



Amethyst Lane Sustainability Statement

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Sustainability Statement

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1.0 Executive summary

HTA Sustainable Futures have been appointed by Reading Borough Council to prepare a Sustainability Statement that describes the response to the sustainability policies to support the submission of the planning application for the redevelopment of the Amethyst Lane 'site' at Reading Borough Council. This report sets out how the redevelopment responds to all relevant planning and project requirements for sustainability.

The description of Proposed Development for this planning application is set out below:

"Demolition and redevelopment of the Amethyst Lane to deliver a new respite care facility alongside 21 new two and three storey houses, landscaping and ancillary works".

The redevelopment of the Amethyst Road will achieve and exceed the national and regional targets, as outlined in the National Planning Policy Framework. This statement has also been prepared in line with the latest Reading Borough Local Plan (2019) as well as council's relevant guidance.

Reading Borough Council has an ambition to provide an additional 15,847 homes (averaging 689 homes per annum) for the period 2013 to 2036 (Policy H1). According to Policy H3, on sites of 10 or more dwellings, 30% of the total dwellings will be in the form of affordable housing, the tenure split should aim to provide 62% 'Reading affordable rent' and a maximum of 38% shared ownership. The aim for the Amethyst Lane site is to consider general needs housing alongside homes downsizer apartments. Capacity on site will rely on balancing housing provision alongside associated car parking levels, amenity and landscape and biodiversity aspirations.

The sustainability strategy for the new development of the Amethyst lane is to meet or exceed the highest quality standards. Proposals will aim to achieve Net Zero Carbon in operation, in response to the climate emergency and also provide residents with warm sustainable homes with manageable energy costs.

The proposals will consider PassiveHaus principles as a best practice guide. Opportunities for incorporating sustainable measures into the development were explored during the design process to ensure that, where possible, the proposed

development achieves the latest standards in sustainable design. Therefore, consideration of the principles for a sustainable development has formed an integral part of the design evolution and the resulting scheme is a reflection of this. The sustainability performance of the proposed development is reported and structured around the relevant requirements pertaining to sustainability, i.e. being able to prove that the scheme will achieve and exceed the national, regional and local sustainability targets.

The proposed development will provide all residents with an opportunity to live a healthy, secure and affordable life. The approach puts people at the centre creating a local area with a distinctive character with communal green spaces. The homes, internal and external spaces and the other facilities will support residents in improving their quality of life and creating a sustainable lifestyle. The vision intends to develop a sustainable place in line with the 'triple bottom line' approach which integrates environmental, social and economic sustainability. As it is illustrated in Table 1, the sustainability framework consists of the following principles:

- Optimise internal and external daylight;
- Maximise pedestrian wind comfort;
- Mitigate heat island effects;
- Reduce CO₂ emissions;
- Decrease Embodied CO₂; and
- Strengthen the Circular Economy Principles

This report summarises the sustainability strategies applied to the site. The following reports have informed the sustainability strategies detailed in this report:

Input	Reference
Energy and Overheating Assessment	HTA Design LLP (2023)
Design and Access Statement	HTA Design LLP (2023)
Landscape Plan	HTA Design LLP (2023)
Daylight, Sunlight & Overshadowing Assessment	HTA Design LLP (2023)
Preliminary Ecological Appraisal	RSK ADAS Ltd (2023)
MEP Utilities Report	Hydrock (2023)
Noise and Vibration Assessment	23 Acoustics (2023)

Table 1. Reports that informed the sustainability strategies.



Figure 1. Illustrative view of the proposed Respite Forecourt (Source: DAS, HTA 2023).

2.0 Introduction and context

2.1 Wider context

The Site is in the West of the Borough in the Southcote ward, southwest of Reading Town Centre. The site is located between Bath Road to the south and Tilehurst Road to the North. To the west is one of Reading's largest parks, Prospect Park. The area is predominantly residential, with a number of local primary schools and community centres throughout. There are shops and local facilities located on Bath Road.

Occupying a plot at the end of the cul-de-sac served by Amethyst Lane, the Site is currently not accessible. The previous Day Centre facility remains standing on the site, as a series of 1 storey courtyard style blocks, and a number of 1 storey outbuildings.

To the East of the site is a relatively recent residential housing development at Ashdene Gardens, consisting of a number of 2-3 storey houses, and 3 storey flatted point blocks, clad in brick, with a series of steeply sloping hipped roofs and 'mock-tudor' detailing. To the West is the primary access road to the site, Liebenrood Road, with Prospect Park just beyond. The site is located within a residential zone of Reading with houses and flatted development 2-3 storeys in height.

2.2 Local context

Existing configuration

The site currently contains a now vacated day centre providing services for older people and a family centre for children in care to meet with the birth parents in a safe environment. The services were relocated as part of previous review and the site has remained vacant for 3 years. Following initial internal site capacity studies the Council has requested a study for a full redevelopment of the site for both general needs housing, and a Respite centre.

