

Hawke Ridge Business Park

Bellway Strategic Land

Energy & Sustainability Statement

30th June 2026

Revision 1.0

AES JOB NUMBER 9555

Revision	Date	Comments	Prepared by	Reviewed by	Approved by
1.0	30.06.2026	First Issue	Ruth Pike	Joshua Collett	Joshua Collett
2.0	14.07.2026	Final Issue	Ruth Pike	Joshua Collett	Joshua Collett

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- 1.3 Save as required in the Retainer, modelling carried out by us and in the preparation of the Report has been carried out in accordance with the guidance issued by the BRE.
- 1.4 This Report reflects the position as at 14th July 2026.

Sources

- 1.5 This Report is based on our review and analysis of the information provided by the Client and Design Team (the "Information"), upon which we have relied in compiling this Report.
- 1.6 We have not sought to establish the accuracy of the Information or the reliability of these sources by reference to independent evidence, but where any independent evidence has been obtained, we have relied upon it for the purpose of preparing this Report.

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1. Introduction

Preface

- 1.1. Written by AES Sustainability Consultants on behalf of Bellway Strategic Land, this Energy and Sustainability Statement has been prepared in support of the full detailed planning application at Hawke Ridge Business Park. This falls under the jurisdiction of Wiltshire Council.

Development Description

- 1.2. This statement has been prepared in support of the detailed planning application which seeks approval for two-hundred and forty nine new build dwellings, a mix of one- and two-bedroom flats, plus two-, three, and four bedroom houses.
- 1.3. This energy and sustainability statement sets out the proposed approach to sustainability for the design proposals.



Figure 1 - Proposed Site Layout.

Purpose and Scope of the Statement

- 1.4. The statement has been prepared to address local and national policy relating to sustainable design and construction of dwellings, including relevant policies contained within the Wiltshire Core Strategy, the Wiltshire Design Guide (2023) and National Planning Policy Framework
- 1.5. Proposals will also aim to be aligned with the Future Homes Standard drive away from on-site combustion of fossil fuels by incorporating highly efficient heat pump technology to serve heating and hot water demand.
- 1.6. A fabric first approach is also taken as a priority to future proof the development for the imminent introduction of the Future Homes Standard from March 2027.
- 1.7. This statement demonstrates that through a combination of fabric measures, the use of a low carbon heating systems and renewable energy, the development will deliver a level of energy performance significantly beyond current regulatory standards.
- 1.8. A range of additional sustainable design considerations will be addressed including resource efficiency, waste reduction, overheating, electric car infrastructure and water efficiency.

2. Planning Policy

National Planning Policy Framework

- 2.1. In December 2024, 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.
- 2.2. 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.
- 2.3. Paragraph 163 requires consideration of climate change and mitigation approaches:

163. The need to mitigate and adapt to climate change should also be considered in preparing and assessing planning applications, taking into account the full range of potential climate change impacts.

- 2.4. Paragraph 164 sets out what is expected from new developments when considering strategies to mitigate and adapt to climate change:

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

- a) 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
- b) 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

- 2.5. 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 CO₂. This obligation was enshrined in the Climate Change Act 2008, which commits the UK to achieving a mandatory 80% reduction in the UK's CO₂ 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. In June 2019, the Government announced it had set a new net zero greenhouse gas emission target for the UK by 2050, compared with the previous target of at least 80% reduction from 1990 levels.
- 2.8. The built environment has a key role to play in delivering these international commitments, as it accounts for approximately a third of overall CO₂ emissions. These commitments have been translated into national policies within the built environment driven by, amongst other mechanisms, the EU Energy Performance of Buildings Directive and the 2012 Energy Efficiency Directive.
- 2.9. Following the introduction of the 2021 edition of Building Regulations Part L, the successive updates now require regulated CO₂ emissions levels from new-build domestic buildings to be approximately 50% lower

than 2006 levels. Similarly, non-domestic buildings have also seen significant updates with a 27% reduction in CO₂ emissions over Part L2A 2013 Building Regulations now being required.

