

Boorley Green Gateway Vistry Homes Southern

Energy Statement

AES Sustainability Consultants Ltd

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Vistry Group

This statement has been commissioned by Vistry Homes Southern to detail the proposed approach to energy and CO₂ reduction to be employed in development of the commercial retail units at Boorley Green Gateway. It should be noted that the details presented, including the proposed specifications, are subject to change as the detailed design of the buildings 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 of Vistry Homes Southern in support of the application for development of the commercial retail units at Boorley Green Gateway.

Development Description

- 1.2. The site is situated within the larger development of Boorley Green, just outside the village of Botley, within the borough of Eastleigh, and less than ten miles from Southampton city centre.
- 1.3. Full Planning permission was granted in May 2021 (ref: F/19/86233) for:

“Demolition of existing buildings and dwelling with the construction of a mixed use retail and residential development comprising an A1 retail convenience store and flexible retail floorspace (A1 and A2 Use Class), and 67 residential units (C3 Use Class) with associated access, parking, landscaping, drainage, and ancillary infrastructure including pedestrian and cycle links.”
- 1.4. This report will address the requirements applied to the non-residential units to be constructed on the development. Vistry Homes Southern will be constructing the units to shell only with the fit-out being carried out by the occupier once known.

Purpose and Scope of the Statement

- 1.5. The primary purpose of this statement is to address Condition 22 of the planning permission reference F/19/86233 by indicating how the development meets the relevant essential requirements in the Eastleigh Borough Council's adopted Environmentally Sustainable Development Supplementary Planning Document.
- 1.6. This statement demonstrates that following a fabric first approach, the development will result in a significant reduction in CO₂ emissions from Part L of the Building Regulations 2013, with a further reduction to be achieved through low or zero carbon systems.



Figure 1. Proposed Site Layout

2. Planning Policy

Conditions of Planning Permission F/19/86233

- 2.1. This statement will address Condition 22 of the outline permission, F/19/86233:

Condition 22

Prior to the occupation of any building within this phase of the development (or in accordance with a timetable to be agreed in writing with the Local Planning Authority), the following shall be submitted to and approved in writing by the Local Planning Authority:

For residential development as-built stage SAP data and as-built stage water calculator confirming energy efficiency and the predicted internal mains water consumption to achieve:

- In respect of energy efficiency, a standard of a 19% improvement of dwelling emission rate over the target emission rate as set in the 2013 Building Regulations
- In respect of water consumption, a maximum predicted internal mains water consumption of 105 litres/person/day. The development shall not be carried out otherwise than in accordance with the approved details.

For non-residential development

- A report indicating how the development meets the relevant essential requirements in the Eastleigh Borough Council's adopted Environmentally Sustainable Development Supplementary Planning Document, including
- A BREEAM New Construction Post Construction certificate at "Excellent" standard.

Reason: To support a comprehensive approach to high quality design across the site; in line with the guidance set out in the Government's Ministerial Statement of 25 March 2015 which states that Local Planning Authorities should, from the date of its publication, take into account the government's intentions in the statement and not set conditions with requirements above a Code level 4 equivalent.

Local Planning Policy

Environmentally Sustainable Development SPD

- 2.2. Condition 22 requires that non-residential development meet the relevant essential requirements in the Eastleigh Borough Council's adopted Environmentally Sustainable Development Supplementary Planning Document, adopted March 2009.
- 2.3. Within the supplementary planning document, the following essential policies are relevant to this development: ESD 1, ESD 2, ESD 4, ESD 5, ESD 6, ESD 7 and ESD 8. From January 2011, Policies ESD 1-8 are relevant to all non-residential and multi-residential development over 500 sq m of external floor space.

General Sustainable Development

ESD 1 Minimum Code For Sustainable Homes and BREEAM Requirements

The Council requires all residential development of 10 dwellings or more to:

- Achieve Level 3 of the Code up to the end of 2010*

The Council requires all residential development to:

- Achieve Level 3 of the Code from January 2011 up to the end of 2011*
- Achieve Level 4 of the Code from January 2012*
- Achieve Level 5 of the Code from January 2014*
- Achieve Level 6 of the Code from January 2016*

The Council requires all non-residential and multi-residential development above 1000 sq m of external floor space to:

- Achieve BREEAM level "very good" up to the end of 2010*

The Council requires all non-residential and multi-residential development above 500 sq m of external floor space to:

- Achieve BREEAM level 'very good' from January 2011 up to the end of 2011*
- Achieve BREEAM level 'excellent' from January 2012*

General Sustainable Development

ESD 2 Rainwater Harvesting and Grey Water Recycling

...Submit details of the rainwater harvesting and/or grey water recycling systems supplying all WC flushing and other appropriate uses for that development

OR

Compliance with Essential Requirement ESD 7 (Green Roofs)

OR

A combination of both

General Sustainable Development

ESD 4 Reducing Surface Water Runoff

...show that run-off rates and annual volumes of run-off post development will be no greater than the previous conditions for the site.

- show that all roofs and hard surfaces are drained by sustainable drainage systems
- provide a drainage report for the whole site.