2.3 Description of development

Proposed configuration

Following design development and pre-application feedback from Planning Officers across a number of disciplines, the adjacent plan represents the emerging scheme. The planning application proposal is described as follows:

21 new Houses (15 x 3 Bed, 6 x 4 Bed)
18 car spaces (0.86 parking ratio)
+ 3 Respite centre staff car spaces
+ Drop off point for minibus
+ 2 visitors vehicle spaces
+ 1 Delivery vehicle Space
+ 1 Car Club Space
6 Bedroom Respite Facility
- GIA = 514sqm
- Total Respite Amenity = 448sqm

Landscape vision

Reading Borough Council has clear policy guidance in relation to landscape and ecology. Amethyst Lane is fairly well located in terms of access to play, with the Kennet Valley play area a five minute walk to the west, and Prospect Park a fifteen minute walk to the east. The existing green spaces to the south of the site could potentially be enhanced and provide natural/ doorstep play as well as be enhanced with wildflower and other planting to increase biodiversity.

A dry swale along the north-south axis in the centre of the site offers a number of benefits including sustainable urban drainage, the opportunity for tree planting and informal play, and wildflower planting to attract pollinating insects.

An existing overgrown hedge to the north of the site is to be cut back and managed as a hedge to provide screening and a wildlife corridor. The group of two category C trees to the south east of the site are retained within communal open space which provides the opportunity for some wildflower planting and habitat features at the entrance to the proposed houses.

Hedges to front gardens and tree planting between parking bays create a greener and more pleasant pedestrian environment.

The respite centre garden would be designed to incorporate best practice, with circulation loops, smooth surfaces, colour contrast and careful placement of seating areas. The three courtyards would provide a range of functions including a sensory garden, a wildlife garden and a social garden for external dining and group activities.



- Key:**
- ① Boundary hedge
 - ② Rear garden
 - ③ Swale/ informal play
 - ④ Existing tree retained
 - ⑤ Proposed tree
 - ⑥ Respite amenity
 - ⑦ Communal amenity space

Figure 2. Illustrative landscape site plan (Source: DAS, HTA 2023).

3.0 Responding to the environmental targets

The UK aims to achieve net zero by 2050, as detailed in the Climate Change Act. This target was amended in 2019 compared to the previous target of an 80% reduction in carbon emissions by 2050 (against a 1990 baseline). Buildings in the UK account for over 40% of all energy use and CO₂ emissions, so there is an increasing need for building regulations to become more demanding in terms of energy performance targets. The city of London aims to become a zero-carbon city by 2050.

Sustainability has been placed at the heart of National, and Local Policy setting performance targets for best practice in design, construction and operation.

This section outlines the relevant policies that are used to inform and guide the sustainable design of the development at Amethyst Lane.

3.1 National policies

Energy White paper (December 2020)

The current energy policy is set out in the Energy White Paper published (December 2020) building on previous work including the 2007 Energy White Paper and the Energy Review Report in 2006.

Following on from the Ten Point Plan and the National Infrastructure Strategy, the Energy White Paper provides further clarity on the Prime Minister's measures and puts in place a strategy for the wider energy system that:

- Transforms energy, building a cleaner, greener future for our country, our people and our planet
- Supports a green recovery, growing our economy, supporting thousands of green jobs across the country in new green industries and leveraging new green export opportunities.
- Creates a fair deal for consumers, protecting the fuel poor, providing opportunities to save money on bills, giving us warmer, more comfortable homes and balancing investment against bill impacts.

Climate Change Act 2008

This document is the world's first long-term legally binding framework to mitigate against climate change.

This document aims to enable the UK to become a low-carbon economy and sets legally binding targets to increase greenhouse gas emission reductions through action in the UK and abroad from the 60% target to 80% by 2050. In 2019, the Climate Change Act 2008 (2050 Target Amendment) Order 2019 was passed which increased the UK's commitment to a 100% reduction in emissions by 2050.

National Planning Policy Framework (NPPF) (July 2021)

The National Planning Policy Framework states that 'achieving sustainable development means that the planning system has three overarching objectives, which are interdependent and need to be pursued in mutually supportive ways (so that opportunities can be taken to secure net gains across each of the different objectives):

a) an **economic** objective - to help build a strong, responsive and competitive economy, by ensuring that sufficient land of the right types is available in the right places and at the right time to support growth, innovation and improved productivity; and by identifying and coordinating the provision of infrastructure;

b) a **social** objective - to support strong, vibrant and healthy communities, by ensuring that a sufficient number and range of homes can be provided to meet the needs of present and future generations; and by fostering a well-designed and safe built environment, with accessible services and open spaces that reflect current and future needs and support communities' health, social and cultural well-being; and

c) an **environmental** objective - to contribute to protecting and enhancing our natural, built and historic environment; including making effective use of land, helping to improve biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy.

The NPPF goes on to state that 'Plans and decisions should apply a presumption in favour of sustainable development'.

Economic

The development has been designed to reduce waste materials, repeating unit designs and using the topography of the site to the fullest extent possible. The proposed scheme will contribute to economic growth both during construction and over the life of the development and will

create a range of employment opportunities within the local and wider economy. This will include jobs directly on site as well as indirect jobs in the supply chain.

Social

The development of the site will introduce new residents to the area and expand the local community. The building also includes communal areas which help improve the health and wellbeing of the occupants.

Environmental

The environmental role is described as contributing to protecting and enhancing our natural, built environment and, as part of this, helping to improve biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy.

Rooms are provided with high fabric performance specifications. Air Source Heat Pumps will also provide heating and hot water efficiently avoiding air quality issues, to ensure comfort conditions within the spaces. An efficient MVHR system will provide ventilation and ensure comfort conditions within the spaces.