- 2.10. 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.
- 2.11. 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 L (Part L) in December 2021.

Future Homes Standard (FHS)

- 2.12. In 2019, the UK Government committed to making significant changes to the energy and emission targets required by Building Regulations for all new residential development.
- 2.13. As well as setting the foundations for new standards in energy efficiency and readiness to adopt a zero-carbon future, the policy also introduced objectives to:
 - ensure new homes are comfortable to live in during spells of hot water,
 - to be suitably ventilated with sufficient air flow to mitigate against damp or mould,
 - to remove the need for fossil fuels when heating homes, and
 - to ensure newly built homes do not have high running costs
- 2.14. Six years later, the Future Homes Standard has introduced changes to Approved Documents Part L (conservation of fuel) and Part F (ventilation) and led to the creation of a new volume to Building Regulations - Part O - which sets mandatory requirements to limit the risk of overheating in new homes.
- 2.15. The conclusion of the Future Homes Standard policy was announced in March 2026, with implementation on new sites across England from March 2027. This will bring the arrival of stricter energy and emission targets through a further revision to Approved Document Part L.
- 2.16. Works at Hawke Ridge Business Park are expected to commence after Spring 2027, meaning they will need to be designed to meet the requirements of the Future Homes Standards.
- 2.17. This energy strategy will be assessed using SAP 10.2 under Approved Document L 2021. However, specification has been uplifted to align with the requirements of the upcoming changes to Approved Document L.

Local Planning Policy – Wiltshire Council

- 2.18. Local policy relating to the sustainable design and construction of buildings is contained within Wiltshire Core Strategy, adopted in January 2015. The following extracts from these documents are relevant to the energy strategy.

Wiltshire Council Core Strategy (2015)

Core Policy 41: Sustainable Construction and Low Carbon Energy

Climate change adaptation

New development, building conversions, refurbishments and extensions will be encouraged to incorporate design measures to reduce energy demand. Development will be well insulated and designed to take advantage of natural light and heat from the sun and use natural air movement for ventilation, whilst maximising cooling in the summer.

Sustainable construction

New homes (excluding extensions and conversions) will be required to achieve at least Level 4 (in full) of the Code for Sustainable Homes. Conversions of property to residential use will not be permitted unless BREEAM's Homes "Very Good" standards are achieved

Renewable and low-carbon energy

All proposals for major development⁸⁷ will be required to submit a Sustainable Energy Strategy alongside the planning application outlining the low-carbon strategy for the proposal.

Wiltshire Design Guide (2023)

Chapter 10.1: Help Deliver Wiltshire's Climate Strategy

10.1.3 The Climate strategy states that,

"New buildings need to be net zero carbon as soon as possible, using less energy and running on low carbon sources of electricity and heat. Existing buildings need to be retrofitted along the same principles. All buildings also need to be able to cope with the impacts of climate change."

To ensure new development is built to net zero carbon standards as soon as possible, Wiltshire Council expects applicants of new developments to consider the following 4 key objectives within their architecture and urban design:

1. *Energy Efficiency and Microgeneration*
2. *Transport Designs*
3. *Waste and Recycling*
4. *Adaption and Nature Based Solutions*

10.2.1 Applicants and assessors are expected to have regard to the principles of the Energy Hierarchy:

1st - Reduce the need for energy

2nd - Improve the energy efficiency

3rd - Maximise use of renewable energy

10.2.2 Ensure that layouts incorporate the design principles in the Built Form and Movement Sections of this Guide to help encourage people to travel by foot or bicycle for short trips and (where possible) bus or rail for longer trips, thus reducing energy needs for all trips.

10.2.3 Consider the block layout and road layout carefully as this will largely dictate the arrangement of buildings on a new development, with east-west alignment generally enabling the optimal orientation of elevations for passive solar gain. However, this is not always possible and variations of up to 30° can be accommodated whilst still benefiting from passive solar gains.

