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PARKHILL AVENUE, CRUMPSALL

ENERGY STATEMENT

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EXECUTIVE SUMMARY

JPM Acoustics has been appointed to provide an Energy Statement to support a planning application for 24x proposed dwellings at Parkhill Avenue, Crumpsall. The proposed development comprises 9x semi-detached dwellings, and 15x flats.

The scheme is being designed to achieve compliance with Building Regulations Part L2021 and Manchester City Council's Planning Policies relating to energy efficiency. The structure and philosophy of this report has been based upon identifying and implementing best practice technologies, where appropriate, and adheres to the "Be Lean, Be Clean and Be Green" hierarchy, a summary of which is provided below.

Energy Efficient Measures (Be Lean – Use Less Energy)

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

- The U-values all improve upon the minimum standards within Building regulations Part L 2021.
- Improved Psi values for limiting thermal bridging.
- Glazing which will be BFRC certified
- Low air leakages rates have been adopted to ensure that the dwellings are air tight and will retain heat to a higher standard.

Energy Efficient Systems (Be Clean – Supply Energy Efficiently)

- Dedicated LED low energy efficient light fittings within all areas
- MVHR has been included to complement the low air leakage rate. This can also improve the air quality and circulation inside the property and will improve any external sound issues.

Renewable Technologies (Be Green – Use Renewable Energy)

The following renewable technologies have been evaluated as part of this report:

- Solar Thermal
- Solar PV
- Combined Heat and Power (CHP)
- Air Source Heat Pump
- Ground Source Heat Pump

The dwellings will be fitted with panel heaters for heating and air source heat pump cylinders for hot water.

Table 1 below provides a summary of the Be Lean, Be Clean and Be Green measured incorporated into the scheme design.

Table 1: Summary of Be Lean, Be Clean and Be Green Measures Adopted Across the Scheme

Be Lean	
Element	Performance
Ground Floor	0.11 W/m ² k
External Wall	0.19 W/m ² k
Roof:	0.15 W/m ² k
Windows including roof lights	1.2 W/m ² k G-value = 0.40 (apartments) G-value = 0.50 (apartments)
External Doors	1.2 W/m ² k
Thermal Bridging	Accredited thermal bridging details
Air Permeability	3.00 (Based on all new build plots being tested)
Be Clean	
Heating is to be provided with panel heaters and hot water is to be provided by air source heat pump hot water cylinders.	
Efficient heating controls – Time and Temp controls	
100% LED lighting	
Low energy mechanical ventilation systems. Houses are to be provided with Decentralised Mechanical Extract Ventilation and Apartments are to be provided by Mechanical Ventilation with Heat Recovery.	
Be Green	
Air Source heat pump cylinders are the most feasible technology for a development of this nature. They will offer a significant reduction in carbon emissions in line with current legislation and ensure Manchester Planning Policies are met.	

This assessment concludes that CO₂ emissions of predicted energy use of the development will meet the targets within Part L of the Building Regulations and Manchester City Council's Planning Policies.

1.0. INTRODUCTION

1.1. OVERVIEW

- 1.1.1. This Energy Statement report has been prepared by JPM Acoustics on behalf of Great Places Housing Group to support a full planning application for a residential development comprising 9x dwelling-houses and 15x flats on land off Parkhill Avenue, Crumpsall.
- 1.1.2. The purpose of this energy statement is to model the energy consumption of the proposed development, utilising SAP 10 software, identify the baseline carbon emissions, then utilise the energy hierarchy to minimise energy usage and carbon emissions, thus ensuring compliance with both national and local development policies.

1.2. SITE LOCATION AND PROPOSED DEVELOPMENT

- 1.2.1. At present, the site comprises open land which is located in a mixed-use area of Crumpsall. Immediately to the north lies Cleveland Road, with the premises of British Cables Company approximately 60 m further north; to the east lies Delaunays Road; to the south are residential properties along Delaunays Road and Parkhill Avenue; and to the west lies Parkhill Avenue.
- 1.2.2. The site location is presented in **Figure 1.1**.

