Proof of Evidence

Energy and Sustainability

APP/E0345/W/21/3289748

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Vastern Court Reading
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1. Introduction

Instruction

1. My name is Timothy David Crawshaw MRTPI. I have been commissioned by Reading Borough Council to act as an expert witness in appeal APP/E0345/W/21/3289748. I am an Associate Consultant with APSE Energy, a partnership developed by member authorities which looks to leverage and maximise the opportunities afforded to local authorities by working together on a national scale in the green energy agenda.

Qualifications and Accreditations

2. I hold a bachelor's degree in Architecture from the Manchester School of Architecture and subsequently studied Energy Efficient Architecture at Oxford Brookes University. I am RIBA Part I accredited. In addition, I hold a Master of Arts in Urban Environmental Design from Leeds Metropolitan University. I am a Chartered Member of the Royal Town Planning Institute.

Experience

3. I have over twenty years' experience in urban planning, sustainability, building design and green infrastructure gained in the public, private and third sectors in the UK and as a climate change and urban planning consultant for the United Nations Development Programme in Europe and Africa. I am the Chair of the Tees Valley Nature Partnership and immediate past Chair of the Historic Towns and Villages Forum.

Declaration

4. The evidence which I have prepared and provide for this Appeal in this written statement is true. It has been prepared and is given in accordance with the guidance

of my professional institution. I confirm that the opinions expressed are my true and professional opinions.

Scope of Evidence

5. In this Proof of Evidence (PoE) I address the Energy and Sustainability matters and how these interact with the landscaping and trees and wind conditions in relationship to the Appellants understanding of the site and context and how this has informed the design of the proposed development.

2. The Proposed Development and Reasons for Refusal

6. The appeal relates to the non-determination by Reading Borough Council (RBC) for the following development at Vastern Court, Vastern Road, Reading, planning application reference 200328/OUT:

> *'Outline planning permission with the details of access, appearance, landscaping, layout and scale reserved for later determination. A demolition phase and phased redevelopment (each phase being an independent act of development) comprising a flexible mix of the following uses: Residential (Class C3 and including PRS); Offices (Use Class B1(a); development in Use Classes A1, A2, A3 (retail), A4 (public house), A5 (take away), D1 and D2 (community and leisure); car parking; provision of new plant and renewable energy equipment; creation of servicing areas and provision of associated services, including waste, refuse, cycle storage, and lighting; and for the laying out of the buildings; routes and open spaces within the development; and all associated works and operations including but not limited to: demolition; earthworks; provision of attenuation infrastructure; engineering operations.*

7. Following submission of the appeal, the application was considered at Planning Applications Committee (PAC) on 15 February 2022 where members agreed that had they been able to determine the planning application, they would have refused it for the reasons set out in the report. 12 reasons for refusal were recommended by

officers. Of relevance to this PoE is reason for refusal No.11 (RfR 11), as amended following PAC, which states:

> *'The application fails to demonstrate a sufficiently robust strategy in terms of minimising carbon dioxide emissions, meeting the predicted residential and commercial energy targets and selection of most appropriate on-site renewable energy technologies, contrary to policies H5, CR10, CC2, CC3, CC4 of the Reading Borough Local Plan (2019) and the Council's adopted SPD, Sustainable Design and Construction (2019).'*

8. This PoE also references RfR 8 and 9 which are expanded upon where relevant to the evaluation and amplification of RfR 11.

3. The Site and Surroundings

9. This is detailed at section 1 (paragraphs 1.8 to 1.14) of the planning officer's committee report. In line with section J.3.2 of the Planning Inspectorate's Procedure Guide, it is not repeated here.

10. Drawing on the analysis provided in the Appellants Design and Access Statement (Collado Collins Architects 2021 (CD 1.49) p71-74) it is clear that the patterns of movement, character areas and building heights have been key design considerations, however, matters such as orientation, wind direction and speed, detailed sun path analysis, landform and landscape have not been key design considerations in terms of energy efficiency or summer overheating.