10.2.4 Solar gain will vary depending on the amount of glazing on each façade, whilst the amount of solar gain which is comfortable will vary depending on the function of the room. The orientation of roofs should also account for the plots orientation so that solar photovoltaics (PV) can better exploit the sun's path, e.g. on north-south roads, gable fronted buildings could provide greater flexibility for maximizing PV.

10.2.5 Developers should be aware of Building regulations Part O when designing the external elevations of buildings, which need to be designed bespoke for different dwellings and depending upon their orientation on the site.

10.2.6 Where possible, every room within a building should have a window for natural ventilation, including bathrooms and hallways where these are adjacent to external walls. It may be necessary to include external shading such as louvres or shutters, as well as tree planting to limit direct solar gain. External shading is preferable to mechanical cooling as it reduces the need for cooling in the first place.

Proposed Strategy

- 2.19. This statement is intended to establish the proposed approach to sustainable construction and a reduction in CO₂ emissions to be delivered for the proposed development.
- 2.20. It is proposed that the development is designed to incorporate all applicable guidance contained within Wiltshire Council's Core Strategy relating to renewable energy provision and the construction of highly efficient buildings which seek to minimise energy demand and CO₂ emissions.
- 2.21. The dwellings will be constructed following a fabric first approach to meet, and exceed the current Building Regulations, with insulation standards, thermal bridging and air leakage all improved beyond the minimum compliance levels.
- 2.22. The development will achieve the below energy demand targets through higher fabric standards, renewable energy systems and through the incorporation of highly efficient heat pump technology to serve heating and hot water demand.
 - i. Exceed the Fabric Energy Efficiency targets of Part L (2021)
 - ii. No reliance on fossil fuels to meet heating and hot water demand
- 2.23. Design to be 'zero carbon ready' due to the drive away on-site combustion of fossil fuels and the decarbonization of the national grid.
- 2.24. This statement provides the proposed fabric specification and a strategy which would enable the dwellings to meet these standards, with the precise strategy to achieve this being subject to change as development design progresses.
- 2.25. Additional sustainable construction considerations are addressed, including overheating risk and climate resilience, sustainable and responsible materials usage and water consumption of the dwellings.
- 2.26. The development also considers the changing future climate and seeks to build in resilience through appropriate construction techniques and materials to avoid future risks of overheating.
- 2.27. There are many other aspects of sustainability which relate to new housing development and will be considered further within this statement including water use and the environmental impacts of materials, construction, and household waste.
- 2.28. In addition, consideration will be given to building design, passive solar design and energy efficiency site-layouts where possible, together with the installation of low carbon energy systems to further reduce carbon emissions arising in accordance with Core Policy 41.

3. Climate Change Resilience

- 3.1. Buildings constructed today may be operating in a substantially different climate over the coming decades and therefore should be designed to ensure that they are resilient to future climate change impacts such as increases in temperature, rainfall, wind, and sea level. Climate resilience is important to building owners against a backdrop of increasingly extraordinary weather events.
- 3.2. Passive design measures will be considered and incorporated to enhance resilience to climate change impacts throughout the lifetime of the development.
- 3.3. Key design decisions utilised on site to mitigate against the potential risk of overheating:
 - Consideration of layout and orientation to minimize solar gain. The majority of dwellings are East/West facing reducing southerly facing façades.
 - A relatively low density development reducing the risk of urban heat island effects
 - Low glazing ratios contributing to mitigation of excessive unwanted solar gain
 - Mechanical ventilation to all dwellings ventilation strategies
 - Dual aspect to all dwellings to increase cross ventilation to purge excess heat during night-time hours.

