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Old Mill Street, Manchester

Energy & Carbon Statement
P01

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1.0 Executive Summary

Crookes Walker Consulting (CWC) has prepared this Energy and Carbon Statement to accompany the full planning application for the residential development at Old Mill Street, New Islington, Manchester. It sets out how the proposals respond to Places for Everyone (PfE) Policy JP-S2 (Carbon and Energy) and Policy JP-S3 (Heat and Energy Networks), and follows the structure, metrics and key performance indicators of the GMCA Net Zero guidance (Parts 1 to 3).

The development is a Major application under the GMCA guidance (10 to 149 homes). In line with the guidance, this statement is supported by predictive operational energy modelling to CIBSE TM54, a Part O overheating assessment, SAP 10.2 Part L calculations, a Low Carbon Heat Appraisal and an upfront embodied carbon assessment to the RICS Whole Life Carbon Assessment standard (2023). The supporting reports are listed in Table 1.

Report	Reference	Revision / date	Prepared by
CIBSE TM54 Operational Energy Assessment	3603-CWC-XX-XX-RP-N-7007	P01, 09/10/2026	CWC
Low Carbon Heat Appraisal	3603-CWC-XX-XX-RP-N-7010	P01, 09/10/2026	CWC
Overheating (AD Part O) Assessment	3603-CWC-XX-XX-RP-N-7005	P03, 09/10/2026	CWC
Part L (Domestic) Compliance Report	3603-CWC-XX-XX-RP-N-7006	P02, 09/10/2026	CWC
Upfront Embodied Carbon Report	44868	First issue, 22/09/2026	Complete Sustainability Solutions

Table 1: Supporting Reports

The key outcomes against the GMCA Energy and Carbon Framework are summarised in Table 2 and in full in the Energy and Carbon Proforma (Table 3, Section 1.1).

Energy hierarchy step	GMCA metric	Target (Major residential)	Old Mill Street	Status
Minimise energy demand	Space heating demand (kWh/m²/yr)	≤ 15 (flats)	30.8 (TM54, incl. landlord heating)	Not met
Maximise energy efficiency	Energy use intensity (kWh/m²/yr)	≤ 35 (TANZ homes); reported for others	79.8 before PV	Not met
Use renewable energy	PV footprint area (% of ground floor)	≥ 40%	c. 16% (c. 85 m²)	Not met
Use low carbon energy	Fossil fuel free	Yes	Yes, all electric	Met
	Carbon content of heat (gCO_2/kWh)	≤ 100	c. 69	Met
Reduce overheating risk	Part O met without mechanical cooling	Yes	Yes (DSY1)	Met
Minimise embodied carbon	Upfront embodied carbon A1 to A5 ($kgCO_2e/m^2$)	≤ 500	359.65	Met
Offsets	Offset contribution (£)	Mechanism to be adopted by each LPA	No mechanism adopted	n/a

Table 2: Summary of Performance Against the GMCA Key Performance Indicators

The development is fossil fuel free, delivers heat below the GMCA low carbon threshold, meets Part O without active cooling and is comfortably within the upfront embodied carbon limit for a Major development. It does not meet the GMCA space heating demand, energy use intensity or PV footprint values. The main reason is the proposed direct electric space heating, which converts each unit of electricity into one unit of heat, so that the space heating demand passes directly into the energy use intensity. The reasons for the proposed strategy, the justification under Policy JP-S3, and the measures identified to reduce energy use as the design develops are set out in Sections 2.6, 3.3 and 5.

1.1 Energy & Carbon Proforma

The completed GMCA Energy and Carbon Proforma (Residential, Major development) is reproduced in Table 3 and is submitted separately in Excel format.

Theme	Metric	Target value	Old Mill Street (Building 1)
General	Area (m^2 GIA)	-	3,226
	No. dwellings / affordable dwellings	-	41 / to be confirmed by the applicant
Minimise energy demand	Space heating demand (kWh/m^2 GIA/yr)	≤ 15 (flats)	30.8
	Calculation methodology	Predictive energy model	Predictive (IES VE 2025.2, CIBSE TM54), all 41 dwellings and landlord areas
	Form factor	≤ 2	0.90
	Average external wall U-value (W/m^2K)	≤ 0.15	0.14
	Average window U-value (W/m^2K)	≤ 1.0 (triple)	1.20 (double)
	Air permeability (m^3/h.m^2 @ 50 Pa)	≤ 1	3.0
Maximise energy efficiency	Energy use intensity (kWh/m^2 GIA/yr), excluding renewables	≤ 35	79.8
	Calculation methodology	Predictive energy model	Predictive (IES VE 2025.2, CIBSE TM54)
Use renewable energy	PV footprint area (% of ground floor)	≥ 40	c. 16 (c. 85 m^2 of c. 538 m^2)
	Annual renewable generation (kWh/m^2 footprint/yr)	-	c. 27
	Renewable energy balance (%)	-	5.6
	Total energy used (kWh/yr)	-	257,500
	Total energy generated on site (kWh/yr)	-	14,500
Use low carbon energy	Fossil fuel free	Yes	Yes

Theme	Metric	Target value	Old Mill Street (Building 1)
	Heating heat source	Electric	Electric (direct electric panel heaters)
	Domestic hot water heat source	Electric	Electric (air source heat pump water heater)
	Low Carbon Heat Appraisal completed	Yes	Yes
	Heat network suitability	-	Case 3: Heat and Energy Network Opportunity Area
	Exemption requested	-	Yes, non-connection justified (LCHA Section 9)
	Efficiency of heating system (SCOP)	≥ 3.5	1.0
	Efficiency of DHW system (SCOP)	≥ 3.5	3.5
	Carbon content of heat (gCO_2/kWh)	≤ 100	c. 69
Reduce overheating risk	Part O met without mechanical cooling?	Yes	Yes
	If no, how many homes are cooled?	-	None
	TM59 run with DSY2 and DSY3? Additional passive measures?	Yes	Yes / No
Minimise embodied carbon	Upfront embodied carbon ($kgCO_2e/m^2$ GIA)	≤ 500	359.65
	Top three materials ($kgCO_2e/m^2$ GIA)	-	1. Galvanised steel framing (SFS) 29.78 2. Reinforcement steel 29.78 3. Ready-mix concrete C32/40, 50% GGBS 25.74
	Life cycle embodied carbon	Large major only	Not required (Major)
Offsets	Offset contribution (£)	-	No mechanism adopted at the time of submission

Table 3: GMCA Energy and Carbon Proforma (Residential, Major)

1.2 Project Overview

The site is a 0.15 hectare cleared brownfield plot, most recently used as a surface gravel car park, at the corner of Old Mill Street and Lampwick Lane within the New Islington regeneration area to the east of Manchester city centre. It is bounded by Old Mill Street to

the north-west, Lampwick Lane and the Grade II listed Ancoats Dispensary to the south-west, existing housing to the north-east and the Stubbs Mill complex to the south-east.

