

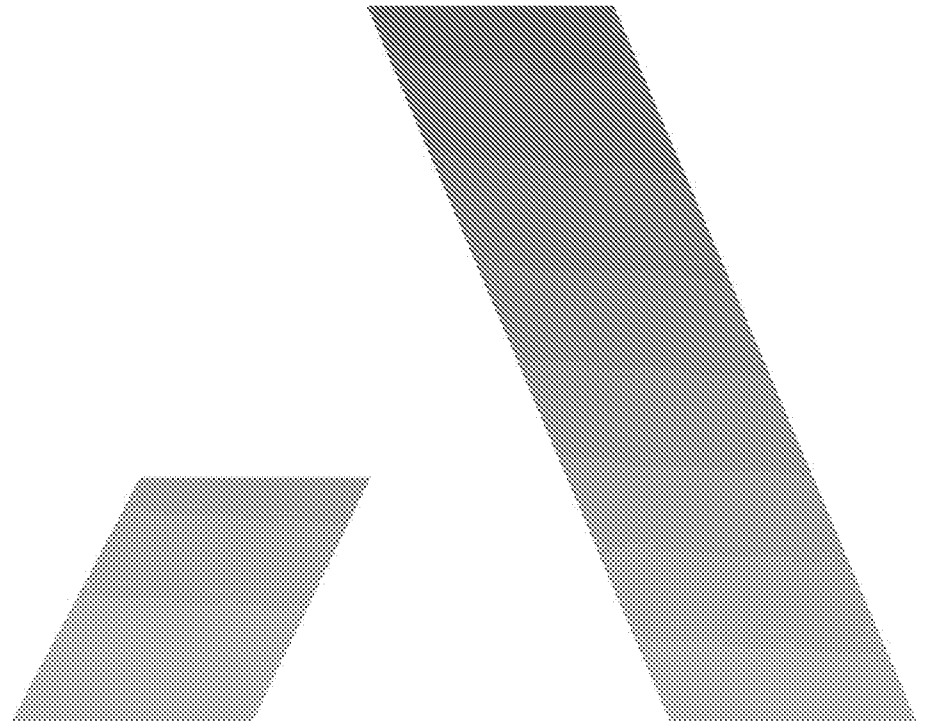
Land East of Tye Lane, Walberton

Vistry Group PLC

Energy Statement

AES Sustainability Consultants Ltd

August 2020



	Author	Date	E-mail address
Produced By	Katrina Edgington	12.08.2020	
Reviewed By	Andrew McManus	13.08.2020	

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Part of the **Vistry Group**

This statement has been commissioned by Group PLC to detail the proposed approach to energy and CO₂ reduction to be employed in development of the site Land East of Tye Lane, Walberton. It should be noted that the details presented, including the proposed specifications, are subject to change as the detailed design of the dwellings progresses, whilst ensuring that the overall commitments will be achieved.

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1. Introduction

Preface

- 1.1. This Energy Statement has been prepared on behalf Vistry Group PLC in support of a revised application for development of the site at Land East of Tye Lane, Walberton.

Development Description

- 1.2. The application site is located to the east of Tye Lane, Walberton falling within the administrative boundary of Arun District Council in West Sussex.
- 1.3. The village is located five miles (8km) north-west of Littlehampton, and south of the A27 road. The parish includes the smaller village of Binstead to the east and the larger neighbourhood of Fontwell, less than a kilometre to the north-west.
- 1.4. This statement has been prepared to support a Full Planning Application to revise the approved and partly implemented permission (WA/95/18/RES and WA/44/17/OUT) at land at Tye Lane, Walberton to provide for 30 additional dwellings including 9 affordable units with associated landscaping, road layout, access and parking.
- 1.5. The proposal seeks to provide 30 new dwellings on the approved development site (WA/95/18/RES and WA/44/17/OUT) which was granted consent for a total of 175 dwellings. A total of 81 residential units were to be situated within the area proposed to be revised by this current planning application. The proposal will therefore provide a total of 111 dwellings incorporating 9 affordable units (an uplift of 30 dwellings from the approved 81 dwellings). Across the wider site this will deliver 205 new dwellings in total.

Purpose and Scope of the Statement

- 1.6. The statement has been prepared to address Condition 20 of RM approval WA/95/18 RES in accordance with Policy ECC SP2 of the Arun Local Plan.
- 1.7. This statement demonstrates that a 10% energy reduction will be achieved following a fabric first approach to demand reduction in compliance with Condition 20 of the outline approval.

