



ENERGY REPORT

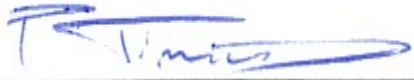
Client: NUVU Development Ltd

Site: Jacksons Brickworks

Document No. 23/080/R/01/F

May 2022

Document Control Sheet

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Date of Issue: 3rd May 2022	File Name: Energy Statement Document Ref: 23/080/R/01/F	Version: 6 Status: Revision F

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1. Executive Summary

Manchester City Council have declared a climate emergency and are committed to reducing CO2 emissions. This Energy Report has been carried out for the proposed Jacksons Brickworks Redevelopment in Newton Heath, Manchester. The report has been based on utilising best practice methodology in-line with the *Be Lean, Be Clean, Be Green* hierarchy.

Below indicates the measures to be included within the proposed development.

Be Lean (Use Less Energy)

To reduce energy demand and maximise energy efficiency, the development will benefit from:

- Improvements to the performance of the building fabric.
- Where possible, use of daylight to reduce lighting loads.
- Natural Ventilation and incorporating MVHR technology.
- Low energy lighting.
- High Efficiency Air Source Heating system.

Be Clean (Energy Efficiency)

To ensure 'clean' energy is utilised from low carbon technologies and to ensure demands are met as efficiently as possible:

- Heating Control (programmer, delayed start room thermostat, TRVs)
- LED Lighting throughout
- MVHR Ventilation

Be Green (Use Renewable Energy)

Inclusion of renewable energy technology:

- Decentralised Air Source Heat Pumps
- Solar PV

In the below table, it is estimated that following the SAP calculations the following improvements will need to be made to the specification.

	Part L 2010 Baseline Specification U Values	Proposed Improvements (15% reduction)
External walls	0.30	0.22
Roof	0.20	0.15
Floors	0.25	0.15
Windows / Doors	2.00	1.4
Partition Walls	0.20	0.20
Pressure Test	10m ³ /(h.m ²)@50pa	3m ³ /(h.m ²)@50pa
Ventilation		MVHR
Main Heating System		Air Source Heat Pump
Electric		Solar PV

It is believed that the above improvements on CO2 emissions of predicted energy use of the development will be reduced by 15% of the 2010 Part L figures listed above, (this equates to a 9% reduction of current Part L figures). This is demonstrated through the Sap Calculations which are attached as an appendix to this document.

Further improvements can be achieved through following latest Building Regulations as and when they're implemented.

2. Introduction

ECS Consultants Ltd have been commissioned by NUVU Development Ltd to carry out an Energy Report to assist with their planning submission for the Jacksons Brickworks Redevelopment, Newton Heath.

The purpose of this report is to analyse potential sustainable solutions, identify baseline carbon emissions and utilise the energy hierarchy to reduce carbon emissions and energy usage in-line with the national and local policies.

2.1 Development Description

The proposed development is located in Newton Heath, Manchester. The proposal is for the construction of approximately 716no. dwellings and a school. The proposed site plan is indicated below:



3. Policy Context

This section of the report reviews both local and national policy, establishing key principles that can be taken forward and applied across the development.

3.1 Policy Context - National

National Planning Policy Framework

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):

- a) *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 co-ordinating the provision of infrastructure.*
- b) *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.*
- c) *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.*

3.2 Policy Context - Local

Manchester's Local Development Framework Core Strategy Development Plan 2012 – 2027.

Strategic Areas for Low and Zero Carbon Decentralised Energy Infrastructure (EN5)

Within Manchester it is considered that the following strategic areas, indicated on the key diagram, will have a major role to play in achieving an increase in the level of decentralised, low and zero-carbon energy supplies available.

- *The Regional Centre, which also includes the Oxford Road Corridor and Eastlands*
- *District Centres and associated major development sites*
- *Airport Strategic Site*
- *Strategic housing location*
- *Strategic employment locations*

Within these areas new development, regeneration and retrofit projects, will be expected to take place in the context of more detailed proposals for a decentralised low and zero carbon energy infrastructure in the form of energy proposal plans. The Council will work with all relevant stakeholders, which may include developers, landowners, residents, community groups, private sector partners, utilities companies, neighbouring authorities and other public sector bodies, as appropriate, to bring forward such plans.

Where investment or development is being undertaken into or adjacent to a public building / asset or district heating network, full consideration shall be given to the potential role that these can have in providing an anchor load within a decentralised energy network or in creating opportunities for CO2 reduction funded contributions.

Manchester City Council's Policy of Core Strategy (EN6)

Applications for residential development of 10 or more units and all other development over 1000m² will be expected as a minimum to meet the target shown in Tables 12.1, unless this can be shown not to be viable. This should be demonstrated through an energy statement, submitted as part of the Design and Access Statement. Such a statement will be expected to set out the projected regulated energy demand and associated CO2 emissions for all phases of the development.

The target framework relates to three broad development locations and their potential for low and zero carbon, decentralised energy. The areas are defined as follows

Table 12.1 Domestic CO2 emissions reduction targets

Target	% Minimum Requirement
Target 1: Network Development Area	CHP / district heating anchor or connection or where not feasible, a 15% increase on Part L 2010
Target 2: Electricity Intense Buildings	10% Increase on Part L 2010
Target 3: Micro Generation Area	15% Increase on Part L 2010

4. Carbon Reduction Strategy

These measures relate to the conservation of the building energy demand and to its subsequent carbon dioxide emission. Passive measures relate to none building services solutions that aim to reduce the building energy demand. These typically include greater levels of thermal insulation resulting in reduced energy demand and subsequent reduction in carbon dioxide emissions.