The proposals comprise a six-storey residential building of 41 dwellings (Use Class C3) with associated bin storage, cycle parking and a small landscaped boundary. The building has a gross internal area of approximately 3,226 m², a reinforced concrete frame on piled foundations and a brick masonry façade. The dwelling mix is set out in Table 4.

Dwelling type	Number	Floor area (m², SAP)
1 bed 1 person apartment	19	40
2 bed 4 person apartment	19	70 to 90
Duplex (2 bed 4 person, 3 bed 6 person, 4 bed 7 person)	3	82 to 128
Total	41	2,429 (dwellings only)

Table 4: Dwelling Mix

The ground floor contains the residential entrance, cycle store (48 spaces), bin store, meter room and plant room, together with the lower levels of the duplex dwellings. The upper floors are arranged around a central stair and lift core.

Key site constraints that have shaped the energy strategy are:

- a tight urban site: the building occupies most of the ownership area, with around 1 m of planting on the south-west and north-east elevations and around 100 mm to the site boundary on parts of the north-west and south-east elevations;
- a level difference of around 500 mm across the site, requiring the ground floor slab to step;
- a small risk of surface water flooding along Lampwick Lane, which has informed external levels and drainage;
- adjacent heritage assets (Ancoats Dispensary and Stubbs Mill), referenced in the massing and façade design; and
- road and environmental noise, which restricts window opening on some façades (Section 6).

The whole building has been modelled in full: all 41 dwellings and the landlord areas are included in the predictive energy model, and all 107 bedrooms and kitchen/living/dining rooms are included in the overheating assessment.

1.3 Basis of this Statement and Limitations

This statement has been prepared at planning stage to set out the approach to Places for Everyone Policies JP-S2 and JP-S3. The following should be noted:

- it is based on the Buttress planning drawings issued under Transmittal 36 (28/09/2026), the architectural and structural information provided by the design team, and the supporting reports listed in Table 1; no site survey has been carried out;
- the energy, overheating and embodied carbon results are design stage predictions from computer modelling. Actual performance will depend on construction quality, commissioning, the way residents and the building manager operate the building, and the weather;
- design development is ongoing. The heating, hot water, ventilation and PV systems, product selections, the thermal line and the extent of the PV array described in this statement are subject to change and will be confirmed at the next design stage. Any changes will be reviewed against the principles of Policies JP-S2 and JP-S3;
- costs and carbon figures quoted from the Low Carbon Heat Appraisal are indicative and are provided for the comparison of options only; capital costs are to be confirmed by the project cost consultant;
- the measures identified in Section 3.3 to reduce energy use are opportunities for review by the design team; their effect is to be confirmed by modelling and they do not form a commitment at this stage; and
- the assessments should be updated as the design develops and at the as-built stage.

2.0 Building Fabric & Ventilation

2.1 Building Form & Heat Loss Envelope

The building is a compact, near-rectangular six-storey block with a simple flat roof, repetitive structural bays and limited façade articulation. There are no cantilevered balconies, inset terraces, podiums or basements. The plan is orientated at around 45° to north, so the four elevations face south-east, south-west, north-west and north-east. The building form is summarised in Table 5.

GIA (m^2)	External heat loss area (m^2)	Form factor	GMCA guide
3,226	2,891 (external walls 1,810; roof 540; ground floor 540)	0.90	≤ 2 (mid-rise apartments); 1 to 1.5 for denser schemes

Table 5: Building Form Summary

The form factor, calculated from the outer envelope of the IES VE model, is 0.90 (heat loss area of 2,891 m^2 over a GIA of 3,226 m^2). There are no exposed floors or boundaries to unheated spaces, as the thermal line encloses the whole building. This is more compact than the 1 to 1.5 range the GMCA guidance suggests for denser schemes and well within the proforma value of 2.

2.2 Elevation Design & Window Proportions

The elevational design references the nearby mills, using a regular grid of punched openings set within brick bays to create the perception of large mill-style windows, while limiting the glazed area to control overheating and heat loss. Window-to-wall ratios, from the architect's façade take-off, are given in Table 6 alongside the GMCA starting guide.

Elevation	Façade area (m^2)	Glazed area (m^2)	WWR	GMCA starting guide
South-east	435.2	124.0	28.5%	South 20 to 30%; east 10 to 20% (flex to 25%)
South-west	546.6	153.6	28.1%	South 20 to 30%; west 10 to 20% (flex to 25%)
North-west	435.2	145.8	33.5%	North 10 to 15%; west 10 to 20% (flex to 25%)
North-east	546.6	140.9	25.8%	North 10 to 15%; east 10 to 20% (flex to 25%)
Whole building	1,963.6	564.3	28.7%	

Table 6: Window-to-Wall Ratio Summary

The south-east and south-west elevations sit within the GMCA guide range for south-facing façades. The north-west and north-east elevations are above the guide for north-facing façades; this reflects the street frontage to Old Mill Street and the consistent mill-style grid on all four elevations. The overheating and space heating results in Sections 2.6 and 6 include the effect of these glazing areas, with lower g-value glass (0.40) on the south, east and west facing windows.

2.3 Heated & Unheated Spaces

The thermal envelope is shown in plan and section in Appendix 1 (Figures 1 and 2). The architect's current strategy encloses the whole building, including the ground floor plant room (78 m^2), bin store, cycle store and meter room, within the insulation line, to keep the envelope simple and avoid heavily insulated internal walls. The thermal line will be confirmed as the MEP design develops.