11. It is also of note that the Residential and Non-residential Sustainability Strategy Documents (Watkins Payne 2020 (CD 1.10, 1.19, 1.20)) provides no baseline information regarding the orientation of the site, wind speed and direction, existing and proposed landscaping, and the susceptibility of the location to summer overheating.

4. Policy and Guidance

National Policy

The National Planning Policy Framework (NPPF)

12. The NPPF ((154b) p45) is specific in requiring new development to reduce GHG emissions through:

> *'its location, orientation and design. Any local requirements for the sustainability of buildings should reflect the Government's policy for national technical standards.'*

13. Paragraph 157 (p46) states that In determining planning applications, local planning authorities should expect new development to:

> *'a) 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; and*
> *b) take account of landform, layout, building orientation, massing and landscaping to minimise energy consumption.'*

The National Design Guide (NDG)

14. The National Design Guide makes specific reference to 'the contributions of natural resources such as sun, ground, wind, and vegetation' as passive measures (para 139 p43). Paragraph 137 (p42) states that well designed places are fit for purpose and adaptable over time and paragraphs 135 and 136 (p42) both identify the role of layout and landscaping to contribute to climate change adaptation and mitigation. Additionally, paragraph 148 (p44) recognises the role of landscaping to reduce the urban heat island effect.

15. The National Design Guide (NDG) under R1 (p43) is clear that:

> *'138 Well-designed places and buildings follow the energy hierarchy of:*
>
> - *reducing the need for energy through passive measures including form, orientation and fabric;*
> - *using energy efficient mechanical and electrical systems, including heat pumps, heat recovery and LED lights; and*
> - *maximising renewable energy especially through decentralised sources, including on-site generation and community-led initiatives.*
>
> *139 They maximise the contributions of natural resources such as sun, ground, wind, and vegetation.*
>
> *140 They make use of potential for renewable energy infrastructures at neighbourhood and building level. These include photovoltaic arrays, heat pumps and district heating systems, to reduce demand for non- sustainable energy sources. IT advances and app-based solutions allow users to take ownership or to manage these systems so as to use them most efficiently.*
>
> *141 They follow the principles of whole life carbon assessment and the circular economy, reducing embodied carbon and waste and maximising reuse and recycling.'*

16. Furthermore, R3 (p44) states that:

> *'147 Well-designed places are robust and take account of local environmental conditions, both prevailing and forecast. They contribute to community resilience and climate adaptation by addressing the potential effects of temperature extremes in summer and winter, increased flood risk, and more intense weather events such as rainstorms.*
>
> *148 Well-designed public and open spaces incorporate planting, structures and water for comfort. They create shade and shelter for their users, improve air quality and mitigate the effects of pollution. Deciduous trees provide shade to buildings, helping to manage solar gain when needed in summer months. These landscape features also contribute to reducing the 'heat island' effect whereby the temperatures in built up areas are significantly higher than outside them.*

150 Well-designed buildings make the most of passive design strategies to minimise overheating and achieve internal comfort. These include:

- *the layout and aspect of internal spaces;*
- *insulation of the external envelope and thermal mass;*
- *management of solar gain; and*
- *good ventilation to reduce overheating.*

They are supported by other measures where necessary, such as mechanical ventilation with heat recovery for efficient ventilation in winter.'

Local Policy

Reading Borough Local Plan (2019) (CD4)

17. Policy CC2: Sustainable Design and Construction (CD 4.3) (p21))

'Proposals for new development, including the construction of new buildings and the redevelopment and refurbishment of existing building stock, will be acceptable where the design of buildings and site layouts use energy, water, minerals, materials and other natural resources appropriately, efficiently and with care and take account of the effects of climate change.