Generally, when looking at Energy Strategy we look at 'Passive' measures as a first port of call, this then develops to 'Active' measures to try and achieve targets that cannot be met passively.

The following section details this design course.

Energy Hierarchy & Design Principles

The design process and decisions for the building follow the energy hierarchy's principles of Be Lean, Be Clean and Be Green.

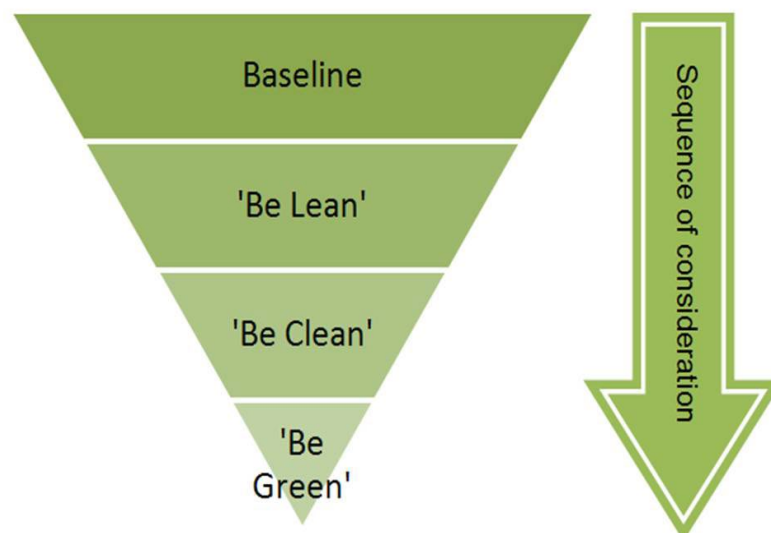


Figure 1 – Energy Hierarchy Diagram

The energy hierarchy is a classification of energy options, prioritised to assist progress towards a more sustainable energy system. The energy hierarchy uses a step by step process.

Be Lean:

In accordance with both national and local planning policy, a fabric first approach shall be taken in reducing energy demand / consumption. Below we have highlighted a number of aspects which shall be considered in achieving the reduction in overall energy demand.

- Improvements to the performance of the building fabric.
- Promotion of daylight to reduce lighting loads.
- Natural Ventilation and incorporating heat recovery technology in the building core.

- Low energy lighting.
- High Efficiency HVAC Plant, e.g. Air source heating / cooling systems.

The below indicates proposed u-values, going beyond the Building Regulation requirements.

Description	Part L1A Limiting Area Average U-Values (w/m ² K)	Proposed Required Average U-Values (w/m ² K)
Roof	0.2	0.15
Walls	0.3	0.22
Floor	0.25	0.15
Windows / Glazing	2	1.4
Air Permeability	10	3

Be Clean:

The aim of 'clean' improvements is to ensure that the energy that is required is sourced from a low-carbon technology and demands are met as efficiently as possible.

Both district-wide and site-wide heat networks can be utilised to provide heating and hot water to a development in an efficient manner, however, in this instance there isn't a district-wide network within the vicinity of the scheme.

In many cases we also see opportunities to include Combined Heat and Power systems (CHP), which allows for production of electricity from unused heat. Due to the development being a domestic, the use of CHP should not be considered.

For domestic dwellings, it is possible to introduce clean measures which reduce carbon emissions. Such as the below systems:

- Heating Control (programmer, delayed start room thermostat, TRVs)
- LED Lighting throughout
- MEV & MVHR Ventilation

Be Green:

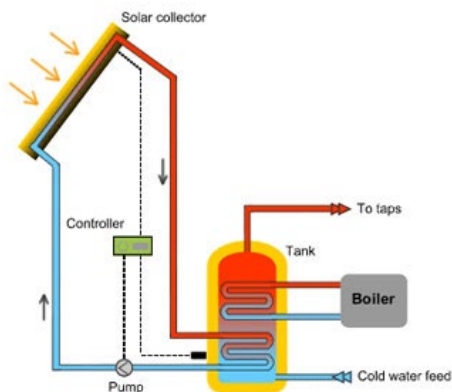
Promoting renewable technologies to further reduce the carbon footprint of the buildings; the appropriateness and size of renewables needs to be assessed at each design stage. Renewable technologies to be considered are listed below:

- Biomass Boilers
- Solar Water Heating
- Ground Source Heat Pump
- Air Source Heat Pump
- Solar PV

Biomass Boilers	
These boilers operate using timber pellets or wood chip fed from an adjacent hopper. The timber pellets or wood chip are burned within the heating chamber producing heat that is then used in a conventional way to serve radiators or underfloor heating. The diagram illustrates a biomass boiler system. It shows a storage room containing a hopper of wood pellets. A pellet boiler is connected to the hopper. The boiler is connected to a buffer storage tank. The buffer storage tank is connected to a space heating system (radiators) and a hot water system (hot water tap).	
Pros	Cons
Reduced Fuel Bills Reduced Carbon Footprint	Regular Pellet Delivery Required Large Plant Space Required Noise Issues Regular Maintenance Required
Suitability: Biomass boilers are not considered appropriate for this development due to the plant space required, regular maintenance requirement for pellet deliveries.	