Figure 1.1: Site location plan



- 1.2.3. The development proposals include for 9 no. properties with private gardens and 15x flats with an associated shared garden space. **Figure 1.2** shows the Proposed Site Layout Plan.

Figure 1.2: Proposed site layout plan

Source: Triangle Architects. Drawing reference: SK06 rev A

2.0. POLICY CONTEXT

2.1. NATIONAL PLANNING POLICY FRAMEWORK FEBRUARY 2021

2.1.1. The NPPF outlines three overarching objectives, which are interdependent and need to be pursued in mutually supportive ways so that opportunities can be pursued to secure net gains across each of the three 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 coordinating the provision of infrastructure;
- b) **social objective** – to support strong, vibrant and healthy communities, by ensuring that a sufficient number and range of homes can be provided to meet the needs of present and future generations; and by fostering a well-designed and safe built environment, with accessible services and open spaces that reflect current and future needs and support communities' health, social and cultural well-being; and
- 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

2.2. MANCHESTER'S LOCAL DEVELOPMENT FRAMEWORK CORE STRATEGY DEVELOPMENT PLAN 2012 – 2027

Strategic Areas for Low and Zero Carbon Decentralised Energy Infrastructure

2.2.1. 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.

Manchester City Council's Policy EN 6 of Core Strategy

2.2.2. Policy EN 6 requires applications for new development of 10 or more units and all other development over 1,000 sq. m to achieve a 15% reduction in CO2 emissions on Part L 2010, this equates to a 9% improvement upon Building Regulations Part L 2016.

2.2.3. After reviewing the Local Planning Policies, the development is required to achieve a 9% improvement above Building Regulations Part L 2016.

3.0. CARBON REDUCTION STRATEGY

- 3.1.1. Within this section of the report we will, utilising SAP 10 software, carry out an assessment of the proposed development against current Building Regulations. We will establish CO₂ baseline for the scheme, then, following the energy hierarchy, establish a low-carbon specification to ensure CO₂ emissions meet the requirements of both national and local policy.
- 3.1.2. Full SAP calculations will be carried out at detailed design to ensure the specification meets the local policy. If any amendments are required these will be incorporated at this point.

3.2. REVIEW AND IMPLEMENT THE ENERGY HIERARCHY: BE LEAN – BE CLEAN – BE GREEN

- 3.2.1. 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:
- Step 1 Be lean – use less energy.
 - Step 2 Be Clean – use energy efficiently.
 - Step 3 Be Green – utilise renewable technology.

Be Lean – Use Less Energy

- 3.2.2. The developer, in accordance with both national and local planning policy, has stated a desire to ensure the development follows a fabric first approach, therefore reducing demand on the national grid as far as reasonably possible. Below we have highlighted the proposed U-values, going beyond the requirements of Building Regulations; thus improving upon the baseline CO₂ emissions.

Table 3.1: Summary of “Be Lean” Measures Adopted Across the Scheme

Be Lean	
Element	Performance
Ground Floor	0.11 W/m ² k
External Wall	0.19 W/m ² k
Roof:	0.15 W/m ² k
Windows including roof lights	1.2 W/m ² k G-value = 0.40 (apartments) G-value = 0.50 (apartments)
External Doors	1.2 W/m ² k
Thermal Bridging	Accredited thermal bridging details

Be Lean	
Air Permeability	3.00 (Based on all new build plots being tested)

Be Clean – Supply Energy Efficiency

- 3.2.3. Within this section of the energy hierarchy, we see an emphasis being placed upon ensuring the regulated energy demands of the development are met as efficiently as possible.
- 3.2.4. Both district-wide and site-wide heat networks can be utilised to provide heating and hot water to a development in an efficient manner. In this instance there isn't a district wide network within the vicinity of the scheme.
- 3.2.5. In some instances there are opportunities to include a Combined Heat and Power system (CHP), which allows for the production of energy. However, due to the units being domestic use, CHP is not considered a viable option.
- 3.2.6. The next stage is to look at possible “be clean” measures that could be introduced to individual dwellings on site. **Table 3.2** identifies potential “be clean” measures which could be adopted across the scheme.