Approved Document L: conservation of fuel and power V.1: dwellings, 2021 edition incorporating 2023 amendments

This approved document gives guidance on how to comply with the energy efficiency requirements for new dwellings. This report explains how the proposed development at Amethyst Lane responds to criteria 1 to 3 of this approved document.

Criterion 1: in accordance with regulation 26, the calculated rate of CO₂ emissions from the dwelling (the Dwelling CO₂ Emission Rate, DER) must not be greater than the Target CO₂ Emission Rate (TER). Additionally, and in accordance with regulation 26A, the calculated Dwelling Fabric Energy Efficiency (DFEE) rate must not be greater than the Target Fabric Energy Efficiency (TFEE) rate.

Criterion 2: the performance of the individual fabric elements and the fixed building services of the building should achieve reasonable overall standards of energy efficiency, following the procedure set out in paragraphs 2.31 to 2.37.

Criterion 3: the dwelling should have appropriate passive control measures to limit the effect of heat gains on indoor temperatures in summer, irrespective of whether the dwelling has mechanical cooling.



Ministry of Housing,
Communities &
Local Government

National Planning Policy Framework

 HM Government

The Building Regulations 2010

**Conservation of
fuel and power**

APPROVED DOCUMENT



Volume 1: Dwellings

Requirement L1: Conservation of fuel and power

Requirement L2: On-site generation of electricity

Regulations: 6, 22, 23, 24, 25, 25A, 25B, 26, 26A, 26C,
27, 27A, 27C, 28, 40, 40A, 43, 44 and 44ZA

2021 edition incorporating 2023 amendments –
for use in England

3.2 Local policy

Reading Borough Council Local Plan (2019)

The Reading Borough Council: "Declared a Climate Emergency in 2019, and set out its commitment to work towards achieving a carbon neutral Reading by 2030 [...] the Local Plan contains sustainability policies that put it at the cutting edge of authorities across the country [...] Reading is in the top 5% of local authorities in Britain for cutting carbon emissions and the Local Plan will play a major part in building upon that success."

Reading Local Plan 2019

"In parallel to the drafting of the Local Plan to 2036, Reading UK, the economic development and marketing company for Reading, has launched a 2050 vision for the town as a smart and sustainable city by 2050 [...] By 2050 it envisages that Reading will be a smart and sustainable city that:

- Shares success to support and enable thriving communities;
- Delivers a real sense of place and identity;
- Thrives on cultural and cross-generational diversity;
- Is recognised for its heritage and natural assets;
- Embeds technology to deliver innovation and low carbon living for all; and
- Welcomes ethical and sustainable businesses who support Reading."(p.12).

The following sustainability objectives are set alongside the objectives of other plans, such as the Climate Change Strategy 2013-2020 (Reading Means Business on Climate Change).

"Improve the quality of life for those living, working, studying in and visiting the Borough, creating inclusive, sustainable communities with good access to employment, open space and waterspace, transport, education, services and facilities (such as sustainable water supplies and wastewater treatment, healthcare services, social and community facilities, sport and recreation, etc.) to meet identified needs;" (p.14).

The following local policies and guidance apply to the development:

- Policy CC1 - Presumption in Favour of Sustainable Development
- Policy CC2 - Sustainable design and construction
- Policy CC3 - Adaptation to climate change
- Policy CC4 - Decentralised energy
- Policy CC5 - Waste minimisation and storage
- Policy EN9 - Provision of open space
- Policy EN16 - Pollution and Water Resources
- Policy EN18 - Flooding and Sustainable Drainage Systems
- Policy H5 - Standards for New Housing
- Policy TR1 - Achieving the transport strategy

Reading's Climate Change Strategy (2013-2020)

The climate action network sets out the following strategic priorities organised by theme:

- Energy supply
- Low Carbon Development
- Natural Environment
- Water Supply and flooding
- Transport
- Purchasing, Supply and consumption
- Education, Communication and Influencing Behaviour
- Community

Sustainable Design and Construction SPD (Adopted December 2019)

This document is a Supplementary Planning Document (SPD). It provides supplementary information to support policies in the Reading Borough Local Plan, adopted in November 2019. It relates particularly to the sustainability policies of the Local Plan, specifically policies CC2, CC3, CC4, CC5, EN18 and H5. It replaces the previous Sustainable Design and Construction SPD, adopted in July 2011.

It provides practical advice on forms of sustainable design and construction, as well as waste minimisation that will meet these policy requirements. It also details how policies will be applied. This should assist applicants in ensuring that the relevant information is submitted at the appropriate stage of the application and development process.

This document also states that Reading Borough Council has declared a Climate Emergency, and set out its commitment to working to achieve a carbon neutral Reading by 2030, while it also includes how Reading adapts to a changing climate, the impact that its built space has on its own natural resources and habitats as well as pollution of its ground, water and air.

Furthermore, Sustainable Design and Construction (SPD) document includes 2 checklist where help to provide pointers for residential and non residential development that has been included into the chapter 4.0 Sustainable statement.