The heating strategy for each space type assumed in the predictive energy model is:

- dwellings: heated (electric panel heaters and towel rails); utility cupboards unheated, with cylinder losses as a gain;
- entrance and lift lobby: heated to 19 °C, 07:00 to 23:00;
- corridors and lobbies (ground to level 05): heated to 18 °C by electric radiant panels;
- stair: heated at level 05 only, 16 °C, 07:00 to 23:00; and
- plant room, meter room, bin store and cycle store: frost protection only (5 °C).

2.4 Fabric Specs & Air Tightness

A fabric first approach has been adopted. The proposed fabric specification, used consistently in the SAP, TM54 and Part O models, is set out in Table 7, and the thermal bridging values used in SAP in Table 8.

Element	Proposed	AD L 2021 limiting value	GMCA proforma value
External walls (incl. walls to corridors)	0.14 W/m²K	0.26 W/m²K	≤ 0.15 W/m²K
Roof	0.11 W/m²K	0.16 W/m²K	-
Ground floor	0.16 W/m²K	0.18 W/m²K	-
Windows (double glazed)	1.20 W/m²K	1.6 W/m²K	≤ 1.0 W/m²K (triple)
Glazing g-value	0.40 south, east, west; 0.50 north	-	-
External doors	1.20 W/m²K	1.6 W/m²K	-
Party walls	Fully filled and sealed (0.00 W/m²K)	0.20 W/m²K	-
Air permeability	3.0 m³/h.m² @ 50 Pa	8.0 m³/h.m² @ 50 Pa	≤ 1.0 m³/h.m² @ 50 Pa

Table 7: Fabric Specification

Junction	ψ (W/mK)	Junction	ψ (W/mK)
E1 / E2 Lintels	0.042	E16 Corner (normal)	0.030
E3 Sill	0.034	E17 Corner (inverted)	0.000
E4 Jamb	0.029	E18 Party wall between dwellings	0.060
E5 Ground floor (normal)	0.080	E21 Exposed floor (inverted)	0.080
E6 Intermediate floor within a dwelling	0.040	P1 Party wall, ground floor	0.040
E7 Party floor between dwellings	0.070	P2 / P3 Party wall, intermediate floors	0.000

Table 8: Thermal Bridging Values (SAP 10.2)

All elements are better than the Approved Document L limiting values. The external walls meet the GMCA proforma value; the windows and air permeability do not. The ψ-values are significantly better than SAP defaults and will need to be supported by calculated values (BR 497) or recognised construction details for every junction. The TM54 sensitivity analysis shows airtightness is the most influential fabric variable (Section 2.6).

2.5 Ventilation System

Each dwelling is served by a mechanical ventilation with heat recovery (MVHR) unit, located within the heated envelope with rigid ductwork, supplying the living rooms and bedrooms and extracting from kitchens and bathrooms. The MVHR runs continuously at the Approved Document F whole dwelling rates, with a boost mode used for summer cooling ventilation (Section 6) and an automatic summer bypass.

The SAP assessments use the Vent-Axia Sentinel Kinetic B (PCDB 500140), with a specific fan power of 0.76 to 1.07 W/(l/s) and heat recovery efficiency of 88% to 91% depending on the number of wet rooms. The final unit selection, including its ability to deliver the Part O boost rates of up to 70 to 82 l/s within the acoustic limits, will be confirmed by the MEP designer at the next design stage. Purge ventilation is provided by openable windows in every habitable room.

2.6 Space Heating Demand

Space heating demand has been calculated using predictive dynamic simulation modelling in IES VE 2025.2.0.0 following CIBSE TM54:2022 (report 3603-CWC-XX-XX-RP-N-7007 P01). The model represents every dwelling room by room, with realistic occupancy (73 residents across nine household types), heating set-points and schedules, and the landlord areas. The results are summarised in Table 9.

Basis	Space heating (kWh/m²/yr)	GMCA value
TM54 baseline (CIBSE TRY, design as specified, whole building incl. landlord heating)	30.8 (99.5 MWh/yr)	≤ 15
TM54 scenario 01: future weather, DSY1 2050 high emissions	26.0	≤ 15
TM54 scenario 02: air permeability 5.0 m³/h.m² (as-built risk)	39.0	≤ 15
TM54 scenario 03: ancillary stores heated to 16 °C	30.5	≤ 15
TM54 scenario 04: all households home working	31.4	≤ 15
For reference: SAP 10.2 area-weighted DFEE (dwellings only, standardised conditions)	31.0	-

Table 9: Space Heating Demand

The predicted space heating demand of 30.8 kWh/m²/yr is around twice the GMCA value of 15 kWh/m²/yr for flats. The contributing factors identified by the modelling are:

- the landlord heating included in the figure, in particular the corridors held at 18 °C around the clock;
- the design air permeability of 3.0 m³/h.m²: each 1 m³/h.m² changes space heating by about 4.1 kWh/m²/yr;
- double glazing at 1.20 W/m²K and window-to-wall ratios above the GMCA guide on the north-west and north-east elevations; and
- the higher heat loss of the three duplexes and the top-floor dwellings (SAP DFEE 34 to 41 kWh/m²/yr for the duplexes).

Measures to reduce the space heating demand have been identified in the TM54 and Low Carbon Heat Appraisal and are summarised in Section 3.3.

3.0 Maximise Energy Efficiency

3.1 Energy Use Intensity

The energy use intensity (EUI) has been calculated with the same TM54 model, including all regulated and unregulated electricity for the dwellings and landlord areas, and excluding PV generation and electric vehicle charging. Electricity is the only fuel. The baseline EUI is 79.8 kWh/m²/yr (257.5 MWh/yr), or 75.3 kWh/m²/yr net of the PV generation. The end-use breakdown is given in Table 10.