Energy/CO₂

ESD 5 Passive Solar Heat Gain

...make full use of potential passive solar heat gain through orientation, building design and landscape design (while avoiding excessive summer heat gain and glare) within a framework of good urban design unless there are particular site or building use factors which make it unfeasible

This should be clearly demonstrated in the Design and Access Statement

Energy/CO₂

ESD 6 Carbon Dioxide Reduction (Small Scale zero/low carbon technologies)

The Council requires all buildings in new residential development of 10 dwellings or more to achieve*:

- Up to the end of 2011 at least one Code Ene 7 credit (10% carbon dioxide emissions reductions via local low/zero carbon energy)
- from January 2012 two Code Ene 7 credits (15% carbon dioxide emissions reductions via local low/zero carbon energy)

The Council requires all new non-residential and multi-residential development (over 1000 sqm of external floorspace) to achieve*:

- at least two BREEAM Ene 5 credits (10% carbon dioxide emissions reductions via local low/zero carbon energy)
- from January 2012 all three BREEAM Ene 5 credits (15% carbon dioxide emissions reductions via local low/zero carbon energy)

Green Infrastructure

ESD 7 Green Roofs

The Council requires either: Green Roofs on at least 80% 1 of the area of :

all flatted residential development roofs (of 10 dwellings or more) and all non-residential and multi-residential development roofs (over 1000 sqm of external floorspace),

provided they are compatible with the Council's design objectives.

OR

Compliance with Essential requirement ESD 2 (Rainwater harvesting/ grey water recycling)

OR

A combination of both

Green Infrastructure

ESD 8 Trees

The Council requires in all residential developments of 10 dwellings or more

- all new streets created for residential development to provide at least 1 street tree per 30 linear metres of street
- All new off-street car parks to provide at least 1 tree per 6 vehicle spaces
- All new private back gardens to retain existing trees or (if no existing trees to retain) receive at least 1 newly planted tree

and

in multi-residential and non-residential development of at least 1000 sq m of external floor space :

- All new off-street car parks accessible to the public to provide at least 1 tree per 6 vehicle spaces

Eastleigh Borough Local Plan (2016-2036)

- 2.4. The Eastleigh Borough Local Plan 2016-2036 was adopted in April 2024. The policies contained within this plan have been reviewed, with Policies S1, DM2 and DM3 considered relevant to sustainability.

Policy S1, Delivering sustainable development

1. To be sustainable, new development in the Borough should:

- meet community needs without compromising the identity of the Borough or its individual settlements, or the ability of future generations to meet their own needs;
- enhance social equality by ensuring equal and easy access to a range of community facilities and services and by promoting the development of employment, education and skills training opportunities;
- maintain and help to grow a high-performing local economy that benefits the Borough, south Hampshire and the wider economy, without adverse impact on south Hampshire's city, town and other centres, the quality of the local environment or local transport networks;
- have regard to the potential impacts of climate change, and the need to limit greenhouse gas emissions including through carbon sequestration and by promoting measures to design buildings and spaces which are adaptable to predicted climate change, and restrict development in areas at risk from flooding, minimise energy use and encourage the generation of renewable energy, and by minimising emissions from motorised transport, industrial activity and domestic uses;
- minimise the need to travel longer distances and, where travel is necessary, prioritise more sustainable forms of transport, such as active travel, other alternatives to car use, or a combination of active travel and other alternatives to car use;
- avoid impacts on the Hamble and Itchen catchments and associated flora and fauna species by preserving water quality and flows from development and safeguarding potential yield of local water resources used for public water supplies having regard to the impacts of abstraction;

Policy S1, Delivering sustainable development continued...

- g. seek opportunities to optimise density of new development and redevelopments;
- h. use resources wisely and minimise the generation of waste in the construction, occupation and use of buildings;
- i. maintain local environmental quality, including avoiding damage to, and where possible enhancing, the existing valued urban and rural environments in the Borough and heritage assets;
- j. have regard to the purposes of the South Downs National Park, including regarding its status as an International Dark Night Skies reserve; and
- k. maintain, enhance, extend and connect the natural habitats within and landscape value of the Borough, extending natural habitats into new and existing development to achieve an environmental net gain.

2. Applicants are encouraged to undertake pre-application consultation with the relevant statutory and non-statutory consultees.

3. When considering development proposals the Council will take a positive approach that reflects the presumption in favour of sustainable development contained in the National Planning Policy Framework. It will always work proactively with applicants jointly to find solutions which mean that proposals can be approved wherever possible, and to secure development that improves the economic, social and environmental conditions in the area.

4. Planning applications that accord with the policies in the Local Plan will be approved without delay, unless material considerations indicate otherwise. Where there are no policies relevant to the application or relevant policies are out of date at the time of making the decision then the Council will grant permission unless material considerations indicate otherwise, taking into account whether:

- a. any adverse impacts of granting permission would significantly and demonstrably outweigh the benefits, when assessed against the policies in the National Planning Policy Framework taken as a whole; or
- b. where specific policies in that Framework or other international or national legislation indicate that development should be restricted.