3.3 Guides

RIBA 2030 Climate Challenge

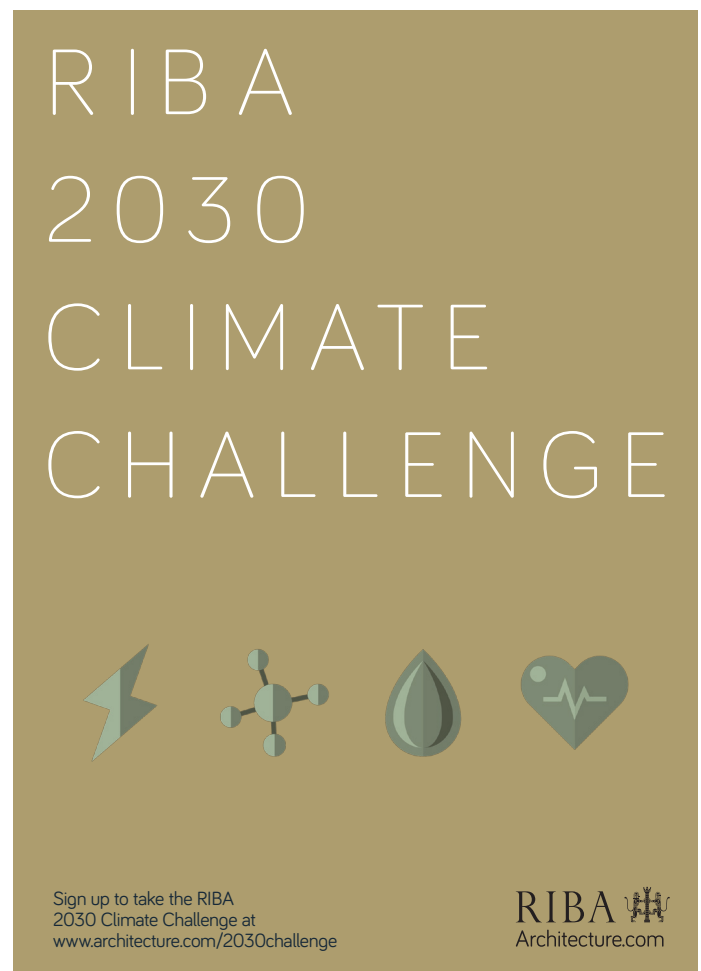
The RIBA Climate Challenge, to which HTA is committed, sets targets for 2020, 2025 and 2030 for energy use, embodied carbon, and water. Other metrics include daylight, overheating and other factors related to the health and wellbeing of people. These metrics have to be factored in to design proposals as they emerge in order to be effective. It should be noted that RIBA 2030 it is neither a mandatory standard nor a document developed for refurbishment projects. The project has begun with the RIBA 2030 targets. Recognising this may not be possible with a refurbishment project they have been adopted to guide and motivate

to reach as close to its measures as possible. Measures include materials specification and services strategy but also justifications on why choices have been made to ensure the high quality design solutions that are being developed are carried through to use.

To achieve the embodied carbon targets requires use of systems/products with a high recyclable/recycled content; the decision to retain as much of the existing fabric of the blocks as possible is already a step in the right direction. Everyone involved was encouraged to give thought to possible solutions to the sustainability challenges throughout the programme.

Client Sustainability Approach

Reading Borough Council have declared a climate emergency. The Amethyst Lane proposal is an opportunity for the Council to demonstrate the type of sustainable development that they would like to see delivered across Reading. The proposed building has been modelled in Design web-based SAP 10.2. The data produced by the software has been used to calculate the carbon dioxide emissions using the SAP 10.2 carbon factors, in line with the requirements set out in the new Approved Document L. The assessment has been undertaken by the energy modelling team of HTA Design LLP who are accredited domestic energy and low carbon assessors.



4.0 Sustainability statement

This part of the report aims to present how the development complies with SPD Revised Sustainable Design and Construction, Local Plan's policies and objectives.

This Statement should be read in conjunction with other supporting documents submitted with the planning application including the Design and Access Statement, prepared by HTA Design, which explain the proposed development in more detail and relate them to the surrounding context and planning policy framework for the site.

The below key sustainability issues as derived from the relevant policies of the Reading Borough Council Local Plan (2019), Reading's Climate Change Strategy (2013-2020), Sustainable Design and Construction SPD (Adopted December 2019, Appendix 1: table A1.1 - p.32) and other relevant guides have been presented in detail in this section. These summarise the sustainability initiatives which have been incorporated into the design of the scheme.

4.1 Energy and CO2

4.2 Waste and Materials

4.3 Ecology

4.4 Pollution and Water resources

4.5 Health & Wellbeing

4.6 Transport Strategy

Policy CC1 - Presumption in Favour of Sustainable Development

"A positive approach to considering development proposals will be taken that reflects the presumption in favour of sustainable development contained in the National Planning Policy Framework (NPPF). Where appropriate, the Council will work proactively with applicants jointly to find solutions which mean that proposals can be approved wherever possible.

Planning law requires that applications for planning permission must be determined in accordance with the development plan unless material considerations indicate otherwise. Planning applications that accord with the policies in the development plan (including, where relevant, with policies in neighbourhood plans) will be approved without delay, unless material considerations indicate otherwise. Proposed development that conflicts with the development plan will be refused, unless other material considerations indicate otherwise.

Where there are no policies relevant to the application or the policies which are most important to determining the application are out of date at the time of making the decision then permission will be granted unless material considerations indicate otherwise – taking into account whether:

- The application of policies in the NPPF that protect areas or assets of particular importance provides a clear reason for refusing the development proposed; or
- Any adverse impacts of doing so would significantly and demonstrably outweigh the benefits, when assessed against the policies in the NPPF taken as a whole." (p.21).

