

Sustainability Statement

Moorhill Road, West End

January 2023



Turley
Sustainability

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Highwood Homes Limited

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1. Introduction

1.1 Introduction

This Sustainability Statement has been prepared by Turley Sustainability, on behalf of Highwood Homes Limited ('the applicant', 'Highwood'), to support a full planning application to Eastleigh Borough Council for the development of a new care home at Moorhill Road, West End.

This Statement provides detail of the various measures incorporated into the development proposals to ensure suitable levels of sustainability performance in accordance with local and national planning policy.

1.2 Site Context

The development site is located on the eastern side of the A27 Moorhill Road, West End, and is approximately 5km north east of Southampton city centre.

The site is previously developed and was previously granted planning permission for a large replacement dwelling. The site is bound to the north and south by two Southern Water reservoirs, and to the east by Telegraph Woods.

1.3 Proposed Development

The development proposals are for the construction of a 70-bed care home with access to Moorhill Road, parking, landscaping and other associated works.

Figure 1 overleaf shows the site plan of the proposed development.

1.4 Document Structure

Chapter 2 of this report provides an overview of relevant national and local legislation, planning policy and guidance.

Chapter 3 reports the approach taken by the team in relation to the BREEAM strategy.

Chapter 4 provides detail of the sustainability and energy strategy of the proposed development, in line with local Planning Policy, and **Chapter 5** provides an overall summary.

The appendices to this document contain the BREEAM Pre-assessment, and energy modelling.

Please note, the terms "carbon", carbon dioxide (CO₂)" and "greenhouse gas (GHG)" are used interchangeably in this statement depending on the terminology of referenced documents

Red thick line denotes Care Home Site Boundary

The site plan illustrates the layout of the Care Home, enclosed by a red thick line. The main building is a large, multi-winged structure with various rooms labeled: Entrance, Office, Cafe, Kitchen, Plant Room, Laundry, Dining, Lounge, and Rain Garden. A central courtyard features a large circular green space. To the left of the building is a parking area with numbered spaces (01-16) and a delivery bay. A sub-station and bin store are located near the delivery bay. The site is landscaped with numerous trees and green spaces. Two infiltration basins are shown on the right side of the site. A red thick line marks the site boundary, and a red arrow points to it with the text 'Red thick line denotes Care Home Site Boundary'.

2. Policy Context

2.1 Introduction

This chapter sets out the planning policy context relating to sustainable design and construction at the national and local authority level.

2.2 National Policy

This section sets out a summary of current national guidance and policy in relation to sustainable development.

2.2.1 National Planning Policy Framework

The National Planning Policy Framework¹ (NPPF) provides a framework for the development of locally prepared plans and the government's planning policies for England and how these are expected to be applied.

Paragraph 7 of the NPPF states that: 'the purpose of the planning system is to contribute to the achievement of sustainable development'.

It states clearly that in order to deliver sustainable development, the planning system must perform three distinct objectives, aligned to the three pillars of sustainability, which must not be taken in isolation and should be pursued jointly:



An **economic** objective to help build a strong, responsive and competitive economy, by ensuring that sufficient land of the right type 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.



A **social** objective supporting 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 well-designed beautiful and safe places, with accessible services and open spaces that reflect current and future needs and support communities' health, social and cultural well-being; and



An **environmental** objective contributing to protecting and enhancing our natural, built and historic environment; including, making effective use of land, improving biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy.

The July 2021 update to the NPPF recognises the role planning must play in support of the UK's pursuit of the United Nations Sustainable Development Goals (UNSDGs) which address social progress, economic wellbeing and environmental protection². Example UNSDGs are presented in **Figure 2**.

¹ [UK Government | NPPF](#)

² [UN Sustainable Development Goals](#)

Figure 2: Example UN Sustainable Development Goals



2.2.2 Planning Practice Guidance

Planning Practice Guidance (PPG) provides further advice on various planning issues associated with development, including those linked to sustainability and renewable energy and underpins the policies within the NPPF.

PPG is a material consideration in planning decisions and should generally be followed unless there are clear reasons not to. It sets out how local authorities should include policies that protect the local environment and strategies to mitigate and adapt to climate change and supports developments that are functional and adaptable for the future.

The March 2019 PPG update confirmed that Local Authorities have the option to set technical requirements exceeding the minimum requirements of the Building Regulations in respect of access, water and space where sufficient evidence is produced to justify the target.

2.2.3 Building Regulations

Whilst not planning policy, the Building Regulations (and specifically Approved Document Part L: Conservation of Fuel and Power) set out the requirements for energy and carbon performance in new buildings.

Periodic updates to these national regulations will drive energy efficiency and carbon reduction improvements.

On 15th June 2022, the Building Regulations were updated as an interim step towards part of the roadmap to the 'full' Future Homes and Buildings Standards, which come into effect in 2025. The regulations aim to deliver buildings that are of a higher quality, with lower energy bills and reduce GHG emissions by around 30% for new homes and 27% for non-domestic buildings. There is a transition period of one year from this date; this will allow any new building, where plans have been submitted before 15th June, one year to make a meaningful start and be allowed to comply with the previous regulations. These transitions apply at a plot level, not at a site level.

As of 15th June 2022, new Building Regulations Part S and Part O are now also in place.

New approved document Part S sets out guidance for electric vehicle (EV) charging infrastructure and specifies that car parks with more than 10 spaces include at least one active EV charge point, with cabling to the remaining 20% of spaces.

Part O sets out new requirements for mitigating overheating, specifying that residential developments must limit unwanted solar gains in the summer and provide means to remove heat. Compliance with Part O can be demonstrated using two methods to demonstrate the risk of overheating from rising summer temperatures has been mitigated:

- Following a simplified prescribed glazing and free area ratio; or,
- Use of a Dynamic Simulation Modelling.

2.3 Local Planning Policy

2.3.1 Eastleigh Borough Local Plan 2016-2036

The Eastleigh Borough Local Plan³ was adopted on 25th April 2022 and sets out the policies and plans to guide future development in the Borough up to 2036. The Council has three strategic priorities: a Green Borough, a Healthy Community, and a Prosperous Place. These priorities inform the vision, objectives and policies included in the Local Plan. Key sustainability policies relevant to this application include:

Policy S1 Delivering sustainable development – To be sustainable, new development in the Borough should:

- Have regard to the potential impacts of climate change, and the need to limit greenhouse gas emissions including through carbon sequestration and by promoting measures to design buildings and spaces which are adaptable to predicted climate change, and restrict development in areas at risk from flooding, minimise energy use and encourage the generation of renewable energy, and by minimising emissions from motorised transport, industrial activity, and domestic uses.
- Minimise the need to travel longer distances, and, where travel is necessary, prioritise more sustainable forms of transport, such as active travel, other alternatives to car use, or a combination of active travel and other alternatives to car use.
- Use resources wisely and minimise the generation of waste in the construction, occupation and use of buildings.

Policy S9 Green Infrastructure – Through new development and other initiatives, the council will seek to achieve the provision, retention and/or enhancement of the following forms of multi-

functional green infrastructure, including provision of:

- Green infrastructure incorporated into all new development with multifunctional spaces connected by primary, secondary and tertiary green links.
- Interconnected urban green infrastructure within the fine grain of existing and new development including green, cycle ways, paths and linkages between community facilities and open spaces to link community facilities.

Policy DM2 Environmentally sustainable development – requires a BREEAM ‘Excellent’ (or equivalent), or BREEAM ‘Very Good’ plus Passivhaus certification including a 15% improvement in predicted carbon emissions, compared with the Building Regulations current at the time.

In addition to the above, all development should, where practical and viable:

- Incorporate energy-efficient passive design principles, make the best use of natural daylight and natural ventilation systems wherever possible.
- Connect to any existing near or adjacent low carbon local energy network unless this is proved unviable.
- Use recycled, low embodied carbon, low environmental impact, and locally sourced materials in construction where possible.
- Be designed with sufficient flexibility to enable the life of the building to be extended by re-use for other purposes where feasible.