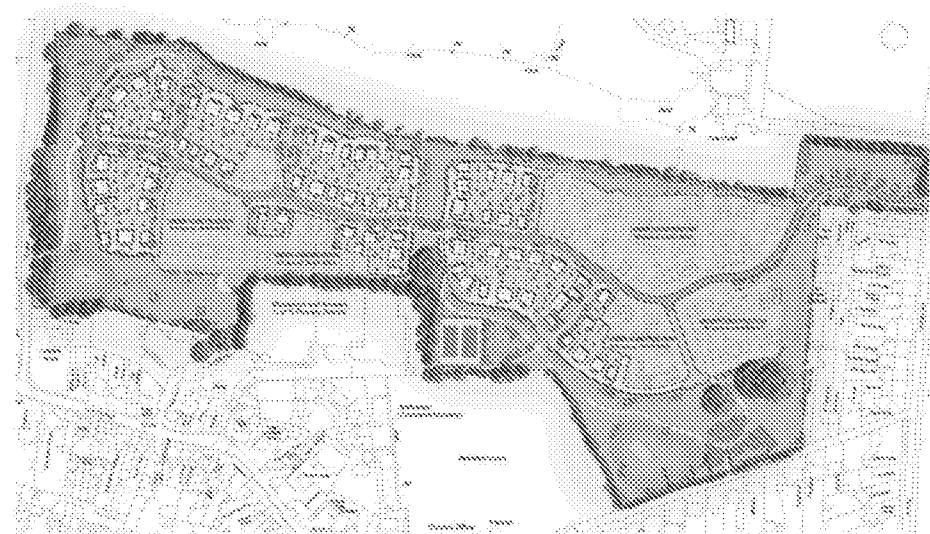


Figure 1. Proposed Site Layout

2. Planning Condition & Policy

Planning Conditions

- 2.1. Reserved Matters permission WA/95/18/ RES included a condition on energy requirements (Condition 20). Condition 20 reflects local policy. This report shall address Condition 20 and local policy to avoid imposing similar such conditions on this new application

Condition 20

At least 10% of the energy supply of the development shall be secured from decentralised and renewable or low carbon energy sources (as described in the glossary of Annex 2 of the National Planning Policy Framework, March 2010). Details and a timetable of how this is to be achieved for each phase or subphase of development, including details of physical works on site, shall be submitted to and approved in writing by the Local Planning Authority before any development in that phase or sub phase begins. The development shall be implemented in accordance with the approved details and timetable and retained as operational thereafter, unless otherwise agreed in writing by the Local Planning Authority.

Reason: In order to secure on site renewable energy in accordance with national planning policy in accordance with Policy GEN7 of the Arun District Local Plan.

Local Planning Policy

- 2.2. This statement addresses Policy ECC SP2 of the Arun Local Plan 2011-2031, adopted on 18th of July 2018. Policy ECC SP2.

Policy ECC SP2: Energy and climate change mitigation

All new residential and commercial development (including conversions, extensions and changes of use) will be expected to be energy efficient and to demonstrate how they will:

- (a) Achieve energy efficiency measures that reflect the current standards applicable at the time of submission;
- (b) Use design and layout to promote energy efficiency; and
- (c) Incorporate decentralised, renewable and low carbon energy supply systems, for example small scale renewable energy systems such as solar panels.

All major developments must produce 10% of the total predicted energy requirements from renewable or low carbon energy generation on site, unless it can be demonstrated that this is unviable. Energy efficiency measures will be taken into consideration when the total predicted energy requirements are calculated. The Council will consider 'allowable solutions' where it is clearly demonstrated that the provision of onsite renewable or low carbon energy generation is unviable or not feasible.

Where planning permission is required to retrofit energy efficiency measures into existing development, schemes will be permitted, subject to the Design and Built Heritage policies.

In assessing the achievement of these standards, the Council will consider:

- Site constraints;
- Technical viability;
- Financial viability; and
- Delivery of additional benefits.