Policy CC2 - Sustainable design and construction

"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." (p.21).

Policy H5 - Standards for New Housing

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

- a. All new build housing outside the Central Area as defined on the Proposals Map will comply with the nationally-described space standard.
- b. All new build housing will be built to the higher water efficiency standard under Regulation 36(3) of the Building Regulations.
- 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.
- e. All new build housing will be accessible and adaptable in line with M4(2) of the Building Regulations, unless it is built in line with M4(3) (see below).
- f. On developments of 20 or more new build dwellings, at least 5% of dwellings will be wheelchair user dwellings in line with M4(3) of the Building Regulations. Any market homes provided to meet this requirement will be 'wheelchair adaptable' as defined in part M, whilst homes where the Council is responsible for allocating or nominating an individual may be 'wheelchair accessible'." (p.81).

4.1 Energy and CO₂

Policy CC3 - Adaptation to climate change

"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." (p.23).

Policy CC4 - Decentralised energy

"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." (p.24).

SPD (Adopted December 2019)- Energy/CO₂

"Aim: To conserve energy, in particular carbon dioxide emissions and maximise the use of energy efficient techniques.

1. How has the development been designed to optimise the use of the energy from the sun and limit heat losses?
2. How has the development been designed to optimise natural daylighting, energy efficient lighting, external lighting and natural ventilation?
3. How will the design of the building make efficient use of energy? (e.g. use of thermally massive materials, levels of insulation, energy efficient white goods and use of green/brown roofs etc.).
4. Has local energy generation from renewables and/or decentralised energy been considered as part of the scheme?
5. How have cycle storage facilities been considered?
6. Does the development meet the requirements of policies H5? Is this clearly illustrated?
7. Is a Section 106 contribution required? If so, what amount?" (p.32).

Based on Reading Borough Council's requirements, all major new-build residential developments should be designed to achieve zero carbon homes. The strategy for reducing energy use and associated carbon emissions through the design of the scheme follows the 'Be Lean', 'Be Clean', 'Be Green' Energy Hierarchy. The improvement

in energy performance will be achieved through the use of high fabric efficiency, good air tightness levels, efficient building services, and the installation of PV panels on the roof.

The development achieves 45% reduction above 2021 Building Regulations at 'Be Lean' stage and 112% overall carbon reduction above 2021 Building Regulations, achieving a net zero regulated carbon. Tables 1-2 and Figure 1 demonstrate the overall reduction in the regulated carbon emissions of the development after each stage of the Energy Hierarchy.

Be Lean

The first step addresses reduction in energy use, through the adoption of fabric, servicing improvements and the incorporation of flexibility measures.

The proposed development will incorporate a range of energy efficiency measures including levels of insulation exceeding current Building Regulation requirements, the installation of high performance glazing, energy efficient lighting and efficient MVHR system for general ventilation purposes in all habitable spaces.

The implementation of these measures at 'Be Lean' stage will reduce regulated CO₂ emissions by 13.4 tCO₂/year or 45% when compared to a notional building built to current Part L Building Regulations (2021).

Be Clean

The possibility of employing a decentralised energy network was investigated but no current or future decentralized energy schemes were identified within the vicinity of the site.

Be Green

The Air Source Heat Pump absorbs heat from outside air and then transfers it via the central heating system to provide both hot water heating and heating for an indoor space. The use of ASHP would allow the development to reduce its carbon emissions and contribute to reducing poor air quality.

The majority of the dwellings will be provided with efficient compact Air Source Heat Pumps (ASHPs) with no outdoor units. Efficient Air Source Heat Pumps with outdoor units will be provided to the large end terrace houses.

Photovoltaic panels (PVs) will be installed on the roof. The full electric HVAC design solutions will be benefited from the future de-carbonisation of the grid. PVs provision has been maximised.

The implementation of the above measures at 'Be Green' stage will further reduce regulated CO₂ emissions by 19.9 tCO₂/year or 67% when compared to a notional building built to current Part L Building Regulations (2021), achieving net zero regulated carbon emissions.

Passive Design Measures

In order to meet the more demanding standards set for

this development, the new building will be built to a high specification prioritising a passive "fabric first" approach. Energy demand reductions will be achieved through:

Building Orientation

The orientation of the buildings is largely dictated by the site. The proposed layout maximises the number of rooms which receive direct sunlight throughout the day and balances the percentage of glazing.

Fabric performance

Lower U-values contribute to lower heat losses through different building elements, especially during winter. As a result the heating demand during the cooler months can be significantly reduced. The development will incorporate high levels of insulation and high performance glazing on all the facades to significantly reduce the demand of space heating. Table 2 shows the performance of the building fabric.

Air tightness

Heat loss may occur due to air infiltration. Although this cannot be eliminated altogether, good construction detailing and the use of best practice construction techniques can minimise the amount of air infiltration.

The maximum air permeability rate set by Part L 2021 Building Regulations is 8 m³/m² at 50Pa. The development will improve upon this to achieve 1 m³/m² at 50Pa.

Active Design Measures

After reducing the energy demand of the development, the next stage would be to use energy efficient building services, lighting and controls throughout the scheme to reduce energy consumption. The proposed energy strategy includes the following measures:

Mechanical Ventilation

Fresh air will be provided via efficient Mechanical Ventilation with Heat Recovery systems.