Policy DM2, Environmentally sustainable development

The Borough Council requires that:

- a. all new build residential development must achieve at the time a Reserved Matters or Full Planning Application is submitted:
 - i. a 19% improvement in predicted carbon emissions, compared with the building regulations standard current at the time, through increased energy efficiency of the building fabric, unless this is superseded by an updated building regulations requirement equivalent to 'zero carbon homes'; and
 - ii. a predicted mains internal water consumption of no more than 110 litres/day.
- b. all non-residential and multi-residential development above 500 sqm of floor space measured externally (including extensions to existing buildings) must achieve;
 - i. BREEAM 'excellent' (or equivalent) or BREEAM 'very good' plus 'passivhaus' certification including a 15% improvement in predicted carbon emissions, compared with the building regulations current at the time, through low or zero carbon energy generation on site or in a Borough location agreed by the Council.
- c. All larger developments (above 150 dwellings or 10,000sq.m of floor space) must:
 - i. address sustainable development issues at the masterplan stage through BREEAM Communities 'excellent' certification; and
 - ii. fund post occupancy evaluation studies.

In addition to the above, all new residential development, and non-residential and multi-residential development above 500sq.m. of floor space measured externally (including extensions to existing buildings) and external spaces should where practical and viable:

- d. incorporate energy-efficient passive design principles, the best use of natural daylight and natural ventilation systems wherever possible;
- e. connect to any existing near or adjacent low carbon local energy network unless this is proved unviable;
- f. use recycled, low embodied carbon, low environmental impact and locally sourced materials in construction where possible;
- g. be designed with sufficient flexibility to enable the life of the building to be extended by re-use for other purposes where feasible;

Policy DM2, Environmentally sustainable development Continued...

- h. aim to achieve a predicted mains internal water consumption of no more than 90 litres/day;
- i. aim to deliver at least 1% of all residential units which achieve full 'passivhaus' certification.

Policy DM3, Adaptation to climate change

All development should be designed to adapt to the predicted climate change impacts for the Borough.

- a. To reduce the potential impacts of surface water flooding, sustainable drainage systems need to be implemented as part of an integrated SuDS strategy for the site in accordance with policy DM6 (Sustainable surface water management and watercourse management) and as part of the landscape framework for the site including green open space and green roofs where appropriate.
- b. New development should have a cooling strategy which can include:
 - i. cooling through generous green infrastructure
 - ii. areas of shade
 - iii. water cooling
 - iv. building design and orientation to reduce overheating
 - v. 'cool roofs' or green roofs and green walls
 - vi. porous cool pavements
- c. To adapt to water stress, new development should be designed to reduce demand.
Measures can include:
 - i. Reduced residential mains water consumption (as per policy DM2)
 - ii. Water efficient appliances, fittings and leak detection devices for non- residential and multi-residential development
 - iii. Rainwater harvesting and grey water recycling
 - iv. Drought resistant landscape design

National Planning Policy Framework

- 2.5. On the 24th December 2024, the Government published the revised National Planning Policy Framework (NPPF), which sets out the Government's planning policies for England and how these are expected to be applied. At the heart of the NPPF is a presumption in favour of sustainable development
- 2.6. Chapter 14 of the NPPF outlines its energy and climate change policies. New development should be planned in ways that:
 - avoid increased vulnerability to the range of impacts arising from climate change...
 - can help to reduce greenhouse 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.
- 2.7. In determining planning applications, local planning authorities should expect new developments to:
 - comply with any development plan policies on local requirements for decentralised energy supply unless it can be demonstrated by the applicant, having regard to the type of development involved and its design, that this is not feasible or viable
 - take account of landform, layout, building orientation, massing and landscaping to minimise energy consumption.
- 2.8. This chapter also outlines the requirement of Local Plans to take account of climate change over the longer term, including factors such as flood risk, coastal change, water supply and changes to biodiversity and landscape. The key focus of the NPPF is to support local and regional planning authorities.

Proposed Strategy

- 2.9. This statement is intended to establish the proposed approach to sustainable construction and reduction in CO₂ emissions to be delivered at the development.
- 2.10. It is proposed that the development meet the requirements of Condition 22 in full by complying with policies ESD 1 - 8 contained within the Eastleigh Borough Council's adopted Environmentally Sustainable Development Supplementary Planning Document.
- 2.11. This statement will primarily deal with policies ESD 1, ESD 5 and ESD 6 relating to sustainable construction. Policies ESD 2, ESD 4, ESD 7 and ESD 8 are addressed further in other documents.
- 2.12. Further details relating to the requirements of Policy ESD 4 can be found in the Flood Risk Assessment dated January 2020 as produced by PFA consulting.
- 2.13. Further details relating to the requirements of Policy ESD 8 Trees can be found in the Arboricultural Method Statement dated March 2023 as produced by Middlemarch Environmental Ltd.
- 2.14. The development will be designed to achieve a BREEAM rating of 'Excellent', in compliance with essential Policy ESD 1, and Policy DM2 of the Eastleigh Borough Local Plan 2016-2036.
- 2.15. Further details of the BREEAM assessment are detailed within the Boorley Green Gateway Credit Summary prepared by AES Sustainability Consultants.
- 2.16. It will be demonstrated that the commercial retail spaces have the potential to achieve in excess of a 15% reduction in CO₂ emissions over a Building Regulations 2013 compliant development by adhering to the principles of the energy hierarchy and prioritising energy demand reduction before the incorporation of renewable or low carbon technology to meet the remaining demand.
- 2.17. The energy demand of the buildings will be minimised through a combination of improved building fabric, air tightness, and maximising the opportunities for passive solar gain, balancing the requirement to avoid excessive solar gain in summer, thereby addressing Policy ESD 5 and Policy DM3 of the Eastleigh Borough Local Plan 2016-2036.
- 2.18. The development is to be assessed under BREEAM 2018, which no longer contains a credit area to achieve a 15% CO₂ reduction from renewables. It is proposed that the development will meet and exceed an equivalent carbon reduction as detailed in Policy ESD 6 primarily through following a fabric first approach. This will also address the requirements of Policy DM2 of the Eastleigh Borough Local Plan 2016-2036..

