorporate passive design measures, energy efficiency improvements, and low/zero-carbon technologies to meet or exceed the intent of SDP16.
- While the client is not aiming to achieve full GMCA sustainability compliance, the project will seek to align as closely as possible with GMCA objectives, acknowledging the regional ambition for Net Zero Carbon by 2038.

3.2.3 Regional Planning Policy

The Greater Manchester Combined Authority (GMCA) Places for Everyone (PfE) and Greater Manchester Spatial Framework (GMSF) set out regional sustainability objectives, including:

- Net Zero Carbon by 2038
- Energy efficiency and renewable energy integration
- Reduction of embodied carbon in construction
- Promotion of sustainable transport and biodiversity enhancements

Recommended Alignment for Pavilion Project:

- Incorporate fabric-first principles and high-efficiency building services.
- Integrate on-site renewable energy generation (e.g., photovoltaics, heat pumps)
- Adopt low-carbon material selection and construction practices.
- Enhance landscaping and biodiversity to support GMCA's environmental goals.

3.3 Key Sustainability Commitments for This Project

- Compliance with Part L 2021 edition incorporating 2023 amendments
- Consideration of BREEAM and NABERS UK standards where commercially viable
- Aspiration for Net Zero Carbon in operation (Scope 1 and Scope 2 only) for the Pavilion building
- Alignment with GMCA sustainability principles, without formal obligation to meet all targets.
- Delivery of a robust energy and carbon reduction strategy, detailed in subsequent sections.

4 Design Considerations

This section outlines the design parameters and principles applied during the Part L2A compliance assessment and the development of the energy and carbon strategy for the proposed Pavilion building.

4.1 Building Regulations Part L Compliance

The Pavilion will be designed to meet the requirements of Building Regulations Approved Document Part L (Volume 2: Buildings other than dwellings), 2021 edition incorporating 2023 amendments.

Carbon emissions are categorised as follows:

- Regulated emissions – Associated with heating, cooling, hot water, lighting, and other fixed building services equipment covered under Part L2A and L2B.
- Unregulated emissions – Associated with small power, plug-in equipment, and process loads, which are outside the scope of Building Regulations Part L.

The design strategy focuses primarily on reducing regulated emissions, while also considering measures to minimise unregulated energy use through efficient systems and user engagement.

4.2 Optimising Energy Use

The Pavilion’s MEP systems will be designed to minimise energy consumption and reduce CO₂ emissions, supporting JD’s aspiration for Net Zero Carbon in operation (Scope 1 and Scope 2 only) for this building.

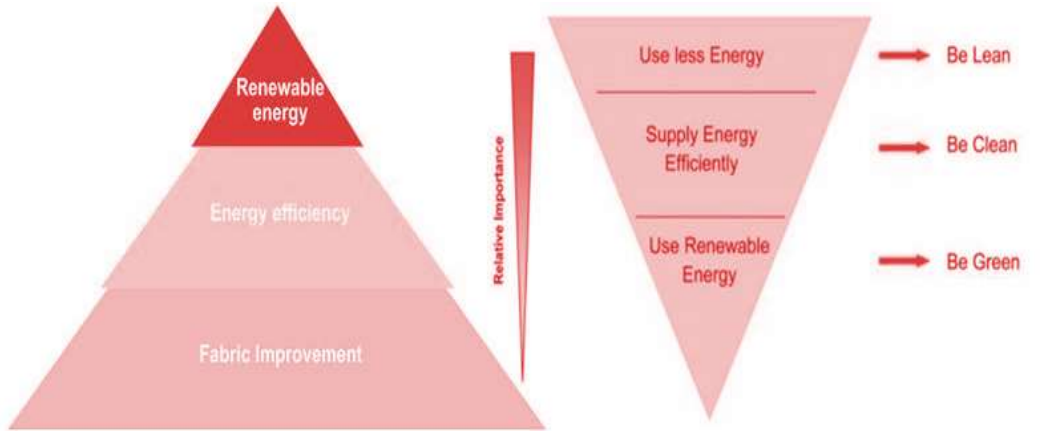


Figure 2 - Energy Hierarchy

The approach follows the Energy Hierarchy:

1. Reduce demand through passive design.
2. Use energy efficiently with high-performance systems.
3. Supply energy from low/zero-carbon sources.