To meet these requirements:

- *All major non-residential developments or conversions to residential are required to meet the most up-to-date BREEAM 'Excellent' standards, where possible;*
- *All minor non-residential developments or conversions to residential are required to meet the most up-to-date BREEAM 'Very Good' standard as a minimum;*
- *All non-residential development or conversions to residential should incorporate water conservation measures so that predicted per capita consumption does not exceed the appropriate levels set out in the applicable BREEAM standard. Both residential and non- residential development should include recycling greywater and rainwater harvesting where systems are energy and cost effective.'*

18. Policy CC3: Adaptation to Climate Change (CD 4.4 (p23))

'All developments will demonstrate how they have been designed to incorporate measures to adapt to climate change. The following measures shall be incorporated into development:

- *Wherever possible, new buildings shall be orientated to maximise the opportunities for both natural heating and ventilation and reducing exposure to wind and other elements;*
- *Proposals involving both new and existing buildings shall demonstrate how they have been designed to maximise resistance and resilience to climate change for example by including measures such as solar shading, thermal mass, heating and ventilation of the building and appropriately coloured materials in areas exposed to direct sunlight, green and brown roofs, green walls, etc;*
- *Use of trees and other planting, where appropriate as part of a landscape scheme, to provide shading of amenity areas, buildings and streets and to help to connect habitat, designed with native plants that are carefully selected, managed and adaptable to meet the predicted changed climatic conditions; and*
- *All development shall minimise the impact of surface water runoff from the development in the design of the drainage system, and where possible incorporate mitigation and resilience measures for any increases in river flooding levels as a result of climate change'*

19. Policy CC4: Decentralised Energy (CD 4.5) p24))

'In meeting the sustainability requirements of this plan, developments of the sizes set out below shall demonstrate how consideration has been given to securing energy for the development from a decentralised energy source.

Any development of more than 20 dwellings and/ or non-residential development of over 1,000 sq m shall consider the inclusion of decentralised energy provision, within the site, unless it can be demonstrated that the scheme is not suitable, feasible or viable for this form of energy provision.

Where there is existing decentralised energy provision present within the vicinity of an application site, further developments of 10 dwellings or more or non-residential development of 1,000 sq m or more will be expected to link into the existing decentralised energy network or demonstrate why this is not feasible.'

20. CR10: Tall Buildings (CD 4.55) p139))

'ii) CR10a, Station Area Cluster (p140):

A new cluster of tall buildings with the station at its heart will signify the status of the station area as a major mixed-use destination and the main gateway to and most accessible part of Reading.

Tall buildings in this area should:

- *Follow a pattern of the tallest buildings at the centre of the cluster, close to the station, and step down in height from that point towards the lower buildings at the fringes;*
- *Contribute to the creation of a coherent, attractive and sustainable cluster of buildings with a high quality of public realm;*
- *Ensure that adequate space is provided between the buildings to avoid the creation of an overly dense townscape and to allow buildings to be viewed as individual forms;*
- *Be designed to fit within a wider planning framework or master plan for the area, which allows separate parcels of land to come forward at different times in a co- ordinated manner.'*

21. Drawing on specific paragraphs pertinent to this scheme CR10 v) (p141):

'all tall building proposals should be of excellent design and architectural quality, and should:

- *Consider innovative ways of providing green infrastructure, such as green walls, green roofs and roof gardens*
- *Maximise the levels of energy efficiency in order to offset the generally energy intensive nature of such buildings*
- *Mitigate any wind speed or turbulence or overshadowing effects through design and siting*
- *Ensure adequate levels of daylight and sunlight are able to reach buildings and spaces within the development'*

22. H5: Standards for New Housing (CD 4.35) p81))

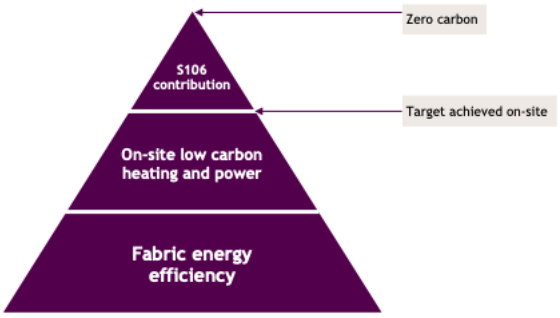
'New build housing should be built to the following standards, unless it can be clearly demonstrated that this would render a development unviable:

c. All major new-build residential development should be designed to achieve zero carbon homes.
d. All other new build housing will achieve at a minimum a 19% improvement in the dwelling emission rate over the target emission rate, as defined in the 2013 Building Regulations.'