Solar Water Heating

This system utilises solar panels to heat an antifreeze solution that provides a pre-heat to a hot water vessel. The system can work in conjunction with certain traditional boiler system.



Pros

- Reduced Fuel Bills
- Reduced Carbon Footprint
- Low Maintenance

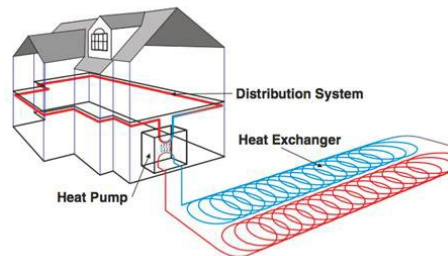
Cons

- Collectors need to be south facing to increase efficiency
- Carbon saving is low in comparison to other technologies

Suitability: Solar water heating is not considered appropriate for this development due to the need for south facing roofs to ensure increased efficiency.

Ground Source Heat Pump

This system operates like a domestic refrigerator but in reverse. The system comprises of a cold fluid that is pumped externally around to a bore hole or slinky coil system. As the fluid passes through the bore hole / slinky system it is heated by the surrounding earth and transferred to the dwelling.



Pros

Reduced Fuel Bills
Reduced Carbon Footprint
Low Maintenance
High Efficiency

Cons

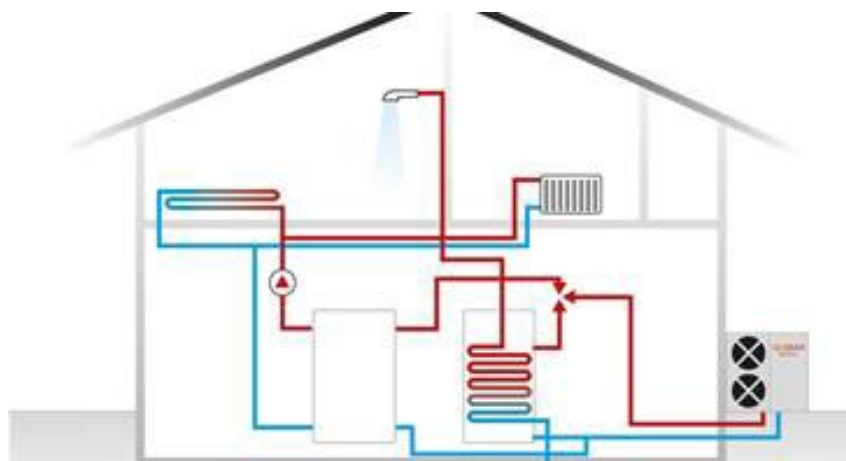
High capital cost
Requires large ground area
Requires larger radiators or UFH system due to reduced heat output

Suitability: A ground source heat pump system would be considered suitable for the apartment buildings; this is largely due to the ground area available and the ability to utilise communal ground in these instances.

A ground source heat pump would achieve a reduction in carbon emissions. Either larger radiators or underfloor heating system will need to be installed internally.

Air Source Heat Pump

This system comprises of a cold fluid which is pumped around an external condenser. The fluid is heated from the air. The warmer fluid is then compressed raising the temperature. The heat passes through a heat exchanger and into a buffer vessel. The buffer vessels are heated providing a core heat that can serve a conventional system such as underfloor heating or radiator system.



Pros

Reduced Fuel Bills
Reduced Carbon Footprint
Low Maintenance
High Efficiency

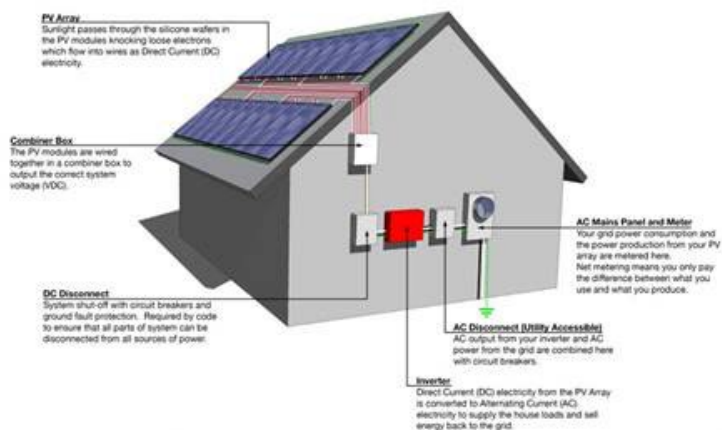
Cons

Requires space to locate unit
Requires larger radiators or UFH system due to reduced heat output

Suitability: An air source heat pump system would be a suitable solution on this development. Careful consideration would need to be given to the location of the external condensers and either larger radiators or UFH system will need to be installed internally, however, an Air Source system would achieve a reduction in carbon emissions and fuel bills.

Solar PV

This system converts sunlight and borrowed light into direct current electricity via a chemical reaction. The electricity is transformed through a series of controls into mains electricity.



Pros

Reduced Fuel Bills
Reduced Carbon Footprint
Low Maintenance
Proven Technology

Cons

Requires space to locate kit
Panels loose efficiency over time
Roof orientation will dictate efficiency of each system

Suitability: Solar PV systems would be a suitable solution on this development. Careful consideration would need to be given to the location of the associated equipment and may result in losing space internally, however, a Solar PV system would achieve a reduction in carbon emissions and fuel bills.

