

Land To the North East of King George V Playing Fields

Bellway Homes North London

Energy and Sustainability Statement

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This statement has been commissioned by Bellway Homes North London to detail the proposed approach to energy and CO₂ reduction to be employed in the development at Land To The North of King George V Playing Fields. 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.

Contents

1.	Introduction	4
2.	Planning Policy	5
3.	Energy Consumption and CO ₂ Emissions	8
4.	Dwelling Performance.....	11
5.	Water Conservation	12
6.	Overheating	13
7.	Conclusions	14

List of figures & tables

Figure 1. Proposed Site Layout	4
Table 1. CO ₂ emissions improvements from Part L standards	8
Figure 2. The Energy Hierarchy	8
Table 2. Benefits of the Fabric First approach	9
Table 3. Proposed construction specification – main elements.....	9
Table 4. Dwelling performance – CO ₂ emissions	11
Table 5. Estimated site-wide performance - CO ₂ emissions.....	11
Table 6. Dwelling performance – Fabric Energy Efficiency.....	11
Table 7. Typical Water Demand Calculation	12
Figure 3 – Properties Requiring Alternative Means of Ventilation	13

1. Introduction

Preface

- 1.1. This Energy and Sustainability Statement has been prepared on behalf of Bellway Homes North London in support of the reserved matters application for development of Land to The North East of King George V Playing Fields.

Development Description

- 1.2. The development site is located on the northern edge of Cuffley in Hertfordshire.
- 1.3. Outline planning permission was granted in March Approval of reserved matters (appearance, landscaping, layout, and scale) following outline planning permission S6/2015/1342/PP as varied by 6/2023/1352/VAR for residential development of up to 121 dwellings, associated infrastructure and a change of use from agricultural land to an extension of the King George V playing field. In addition, to approve details for Condition 10 (noise), Condition 11 (air quality) and Condition 16 (LEMP).
- 1.4. The development would deliver 121 dwellings, across a mix of one to five bed houses, and flats, with 35% of the dwellings designated as affordable housing. The proposed site layout is shown in Figure 1.

Purpose and Scope of the Statement

- 1.5. The statement has been prepared to address national and local policy relating to sustainable design and construction of dwellings, including relevant policies within the Welwyn Hatfield District Plan 2005 and Welwyn Hatfield Borough Council Draft Local Plan Proposed Submission, adopted in August 2016.
- 1.6. This statement demonstrates that by following a fabric first approach to demand reduction, the proposed development will deliver a level of energy performance beyond the current Building Regulation standards whilst addressing a range of additional sustainable design considerations.
- 1.7. The statement will also demonstrate how water saving measures have been incorporated into the design in order to deliver a calculated water use per person which exceeds Building Regulations requirements.



Figure 1. Proposed Site Layout

2. Planning Policy

Local Policy

- 2.1. This statement will address relevant policies within the Welwyn Hatfield District Plan 2005, adopted in April 2005, relating to sustainable design and construction:

Policy SD1 – Sustainable Development

Development proposals will be permitted where it can be demonstrated that the principles of sustainable development are satisfied and that they accord with the objectives and policies of this plan. To assist the Council in determining this, applicants will be expected to submit a statement with their planning application demonstrating how their proposals address the sustainability criteria in the checklist contained in the Supplementary Design Guidance.

- 2.2. This statement will also address relevant policies within the Welwyn Hatfield Borough Council Draft Local Plan Proposed Submission, adopted in August 2016 to demonstrate compliance with emerging Policy SADM13, relating to sustainable requirements:

Policy SADM 13

Sustainability requirements

- i. All major development proposals must demonstrate that they have sought to maximise opportunities for renewable and low carbon sources of energy supply where consistent with other Local Plan policies.
- ii. All non-residential development with a floorspace of 1,000 square metres or more will be required to meet at least BREEAM 'Excellent' unless it is demonstrated that it is not technically feasible or viable to do so, in which case such proposals will be required to demonstrate a 'Very Good' rating.
- iii. All newly constructed dwellings will be required to achieve an estimated water consumption of no more than 110 litres/person/day, with water reuse and recycling and rainwater harvesting incorporated wherever feasible to reduce demand on mains water supply