National Planning Policy Framework

- 2.3. In July 2018, the Government published the updated National Planning Policy Framework (NPPF), which sets out the Government's planning policies for England and how these are expected to be applied.
- 2.4. The planning process has been identified as a system to support the transition to a low carbon future in response to climate change by assisting in the reduction of greenhouse gas emissions and supporting renewable and low carbon energy.
- 2.5. Paragraph 150 sets out what is expected from new developments when considering strategies to mitigate and adapt to climate change:

150. New development should be planned for in ways that:

Avoid increased vulnerability to the range of impacts arising from climate change. When new development is brought forward in areas which are vulnerable, care should be taken to ensure that risks can be managed through suitable adaption measures, including through the planning of green infrastructure; and

Can help to reduce greenhouse gas emissions, such as through its location, orientation and design. Any local requirements for the sustainability of buildings should reflect the Government's policy for national technical standards.

Current National Policy Standards

- 2.6. The NPPF requires that "local planning authorities should ...when setting any local requirement for a building's sustainability, do so in a way consistent with the Government's zero carbon buildings policy and adopt nationally described standards."¹
- 2.7. A policy announcement presented by HM Treasury as part of the July 2015 productivity plan "Fixing the Foundations"² advised that the Government considered that energy efficiency standards introduced through recent changes to Building Regulations 'need time to become established' and will therefore persist until further notice.
- 2.8. This statement therefore sets out details relating to building energy performance standards and proposes an approach through which these will be achieved in a manner which improves the long-term sustainability of the dwellings.

¹ Department for Communities and Local Government, 2012, *NPPF, paragraph 55*

Proposed Strategy

- 2.9. Condition 20 and local policy requires the development to deliver 10% of the energy demand of the dwellings from low carbon or renewable energy systems.
- 2.10. Condition 20 was previously discharged on the basis of a 'Fabric First, delivering equivalent energy saving through a focus on reducing unnecessary energy demand through improved levels of insulation and efficient building services, leading to a number of benefits for the householders and the wider environment.
- 2.11. This energy strategy therefore supports the continuation of this previously approved strategy across the revised development proposals and demonstrates that the 10% energy reduction will be maintained across the site.
- 2.12. Further details of the strategy, including the benefits compared with low carbon or renewable energy systems are explored in the following sections of this statement together with calculations demonstrating the energy savings that will be achieved.

² HM Treasury, July 2015, *'Fixing the Foundations' Productivity Plan*

3. Baseline Energy Demand and CO₂ Emissions

- 3.1. The development is to be designed and constructed to meet the requirements of Part L1A of the Building Regulations 2013, therefore compliance with this standard forms the first stage in the sustainable construction approach.
- 3.2. Part L compliance is assessed through the Standard Assessment Procedure (SAP), which uses the 'Target Emission Rate' (TER) – expressed in kilograms CO₂ per meter squared of total useful floor area, per annum – as the benchmark. The calculated performance of the dwelling as designed – the Dwelling Emission Rate (DER) – is required to be lower than this benchmark level.
- 3.3. The energy demand of the Part L compliant development is also calculated as part of this process, and takes into account of regulated energy demand, in line with Condition 31.
- 3.4. Calculations have been undertaken to a range of the proposed dwellings at Land East of Tye Lane, Walberton in order to build a representative site model to establish the energy demand reduction required to meet Condition 20.
- 3.5. The Part L compliant calculated baseline carbon emissions and energy demand for a range of the proposed dwelling types are reported in Table 1.

Table 1. Part L compliant energy demand and CO₂ emissions

House Type	Energy Demand (kWh/yr)	CO ₂ emissions (kgCO ₂ /yr)
Ground Floor Apartment	4,920	20.05
First Floor Apartment	4,192	22.18
A24L – Semi	5,797	19.61
Beckett – Det	7,811	19.27
Beckett – End/Semi	7,157	17.79
Carterwright – End/Semi	5,756	19.17
Carterwright – Mid	5,209	17.54
Elmslie – End/Semi	6,563	17.98
Elmslie – Det	7,061	19.22
Levinton – Det	8,476	17.64
Lincoln – Semi	7,593	16.14
Moine – Det	8,105	18.11
Pembroke – Det	9,160	17.09

- 3.6. Based on these calculations as shown in Table 1, the estimated site-wide Part L compliance CO₂ emissions and energy demand is shown in Table 2:

Table 2: Site-wide Part L CO₂ emissions and energy demand

Part L Compliant Energy Demand (kWh/yr)	Part L Compliant CO ₂ emissions (kgCO ₂ /yr)
751,128.14	177,247.59

4. Energy & CO₂ Reduction Strategy – Fabric First

Overview

- 4.1. The proposed construction specification and sustainable design principles to be applied to the development will ensure that each dwelling meets the CO₂ reductions mandated by Part L1A of the Building Regulations through fabric measures alone.
- 4.2. It is proposed that the energy reduction strategy for the development incorporates further improvements beyond a Part L compliant specification and initially concentrates finance and efforts on reducing energy demand as the first stage of the Energy Hierarchy (Figure 2).