Electrification of heat

- 3.4. For the United Kingdom to achieve its legally binding goal of net zero by 2050, significant changes are required to the country's energy habits to untie our reliance on fossil fuels.
- 3.5. The UK electricity grid has been decarbonising for decades. In recent years, the UK has closed all coal-based power stations, and routinely breaks its own record for energy generation via wind and solar farms.
- 3.6. This transition means the use of electricity is now a more sustainable option than using mains gas to heat our buildings. In future years, as this decarbonisation continues, electricity will become a net zero carbon supply of energy.
- 3.7. The Future Homes Standard, released in April 2026, restricts the use of fossil fuel heating systems on all new developments throughout England. The emissions targets in Approved Document Part L will be so strict that gas options are unlikely to be a viable route to compliance.
- 3.8. Although this policy is yet to be implemented, the Applicant intends to act early, and is planning to install all-electric systems to meet the requirements of heating, hot water and cooking in all dwellings and buildings included within the development proposals.
- 3.9. By taking this approach now, the Developer is ensuring homes built today will be futureproofed to become zero carbon with no retrospective renovation works required.

4. Energy Consumption and CO₂ Emissions

- 4.1. As one of the key areas of ongoing impact of any development, the energy demand of the dwellings to be constructed is a key consideration in the overall sustainability strategy.
- 4.2. As set out within the policy review section of this statement, it is considered that Building Regulations form the minimum requirement for new dwellings in terms of energy performance.
- 4.3. As shown in Table 1, the CO₂ standards contained within Part L were increased in 2010 and 2013, reducing the TER by approximately 25% and a further 6% (9% for non-residential) respectively.
- 4.4. Part L 2021 became mandatory from June 2023, which constitutes a much larger step change of a 31% reduction in emissions.

Table 1. CO₂ Emissions improvements from successive Part L editions

Building Regulations	CO ₂ emissions improvements over preceding regulations
L1A 2006	-
L1A 2010	25%
L1A 2013	6%
L1 2021	31%

Energy Reduction Strategy - Fabric First

- 4.5. 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 L of the Building Regulations through fabric measures alone.
- 4.6. 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 as the first stage of the Energy Hierarchy.



Figure 3. The Energy Hierarchy

Be Lean – reduce energy demand

- 4.7. 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 – supply energy efficiently

- 4.8. 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

- 4.9. 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
- 4.10. 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.
- 4.11. This approach has been widely supported by industry and government for some time, particularly in the residential sector, 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.
- 4.12. The benefits to prospective occupants of following the Fabric First approach are summarised in Table 2.

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

Table 2. Benefits of the Fabric First approach

	Fabric energy efficiency measures	Bolt-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

- 4.13. 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.
- 4.14. 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.
- 4.15. 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 Strategy.
- 4.16. The space heating demand targets as detailed within the emerging Local Plan will be achievable through efficient design and through improvements to the performance of heat loss elements.

Proposed Fabric Specification

- 4.17. 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 3 details the proposed fabric specification of the major building elements, with the first column in this table setting out the Part L limiting fabric parameters in order to demonstrate the improvements to be delivered.

Table 3. Indicative construction specification – main elements – Dwellings

	Part L Limiting Fabric Parameters	Proposed Specification
External wall – u-value	0.26 W/m ² K	0.18-0.19 W/m ² K
Party wall – u-value	0.20 W/m ² K	0.00 W/m ² K
Roof – u-value	0.16 W/m ² K	0.09 W/m ² K
Ground floor – u-value	0.18 W/m ² K	≤ 0.12 W/m ² K
Windows – u-value	1.60 W/m ² K	1.30 W/m ² K
French doors – u-value	1.60 W/m ² K	1.30 W/m ² K
Doors – u-value	1.60 W/m ² K	1.20 W/m ² K
Air Permeability	8.0 m ³ /h.m ² at 50 Pa	4.0 m ³ /h.m ² at 50 Pa
Ventilation	Natural Ventilation with Intermittent extract fans	Decentralised MEV
Thermal Bridging	Y = 0.20 (default)	Y = ≤ 0.050 (approx..)

Thermal bridging

- 4.18. 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.
- 4.19. The specification should 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.
- 4.20. All junctions have been modelled and perform better than those as outlined in Appendix R of the SAP conventions.

Air leakage

- 4.21. 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 4.00 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.

Provisions for Energy-Efficient Operation of the Dwelling

- 4.22. The occupant of the dwelling should be provided with all necessary literature and guidance relating to the energy efficient operation of fixed building services. Currently it is assumed that all dwellings will be provided with air source heat pumps, fully insulated primary pipework, and multi-zone zone controls to avoid unnecessary heating of spaces when not required.