Policy DM3 Adaptation to climate change – All development should be designed to adapt to the predicted climate change impacts for the Borough.

- To reduce the potential impacts of surface water flooding, sustainable drainage systems need to be implemented as part of an integrated SuDS strategy for the site, in

³ [eastleigh-borough-local-plan.pdf](#)

accordance with Policy DM6 below, and as part of the landscape framework for the site including green open space and green roofs where appropriate.

- New development should have a cooling strategy which can include:
 - Cooling through generous green infrastructure and trees
 - Areas of shade
 - Water cooling
 - Building design and orientation to reduce overheating
 - ‘Cool roofs’ or green roofs and green walls
 - Porous cool pavements
- To adapt to water stress, new development should be designed to reduce demand. Measures can include:
 - Reduced residential mains water consumption
 - Water efficient appliances, fittings and leak detection devices for non-residential and non C3 use class residential development
 - Rainwater harvesting and greywater recycling
 - Drought resistant landscape design and planting.

Policy DM6 Sustainable surface water management and watercourse management – New development will only be permitted if it incorporates Sustainable Drainage Systems (SuDS). Wherever feasible, naturalised filtration should be included within the treatment train.

Policy DM11 Nature conservation – Development should seek a net gain in biodiversity on all development sites through the protection, enhancement and connection of existing habitats, and provision of new habitats and features of

nature conservation interest compatible with the native biodiversity characteristics of the Borough.

2.3.2 Climate Emergency

Eastleigh Borough Council declared a Climate Change and Environmental Emergency in July 2019 and have set a target of becoming carbon neutral by 2025. The council will also support communities and businesses across the borough to achieve carbon neutrality by 2030. To reaffirm its commitment on this issue, the council have produced a Climate and Environment Emergency Strategy⁴ (2020-2030) which sets out progress to date, baseline assessment and the strategy that the council is taking to meet these targets in all aspects of development.

2.3.3 Eastleigh Validation Checklist⁵

A Sustainability Statement is required for all developments involving the provision of new dwellings, and for all non-residential and multi-residential developments above 500sqm of floor space measured externally. The statement should demonstrate how the proposed development complies with the sustainability principles and requirements as set out in the Council’s adopted planning policies.

2.4 Planning Policy Summary

Local and national policy aims to ensure the delivery of sustainable and well-designed buildings which mitigate and adapt to the impacts of climate change.

The recently adopted Local Plan requires development to consider a range of sustainable design measures, including sustainable design and resource management, green infrastructure, SuDS, energy efficient and low carbon buildings, water efficiency, and enhancing biodiversity. This demonstrates the borough’s commitment to the creation of sustainable new developments. Furthermore, development must demonstrate sustainability credentials through achievement of a

⁴ [climate-change-and-environmental-emergency-strategy-2020-2030.pdf \(eastleigh.gov.uk\)](#)

⁵ [Microsoft Word - Validation Checklist Final Version Amended 25 June 14 pdf.docx \(eastleigh.gov.uk\)](#)

BREEAM 'Excellent' rating where technically feasible and viable.

Latest national planning policy and guidance confirms the Government's approach to sustainable development is being driven through the updates to the Building Regulations to ensure that new buildings are well designed and reduce emissions in line with the UK's national carbon targets.

The following sections of this Sustainability Statement set out the sustainability measures incorporated into the design of the development to ensure the delivery of a sustainable development and address the requirements of local policy.

3. BREEAM Strategy

3.1 Introduction

Policy DM2 of the Eastleigh Borough Local Plan requires all non-residential development over 500m² to achieve a BREEAM 'Excellent' rating, unless this is not technically feasible, or viable.

This Chapter sets out the BREEAM strategy proposed for the care home.

3.2 BREEAM

BREEAM is the world's leading sustainability assessment tool for new buildings. The scheme is operated by the Building Research Establishment (BRE) and includes a range of criteria against which the sustainability performance of new buildings are assessed.



The current BREEAM New Construction standard is the 2018 Version 3.0 under which the 'Multi-Residential' sub-scheme is applicable to the care home.

3.3 BREEAM Strategy

Turley Sustainability (BREEAM Advisory Professional and Licenced Assessor) has undertaken a pre-assessment of the building (see **Appendix 1**) using the New Construction 2018 'Multi-Residential' methodology. Turley has extensive experience providing early-stage guidance and certifying

several multi-residential buildings, including care homes.

The results of the pre-assessment and workshops with the team demonstrate that a maximum score of 77.49% is achievable, which would deliver an 'Excellent' rating with a buffer over the 70% required. **Table 1** shows the maximum credits achievable within in each section, and overall as per the results of the pre-assessment. It should be noted that the route to BREEAM compliance, as set out in the pre-assessment, may be subject to change during ongoing detailed design and construction.

Table 1: BREEAM Pre-assessment Results

Category	Percentage Targeted
Management	10.48%
Health & Wellbeing	8.11%
Energy	12.52%
Transport	6.67%
Water	4.67%
Materials	12.86%
Waste	4.20%
Land Use & Ecology	8.00%
Pollution	6.00%
Exemplary	4.00%
Score	77.49% (Excellent)

A summary of credits targeted within each category for the pre-assessment, and the value that meeting the criteria brings to the development, is discussed in the following sections. A full breakdown of each credit targeted is provided within **Appendix 1**.

3.3.1 Management

The management category encourages the adoption of sustainable management practices in connection with design, construction, commissioning, handover and aftercare.

The credits within this category are awarded to project and design teams who consider and incorporate sustainability measures, involving key stakeholders from project brief through to occupation.



Sustainability practices targeted include life cycle costing, seasonal commissioning, consideration of construction site impacts, and, post occupancy evaluation.

3.3.2 Health and Wellbeing

The Health and Wellbeing category of the BREEAM schemes has been aligned with the 'WELL' Standard, bringing the comfort of building occupiers to the forefront of the design.

Overheating within buildings is likely to be a significant effect of climate change and therefore an assessment has been undertaken to ensure the development doesn't overheat in current and future scenarios.

The indoor air quality, visual comfort, thermal comfort acoustic performance, security and safety of the development proposal will also be considered to ensure a comfortable, high quality living environment for the residents and staff.

3.3.3 Energy

The Energy category encourages the specification and design of energy efficient solutions, systems

and equipment. The credit requirements support the reduction of carbon emissions throughout the operational phase of the development proposal. Further detail on the energy strategy is provided within **Section 4.5**.

Unregulated energy will be reduced through careful specification of large energy consuming systems such as lifts.

Energy modelling will be undertaken for a number of operational scenarios to reduce the performance gap between 'as designed' and 'in use' energy performance. Furthermore, extensive sub-metering will allow the building user to monitor energy performance to establish possible efficiencies during operation.

3.3.4 Transport

A Transport Statement has been produced to assess the effect of the development on local transport infrastructure. A Travel Plan has also been produced to communicate proposed sustainable transport measures to reduce private car travel to and from site and increase the uptake of sustainable and active modes of travel.

Credits are awarded on the basis of number of transport options available to the site pre-development and as a result of the development.

As discussed in **Section 4.3**, the care home is in a highly accessible location, and there is excellent pedestrian infrastructure within the vicinity of the site. Sustainable transport measures are proposed to enhance this, including the provision of cycle parking in line with local policy guidance, and EV charging points to 10% of the parking spaces (equivalent to three).

3.3.5 Water

The aim of the Water category is to reduce the consumption of internal and external potable water over the lifetime of the building and minimising losses through leakage.

The detailed design and specification will confirm the final measures incorporated to reduce internal

water usage, which will be monitored through water meters and a leak detection system.

3.3.6 Materials

The Materials category encourages development to take a 'whole life cycle' approach to construction products, considering impacts of the supply chain from raw material, to end-of-life.

At concept design, a life cycle assessment (LCA) of the development's superstructure (external walls, frame, roof etc.), substructure and hard landscaping was undertaken, to model the environmental impact, including carbon emissions, associated with construction and materials. An options appraisal has also undertaken to identify carbon 'hotspots', and measures which could reduce these emissions. Further details on measures considered to reduce embodied carbon are provided within **Section 4.7**.