Planning Permission S6/2015/1342/PP

- 2.3. This statement will address Condition 10 of the planning permission, reference S6/2015/1342/PP

Condition 10 of planning permission ref: S6/2015/1342/PP (relevant part of Condition)

No development above ground level shall take place until a scheme to protect future occupiers from noise due to transport sources has been submitted to and approved in writing by the Local Planning Authority in accordance with the following requirements:

- Indoor ambient noise levels in living rooms and bedrooms should meet the standards with BS 8233:2014
- Internal L_{Amax} levels should not exceed 45dB more than ten times a night in bedrooms,
- If opening windows raise the internal noise levels above those within BS8233, alternative methods must be submitted for consideration.

Passive systems and rates will be considered, however, evidence that overheating will not occur will be need to be provided in the form of a SAP assessment (..) conducted with windows closed, curtain/blinds not being used, showing the required ventilation rates to ensure that overheating will not occur (...)

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 on 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 2013 edition of Building Regulations Part L, the successive updates now require regulated CO₂ emissions levels from new build domestic buildings to be approximately 30% lower than 2006 levels.
- 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 L1A (Part L) in December 2021. The CO₂ emissions requirement of Part L 2021 is set at a 31% improvement on Part L 2013.

National Planning Policy Framework

- 2.12. On the 20th July 2021, 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

- 2.13. 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.
- 2.14. 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.
- 2.15. 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

- 2.16. This statement is intended to establish the proposed approach to sustainable construction and energy and water demand reduction to be delivered at the development.
- 2.17. The current edition of Part L of the Building Regulations requires regulated CO₂ emission levels from new build domestic buildings to be approximately 30% lower than 2006 levels.
- 2.18. It is proposed that the dwellings will be constructed following a fabric first approach to meet, and exceed where possible, the current Building Regulations, with insulation standards, thermal bridging and air leakage all improved beyond the minimum compliance levels. In addition, consideration will be given to building design, passive solar design and energy efficiency site-layouts where possible.
- 2.19. The following sections of this statement set out the sustainable design considerations which will be applied to the dwellings in order to deliver low energy, comfortable and affordable housing.

3. Energy Consumption and CO₂ Emissions

- 3.1. As one of the key areas of ongoing impact of any new development, the energy demand of the dwellings to be constructed is a key consideration in the overall sustainability strategy.
- 3.2. 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.

Building Regulations

- 3.3. The proposed site will be constructed in accordance with the 2013 edition of Approved Document L1A (hereafter 'Part L'), therefore this forms the baseline compliance level in terms of energy demand and CO₂ emissions.
- 3.4. Part L sets out 5 Criteria which must be met in order to demonstrate that the dwellings are designed and constructed in accordance with the approved standards:
 - Criterion 1 – Achieving the TER
 - Criterion 2 – Limits on Design Flexibility
 - Criterion 3 – Limiting the Effects of Solar Gain in Summer
 - Criterion 4 – Building Performance Consistent with DER
 - Criterion 5 – Provisions for Energy-Efficient Operation of the Dwelling

Criterion 1 - Achieving the TER

- 3.5. Criterion 1 relates to achieving a maximum calculated level of CO₂ emissions, referred to as the 'Target Emission Rate' (TER). The TER is calculated in accordance with the Standard Assessment Procedure (SAP), which establishes a maximum rate - expressed in kilograms of carbon dioxide per metre squared of total useful floor area, per annum (kgCO₂/m²/yr) - as the benchmark for compliance.
- 3.6. 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, requiring substantial improvements to thermal insulation and heating services, or a significant increase in on-site renewable energy provision.

Table 1. CO₂ emissions improvements from Part L standards

Building Regulations	CO ₂ emissions improvement over L1A 2006
L1A 2006	-
L1A 2010	25%
L1A 2013	Circa 30%

Energy and CO₂ Reduction Strategy – Fabric First

- 3.7. It is proposed that the CO₂ reduction strategy to meet the TER figure of each dwelling incorporates improvements beyond the minimum requirements contained within Part L1A and concentrates finance and efforts on reducing energy demand as the first stage of the Energy Hierarchy (Figure 2).