Passive design measures include:

- High thermal performance of the building envelope
- Low air permeability to minimise heat loss.
- Optimised glazing ratios to maximise daylight while controlling solar gains.
- Building orientation and shading strategies to reduce cooling loads

Where mechanical ventilation is required for functional or regulatory compliance, systems will incorporate heat recovery to minimise energy losses. The general ventilation strategy includes:

- Externally located, double-stacked air handling units providing tempered and filtered fresh air and general extract.
- Heat recovery via thermal wheel or plate heat exchangers.
- Initial frost protection via electric frost coils, with additional tempering through DX refrigerant coils connected to local heat pump condenser units.

Environmental systems will be simple to operate and control, providing occupants with effective control over their environment while maintaining energy efficiency.

4.3 Energy Efficiency Measures

Reducing energy demand is the most effective way to minimise carbon emissions. The Pavilion’s energy strategy adopts a Lean, Clean, Green approach:

- Lean – Minimise energy demand through advanced modelling and passive design techniques.
- Clean – Incorporate high-efficiency MEP systems and effective controls.
- Green – Integrate renewable energy technologies where technically and commercially viable.

Passive design measures considered include:

- Optimised building orientation to benefit from solar gain and daylight.

- Simplified building form to reduce surface area and heat loss.
- High levels of insulation and airtightness exceeding Part L notional building standards
- High-performance glazing systems with optimised window-to-wall ratios

Active design measures include:

- High-efficiency heating, cooling, and ventilation systems
- LED lighting with intelligent controls
- Systems designed to meet or exceed the performance standards in the UK Government Non-Domestic Building Services Compliance Guide (2021 edition incorporating 2023 amendments)

4.4 Summary of Design Intent

The Pavilion will deliver:

- Compliance with Part L 2021 edition incorporating 2023 amendments
- Optimised passive design to reduce energy demand.
- Efficient active systems to minimise operational energy use.
- Integration of renewable energy technologies (detailed in later sections)
- A design aligned with JD's sustainability objectives and aspirations for Net Zero Carbon in operation (Scope 1 and 2)

5 Energy Strategy

This section outlines the project’s energy strategy and the approach adopted to meet the Pavilion’s technical requirements and relevant planning policies. The strategy integrates passive design principles, energy efficiency measures, and low/zero-carbon technologies to minimise energy demand and operational carbon emissions.

An energy assessment has been undertaken using the National Calculation Methodology (NCM) and Government-approved software in accordance with Part L2A (2021 edition incorporating 2023 amendments). This assessment benchmarks the proposed design against regulatory requirements and evaluates performance against local planning guidance.

5.1 Energy Hierarchy

The Pavilion’s energy strategy follows the Energy Hierarchy, applying a “Steps to Low Carbon” methodology:

1. Be Lean – Reduce energy demand through passive design and improved building fabric.
2. Be Clean – Incorporate high-efficiency building services and advanced controls.
3. Be Green – Integrate renewable and low-carbon technologies where feasible and commercially viable.

5.2 Demand Reduction – Be Lean

5.2.1 Building Envelope

The design prioritises a high-performance building envelope based on five key principles:

- Continuous thermal insulation
- Airtightness
- Thermal bridge-free detailing
- High-performance glazing
- Ventilation systems with heat recovery

An air leakage rate of 3 m³/hr·m² @ 50 Pa is targeted, exceeding typical regulatory standards. This will be achieved through:

- Prefabrication of key components under controlled factory conditions



Figure 3 - Indicative PV Roof Layout

- Robust detailing at junctions
- Stringent on-site quality assurance

5.2.2 Building Services

All systems will exceed minimum performance requirements set out in the Non-Domestic Building Services Compliance Guide (2021 edition incorporating 2023 amendments). Key measures include:

- Variable-speed drives on fans and pumps to optimise energy use.
- Zoned heating and cooling systems with responsive local controls
- LED lighting throughout, with daylight dimming and occupancy sensors.
- Maximised natural daylight through optimised glazing design

5.2.3 Unregulated Energy

Unregulated loads (e.g., catering equipment, IT, plug-in devices) will be addressed through:

- Specification of energy-efficient appliances and white goods
- Engagement with JD’s operational team to promote energy-conscious practices.

5.2.4 Cooling and Overheating

The Pavilion is designed to minimise reliance on active cooling through:

- Passive measures such as solar control glazing (low g-value) and optimised façade design
- Internal heat gain reduction via LED lighting and efficient equipment
- Active cooling only where necessary, using high-efficiency heat pump systems.

5.3 Low & Zero Carbon Technologies – Be Green

The following technologies were assessed for feasibility:

5.3.1 Solar Photovoltaics (PV)

PV panels will be installed on the Pavilion roof to offset electrical demand. PV offers:

- Direct conversion of solar energy to electricity
- Minimal maintenance requirements
- Significant carbon savings, particularly as the UK grid continues to decarbonise.

5.3.2 Heat Pumps

Air Source Heat Pumps (ASHP) have been selected as the preferred solution for space heating and domestic hot water (DHW), due to:

- Lower capital cost compared to Ground Source Heat Pumps (GSHP)
- Compatibility with low-temperature heat emitters (e.g., underfloor heating or oversized radiators)
- High efficiency (up to COP 4:1), delivering substantial carbon savings over gas boilers.

DHW will be generated using high-temperature refrigerant ASHP systems (e.g., CO₂-based) to meet hot water requirements efficiently.

5.3.3 Other Technologies

The following were considered but deemed unsuitable:

- Wind Turbines – Urban site constraints and noise/vibration concerns.
- Biomass – Space limitations for fuel storage and potential air quality impacts
- Solar Thermal – Limited roof space and lower carbon benefit compared to PV.
- Micro Hydro Power – No watercourses available
- Combined Heat and Power (CHP) – Insufficient constant heat demand and NO_x emissions concerns

Table: Energy Strategy Summary – Lean, Clean, Green Approach

Category	Measures Implemented
Lean – Demand Reduction	• High-performance building envelope (continuous insulation, airtightness, thermal bridge-free detailing) • Air leakage target: ≤ 3 m³/hr·m² @ 50 Pa • Optimised glazing ratios for daylight and solar control • Passive solar design and shading strategies • Natural ventilation opportunities with heat recovery
Clean – Energy Efficiency	• High-efficiency HVAC systems with zoned controls • Variable-speed drives on fans and pumps • LED lighting throughout with daylight dimming and occupancy sensors. • Maximised natural daylight to reduce artificial lighting demand. • Energy-efficient appliances • Compliance with Non-Domestic Building Services Compliance Guide (2021 edition incorporating 2023 amendments)
Green – Low/Zero Carbon Technologies	• Solar Photovoltaics (PV) on roof to offset electrical demand. • Air Source Heat Pumps (ASHP) for space heating and domestic hot water • High-temperature refrigerant ASHP for DHW (e.g., CO₂-based) • Integration with decarbonising UK grid for long-term carbon savings

5.4 Summary of Energy Strategy

- Fabric-first approach to minimise energy demand.
- High-efficiency MEP systems with advanced controls

- Integration of PV and ASHP technologies for low-carbon energy supply
- Alignment with Part L 2021 edition incorporating 2023 amendments compliance and local planning guidance
- Supports JD’s aspiration for Net Zero Carbon in operation (Scope 1 and 2) for the Pavilion building.