Sustainable Design and Construction SPD (CD 7.7)

23. The SPD expands upon the Policies of the Local Plan, in particular the suite identified above. Section 3 (p10) identifies the submission requirements for planning applications in terms of Sustainability Statements and Energy Statements, including the content and detail expected. In the round the objectives of the SPD are intertwined within these submission requirements and should be considered across the scheme as a whole and as interdependent.

Figure 4.1



Extract from the Sustainable Design and Construction SPD.

24. Referring to the diagram above (p19) the definition of 'Fabric Energy Efficiency is provided. This accords with the generally accepted principles of the energy hierarchy as described in the National Design Guide (138 p44) described earlier and is defined in the SPD as being a combination of natural daylighting, solar gain, thermal mass, natural ventilation, green roofs and walls and landscaping (p20-21)

25. Recognising that this is an outline application it is of note that the requirements of the SDP through any accompanying Sustainability Statements should be integral to the design process and not 'bolt-on' at a later stage, assessed in part by the evaluation of the scheme, alongside the Design and Access Statement or Design Code, for example.

26. The SPD sets out requirements for the stages of application from pre-application to post-approval and compliance with this is discussed later in the PoE, however, it is crucial to note the role of buffers in the pre-assessment stage for non-residential development. Buffers provide certainty over the ability for proposed development too meet targets when constructed.

27. Section 4 – Energy Efficiency (p19) provides clear guidance to applicants in achieving the policy requirements of the Local Plan expanded upon in the SPD. Underpinning this section is the requirement for 'fabric first' measures, supported by a range of passive means that support this principle. These include:

- Designing buildings to take advantage and manage solar gain, including the location of toilets and storage and habitable rooms in relationship to habitable spaces and specifically sleeping areas
- Natural daylighting to reduce energy consumption
- Natural ventilation balanced with winter air tightness including the use of mechanical means
- Insulation and managing the glazed areas in relation to orientation
- Green and brown roofs as a passive insulation and cooling mechanism
- The role of landscaping in supporting energy efficiency through shading and supporting solar gain

28. Section 6 – Water Management (p24) identifies RBC as having set and optional potable water consumption target over and above the Building Regulations target of 100l/person/day. Additionally, the use of SUDs is required to deliver a wide range of ecosystems services and whilst not specifically identified this can make a significant contribution to tackling the urban heat island effect as part of a wider landscaping strategy under the National Design Guide (p33).

29. Section 8 – Decentralised Energy and District Heating (p29) expands upon the Local Plan requirement of Policy CC4 and expects developments of more than 20 dwellings and/or non-residential development of over 1,000 sq m to consider the inclusion of decentralised energy provision, within the site, unless it can be demonstrated that the scheme is not suitable, feasible or viable for this form of energy provision. It also expects developments of over 10 dwellings or more or non-residential development of 1,000 sq m or more to link into an existing district energy network, where one is present within the vicinity of an application site, or demonstrate why this is not feasible.

30. Within the identified heat cluster of the North of the Station (p30), considered viable through an assessment by Element Energy there is an expectation that new developments will make provision to join any future network. Whilst an individual development may not be able to provide an energy centre to serve the wider area provision should be made, under the SPD for:

    - *'Designing the development with wet (i.e. hydraulic) space heating and hot water distribution systems, so that the building heat distribution network can interact with (i.e. supply heat to/extract heat from) a DH network;*
    - *Space provision in heating plant rooms for connection to a DH network – this may include (but is not limited to): wall penetrations for DH pipework into plant room; reserved plinths for plate heat exchangers (including redundant units)*

- *Where necessary, provide buried and capped-off DH pipework from the development's plant room to a convenient location (to be agreed with RBC) in preparation for connection to the DH network.'*

Reading Station Area Framework (RSAF) (2010) (CD 7.1)

31. The RSAF envisages the use of decentralised energy and heat networks and whilst now superseded by a substantially decarbonised grid, the principle of a heat network is established (10.5 p56). Additionally, the role of green roofs (10.7 p56) and walls are identified as a means of reducing the urban heat island effect.