End use	MWh/yr	kWh/m²/yr	Share
Space heating (direct electric)	99.5	30.8	38.6%
Dwelling equipment, appliances and cooking	69.6	21.6	27.0%
Domestic hot water (heat pump water heater, SCOP 3.5)	35.4	11.0	13.8%
Passenger lift	15.1	4.7	5.9%
Internal lighting	10.9	3.4	4.2%
HVAC fans (MVHR)	10.0	3.1	3.9%
HVAC pumps	10.0	3.1	3.9%
Other equipment (landlord systems, alarms, booster set)	6.8	2.1	2.7%
External lighting	0.2	0.1	0.1%
Total before PV	**257.5**	**79.8**	**100%**
PV generation	-14.5	-4.5	
Total net of PV	**243.0**	**75.3**	

Table 10: Predicted Energy Use by End Use (TM54 baseline)

The EUI is around 2.3 times the GMCA value of 35 kWh/m²/yr, which is a requirement for Truly Affordable Net Zero (TANZ) homes and a reporting benchmark for other residential schemes. Space heating is the largest end use because the panel heaters deliver one unit of heat per unit of electricity. Appliance and cooking use alone (21.6 kWh/m²/yr) is close to two thirds of the GMCA value. TM54 scenario testing gives a range of 75.2 to 87.9 kWh/m²/yr (Table 11).

Scenario	Description	EUI before PV (kWh/m²/yr)	Change
Baseline	CIBSE TRY Manchester, design as specified, realistic occupancy	79.8	-
01	Future weather, DSY1 2050 high emissions 50th percentile	75.2	-5.8%
02	Air permeability 5.0 m³/h.m² (base 3.0)	87.9	+10.1%
03	Ancillary stores heated to 16 °C (base 5 °C)	79.5	-0.5%
04	All households home working	80.4	+0.7%
05a / 05b	Dwelling appliance use +25% / -25%	84.1 / 75.5	+5.4% / -5.4%
06a / 06b	Cooking energy +33% / -33%	81.3 / 78.4	+1.8% / -1.8%

Table 11: TM54 Scenario Results

3.2 Efforts to Reduce Energy Use of Equipment

Unregulated loads have been modelled item by item rather than as a single W/m² allowance, following TM54 Steps 4 to 9:

- appliances and cooking: each appliance modelled as a separate gain with its own timing profile, using energy label and product data for efficient mid-price models and measured UK use (Household Electricity Survey / Powering the Nation 2, Which?, ENERGY STAR, Ofcom), giving 1,215 to 2,704 kWh/yr per dwelling depending on household type;
- lift: one 17-person machine-room-less VVVF lift serving six floors, calculated with the NABERS UK Design for Performance method (15,083 kWh/yr, no regenerative drive credited);
- lighting: LED throughout, 120 lm/W in landlord areas with presence or microwave detection, profiles linked to occupancy and hours of darkness;
- landlord systems: alarms, access control, smoke control standby and the combined booster and sprinkler set, from assessor estimates pending the contractor's selections (6,839 kWh/yr); and
- hot water: SAP Appendix J volumes (Energy Saving Trust data), drawn according to bathroom and kitchen occupancy.

Measures to reduce these loads are included in the opportunities for further reduction in Section 3.3, including a regenerative lift drive, low-power MVHR, a variable speed booster set with low standby power and efficient white goods where supplied by the developer.

3.3 Opportunities for Further Reduction

The TM54 assessment has identified further opportunities to reduce operational energy use. These are to be reviewed with the design team, and their effect, individually and in combination, is to be confirmed by modelling as the design develops:

- heat pump space heating: replacing direct electric panel heaters with a heat pump system is the largest single opportunity, as a heat pump delivers several units of heat per unit of electricity. Options include individual air-to-water heat pumps with low temperature radiators, a communal air source heat pump or ambient loop, or exhaust air heat pumps;
- airtightness: a tighter design air permeability than 3.0 $m^3/h.m^2$, supported by an airtightness strategy at Stage 4, a continuous air barrier, sealed service penetrations and testing at first fix as well as completion;
- landlord heating: a lower corridor set-point with time control, or frost protection only, as corridors between heated dwellings with MVHR rarely need full heating;
- fabric: triple glazing and improved junction details at lintels, floor edges and masonry support;
- hot water: cylinders sized to need, the lowest declared standing losses, insulated primary and hot water pipework, low-flow fittings and, where practicable, waste water heat recovery on showers;
- ventilation: low-power MVHR units with short, low-resistance duct runs, commissioned to the design flow rates;
- lift and landlord systems: a regenerative lift drive, low standby power and a variable speed booster set;
- appliances: efficient white goods, induction hobs and heat pump dryers where supplied by the developer; and
- controls and residents: heating schedules pre-set at handover to follow occupancy rather than a continuous set-back, with a home user guide covering the heating app, MVHR boost and summer bypass, and window opening in hot weather.

Appliance and cooking use is the second largest end use and depends on residents, so part of the gap to the GMCA value cannot be fully controlled through the design.

4.0 Renewable Energy Generation

4.1 Proposed Renewable Energy Generation System

Roof-mounted solar PV is proposed, serving the landlord areas. The PV has not been included in the dwelling SAP assessments. The roof is shared with an extensive sedum green roof (also providing blue roof attenuation), the lift overrun, automatic opening smoke vents and the roof access hatch (Appendix 3, Figure 3). The proposed system is summarised in Table 12.

Description	Solar PV
Array area	c. 85 m^2 (estimated unshaded roof area)
Orientation / tilt	To be confirmed at detailed design (biosolar arrangement compatible with the sedum roof)
Peak output (kWp)	c. 16 to 19 kWp (to be confirmed at detailed design)
Panel	High efficiency monocrystalline modules (specification to be confirmed at detailed design)
PV area as a percentage of ground floor area	c. 16% (c. 85 m^2 of c. 538 m^2)
Expected annual renewable energy generation	c. 14,500 kWh/yr (TM54)
Annual generation per m^2 GIA	c. 4.5 kWh/m^2/yr
Annual generation per m^2 building footprint	c. 27 kWh/m^2fp/yr
Balance between total energy use and generation	5.6%
Shading constraints	Parapets, lift overrun and roof plant, and adjacent buildings
Data source	IES VE (TM54 model)

Table 12: PV System Specification

4.2 PV Footprint Area

The proposed array of about 85 m^2 is equivalent to around 16% of the building footprint, against the GMCA expectation of at least 40% (about 215 m^2). The current estimate reflects the roof area that is not significantly shaded by the parapets, lift overrun and adjacent buildings, after allowing for the smoke vents, access hatch and maintenance access. The extent of the array will be confirmed by a PV

layout and shading study at the next design stage, with the aim of maximising the PV area on the roof. A biosolar arrangement compatible with the sedum roof is proposed so that PV and green roof are not traded off against each other.