5. Low Carbon and Renewable Energy Systems

- 5.1. A range of technologies have been assessed for potential incorporation into the scheme in accordance with Regulation 25A of the Building Regulations and with the intent of meeting Part L 2021 and the relevant policies within the adopted Wiltshire Council Core Strategy.

Wind Power

- 5.2. 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.
- 5.3. A preliminary examination of the BERR wind speed database indicates that average wind speeds at 10m above ground level are around 5.2 m/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

- 5.4. 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 Photovoltaic (PV)
 - Air Source Heat Pumps (ASHPs)
 - Ground Source Heat Pump (GSHPs)
- 5.5. The advantages and disadvantages of these technologies are evaluated in Tables 4-8.

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

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

Table 4. Individual 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
Estimated costs and benefits	
Cost £2,000 upwards for a wood-pellet boiler, not including cost of fuel	
Conclusions	
Biomass heating is not considered technically feasible in this development scheme due to insufficient space and difficulty in securing adequate fuel supply.	

Table 5. 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 dwellings 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)
Estimated costs and benefits	
• Cost £2,000 - 5,000 for standard installation • Ongoing offset of heating fuel, minimal maintenance requirements	
Conclusions	
Solar thermal systems are not considered feasible for compliance under the FHS.	

Table 6. Solar Photovoltaic systems feasibility appraisal

Potential Advantages	Risks & Disadvantages
- The technology offsets the high carbon content of 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 dwelling 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 - 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
Estimated costs and benefits	
- Cost £1,500 upwards (1kWp+) and scalable - Ongoing offset of electricity fuel costs, minimal maintenance requirements	
Conclusions	
PV panels are considered technically feasible for all buildings with suitable roof orientations. The relatively low cost, high carbon saving potential and limited additional impacts mean that PV is considered a feasible option for this development.	

Table 7. 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 - Will benefit from ongoing decarbonisation of the electricity grid	- Air source heat pumps are powered by electricity, leading to potentially higher fuel bills than gas heating systems - 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
Estimated costs and benefits	
- Cost circa £2,000 - Low space requirements and no external unit - Significant running cost reduction compared with direct immersion - Low carbon water heating	
Conclusions	
Air source heat pumps are considered technically and commercially viable for the development proposals. They deliver significant carbon reductions over the target emission rate and are aligned with the future homes standard drive away from fossil fuels and towards highly efficient all electric systems.	

Table 8. 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 - Will benefit from ongoing decarbonisation of the electricity grid	- 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 - Ground source heat pumps are powered by electricity, leading to potentially higher fuel bills than gas heating systems - 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
Estimated costs and benefits	
- Cost circa £10,000+ - Shared ground loop approach eligible for non-domestic RHI. Estimated simple payback at circa 18 years (systems only) - Running cost linked to COP of heat pump, circa 3.0 equates to 66% reduction vs electricity or around 5-6p/kWh (higher than mains gas) - Additional costs to upgrade electricity infrastructure currently unknown	
Conclusions	
Ground source heat pumps are not considered a technically-viable option for this development scheme as there are physical constraints in terms of ground conditions and area available for installation. The capital installation cost would also be high which leads us to the conclusion that GSHPs would not be a commercially viable option for this development scheme.	

5.6. The following low-carbon and renewable energy technologies, summarised below, are considered potentially-viable options for the proposed Development.

Table 9: Summary of feasible technologies

Feasible	Unfeasible
• Solar Photovoltaic • Aerothermal	• Wind • Geothermal • Biomass • Solar Thermal

6. Indicative Dwelling Performance

- 6.1. Through following the strategy described, the dwellings will significantly reduce energy demand and consequent CO₂ emissions beyond a Part L compliant level of performance through the dwelling fabric, and ASHPs to serve heating and hot water.
- 6.2. Indicative SAP calculations have been undertaken on a sample of the proposed dwelling types to provide an overview of the typical as-designed energy performance, in comparison with Building Regulations standards. The results of these calculations are shown in Tables 10,11 and 12.