Table: JD Pavilion Project vs Local & Regional Sustainability Targets

Criteria	Bury Council SDP16 Requirements	GMCA Objectives	JD Pavilion Project Approach
Building Regulations Compliance	Improve CO ₂ emissions by ≥25% beyond 2006 Part L	Align with Net Zero Carbon by 2038	Full compliance with Part L 2021 edition incorporating 2023 amendments; improved TER and TPER
Energy Hierarchy	Encourage sustainable design techniques	Prioritise fabric-first and energy efficiency	Adopt Lean, Clean, Green approach
On-site Renewable Energy	Provide ≥10% predicted energy demand from on-site/near-site low-carbon sources	Maximise renewable integration	Solar PV installed on Pavilion roof
BREEAM / Certification	Aim for BREEAM Very Good	Encourage recognised sustainability benchmarks	Consider BREEAM and NABERS UK where commercially viable
Carbon Reduction Target	No explicit Net Zero requirement	Net Zero Carbon (operational and embodied) by 2038	Net Zero Carbon in operation (Scope 1 & 2) for Pavilion only
Low Carbon Technologies	Evidence of on-site energy provision	Promote electrification and heat pumps	Air Source Heat Pumps (ASHP) for heating and DHW
Embodied Carbon	Not explicitly addressed	Reduce embodied carbon in construction	Low-carbon material selection and efficient construction practices
Biodiversity & Landscaping	Improve site aesthetics and accessibility	Enhance biodiversity and green infrastructure	Soft landscaping and biodiversity enhancements integrated

Transport & Connectivity	Encourage sustainable transport	Promote EV charging and active travel	EV charging points and improved pedestrian access
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6 Carbon Reduction Strategy

The Pavilion development adopts a comprehensive approach to minimising operational carbon emissions and supporting JD’s aspiration for Net Zero Carbon in operation (Scope 1 and Scope 2 only) for this building. The strategy focuses on reducing regulated emissions through fabric-first design, energy-efficient systems, and integration of renewable technologies, while also addressing unregulated energy use where feasible.

6.1 Operational Carbon Reduction

Regulated Emissions

- Regulated emissions include heating, cooling, hot water, lighting, and other fixed building services covered under Building Regulations Part L2A (2021 edition incorporating 2023 amendments). The Pavilion design achieves:
- Improved building fabric performance beyond Part L notional standards
- Air leakage rate target of $\leq 3 \text{ m}^3/\text{hr}\cdot\text{m}^2$ @ 50 Pa
- High-efficiency HVAC systems with heat recovery and variable-speed drives
- LED lighting with intelligent controls to minimise energy use.
- Integration of on-site renewable energy via roof-mounted solar PV

Unregulated Emissions

- Unregulated emissions (e.g., catering equipment, IT, plug-in devices) will be mitigated through:
- Specification of energy-efficient appliances and white goods
- Engagement with JD’s operational team to promote energy-conscious practices.

6.2 Net Zero Carbon in Operation

- The Pavilion aims to achieve Net Zero Carbon in operation for Scope 1 and Scope 2 emissions only, limited to this building under the planning application. This will be achieved through:
- Electrification of heating and hot water using Air Source Heat Pumps (ASHP)
- On-site renewable electricity generation via solar PV
- Procurement of grid electricity from renewable sources, leveraging the UK’s decarbonising grid

6.3 Embodied Carbon Reduction

- While the primary focus is operational carbon, the project also seeks to minimise embodied carbon through:

- Responsible material selection, prioritising low-carbon and locally sourced materials where feasible.
- Efficient structural design to reduce material quantities.
- Prefabrication of key components to improve quality and reduce waste.
- Engagement with contractors to adopt best practice construction methods aligned with CIBSE TM65 and RICS Whole Life Carbon Assessment principles.

6.4 Alignment with Policy

- Part L 2021 edition incorporating 2023 amendments compliance achieved with improved TER and TPER
- Local policy intent (SDP16) met through on-site renewable energy and sustainable design measures.
- GMCA Net Zero 2038 ambition acknowledged; Pavilion aligns closely but does not extend to full campus or embodied carbon neutrality.

