Land At Mercer Road
Riverdale Developments

Energy and Sustainability Statement

AES Sustainability Consultants Ltd

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Rev 0	Claire Stone	08.02.2021	Initial draft issue for comments
Rev1	Eloise Utley	17.02.2024	Revised scheme
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This statement has been commissioned by Riverdale Developments to detail the proposed approach to sustainable construction to be employed at the site at Land at Mercer Road. 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. Written by AES Sustainability Consultants Limited on behalf of Riverdale Developments, this statement has been prepared in support of an application for planning at Land at Mercer Road, Horsham.

Development Description

1.2. The development site is located to the north of Horsham town centre, in West Sussex.

1.3. The proposed application would deliver 304 dwellings across a mix of two to five bed detached, semi-detached and terraced houses along with one and two bed apartments and a shell and core retail unit. The proposed site plan is shown in Figure 1.

Purpose and Scope of the Statement

1.4. The statement has been prepared to address national and local policy relating to sustainable design and construction of dwellings, including relevant policies within the new Regulation 19 Local Plan which is currently under review.

1.5. This statement has been structured to align with the 'Energy Hierarchy' – Be Lean, Be Clean, Be Green and demonstrates that following a fabric first approach, the development will result in a reduction in CO_2 emissions from Part L of the Building Regulations 2021. These savings will be secured through a combination of energy demand reduction measures and renewable heating.

1.6. The statement will also detail some of the various aspects of sustainability that have been considered across the site including water use and waste reduction.

Figure 1. Proposed site layout

2. Planning Policy

National Planning Policy Framework

2.1. The revised National Planning Policy Framework was updated on 19 December 2023 and 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

2.2. 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.

2.3. 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.

2.4. 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.

National Energy Standards

2.5. Government policy in relation to the energy performance of buildings has been evolving over the past decade, following government commitments to reduce the emission of greenhouse gases – particularly CO_2. This aim was enshrined in the Climate Change Act 2008, which commits the UK to achieving a mandatory 80% reduction in the UK's CO_2 emissions by 2050, compared with 1990 levels.

2.6. In 2016, the UK Government ratified the Paris Agreement, which provides a framework for governments to pursue the target of limiting global warming below 2°C.

2.7. The built environment therefore has a key role to play in delivering on these international commitments, accounting for approximately a third of overall CO_2 emissions. The translation of these commitments into national policies within the built environment has been driven by, amongst other mechanisms, the EU Energy Performance of Buildings Directive 2002/91/EC and the 2012 Energy Efficiency Directive.

2.8. This legislation requires EU countries to set minimum energy performance standards for new buildings, with the aim that all new buildings should be 'nearly zero energy' by 2020. Remaining energy demand should be provided 'to a very large extent' from low carbon or renewable energy sources. The definition of 'nearly zero energy' is subject to a cost optimal assessment, and therefore this directive does not currently mandate the achievement of energy self-sufficient buildings.

2.9. The EPBD is currently enforced through the Energy Performance of Buildings (England and Wales) (Amendment) Regulations 2016, which came into effect from January 2016, following the initial 2012 Regulations. These regulations set out the framework for Energy Performance Certificates and define the data that must be gathered and used for energy performance calculations.

2.10. These energy performance calculations are governed by Part L of the Building Regulations, which mandate a minimum absolute level of regulated carbon emissions – those arising from energy demand for space and water heating, lighting, fixed building services (but not including appliance use, cooking or other building equipment not used to condition the space).

2.11. Following the introduction of the 2013 edition of Building Regulations Part L, the successive updates now require regulated CO_2 emissions levels from new built non-domestic buildings to be approximately 30% lower than 2006 levels.

2.12. The Government proposes that the Building Regulations are the appropriate mechanism to drive future standards with respect to energy consumption, with local authorities able to apply the optional requirements of the national technical standards with respect to water consumption and space.

2.13. As an acknowledgement of the challenge to the built environment in meeting future 'net zero' targets, the Government published the next revision to the Building Regulations Approved Document L2 (Part L) in December 2021.