Be Green

We have reviewed the renewable options available to this development and conclude that either an air source heat pump or solar PV system would be a suitable renewable technology.

Summary of Be Lean, Be Clean, Be Green Proposals

Be Lean	U-Value
Ground Floor	0.15
External wall	0.22
Roof	0.15
Windows	1.4
Air Permeability	3
Be Clean	
Heating Controls ensuring efficiency	
MVHR System	
LED Lighting throughout	
Be Green	
Air Source Heat Pump or Solar PV panels to be investigated and specified for dwellings. Ground Source Heat Pump to be investigated for apartment buildings.	

The strategies that could be employed to meet the client's aspirations should apply measures as outlined above, to the new dwellings.

This should include, but not be limited to:

- (i) Improved building fabric.
- (ii) Installation of clean and green renewable technologies.
- (iii) Installation of Electric Car Charging points

Energy Meters

Energy metering systems should be installed to ensure that 90% of the estimated annual energy of each fuel type can be attributed to an end use category, e.g. lighting, heating, cooling, etc. Where specified, Low and Zero Carbon technologies should be separately monitored.

Insulation of Pipes, Ducts and Vessels

In general, the Insulation of Pipes, Ducts and Vessels must be designed in accordance with the Non-Domestic Heating, Cooling and Ventilation Compliance Guide.

5. SAP Calculations

SAP Calculations have been carried out on various proposed dwelling types to demonstrate a 15% reduction on 2010 Part L figures (9% reduction of current Part L figures)

5.1 Dwellings

A total of 6 SAP Calculations have been carried out for the proposed Jacksons Brickworks development, the SAP Calculations have been carried out using the below dwelling types: -

Apartment	-	Apartment 101
House	-	HT71
House	-	HT87
House	-	HT102
House	-	HT113
House	-	HT130

All the calculations have been completed with the worse case orientation and sheltered sides.

The dwellings are assumed to have a cavity construction with an aircrete block for the inner leaf and Accredited Construction Details for the thermal bridging.

5.2 U-Values

The below U-Values have been used in producing the SAP Calculations.

	Part L 2010 Baseline Specification U Values	Proposed U-Values (in line with AECB figures provided by Green Build Store)
External walls	0.30	0.22
Roof	0.20	0.15
Floors	0.25	0.15
Windows / Doors	2.00	1.4
Pressure Test	10m ³ /(h.m ²)@50pa	3m ³ /(h.m ²)@50pa

5.3 Mechanical and Electrical Systems

The below Systems have been used in producing the SAP Calculations.

Primary Heating	Air Source Heat Pump
Heat Emitters	Underfloor Heating Throughout
Water Heating	From Heat Pump
Water Cylinder	Indirect Cylinder
Ventilation	MVHR
Lighting	100% LED

It is confirmed that based on the details above, all the calculations are passing the requirements of Part L1a and are all bettering the carbon (DER) target by over 9% - HT-87 is closest sitting at around a 13.8% improvement with the other houses between 15-16% and the apartment is showing an improvement of over 46%.

All SAP Calculations are attached in Appendix A.

6. Conclusion

This report is based upon a review of the proposals and analysing the relevant national and local planning policy requirements. Manchester's Local Development Framework core Strategy Development Plan 2012 to 2027 has been reviewed and applied to the development.

Manchester City Councils Core Strategy, policy EN6 – target framework for CO₂ reductions from low or zero carbon energy supplies – highlights the requirement for a 15% reduction on Part L 2010, which equates to a 9% increase on Part L 2016.

The development follows the Be Lean, Be Clean, Be Green hierarchy.

Be Lean: Energy Efficient Measures

The development will benefit from a high specification building fabric with U Values which improve on current Part L1A 2016 values. This will ensure energy demand is reduced.

Be Clean: Energy Efficient Systems

All dwellings will have highly efficient MVHR ventilation systems installed and highly efficient LED lighting throughout.

Be Green: Renewable Technologies

Various renewable technologies have been evaluated as part of this report. The renewable energy systems below have been deemed suitable for the dwellings:

- Air Source Heat Pumps (standalone dwellings)
- Ground Source Heat Pump (apartment buildings)
- Solar PV

The SAP Calculations indicate that the proposal achieves the required 15% reduction on Part L 2010 Regulations as required as part of Manchester City Council's strategy.

APPENDIX A

SAP CALCULATIONS

BASIC COMPLIANCE REPORT

Calculation Type: New Build (As Designed)

Property Reference	CWS/ECS/Jackson/AptB1/101				Issued on Date	29/04/2022
Assessment Reference	Design	Prop Type Ref	Apt Block 1			
Property	Plot 101, Apartment Block 1, Jacksons Brickworks, Newton Heath, MANCHESTER, M40					
SAP Rating	81 B	DER	17.28	TER	32.46	
Environmental	88 B	% DER<TER	46.76			
CO ₂ Emissions (t/year)	0.94	DFEE	62.32	TFEE	66.72	
General Requirements Compliance	Pass	% DFEE<TFEE	6.60			
Assessor Details	Mr. Christopher Stevens, Award Energy, Tel: 01423 506070, info@awardenergy.co.uk				Assessor ID	K343-0001
Client						

SUMMARY FOR INPUT DATA FOR New Build (As Designed)