To reduce material wastage associated with maintenance and replacement, protection measures will be incorporated into the detailed design to protect from damage that may arise from residents, patients, staff and visitors, such as protecting internal areas from trolley movement, pedestrian traffic or external areas from parking and/or delivery vehicles.

The design team will also consider the effect of environmental factors such as water ingress, solar radiation and temperature variation on the building.

Manufacturers with responsible sourcing accreditation, for example, BES6001, ISO14001, FSC and CARES certification will be prioritised during construction.

3.3.7 Waste

The Waste category encourages the reduction of waste associated with construction methods through measures implemented during the design and on-site management. The category also rewards design measures encouraging the building users to recycle waste during building operation.

The proposed development will minimise construction and operational waste in line with the measures set out within the waste (**Section 4.7**) of this report.

Additionally, the design is flexible and adaptable to climate change, change in use and refurbishment to reduce the environmental impacts of excess material usage and waste in the future.

3.3.8 Land Use and Ecology

The aim of the Land Use and Ecology category is to encourage sustainable land use, habitat protection and creation and improvement of long-term biodiversity.

As discussed further within **Section 4.6**, an Ecological Appraisal has been completed to set out mitigation and enhancement measures for the proposed development.

3.3.9 Pollution

The aim of the Pollution category is to address the prevention and control of pollution and surface water run-off associated with the building's location and use.

Pollution issues covered within the credit requirements include light, noise, flooding and emissions to air, land and water.

If provided, gas boilers with low NOx emissions will be specified to limit any adverse impact on local air quality.

Furthermore, pollution impacts associated with light and noise will be reduced and managed appropriately.

An FRA has been undertaken which identifies any risks to the development, and appropriate mitigation measures in line with the drainage hierarchy (**Section 4.5**).

Mitigation measures are being incorporated into the design to ensure surface water run-off is appropriately managed.

3.4 Summary

The above section summarises the credits targeted by the proposed development to achieve an 'Excellent' rating. The credits targeted equate to a score of circa 77.49% which would achieve the required scores within a significant margin of safety.

It should be noted that this Sustainability Statement does not guarantee the award of these credits and may not reflect the final route to achieve the required BREEAM ratings. Credits may be removed and replaced with others which may be more viable over the course of the design and construction.

4. Sustainability Strategy

4.1 Introduction

This section of the report outlines the sustainability strategy for the proposed development at Moorhill Road, demonstrating how the proposed care home responds to both national and local planning policy, including the NPPF.

4.1.1 Sustainability at Highwood Homes Limited

Highwood Homes Limited are a proactive developer and aim to ensure that key sustainability issues such as climate resilience, social responsibility and wider environmental impacts are addressed within their developments.

Care home facilities are intrinsically complex buildings, which must balance environmental impacts with the comfort and wellbeing of staff, visitors and residents.

Although this Sustainability Statement focusses on the environmental pillar of sustainability, some social and economic benefits have also been highlighted and are presented within the following sections:

- Building a Strong and Competitive Economy
- Promoting Sustainable Transport
- Promoting Healthy Communities
- Meeting the Challenge of Climate Change
- Conserving and Enhancing the Natural Environment
- Sustainable Resources

4.2 Building a Strong and Competitive Economy

The proposed development will contribute to positive economic growth for the borough through construction and occupation of the proposed care home, supporting the aims of the NPPF.

Construction – The economic benefits of construction are well known with considerable direct and indirect positive impacts.

A study by the Confederation of British Industries (CBI) in February 2020⁶ demonstrates that construction projects have a significant benefit on the local and wider economy. The report concludes that for every £1 of construction expenditure £2.92 is injected into the economy.

The construction of the care home will therefore provide opportunities for local employment as well as increased revenue locally for materials, services and goods.

Occupation – The construction of a 70-bed care home will increase the population resulting in local benefits through the demand for goods and services. Furthermore, the increase in local population will also help support local facilities, groups and stores helping promote the vitality of the local area and beyond.

4.3 Promoting Sustainable Transport

A Transport Statement has been prepared by Paul Basham Associates. This section summarises the existing conditions in the vicinity of the site, the accessibility of the site relative to local facilities and services, and outlines the development proposal for the site.

⁶ <https://www.cbi.org.uk/media/4121/fine-margins-february-2020-cbi.pdf>

4.3.1 Local Environment

The site is located along Moorhill Road (A27) approximately 1.1km south of the High Street in West End. The site historically encompassed a single residential dwelling, and is bound to the west by Moorhill Road, to the north by Telegraph Road, to the east by Telegraph Woods and to the south by a covered reservoir.

Local Services and Amenities – The site is situated within walking/cycling distance of several local amenities and services in the local area. The following amenities are within a 15 minute walk:

- Three Diamonds Convenience Store
- Full House Chinese Takeaway
- Thornhill Park Post Office
- Sangha Pharmacy
- Morrisons
- Tesco Express

Walking/Cycling Services – There is excellent pedestrian infrastructure within the vicinity of the site, including continuous and lit footways along the western side of Moorhill Road, providing pedestrian access to Harefield and Bitterne Village to the west. In addition, north of the site is a footway which provides a pedestrian passage into Telegraph Woods and West End to the east. The footways are accompanied by pedestrian crossing infrastructure, with dropped kerbs and tactile paving in place to provide safe crossing points. There are also Public Rights of Way (PRoW) routes nearby which provide further pedestrian opportunities.

Moorhill Road is a wide and predominantly straight road, presenting a bicycle-friendly road, with opportunities for drivers to overtake safely. Additionally, there is a shared foot/cycleway along the northern side of the High Street which presents

the opportunity to promote cycling to the nearby amenities.

Bus Services – The nearest bus stop to the site is the 'Hare and Hounds' bus stop located on Minstead Avenue approximately 315m west of the site. The bus stop is served by the number 13 bus service which runs to Southampton City Centre every 30 minutes Monday – Saturday. The number 3 Bluestar service is also available from further bus stops located on Thornhill Park Road, 750m south of the site. This provides an hourly service between Southampton City Centre and Eastleigh from Monday – Saturday, and a service every 2 hours on a Sunday. More detail on the bus services available to the site can be found in the Transport Statement which accompanies the planning application.

4.3.2 Sustainable Transport Measures

As part of the development proposals, measures to enhance and encourage sustainable transport include:

Walking/Cycling Services – The proposed development will align with the Eastleigh Borough Council Residential Parking Standards SPD⁷ which provides guidance on cycle parking provision at care homes. The proposed development will therefore provide storage space for 1 bicycle space per 10 staff, and 1 bicycle space per 10 beds, encouraging this mode of active travel to and from the site.

EV Charging – Electric vehicle charging provision will be provided in line with BREEAM standards, whereby 10% of parking must be provided with electric vehicle charging spaces. Therefore, three of the proposed parking bays will be supplied with the necessary EV infrastructure, reducing transport-related emissions.

Summary – There is a good range of amenities and services within walking distance of the proposed site, meaning it provides an excellent opportunity to create a sustainable development. Given the accessibility of the site with the nature of the development, existing pedestrian network and bus

⁷ [ppdadoptionparkingstandards0109downsize.pdf](https://www.eastleigh.gov.uk/ppdadoptionparkingstandards0109downsize.pdf)
([eastleigh.gov.uk](https://www.eastleigh.gov.uk))

services, the site can currently be considered to be a good location to produce a sustainable development.

4.4 Promoting Healthy Communities

Creating a high-quality development that promotes health and wellbeing for residents, staff and visitors is a key aim of the scheme in line with UN SDG 3 Good Health and Wellbeing. In this context the design has been developed to enhance the health and wellbeing of the residents.

Key elements of the care home include:

- A safe and secure environment.
- Specialist design to support the living experience and care of the residents, and function of the carers.
- Individual bedrooms with accessible ensembles.

A variety of amenities are provided to the care home residents, including day-spaces, cafe, cinema, and hair salon.

