

Energy & Sustainability Statement

Miller Homes Limited

June 2021



Former Manchester College,
Moss Hey Drive,
Northenden

Rev B 21/10/2021



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1.0 Introduction

1.1 Context

This Statement was prepared by Energy & Design Ltd on behalf of Miller Homes Limited to support a planning application for the proposed 224 dwelling development at Former Manchester College, Moss Hey Drive, Northenden.

This energy and sustainability statement shows that the requirement will be met to comply with policy EN6 as follows:

Domestic CO₂ emissions reduction targets

Table 12.1

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	+15% increase on Part L 2010
Target 3: Micro generation area	+15% increase on Part L 2010

1.2. Description of Development

The Former Manchester College, Moss Hey Drive, Northenden proposes 224 plots. These plots comprise of a range of detached, semi-detached & terraced housing.

The current site is shown below.



1.3. Project Brief

The development is being designed to achieve a reduction of 15% from the Target Emission Rate (TER) as set out in Part L of the Building Regulations (2013).

For the purpose of this energy statement, we will be splitting the site into two separate parts.

The first part will be 70 plots, and these will be built to L1a2013 standards and a minimum CO₂, kg/year emissions reduction of 15%, these will be plots 143-174, 177-185 & 196-224 and shown in the red line layout below.



The remaining 154 Plots will be designed to comply with SAP 10 L12021 * and achieve a minimum CO₂, kg/year emissions reduction of 31% on L1a2013.

2.0 Methodology

2.1 Assessment Methodology (70 Plots to L1a2013)

Energy & Design Ltd have modelled each plot using SAP 2012 methodology to calculate the energy demand of the 70 dwellings.

This will allow us to show compliance in two steps.

- 1) Baseline Energy Demand – this will be calculated and given in Total CO₂ emissions (kgCO₂/year). SAP uses the Target Emission Rate (TER = CO₂ kilograms, per M₂ of total useful floor area, per year) to create the baseline for compliance with the approved document Part L1a2013. This is then multiplied by the total useful floor area to give the overall CO₂ emissions.
- 2) Improved Fabric with Low and Zero Carbon (LZC) technologies – various fabrics & technologies will be looked at to get the reduction of CO₂ emissions (kgCO₂/year) of 15% in total.

2.2 Assessment Methodology (158 Plots to L12021*)

Energy & Design Ltd have assumed each of the 158 plots using SAP 10 methodology will achieve 31% reduction by default by complying with the proposed L12020 Approved Document.

3.0 Baseline Energy Demand

3.1 The Development Baseline (70 Plots to L1a2013)

To evaluate the proposed energy strategy, it is important to determine firstly the base line. In this case it is the Target Emission Rate for CO₂ emissions per year.

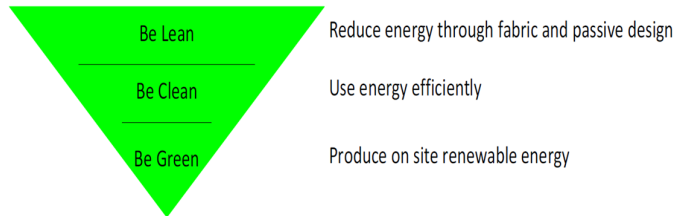
The proposed dwellings have been modelled in SAP L1a2013 and the total maximum CO₂ emissions permitted to comply with L1a2013 are 111,233 kgCO₂/year.

The base line energy demand is shown below:

Target Emission Rate: Compliant with AD L 2013	
Total CO ₂ emissions – kgCO ₂ /year	120,682

4.0 CO₂ Reduction Strategy - Fabric First Approach

4.1 Energy Hierarchy



The proposed dwellings have been designed in accordance with the 'energy hierarchy', which aims to reduce energy demand through passive design measures and a fabric first approach before utilising low carbon energy and the production of on-site renewable energy.

Most importantly to the delivery of low carbon and energy efficient buildings is the 'Fabric First' principle which recognises the most effective way of minimising carbon emissions is to reduce the demand for heat and power through a well-insulated, energy efficient building fabric and services.

Reducing the primary energy demand of a building using an efficient fabric and services is widely regarded as best practice and is promoted by the Zero Carbon Hub so this should be the first and most important step to reducing carbon emissions.

This 'fabric first' approach has several benefits including:

- Little to no reliance on an occupier's behaviour to deliver carbon reductions. Achieving carbon savings from renewable energy technologies requires education, awareness and often, behavioural changes from occupants.
- Virtually no maintenance and/or replacement costs to maintain carbon reductions through improved fabric; and
- Carbon savings delivered are 'locked-in' for the lifetime of the building (60 years or more) rather than the much shorter lifespan (around 25 years) of a renewable energy technology.