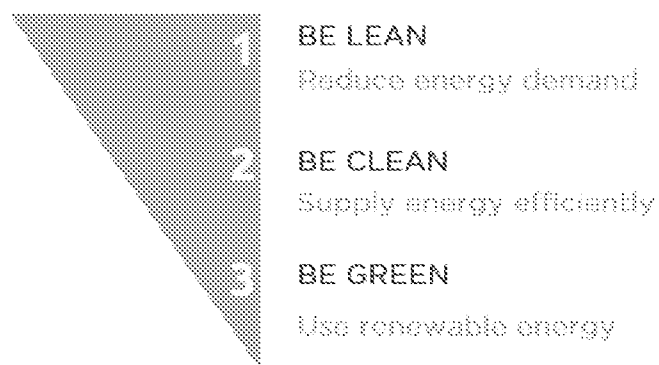


Figure 2. The Energy Hierarchy

Be Lean – reduce energy demand

- 4.3. The design of a development – from the masterplan to individual building design – will assist in reducing energy demand in a variety of ways, with a focus on minimising heating, cooling and lighting loads. Key considerations include:
- Building orientation – maximise passive solar gain and daylight
 - Building placement – control overshadowing and wind sheltering
 - Landscaping – control daylight, glare and mitigate heat island effects
 - Building design – minimise energy demand through fabric specification

Be Clean – supply energy efficiently

- 4.4. The design and specification of building services to utilise energy efficiently is the next stage of the hierarchy, taking into account:
- High efficiency heating and cooling systems
 - Ventilation systems (with heat recovery where applicable)
 - Low energy lighting
 - High efficiency appliances and ancillary equipment

Be Green – use low carbon / renewable energy

- 4.5. Low carbon and renewable energy systems form the final stage of the energy hierarchy and can be used to directly supply energy to buildings, or offset energy carbon emissions arising from unavoidable demand. This may be in the form of:
- Low carbon fuel sources – e.g. biomass
 - Heat pump technologies
 - Building scale renewable energy systems
 - Small-scale heat networks
 - Development-scale heat networks
- 4.6. As this hierarchy demonstrates, designing out energy use is weighted more highly than the generation of low-carbon or renewable energy to offset unnecessary demand. Applied to the development, this approach is referred to as 'fabric first' and concentrates finance and efforts on improving U-values, reducing thermal bridging, improving airtightness, and installing energy efficient ventilation and heating services.
- 4.7. This approach has been widely supported by industry and government for some time, particularly in the residential sector, with the Zero Carbon Hub and the Energy Savings Trust having both stressed the importance of prioritising energy demand as a key factor in delivering resilient, low energy buildings.
- 4.8. The benefits to prospective homeowners of following the Fabric First approach are summarised in Table 3.

Table 3. Benefits of the Fabric First approach

	Fabric energy efficiency measures	Boil-on-renewable energy technologies
Energy/CO ₂ /fuel bill savings applied to all dwellings	✓	✗
Savings built-in for life of dwelling	✓	✗
Highly cost-effective	✓	✗
Increases thermal comfort	✓	✗
Potential to promote energy conservation	✓	✓
Minimal ongoing maintenance / replacement costs	✓	✗
Significant disruption to retrofit post-occupation	✓	✗

Building Regulations standards – Fabric Energy Efficiency

- 4.9. In addition to the CO₂ reduction targets, the importance of energy demand reduction was further supported by the introduction of a minimum fabric standard into Part L1A 2013, based on energy use for heating and cooling a dwelling. This is referred to as the 'Target Fabric Energy Efficiency' (TFEE), and expressed in kWh/m²/year.
- 4.10. This standard enables the decoupling of energy use from CO₂ emissions and serves as an acknowledgement of the importance of reducing demand, rather than simply offsetting CO₂ emissions through low carbon or renewable energy technologies.
- 4.11. The TFEE is calculated based on the specific dwelling being assessed with reference values for the fabric elements contained within Approved Document L1A. These reference values are described as 'statutory guidance' as opposed to mandatory requirements, allowing full flexibility in design approach and balances between different aspects of dwelling energy performance to be struck so that the ultimate goal of achieving the TFEE is met. The proposed approach and indicative construction specifications are set out in the following sections of this Strategy.