Reading Tall Buildings Strategy (2008 updated 2018) (CD 7.44)

32. Under 'Local Environment' (p43) of the Reading Tall Buildings Strategy the importance of considering orientation, microclimate and overshadowing is identified as an early design consideration whereby:

'Orientation is mainly determined by prevailing winds, solar considerations and views of the building. Solar issues need to be considered in terms of:

- *Solar gains when passive heating is desired (e.g. residential floors during the winter season);*
- *Shading from solar gains where they are undesired (e.g. in offices floors, where heat gains from people and equipment could be too high);*
- *Daylighting, to reduce the need of artificial lighting; and*
- *Renewable energy generation by e.g. PV cells, where overshadowing of part of the system would be detrimental to the function of cell arrays.'*

5. Energy and Sustainability

33. Reason for Refusal 11 states that:

'The application fails to demonstrate a sufficiently robust strategy in terms of minimising carbon dioxide emissions, meeting the predicted residential and commercial energy targets and selection of most appropriate on-site renewable energy technologies, contrary to policies H5, CR10, CC2, CC3, CC4 of the Reading Borough Local Plan (2019) and the Council's adopted SPD, Sustainable Design and Construction (2019).'

34. I will deal with the substantive sections of Rfr11 in this section, demonstrating areas where the proposed scheme is contrary to Local and National Policy.

<u>Part 1 - The application fails to demonstrate a sufficiently robust strategy in terms of minimising carbon dioxide emissions</u>

Design and Access Statement (CD 1.48 – 1.55)

35. Under the section "Constraints and Opportunities" (p71) within 3. Site Evaluation (CD 1.50), a sun path analysis is provided that in general terms describes the overall aspect of the site and some diagrammatic information regarding the potential insolation and solar shading at a high level. Whilst this appears sufficient for an early-stage design consideration the role of these factors this do not appear to have influenced the scheme design in terms of sustainability.

36. Analysis of the prevailing wind and potential cooling effects have not been analysed in the Design and Access Statement and therefore cannot be counted as having been a significant design consideration.

37. The contribution of existing landscaping, and the role of any proposed landscaping, alongside the impact of existing development surrounding the proposed scheme and how this could contribute to the resources of the site has not been assessed and there is no narrative in terms of the urban heat island effect either in the immediate locality or across the Borough and region. Therefore, the assumption can be made that these factors and those identified above have not been key design considerations at a site layout or building design stage.

38. Translated into the '3.5 The Concept (CD 1.50) p85)), the presence of the Thames and the historic flood plain and the ambition to incorporate water features into the proposed scheme has not translated into any analysis into the role of this to reduce the urban heat island effect, both in and around buildings and in the local area. This is a missed opportunity.

39. Under 6.5 Development Parameters (CD 1.53) there is a site layout strategy (p115) that identifies the sun path and some recognition of the need for natural light in buildings and outdoor amenity spaces. However, this is the limit of the appreciation of the role of the sun path in the design of the scheme.

40. Section 6. Illustrative Concept (CD 1.54) suggests a broadly similar elevational treatment for each aspect in terms of solid to void ratios irrespective of orientation or solar gain. Also, it is not clear how solar PV will be integrated into the design of the roofs.

41. Overall, the use of green roofs and walls appears limited and the role of the landscaping in terms of reducing summer temperatures is not clear or been discussed within the Statement. The presence of water, that could have a significant cooling effect appears limited and has been reduced to a symbolic gesture in terms of design, somewhat at odds with the ambitions of '3.5 The Concept'.

The Design Code

42. Whilst the Design Code refers to the Energy Hierarchy (p15) and passive design measures these don't appear to be borne out in the rest of the document.

43. Within the Design Code there is no guidance that supports the use of materials for solar gain, the use of solar shading strategies (such as brise soleil, overhangs or recesses) to reduce solar gain and summer overheating.

44. Furthermore, the solid to void ratio does not change in relationship to the potential orientation of the built elements within the proposed development of the detailed design.

