

Raise Rochdale PRU

Energy Statement
Places for Everyone (JP-S2)

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Rev P01

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0. Executive Summary

0.1 Project Overview

This Renewable and Low-Carbon Energy Statement has been prepared to support the full planning application for the proposed three-storey new-build school Raise Rochdale PRU. The school will be able to accommodate 64 students who require alternative provision schooling.

The development will be located at Mayfield Street, Rochdale. It comprises a three-storey primary school with a Gross Internal Area (GIA) of approximately 1500 m² (Major Development). The facility includes classrooms, administration offices, welfare areas, toilets and stores.

PfE Policy JP-S2 requires developments to support Greater Manchester's goal of becoming carbon neutral by 2038, through minimising energy demand, maximising efficiency, using renewable and low carbon energy, and reducing whole life cycle emissions.

This report sets out the requirements of JP-S2 and demonstrates how the Raise Rochdale PRU complies with each element of the policy.

This report outlines the proposed energy strategy for the extension, which includes the installation of air source heat pumps (ASHPs) to provide space heating and mechanically ventilation for fresh air supported by an array of photovoltaic (PV) panels to generate on-site electricity. These technologies have been selected to deliver a significant proportion of the building's energy requirements in a manner that is efficient, viable, and sensitive to the local environment.

0.2 Energy & Carbon Proforma

A completed Non-Residential Major Energy and Carbon Proforma has been prepared to accompany this submission. This document provides a summary of the predicted operational energy performance, carbon emissions, and compliance with the PfE JP-S2 policy. A copy of the completed proforma is included in Appendix A.

1.0 Building fabric and ventilation

1.1 Building form, and heat loss envelope

The building form is simple and rectangular, with two staggered flat roofs, external courtyard simple facades and is three storeys.

PfE JP-S2 requires developments to minimise energy demand through efficient building form and reduced heat loss surfaces.

For a Non-Residential Major Development, this should be less than or equal to 2.

Perimeter: 500m
Elevation: 10.6m
Envelope Area: 3634m²
GIA: 1500m²

Form factor: $3634 / 1500 = \underline{2.42}$

It is acknowledged that the Form Factor target of <2 as set by the Energy & Carbon Proforma for Non-Residential Major developments is not met. However, it should be noted, the effective

heat loss is reduced by the structure being partially built into the hillside, benefiting from elevated ground temperatures that limit external exposure and associated transmission losses.

1.2 Elevation design and window proportions

PfE JP-S2 requires that elevation design and glazing proportions balance daylight access and control of solar gains.

Window-to-wall ratios (WWR) have been calculated as below;

North-east:	23%
Nort-west:	17%
South-west:	16%
South-east:	21%

1.3 Heated and unheated spaces

All occupied spaces including teaching and staff areas are heated/cooled. All areas within the building have been accounted for within the heat loss assessment for the building – Where losses to individual spaces are minimal, the loss has been included in the heating demand of adjacent spaces. I.e. Small WC area losses are provided within the adjacent circulation space.

The only explicitly unheated space within the building is the main plantroom and incoming services.

Due to the plant equipment gains within this space, no heating is proposed.

Refer to Appendix B for thermal envelope plan & sections (Indicated by the dashed red line).

1.4 Building fabric specifications and airtightness

PfE JP-S2 requires developments to minimise energy demand and maximise energy efficiency.

This scheme complies by adopting a fabric-first approach with high-performance envelope design as below. The U-Values have been developed with the architect to specify U-values significantly better than the baseline Building Regulations (Approved Document Part L 2021).

The proposed construction achieves:

- Air Tightness: **3 m³/h·m² @ 50 Pa** (improved from the notional 8 m³/h·m² @ 50 Pa)
- Floors: **0.12 W/m²K** (improved from 0.18 W/m²K)
- Walls: **0.14 W/m²K** (improved from Part L notional 0.26 W/m²K)
- Roof: **0.12 W/m²K** (improved from 0.16 W/m²K)
- Windows: **1 W/m²K** (improved from 1.6 W/m²K)
- Doors: **1.5 W/m²K** (improved from 1.6 W/m²K)

It is acknowledged that the Air Permeability target of <1 as set by the Energy & Carbon Proforma for Non-Residential Major developments is not met. However, it should be noted that the contractor should aim to construct the building with the aim of minimising the air permeability of the building.