4.2 Efficiency Measures (70 Plots to L1a2013)

The proposed design will aim to reduce thermal energy demand by targeting improved insulation levels, air leakage and fabric u-values in line with current Building Regulations requirements.

The following measures to reduce energy use and carbon emissions have been included in the design of the new dwellings:

- Design of new homes to optimise natural daylight in all the habitable spaces with suitable window sizes relative to living spaces and bedrooms;
- Design and layout to promote passive solar gains, maximise natural daylight, sunlight and ventilation, with the majority of homes orientated to the South;
- Development which balances minimising the direct adverse impact of shading from other buildings and landscape features and improving access to passive solar gains;
- High performance glazing with appropriate window u-values and g-values to reduce heat loss and optimise positive solar gain while reducing the potential for overheating.
- 100% low energy lighting.
- Bespoke individual PSI values - these have been calculated and used, this assists in Fabric Energy Efficiency by designing out the cold bridges which may occur, if using the Approved details.
- TMP – the TMP (Thermal Mass Perimeter) has now been calculated rather than using default figures, this now gives a more accurate reflection of the actual as built dwelling, closing the gap between design and as built performance.
- Boilers – The Baxi Assure range of boilers has been used, these can give improvements of approx. 5% over other manufacturers L1a2013 compliant boilers.

4.3 Proposed Fabric First Specification (70 Plots to L1a2013)

The following is the values of the proposed fabric.

Element	Limiting Average Values - Part L1a 2013	Proposed Average Values
Ground Floor U-Value (W/m ² K)	0.25	0.19
External Wall U-Value (W/m ² K)	0.30	0.27
Party Wall U-Value (W/m ² K)	0.20	0.00 (fully filled & sealed)
Roof - Insulated at ceiling U-Value (W/m ² K)	0.20	0.16
Roof - Insulated at Slope U-Value (W/m ² K)	0.20	0.13
Window U-Value (W/m ² K)	2.00	1.30
Door U-Value (W/m ² K)	2.00	1.50
Design Air Permeability m ³ /h.m ² at 50 Pa	10.00	4.50

4.4 Efficiency Measures (158 Plots to L12021*)

The proposed design will aim to reduce thermal energy demand by targeting improved insulation levels and air leakage and fabric u-values in line with current Building Regulations requirements.

The following measures to reduce energy use and carbon emissions have been included in the design of the new dwellings:

- Design of new homes to optimise natural daylight in all the habitable spaces with suitable window sizes relative to living spaces and bedrooms;
- Design and layout to promote passive solar gains, maximise natural daylight, sunlight and ventilation, with the majority of homes orientated to the South;
- Development which balances minimising the direct adverse impact of shading from other buildings and landscape features and improving access to passive solar gains;
- High performance glazing with appropriate window u-values and g-values to reduce heat loss and optimise positive solar gain while reducing the potential for overheating.
- 100% low energy lighting.
- Bespoke individual PSI values - these have been calculated and used, this assists in Fabric Energy Efficiency by designing out the cold bridges which may occur, if using the Approved details.
- TMP – the TMP (Thermal Mass Perimeter) has now been calculated rather than using default figures, this now gives a more accurate reflection of the actual as built dwelling, closing the gap between design and as built performance.
- Boilers – The Baxi Assure range of boilers has been used, these can give improvements of approx. 5% over other manufacturers L1a2013 compliant boilers.
- Ground floor Insulation - 125mm PIR floor insulation.
- Cavity width - 125mm cavity post filled with insulation.
- Roof insulation – 600mm of loft roll insulation will be put into suitable house types.

4.3 Proposed Fabric First Specification (154 Plots to L12021*)

The following is the values of the proposed fabric.

Element	Limiting Average Values - Part L1a 2013	Proposed Average Values
Ground Floor U-Value (W/m ² K)	0.25	0.15
External Wall U-Value (W/m ² K)	0.30	0.21
Party Wall U-Value (W/m ² K)	0.20	0.00 (fully filled & sealed)
Roof - Insulated at ceiling U-Value (W/m ² K)	0.20	0.07
Roof - Insulated at Slope U-Value (W/m ² K)	0.20	0.13
Window U-Value (W/m ² K)	2.00	1.30
Door U-Value (W/m ² K)	2.00	1.50
Design Air Permeability m ³ /h.m ² at 50 Pa	10.00	5.0

5.0 Low and Zero Carbon (LZC) technologies

5.1 Technologies

The following technologies will be assessed for the appropriateness in the development.