Residential Development Energy and Sustainability Statement/Strategy (CD 1.19 – 1.20)

45. The Statement (p15) makes reference to the passive measures that have been considered in the design of the proposed scheme:

> *'The passive and low energy design principles that have been adopted in the current design include:*
>
> - *High performance glazing*
> - *Enhanced thermal performance to the existing walls and roof by the introduction of thermal insulations. High degree of thermal insulations within the new walls and roof associated with the building (Fabric Efficiencies are listed within Appendix 1)*
> - *Low building air leakage rate (3 m3/hr/m2 at 50 Pa which represents a 40 % improvement over the minimum 2013 Building Regulations requirements)*
> - *Whole house mechanical supply and extract ventilation with integral heat recovery*
> - *Community heating system serving all flats*
> - *Low energy lighting (LED lamp sources)*
> - *High efficiency gas fired boilers*
> - *Variable speed pumps*
> - *Building management system to provide sophisticated energy efficiency controls'*

46. There is no reference to the consideration of orientation, prevailing wind, existing or proposed landscaping, water natural ventilation or daylight as a means to reducing

energy demand and therefore carbon emissions within the Statement and the subsequent calculations and assessment have been based on this approach.

Non-residential Development Energy and Sustainability Statement/Strategy (CD 1.10)

47. In terms of reducing energy demand the Statement (p15) states:

'The passive and low energy design principles that have been adopted in the current design include:

- *High performance glazing*
- *Improved building fabric thermal insulation*
- *Low building air leakage rate (3 m3/hr/m2 at 50 Pa which represents a 70 % improvement over the minimum 2013 Building Regulations requirements)*
- *High efficiency heating and cooling plant*
- *Variable speed fans and pumps*
- *Low energy lighting (LED lamp sources)*
- *Automatic lighting control with occupancy and daylight dimming controls'*

48. There is no reference to the consideration of orientation, prevailing wind, existing or proposed landscaping, water natural ventilation or daylight as a means to reducing energy demand and therefore carbon emissions within the Statement and the subsequent calculations and assessment have been based on this approach.

Environmental Statement Non-Technical Summary (CD 1.3)

49. The proposed heating and cooling strategies are considered in paragraphs 5.7 and 5.8 (p14):

'5.7 Proposed Development Heating

Residential

Each of the residential buildings would have their own centralised heating and cooling system located at roof level. The proposed system would use air to water based heat pumps to serve an energy loop passing throughout the building to serve each residential apartment. Within each apartment, an individual heat pump system would provide heating/cooling along with

domestic hot water utilising the energy loop as the prime energy source. Final delivery of heating and cooling within each apartment would be by radiators and fan convectors.

Non-residential
A similar system would be adopted for the non-residential buildings, with the exception of using a fan coil unit as the emitter for the commercial areas to provide heating and cooling instead of a radiator.

5.8 Proposed Development Cooling and Ventilation

Residential

Each of the residential apartments would be fitted with openable windows; the specification of which would be determined during detailed design and informed by the noise assessment within the ES. In addition, residential units would be designed to be dual aspect in nature and to allow through ventilation. The openable windows would enable the circulation of clean-air though apartments.

Non-residential

In the event of a non-residential development, mechanical ventilation would be provided to the offices. A number of air handling units would be provided to serve each building independently. Each air handling unit would provide heat recovery and benefit from the free heat generated by the proposed development. The air handling units would be located at roof level and each building would have stand-alone units. The intake and exhaust ductwork would be suitably located to ensure there is no re-circulation or near external pollutants.'

50. This description is somewhat inconsistent with the Sustainability and Energy Statements in terms of the application of technology and the integration of passive means. For example, the opening windows and individual heat pumps are not described in the non-residential Sustainability and Energy Statement and whilst each may have merit, they will lead to different outcomes and implications for connections to the district heating network in the case of heat pumps and operational considerations in terms of opening windows. Furthermore, on upper floors high winds

may make the use of opening windows uncomfortable and result in overheating if operated at the wrong time of day.