3. Energy Reduction Strategy – Fabric First

- 3.1. The proposed construction specification and sustainable design principles to be applied to the development will ensure that the building meets the CO₂ reductions mandated by Part L of the Building Regulations through fabric measures alone.
- 3.2. It is proposed that the energy demand reduction strategy for the development incorporates further improvements beyond a Part L compliant specification and initially concentrates finance and efforts on reducing energy demand in line with the energy hierarchy.



Figure 2. The Energy Hierarchy

- 3.3. 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.
- 3.4. This approach has been widely supported by industry and government for some time, with the Zero Carbon Hub¹ and the Energy Savings Trust² having both stressed the importance of prioritising energy demand as a key factor in delivering resilient, low energy buildings.

Be Lean – reduce energy demand

- 3.5. 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

- 3.6. 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

- 3.7. 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

¹ Zero Carbon Hub, Zero Carbon Strategies for tomorrow's new homes, Feb 2013

² Energy Savings Trust, Fabric first: Focus on fabric and services improvements to increase energy performance in new homes, 2010

4. Baseline CO₂ Emissions

- 4.1. The development is to be designed and constructed to meet the requirements of Part L2A of the Building Regulations 2013, therefore compliance with this standard forms the first stage in the sustainable construction approach.
- 4.2. CO₂ compliance standards were first introduced in the Building Regulations through the update to Part L in 2006. For non-residential development, successive updates raised this standard by 25% in 2010 and approximately a further 9% in 2013 across the mix of use classes.
- 4.3. In order to assess baseline CO₂ emissions for Building Regulations compliance for the commercial properties, a Dynamic Simulation Model (DSM) calculation has been carried out using IESVE software to measure the energy demand of the building and assess the renewable energy provision required to meet the planning policy requirements.
- 4.4. DSM is a methodology used to analyse the energy and environmental performance of non-residential buildings. Its purpose is to provide accurate and reliable assessments of buildings energy performances that are needed to underpin energy and environmental policy initiatives.
- 4.5. DSM for Part L2 assesses buildings against a target emission rate (TER), expressed in kilograms of carbon dioxide per metre squared of total useful floor area per annum, as the benchmark for Part L Building Regulations compliance. The building emission rate (BER) must meet or exceed this level of performance in order to comply with Part L requirements.
- 4.6. The energy uses regulated by the Building Regulations are those most directly influenced by the structure and design of the buildings. These are the energy used for space heating, water heating, lighting and ventilation. Un-regulated energy uses are those in connection with the building user process/equipment small power loads.
- 4.7. Vistry Homes Southern will be constructing the unit to shell and core only, therefore at this stage the building services specification is assumed, with the fit out to be carried out by the future occupier of the buildings.
- 4.8. The requirement for carbon reduction is calculated from the building's regulated energy uses only. DSM calculations have been carried out for each of the retail units on this development.

Table 1. Part L 2013 compliant CO₂ emissions

Part L 2013 Compliant Development	Regulated emissions –tCO ₂ /annum
Retail Unit 1	32.5
Retail Unit 2	32.5
Convenience Store	35.4
Total	100.4

- 4.9. The total regulated CO₂ figure of 100.4 tonnes/annum forms the baseline target against which any reduction will be assessed.
- 4.10. The first stage of the energy strategy will be to ensure that the development meets or exceeds Building Regulation Part L 2013 for regulated emissions before considering potential low carbon or renewable energy technologies to offset emissions. The proposed strategy is discussed in the following sections of this statement.

5. Be Lean – Energy Demand Reduction

- 5.1. The sustainable construction strategy will initially prioritise improvements to the fabric of the proposed building in excess of Building Regulations requirements in order to reduce energy demand as far as is practically possible.

Passive Design Measures

- 5.2. In order to ensure energy use is minimised from the outset, where practical the building has been designed with regard to the principles of passive design, including consideration of building orientation and site placement to maximise the potential for solar gain.
- 5.3. Within the proposed development layout, orientation and massing have been designed to maximise (within reason) passive solar gain, other design considerations have also been taken into account within the layout and orientation, minimising the overshadowing from adjacent buildings and vegetation to maximise solar gains where possible.
- 5.4. Glazing has been specified with a solar transmittance value (g-value) of 0.5 to strike a balance reducing the heating demand in winter by taking advantage of useful solar gain, and reducing the cooling demand in summer
- 5.5. Through optimising for solar gain, the building will additionally benefit from good daylighting levels, thereby reducing the use of internal lighting and promoting well-being.
- 5.6. Where possible, ventilation will be provided naturally, via a mixture of cross ventilation, stack effect and openable windows.