4.3 Renewable Energy Balance

The predicted annual PV generation of about 14.5 MWh/yr balances around 5.6% of the total predicted annual energy use of 257.5 MWh/yr. The remaining 243.0 MWh/yr would be the gap to be met by offsetting in future, should Manchester City Council adopt a mechanism (Section 8). PV generation reduces net energy and landlord bills but does not reduce the EUI used for the GMCA comparison.

5.0 Low Carbon Heating

5.1 Fossil Fuel Free

The development is fossil fuel free. There is no gas supply to the site and no combustion of any kind on site for space heating, hot water, cooking or back-up generation. No exemption from the fossil fuel free requirement is sought.

5.2 Proposed Systems for Heating and Hot Water

Heat network location case. No operating low carbon heat networks currently exist in Greater Manchester, so Case 1 does not apply. CWC is not aware of any planned low carbon heat network within 500 m of the site; this will be confirmed with Manchester City Council. The site lies within the PfE Heat and Energy Network Opportunity Areas east of the city centre and has therefore been assessed as Case 3, with a notional low carbon heat network at 100 gCO_2/kWh included in the appraisal. The DESNZ heat network zoning work identifies a Manchester city centre zone opportunity, but no formal zone has been designated. The nearest existing network, the Civic Quarter Heat Network about 2 km to the south-west, is supplied by gas-fired CHP and in line with the GMCA guidance is not considered for connection.

The proposed strategy is all electric:

- space heating: individual electric panel heaters sized room by room, with programmable time and temperature control and app control; electric towel rails to bathrooms and en-suites;
- domestic hot water: an individual air source heat pump water heater with integral storage cylinder in each dwelling (basis of design KERS Weatherby), located in the utility cupboard and ducted to the façade, so no external unit is needed;
- ventilation: MVHR to each dwelling (Section 2.5); and
- landlord areas: local direct electric heating (Section 2.3).

This corresponds to the GMCA "hot water heat pump plus direct electric" archetype. The blended carbon content of heat delivered is estimated at about 69 gCO_2/kWh, using an electricity factor of 0.100 $kgCO_2e$/kWh assumed for 2029 to 2043 in the absence of a confirmed completion date (the GMCA basis is the HM Treasury Green Book average over the first 15 years from completion). Space

heating is delivered at the grid factor and hot water at about 40 gCO_2/kWh. Using the current SAP 10.2 factor (0.136 $kgCO_2$/kWh) the figure would be about 94 gCO_2/kWh, still below the 100 gCO_2/kWh threshold.

5.3 Summary of Comparison with Other Systems from Low Carbon Heat Appraisal

The Low Carbon Heat Appraisal (Appendix 2) compares the proposed system with the GMCA benchmark (individual air source heat pump), a communal air source heat pump and a notional low carbon heat network. The key outputs are summarised in Table 13. All figures are indicative, per dwelling, using the Ofgem price cap unit rate for October to December 2026 (26.32 p/kWh).

KPI	Option 1: Proposed	Option 2: Benchmark individual ASHP	Option 3: Communal ASHP	Option 4: Notional heat network
Carbon content of heat (gCO_2/kWh)	69	34	57	100
Energy cost (£/yr)	690	340	480 + 150 charge	380 + 350 charge
Maintenance + replacement (£/yr)	60 + 230	150 + 410	220 + 330	120 + 80
Total operating cost vs benchmark	+9%	-	+32%	+4%
Capital cost (£/dwelling)	7,000	10,000	12,000	14,000
Capital cost vs benchmark	-30%	-	+20%	+40%
External plant / communal pipework	None / none	41 external units / none	Roof plant / yes	Interim plant / yes

Table 13: Heating System Appraisal Summary (LCHA)

The proposed system has been selected on the balance of:

- low carbon heat below the GMCA 100 gCO_2/kWh threshold, with no fossil fuel and no local combustion;
- the lowest capital cost of the options assessed (around 30% below the benchmark);
- the constrained site: 41 external heat pump units on a building close to the boundary and next to the Grade II listed Ancoats Dispensary would be difficult to locate and screen, and roof plant for a communal system would compete with the PV and green roof;
- no communal heating pipework in corridors and risers, avoiding distribution losses and overheating risk; and
- consumer protection: residents keep individual electricity supplies, can switch supplier, are covered by the price cap and can use time-of-use tariffs.

CWC acknowledges that the proposed system is not the lowest carbon option assessed, and that the benchmark individual air source heat pump would roughly halve residents' energy costs (about £340 against £690 per dwelling per year). The GMCA guidance describes the proposed archetype as suitable where heating loads are very low, and the predicted space heating demand (Section 2.6) is around twice the GMCA value. The LCHA therefore recommends fabric, airtightness, MVHR and control measures to reduce the space heating demand, and that individual air source heat pumps are reconsidered if the predicted demand cannot be brought close to the GMCA value.

Non-connection to a heat network is justified in Section 9 of the LCHA on carbon grounds (both on-site options are below the 100 gCO_2/kWh notional network), heating cost grounds (network charges of about £730/yr against £340/yr for the lower carbon benchmark), cost effectiveness grounds (no network or connection cost exists; about £14,000 against £7,000 per dwelling) and technical grounds (no programme or zone designation; communal pipework would add losses and overheating risk to a small, compact building). The decision on the exemption rests with the Local Planning Authority.

5.4 Proposed System for Cooling

No mechanical cooling is proposed in any dwelling or landlord space. Part O is met without active cooling (Section 6), using window opening within the acoustic limits and MVHR boost ventilation with summer bypass.

6.0 Overheating Risk

6.1 Natural Ventilation

Openable windows are provided to all bedrooms and kitchen/living/dining rooms. Window opening is restricted on some façades to meet internal noise limits, using the limits in the Stage 3 Acoustic Design Report by Hann Tucker Associates (32297/ADR1 Rev 0, 12/08/2025). Any change to the acoustic advice would require the overheating assessment to be updated. At night, bedroom openings are limited to the maximum acoustic open area for each façade zone; during the day, the hours that windows can be open are limited in line with the AVO Guide (Table 14).