Criterion 1 – Achieving the TER and TFEE rate

1a TER and DER

Fuel for main heating	Electricity (c)		
Fuel factor	1.55 (electricity)		
Target Carbon Dioxide Emission Rate (TER)	32.46	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	17.28	kgCO ₂ /m ²	Pass
	-15.18 (-46.8%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	66.72	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	62.32	kWh/m ² /yr	
	-4.4 (-6.6%)	kWh/m ² /yr	Pass

Criterion 2 – Limits on design flexibility

Limiting Fabric Standards

2 Fabric U-values

Element	Average	Highest	
External wall	0.21 (max. 0.30)	0.22 (max. 0.70)	Pass
Party wall	0.00 (max. 0.20)	-	Pass
Floor	0.15 (max. 0.25)	0.15 (max. 0.70)	Pass
Openings	1.40 (max. 2.00)	1.40 (max. 3.30)	Pass

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals	3.00 (design value)	
Maximum	10.0	Pass

Limiting System Efficiencies

4 Heating efficiency

Main heating system	Community heating scheme	-
Secondary heating system	None	

5 Cylinder insulation

Hot water storage	No cylinder	
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BASIC COMPLIANCE REPORT

Calculation Type: New Build (As Designed)

6 Controls

Space heating controls	Charging system linked to use of community heating, programmer and at least two room stats	Pass
Hot water controls	No cylinder	

7 Low energy lights

Percentage of fixed lights with low-energy fittings	100	%	
Minimum	75	%	Pass

8 Mechanical ventilation

Continuous supply and extract system			
Specific fan power	0.66		
Maximum	1.5		Pass
MVHR efficiency	90	%	
Minimum	70	%	Pass

Criterion 3 – Limiting the effects of heat gains in summer

9 Summertime temperature

Overheating risk (West Pennines (England))	Slight	Pass
Based on:		
Overshading	Average	
Windows facing North	3.51 m ² , No overhang	
Windows facing East	5.30 m ² , No overhang	
Windows facing West	5.74 m ² , No overhang	
Air change rate	4.00 ach	
Blinds/curtains	None	

Criterion 4 – Building performance consistent with DER and DFEE rate

Party Walls

Type	U-value		
		W/m ² K	Pass

Air permeability and pressure testing

3 Air permeability

Air permeability at 50 pascals	3.00 (design value)		
Maximum	10.0		Pass

10 Key features

Party wall U-value	0.00	W/m ² K
Air permeability	3.0	m ³ /m ² h

This report has not been submitted through the Elmhurst Energy members' portal, therefore results are subject to change when the dwelling is completed.

BASIC COMPLIANCE REPORT

Calculation Type: New Build (As Designed)

Property Reference	CWS/ECS/Jackson/HT-71	Issued on Date	29/04/2022
Assessment Reference	Design	Prop Type Ref	HT71
Property	HT71, Jacksons Brickworks, Newton Heath, MANCHESTER, M40		
SAP Rating	81 B	DER	23.59
Environmental	83 B	TER	28.07
CO ₂ Emissions (t/year)	1.47	% DER<TER	15.95
General Requirements Compliance	Pass	DFEE	54.01
		TFEE	55.41
		% DFEE<TFEE	2.53
Assessor Details	Mr. Christopher Stevens, Award Energy, Tel: 01423 506070, info@awardenergy.co.uk		Assessor ID
			K343-0001
Client			

SUMMARY FOR INPUT DATA FOR New Build (As Designed)

Criterion 1 – Achieving the TER and TFEE rate

1a TER and DER

Fuel for main heating	Electricity		
Fuel factor	1.55 (electricity)		
Target Carbon Dioxide Emission Rate (TER)	28.07	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	23.59	kgCO ₂ /m ²	Pass
	-4.48 (-16.0%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	55.41	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	54.01	kWh/m ² /yr	
	-1.4 (-2.5%)	kWh/m ² /yr	Pass

Criterion 2 – Limits on design flexibility

Limiting Fabric Standards

2 Fabric U-values

Element	Average	Highest	
External wall	0.22 (max. 0.30)	0.22 (max. 0.70)	Pass
Party wall	0.00 (max. 0.20)	-	Pass
Floor	0.15 (max. 0.25)	0.15 (max. 0.70)	Pass
Roof	0.15 (max. 0.20)	0.15 (max. 0.35)	Pass
Openings	1.40 (max. 2.00)	1.40 (max. 3.30)	Pass

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals	3.00 (design value)	
Maximum	10.0	Pass

Limiting System Efficiencies

4 Heating efficiency

Main heating system	Heat pump with radiators or underfloor - Electric Air-to-water heat pump	
Secondary heating system	None	

BASIC COMPLIANCE REPORT

Calculation Type: New Build (As Designed)

5 Cylinder insulation

Hot water storage	Measured cylinder loss: 1.36 kWh/day Permitted by DBSCG 2.03	Pass
Primary pipework insulated	Yes	Pass

6 Controls

Space heating controls	Programmer and at least two room thermostats	Pass
Hot water controls	Cylinderstat	Pass
	Independent timer for DHW	Pass

7 Low energy lights

Percentage of fixed lights with low-energy fittings	100	%	
Minimum	75	%	Pass

8 Mechanical ventilation

Continuous supply and extract system			
Specific fan power	0.81		
Maximum	1.5		Pass
MVHR efficiency	89	%	
Minimum	70	%	Pass

Criterion 3 – Limiting the effects of heat gains in summer

9 Summertime temperature

Overheating risk (West Pennines (England))	Not significant	Pass
Based on:		
Overshading	Average	
Windows facing North	6.18 m ² , No overhang	
Windows facing East	3.08 m ² , No overhang	
Windows facing South	7.05 m ² , No overhang	
Air change rate	4.00 ach	
Blinds/curtains	None	

Criterion 4 – Building performance consistent with DER and DFEE rate

Party Walls

Type	U-value		
Filled Cavity with Edge Sealing	0.00	W/m ² K	Pass

Air permeability and pressure testing

3 Air permeability

Air permeability at 50 pascals	3.00 (design value)		
Maximum	10.0		Pass

10 Key features

Party wall U-value	0.00	W/m ² K
Air permeability	3.0	m ³ /m ² h

This report has not been submitted through the Elmhurst Energy members' portal, therefore results are subject to change when the dwelling is completed.