Current standards – Part L 2021

2.14. The uplift to Part L 2021 incorporates the following changes from the previous Building Regulations Part L 2013 standards:

Higher Standards for Carbon Dioxide Emissions

2.15. The CO_2 emissions requirement is set at a 31% improvement (27% for non-residential) on Part L 2013, expected to be met through a combination of efficient heating systems, improved fabric standards and on-site renewable energy generation.

Higher Standards for Fabric Energy Efficiency

2.16. The Building Regulations control thermal insulation requirements through setting an upper limit on space heating demand. These requirements have been further improved in Part L 2021, meaning that insulation standards will need to be improved.

Introduction of Primary Energy Rate Compliance Metric

2.17. The regulations have introduced a primary energy rate compliance metric. This is in order to align the regulations with the amended EU Energy Performance of Building Directive (2018), which states:

"The energy performance of a building shall be expressed by a numeric indicator of primary energy use in kWh/(m^2.y) for the purpose of both energy performance certification and compliance with minimum energy performance requirements."

2.18. Primary energy is an expression of the energy content available in a fuel / fuel source which has not undergone any conversion or transformation process. Individual factors are assigned to all fuel types to take account of upstream processes and energy use – e.g. mains electricity has a higher factor due to the additional transformation and distribution processes that the energy undergoes building.

2.19. Buildings will therefore be assessed based on their primary energy consumption in a similar way to carbon compliance.

Future Homes and Buildings Standards

2.20. The government has re-iterated the intent to adopt the more ambitious Future Homes Standard in 2025, which aims to form a good basis for achieving the overall net zero goals.

2.21. As part of the proposed changes, it is expected that heat pump technologies will be the preferred heating system in order for all new dwellings to be 'zero carbon ready' by taking advantage of the decreasing carbon factor associated with grid electricity.

Local Planning Policy

2.22. On 27 November 2015 Horsham District Council adopted the Horsham District Planning Framework (HDPF).

2.23. The HDPF set out the planning strategy for the years up to 2031 to deliver the social, economic and environmental needs for the district (outside the South Downs National Park). Since 2015, government policy and legislation has changed. In particular the government's national planning strategy, known as the National Planning Policy Framework (NPPF), was re-issued in 2019, with a number of significant changes compared to the 2012 version.

2.24. The new Regulation 19 Local Plan is currently under review, it will cover the period from 2023 to 2040. Like the HDPF, it aims to deliver the social, economic and environmental needs of Horsham District, as well as looking beyond the district's boundaries.

2.25. The energy strategy for the site has been developed with consideration of the policies contained within the new local plan to ensure that it meets the needs of the Council for the future. The Regulation 19 Local Plan contains policies 6, 7 and 8 relating to sustainable development.

Strategic Policy 6: Climate Change

Carbon Reduction

1. Development proposals will only be supported where they include measures which contribute to achieving net zero carbon emissions across the District by 2050 at the latest. The Council will be supportive of a range of measures to achieve this target, including but not limited to:

a) Design which incorporates high standards of energy efficiency including optimal levels of thermal insulation, ventilation and cooling and passive solar design;

b) The use of renewable and low carbon energy supply systems and connection to renewable and low carbon heat networks;

c) The efficient use of natural resources used in new buildings to reduce the environmental impacts of construction;

d) Design that influences the behaviour of occupants to reduce energy use;

Strategic Policy 6: Climate Change – continued…

e) Using patterns of development and providing sustainable transport infrastructure which reduce the need to travel, encourage walking and cycling and include good accessibility to public transport and other forms of sustainable transport and ensure residents have access to services and facilities that are within walking distance;

f) Reduce whole life carbon emissions by retaining and reusing existing buildings, components or materials, including on-site where possible.

Climate Change Adaptation

2. Development will only be supported if it includes site and building level measures to adapt to the future impacts of climate change and reduce vulnerability, particularly in terms of the comfort, health and wellbeing of current and future occupiers. Flood risk, water supply, overheating and changes to the District's landscape should also be considered. Measures should include but are not limited to:

a) Use of site and interior building layout: new buildings should be orientated to maximise the opportunities for both natural heating and ventilation and to reduce the exposure to wind and other elements, and the potential for overheating;

b) The conservation of water supplies to minimise the risk and impact of drought and flooding;

c) The use of green/blue infrastructure and dual use Sustainable Drainage Systems (SuDS) to provide multifunctional benefits such as helping to absorb heat, reduce surface water runoff, provide flood storage capacity and assist habitat migration; and

d) Moderating external temperatures through the use of green walls and roofs, tree planting or other nature-based solutions and landscaping for shade and drainage design.