- Combined Heat and Power (CHP)
- Air Source Heat Pumps (ASHP)
- Ground Source Heat Pumps (GSHP)
- Wind Power
- Biomass Technology
- Solar Hot Water (SHW) Technology
- Photovoltaic (PV) Technology
- Flue Gas Heat Recovery System (FGHRS)
- Waste Water Heat Recovery System (WWHRS)

5.2 Combined Heat and Power (CHP)

District Heating Networks (DHN) comprise a centralised heat generator, typically a gas fired Combined Heat and Power (CHP) engine. CHP systems generate electricity and waste heat which can be fed into a network of insulated pipes which deliver low carbon heat to buildings to provide heating and hot water via individual heat transfer units.

DHNs and CHP are suited to development with high thermal demand, typically provided by sufficient density or a large anchor load, i.e., high-density flats, leisure centres and industrial process with different heat demand profiles.

There are no DHN's around the proposed development.

For a development of highly insulated, low density and high efficiency homes such as those proposed limits the heating demand of development and therefore the feasibility and viability of the installation of CHP and district heating.

For these reasons, CHP & DHN are considered **not suitable** for this development.

5.3 Air Source Heat Pump (ASHP)

ASHP technology extract heat from the external air and condense this energy to heat a smaller space within a dwelling or non-domestic building. A pump circulates a refrigerant through a coil to absorb energy from the air. This refrigerant is then compressed to raise its temperature which can then be used for space heating and domestic hot water.

Advantages

- Mature technology
- Can assist in cooling
- Approx. 250% efficient using electricity

Disadvantages

- Hot water cylinder required
- Either oversized radiators or underfloor heating is required
- Currently CO2 carbon factors for electricity are high compared to a gas system
- Can be noisy

Conclusion

Due to the potential of high CO2 emissions, ASHP has been deemed **not suitable for this development.**

5.4 Ground Source Heat Pump (GSHP)

GSHP technology exploits seasonal temperature differences between the ground and air. Fluid is pumped through pipes laid in the ground, taking up heat which is then extracted by the heat pump and released at a higher temperature to drive a space heating system. The pipework is placed either horizontally or vertically in the ground.

Advantages

- More efficient than ASHP
- Mature technology
- Can assist in cooling
- Approx. 320% efficient using electricity

Disadvantages

- Costly to install
- Hot water cylinder required
- Either oversized radiators or underfloor heating is required
- Currently CO2 carbon factors for electricity are high compared to a gas system
- Can be noisy

Conclusion

Due to the cost and the potential of high CO2 emissions, GSHP has been deemed **not suitable for this development.**

5.5 Wind Power

Wind turbines are available in various sizes from large rotors able to supply whole communities, small roof or wall-mounted units for individual dwellings.

Advantages

- Generation of clean energy

Disadvantages

- Costly to install
- Maintenance costs
- Can be noisy (hum of generator)

Conclusion

The <http://www.renew-reuse-recycle.com/> predictor suggest that the wind speed is 4.5m/s at 10 meters above ground. This is below the minimum of 5m/s for a technical viability.

Wind speed at 10m above ground level (m/s)		
4.6	4.5	4.5
4.7	4.5	4.5
4.7	4.7	4.6

Wind power has been deemed not suitable for this development.

5.6 Biomass Technology

Biomass boilers work on the principle that the combustion of wood chip or pellets can create heat for space heating and hot water.

Advantages

- Considerable reduction in CO₂ emissions

Disadvantages

- Can be costly to run compared to a gas boiler
- Space for a plant room to store fuel and plant
- Regular maintenance may be required
- A local source of fuel (reduce transport emissions)

Conclusion

Due to the cost and the requirement of space for plant and fuel storage, Biomass has been deemed **not suitable for this development.**

5.7 Solar Hot Water (SHW) Technology

Solar thermal technology harnesses solar energy to generate heated water.

Advantages

- Mature Technology
- Approx. 50% of hot water demand can be met
- Low maintenance

Disadvantages

- Not always aesthetically pleasing
- The benefit of installation is limited to the water heating demand
- A Large hot water cylinder is required
- If system oversized can contribute to overheating
- Access for maintenance
- Not as many installers as previously
- Benefits not as good as similar technologies

Conclusion

Due to the amount of disadvantages, SHW has been deemed **not suitable for this development.**

5.8 Photovoltaic (PV) Technology

Photovoltaic (PV) technology involves the conversion of the sun's energy into electricity.