A key health and wellbeing offering of the care home is the provision of extensive garden areas. The gardens will be private to residents and visitors and will provide multi-functional uses including an open lawn, activity gardens, ornamental planting, and patio seating areas. The gardens will be accessible immediately from the care home, and feature footpath networks to enable short walks to be taken.

The planting strategy incorporates colourful and scented planting throughout, to provide sensory stimulation for the residents. The gardens will also be sheltered from the public realm to maintain privacy.

In addition, the design of the care home has incorporated measures to improve internal living environments including maximisation of natural daylight in occupied areas such as bedrooms and lounges.

The scheme is targeting a BREEAM 'Excellent' rating, with a number of credits in the Health and Wellbeing section, supporting healthy communities.

4.5 Meeting the Challenge of Climate Change

One of the main challenges facing the UK and new development is the need to mitigate and adapt to a changing climate. The Government is committed to tackling climate change and in 2019 set out an ambition to extend the UK Carbon reduction target to reduce carbon emissions by 100% by 2050.

Climate change will cause the UK to become warmer, winters will become wetter, and summers will become drier. Adapting to this changing climate will impact on the design, construction, location, cost and operation of all new buildings in the next few decades. One of the NPPF's core planning principles is for development to consider climate change adaptation and mitigation during the planning process.

The council's recently adopted Local Plan supports the government's objectives for sustainable development reducing energy use and carbon dioxide emissions, adapting to, and mitigating the effects of climate change.

In this context the following sections outlines the key climate change mitigation and adaptation measures considered appropriate for this development based on the latest national guidance.

4.5.1 Mitigating Climate Change

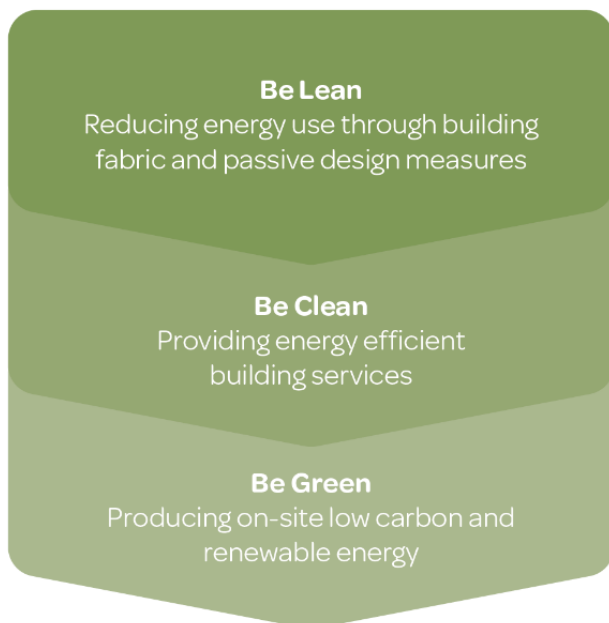
Developing energy efficient, low carbon buildings is a key objective of national policy and recent changes to the Building Regulations, supporting the reduction of energy demand through efficient building design to reduce carbon emissions.

A key aspect of the future regulations is related to the continuing decarbonisation of the national electricity network. The phasing out of coal fired power stations and increasing generation of energy from renewable sources is rapidly reducing the carbon intensity of the electricity network.

Through decarbonisation of the national electricity grid and introduction of SAP10 carbon factors within updated Building Regulations, electric heating systems are expected to deliver a higher carbon saving than gas alternatives.

The proposed care home has been designed in accordance with the Energy Hierarchy, as shown in **Figure 3**, which aims to reduce energy demand through passive design measures and a fabric first approach before utilising low carbon energy and the production of on-site renewable energy.

Figure 3: The Energy Hierarchy



The following sections set out the measures included to deliver an energy efficient, low carbon development.

Be Lean – Reducing Energy Use

Central to the delivery of low carbon and energy efficient buildings is the 'Fabric First' principle which recognises the most effective way of minimising carbon emissions is to reduce the demand for heat and power through a well-insulated, energy efficient building fabric and services.

Reducing the primary energy demand of a building through the use of an efficient fabric and services is widely regarded as best practice and is therefore

the first and most important step to reducing carbon emissions.

This 'fabric first' approach has a number of distinct benefits including:

- Carbon savings delivered are 'locked-in' for the lifetime of the building (60 years or more).
- Virtually no maintenance and/or replacement costs to maintain carbon reductions through improved fabric.
- No reliance on an occupier's behaviour to deliver carbon reductions.

The development will be required to meet Part L 2021, which requires a 27% reduction in carbon emissions beyond previous regulation (Part L 2013).

A range of measures will be implemented to reduce energy use and carbon emissions, in line with Policy DM2 of the Eastleigh Borough Local Plan. In line with BREEAM credit issue Ene 04, a Passive Design Analysis (PDA) has been undertaken by Hopkins M&E Engineers ('Hopkins'). The PDA outlines several measures which have been incorporated into the design of the buildings, as follows:

- Specification of thermal insulation and air permeability standards which exceed the minimum standards contained within Part L 2021.
- Specification of glazing with an appropriate g-value to reduce overheating from solar gain whilst allowing natural daylight.
- Mechanical Ventilation Heat Recovery (MVHR) incorporated throughout the care home.
- Highly efficient lighting, targeting 100% LED light fittings with PIR control in areas intermittently accessed such as staircases and corridors.
- Use of a Building Energy Management System (BEMS) within the care home to monitor energy usage and reduce the performance gap through detection of high energy usage.

Be Clean – Efficient Energy

The next stage of the energy hierarchy is the provision of energy efficiently, i.e. from a decentralised energy system such as a Heat Network.

District Heating Networks (DHN) comprise a centralised heat generator, typically a gas fired Combined Heat and Power (CHP) engine. CHP systems generate electricity and waste heat which can be fed into a network of insulated pipes which deliver low carbon heat to buildings to provide heating and hot water via individual heat transfer units. There are no known heat networks in the vicinity of the proposed development.

As summarised earlier, the continued decarbonisation of the national electricity network and anticipated changes to the Building Regulations mean that the carbon emission benefits of traditional CHP systems will diminish during their life cycle.

A DHN requires significant infrastructure and would need to be retrofitted in future to meet the government's net zero goals and phasing out of fossil fuels. Furthermore, there are no DHNs local to the site.

CHP and DHN therefore will not be incorporated into the development.

Be Green – Low Carbon Renewable Energy

The final stage of the Energy Hierarchy is the generation of on-site low carbon and/or renewable energy to provide a further reduction in carbon emissions.

An initial review of potential low carbon renewable energy technologies which may be suitable for inclusion in the design of the care home has been completed to reduce carbon emissions further. A summary of the technologies reviewed is provided below.

Wind Turbines

Wind turbines have been ruled out for this development due to the lack of wind speed modelled in the area.

Small Scale Hydro Power

Hydroelectric power is the generation of electric power from the movement of water. A hydroelectric facility requires a dependable flow of water and a reasonable height for the water to fall. Due to the lack of suitable nearby watercourses, this option has been discounted.

Biomass

Biomass provides useable heat from a range of solid fuels including wood and straw. The installation of a biomass boiler, flue and associated fuel store require significant space and regular deliveries and is therefore not considered appropriate for the development.

Solar Photovoltaics (PV)

Solar photovoltaic (PV) systems generate zero carbon electricity from sunlight and are well suited to buildings with unobstructed south-east to south-west facing roof space. Excess power is exported to the grid or can be harnessed using battery storage. Maintenance requirements are typically minimal.

Solar PV is suitable for the care home and could be incorporated into the design to reduce carbon emissions.

Solar Thermal

Solar thermal systems generate zero carbon hot water from sunlight in a similar manner to Solar PV. They require insulated tanks to store the hot water and have greater maintenance demands than solar PV given the need to ensure anti-freeze in the pipework is topped up every few years. This technology is likely to be feasible for the care home, however roof space may be better suited to solar PV which can meet a consistent electricity demand and require less maintenance.