Table 3.2: Summary of “Be Clean” Measures Adopted Across the Scheme

Be Clean
Heating is to be provided with panel heaters and hot water is to be provided by air source heat pump hot water cylinders.
Efficient heating controls – Time and Temp controls
100% LED lighting
Low energy mechanical ventilation systems. Houses are to be provided with Decentralised Mechanical Extract Ventilation and Apartments are to be provided by Mechanical Ventilation with Heat Recovery.

Be Green – Review of Renewable Technologies

- 3.2.7. The final phase is to ascertain if the development could reasonably benefit from renewable / low carbon technologies. As such, the following renewable/low carbon technologies have been analysed for implementation:
- Solar Thermal
 - Solar PV
 - CHP
 - Air Source Heat Pump
 - Ground Source Heat Pump

3.2.8. Tables 3.3, 3.4, 3.5, 3.6 and 3.7 present a summary of the Pros and Cons of the renewable technologies detailed above.

Table 3.3: Summary of Pros and Cons of Solar Thermal Technologies

Solar Thermal - solar thermal hot water collectors are panels or evacuated tubes which are typically located on the roof of the buildings. The collectors harness the sun's energy to warm domestic hot water.	
Pros	Cons
Reduced fuel bills and carbon footprint.	Only compatible with boilers that have hot water storage.
Low maintenance.	Need south facing roofs to optimise efficiency.
Proven technology.	Carbon saved is low comparative to the savings offered by PV.
Suitability – Solar Thermal HW is not considered appropriate for this development due to the relatively low carbon savings offered by this technology. Greater savings will be achieved using other measures.	

Table 3.4: Summary of Pros and Cons of Solar PV Technologies

Solar PV - Solar Photovoltaic (PV) panels work by converting energy from the sun into electricity. This can then be used with the development to offset the electrical usage.	
Pros	Cons
Reduced bills and carbon footprint.	PV panels lose efficiency over their lifetime.
Benefit from the feed in tariff.	
Proven technology.	
Relatively maintenance free.	
Suitability – PV would be suited to this development as it is a simple bolt on technology that will assist with meeting the energy demand of the building and ensure compliance with the local planning policy. PV, has however been discounted as compliance with Building Regs and Manchester Planning Policies will be achieved using Air Source Heat Pump Hot Water Cylinders.	

Table 3.5: Summary of Pros and Cons CHP technology

CHP - CHP is a technology which develops heat and power from the same energy source, typically mains gas. The CHP engine is fed by mains gas which then drives an alternator to provide electricity

Pros	Cons
Reduced fuel bills and carbon footprints.	Not a true renewable technology.
Eligible for the feed in tariff.	Heating and electricity demand must remain fairly stable to ensure CHP is running at optimum efficiency.
Proven technology which is in use in many schemes in the UK.	Requires a centralised/district heating network scheme so is therefore more suited to apartment blocks.
Suited to large developments.	Noise.
	Capital intensive.
<p>Suitability – The total size and nature of the development does not lend itself to CHP. It would add to the capital costs of the development making the development not financially viable. For these reasons, CHP has been discounted.</p>	

Table 3.6: Summary of Pros and Cons of Air Source Heat Pump

Air Source Heat Pump - Air source heat pumps extract heat from the external air which can be used to heat radiators/underfloor heating and hot water within a dwelling. ASHP can still extract heat from air as cold as -15 degrees centigrade.

Pros	Cons
Can offer lower heating bills and reduce carbon footprints (when compared to electric systems).	Requires space to locate the external condenser unit. The unit requires lots of space around it to ensure adequate air flow.
Relatively maintenance free.	Noise issues.
Offers high efficiencies.	
Can offer heating and cooling depending on system chosen (air to air).	

Air Source Heat Pump - Air source heat pumps extract heat from the external air which can be used to heat radiators/underfloor heating and hot water within a dwelling. ASHP can still extract heat from air as cold as -15 degrees centigrade.

Suitability – The total size and nature of the development does not lend itself to CHP. It would add to the capital costs of the development making the development not financially viable. For these reasons, CHP has been discounted.