6.5 Summary of Carbon Reduction Measures

Category	Key Actions
Operational Carbon	• High-performance building envelope • ASHP for heating and DHW • Solar PV for renewable electricity • LED lighting with controls
Unregulated Carbon	• Energy-efficient appliances • Occupant engagement
Embodied Carbon	• Low-carbon material selection • Prefabrication • Efficient structural design

7 Embodied Carbon Strategy

The Pavilion development recognises the importance of reducing embodied carbon—the greenhouse gas emissions associated with the extraction, manufacture, transportation, and installation of construction materials. While the primary focus of this planning submission is on operational carbon reduction, the project also seeks to address embodied carbon impacts in line with best practice guidance.

7.1 Approach During Design Stage

At this stage, the design team is committed to:

- Specifying materials with lower embodied carbon where feasible, prioritising:
 - Products with Environmental Product Declarations (EPDs)
 - Materials sourced locally to reduce transportation emissions
 - Durable, long-life components to minimise replacement cycles.
- Optimising structural design to reduce material quantities without compromising performance
- Encouraging prefabrication of key components to improve quality and reduce waste.

These measures will be incorporated into the design as far as practicable during RIBA Stage 3, while maintaining flexibility for future procurement decisions.

7.2 Principal Contractor Responsibility

The management and detailed assessment of embodied carbon will be undertaken by the Principal Contractor upon appointment, as part of their sustainability obligations. This will include:

- Completing a Whole Life Carbon Assessment in accordance with RICS Professional Statement and CIBSE TM65 guidance
- Tracking embodied carbon through procurement and construction phases
- Implementing best practice construction methods to minimise waste and emissions
- Reporting embodied carbon performance against agreed project benchmarks

The contractor will also be expected to explore opportunities for:

- Material reuse and recycling
- Low-carbon concrete alternatives

- Efficient planning of logistics to reduce transport emissions.

7.3 Policy Alignment

While Bury Council’s current planning guidance does not explicitly mandate embodied carbon targets, the Pavilion project aims to align with the direction of travel of emerging GMCA policies, which encourage:

- Reduction of embodied carbon in construction
- Adoption of circular economy principles
- Whole life carbon reporting

7.4 Summary

- Design team commitment: Specify low-carbon materials and efficient design solutions where feasible.
- Principal Contractor responsibility: Undertake full embodied carbon assessment and implement reduction measures during construction.
- Flexibility maintained: Detailed targets and reporting will be confirmed post-contract award to allow for market conditions and supply chain capabilities.

8 Whole Life Carbon and Circular Economy Principles

The Pavilion development acknowledges the growing importance of Whole Life Carbon (WLC) assessment and Circular Economy principles in delivering sustainable buildings. While detailed WLC analysis will be undertaken post-planning, the project aims to embed these principles early in the design process and maintain flexibility for future implementation.

8.1 Whole Life Carbon Approach

Whole Life Carbon considers all emissions across the building lifecycle, including:

- Product Stage (A1–A3) – Raw material extraction and manufacturing
- Construction Stage (A4–A5) – Transport and installation
- Use Stage (B1–B7) – Operational energy, maintenance, and replacements.
- End-of-Life Stage (C1–C4) – Deconstruction, disposal, and recycling.

Planning Stage Commitment:

- The design team will specify materials with Environmental Product Declarations (EPDs) where feasible.
- Structural and architectural design will aim to reduce material quantities without compromising performance.
- Prefabrication and modular construction will be considered to minimise waste and improve quality.

Post-Planning Responsibility:

- The Principal Contractor will lead the Whole Life Carbon assessment in accordance with:
 - RICS Professional Statement: Whole Life Carbon Assessment for the Built Environment
 - CIBSE TM65: Embodied Carbon in Building Services
- The contractor will report WLC performance and implement reduction strategies during procurement and construction.