High efficacy lighting

The development intends to incorporate low energy lighting fittings throughout the building. 100% of all lighting fittings will be specified as low energy lighting.

	Proposed
Ground and Exposed Floor	0.10 W/m ² K
External Walls	0.13 W/m ² K
Corridor Walls	0.15 W/m ² K
Roof	0.11 W/m ² K
Windows	Triple glazing 0.80 W/m ² K (clear window g-value: 0.54) (Frame factor: 0.8)
Entrance doors	1.00 W/m ² K
Air permeability	Whole development: 1 m ³ /hm ² (@50 Pa)
MVHR Unit	Heat Recovery (HR) 90% SFP: 1 Wet Room: 0.54 W per l/s 2 Wet Rooms: 0.55 W per l/s 3 Wet Rooms: 0.62 W per l/s 4 West Rooms: 0.76 W per l/s
Lighting	Low Energy LED Lighting

Table 2. Building fabric performance - Part L 2021.

4.2 Waste and Materials

Policy CC5 - Waste minimisation and storage

"Development should demonstrate measures to minimise the generation of waste in the construction, use and life of buildings and promote more sustainable approaches to waste management, including the reuse and recycling of construction waste and the promotion of layouts and designs that provide adequate, well-designed space to facilitate waste storage, reuse, recycling and composting." (p.26).

Materials

All the materials specified for the proposed development will be durable and of high quality to minimise the need for maintenance or replacement. The use of materials and construction techniques that have smaller ecological and carbon footprints will be prioritised, as well as materials which help create good air quality. Where possible, materials will be sourced for local suppliers and manufacturers.

Waste

Refuse & Recycling

It is hoped that by locating recycling facilities in convenient locations, will encourage recycling by residents. The front gardens of all the houses and the ground floor flats have been designed to incorporate an enclosure for a general waste and recycling bins and in the apartment building a

shared refuse and recycling store is located immediately adjacent to main entrance.

Refuse Access

- The Refuse Vehicle used within Reading has been tracked to ensure it can manoeuvre through the site, making a turn at the T-junction at the top of the site.
- The terraced homes will house their bins in their front gardens and be collected from there.
- The Respite Care Centre will be designed to accommodate an integral communal bin store, housing 1100l eurobins for refuse and recycling on a weekly collection.



Figure 4: Refuse strategy (Source: DAS, HTA 2023).

4.3 Ecology

Policy EN9 - Provision of open space

"All new development should make provision for appropriate open space based on the needs of the development. This can be achieved through on or off-site provision, contributions toward provision or improvement of existing leisure or recreational facilities.

On sites of 50 dwellings or more, or for developments where the availability and quality of existing open space has been identified as deficient, new provision will be sought. Development must ensure satisfactory provision of children's play areas and neighbourhood parks.

A secure maintenance arrangement shall be demonstrated to ensure that any open space is properly maintained throughout the life of the development. In exceptional circumstances where the Council agrees to the adoption of the open space, a commuted sum for future maintenance will be required as part of any legal agreement.

On sites of less than 50 dwellings, or in areas not identified as deficient in the provision of open space, new open space provision, improvements or enhancements will be sought, including through appropriate contributions.

The provision of open space for all developments shall satisfy the most urgent need subject to considerations of particular deficiencies. The most up-to-date Open Spaces Strategy should guide provision type and size. New open space should:

- Be in useable parcels of land and not be fragmented;
- Be safely and easily accessible and not severed by any physical barrier, including a road;
- Be accessible to the general public and be designed so as to feel that it is part of the public and not private realm;
- Create a safe environment, appropriately considering lighting and layout to reduce the fear of crime;
- Provide some informal landscaping for aesthetic, wildlife and recreational purposes; and
- Link into the Green Network where possible." (p. 45).

SPD (Adopted December 2019) - Ecology

"Aim: To retain, protect and enhance wildlife habitats and natural features.

25. How have the wildlife habitats and natural features on and adjacent to the site been considered and how will they be retained, protected and enhanced?" (p. 33).

Landscape strategy

Reading Borough Council has clear policy guidance in relation to landscape and ecology. In line with Policy EN9 - Provision of open space and the following associated planning and strategy documents, the landscape design was developed.

- Reading Borough Local Plan 2019
- Tree Strategy 2021
- Reading Biodiversity Action Plan 2021
- The Reading Climate Emergency Strategy 2020-25

Landscape amenity/ sensory garden for the respite centre

- Creating a wide range of external spaces - lawns, shaded seating areas, sensory planting, wildflower meadows, raised beds, etc. would enhance the amenity value of the garden and provide the residents with a choice of sensory experience depending on their mood.

Circulation loops, smooth surfaces, colour contrast and careful placement of seating areas help those that may be anxious.

- Landscapes enhanced with edible planting such as orchards, growing gardens, and plant beds enriched with perennial herbs, vegetables and fruits. provide food for both people and animals and create an additional amenity resource for garden users.

Enriching biodiversity

- Where possible, retention of existing trees provides important habitat such as nesting and foraging opportunities for birds and bats.
- Adopting a planting strategy that aims to maximise diversity of planting across the site would provide a variety of nectar, pollen and fruit resources throughout the seasons, a variety of structural diversity and larval food plants.

- Habitat features, such as Integrated and tree mounted bird and bat boxes, Insect hotels, loggerys (made from site won timber) and bee bricks, provide important homes for insects.