Advantages

- Mature Technology
- Low maintenance
- Easily integrated

Disadvantages

- Not always aesthetically pleasing
- Poor design can lead to lower-than-expected yields
- Access for maintenance

Conclusion

Due to the benefits gained from this technology, for appropriate plots with suitable roof orientations, PV has been deemed **suitable for this development.**

5.9 Flue Gas Heat Recovery System (FGHRS)

Flue Gas Heat Recovery (FGHRS) technology helps improve the efficiency of your heating system by recovering heat from flue gases.

Advantages

- Helps improve the efficiency of your heating system by recovering heat from flue gases.
- Use less gas for the same temperature.
- Fit and forget technology, very little maintenance required.

Disadvantages

- Not always aesthetically pleasing.
- Access for maintenance

Conclusion

Due to the benefits gained from this technology, for appropriate plots, FGHRS has been deemed **suitable** for this development.

5.10 Waste Water Heat Recovery System (WWHRS)

Waste Water Heat Recovery System (WWHRS) technology uses the residual heat from the waste shower water to preheat the incoming cold feed that refills the system. Therefore, less energy is used to heat that water to the required temperature.

Advantages

- Helps improve the efficiency of your heating system by technology that uses the residual heat from the waste shower water to preheat the incoming cold feed that refills the system.
- Use less gas for the same temperature.
- Fit and forget technology, very little maintenance required.

Disadvantages

- Access for maintenance

Conclusion

Due to the benefits gained from this technology, for appropriate plots, WWHRS has been deemed **suitable** for this development.

5.11 Conclusion

The following technologies have been deemed suitable for this development.

- Photovoltaic (PV) Technology
- Flue Gas Heat Recovery System (FGHRS)
- Waste Water Heat Recovery System (WWHRS)

5.12 Proposed fabric & LZC Results (70 Plots to L1a2013)

Photovoltaics (PV) & WWHRS has been chosen as the preferred technologies for this development.

To achieve the required 15% reduction in kgCO₂/year it has been calculated that the following is required:

- 0.56KWp of PV in an unshaded position at 45-degrees is required per plot
- Approx. 2 WWHRS systems per plot

After incorporating the improved fabric, WWHRS and PV, the total site demand is 97,354 kgCO₂/year a 19.33% saving on the base line

Target & Design Emission Rate: Compliant with AD L 2013		
Target Total CO ₂ emissions – kgCO ₂ /year	120,682	
Design Total CO ₂ emissions – kgCO ₂ /year	97,354	
Total achieved reduction	23,328	19.33%

The proposed specification may change but will achieve a minimum of 15% reduction in carbon emissions (kg CO₂/year) using L1a2013 methodology.

5.13 Proposed fabric & LZC Results (154 Plots to L12021*)

Photovoltaics (PV), WWHRS & FGHRs has been chosen as the preferred technologies for this development.

To achieve the required 31% reduction in kgCO₂/year it has been calculated that the following is required:

- PV in an unshaded position at 45-degrees is required per plot (figure to be determined)
- Approx. 2 WWHRS systems per plot
- 1 FGHRs per plot

After incorporating the improved fabric, FGHRs, WWHRS and PV, the total site demand will have a minimum 31.00% saving according to the proposed AD L12020 compared with AD L1a2013

The proposed specification may change but will achieve a minimum of 15% reduction in carbon emissions (kg CO₂/year) using L1a2013 methodology.

6.0 Conclusion

6.1 Carbon Reduction (70 Plots to L1a2013)

By use of enhanced fabric specifications, WWHRS and PV it is shown that the required reduction of 15% from the Target Emission Rate (TER) as set out in Part L of the Building Regulations (2013) has been met by achieving a **reduction of 19.33% carbon emissions (kgCO₂/year) using L1a2013**

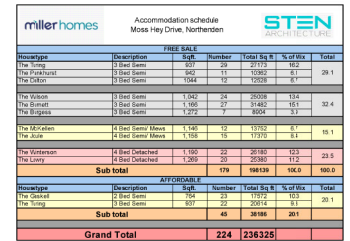
6.2 Carbon Reduction (154 Plots to L12021*)

By use of enhanced fabric specifications, FGHRs, WWHRS and PV the target to meet L12021 should be met by achieving a **reduction of 31% carbon emissions (kgCO₂/year) compared to L1a2013**

6.3 Carbon Reduction (all 224 Plots)

By using the above proposals, we expect the site will achieve an **average reduction of 27.35% carbon emissions (kgCO₂/year) using L1a2013**