3. Development will be supported providing it avoids responses to climate impacts which lead to increases in energy use and carbon dioxide emissions. In considering the likely impact of climate change over the lifetime of the development reference should be made to the most recent climate change projections.

Sustainability Statement

4. Development will be supported provided a Sustainability Statement is submitted which demonstrates how the development has taken measures to mitigate and adapt to the effects of climate change.

Strategic Policy 7: Appropriate Energy Use

Energy Hierarchy

1. Development will be supported provided that it contributes to clean, efficient energy in Horsham based on the following cascade:

a) Be Lean – use less energy – for example, by minimising energy demand through energy efficiency measures such as fabric performance and passive design;

b) Be Clean – supply energy efficiently and exploit local energy resources such as secondary heat and district energy networks where available. Preference must be given to technologies with greater efficiencies and fuels with lower carbon emissions to achieve the highest total lifecycle carbon emission savings, in accordance with Part 2 of this policy;

c) Be Green – maximise the use of renewable energy sources.

d) Be Seen – monitor, verify and report on energy performance.

Zero and Low Carbon Heating

2. Development proposals must demonstrate how they will provide zero and low carbon heating in accordance with the following hierarchy. Evidence must be provided that opportunities to meet each level of the hierarchy have been exhausted before cascading to the next level:

a) Connect to local existing or planned heat networks*, in combination with on-site renewable energy generation;

b) Maximise use of on-site renewable energy generation;

c) Use of the optimum means of low or zero-carbon heat supply is demonstrated, based on the in order of preference below:

i. Use of waste heat sources;

ii. Electrically-driven ground, water or air source heat pumps;**

iii. Direct Electric Heating. **

Energy Statements

3. Residential or commercial development will be supported provided that it includes an Energy Statement, (which may be incorporated into the Sustainability Statement), demonstrating how compliance with this policy has been achieved.

Strategic Policy 7: Appropriate Energy Use – continued…

Renewable Energy Schemes

4. Stand-alone renewable energy schemes will be supported where they do not conflict with other policies in this Plan. Renewable and low carbon energy generation developments that are led by, or meet the needs of, local communities will carry significant weight.

**Where a local heat network is planned but not yet in existence or connection is not currently viable, but may become viable in the future, the development should be designed to allow for the cost-effective connection and supply at a later date. In this case the heat should be supplied according to steps 2b and 2c of the above hierarchy.*

***Electric heat pumps and direct electric heating are assumed to become zero-carbon when the national grid decarbonises.*

Strategic Policy 8: Sustainable Design and Construction

1. Development will be supported where it is demonstrated that sustainable design, including its construction and operation, is integrated into the development from the design stage onwards. To deliver sustainable design, development will only be supported where it meets all of the following requirements that are relevant:

a) New-build homes to deliver, as a minimum, carbon emissions reduction as set out in the 2021 Edition (or any future update) of the 2010 Building Regulations (Part L);

b) New non-domestic buildings to achieve a BREEAM rating of 'Excellent', unless it can be demonstrated that this would make the scheme unviable;

c) Incorporate a Fabric First Approach, maximising the performance of the components and materials that form the building fabric itself, before consideration of the use of mechanical or electrical building service systems;

d) Minimise construction and demolition waste, utilise recycled and low-impact materials and incorporate measures that reduce the amount of biodegradable waste sent to landfill;

e) Be designed flexibly to enable future modification of use or layout, facilitating future adaption, refurbishment and retrofitting;

f) Include the provision of gigabit capable broadband access and enable provision of future communication technologies.

Strategic Policy 8: Sustainable Design and Construction – continued…

2. Where permission is required to retrofit energy efficiency measures into existing development, schemes will be supported in principle.