Table 3.7: Summary of Pros and Cons of Ground Source Heat Pump Technology

Ground Source Heat Pump - Ground source heat pumps (GSHP) work in a similar way to air source heat pumps, however they extract heat from the ground.

Pros	Cons
Can offer lower heating bills and reduce carbon footprints (when compared to electric systems).	High capital costs.
Relatively maintenance free.	Requires space for boreholes or trenches to locate ground loops.
Offers high efficiencies.	Requires the use of under floor heating or large radiators due to low grade heat.

Suitability – Ground source heat pumps have been discounted on this development predominantly due to the nature of the development and the lower emissions associated with other technologies.

3.2.9. Table 3.8 presents a summary of proposed “Be Clean” measures adopted across the scheme.

Table 3.8: Summary of “Be Clean” Measures Adopted Across the Scheme

Be Clean
Heating is to be provided with panel heaters and hot water is to be provided by air source heat pump hot water cylinders.

3.3. REVIEW OF ENERGY AND CARBON REDUCTION

3.3.1. Table 3.9 overleaf presents a summary of the Part L1A 2021 assessment calculations for the proposed dwelling-houses and flats across the scheme.

3.3.2. It should be noted that while the top floor flat is shown to fail to achieve compliance with the Part L requirements on an individual basis, when the multiple block compliance method is used, the block as a whole will meet compliance with Building Regulations Part L1A 2021.

Table 3.9: Summary of Part L1A 2021 Assessment Results

House Type	DER	TER	%DER <TER	DFEE	TFEE	%DFEE <TFEE	DPER	TPER	%DPER <TPER
3B 6P House Mid Terrace	1.81	9.88	81.68	33.35	33.67	0.96	19.33	51.45	62.43
3B 6P House End Terrace	1.82	8.13	77.61	25.09	25.41	1.26	19.38	42.11	53.99
1B Ground Floor Apartment	2.45	15.48	84.11	33.62	37.14	9.49	26.29	82.65	68.19
1B Mid Floor Apartment	2.38	13.93	82.91	29.96	30.36	1.32	25.53	74.19	65.59
1B Top Floor Apartment	2.42	13.95	82.65	32.77	30.53	-7.34	25.89	74.26	65.14

3.3.3. SAP 10 shows a 28% improvement upon Part L 2016 regulations, therefore the scheme is meeting compliance with Manchester Planning Policies.

4.0. CONCLUSIONS

4.1.1. This report is based upon a review of the proposals and a thorough analysis of relevant national and local planning policy requirements. Both the National Planning Policy Framework 2021 and Manchester Planning Policies have been reviewed and applied to the development.

4.1.2. The development will follow the Be Lean, Be Clean, Be Green Energy Hierarchy as follows:

4.2. ENERGY EFFICIENT MEASURES (BE LEAN – USE LESS ENERGY).

4.2.1. To maximise the energy efficiency of the development and reduce the energy demand, the development will benefit from the following:

- The U values all improve upon the minimum standards within Building regulations Part L 2021.
- Improved Psi values for limiting thermal bridging.
- Glazing which will be BFRC certified
- Low air leakages rates have been adopted to ensure that the dwellings are air tight and will retain heat to a higher standard.

4.3. ENERGY EFFICIENT SYSTEMS (BE CLEAN – SUPPLY ENERGY EFFICIENTLY)

- Dedicated LED low energy efficient light fittings within all areas
- MVHR has been included to complement the low air leakage rate. This can also improve the air quality and circulation inside the property and will improve any external sound issues.

4.4. RENEWABLE TECHNOLOGIES (BE GREEN – USE RENEWABLE ENERGY)

4.4.1. The following renewable technologies have been evaluated as part of this report:

- Solar Thermal
- Solar PV
- Combined Heat and Power (CHP)
- Air Source Heat Pump
- Ground Source Heat Pump

4.4.2. The dwellings will be fitted with panel heaters for heating and air source heat pump cylinders for hot water.

4.4.3. It can be concluded that CO₂ emissions of predicted energy use of the development will meet the targets within Building Regulations Part L of and Manchester City Council's Planning Policy.