8.2 Circular Economy Principles

The Pavilion project will adopt Circular Economy principles to reduce resource consumption and waste:

- Design for durability and adaptability – Ensuring long service life and flexibility for future use.
- Material efficiency – Minimising waste through accurate design and prefabrication.
- Reuse and recycling opportunities – Encouraging recovery of materials at end-of-life.

- Responsible sourcing – Prioritising suppliers with sustainable practices and local supply chains.

These principles will be embedded in the design where feasible and expanded during construction through contractor-led initiatives.

8.3 Policy Alignment

- While Bury Council SDP16 does not explicitly require WLC or Circular Economy measures, the Pavilion aligns with the direction of emerging GMCA policies, which promote:
 - Whole Life Carbon reporting
 - Circular economy adoption
 - Reduction of embodied carbon and waste

8.4 Summary

- Design team commitment: Early integration of low-carbon materials and adaptable design principles.
- Principal Contractor responsibility: Full WLC assessment and implementation of circular economy measures during construction.
- Flexibility maintained: Detailed targets and reporting to be confirmed post-contract award.

9 Energy Assessment

The Pavilion development has been assessed to ensure compliance with Building Regulations Approved Document Part L2A (2021 edition incorporating 2023 amendments). A dynamic energy model was created to evaluate energy performance and carbon emissions, incorporating passive design measures, energy-efficient systems, and renewable technologies.

9.1 Calculation Methodology

- The building was modelled using IES VE 2024, simulating performance at hourly intervals over a full test year. In accordance with National Calculation Methodology (NCM) requirements:
- Standardised occupancy profiles, heating set points, ventilation rates, and lighting levels were applied.
- The model calculates energy consumption required to deliver defined comfort and service conditions.
- This approach ensures compliance with Approved Document Part L2A and provides a robust benchmark for energy and carbon performance.

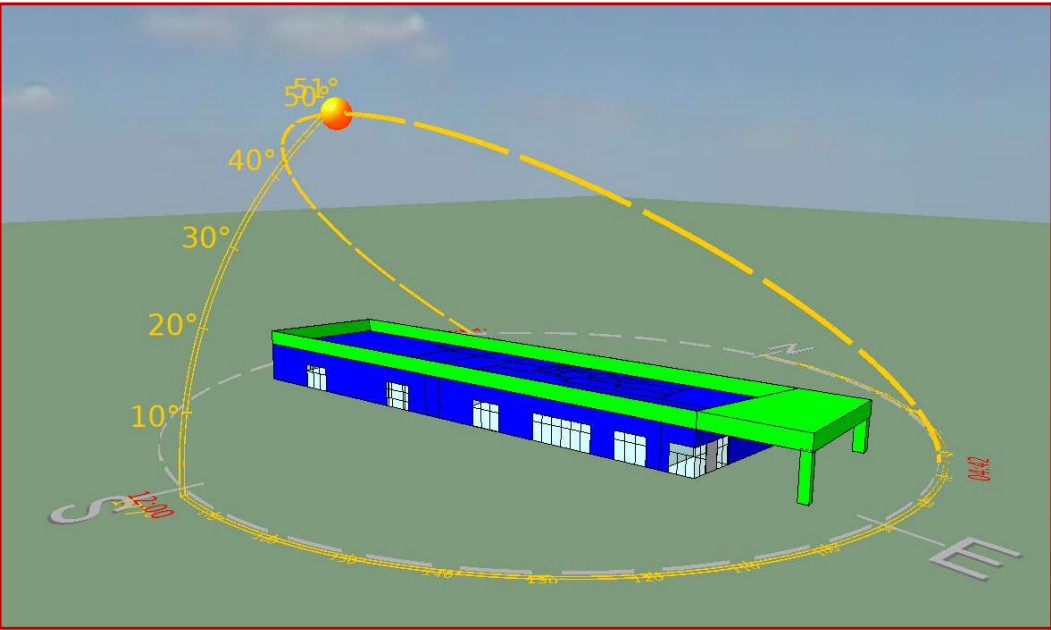


Figure 4 - IES VE Model of the Proposed Pavilion

9.1.1 Weather Data

The model uses CIBSE/Met Office Test Reference Year (TRY) data for Manchester, representing typical climatic conditions for the site. This dataset is sourced from CIBSE 2016 weather files, as required by Part L Volume 2.