51. This inconsistency of approach points towards an immature understanding of the design and operation of the proposed buildings which could be acceptable at outline stage if they did not have strategic implications for the overall energy consumption for heating and cooling.

Relationship to other Reasons for Refusal

52. Reasons for refusal 8 and 9 are also relevant to this PoE as they highlight deficiencies in the understanding of the site, context, microclimate and the role of landscaping in climate change adaptation.

53. RfR 8 relates to wind conditions, comfort and safety and whilst these matters have been considered in some detail regarding hazardous conditions this has not been applied to the potential for the prevailing wind and microclimate to support summer cooling and the comfortable use of space in a positive way. This points to a rudimentary understanding of the resources of the site as described in the NDG and is a missed opportunity for non-mechanical means of cooling, the orientation of the buildings, the choice of materials and aspect and the landscaping.

54. RfR 9 relates to landscape, trees and the green network. The green network makes a key contribution to reducing the urban heat island effect and other ecosystems services and could mitigate for the wind conditions and but also crucially contribute to climate change adaptation through solar shading. This points to a lack of integration between the buildings, landscape and green infrastructure that is a missed

opportunity to comply with the NDG, NPPF, Local Plan and SPD in terms of sustainability.

55. **In summary the application fails to demonstrate a sufficiently robust strategy in terms of minimising carbon dioxide emissions on account of an inconsistent approach to the energy hierarchy as described in the Sustainable Design and Construction SPD, The National Design Guide and the NPPF.**

56. **Furthermore, the lack of assessment of orientation, prevailing wind, the role of existing and proposed landscaping and landform further undermines the energy hierarchy and does not demonstrate a robust strategy to reduce carbon emissions through passive measures and 'Fabric Energy Efficiency'. This extends to both the need for passive measures to reduce heating and lighting loads but also to summer cooling and the reduction of the urban heat island effect.**

57. **These matters are fundamental to the design principles of the proposed development in terms of layout, building design and landscaping and as such it would not be appropriate to secure compliance through planning conditions. The parameter plans that would form any approval will result in a form of development that has not been proven to optimise the natural resources of the site in terms of sun, ground, wind and vegetation as defined in the NDG and described in the Sustainable Design and Construction SPD.**

58. **The nature of parameter plans is to provide certainty, however the underlying principles in terms of passive measures to support energy efficiency have not been applied to the development of these, therefore it is clear that a future scheme based upon these will not have optimised the opportunities presented by the site and context. Taken in the round, alongside related RfR 8 and 9 the lack of analysis and**

detailed understanding underpinning this approach will result in a form of development that undermines the strategy for minimising carbon reductions.

Part 2 - The application the application fails to demonstrate a sufficiently robust strategy in terms of meeting the predicted residential and commercial energy targets

59. As an overarching consideration the non-compliance with policy described in Part 1 (above) undermines the calculation of the carbon emission calculations provided and the assumptions made around the use of renewable and low-carbon energy sources and ultimately any offsetting requirements.

Residential Development Energy and Sustainability Statement/Strategy (CD 1.19 – 1.20)

60. The Executive Summary (p3) states that:

> *'Block A achieves a 8.58% improvement in fabric energy efficiency, Block B achieves a 9.13% improvement in fabric energy efficiency, Block C achieves a 3.38% improvement in fabric energy efficiency and Block D achieves a 9.06% improvement in fabric energy efficiency when compared to a Building Regulation 2013 compliant building as required by the Reading Plan.'*

61. The potential for fabric energy efficiency has not been fully demonstrated, as described in Part 1 (above), and the fabric improvements proposed are modest, particularly in the case of Block C at 3.38%.

62. The Energy Strategy accepts the principle of zero carbon homes within the Executive Summary (p3) and the overall targets have been broadly accepted by the Council with clarifications made by the Appellant in a subsequent review 'Response to LPA SOC wind related matters by Watkins Payne 22-03-22' (CD8.7)

Non-residential Development Energy and Sustainability Statement/Strategy (CD 1.10)

63. The Non-residential Development Energy and Sustainability Statement/Strategy identifies a 9.15% reduction in carbon emissions from fabric energy efficiency, however as described in Part 1, the assessment of the potential of the site and passive design measures is inadequate with a consequential impact on the calculations provided.