Heat Pumps

Heat pumps provide low carbon heat sourced either from the ground, (ground source heat pumps, GSHPs), water (water source heat pumps, WSHPs) or air (air source heat pumps, ASHPs). They require mains electricity to operate but typically generate at around three units of heat for every unit of electricity that is consumed. Because the heat generated is at a lower temperature than that produced by a gas boiler, heat pumps typically require underfloor heating or over-sized radiators to ensure the heat is distributed efficiently.

GSHP - Due to the high capital cost associated with the boreholes for GSHP, this technology is not considered viable.

WSHP - There is no suitable watercourse nearby, therefore this technology is not considered feasible.

ASHP – The relatively minimal maintenance, efficiency and capital cost of an ASHP system means that it is suitable for incorporation into the care home's energy strategy. The heat pumps will draw from grid electricity, and deliver carbon savings due to the increasing amount of renewable in the UK power generation mix.

ASHPs will therefore be incorporated into the developing design, to supplement the hot water demand.

Be Green – Summary

The energy strategy for the proposed development is ongoing. The applicant commits to incorporating low/zero carbon energy to meet a portion of the development's energy demand either by use of ASHPs to supplement the hot water demand, and/or installation of Solar PV.

Energy and Carbon Reduction Summary

Table 2 demonstrates the anticipated operational performance of the development, taken from energy modelling completed by Hopkins (**Appendix 2**).

The modelling undertaken demonstrates that an improvement over Part L 2021 of 22% in the care home is possible, based on an energy strategy which prioritises passive design, and incorporates low and zero carbon technologies, subject to the ongoing feasibility study at detailed design. This result demonstrates that the development will be highly efficient and significantly reduce carbon emissions during operation.

These results also meet the mandatory energy performance rating to achieve BREEAM 'Excellent'.

Table 2: Energy Modelling Results

Target Emission Rate (TER) kgCO ₂ /m ² /year	Building Emission Rate (BER) kgCO ₂ /m ² /year	% Reduction in Carbon Emissions
8.45	6.6	22%

4.5.2 Climate Change Adaptation

To ensure the proposed development is resilient to the effects of climate change it will incorporate a number of key design measures in response to the climate predictions set out in the UKCP18 projections.

The Independent Assessment of UK Climate Risk (June 2021)⁸ identifies key risks associated with the effects of climate change. In relation to the built environment and the proposed development, these include reduced summer water availability, increased winter rainfall, and increased summer temperatures. For the BREEAM assessment and to address credit issue Wst 05, a Climate Change Adaptation Appraisal has been carried out for the proposed development.

This section identifies key measures which will be incorporated into the design of new buildings and

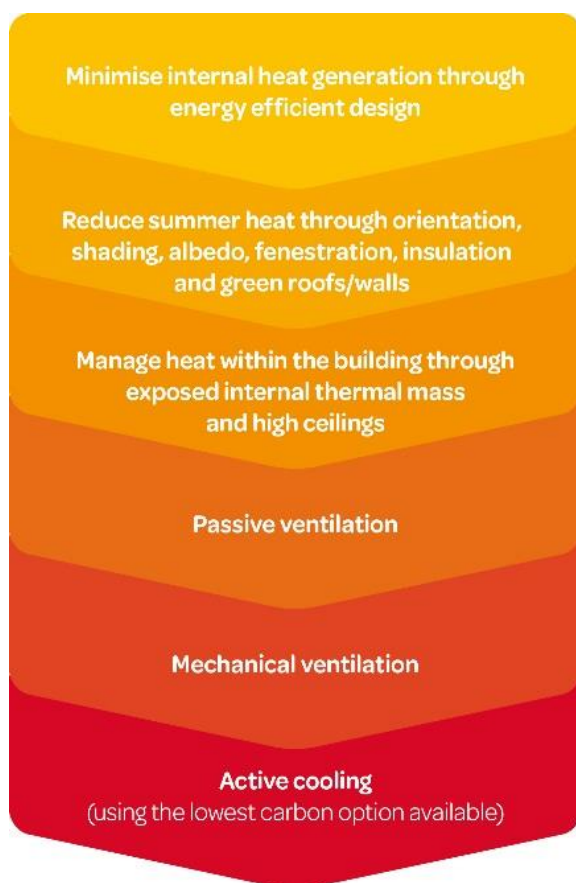
⁸ [CCC | Advice to the Government for CCRA3](#)

future climate scenarios, to assess how the care home may be affected by overheating.

To inform initial Concept Design, an Overheating Study has been undertaken by Hopkins. The study confirms that all rooms pass for current climate scenarios (according to TM59 and TM52), and highlights measures (such as in-pane blinds, solar film, and increasing openable window area) which could be retrofitted in future should any rooms fail future climatic scenarios.

The proposed care home has considered the cooling hierarchy, as shown in **Figure 5** to prioritise occupant comfort and reduce carbon emissions.

Figure 5: Cooling Hierarchy



4.6 Conserving and Enhancing the Natural Environment

The proposed development will incorporate measures to support and enhance the environment through consideration of the existing site ecology,

including measures to mitigate any impacts, and enhance site biodiversity, as well as incorporate measures to reduce pollution from the site.

4.6.1 Ecology

An Ecological Appraisal has been prepared by Tetra Tech Limited to establish the ecological status of the site and the impact of the proposed development at Moorhill Road.

Current Site Conditions

The appraisal has been informed by a Phase 1 Habitat Survey which found the site to consist of dense / scattered scrub, mixed scattered trees, poor semi-improved grassland, tall ruderal, artificial exposures, waste spoil, amenity grassland, introduced shrub, buildings and hardstanding.

Whilst the habitats on site are generally of low quality, they have potential to support great crested newt, reptiles, bats, badger, hazel dormouse, common nesting birds, invertebrates, hedgehog.

Mitigation Measures

To protect the site habitats and species, and wider area, a range of mitigation measures have been proposed and recommended. They can be summarised as follows:

- Where the retention of scrub and trees is not possible, removal of vegetation is recommended to be undertaken outside of the breeding season for birds (March-September inclusive) and supervised.
- Deadwood features should be retained.
- Produce a Construction Environmental Management Plan (CEMP) to set out measures to reduce pollution impact on nearby designated sites.
- Undertake a nutrient balancing assessment to avoid impact on the Solent and Southampton Water Special Protection Area (SPA).

Enhancement Measures

Several ecological enhancements have been proposed, which would improve the quality of the

site for native flora and fauna. These enhancement measures include:

- Inclusion of two bird boxes on newly constructed building/retained trees.
- Inclusion of two bat boxes on newly constructed building/retained trees.
- Design of a lighting strategy sensitive to impacts on bats.
- Installation of fencing with access holes to maintain commuting routes.
- Inclusion of native planting within landscape design to provide a gain for biodiversity within the site, aligning with Policy DM11 of the Eastleigh Borough Local Plan.

Biodiversity net gain calculations will be undertaken at detailed design. A minimum 10% net gain will be targeted directly on site, in line with the ecological hierarchy.

4.6.2 Pollution

The proposed development will aim to minimise any negative impacts on the natural environment considering the impacts of water use, and air quality.

Throughout construction, negative impacts will be minimised by adhering to a CEMP which will set out pollution prevention measures.

4.7 Sustainable Resources

4.7.1 Materials

A key benefit of using sustainable and natural materials, and incorporating material efficiency into new development, is reducing carbon emissions. Increasingly stringent energy efficiency and operational carbon regulations means that embodied carbon is proportionately an increased contribution to climate change. Finding ways to reduce embodied carbon associated with new development is therefore becoming increasingly important.

As part of the BREEAM strategy, an LCA of the building's superstructure, substructure and hard landscaping has been undertaken.

LCA is an evaluation of the environmental effects of a product, service or process over its entire life cycle. The assessment considers all the steps that lead from raw material to manufactured product, including extraction of the materials, energy consumption, manufacture, transportation, use, recycling, and final disposal or end of life. The assessment was undertaken using 'One Click LCA' software to estimate embodied carbon of various design scenarios.