9.2 Building Fabric

To comply with Criterion 2 of Part L2A, heat gains and losses are limited through high-performance thermal elements and airtight construction. The following design parameters confirm compliance:

Building Element	Design Value (W/m ² ·K)
Floor (avg.)	0.18
Roof	0.16
Walls	0.26
Curtain Walling	1.10
Doors	1.60
Windows (incl. frame)	1.60
Glazing VLT	0.70
Air Permeability @ 50 Pa	3 m ³ /hr·m ²

9.3 MEP Systems

- Ventilation: Externally located, double-stacked AHUs with heat recovery (85% seasonal efficiency), frost protection coils, and DX coils fed by ASHP condensers.
- Heating: Primary heating via Air Source Heat Pumps (ASHP) – no natural gas connection.
- Domestic Hot Water: ASHP-based DHW generation located near plant room to minimise losses.
- Cooling: Limited to the gym, canteen and server room only via ASHP (SEER ≥ 4.89).

- Lighting: High-efficacy LED luminaires with daylight dimming and occupancy sensors.

9.4 Energy Model Inputs

System	Model Input
ASHP Efficiency	95%
Ventilation Heat Recovery	85%
Specific Fan Power	1.5 W/l/s
DHW Efficiency	90%
DHW Storage Loss	0.01520 kWh/litre/day
PV Efficiency	20.8%
PV Area	700 m²

9.5 Results

The energy model demonstrates compliance with Part L 2021 edition incorporating 2023 amendments and significant improvement over notional building benchmarks:

Metric	Result
Target CO ₂ Emission Rate (TER)	3.64 kgCO ₂ /m²·yr
Building CO ₂ Emission Rate (BER)	3.25 kgCO ₂ /m²·yr
Target Primary Energy Rate (TPER)	37.89 kWhPE/m²·yr
Building Primary Energy Rate (BPER)	26.62 kWhPE/m²·yr
Improvement (BPER vs TPER)	29.74%
Part L Pass	YES

The BRUKL Report confirms:

- $BER \leq TER$ and $BPER \leq TPER$
- Pavilion achieves compliance with Part L 2021 edition incorporating 2023 amendments and exceeds minimum requirements by 29.74% improvement in primary energy performance.

9.5.1 Compliance Statement

The Pavilion achieves:

- $BER \leq TER$ and $BPER \leq TPER$, confirming full compliance with Building Regulations Part L 2021 edition incorporating 2023 amendments.
- A 29.74% improvement in primary energy performance compared to the notional building benchmark.
- Significant carbon reduction through fabric-first design, high-efficiency systems, and renewable technologies.

The BRUKL Report generated via IES VE 2024 validates these results and confirms that the proposed development exceeds minimum regulatory requirements.

9.5.2 BRUKL Output Document

BRUKL Output Document

 HM Government

Compliance with England Building Regulations Part L 2021

Project name

JD SPORTS

As designed

Date: Sun Dec 07 21:29:06 2025

Administrative information

Building Details

Address: Bury, Manchester,

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.28

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.28

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

Certifier details

Name: Kennedy Redford

Telephone number:

Address: 20 Market Street, Altrincham, Manchester, WA14 1PF

Foundation area [m²]: 1397.18

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

Target CO ₂ emission rate (TER), kgCO ₂ /m²annum	3.64
Building CO ₂ emission rate (BER), kgCO ₂ /m²annum	3.25
Target primary energy rate (TPER), kWh _{eq} /m²annum	37.89
Building primary energy rate (BPER), kWh _{eq} /m²annum	26.63
Do the building's emission and primary energy rates exceed the targets?	BER <= TER BPER <= TPER