3. Development that involves the retrofitting of an existing historic building (heritage asset) will be supported provided that the following criteria are met:

a) It does not result in detriment to the significance of the asset or damage to its fabric;

b) A whole building approach to improving energy efficiency is taken as advocated by Historic England;

c) Micro-renewable technologies do not result in harm to the heritage asset or their setting;

d) Where the proposal involves major development, it is demonstrated that opportunities for the retention and retrofitting of existing historic buildings within the site boundary have been included within the scheme.

4. In order to demonstrate compliance, proposals should be accompanied by a Sustainability Statement to demonstrate how these measures will be incorporated into development design.

Proposed Policy Response

2.26. This statement is intended to establish the proposed approach to sustainable construction and reduction in energy demand to be delivered at the development in order to meet Part L 2021 Building Regulations and applicable planning policy contained within the Regulations 19 Local Plan.

2.27. In line with Strategic policies 6-8 the development is designed to incorporate all applicable guidance specifically, in relation to the energy hierarchy and the construction of highly efficient buildings.

2.28. All heating systems are proposed to be heat pumps wherever technically feasible in line with Policy 8.

2.29. A range of additional sustainability measures have been considered including passive design, minimising water demand and site run off, and minimising waste during construction and occupation.

BREEAM Energy Requirements

2.30. Strategic Policy 8 requires a BREEAM rating of 'Excellent' to be achieved for the non-residential development. The non-residential aspects of the development constitute only a minor proportion of the overall development making up less than 1% of the total useful floor area of the site. Furthermore the retail unit is at this stage to be developed to a scope of shell only, with the incoming occupier responsible for fitting the building services.

2.31. The building services, including heating and lighting, play a large role in determining the emissions and energy efficiency of the unit. At this stage of development, the developer is only able to influence the building fabric, which will be designed to reduce energy demand as low as practically possible.

2.32. Given the size of the non-residential aspects of the development and low level of influence that the developer has over them, a full BREEAM assessment is considered overly onerous, and it is instead proposed that the building is designed to ensure that the necessary minimum energy credits are achieved by the building fabric, to ensure that the energy standards equate to those of a BREEAM 'Excellent' building, without the need to produce a full assessment.

2.33. Under BREEAM UK New Construction, it is mandatory to achieve a minimum of 4 Ene01 credits to achieve an Excellent rating.

3. Energy Hierarchy

Overview

3.1. In accordance with Strategic Policy 7: Appropriate Energy Use, the development will be designed in line with the Energy Hierarchy approach to sustainable construction.

Figure 2. The Energy Hierarchy

3.2. 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.

3.3. 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.

Be Lean

3.4. 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 overshading and wind sheltering
- Landscaping – control daylight, glare and mitigate heat island effects
- Building design – minimise energy demand through fabric specification

Be Clean

3.5. 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

3.6. 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

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4. Baseline CO_2 Emissions

4.1. The development is to be designed and constructed to meet the requirements of Part L2 and L1 of the Building Regulations 2021, therefore compliance with these standards forms the first stage in the sustainable construction approach.

4.2. CO_2 compliance standards were first introduced in the Building Regulations through the update to Part L in 2006. For residential development, successive updates raised this standard by 25% in 2010 and approximately a further 6% in 2013, with non-residential standards being increased in parallel by 25% and 9% across the mix of use classes.

4.3. The introduction of Part L 2021 saw further reductions in CO_2 emissions with a 31% reduction in allowable CO_2 emissions below 2013 standards for residential development, and a 27% reduction for non-residential.

4.4. In order to assess baseline CO_2 emissions for Building Regulations compliance, Standard Assessment Procedure (SAP) calculations have been applied to a sample of the proposed development to assess the energy demand and build a representative site model to assess the renewable energy provision required to meet the planning policy requirements.

4.5. Similarly, in order to assess baseline CO_2 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 buildings.

4.6. DSM and SAP are the methodologies used by the Government to assess and compare energy and environmental performance. Their purpose is to provide accurate and reliable assessments of building energy performances that are needed to underpin energy and environmental policy initiatives[1]

4.7. SAP and DSM assess dwellings and commercial 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 dwelling emission rate (DER) or Building Emission Rate (BER) must meet or exceed this level of performance in order to comply with Part L requirements.