The following measures based have been chosen to reduce the embodied carbon associated with the development:

- Loadbearing masonry walls forming the majority of the external walls.
- Timber joist roof system.

As demonstrated above, the development proposes the use of natural resources where possible, including timber and brickwork. Brick is a sustainable and relatively low carbon material selection due to its durability and lack of maintenance / replacement required throughout a building's lifetime. Furthermore, brick is entirely recyclable. Where possible, the bricks will be procured locally.

During detailed design, the LCA will be revisited to consider further measures to reduce construction carbon. At this stage, the supply chain will be further progressed and options open to the team will be better known. Such measures could include incorporation of recycled materials such as ground-granulated blast-furnace slag (GGBS) as a cement alternative within the foundations, slab and frame of the building. Furthermore, concrete and brick paving products with reduced embodied carbon may be available and will be considered.

Where possible, materials will be procured locally, to reduce carbon emissions associated with the transport of materials.

The development specification will also prioritise responsible supply chains such as those who hold FSC and BES6001 certification.

Insulation materials containing substances known to contribute to stratospheric ozone depletion or with the potential to contribute to global warming will not be used. Natural insulation materials such as mineral wool, rock wool or cork board will be considered as they are amongst the lowest Global Warming Potential (GWP) rating.

4.7.2 Construction Waste Management

Prior to the construction phase a CEMP will be developed to ensure the use of measures to minimise waste during the construction phases of the development, including the use of a scheme for recycling/disposing of waste arising from demolition and construction works. This will be approved by the Local Planning Authority prior to commencement.

The reduction, reuse and recycling of demolition and construction waste is to be prioritised through measures such as avoidance of over-ordering,

supervision of deliveries, use of secure materials storage facilities and reuse of materials onsite where feasible.

In addition, the development will be registered with the Considerate Constructors Scheme and achieve certification against the Code of Considerate Practice.

4.7.3 Operational Waste Management

The development will make provision for the storage of non-recyclable waste and recyclable waste including a dedicated external refuse store for the care home.

Full consideration will be given to the council's waste management infrastructure and services to ensure that the occupiers have the necessary infrastructure to participate in local recycling services.

The BREEAM Wst 03 Operational Waste credit is targeted, this credit requires adequate storage provision for general, recyclable and food waste.

5. Conclusion

This Sustainability Statement has been prepared to demonstrate how the proposed care home at Moorhill Road responds positively to national and local sustainable policy requirements.

The key sustainability measures incorporated at this stage and further measures to be considered during the detailed design of the proposed development have been set out within previous chapters and are summarised below.

Social and Economic Benefits

The development aims to provide a range of social and economic benefits to both new and existing residents, through:

- Provision of a high-quality residential care home to support those in the local area who require it.
- Support to the local community through increased jobs and population.
- Incorporation of sustainable transport measures to encourage active travel in the form of walking and cycling, through provision of cycle storage and facilities.
- Provision of a Travel Plan to provide staff with sustainable and safe transport options.
- Provision of a healthy and comfortable indoor and outdoor environment in line with the requirements of BREEAM Health and Wellbeing.

Environmental Protection and Enhancement

Through a range of design measures the development aims to protect and enhance the local environment. The following measures align with Local Plan Policies S9, DM2, DM6, and DM11, including:

- Provision of biodiversity enhancement measures to provide multi-functional benefits including support to protected species, climate resilience and recreation.
- Provision of measures through construction and operation of the site to reduce pollution, minimise waste and encourage recycling.

Mitigating and Adapting to Climate Change

In recognition of the climate emergency and local policies relating to climate change (predominantly Policies S1, DM2, and DM3, the development will incorporate a range of measures to reduce carbon emissions, mitigate the effects of climate change, and to ensure the long-term resilience of the development to the effects of climate change. Measures include:

- Targeting a BREEAM Excellent rating.
- Use of passive design measures, ASHPs, and solar PV to reduce grid energy demand, helping mitigate the effects of climate change and reducing carbon emissions by 22% over Part L 2021.
- Reduced emissions associated with private car travel through development in a sustainable location, with access to public transport and amenities, and provision of cycle storage.
- Encouraging electric vehicle uptake by providing three EV charging spaces, equivalent to 10% provision.
- A design which has considered the embodied carbon associated with construction materials and selected sustainable products where possible to reduce environmental impacts of construction.
- A design which reduces the risk of overheating at current and future climate scenarios.

- Targeting two credits under BREEAM Wat 01 by reducing flow rates, flush volumes, and specifying water efficient kitchen equipment.
- Development in Flood Zone 1, and incorporation of SuDS including permeable

paving, rain gardens, surface water attenuation, and below ground geo-cellular infiltration to ensure that post development surface water-run off is managed up to 1-in-100 year storm events with a 40% allowance for climate change.

Highwood Homes Limited is committed to the delivery of a sustainable, high quality care home, which provides economic and social benefits; protects and enhances the environment and mitigates and adapts to the effects of climate change.

Appendix 1 – BREEAM Pre-assessment



Moorhill Road, Southampton

BREEAM New Construction 2018 (Multi-Residential - Care Home)

Pre-assessment for Planning Submission October 2022



Key

Mandatory Credit for 'Excellent'

TARGET (>70%)	77.49%	Excellent			
Credit Summary BREEAM 2018: Multi-Residential (Fully Fitted)			Credit Ref.	Credits Available	Excellent Target
MANAGEMENT					
Credit Value 0.52%	Project Brief and Design	Project Delivery Planning	Man 01	1	1
		Stakeholder Consultation		1	1
		BREEAM Advisory Professional		1	1
				1	1
	Life Cycle Costing (LCC) and Service Life Planning	Elemental Life Cycle Cost	Man 02	2	2
		Component Life Cycle Cost		1	1
		Capital Cost Reporting		1	1
	Responsible Construction Practices	Legally harvested and traded timber - Pre-requisite	Man 03	-	Y
		Environmental Management		1	0
		Sustainability Champion		1	1
		Responsible Construction Management		2	2
		Monitoring of Construction Site Impacts		2	2
	Commissioning and Handover	Commissioning and Testing Schedule and Responsibilities	Man 04	1	1
		Commissioning Building Services		1	1
		Testing and Inspecting Building Fabric		1	1
		Handover (Building User Guide mandatory)		1	1
	Aftercare	Aftercare Support	Man 05	1	1
		Commissioning - Implementation		1	1
		Post Occupancy Evaluation		1	1
Section Credit Total				21	20
Weighted Section Total				11%	10.48%

HEALTH & WELLBEING						
Credit Value 0.74%	Visual Comfort	Glare control	Hea 01	1	1	
		Daylight factors		2	0	
		View Out		1	0	
		Internal and External Lighting Levels		1	1	
	Indoor Air Quality	Indoor Air Quality Pre-Requisite	Hea 02	-	Y	
		Ventilation		1	0	
		Emissions from Construction Products		2	1	
		Post Construction Indoor Air Quality Management		1	1	
	Thermal Comfort	Thermal modelling	Hea 04	1	1	
		Adaptability for projected climate change scenario		1	1	
		Thermal Zoning and Controls		1	1	
	Acoustic Performance	Sound Insulation	Hea 05	2	0	
		Indoor Ambient Noise Levels		1	1	
		Room Acoustics		1	1	
	Security		Hea 06	1	1	
	Safe and Healthy Surroundings	Safe access	Hea 07	1	0	
		Outside Space		1	1	
Section Credit Total				19	11	
Weighted Section Total				14%	8.11%	
ENERGY						
Credit Value 0.70%	Reduction of Energy Use and Carbon Emissions	Energy Performance Ratio	Ene 01	9	5	
		Prediction of Operational Energy Consumption		4	4	
	Energy Monitoring	Sub-metering End-Use Categories	Ene 02	1	1	
		Sub-metering of High Energy Load and Tenancy Areas		1	1	
	External Lighting		Ene 03	1	1	
	Low Carbon Design	Passive Design Analysis (PDA)	Ene 04	1	1	
		Free Cooling		1	0	
		Low and Zero Carbon Feasibility Study		1	1	
	Energy Efficient Transportation Systems	Energy Consumption	Ene 06	1	1	
		Energy Efficient Features		1	1	
	Energy Efficient Equipment		Ene 08	2	2	
	Section Credit Total				23	18
	Weighted Section Total				16%	12.52%
TRANSPORT						
Credit Value 0.83%	Transport Assessment and Travel Plan		Tra 01	2	2	
	Sustainable Transport Measures		Tra 02	10	6	
Section Credit Total				12	8	
Weighted Section Total				10.0%	6.67%	