Façade zone	Max. acoustic open area, bedroom windows, 23:00 to 07:00 (m^2)	Max. hours windows can be open, 07:00 to 23:00 (h)
Red	0.011	5.8
Orange	0.045	8.1
Green	0.111	11.2

Table 14: Acoustic Window Opening Restrictions Applied in the Thermal Model

Within these limits, windows open when rooms are occupied and the internal temperature reaches 22 °C, opening incrementally to fully open at 26 °C, as prescribed by Approved Document O. Because window opening is restricted, the dwellings have been assessed as predominantly mechanically ventilated, with the MVHR boosting above the background rate when the room temperature exceeds 21 °C (total supply and extract capacity of 70 l/s per dwelling, 82 l/s for the four-bedroom duplex) and heat recovery bypassed. Internal blinds have not been relied on. The glazing g-value is 0.40 on the south, east and west facing windows and 0.50 on north facing windows.

6.2 Overheating Risk Assessment

The assessment was carried out by dynamic thermal simulation in IES VE 2025.2.0.0 to Approved Document O (2021) and CIBSE TM59, using the Manchester DSY1 2020 high emissions 50th percentile weather file (report 3603-CWC-XX-XX-RP-N-7005 P03). As the dwellings are predominantly mechanically ventilated, the CIBSE fixed temperature test applies: operative temperature in living rooms, kitchens and bedrooms must not exceed 26 °C for more than 3% of annual occupied hours. The results are summarised in Table 15.

Weather file	Status	Bedrooms: highest % hours > 26 °C	KLDs: highest % hours > 26 °C	Rooms passing	Result
DSY1 (2020, high, 50th)	Mandatory	2.18% (GF 3B6P duplex, bed 1)	2.95% (GF 3B6P duplex)	107 of 107	Pass
DSY2	Advisory	Assessed: results available on request			-
DSY3	Advisory	Assessed: results available on request			-

Table 15: Overheating Risk Summary (CIBSE TM59 fixed temperature test, limit 3%)

All 107 assessed rooms (66 bedrooms and 41 kitchen/living/dining rooms) pass under DSY1 without mechanical cooling. The highest result, 2.95% in a ground floor duplex living space, is close to the 3% limit, so the margin is small for the ground floor duplexes. Communal corridors are reported as having no overheating risk; the proposed system has no communal heating pipework. The DSY2 and DSY3 weather files, representing more intense and longer summer heat events, have also been run as advisory stress tests of the design. In line with Approved Document O, compliance is demonstrated against DSY1; the DSY2 and DSY3 results are available on request.

7.0 Materials

7.1 Upfront Embodied Carbon

Upfront embodied carbon (modules A1 to A5) has been assessed by Complete Sustainability Solutions using One Click LCA, in accordance with the RICS Whole Life Carbon Assessment for the Built Environment (2023), based on the Stage 3 material take-off and the current architectural and structural information (report 44868, 22/09/2026). The results include a 15% design-stage uncertainty top-up and a 2% data uncertainty factor. The results are summarised in Table 16.

GIFA (m^2)	Total A1 to A5 ($kgCO_2e$)	Intensity ($kgCO_2e/m^2$)	GMCA target, Major ($kgCO_2e/m^2$)	LETI band (6+ storey residential)
3,224	1,159,503	359.65	≤ 500	B (< 400)

Table 16: Upfront Embodied Carbon Summary

The development meets the GMCA upfront embodied carbon target of 500 $kgCO_2e/m^2$ for a Major residential development and sits within LETI band B. The three materials with the highest upfront embodied carbon are:

- galvanised steel framing (SFS infill to the external wall): 29.78 $kgCO_2e/m^2$ (10.5% of A1 to A3), about 96 tCO_2e;
- reinforcement steel: 29.78 $kgCO_2e/m^2$ (10.5% of A1 to A3); and
- ready-mix concrete C32/40 with 50% GGBS in the binder: 25.74 $kgCO_2e/m^2$ (9.1% of A1 to A3), about 83 tCO_2e.

The embodied carbon assessment is based on Stage 3 information. The building services inputs in particular are subject to change and the assessment will be updated as the design develops.

7.1.1 Structural Lean Design

The structural scheme (Renaissance) is a reinforced concrete frame on piled foundations. Several options were considered at the early stages to coordinate the architectural layout with the structure:

- structural grid: the upper floors coordinate with a central core and an efficiently spaced perimeter of columns, and the ground floor layout has been coordinated so that the upper floor grid runs through to the foundations, avoiding carbon intensive transfer beams;
- core location: the central core provides vertical support and lateral stability; its central position minimises eccentric loading, core wall stresses and foundation demand, so only the walls needed structurally are reinforced concrete and the remainder are blockwork;
- slabs: the floor slabs carry most of the frame's embodied carbon, so the efficient grid has been used to reduce slab thickness to the practical minimum for acoustics, fire and detailing; transfer structures and cantilevers have been omitted; and
- concrete specification: 50% GGBS cement replacement in the C32/40 concrete reduces the product stage impact of the frame.

7.1.2 Architectural Lean Design

- façade: a simple form with repetitive structural bays and limited articulation, reducing material use, fabrication complexity and waste compared with a heavily articulated façade;
- metal components: decorative metal screens and feature fins have been avoided; the primary elevations are masonry, limiting secondary metal support to masonry support brackets and the SFS infill (which is nevertheless the largest single contributor, and the main opportunity for further reduction);
- windows: window areas have been sized to provide suitable daylight while limiting glazing, reducing the aluminium framing and glass in the façade; and
- multi-purpose components: the brick outer leaf provides weather protection, appearance, impact and fire resistance; the roof build-up provides weatherproofing, insulation, biodiversity and blue roof attenuation; plasterboard linings provide finish, acoustic and fire performance; and the aluminium windows provide daylight, purge ventilation, thermal and acoustic performance.