Improved fabric specification

- 4.12. In order to ensure that the energy demand of the development is reduced, the dwellings should be designed to minimise heat loss through the fabric wherever possible. Table 4 details an indicative fabric specification of the major building elements, with the first column in this table setting out the Part L1A limiting fabric parameters in order to demonstrate the potential improvements.

Table 4. Indicative construction specification – main elements

	Part L1a Limiting Fabric Parameters	Indicative Specification
External wall – u-value	0.30 W/m ² K	0.21 W/m ² K
Party wall – u-value	0.20 W/m ² K	0.00 W/m ² K
Plane roof – u-value	0.20 W/m ² K	0.11 W/m ² K
Ground floor – u-value	0.25 W/m ² K	≤ 0.18 W/m ² K
Windows – u-value	2.00 W/m ² K	1.40 W/m ² K
Doors – u-value	2.00 W/m ² K	0.90 W/m ² K
Air Permeability	10 m ³ /h.m ² at 50 Pa	5.01 m ³ /h.m ² at 50 Pa
Thermal Bridging	Y = 0.150 (default)	Y = ≤ 0.050 (calculated)

Thermal bridging

- 4.13. The significance of thermal bridging as a potentially major source of fabric heat losses is increasingly understood. Improving the U-values for the main building fabric without accurately addressing the thermal bridging will not achieve the desired energy and CO₂ reduction targets.
- 4.14. The specification will seek to minimise unnecessary bridging of the insulation layers, with avoidable heat loss therefore being reduced wherever possible. Accurate calculation of these heat losses forms an integral part of the SAP calculations undertaken to establish energy demand of the dwellings, and as such thermal modelling will be undertaken to assess the performance of all main building junctions.
- 4.15. It is calculated that the average total Y value is around 0.050, against a SAP default figure of 0.150.

Air leakage

- 4.16. After conductive heat losses through building elements are reduced, convective losses through draughts are the next major source of energy wastage. The proposal adopts an airtightness standard of 5.01 m³/h.m² at 50Pa, with pressure testing of all dwellings to be undertaken on completion to confirm that the design figure has been met.

Passive design measures and overheating risk mitigation

- 4.17. Glazing will be specified with a solar transmittance value (g-value) to strike the balance between useful solar gain in the winter and unwanted solar gain in the summer.
- 4.18. Where feasible, dwellings should be fitted with high-efficiency combination boilers, removing the need for hot water cylinders which would lose useful heat to the dwelling at the rate of around 15kWh/day, or circa 550kWh over the course of a year.
- 4.19. Due to these measures to reduce internal heat gain, natural ventilation provided through window openings and the opportunity for cross ventilation will allow sufficient air exchange rates to purge any heat build-up. Active cooling systems are therefore not proposed.
- 4.20. By following these principles, the development will be designed to build in resilience to a potentially changing climate over the lifetime of the buildings and minimise overheating risk, which can be exacerbated by the drive to build better insulated, more airtight homes if not considered within the design and construction process.

As-designed performance - Fabric Energy Efficiency

- 4.21. By following the strategy described, the dwellings will build in a reduction in energy demand. In addition to an overall level of CO₂ emissions, the Building Regulations set a minimum level of efficiency for the dwelling fabric, expressed in terms of energy requirements for heating and cooling per unit of floor area.
- 4.22. The Fabric Energy Efficiency metric is therefore an expression of the performance of the thermal elements of the dwelling, to ensure that minimum standards are met and poor fabric performance isn't simply offset through higher performance heating, cooling or ventilation systems.
- 4.23. The assessed target fabric energy efficiency (TFEE) for compliance and the designed fabric energy efficiency (DFEE) after demand reduction measures are shown for a range of the proposed dwelling types in Table 5.