Fabric Specification

- 5.7. The first stage of demand reduction is ensuring an efficient thermal envelope of the building. The specification of materials and insulation will ensure that unwanted heat loss from the buildings is minimised, thereby limiting the required energy inputs to maintain comfortable internal temperatures throughout the year.
- 5.8. In order to deliver the energy demand reduction required to meet and exceed Part L 2013 compliance, improvements to the fabric specification forms the first stage of the energy hierarchy.
- 5.9. Table 2 shows the proposed fabric specification for the commercial units. The first column in this table sets out the Part L2A limiting fabric parameters in order to demonstrate the

improvements that have been made. The proposed specification incorporates low U values to all fabric elements and a low air leakage rate.

- 5.10. The proposed specification of the main thermal elements is shown in contrast with the minimum requirements of Building Regulations L2A standards to demonstrate the improvements made.

Table 2. Proposed fabric specification – Commercial

	AD L2A 2013 Limits	Proposed Specification
External wall	0.35 W/m ² K	0.26
Ground Floor	0.25 W/m ² K	0.11
Windows	2.20 W/m ² K	1.4
Air Permeability	10 m ³ /(h.m ²) @50Pa	5.0

Air Leakage

- 5.11. After conductive heat losses through building elements are reduced, convective losses through draughts are the next major source of energy wastage.
- 5.12. It is assumed at this stage that the retail units will be designed to achieve an airtightness standard of no greater than 5.00 m³/h.m²@50Pa a significant enhancement on Part L minimum requirements. Pressure testing in accordance with Building Regulations and ATTMA standards is required on completion to confirm that the design figure has been met.

Be Lean – CO₂ Reductions Achieved

- 5.13. Table 3 demonstrates the CO₂ reduction achieved from energy demand reduction measures of the proposed development.

Table 3. Regulated CO₂ after demand reduction

Part L 2013 Compliant Development	Regulated emissions –tCO ₂ /annum
Retail Unit 1	25.7
Retail Unit 2	25.1
Convenience Store	22.4
Total	73.2

- 5.14. The predicted emissions after demand reduction are 73.2 tCO₂/year. This is a total saving of 28.2 tCO₂/year when compared with the baseline. The savings equate to a 27.1% reduction in carbon emissions as demonstrated in Table 4.

Table 4. Regulated CO₂ savings from demand reduction

	Regulated carbon dioxide	
Baseline	100.4	
After energy demand reduction	73.2	
	(Tonnes CO ₂ per annum)	%
Be Lean - Savings from energy demand reduction	27.2	27.1

- 5.15. The development therefore greatly improves upon Building Regulations standards through the combination of energy efficiency measures.
- 5.16. The reduction achieved meets the carbon reduction detailed in Policy ESD 6 contained within the Eastleigh Borough Council's adopted Environmentally Sustainable Development Supplementary Planning Document through fabric energy efficiency alone.

6. Be Green - Low Carbon and Renewable Energy Systems

- 6.1. Once energy demand is reduced and energy used as efficiently as possible, methods for generating that energy in a sustainable, renewable way should be considered.
- 6.2. A range of technologies have been assessed for potential incorporation into the scheme in accordance with Regulation 25A of the Building Regulations.
- 6.3. These options are considered over the lifetime of the development and are considered at early stage design to ensure that they can be integrated successfully.

Combined Heat and Power (CHP) and District Energy Networks

- 6.4. A CHP unit is capable of generating heat and electricity from a single fuel source. The electricity generated by the CHP unit is used to displace electricity that would otherwise be supplied from the national grid, with the heat generated as effectively a by-product utilised for space and water heating.
- 6.5. The economic and technical viability of a CHP system is largely reliant on a consistent demand for heat throughout the day to ensure that it operates for over 5000 hours per year. Heat demand from small scale schemes is generally not favourable to efficient system operation, with a defined heating season and intermittent daily profile, with peaks during the day and no demand during evenings and weekends. For this reason, the use of a CHP system is considered unfeasible for this development.
- 6.6. There are currently no heat networks which extend near the proposed development. High network heat losses associated with distribution to individual buildings, as opposed to large high-rise apartment blocks and high-density commercial developments such as hotels and leisure centres mean that a new heat network to serve the area is not considered viable or an environmentally preferred option. Due to these reasons, the provision for future connection to a district heating system is also not proposed.

Wind Power

- 6.7. Locating wind turbines adjacent to areas with buildings presents a number of potential obstacles to deployment. These include the area of land onsite required for effective operation, installation and maintenance access, environmental impact from noise and

vibration, visual impact on landscape amenity and potential turbulence caused by adjacent obstacles, including the significant amount of woodland on and around the development.

- 6.8. A preliminary examination of the BERR wind speed database indicates that average wind speeds at 10m above ground level are around 4.7m/s³. Wind turbines at this site are therefore unlikely to generate sufficient quantities of electrical energy to be cost effective⁴. For these reasons wind power is not considered feasible.

Building Scale Systems

- 6.9. The remaining renewable or low carbon energy systems considered potentially feasible are at a building scale. These are as follows;
- Individual biomass heating
 - Solar thermal
 - Solar photo-voltaic (PV)
 - Air Source Heat Pumps (ASHPs)
 - Ground Source Heat Pump (GSHPs)
- 6.10. The advantages and disadvantages of these technologies are evaluated in Tables 5-9.

³ NOABL Wind Map (<http://www.rensmart.com/Weather/BERR>)

⁴ CIBSE TM38:2006. Renewable energy sources for buildings.