WATER					
Credit Value 0.78%	Water Consumption (1 credit mandatory)		Wat 01	5	2
	Water Monitoring		Wat 02	1	1
	Water Leak Detection & Prevention	Leak Detection System	Wat 03	1	1
		Flow Control Devices		1	1
	Water Efficient Equipment		Wat 04	1	1
Section Credit Total				9	6
Weighted Section Total				7%	4.67%
MATERIALS					
Credit Value 1.07%	Environmental Impacts from Construction Products - Building Life Cycle Assessment (LCA)		Mat 01	7	7
	Environmental Impacts from Construction Products - Environmental Product Declarations (EPD)		Mat 02	1	0
	Responsible Sourcing of Construction Products	Pre-requisite - Legal and Sustainable Timber	Mat 03	-	Y
		Enabling Sustainable Procurement		1	1
		Measuring Responsible Sourcing		3	3
	Designing for Durability and Resilience		Mat 05	1	1
	Material Efficiency		Mat 06	1	0
Section Credit Total				14	12
Weighted Section Total				15.0%	12.86%
WASTE					
Credit Value 0.60%	Construction Waste Management	Pre-Demolition Audit	Wst 01	1	1
		Construction Resource Efficiency		3	1
		Diversion of Resources from Landfill		1	1
	Use of Recycled and Sustainably Sourced Aggregates		Wst 02	1	0
	Operational Waste		Wst 03	1	1
	Adaptation to Climate Change		Wst 05	1	1
	Design for Disassembly and Adaptability		Wst 06	2	2
Section Credit Total				10	7
Weighted Section Total				6.0%	4.20%
LAND USE & ECOLOGY					
Credit Value 1.00%	Site Selection	Previously Developed Land	LE 01	1	0
		Contaminated Land		1	0
	Ecological Risks and Opportunities	Survey and Evaluation	LE 02	1	1
		Determining Ecological Outcomes		1	1
	Managing Negative Impacts on Ecology	Prerequisite - Ecological risks and Opportunities	LE 03	-	Y
		Planning and Measures On-site		1	1
		Managing Negative Impacts		2	1
	Ecological Change and Enhancement	Prerequisite - Managing Negative Impacts on Ecology	LE 04	-	Y
		Ecological Enhancement		1	1
		Change and Enhancement of Ecology		3	1

	Long Term Ecological Management and Maintenance	Prerequisite - Statutory Obligations, Planning and Site Implementation	LE 05	-	Y
		Management and Maintenance throughout the Project		1	1
		Landscape and Ecology Management Plan		1	1
Section Credit Total				13	8
Weighted Section Total				13%	8.00%
POLLUTION					
Credit Value 0.67%	Impact of Refrigerants	Prerequisite	Pol 01	-	
		Impact of Refrigerants		2	0
		Leak Detection		1	0
	Local Air Quality		Pol 02	2	2
	Surface Water Run Off	Low Flood Risk	Pol 03	2	2
		Surface Water Run-Off - Rate		1	1
		Surface water Run-Off - Volume		1	1
		Minimise watercourse pollution		1	1
	Reduction of Night Time Light Pollution		Pol 04	1	1
	Reduction of Noise Pollution		Pol 05	1	1
Section Credit Total				12	9
Weighted Section Total				8%	6.00%
INNOVATION					
Credit Value 1.00%	Man 03 Responsible Construction Practices			1	1
	Hea 01 Visual Comfort			2	0
	Hea 06 Security			1	0
	Ene 01 Beyond Zero Net Regulated Carbon			3	0
	Ene 01 Post Occupancy Stage			2	2
	Wat 01 Water Consumption			1	0
	Mat 01 Life Cycle Impacts			3	1
	Mat 03 Responsible Sourcing of Materials			1	0
	Wst 01 Construction Waste Management			1	0
	Wst 02 Recycled Aggregates			1	0
	Wst 05 Adaptation to climate change			1	0
	LE 02 Ecological Risks and Opportunities			1	0
	LE 04 Ecological Change and Enhancement			1	0
Section Credit Total				19	4
Weighted Section Total				19%	4%
Disclaimer	It should be noted therefore that this score is indicative only at this stage and must be reviewed throughout design development as well as audited by the BRE to confirm the final rating.		TARGET RATING		77.49%

Appendix 2 –Energy Modelling



In partnership with

Hopkins
Mechanical • & Electrical Engineers

Moorhill Care Home

ADL2A 2013 “as designed” Compliance Report

Design Stage Report

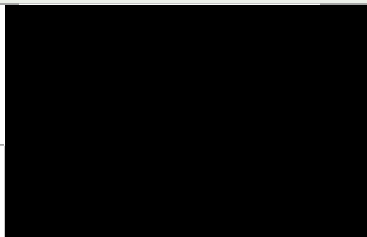
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Document Number: 20975.R01 ADL2A 2013 "as designed" Compliance Report		Revision	A
	Name	Signature	Date
Author	Keith Franklin		13/09/2022
Checked	Damian Markham-Smith CIBSE LCEA 41943		13/09/2022

Revision Record					
Rev	Date	By	Summary of Changes	Ckd	Appr
A	19/01/2021	KF	Update for 2021 regulations	DMS	DMS

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EXECUTIVE SUMMARY

This report discusses the findings of an “as designed” ADL Vol 2 2021 calculation for Moorhill Care Home.

The objective of this study is to highlight the design requirements in order to achieve compliance under ADL 2021, for criterion 1 (limiting CO₂ emission levels) and criterion 3 (control of solar gain).

To assess the performance of the proposed new building design a dynamic thermal modelling software suite (IES <VE> Pro) has been used to predict the building emissions. Work has been conducted and checked by CIBSE accredited Low Carbon Energy Assessors.

Modelling has been carried out based on the drawings provided. The outline design efficiencies have been agreed with Hopkins.

The building achieves the design requirements for ADL Vol 2 2021 in relation to criterion 1 and criterion 3. The full BRUKL certificate is provided within the Appendix.

The detail design team will need to review and undertake their own calculations to confirm and incorporate any design development. If not specified, the design must conform to all requirements of the building regulations.

The proposed building achieves five ENE01 BREEAM credits under 2018 based on an estimate using the 2013 simulation, this need to be confirmed by an accredited BREEAM assessor.

This report outlines that the strategy can achieve compliance; during detail design this assessment needs to be reviewed and worked up as part of the design development.

INTRODUCTION

The building is a three-storey block care home with an area of 3,777 m². The accommodation consists of bedrooms with bathrooms and shared dinning and lounge facilities along with associated ancillary spaces.

The building is undertaken under the 2021 regulations.

The building is independent in terms of structure and services and as such is assessed under ADL Vol 2 2021.

This section of the report summarises the design criteria for the building fabric and services, used in the calculation to show compliance. If not detailed, the building regulations should be used to detail the minimum design standards.

OUR APPROACH

To assess the performance of the proposed new building design a dynamic thermal modelling software suite (IES <VE> Pro) has been used, which runs a specific accredited simulation for L2A studies. Studies provide detailed temperature profiles for each space throughout the assessment period. Ventilation, solar shading and load profiles are considered in detail.

Modelling has been carried out for all occupied spaces using appropriate hourly weather data, Southampton TRY, stipulated by the CL2.1 SBEM weather locations lookup spread sheet. The NCM templates set levels for internal gains, heating, cooling, ventilation and infiltration losses. The model is then adapted with the variable modelling parameters as per the initial design drawings provided, within the constraints of the L2A methodology.