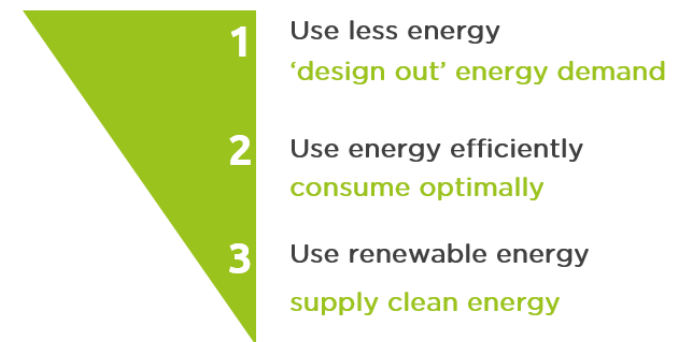


Figure 2. The Energy Hierarchy

- 3.8. 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 of new housing, 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.

- 3.9. This approach has been widely supported by industry and Government for some time, with the Zero Carbon Hub¹ and Energy Savings Trust² having both stressed the importance of prioritizing energy demand as a key factor in delivering resilient, low energy homes.
- 3.10. There is further explicit acknowledgement of the benefits of this approach through the introduction of Fabric Energy Efficiency Standards into Part L of the Building Regulations 2013, which is intended to “discourage excessive and inappropriate trade-offs... for example... poor insulation standards being offset by renewable energy systems with uncertain service lives.”³
- 3.11. The benefits to prospective homeowners of following the Fabric First approach are summarized in Table 2.

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	✓	✗

Criterion 2 – Limits on Design Flexibility

- 3.12. Criterion 2 introduces minimum standards which must be met for all main building elements to ensure that an excessively low performance in one area is not simply offset through over-performance in another area.
- 3.13. In accordance with this approach and 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. The first column in this table sets out the Part L1A limiting fabric parameters in order to provide a comparison with the proposed specification.

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

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

Table 3. Proposed construction specification – main elements

	Part L1A 2013 Limiting Fabric Parameters	Proposed Fabric Specification
External wall – u-value	0.30 W/m ² K	0.23 – 0.26 W/m ² K
Party wall – u-value	0.20 W/m ² K	0.00 W/m ² K
Plane roof – u-value	0.20 W/m ² K	0.11 W/m ² K
Ground floor – u-value	0.25 W/m ² K	0.10 -0.13 W/m ² K
Windows – u-value	2.00 W/m ² K	1.30 W/m ² K
Doors – u-value	2.00 W/m ² K	0.64 – 1.30 W/m ² K
Air permeability	10 m ³ /h.m ² at 50 Pa	5.01 m ³ /h.m ² at 50 Pa
Thermal Bridging	Y = 0.150 (default)	Y = 0.040 (calculated)

Energy efficient heating and lighting

- 3.14. Heat generation and distribution systems will be designed to give the occupants a high level of control over their use, encouraging and allowing energy-efficient behaviour. High efficiency combi boilers should be installed to properties to eliminate the need for hot water cylinders where feasible. Primary pipework should be fully insulated in all dwellings, and controls including programmers, thermostats and thermostatic radiator valves will be installed in all dwellings.
- 3.15. Internal lighting should be low energy wherever possible. . External security and space lighting should be low energy and fitted with PIR and daylight sensors where appropriate.

Criterion 3 – Limiting the Effects of Solar Gains in Summer

Passive design measures and overheating risk mitigation

³ The Building Regulations 2010, Approved Document L1A 2013 Edition

- 3.16. Site constraints can dictate layout; however, orientation has been considered to maximise the potential for solar gain where feasible.
- 3.17. Most dwellings will be able to benefit from cross-ventilation to reduce unwanted heat build-up in hot weather, however when considering glazing specification, a balance should be considered which allows useful solar gain in the winter whilst reducing unwanted solar gain in the summer.
- 3.18. Measures taken to reduce internal heat gain and provide natural ventilation through window openings will allow sufficient air exchange rates to purge any heat build-up. Active cooling systems are therefore not proposed.
- 3.19. These measures will serve to ensure that the development builds in resilience to a potentially changing climate over the lifetime of the buildings and minimises the overheating risk that can be exacerbated by the drive to build better insulated, more airtight homes, if not considered within the design and construction process.