Table 5. Fabric Energy Efficiency of indicative dwellings

House Type	Target FEE (kWh/m ² /yr)	Design FEE (kWh/m ² /yr)	% Reduction
Ground Floor Apartment	53.25	45.93	13.74
First Floor Apartment	57.48	51.89	9.73
A24L - Semi	53.63	46.38	13.52
Beckett - Det	60.67	51.27	15.49
Beckett - End/Semi	52.86	43.66	17.41
Cartwright - End/Semi	52.61	43.53	17.25
Cartwright - Mid	43.82	35.09	19.92
Emble - End/Semi	51.13	42.25	17.38
Emble - Det	57.61	48.06	16.57
Leviston - Det	57.33	47.77	16.67
Lincoln - Semi	48.66	41.29	15.14
Kyne - Det	56.95	47.27	17.00
Pembroke - Det	56.66	46.97	17.10

- 4.24. As demonstrated, through following the demand reduction approach proposed, the fabric energy efficiency of the dwellings will be improved by an average of approximately 16.10% compared with a Part L compliant specification.

5. Energy Demand after Fabric Measures

- 5.1. Table 6 demonstrates the improvement on Part L compliant energy use achieved through energy efficiency measures to the sample dwelling types.

Table 6. Energy demand of indicative dwellings – after fabric efficiency measures

House Type	Part L compliant (kWh/yr)	As designed (kWh/yr)	% Reduction
Ground Floor Apartment	4920	4444	9.69%
First Floor Apartment	4192	3917	6.56%
A241 – Semi	5797	5268	9.14%
Beckett – Det	7811	7187	7.98%
Becken – End/Semi	7157	6456	9.80%
Cartwright – End/Semi	5756	5048	2.29%
Canwright – Mid	5209	4453	14.51%
Elmore – End/Semi	6563	5835	11.10%
Embley – Det	7061	6349	10.07%
Leventon – Det	8476	7614	10.17%
Lincoln – Semi	7593	6754	11.05%
Mylna – Det	8105	7183	11.38%
Pembroke – Det	9160	8220	10.26%

- 5.2. Table 7 demonstrates the total energy demand reductions achieved through the proposed fabric measures.

Table 7. Site-wide energy demand – after fabric efficiency measures

	Energy Demand (kWh/year)	
Part L compliant	751,128	
After fabric measures	672,094	
	kWh/year	%
Total savings	79,034	10.52

The calculations demonstrate that the revised development proposals continue to deliver a 10% energy reduction following a fabric first approach to demand reduction.

6. Overall Energy and CO₂ Reduction

- 6.1. Through the described fabric first approach to sustainable construction the development will deliver energy demand reductions in line with planning policy, achieving a 10.52% reduction in energy demand from the Part L baseline, in accordance with the previously approved strategy for the development.
- 6.2. Table 8 demonstrates the energy and CO₂ reductions achieved.

Table 8. Total site-wide energy savings

	Energy Demand kWh/year		Part L Compliant CO ₂ emissions (kgCO ₂ /yr)	
Part L compliant	751,128.14		177,247.59	
After fabric measures	672,093.83		160,215.50	
	kWh	%	kgCO ₂ /yr	%
Total savings	79,034.31	10.52	17,032.09	9.61

7. Conclusions

- 7.1. This Energy Statement has been prepared by AES Sustainability Consultants Ltd on behalf of Vistry Group PLC in support of a Full Planning Application to revise the approved and partly implemented permission (WA/95/18/RES and WA/44/17/OUT) at land at Tye Lane, Walberton to provide for 30 additional dwellings including 9 affordable units with associated landscaping, road layout, access and parking.
- 7.2. Local planning policy contained within the Arun District Local Plan requires new development to deliver 10% of the calculated energy demand from low carbon or renewable technologies.
- 7.3. This requirement was previously addressed and the relevant condition discharged on the basis of following a 'Fabric First' approach to sustainable construction, delivering an equivalent 10% energy demand reduction through improvements to the dwelling fabric, attention the thermal bridging and unwanted air leakage and additional passive and active demand reduction measures.
- 7.4. By following this approach, the energy demand reductions will be built-in to the lifetime of the dwellings, rather than the limited lifespan of bolt-on renewable energy technologies, in addition to delivering numerous other benefits including minimising ongoing maintenance costs and improving thermal comfort.
- 7.5. This statement demonstrates that the revised development proposals maintain the previously approved strategy for the site as a whole, recalculating the baseline energy demand of the site and demonstrating that a 10% improvement is delivered through the energy demand reduction strategy.