Respite Centre Garden

- Outdoor spaces host a multitude of proven benefits for those living with complex neurological conditions.
- The respite centre garden will be designed to cater for the needs of those with hypo or hyper-sensitivities, with careful consideration given to the choice of plants and hard materials to create a calm environment.
- The precedents on the right illustrate some of the ideas we would like to incorporate into the gardens.
- The proposed garden is divided into three key courtyard spaces:
 - 1) Social garden
 - 2) Sensory garden
 - 3) Wildlife garden

Preliminary Ecological Appraisal

The Preliminary Ecological Appraisal by ADAS identify the following ecological constraints and opportunities for the development of residential housing at the brownfield site on Amethyst Lane, Reading:

- Broadleaved plantation woodland – native tree planting should be incorporated as part of the landscaping of the site to replace any trees removed on a 1:1 basis.
- Scattered broadleaved trees – should any trees be removed as part of the work, the same number of trees should be replaced as part of the landscaping plan in line with the Reading Borough Local Plan section EN12 where it states 'Development should... provide new tree planting, wildlife friendly landscaping and ecological enhancements.'
- Birds – the hedges, trees and scrub provide suitable nesting and foraging opportunities for common and widespread birds. Compensation for reduction in nesting opportunities to include 8 bird boxes
- Bats – three further surveys are recommended to be carried out between May and September, spaced two weeks apart. Surveys will inform any mitigation needed. It is recommended that any new lighting follows 'Bats and Artificial Lighting in the UK (2018)' guidance note.
- Badgers - All badger activity was contained within the north of the site, with a well-established path between the setts and latrines leading off site. Further survey required.
- Other mammal species – evidence suggestive of a fox den present. Monitoring with camera traps recommended for 1 month.
- Non-native invasive plants – Hollyberry Cotoneaster identified on site – measures to ensure this species is not spread around/ off the site should be put in place, within a detailed Biosecurity method statement, to ensure compliance with the Wildlife and Countryside Act 1981 (as amended).

Other enhancement opportunities:

Recommendation that Biodiversity Impact Calculations be carried out to ensure the proposals are in line with the Reading Borough local Plan policy EN12 which states new development should include 'tree planting, wildlife-friendly landscaping and ecological enhancements' which could include;

- Artificial hibernacula should be installed in the retained boundary landscaping, such as log piles, using any felled trees or dead branches from the site will also increase the opportunity for invertebrates and other mammals such as hedgehogs.
- In any area of grassland not affected by the works, habitat enhancement could be carried out, such as re-seeding to rough grassland.
- Soft landscaping should be incorporated using native species planting to ensure that connectivity and foraging opportunities are not lost. Planting schemes should use a range of native flora, including diverse meadow seed mixes, fruit/seed/nut-bearing species and those that provide pollen and/or nectar (such as *Corylus* sp., *Sambucus* sp., *Prunus* sp., *Malus* sp., *Sorbus* sp., *Viburnum* sp., etc.) this will also increase foraging opportunities for invertebrates, badgers, bats and birds.
- Additional locally occurring plants could be added to the site, such as the naturalised plant red valerian (*Centranthus ruber*) to encourage more butterflies and night-scented plants such as jasmine (*Cestrum nocturnum*). Additional native bee-friendly plants could also be incorporated within the site, for example, adding more lavender to the introduced shrub areas.
- The line of the hedge with trees bordering the site provides potential habitat for commuting Hedgehogs and the amenity grass provides foraging opportunities. To enhance the site for hedgehogs following works, it is recommended that the hedge should have additional native planting to increase suitability for hedgehogs, a strip of grass around the boundary line be allowed to grow long, and leaf litter and dead wood should be left in areas around the site to provide more foraging and nesting opportunities. These areas should be created away from the road and parking areas too. Hedgehog homes could also be provided within the line of scattered trees.

Although the proposals suggest removal of some of the boundary vegetation to the eastern boundary, it is hoped that the trees to the north can be maintained as a hedge and wildlife corridor. Hedgehog gaps should be incorporated into all rear garden fencing to allow movement of hedgehogs

and other small mammals through the site.

Further discussions with the project ecologist are required to determine enhancement opportunities based on the proposed layout.

For more information on the proposed ecological enhancements, please refer to the DAS prepared by HTA on the landscape chapters.

4.4 Pollution and Water resources

Policy EN16 - Pollution and Water Resources

"Development will only be permitted where it would not be damaging to the environment and sensitive receptors through land, noise or light pollution; where it would result in no deterioration in, or ideally enhance, ground and surface water quality; and where adequate water resources, sewerage and wastewater treatment infrastructure will be in place to support the proposed development prior to occupation.

Proposals for development that are sensitive to the effects of noise or light pollution will only be permitted in areas where they will not be subject to high levels of such pollution, unless adequate mitigation measures are provided to minimise the impact of such pollution.

Development will only be permitted on land affected by contamination where it is demonstrated that the contamination and land gas can be satisfactorily managed or remediated so that it is suitable for the proposed end use and will not impact on the groundwater environment, human health, buildings and the wider environment, during demolition and construction phases as well as during the future use of the site." (p.59).

SPD (Adopted December 2019) - Water

" Aim: To improve efficiency in the use of water, conserve water resources and minimise vulnerability to flooding.