Table 10. Indicative dwelling performance including ASHPs and PV – CO₂ emissions.

House type	Part L compliant emissions (kgCO ₂ /m ² /year)	As-designed emissions (kgCO ₂ /m ² /year)	Improvement %
Baker	11.56	1.56	85.51
Bowyer	10.38	0.90	91.33
Coppersmith	10.48	1.63	84.45
Goldsmith	9.62	1.37	85.76
Harper	10.42	1.32	87.33
Mason	11.65	1.27	89.10
Potter	12.27	1.64	86.63
Scrivener	10.85	0.96	91.15
Tillman	10.57	1.25	88.17
Horner	12.44	2.55	79.5
Dyer	12.78	2.34	81.69
Mercer	11.46	1.00	91.27

Fabric Energy Efficiency

- 6.3. Table 11 demonstrates that the dwellings will exceed the uplifted Fabric Energy Efficiency targets within Part L 2021 through the proposed specification.

Table 11. Fabric Energy Efficiency of sample dwellings

	Target Fabric Energy Efficiency (kWh/m2/year)	Design Fabric Energy Efficiency (kWh/m2/year)	Improvement %
Baker	36.78	32.92	10.50
Bowyer	42.11	38.26	9.14
Coppersmith	36.61	33.22	9.25
Goldsmith	39.98	36.44	8.86
Harper	35.4	31.64	10.63
Mason	42.89	38.80	9.54
Potter	37.47	33.29	11.16
Scrivener	41.59	37.89	8.90
Tillman	35.75	32.47	9.16
Horner	32.55	31.64	2.79
Dyer	32.87	30.80	6.31
Mercer	44.96	39.26	12.69

- 6.4. This calculated performance indicates that the development proposals will significantly exceed the requirements of Part L through the proposed specification. And equates 87.21% improvement over the Part L 2021 baseline. This level of reduction is a significant improvement upon the 19% uplift required over the regulatory standard within Core Policy 41 of the Wiltshire Council Core Strategy.
- 6.5. The table below demonstrates the indicative site wide emissions against the baseline. A selection of representative house types has been modelled and their results extrapolated to provide the site wide emissions standard achieved.

Table 12. Indicative site-wide Part L compliant and as-designed CO₂ emissions

	Part L compliant emissions (kgCO ₂ /year)	As-designed emissions (kgCO ₂ /year)	Improvement %
Site-wide emissions	250,107	31,998	87.21

7. Resource Efficiency

- 7.1. It is important that development is efficient with resources both during construction and in operation of the development. This section sets out details of additional resource efficiency and sustainable design principles to be applied at the development.

Sustainable Materials

- 7.2. The impacts of construction materials range from the depletion of natural resources to the greenhouse gas emissions and water use associated with their manufacture and installation.
- 7.3. The Applicant will implement an environmentally responsible approach to the procurement of construction materials and supply chain management for the development where possible.
- 7.4. Within the development choices will be made in order to reduce the consumption of primary resources and using materials with fewer negative impacts on the environment, including but not limited to the following;
- Use fewer resources and less energy through designing buildings more efficiently.
 - Specify and select materials and products that strike a responsible balance between social, economic and environmental factors. An example would be to use locally sourced materials where possible.
 - Incorporate recycled content, use resource-efficient products and give due consideration to end-of-life uses.
 - Influence, specify and source increasing amounts of materials which can be reused and consider future deconstruction and recovery.

Waste

- 7.5. The Applicant is committed to prioritising steps of the waste hierarchy and implements the following Strategy to ensure a sustainable and environmentally responsible approach is taken to the management of domestic waste and waste during the design and construction of the development. Full details are available in the submitted Site Waste Management Plan and Waste and Recycling Strategy.
- 7.6. This will be managed through the effective implementation of an on-site plan that will focus on steps in the waste hierarchy:
- Prevention
 - Minimisation
 - Reuse
 - Recycling
 - Energy recovery
 - Disposal
- 7.7. Sending waste to landfill has various environmental impacts, such as the release of local pollution, ecological degradation and methane emissions, in addition to exacerbating resource depletion. Waste in housing comes from two main streams; construction waste and domestic waste during occupation.