Criterion 4 – Building Performance Consistent with DER

Thermal bridging

- 3.20. 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.
- 3.21. The dwellings should be constructed 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 which will be undertaken to establish energy demand of the dwellings. Industry approved calculations provide guidance on reducing bridging and provide calculated values to be used within calculations. Where bespoke detailing is used, thermal modelling will need to be undertaken to assess the performance of these building junctions.

Air leakage

- 3.22. After conductive heat losses through building elements are reduced, convective losses through draughts are the next major source of energy wastage. It is assumed at this stage that the dwellings will be designed to achieve an airtightness standard of no greater than 5.01 m³/h.m²@50Pa, a significant enhancement on Part L1A 2013 minimum requirements.
- 3.23. Pressure testing in accordance with Building Regulations and ATTMA standards is required on completion to confirm that the design figure has been met.

Criterion 5 – Provisions for Energy-Efficient Operation of the Dwelling

- 3.24. The occupant of the dwelling should be provided with all necessary literature and guidance relating to the energy efficient operation of fixed building services.
- 3.25. Currently it is assumed that all dwellings will be provided with modern gas-fired heating systems, fully insulated primary pipework, and controls including programmers, thermostats and thermostatic radiator valves to avoid unnecessary heating of spaces when not required.

4. Dwelling Performance

- 4.1. Through following the strategy described, the dwellings will significantly reduce energy demand and consequent CO₂ emissions beyond a Part L 2013 compliant level of performance through the dwelling fabric alone, without requiring low carbon or renewable energy systems with shorter service lives to offset unnecessary emissions.
- 4.2. 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 Table 4.

Table 4. Dwelling performance – CO₂ emissions

House type	Part L compliant emissions (kgCO ₂ /year)	As-designed emissions (kgCO ₂ /year)	Improvement %
Parkman - Semi	1,983	1,911	3.62
Reedmaker - Detached	2,001	1,931	3.49
Flat – Top floor	1,132	1,101	2.69
Flat -Mid floor	1,283	1,192	7.05
Flat – Ground floor	1,273	1,183	7.10
Philosopher - Detached	2,213	2,137	3.44
Weaver - Detached	2,435	2,305	5.33
Harper - Semi	1,631	1,519	6.88
Cooper - Semi	1,335	1,219	8.63
Baker – Semi/End	1,523	1,397	8.28

- 4.3. The estimated site-wide Part L compliant and as-designed CO₂ emissions are shown in Table 5.

Table 5. Estimated site-wide performance - CO₂ emissions

	Part L compliant emissions (kgCO ₂ /year)	As-designed emissions (kgCO ₂ /year)	Improvement %
Site-wide emissions	208,128	196,430	5.62

- 4.4. As previously discussed, the Fabric Energy Efficiency (FEE) rating is an additional metric by which the improved performance of the dwellings as designed can be measured. Table 6 shows the Part L compliant Target Fabric Energy Efficiency (TFEE) and the as-designed calculated Dwelling Fabric Energy Efficiency (DFEE) to demonstrate the improvements made.

Table 6. Dwelling performance – Fabric Energy Efficiency

House type	TFEE (kWh/year)	DFEE (kWh/year)	Improvement %
Parkman - Semi	6,499	5,435	16.36
Reedmaker - Detached	6,595	5,535	16.08
Flat – Top floor	2,742	2,640	3.72
Flat -Mid floor	3,454	2,966	14.13
Flat – Ground floor	3,403	2,930	13.92
Philosopher - Detached	7,588	6,313	16.80
Weaver - Detached	8,843	7,209	18.48
Harper - Semi	4,716	4,102	13.02
Cooper - Semi	3,624	3,137	13.44
Baker – Semi/End	4,224	3,637	13.90

- 4.5. This calculated performance indicates that the dwellings will exceed the requirements of Part L through the proposed specification.