Table 5. Biomass Heating feasibility appraisal

Potential Advantages	Risks & Disadvantages
• Potential to significantly reduce CO₂ emissions as the majority of space and water heating will be supplied by a renewable fuel • Decreased dependence on fossil fuel supply	• A local fuel supply is required to avoid increased transport emissions • Fuel delivery, management and security of supply are critical • Space is required to store fuel, a thermal store and plant • A maintenance regime would be required even though modern systems are relatively low maintenance • Building users or a management company must be able to ensure fuel is supplied to the boiler as required. • Local environmental impacts potentially include increased NO_x and particulate emissions
Conclusions	
Sustainable and local fuel supply is critical to ensuring predicted CO₂ emissions savings for biomass energy systems. Fuel storage capacity on site dictates the length of time required between deliveries and the volume of fuel delivery required. With limited space for access and storage of fuel more frequent deliveries would be required. Combustion of wood products would give rise to significant NO_x and particulate emissions. For these reasons, biomass is not considered an appropriate fuel source for this proposed development.	

Table 6. Solar Thermal systems feasibility appraisal

Potential Advantages	Risks & Disadvantages
• Mature and reliable technology offsetting the fuel required for heating water (typically gas) • Solar thermal systems require relatively low maintenance • Typically, ~50% of hot water demand in buildings can be met annually	• Installation is restricted to favourable orientations on an individual building basis • The benefit of installation is limited to the water heating demand of the building • Safe access must be considered for maintenance and service checks • Buildings need to be able to accommodate a large solar hot water cylinder • Distribution losses can be high if long runs of hot water pipes are required • Visual impact may be a concern in special landscape designations (e.g. AONB)
Conclusions	
Solar thermal systems are considered technically feasible on all buildings with suitable roof orientations. However, due to the intermittent and unknown level of water usage within the building, this option is not considered favourable.	

Table 7. Solar Photovoltaic systems feasibility appraisal

Potential Advantages	Risks & Disadvantages
- The technology offsets grid supplied electricity used for lighting, pumps and fans, appliances and equipment - Mature and well proven technology that is relatively easily integrated into building fabric - Adaptable to future system expansion - Solar resource is not limited by energy loads of the building as any excess generation can be transferred to the national grid - PV systems generally require very little maintenance - Service and maintenance requirement minimal, and 2-3 storey buildings should not require significant additional safety measures (mansafe systems etc) for roof access	- Poor design and installation can lead to lower than expected yields (e.g. from shaded locations) - Installation is restricted to favourable orientations - Feed in Tariff support mechanism has been discontinued - Safe access must be considered for maintenance and service checks - Visual impact may be a concern in special landscape designations (e.g. AONB) or conservation areas - Reflected light may be a concern in some locations
Conclusions	
PV panels are considered technically feasible for all buildings with suitable roof orientation and pitch. The relatively low cost, high carbon saving potential and limited additional impacts mean that PV is considered a feasible option for this development. The renewable energy assessment shows that PV systems can be provided to generate renewable power. The technology can work well with all the other proposed technologies (e.g. ASHP) and can provide meaningful CO₂ reduction.	

Table 8. Air Source Heat Pump systems feasibility appraisal

Potential Advantages	Risks & Disadvantages
- Heat pumps are relatively mature technology providing heat using the reverse vapor compression refrigeration cycle - Heat pumps are a highly efficient way of providing heat using electricity, with manufacturers reporting efficiencies from 250% - Can be of increased benefit where cooling is also required, therefore particularly relevant to commercial buildings	- It is critical that heat pump systems are designed and installed correctly to ensure efficient operation can be achieved. Users must be educated in how heat pump systems should be operated for optimal efficiency - Air source heat pump plant should be integrated into the building design to mitigate concerns regarding the visual impact of bolt-on technology - Noise in operation may be an issue particularly when operating at high output
Conclusions	
Air source heat pumps are technically feasible for the retail units within this development. For commercial spaces where heating is predominately required during daytime hours ASHP can provide a cost effective and efficient solution for heating and cooling. Due to the low hot water requirement and a heat pumps capability to reverse the process, and thus act like an air conditioning unit, it also lends itself to a retail use.	

Table 9. Ground Source Heat Pump systems feasibility appraisal

Potential Advantages	Risks & Disadvantages
- Heat pumps are relatively mature technology providing heat using the reverse vapor compression refrigeration cycle - Heat pumps are a highly efficient way of providing heat using electricity, with manufacturers reporting efficiencies from 320% - Can be of increased benefit where cooling is also required, therefore particularly relevant to commercial buildings	- Low temperature heating circuits (underfloor heating) would be required to maximise the efficiency of heat pumps - A hot water cylinder would also be required for both space and water heating - It is critical that heat pump systems are designed and installed correctly to ensure efficient operation can be achieved - Ground source heat pumps either require significant land to incorporate a horizontal looped system or significant expense to drill a bore hole for a vertical looped system
Conclusions	
The ground pipe system of a GSHP can be horizontal or vertical. For horizontal systems, a coiled pipe network, commonly called a 'slinky', may be used. It is buried at around 2m below ground level. This requires a large area of open space and intensive civil works. For vertical systems, the pipes are placed in holes bored straight into the ground to a depth of between 15 and 150 metres depending on ground conditions and size of system. The installation of GSHPs requires a large amount of civil engineering works and feasibility of installation is highly dependent upon the geological conditions at the site, due to extensive groundworks and costs this option is discounted.	