A target of **3 m³/h·m² @ 50 Pa** is seen as attainable, and provides a reasonable value to be used within all other MEP services calculations to ensure plant is sized adequately without any risk of over sizing.

1.5 Ventilation system

All occupied spaces within the building shall be mechanically ventilated. The school is located sufficiently far from any sources of pollution such as main roads.

Mechanical ventilation with heat recovery (MVHR) is provided to all occupied areas. Systems are designed for low Specific Fan Power and specified with high efficiency heat recovery.

1.6 Space heating demand

Based on DSM (regulatory model) results, predicted annual space heating demand is approximately 17.3 MWh/yr (~11.5 kWh/m²/yr) and cooling demand approximately 0.09 MWh/yr (~0.06 kWh/m²/yr).

District heating has been discounted as an option for this site based on Appendix F – LZC (3220293_Raise Rochdale PRU_Renewable and low carbon energy statement_Rev00) Report.

2.0 Maximise energy efficiency

2.1 Energy use intensity

Regulatory energy modelling undertaken using DSM methodology gives a predicted Energy Use Intensity (EUI) of 39.76 kWh/m²/yr, equivalent to 59.6 MWh/yr total including PV.

Note: a TM54 predictive model assessment has not been completed for this development.

2.2 Efforts to reduce energy use of equipment

Unregulated loads, primarily small power and IT equipment, have been derived from benchmark data and design team input, with conservative allowances applied where information was unavailable. Management factors such as hours of operation, control strategies, and commissioning have been agreed with the design team to reflect the intended facilities management approach.

This has been assessed to provide an approximate Unregulated load of ~22.06 kWh/m² per year. The building operator shall be responsible for ensuring that profile settings and equipment procurement are carried out with energy efficiency as a primary consideration.

3.0 Renewable energy generation

3.1 Proposed renewable energy generation system

Solar photovoltaic (PV) panels are proposed, generating approximately 22,646 kWh annually (15.09kWh/m²).

Refer to Appendix E for PV footprint layout.

The below table summarises the proposed system:

Description	Solar PV
Orientation	South east 165°
Tilt	30° (Horizontal)
Peak output (kWp)	34.92kWp
Panel (maximum output, type of inverters)	445 W panels, string inverters
PV area as a percentage of ground floor area	10%
Expected annual renewable energy generation	23,368 kWh/yr
Annual renewable energy generation per m ² GIA	15.09 kWh/yr/m ²
Annual renewable energy generation per m ² building footprint	15.09 kWh/yr/m ²
Balance between total energy use and renewable energy generation	27.1%
Shading constraints?	None significant
Data source	IES

3.2 Renewable energy balance

Predicted annual demand (TM54 central case): 73,600 kWh
PV output: 23,368 kWh/yr
Balance: ~31% of total demand met by PV.

4.0 Low carbon heating

4.1 Fossil fuel free

The building is fossil-fuel free with no reliance on natural gas.

4.2 Proposed system for heating and hot water

Heating will be provided by high efficiency heat pump. Hot water will be provided by PoU instant or local water storage heaters.

Other LZC technologies were considered but found unfeasible for this site (Refer to Renewable and low carbon energy statement_Rev00 Report – Appendix F).

District heating was considered to the site, but discounted on the basis of proximity to an existing heat network.

4.3 Proposed system for cooling

High efficiency DX cooling will be provided to the server room.

5.0 Overheating risk

5.1 Natural ventilation

Natural ventilation will only occur through open doorways in transient spaces, the scheme is designed as part of a mechanical ventilation strategy.

5.2 Overheating risk assessment

A Thermal Comfort Assessment has been appended to this report (Appendix G).

6.0 Materials

6.1 Efforts made to minimise embodied carbon

Embodied carbon assessment has not been produced at this stage.

7.0 - Appendices

7.1 Appendix A – Non-Residential Minor Energy and Carbon Proforma

7.2 Appendix B – Thermal Envelope Plan & Sections

7.5 Appendix E – Solar PV Layout

7.6 Appendix F – LZC Report

7.7 Appendix G – Thermal Comfort Report