BASIC COMPLIANCE REPORT

Calculation Type: New Build (As Designed)

Property Reference	CWS/ECS/Jackson/HT-87			Issued on Date	29/04/2022
Assessment Reference	Design	Prop Type Ref	HT87		
Property	HT87, Jacksons Brickworks, Newton Heath, MANCHESTER, M40				
SAP Rating	80 C	DER	22.18	TER	25.74
Environmental	82 B	% DER<TER	13.82		
CO ₂ Emissions (t/year)	1.70	DFEE	50.30	TFEE	52.06
General Requirements Compliance	Pass	% DFEE<TFEE	3.37		
Assessor Details	Mr. Christopher Stevens, Award Energy, Tel: 01423 506070, info@awardenergy.co.uk			Assessor ID	K343-0001
Client					

SUMMARY FOR INPUT DATA FOR New Build (As Designed)

Criterion 1 – Achieving the TER and TFEE rate

1a TER and DER

Fuel for main heating	Electricity		
Fuel factor	1.55 (electricity)		
Target Carbon Dioxide Emission Rate (TER)	25.74	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	22.18	kgCO ₂ /m ²	Pass
	-3.56 (-13.8%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	52.06	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	50.30	kWh/m ² /yr	
	-1.8 (-3.5%)	kWh/m ² /yr	Pass

Criterion 2 – Limits on design flexibility

Limiting Fabric Standards

2 Fabric U-values

Element	Average	Highest	
External wall	0.22 (max. 0.30)	0.22 (max. 0.70)	Pass
Party wall	0.00 (max. 0.20)	-	Pass
Floor	0.15 (max. 0.25)	0.15 (max. 0.70)	Pass
Roof	0.15 (max. 0.20)	0.15 (max. 0.35)	Pass
Openings	1.40 (max. 2.00)	1.40 (max. 3.30)	Pass

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals	3.00 (design value)	
Maximum	10.0	Pass

Limiting System Efficiencies

4 Heating efficiency

Main heating system	Heat pump with radiators or underfloor - Electric Air-to-water heat pump	
Secondary heating system	None	

BASIC COMPLIANCE REPORT

Calculation Type: New Build (As Designed)

5 Cylinder insulation

Hot water storage	Measured cylinder loss: 1.64 kWh/day Permitted by DBSCG 2.24	Pass
Primary pipework insulated	Yes	Pass

6 Controls

Space heating controls	Programmer and at least two room thermostats	Pass
Hot water controls	Cylinderstat	Pass
	Independent timer for DHW	Pass

7 Low energy lights

Percentage of fixed lights with low-energy fittings	100	%	
Minimum	75	%	Pass

8 Mechanical ventilation

Continuous supply and extract system			
Specific fan power	1.01		
Maximum	1.5		Pass
MVHR efficiency	87	%	
Minimum	70	%	Pass

Criterion 3 – Limiting the effects of heat gains in summer

9 Summertime temperature

Overheating risk (West Pennines (England))	Not significant	Pass
Based on:		
Overshading	Average	
Windows facing North	7.26 m ² , No overhang	
Windows facing East	1.64 m ² , No overhang	
Windows facing South	10.08 m ² , No overhang	
Air change rate	4.00 ach	
Blinds/curtains	None	

Criterion 4 – Building performance consistent with DER and DFEE rate

Party Walls

Type	U-value		
Filled Cavity with Edge Sealing	0.00	W/m ² K	Pass

Air permeability and pressure testing

3 Air permeability

Air permeability at 50 pascals	3.00 (design value)		
Maximum	10.0		Pass

10 Key features

Party wall U-value	0.00	W/m ² K
Air permeability	3.0	m ³ /m ² h

This report has not been submitted through the Elmhurst Energy members' portal, therefore results are subject to change when the dwelling is completed.

BASIC COMPLIANCE REPORT

Calculation Type: New Build (As Designed)

Property Reference	CWS/ECS/Jackson/HT-102				Issued on Date	29/04/2022
Assessment Reference	Design			Prop Type Ref	HT102	
Property	HT102, Jacksons Brickworks, Newton Heath, MANCHESTER, M40					
SAP Rating	80 C	DER	20.99	TER	25.09	
Environmental	82 B	% DER<TER	16.34			
CO ₂ Emissions (t/year)	1.89	DFEE	49.92	TFEE	54.25	
General Requirements Compliance	Pass	% DFEE<TFEE	7.98			
Assessor Details	Mr. Christopher Stevens, Award Energy, Tel: 01423 506070, info@awardenergy.co.uk				Assessor ID	K343-0001
Client						