7.1.3 Building Services Lean Design

- passive measures (fabric, g-value selection, window opening and MVHR boost) avoid the need for any active cooling plant;
- individual in-dwelling systems avoid communal heating plant, risers and corridor pipework, and the hot water heat pumps need no external units;
- MVHR units to be located close to external walls with short, low-resistance duct runs; and

- each hot water heat pump has a small factory-sealed refrigerant charge; the refrigerant type and global warming potential are to be confirmed at detailed design, with a low GWP refrigerant preferred (the UK Net Zero Carbon Buildings Standard pilot limit is 677 $kgCO_2e/kg$).

7.2 Life Cycle Carbon Analysis

Life cycle embodied carbon (modules A to C) is required by the GMCA guidance for Large Major applications only and has not been reported for this Major application.

8.0 Offsetting

At the time of submission no operational carbon offsetting mechanism or tariff has been adopted by Manchester City Council or GMCA, so no financial contribution has been calculated.

For information, the gap between the predicted annual energy use (257.5 MWh/yr) and on-site renewable generation (14.5 MWh/yr) is about 243.0 MWh/yr. At the 0.100 $kgCO_2e/kWh$ factor used in the LCHA this is equivalent to about 24 tCO_2e per year. This figure would reduce with the measures in Section 3.3.

Appendix 1: Thermal Line Strategy

Thermal line (red) in plan and section, from the architect (Buttress). The thermal line will be confirmed as the MEP design develops.