Summary

- 6.11. Following this feasibility assessment, it is considered that roof-mounted PVs and ASHPs are therefore likely to be most suited to the development:

ASHP

- 6.12. An ASHP is not a zero-carbon technology, but it is a low carbon technology. An ASHP works by converting energy from the outside air into heat.
- 6.13. This can be used for heating in the winter, but can be reversed for cooling in the summer months. ASHPs work by extracting latent heat from the outside air and passing it through a heat exchanger which increases its temperature. The heat is then fed to the required rooms. An ASHP will produce a lower CoP than a GSHP due to the lower temperature of outside air and greater variance in temperature. However, the cost of an ASHP is much lower as there is no need for any expensive ground works
- 6.14. A multi-split air-to-air heat pump is anticipated to be used in the retail space with the ability to operate in reverse and provide heating and cooling.
- 6.15. Split systems are made up of one or more indoor room units and an outdoor unit that extracts heat from the exterior when the system is in heating mode. The indoor and outdoor units are linked by pipes which transport refrigerant between the units.
- 6.16. Air-source heat pumps can have a number of environmental and operation advantages. More heat is supplied to the building than energy is consumed by the heat pump.
- 6.17. An air-source heat pump with a heating efficiency of 3.5 will supply 3 kilowatts of heat energy for the consumption of 1 kilowatt of electricity. If the heat pump is replacing (or being used as an alternative to) electric space heating, the use of the heat pump offers significant carbon savings.

Photovoltaic Panels (PV)

- 6.18. Photovoltaics (PV) or solar cells, as they are often referred to, are semiconductor devices that convert sunlight into direct current (DC) electricity.
- 6.19. Groups of PV cells are electrically configured into modules and arrays which can be used to charge batteries, operate motors and power any number of electrical loads. With the appropriate power conversion equipment (inverters), PV systems can produce alternating current (AC) compatible with any conventional appliances and operate in parallel with the utility grid.

- 6.20. Excess electricity can be sold to the National Grid when the generated power exceeds the local need, this can be beneficial with a large system, when the building is not used all of the time. PV systems require only daylight, not sunlight to generate electricity (although more electricity is produced with more sunlight). Therefore, energy can still be produced in overcast or cloudy conditions and used successfully in all parts of the UK.
- 6.21. PV panels can be fitted to the top of roofs. Ideally the panels should face between south-east and south-west, at an elevation of about 30-40°. However, in the UK even flat roofs receive 90% of the energy of an optimum system.
- 6.22. Roof mounted photovoltaic panels are also considered a feasible technology for this development.

Proposed Renewable Energy Systems - ASHP

- 6.23. ASHPs are considered to be the most appropriate technology to provide heating to the retail units to provide heating and cooling.
- 6.24. As Vistry Homes Southern will be developing these units to a scope of shell and core only, the final systems will be installed by the future occupier. Therefore, at this stage these systems are indicative only.
- 6.25. Table 10 details the CO₂ savings that would be achieved per year across the three retail units when compared to a gas boiler with the same efficiency as the Building Regulations L2A notional building.

Table 10. Proposed ASHP systems

Low Carbon energy generation	
Buildings to benefit from ASHP	All Retail Units
CO ₂ saving (tonnes CO ₂ /year)	4.8

7. Overall Reduction in CO₂ Emissions

- 7.1. Table 11 demonstrates the CO₂ reduction achieved from the inclusion of an air source heat pump as the main heating system for the proposed development.

Table 11. Regulated CO₂ after demand reduction

Part L 2013 Compliant Development	Regulated emissions –tCO ₂ /annum
Retail Unit 1	23.4
Retail Unit 2	23.1
Convenience Store	21.9
Total	68.4

- 7.2. The predicted emissions after demand reduction and the inclusion of low carbon technology are 68.4 tCO₂/year. This is a total saving of 32.0 tCO₂/year when compared with the baseline. The savings equate to a 31.9% reduction in carbon emissions as demonstrated in Table 12.

Table 12. Regulated CO₂ savings from demand reduction

	Regulated carbon dioxide	
Baseline	100.4	
After energy demand reduction	73.2	
After Renewables/Low Carbon Technology	68.4	
	(Tonnes CO ₂ per annum)	%
Savings from energy demand reduction	27.2	27.1
Savings from Renewables/Low Carbon Technology	4.8	4.8

Total Savings	32.0	31.9
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- 7.3. The development therefore achieves a greater than 15% reduction in CO₂ emissions, in compliance with Policy ESD 6 of the Eastleigh Borough Council's adopted Environmentally Sustainable Development Supplementary Planning Document, as well as including low carbon energy generation in line with Policy DM2 of the Eastleigh Borough Local Plan 2016-2036.
- 7.4. Table 13 details the calculated heating and cooling demand for both the actual and notional building which is calculated as part of the assessment.