8. How will the development incorporate the use of water saving devices to achieve the higher water efficiency standard under Regulation 36(3) of the Building Regulations?

9. How will the development incorporate recycling rainwater and reduce the use of potable water?

10. Has the collection, treatment and re-use of grey water been considered? If so, how will these facilities be incorporated within the development?" (p.32).

Noise and Vibration Assessment

According to the Noise and Vibration Assessment developed by 23 Acoustics and in line with the Local authority guidance, BS 8233: 2014 and the WHO Guidelines, the following internal noise levels where needed to be achieved:

- Daytime level 35 dB LAeq, 16 hour in bedrooms and living rooms;
- Night-time level of 30 dB LAeq, 8 hour in bedrooms;
- Night-time internal level of 45 dB L_{Amax}, fast in bedrooms for regular events.
- Aspirational target limit of 55 dB LAeq, 16hr in external amenity areas.

The noise measurements were undertaken on the site between 1st and 8th March 2023 using appropriate equipment. 24 Acoustics mention "The typical max event to be the 10th highest noise level during the relevant night-time period. The dominant noise source at the monitoring location was traffic noise from Liebenrood Road. The measured typical background noise levels representative of the existing noise sensitive properties to the east and west of the site, were in the order of 40 dB LA90,1hr during daytime periods (07:00 – 23:00) and 29 dB LA90,15min during the night (23:00 to 07:00 hours)." (p.10).

"The site is affected by noise from distant road traffic using Liebenrood Road. Acceptable internal noise levels would be achieved within the proposed properties and sleeping accommodation using standard thermal double glazing and the proposed use of mechanical ventilation (MVHR), in accordance with defined criteria (BS 8233:2014 and WHO:2000). The assessment indicates that noise levels in external amenity areas will be within the constraints identified in British Standard 8233. External noise criteria have been established for new plant associated with the respite centre, based on the measured background noise levels and BS 4142: 2014." (p.13).

Overall, appropriate internal and external acoustic environment can be provided to the proposed residential properties on the Amethyst Lane development.

Water efficiency

In line with the Sustainable Design and construction Checklist (Water section), the new dwellings will reduce the use of potable water to below 105 litres/person/day using water efficient fittings. A downpipe is proposed to the rear of every house to provide the opportunity for rainwater collection for gardening purposes.

4.5 Health & Wellbeing

Policy CC8 - Safeguarding Amenity

"Development will not cause a detrimental impact on the living environment of existing residential properties or unacceptable living conditions for new residential properties, in terms of:

- Privacy and overlooking;
- Access to sunlight and daylight;
- Visual dominance and overbearing effects of a development;
- Harm to outlook;
- Noise and disturbance;
- Artificial lighting;
- Vibration;
- Dust and fumes;
- Smell;
- Crime and safety; or
- Wind, where the proposals involve new development of more than 8 storeys.

The position of habitable rooms, windows and outdoor living spaces will be particularly important. A back-to-back distance of 20 metres between dwellings is usually appropriate, although the circumstances on individual sites may enable dwellings to be closer without a detrimental effect on privacy.

As well as immediate impacts, other aspects to which this policy applies will include matters such as hours of operation of businesses, and effects of traffic movements, particularly of heavy goods vehicles (HGVs). Proposals which would generate regular movements of HGVs on residential roads will not be acceptable.

Where an otherwise acceptable development could change its character to a use that would have a greater impact on amenity without needing planning permission, conditions will be applied to restrict such changes." (p.30).

Daylight, sunlight and overshadowing (DSO)

A detailed DSO assessment has been carried out by HTA Design LLP in support of this application. Overall, the proposed development will offer adequate levels of daylight and sunlight to future occupants, the living spaces and to the external amenity area throughout the year.

The daylight analysis considered all the surrounding buildings with main windows facing the development. Overall the results are acceptable given the low-rise nature of the existing structures on site. In terms of impact on the surrounding properties, the proposed development will not cause unacceptable harm to the surrounding residential amenity. The daylight and sunlight levels are appropriate to the urban context and the overall results are, therefore, considered acceptable against the relevant planning policies and guidance.

Health and Social Wellbeing

To promote an active lifestyle, cycle storage for the individual houses and the apartment building have been integrated into the design. In addition, pedestrian and cycle routes across the site have been enhanced, creating better connections to the wider Reading cycle network. Proposed trees planting and vegetation throughout the proposed site plan is intended to improve the quality of the physical environment.

5.0 Conclusion

The Sustainability Statement outlines the key measures and strategies adopted by the design teams demonstrating that the Amethyst Lane scheme is aligned with the sustainability objectives and targets stated within the Reading Borough Council Local Plan (2019). The development has been assessed against the relevant sustainability standards to demonstrate how the development responds to them and how it will underpin a successful development.

The following features have been implemented:

- Improved sense of community to accommodate the needs of the residents;
- Providing new affordable homes at higher sustainable standards and ensuring a healthy indoor environment;
- A saving of 100% of carbon emissions compared to the predicted baseline;
- Improved connectivity across the site with its surrounding built and natural environment;
- A more sustainable travel plan for residents where walking and cycling movements are prioritised;
- Enhanced external landscape and biodiversity values;
- Optimisation of the resources used and minimisation of their impact on the existing environment across all construction and operation stages.
- The proposed measures summarised in this report are also the result of the consultations undertaken in the past months and account for comments and suggestions which came from the existing community.

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