SUMMARY FOR INPUT DATA FOR New Build (As Designed)

Criterion 1 – Achieving the TER and TFEE rate

1a TER and DER

Fuel for main heating	Electricity			
Fuel factor	1.55 (electricity)			
Target Carbon Dioxide Emission Rate (TER)	25.09	kgCO ₂ /m ²		
Dwelling Carbon Dioxide Emission Rate (DER)	20.99	kgCO ₂ /m ²		Pass
	-4.10 (-16.3%)	kgCO ₂ /m ²		

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	54.25	kWh/m ² /yr		
Dwelling Fabric Energy Efficiency (DFEE)	49.92	kWh/m ² /yr		
	-4.4 (-8.1%)	kWh/m ² /yr		Pass

Criterion 2 – Limits on design flexibility

Limiting Fabric Standards

2 Fabric U-values

Element	Average	Highest	
External wall	0.21 (max. 0.30)	0.22 (max. 0.70)	Pass
Party wall	0.00 (max. 0.20)	-	Pass
Floor	0.15 (max. 0.25)	0.15 (max. 0.70)	Pass
Roof	0.14 (max. 0.20)	0.15 (max. 0.35)	Pass
Openings	1.40 (max. 2.00)	1.40 (max. 3.30)	Pass

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals	3.00 (design value)	
Maximum	10.0	Pass

Limiting System Efficiencies

4 Heating efficiency

Main heating system	Heat pump with radiators or underfloor - Electric Air-to-water heat pump	
Secondary heating system	None	

BASIC COMPLIANCE REPORT

Calculation Type: New Build (As Designed)

5 Cylinder insulation

Hot water storage	Measured cylinder loss: 1.64 kWh/day Permitted by DBSCG 2.24	Pass
Primary pipework insulated	Yes	Pass

6 Controls

Space heating controls	Programmer and at least two room thermostats	Pass
Hot water controls	Cylinderstat	Pass
	Independent timer for DHW	Pass

7 Low energy lights

Percentage of fixed lights with low-energy fittings	100	%	
Minimum	75	%	Pass

8 Mechanical ventilation

Continuous supply and extract system			
Specific fan power	1.01		
Maximum	1.5		Pass
MVHR efficiency	87	%	
Minimum	70	%	Pass

Criterion 3 – Limiting the effects of heat gains in summer

9 Summertime temperature

Overheating risk (West Pennines (England))	Not significant	Pass
Based on:		
Overshading	Average	
Windows facing East	8.68 m ² , No overhang	
Windows facing South	2.04 m ² , No overhang	
Windows facing West	7.66 m ² , No overhang	
Air change rate	4.00 ach	
Blinds/curtains	None	

Criterion 4 – Building performance consistent with DER and DFEE rate

Party Walls

Type	U-value		
Filled Cavity with Edge Sealing	0.00	W/m ² K	Pass

Air permeability and pressure testing

3 Air permeability

Air permeability at 50 pascals	3.00 (design value)		
Maximum	10.0		Pass

10 Key features

External wall U-value	0.11	W/m ² K
Party wall U-value	0.00	W/m ² K
Roof U-value	0.11	W/m ² K
Air permeability	3.0	m ³ /m ² h

This report has not been submitted through the Elmhurst Energy members' portal, therefore results are subject to change when the dwelling is completed.

BASIC COMPLIANCE REPORT

Calculation Type: New Build (As Designed)

Property Reference	CWS/ECS/Jackson/HT-113			Issued on Date	29/04/2022
Assessment Reference	Design	Prop Type Ref	HT113		
Property	HT113, Jacksons Brickworks, Newton Heath, MANCHESTER, M40				
SAP Rating	80 C	DER	20.67	TER	24.43
Environmental	82 B	% DER<TER	15.39		
CO ₂ Emissions (t/year)	2.02	DFEE	50.90	TFEE	53.60
General Requirements Compliance	Pass	% DFEE<TFEE	5.04		
Assessor Details	Mr. Christopher Stevens, Award Energy, Tel: 01423 506070, info@awardenergy.co.uk			Assessor ID	K343-0001
Client					

SUMMARY FOR INPUT DATA FOR New Build (As Designed)

Criterion 1 – Achieving the TER and TFEE rate

1a TER and DER

Fuel for main heating	Electricity		
Fuel factor	1.55 (electricity)		
Target Carbon Dioxide Emission Rate (TER)	24.43	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	20.67	kgCO ₂ /m ²	Pass
	-3.76 (-15.4%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	53.60	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	50.90	kWh/m ² /yr	
	-2.7 (-5.0%)	kWh/m ² /yr	Pass

Criterion 2 – Limits on design flexibility

Limiting Fabric Standards

2 Fabric U-values

Element	Average	Highest	
External wall	0.22 (max. 0.30)	0.22 (max. 0.70)	Pass
Party wall	0.00 (max. 0.20)	-	Pass
Floor	0.15 (max. 0.25)	0.15 (max. 0.70)	Pass
Roof	0.15 (max. 0.20)	0.15 (max. 0.35)	Pass
Openings	1.40 (max. 2.00)	1.40 (max. 3.30)	Pass

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals	3.00 (design value)	
Maximum	10.0	Pass

Limiting System Efficiencies

4 Heating efficiency

Main heating system	Heat pump with radiators or underfloor - Electric Air-to-water heat pump	
Secondary heating system	None	

BASIC COMPLIANCE REPORT

Calculation Type: New Build (As Designed)