Table 13. Heating and Cooling demand

	AD L2A 2013 Compliant (MWh)	Proposed Specification (MWh)	% Reduction
Retail Unit 1	16.8	14.3	14.8%
Retail Unit 2	16.5	14.4	13.2%
Convenience Store	62.6	58.9	5.9%
Total	95.9	87.6	8.7%

- 7.5. As shown above the retail units achieve a combined average 8.7% reduction in heating and cooling demand over a Building Regulations 2013 compliant level. This reduction equates to an equivalent of 8 credits scored under the BREEAM ENE 01 credit area.

8. Sustainability

- 8.1. This section sets out details of additional resource efficiency and sustainable design principles to be applied at the development in order to address the requirements within Eastleigh Borough Council's adopted Environmentally Sustainable Development Supplementary Planning Document.

Water Efficiency

- 8.2. The UK Climate Change Risk Assessment 2017 identified risks of shortages in water supply as a future climate change impact. Therefore, the efficient use of water is an important factor when considering future resilience to climate change.
- 8.3. Water will be managed effectively to reduce the water consumption associated with the proposed development. Water efficiency measures including the use of efficient dual flush WCs, low flow showers and aerated taps, with the aim to limit the use of water during the operation of the proposed development.
- 8.4. Native planting will be selected to reduce irrigation requirements, and consideration will be given to the installation of water butts or rainwater harvesting if required for the watering of outdoor plants.

Sustainable Drainage and Flood Prevention

- 8.5. Surface water will as far as practicable, be managed in a sustainable manner to reduce the surface water flows arising from the site, reducing the flood risk on the site itself and elsewhere, taking climate change into account.
- 8.6. Policies ESD 2 and ESD 7 require either rainwater harvesting and/or grey water recycling systems and/or green rooves.
- 8.7. The majority of rooves on this development are pitched rooves, which may be required to support solar PV systems for the residential development. Green rooves are generally constructed from reinforced concrete in order to support the increased load. The embodied carbon emissions associated with concrete are significantly greater than a timber structure, and therefore a pitched rooves with timber trusses are likely to be the option with the lowest embodied carbon.
- 8.8. Due to the above reasons, green rooves are not considered appropriate for this development, and alternative measures for water retention and additional habitat creation are proposed in lieu.

- 8.9. Additional drainage features which will be incorporated in to the design include; permeable pavements and surfaces, swales for attenuation and to convey surface water through the site, where levels allow, and the addition of a storage tank for water retention under the car park.

- 8.10. Further details relating to the requirements of Policy ESD 4 can be found in the Flood Risk Assessment and Drainage Strategy dated January 2020 as produced by PFA consulting.

Trees and Biodiversity

- 8.11. Policy ESD 8 requires non-residential development with new off-street car parks accessible to the public to provide at least 1 tree per 6 vehicle spaces.
- 8.12. A Biodiversity Mitigation and Enhancement Plan (June 2022) has been produced by Tetra Tech to detail the approach at the site to habitats and biodiversity.
- 8.13. The development of the site will retain some of the current habitats present in addition to the creation and enhancement of new habitats. The line of trees to the south-west of the site shall be retained and protected, whilst proposed enhancements include the sowing of meadow grassland and planting of native shrubs and hedgerows.
- 8.14. In addition, an Arboricultural Method Statement dated March 2023 has been produced by Middlemarch Environmental Ltd. Which details measures taken to protect existing trees and prevent unnecessary tree removal.

9. Conclusions

- 9.1. This Energy Statement has been prepared by AES Sustainability Consultants Ltd on behalf of Vistry Homes Southern to address Condition 22 of the planning permission reference F/19/86233 by indicating how the retail units at Boorley Green Gateway will meet the relevant essential requirements in the Eastleigh Borough Council's adopted Environmentally Sustainable Development Supplementary Planning Document.
- 9.2. The statement sets out a fabric first approach to sustainable construction, demonstrating that decisions about the built form, orientation and design as well as improvements in insulation specification, a reduction in unwanted air leakage paths and further passive design measures will ensure that energy demand and consequent CO₂ emissions are minimised.
- 9.3. The development will be designed to achieve a BREEAM rating of 'Excellent', in compliance with essential Policy ESD 1, and further taking in to account the requirements of Policy DM2 of the Adopted Eastleigh Borough Local Plan 2016-2036. A reduction in energy demand for heating and cooling through fabric measures will ensure that the development achieves the minimum of 5 credits required under the ENE 01 credit area.
- 9.4. It has been demonstrated that the commercial retail spaces have the potential to achieve in excess of a 15% reduction in CO₂ emissions over a Building Regulations 2013 compliant development by adhering to the principles of the energy hierarchy and prioritising energy demand reduction before the incorporation of renewable or low carbon technology to meet the remaining demand.
- 9.5. A range of potentially appropriate technologies have been assessed for feasibility in delivering an addition reduction in CO₂ emissions, concluding that ASHPs and solar PV both constitute viable technologies for these retail units.
- 9.6. Calculations demonstrate that the design fabric specification and assumed fit out would deliver energy savings of 31.9% over the Part L 2013 standards, therefore adhering to the standards of Policy ESD 6 of the SPD, as well as Policy DM2 of the Eastleigh Borough Local Plan 2016-2036.
- 9.7. In conclusion, this statement demonstrates that the sustainable design will meet the requirements of each of the relevant policies within Eastleigh Borough Council's adopted Environmentally Sustainable Development Supplementary Planning Document, thereby complying with the requirements of Condition 22.