** The L12021 regulations are not yet finalised as such specifications may change to achieve the final Approved Document requirements.*



millerhomes		Accommodation schedule Mossy Bay Drive, Northcote		STEN ARCHITECT	
FREE SALE					
HouseType	Description	Sub	Number	Total Sq B	% of total
The Working	2300 East Gate	937	29	21773	88.2
The Working	2300 East Gate	938	29	21773	88.2
The Colton	1000 East Gate	1004	19	12518	6.1
The Colton	1000 East Gate	1005	24	15528	6.1
The Colton	1000 East Gate	1006	24	15528	6.1
The Colton	1000 East Gate	1007	24	15528	6.1
The Colton	1000 East Gate	1008	24	15528	6.1
The Colton	1000 East Gate	1009	24	15528	6.1
The Colton	1000 East Gate	1010	24	15528	6.1
The Colton	1000 East Gate	1011	24	15528	6.1
The Colton	1000 East Gate	1012	24	15528	6.1
The Colton	1000 East Gate	1013	24	15528	6.1
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The Colton	1000 East Gate	1015	24	15528	6.1
The Colton	1000 East Gate	1016	24	15528	6.1
The Colton	1000 East Gate	1017	24	15528	6.1
The Colton	1000 East Gate	1018	24	15528	6.1
The Colton	1000 East Gate	1019	24	15528	6.1
The Colton	1000 East Gate	1020	24	15528	6.1
The Colton	1000 East Gate	1021	24	15528	6.1
The Colton	1000 East Gate	1022	24	15528	6.1
The Colton	1000 East Gate	1023	24	15528	6.1
The Colton	1000 East Gate	1024	24	15528	6.1
The Colton	1000 East Gate	1025	24	15528	6.1
The Colton	1000 East Gate	1026	24	15528	6.1
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The Colton	1000 East Gate	1046	24	15528	6.1
The Colton	1000 East Gate	1047	24	15528	6.1
The Colton	1000 East Gate	1048	24	15528	6.1
The Colton	1000 East Gate	1049	24	15528	6.1
The Colton	1000 East Gate	1050	24	15528	6.1
The Colton	1000 East Gate	1051	24	15528	6.1
The Colton	1000 East Gate	1052	24	15528	6.1
The Colton	1000 East Gate	1053	24	15528	6.1
The Colton	1000 East Gate	1054	24	15528	6.1
The Colton	1000 East Gate	1055	24	15528	6.1
The Colton	1000 East Gate	1056	24	15528	6.1
The Colton	1000 East Gate	1057	24	15528	6.1
The Colton	1000 East Gate	1058	24	15528	6.1
The Colton	1000 East Gate	1059	24	15528	6.1
The Colton	1000 East Gate	1060	24	15528	6.1
The Colton	1000 East Gate	1061	24	15528	6.1
The Colton	1000 East Gate	1062	24	15528	

- | # | Task description | Unit | Time (h) |
|---|--|------|----------|
| 1 | Cell dose problem solved, new assays set up to go | TS | 13.10.21 |
| 2 | Parking around 5 plots 10-15 to introduce some landscaping | ND | 12.12.21 |
| 3 | Designing and building to replace old parking, highly ornate to the estate (even have dedicated horse and carriage tracks) and to be a new look around plots 14-16/17. Plot 17-18 (back perimeter) to be new | ND | 04.10.21 |
| 4 | Parking in plots 17, 18/19 and adjacent. Plot 17-18 (back perimeter) to be new | ND | 13.08.21 |
| 5 | Gas and water mains beneath and boundary and easements | ND | |
| 6 | Gas and water measurements to 3.7m. Cycle stores added | SWD | 18.06.21 |
| 7 | Rear boundary extended to 11m close to the rear of the house to complete the crime-proofed aluminium security design. | SWD | 14.08.21 |
| 8 | Plot 20-21 extended to allow pump station, minor extend to boundary and plot 22 following boundary material | TS | 02.08.21 |
| 9 | Max adjustment to relocate the new tree corridor along driveway area L2/20 | ND | 01.06.21 |

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Project Title
Former Manchester College
Moss Hey Drive
Northenden

Drawing Title			
Proposed Overall Site Layout			
Scale	Drawn By	Checked By	Authorized By
1:500	STEN		
	Date 28.05.21	Date	Date
Job No.	Drawing No.	Revision	
	2131 / SL / 01	H	



DRAWING LEGEND: -

-  • Denotes Development Boundary
-  • Boundary line to a phase other to boundary treatment plan for additional details
-  • Boundary wall - phase refers to boundary treatment plan for additional details
-  • Boundary wall/gas - phase refers to boundary treatment plan for additional details
-  • Denotes 1.0m Garden Gates
-  • Denotes CAT A line and RPA to be retained
-  • Denotes CAT B line and RPA to be retained
-  • Denotes CAT B line and RPA to be retained
-  • Denotes Speed hump
-  • Denotes ramp and mild slope
-  • Denotes secure cycle store