5 Cylinder insulation

Hot water storage	Measured cylinder loss: 1.71 kWh/day Permitted by DBSCG 2.56	Pass
Primary pipework insulated	Yes	Pass

6 Controls

Space heating controls	Programmer and at least two room thermostats	Pass
Hot water controls	Cylinderstat	Pass
	Independent timer for DHW	Pass

7 Low energy lights

Percentage of fixed lights with low-energy fittings	100	%	
Minimum	75	%	Pass

8 Mechanical ventilation

Continuous supply and extract system			
Specific fan power	0.88		
Maximum	1.5		Pass
MVHR efficiency	88	%	
Minimum	70	%	Pass

Criterion 3 – Limiting the effects of heat gains in summer

9 Summertime temperature

Overheating risk (West Pennines (England))	Not significant	Pass
Based on:		
Overshading	Average	
Windows facing North	1.36 m ² , No overhang	
Windows facing East	9.29 m ² , No overhang	
Windows facing West	9.09 m ² , No overhang	
Air change rate	4.00 ach	
Blinds/curtains	None	

Criterion 4 – Building performance consistent with DER and DFEE rate

Party Walls

Type	U-value		
Filled Cavity with Edge Sealing	0.00	W/m ² K	Pass

Air permeability and pressure testing

3 Air permeability

Air permeability at 50 pascals	3.00 (design value)		
Maximum	10.0		Pass

10 Key features

Party wall U-value	0.00	W/m ² K
Air permeability	3.0	m ³ /m ² h

This report has not been submitted through the Elmhurst Energy members' portal, therefore results are subject to change when the dwelling is completed.

BASIC COMPLIANCE REPORT

Calculation Type: New Build (As Designed)

Property Reference	CWS/ECS/Jackson/HT-130				Issued on Date	29/04/2022
Assessment Reference	Design	Prop Type Ref	HT113			
Property	HT113, Jacksons Brickworks, Newton Heath, MANCHESTER, M40					
SAP Rating	80 C	DER	20.19	TER	23.89	
Environmental	82 B	% DER<TER	15.50			
CO ₂ Emissions (t/year)	2.26	DFEE	51.41	TFEE	54.42	
General Requirements Compliance	Pass	% DFEE<TFEE	5.51			
Assessor Details	Mr. Christopher Stevens, Award Energy, Tel: 01423 506070, info@awardenergy.co.uk				Assessor ID	K343-0001
Client						

SUMMARY FOR INPUT DATA FOR New Build (As Designed)

Criterion 1 – Achieving the TER and TFEE rate

1a TER and DER

Fuel for main heating	Electricity		
Fuel factor	1.55 (electricity)		
Target Carbon Dioxide Emission Rate (TER)	23.89	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	20.19	kgCO ₂ /m ²	Pass
	-3.70 (-15.5%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	54.42	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	51.41	kWh/m ² /yr	
	-3.0 (-5.5%)	kWh/m ² /yr	Pass

Criterion 2 – Limits on design flexibility

Limiting Fabric Standards

2 Fabric U-values

Element	Average	Highest	
External wall	0.22 (max. 0.30)	0.22 (max. 0.70)	Pass
Party wall	0.00 (max. 0.20)	-	Pass
Floor	0.15 (max. 0.25)	0.15 (max. 0.70)	Pass
Roof	0.15 (max. 0.20)	0.15 (max. 0.35)	Pass
Openings	1.40 (max. 2.00)	1.40 (max. 3.30)	Pass

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals	3.00 (design value)	
Maximum	10.0	Pass

Limiting System Efficiencies

4 Heating efficiency

Main heating system	Heat pump with radiators or underfloor - Electric Air-to-water heat pump	
Secondary heating system	None	

BASIC COMPLIANCE REPORT

Calculation Type: New Build (As Designed)

5 Cylinder insulation

Hot water storage	Measured cylinder loss: 1.71 kWh/day Permitted by DBSCG 2.56	Pass
Primary pipework insulated	Yes	Pass

6 Controls

Space heating controls	Programmer and at least two room thermostats	Pass
Hot water controls	Cylinderstat	Pass
	Independent timer for DHW	Pass

7 Low energy lights

Percentage of fixed lights with low-energy fittings	100	%	
Minimum	75	%	Pass

8 Mechanical ventilation

Continuous supply and extract system			
Specific fan power	0.88		
Maximum	1.5		Pass
MVHR efficiency	88	%	
Minimum	70	%	Pass

Criterion 3 – Limiting the effects of heat gains in summer

9 Summertime temperature

Overheating risk (West Pennines (England))	Not significant	Pass
Based on:		
Overshading	Average	
Windows facing North	1.36 m ² , No overhang	
Windows facing East	9.20 m ² , No overhang	
Windows facing West	10.16 m ² , No overhang	
Air change rate	4.00 ach	
Blinds/curtains	None	

Criterion 4 – Building performance consistent with DER and DFEE rate

Party Walls

Type	U-value		
Filled Cavity with Edge Sealing	0.00	W/m ² K	Pass

Air permeability and pressure testing

3 Air permeability

Air permeability at 50 pascals	3.00 (design value)		
Maximum	10.0		Pass

10 Key features

Party wall U-value	0.00	W/m ² K
Air permeability	3.0	m ³ /m ² h

This report has not been submitted through the Elmhurst Energy members' portal, therefore results are subject to change when the dwelling is completed.