Household Waste

- 7.8. In respect of household waste, regard has been given to the policy advice contained in the NPPF together with the Council's current strategy in terms of waste and recycling, to ensure that the new dwellings are provided with adequate storage facilities for both waste and recyclable materials.
- 7.9. Wiltshire Council currently offer kerbside collection for recycling, separated into various collections streams, including food waste, paper and card, glass, metals and plastics.

- 7.10. Dedicated bin storage space will be provided on plot to accommodate the relevant collection boxes.
- 7.11. Future occupiers of the dwellings will be provided with an information pack detailing the Council's current collection arrangements for waste and recycling and advising of the nearest recycling centres to the Application site.

Construction Waste

- 7.12. The Applicant will implement guidance on sustainable waste management. As a primary objective, and in accordance with the waste hierarchy, the Applicant will seek to prevent waste in the first instance. This will be achieved through a site waste management plan.
- 7.13. The development will additionally be designed to effectively and appropriately monitor and manage construction site waste. Target benchmarks for resource efficiency will be set in accordance with best practice – e.g., 5m³ of waste per 100m² / tonnes waste per m².
- 7.14. Wherever possible materials will be diverted from landfill through re-use on site, reclamation for re-use, returned to the supplier where a 'take-back' scheme is in place or recovered and recycled using an approved waste management contractor.
- 7.15. The Applicant will work with a principal contractor for the Company in delivering the objective of reducing the proportion of waste diverted to landfill. The Applicant will monitor and review this commitment by defining the following:
- Waste minimisation actions to be undertaken.
 - Procedures for minimising hazardous waste
 - Procedures for sorting, reusing, and recycling construction waste into defined waste groups, either on-site or through a licensed external contractor. The delivery of this target will be managed through the effective implementation of an on-site plan that will focus on steps in the waste hierarchy.
- 7.16. These approaches will ensure that waste from the site is minimised, and environmental impact is reduced.

8. Water Conservation

- 8.1. In line with Part G of Building Regulations 2015, water use will be managed effectively throughout the development through the incorporation of appropriate efficiency measures.
- 8.2. The water consumption of a dwelling has a significant impact on not only direct operational running costs (i.e. water consumption charges), but also indirectly through additional energy usage and the heating of water for domestic use. This is, in part, reflected in the SAP 10.2 methodology which assumes reduced energy consumption should a dwelling be compliant with Approved Document Part G 2013.
- 8.3. Table 14 shows a typical water demand calculation for a 2-3 bed house type and shows how the development could achieve a result less than 110 litres/occupier/day calculated in accordance with Wiltshire Council Core Strategy which states that water efficiency measures should be maximised and carried out using Building Regulations 17.K methodology.
- 8.4. The calculation results in a total internal water consumption of 109.56/occupier/day for the intended specification, below the maximum of 110 litres/occupier/day in accordance with the higher water efficiency standard in the appendix to Building Regulations Approved Document Part G.

Table 13. Typical Water Demand Calculation

Installation Type	Unit of measure	Capacity/ flow rate	Litres/occupier/day
WC (dual flush)	Full flush (l)	4.0	5.84
	Part flush (l)	2.7	7.99
Taps (excluding kitchen taps)	flow rate (l/min)	5	9.48
Bath	Capacity to overflow (l)	160	17.6
Shower	Flow rate (l/min)	9	39.33
Kitchen sink taps	Flow rate (l/min)	6	13.00
Washing Machine	Litres/kg dry load	8.17	17.16
Dishwasher	Litres/place setting	1.25	4.5
Calculated Use			114.90
Normalisation Factor			0.91
Total Internal Consumption (L)			104.56
External Use			5.0
Building Regulations 17.K			109.56

9. Overheating Mitigation

- 9.1. With the risk of potentially higher summer temperatures and longer hot spells in the future, it is important to consider the thermal comfort of the dwelling. Passive design measures are proposed in order to mitigate future overheating.