64. For the reasons above the application fails to demonstrate a sufficiently robust strategy in terms of meeting the predicted residential and commercial energy targets as the energy hierarchy has been undermined by the approach taken. The subsequent calculations presented are not robust as further fabric energy efficiency measures could have been proposed had an appropriate assessment and design approach have been taken.

65. The relatively small contribution made from fabric energy efficiency within the overall calculations, which is it accepted meet policy requirements, does not maximise the contribution that these measures could make, leading to a greater reliance on active measures, low carbon technologies and renewable energy which could either deliver greater carbon reduction, or require less interventions and ultimately offsetting.

<u>Part 3 - The application fails to demonstrate a sufficiently robust strategy in terms of selection of the most appropriate on-site renewable energy technologies.</u>

66. This section relates to the 'On-site low carbon heating and power' as described and illustrated in the Sustainable Design and Construction SPD (p19) and as the second stage in the energy hierarchy as described in the NDG (138 p44).

Residential Development Energy and Sustainability Statement/Strategy (CD 1.19 – 1.20)

Non-residential Development Energy and Sustainability Statement/Strategy (CD 1.10)

67. The use of Solar PV is proposed as a viable technology for renewable energy generation to contribute to the wider carbon reductions across the proposed development (p27/p21) identified in both documents:

> *'The development has unshaded roof areas that could be utilised for PV panels. Based on various site constrains only the roof of Block D has available space for a PV installation and an area of 30m2 can be provided for the installation of PV panels. The contribution from the PV installation shall be put towards Block A, Block B, Block C and Block D.'*

68. The matter of the contribution of solar PV to the energy hierarchy remains unresolved with no clear justification for the very small solar installation (30m2) over the whole of the roof area. This points to a lack of consideration of the solar potential of the site as a whole, and how this could have been achieved if this had been a design consideration from the outset.

Response to LPA SoC wind related matters by Watkins Payne 22-3-22 (CD8.7)

69. Watkins Payne have subsequently reviewed the comments made by RBC and have provided clarification and updates relating to the Residential Development Energy and Sustainability Statement/Strategy (CD 1.19 – 1.20) and Non-residential Development Energy and Sustainability Statement/Strategy (CD 1.10).

70. Air Source Heat Pumps appears to be the overall technological approach as clarified in the Review (p3 – unnumbered), which is acceptable in policy terms, and it is understood from the Review that further consideration will be made for the use of Ground Source Heat Pumps to meet the requirements of the SPD and supported with appropriate thermal storage and connections to the district heating network.

71. The Review (p4 unnumbered) states that the blocks will be designed to accommodate connection to the district heating network when this is delivered. Whilst this is welcomed further clarity is required regarding:
    - The design of the centralised heating and cooling systems proposed and their suitability for future connection to the district heating network
    - The route of connections to the proposed district heating network and the appropriate safeguarding of pipe and service corridors through design and the future management of the public realm
    - The contribution that the site could make in the future to the district heating and cooling network in terms of heat and cooling loads

72. For the above reasons the application fails to demonstrate a sufficiently robust strategy in terms of selection of the most appropriate on-site renewable energy technologies. The potential for solar PV has not been integral to the design process and is limited in terms of generation potential. The strategy for the solar PV installation appears to be a 'bolt-on' measure and as such does not comply with Local Plan and Sustainable Design and Construction SPD.

73. As there is no evidence provided to back up the claim that the solar PV installation of greater than 30m^2 cannot be achieved it would be inappropriate to secure a greater area through a planning condition. Through an appropriate design for the site a greater area of solar PV could be accommodated on the site, however in the absence of any assessment of the potential it is evident from the Appellants Statements that this is feasible, this could not meaningfully be conditioned.

74. Additionally, there is a lack of certainty regarding connection to the District Heating network and the use of ground source or air source heat pumps and the suitability

of the system to be integrated. A suitable form of connection and the appropriate technology could be secured by a Planning Obligation.