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

Fabric element	U _o -Limit	U _o -Calc	U _i -Calc	First surface with maximum value
Walls*	0.26	0.26	0.26	RF000000:Surf[2]
Floors	0.18	0.18	0.18	RF000000:Surf[0]
Pitched roofs	0.16	-	-	No pitched roofs in building
Flat roofs	0.18	0.16	0.16	RF000000:Surf[1]
Windows** and roof windows	1.6	1.6	1.6	GY000002:Surf[2]
Rooflights***	2.2	-	-	No roof lights in building
Personnel doors [§]	1.6	1.6	1.6	RF000000:Surf[3]
Vehicle access & similar large doors	1.3	-	-	No vehicle access doors in building
High usage entrance doors	3	-	-	No high usage entrance doors in building

U_o-Limit = Limiting area-weighted average U-values [W/(m²K)]

U_o-Calc = Calculated area-weighted average U-values [W/(m²K)]

U_i-Calc = Calculated maximum individual element U-values [W/(m²K)]

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

** Display windows and similar glazing are excluded from the U-value check.

*** Values for rooflights refer to the horizontal position.

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

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

Air permeability	Limiting standard	This building
m³/(h.m²) at 50 Pa	8	3

10 Sustainability Outcomes and Planning Compliance Summary

The Pavilion development for JD Sports demonstrates a robust and integrated approach to energy efficiency, carbon reduction, and sustainable design, aligned with national and local planning policy requirements. The strategy reflects JD’s commitment to environmental responsibility while maintaining commercial viability and flexibility for future implementation.

10.1 Key Sustainability Outcomes

- **Energy Performance**
 - Full compliance with Building Regulations Part L 2021 edition incorporating 2023 amendments
 - Achieves $BER \leq TER$ and $BPER \leq TPER$, with a 29.74% improvement in primary energy performance over the notional building.
- **Carbon Reduction**
 - Operational carbon minimised through fabric-first design, high-efficiency systems, and renewable technologies.
 - Pavilion designed to achieve Net Zero Carbon in operation (Scope 1 & 2 only)
- **Renewable Integration**
 - Solar PV installed on roof to offset electrical demand.
 - Air Source Heat Pumps (ASHP) for heating and domestic hot water, eliminating reliance on natural gas.
- **Embodied Carbon**
 - Early-stage commitment to low-carbon material specification
 - Full Whole Life Carbon assessment and management to be undertaken by the Principal Contractor
- **Circular Economy**
 - Design principles support durability, adaptability, and material efficiency.
 - Contractor-led initiatives will address reuse, recycling, and waste minimisation.
- **Health & Wellbeing**
 - Pavilion includes gymnasium, canteen, and landscaped areas, promoting staff wellbeing and community engagement.

10.2 Policy Compliance Summary

Policy Area	Requirement	Project Response
Part L 2021 edition incorporating 2023 amendments	Compliance with TER and TPER	Achieved; 29.74% improvement in primary energy
SDP16 (Bury Council)	Sustainable design, BREEAM Very Good, 10% on-site renewables	Consideration of BREEAM/NABERS UK; PV installed
GMCA Net Zero 2038	Net Zero Carbon for operational and embodied emissions	Pavilion aligns closely for operational carbon; embodied carbon managed post-contract
Energy Hierarchy	Lean, Clean, Green approach	Fully adopted
Circular Economy	Encourage material reuse and waste reduction	Embedded in design principles; contractor to implement

10.3 Planning Statement

The Pavilion project:

- Meets and exceeds Building Regulations Part L 2021 edition incorporating 2023 amendments
- Aligns with local and regional sustainability objectives.
- Demonstrates a clear pathway to Net Zero Carbon in operation for Scope 1 & 2
- Incorporates renewable energy and low carbon technologies.
- Commits to Whole Life Carbon and Circular Economy principles, with flexibility for contractor-led delivery.

This approach ensures the Pavilion will deliver a high-performance, low-carbon facility that supports JD’s ESG commitments and contributes positively to the local environment and community.