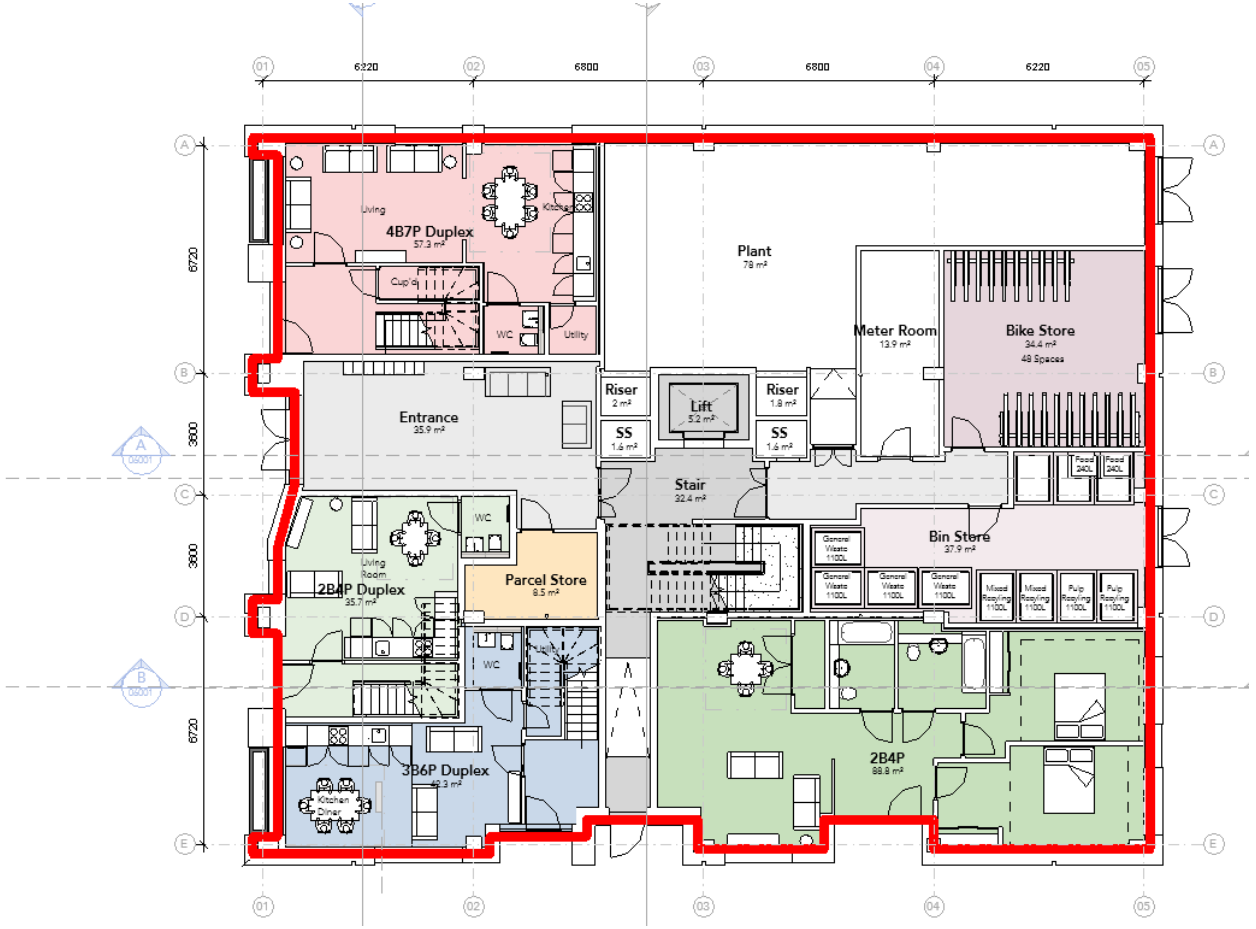


Figure 1: Thermal Line, Ground Floor Plan

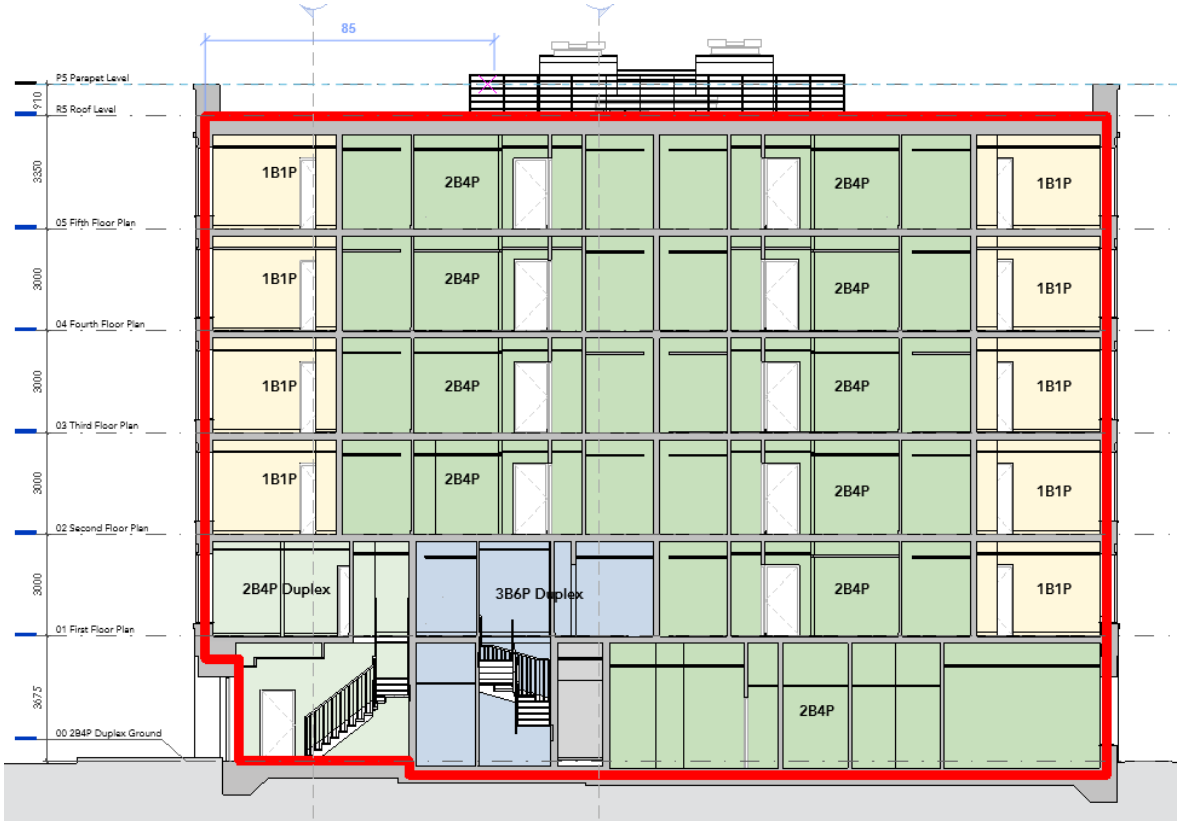


Figure 2: Thermal Line, Section

Appendix 2: Low Carbon Heat Appraisal

Low Carbon Heat Appraisal, 3603-CWC-XX-XX-RP-N-7010 P01 (09/10/2026), appended separately.

Appendix 3: Roof Layout

Roof GA plan (Buttress OLDMS-BUT-01-R5-DR-A-94006 P03). The PV layout will be added following the PV layout and shading study at the next design stage.

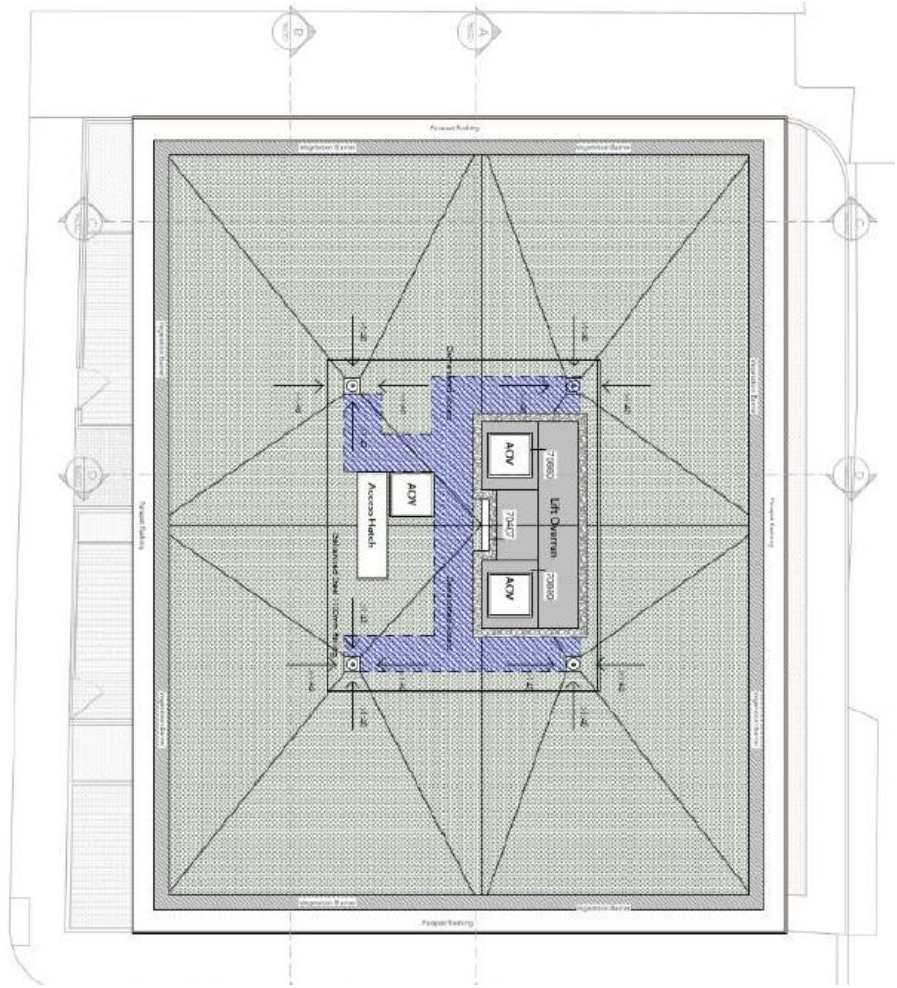


Figure 3: Roof Plan

Appendix 4: Overheating Report

Overheating (AD Part O) Assessment, 3603-CWC-XX-XX-RP-N-7005 P03 (09/10/2026), appended separately.

Appendix 5: Embodied Carbon Calculations

Upfront Embodied Carbon Report, Complete Sustainability Solutions, ref. 44868 (22/09/2026), appended separately.

Appendix 6: Supporting Energy Reports

CIBSE TM54 Operational Energy Assessment, 3603-CWC-XX-XX-RP-N-7007 P01, and Part L (Domestic) Compliance Report, 3603-CWC-XX-XX-RP-N-7006 P02 (09/10/2026), appended separately.