Cooling Hierarchy

- 9.2. In common with sustainable heating strategies, it is possible to apply a sustainable 'cooling hierarchy' which sets out the priorities to ensure overheating risk is minimised:

- Minimise internal heat gain
- Manage heat through internal thermal mass and design of spaces
- Passive ventilation strategies
- Mechanical ventilation systems
- Active cooling systems

Approved Document Part O

- 9.3. To more robustly address overheating risk, the Government has introduced Approved Document, 'Part O', into the Building Regulations.
- 9.4. This document requires a more in-depth assessment of the risk of overheating, taking into account site location, dwelling orientation, glazing proportions and openable window areas for natural ventilation.
- 9.5. This assessment will be undertaken at the start of detailed design and any mitigation measures that may be required will be built in.

Addressing Overheating Risk

- 9.6. The thermal mass of a building influences how the occupants experience overheating during summer months. There are advantages to construct with a high thermal mass, but separate advantages to using a low thermal mass.
- 9.7. A construction with a high thermal mass can help to reduce overheating risk as it absorbs heat during the day and slowly releases it during cooler nighttime hours, effectively smoothing out temperature fluctuations within the property.
- 9.8. Within the development layout, orientation and massing will be considered to maximise useful passive solar gain.
- 9.9. 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.
- 9.10. Where site layout allows, all dwellings will be able to benefit from cross-ventilation to effectively purge warm air from the properties during periods of hot weather.
- 9.11. Window opening areas will be considered and guided by the Part O assessment, with increased opening areas being designed in as required.

10. Conclusions

- 10.1. This Energy and Sustainability Statement has been prepared by AES Sustainability Consultants on behalf of Bellway Strategic Land to detail the proposed approach to sustainable construction to be employed at Hawke Ridge Business Park.
- 10.2. A review of National Policy including the NPPF and relevant recent Government statements has established that the Building Regulations are now considered the appropriate method for setting standards relating to energy use and CO₂ emissions, giving consideration to building design and site-layout to further reduce energy consumption.
- 10.3. The standards contained within Approved Document L 2021 have therefore been reviewed, and a 'Fabric First' approach which prioritises improvements to the fabric of the dwellings to avoid unnecessary energy demand and consequent CO₂ reduction is proposed.
- 10.4. Improvements in insulation specification, efficient building services, a reduction in thermal bridging and unwanted air leakage paths and further passive design measures will enable the relevant standards to be met, whilst building in low energy design and future climate resilience to the design and construction of the dwellings.
- 10.5. Alongside the above, highly efficient ASHP technology will be installed to all dwellings and non-domestic space to serve both space heating and domestic hot water demand.
- 10.6. As the Development is likely to begin construction after the implementation of the Future Homes Standard, PV panels are also incorporated into the design proposals.
- 10.7. All dwellings will be expected to install a PV area at 40% of total footprint area to a southerly orientation within the notional specification. Assumptions have been made on the sample dwellings modelled, but the amount of PV required will vary on a plot-by-plot basis and exact quantity of PV required will need to be ascertained at detailed design stage for individual plots.
- 10.8. Calculations based on a sample range of dwelling types, demonstrates that through following the energy efficiency approach described, the calculated as-designed emissions are reduced by 87.21% over Part L 2021 requirements.
- 10.9. This significant reduction over the baseline demonstrates compliance with Core Policy 41 of the Wiltshire Council Core strategy which states that development proposals should demonstrate Code For Sustainable Homes Level 4, which equates to a 19% improvement in carbon emissions over the regulatory baseline. The proposals also demonstrate that the Development as being future proofed for upcoming changes to the building regulations through the omission of on-site combustion.
- 10.10. It has also been determined that the calculated water consumption could equate to a maximum internal water consumption of no more than 110 litres/occupier/day, and therefore offer an improvement on the higher water efficiency standard in the appendix to Building Regulations Approved Document Part G.