4.8. The energy uses regulated by the Building Regulations are those most directly influenced by the structure and design of the buildings. These are energy used for space heating, water heating, lighting and ventilation.

4.9. The retail unit is at this stage to be developed to a scope of shell only, with the incoming occupier responsible for fitting the building services.

4.10. The building services, including heating and lighting, play a large role in determining the emissions and energy efficiency of the unit. At this stage of development the developer is only able to influence the building fabric, which will be designed to reduce energy demand and ensure that a compliant solution can be achieved by the incoming occupier.

4.11. The DSM calculations have been carried out using an assumed fit-out specification in order to produce a valid assessment.

4.12. The Part L compliant calculated baseline carbon emissions and energy demand for the proposed development are reported in table 1.

Table 1. Part L 2021 compliant CO_2 emissions – site wide

Part L 2021 Compliant Development	Regulated emissions –tCO_2/annum
Residential Emissions	284.9
Non-residential Emissions	0.8
Total CO_2 emissions	285.7

4.13. The first stage of the energy strategy will be to ensure that the development reduces energy demand through efficient building design and insulation levels before considering low carbon or renewable energy technologies. The proposed strategy is discussed in the following sections of this statement.

[1] https://www.gov.uk/guidance/standard-assessment-procedure

5. Be Lean – Energy Demand Reduction

5.1. The sustainable construction strategy will initially prioritise improvements to the fabric of the proposed dwellings in excess of Building Regulations requirements in order to reduce energy demand. This will be achieved through a thermally efficient building fabric, in conjunction with energy efficient lighting and building services.

Building Regulations Standards – Fabric Energy Efficiency

5.2. In addition to the CO_2 reduction targets contained within Part L, 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. The fabric energy efficiency standards were increased further with the introduction of Part L 2021.

5.3. This standard enables the decoupling of energy use from CO_2 emissions and serves as an acknowledgement of the importance of reducing demand, rather than simply offsetting CO_2 emissions through low carbon or renewable energy technologies.

5.4. The TFEE is calculated based on the specific dwelling being assessed with reference values for the fabric elements contained within Approved Document L1. 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 Statement.

Passive Design Measures

5.5. In order to ensure energy use is minimised from the outset, where practical the proposed dwellings have been designed with regard to the principles of passive design, including consideration of building orientation and site placement to maximise the potential for useful solar gain to minimise the heating demand during the winter months, whilst ensuring that south and southwest facing facades are not overly glazed so as to minimise the risk of overheating during summer months.

5.6. Within the proposed development layout, orientation and massing have been designed to maximise (within reason) passive solar gain. Glazing will be specified with a solar transmittance value (g-value) to strike the balance between useful solar gain in winter and unwanted solar gain in summer.

5.7. Through optimising for solar gain, all dwellings will additionally benefit from good daylighting levels, thereby reducing the use of internal lighting and promoting well-being.

Fabric Specification

5.8. 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 dwellings is minimised, thereby limiting the required energy inputs to maintain comfortable internal temperatures throughout the year.

5.9. In order to deliver the energy demand reduction required to meet and exceed Part L 2021 compliance, improvements to the fabric specification and heating systems of the buildings forms the first stage of the energy hierarchy.

5.10. Table 2 shows an indicative fabric specification for the residential and commercial units. The first column in this table sets out the Part L limiting fabric parameters in order to demonstrate the improvements that have been made. The proposed specification incorporates low U values to all fabric elements, a low air leakage rate and good thermal detailing. The figures presented within this report represent an indicative specification and full details will be presented during detailed design.

Table 2. Proposed fabric specification

	Part L1 Limiting parameter (W/m²K)	Proposed Specification (W/m²K)
External wall	0.26	0.19
Party wall	0.20	0.00
Roof	0.16	0.09
Ground Floor	0.18	0.10 – 0.12 (P/A)
Windows	1.60	1.20 - 1.30
Air Permeability	8 m³/(h.m²) @50Pa	≤ 3.00 - 5.01 m³/(h.m²) @50Pa