5. Water Conservation

- 5.1. Policy SADM13 of the Welwyn Hatfield Proposed Submission Local Plan, requires measures to limit water use to no more than 110 litres/person/day and external water use of no more than 5 litres/person/day.
- 5.2. In line with Policy SADM13 and Building Regulations 2013, water use will be managed effectively throughout the development through the incorporation of appropriate efficiency measures.
- 5.3. Water efficiency measures including the use of efficient dual flush WCs, low flow showers and taps and appropriately sized baths will be encouraged with the aim to limit the use of water during the operation of the development to limit water use.
- 5.4. Table 7 shows how the development could achieve a result less than the required 110 litres/occupier/day calculated in accordance with Building Regulations 17.K methodology.
- 5.5. The calculation results in a total water consumption of 107.1 Litres/Person/Day for the intended specification, including external use, well below the maximum of 110 litres/person/day required by Policy SADM13.

Table 7. Typical Water Demand Calculation

Installation Type	Unit of measure	Capacity/ flow rate	Litres/Person/Day
WC (dual flush)	Full flush (l)	6	8.76
	Part flush (l)	3	8.88
Taps (excluding kitchen taps)	flow rate (l/min)	3.67	7.37
Bath	Capacity to overflow (l)	160	17.60
Shower	Flow rate (l/min)	8	34.96
Kitchen sink taps	Flow rate (l/min)	6	13.00
Calculated Use			112.23
Normalisation Factor			0.91
Total Internal Consumption (L)			102.13
External Use			5.0
Building Regulations 17.K			107.1

6. Overheating

- 6.1. Noise Assessment (ref: 10929 NA01) prepared by Brookbanks indicates that habitable rooms fronting the railway and the public highway to the west – are likely to need have windows closed during the day (Figure 3) cause opening windows for ventilation purposes will increase noise levels.
- 6.2. To mitigate the risk of overheating and meet condition 10 of planning permission (ref: **S6/2015/1342/PP**) Dynamic Simulation using CIBSE TM19 will be used to assess the risk of overheating to the plots identified in the acoustician's report.
- 6.3. At the design stage of development overheating risk will be assessed to make sure the development will meet the requirements as outlined in Condition 10.



Figure 3 – Properties Requiring Alternative Means of Ventilation

7. Conclusions

- 7.1. This Energy and Sustainability Statement has been prepared on behalf of Bellway Homes North London in support of the reserved matters application for development of Land to The North East of King George V Playing Fields.
- 7.2. The development site is located on the northern edge of Cuffley in Hertfordshire.
- 7.3. Development would deliver 121 dwellings, across a mix of one to five bed houses, and flats, with 35% of the dwellings designated as affordable.
- 7.4. The statement is intended to demonstrate that following a fabric first approach to demand reduction, the proposed development will deliver a level of energy performance beyond the current Building Regulation standards whilst addressing a range of additional sustainable design considerations including how various sustainable transport provisions have been designed in to the site.
- 7.5. 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.
- 7.6. The standards contained within Approved Document L1A 2013 have therefore been reviewed, and a strategy by which each of the 5 criteria will be met is presented. This strategy focuses on a 'Fabric First' approach which prioritises improvements to the fabric of the dwellings to avoid unnecessary energy demand and consequent CO₂ production.
- 7.7. 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.
- 7.8. Calculations undertaken on the proposed dwellings under the approved Standard Assessment Procedure demonstrate that through following the energy efficiency approach described, the calculated as-designed emissions are reduced by 5.62% over Part L 2013 requirements.
- 7.9. It has been determined that the calculated water consumption would equate to a maximum water consumption of 107.1 litres/person/day, and therefore offer a significant improvement on the maximum of 110 litres/person/day allowable by Policy SADM13 of the Welwyn and Hatfield Proposed Submission Local Plan, adopted in August 2016.