The IES <VE> ApacheSim software, supported by the Suncast and Macroflo modules, is compliant with the requirements of CIBSE Application Manual AM11 and meets the requirements laid out in BREEAM.

Input parameters including building orientation, geometry and thermo-physical data for the main construction elements have been specified in accordance with the description provided by the design team.

All parameters should be reviewed and signed-off. Should any amendments be required then these can be included within a revision exercise

MODEL IMAGES



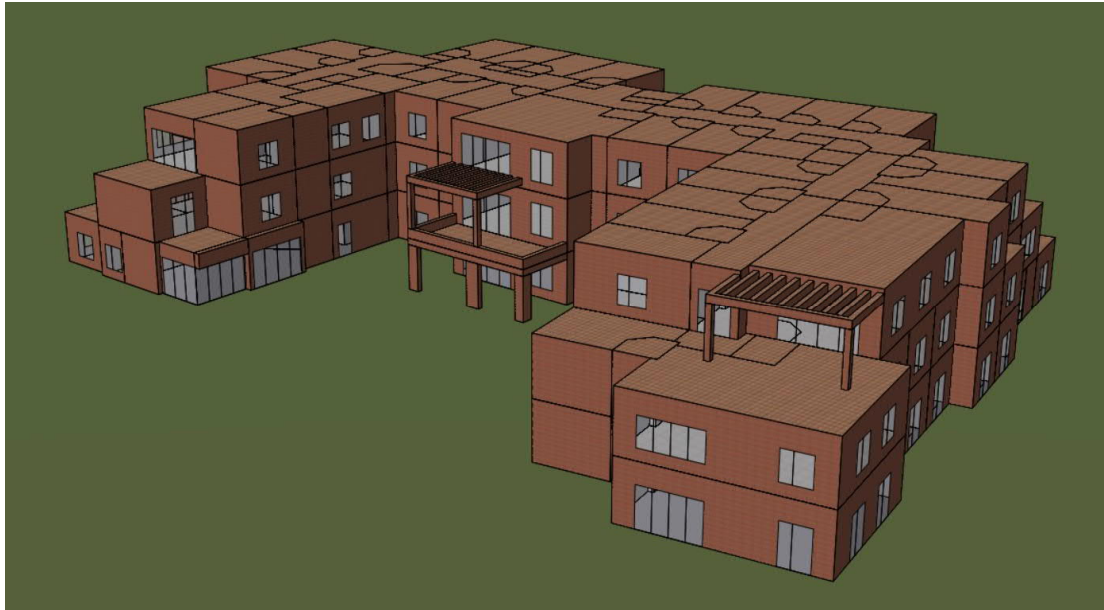


Figure 1 – Model images

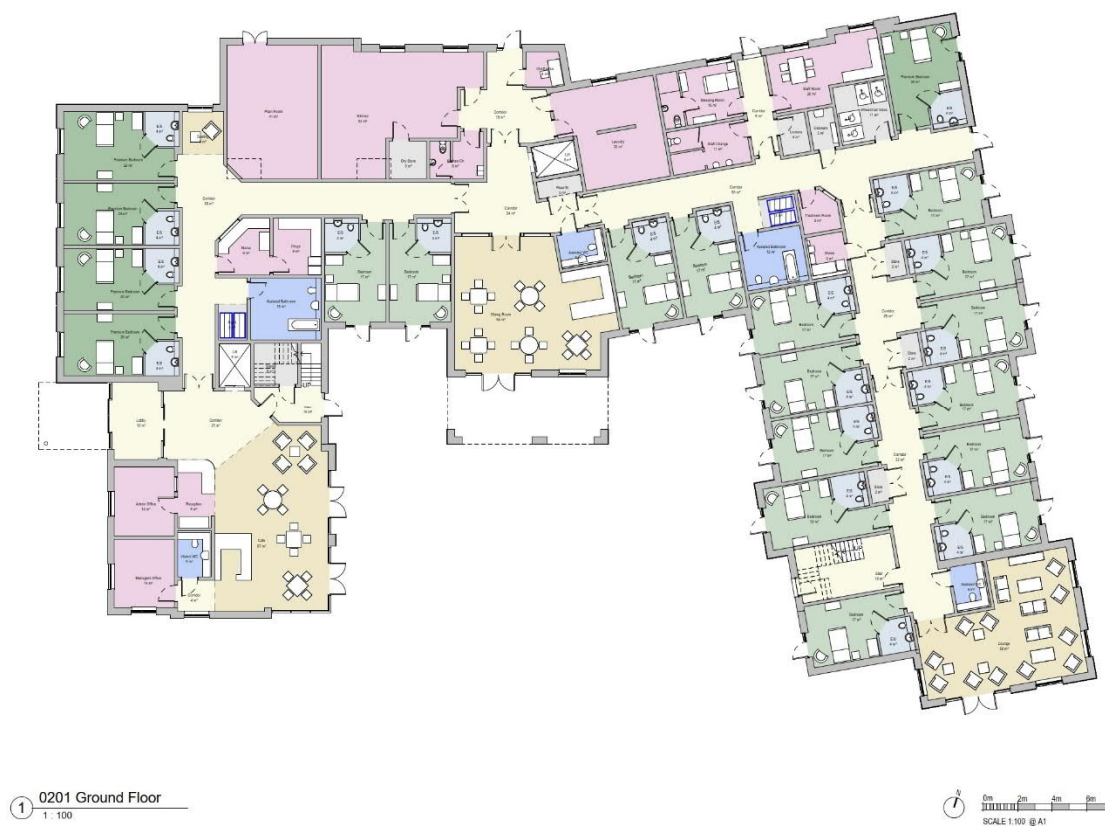


Figure 2 - Orientation, North in line with the page towards the top.

MODEL CONSTRUCTION INFORMATION

The model has been based on the following plans provided by Hopkins on the 28/07/2022:

- 3127-HIA-01-00-DR-A-0202-Proposed Ground Floor Plan-S3-P3
- 3127-HIA-01-01-DR-A-0211-Proposed First Floor Plan-S3-P3
- 3127-HIA-01-01-DR-A-0221-Proposed Second Floor Plan-S3-P3

And additional information from sections and elevations:

- 3127-HIA-01-XX-DR-A-0301-General Arrangement Elevations - West and South Elevations-S3-P4
- 3127-HIA-01-XX-DR-A-0302-General Arrangement Elevations - East and North Elevations-S3-P2
- 3127-HIA-01-XX-DR-A-0303-General Arrangement Elevations - Courtyard Elevations-S3-P2

Information was also gleaned from the Revit model

- 3127-HIA-01-XX-M3-A-0002-CARE HOME-S3-P7

LOCATION

This project uses the location of Southampton weather centre, this being the most appropriate location to the site on Moorhill Road, West End, Southampton. The Part L study uses the Southampton_TRY weather file.

BUILDING FABRIC

The constructions assigned to the model have the basic properties as agreed with Hopkins:

EXTERNAL OPAQUE ELEMENTS

Element	Description	Thermal Mass, Cm	U-value
External walls	Brick or tile, insulation, block, plasterboard	145	0.19
Floor	Concrete, insulation, screed, carpet	95	0.17
Flat Roof	Plaster ceiling, insulation, waterproof, wooden deck, finish	10	0.15
Panelling in windows	Panels	4	1.25
Wooden Door		23	2.19

Table 1 – U-values for opaque elements

GLAZING TO WINDOWS/ ROOFLIGHTS/ DOORS

Element	Description	U-value (Net inc. frame) W/m ² /K	g-factor	Blinds	Solar Shading
Windows	Double Glazing 10 to 40% Frame *	1.12	0.4	None	None
Glazed Door	Double Glazing 10 to 40% Frame *	1.12	0.4	None	None
Internal Glazing to Lobby	Single Glazing 10% Frame	3.7	0.88	None	None

Table 2 – Glazing properties

* Frame percentage taken from elevations provided by Hopkins by e-mail on 28/07/2022

INTERNAL OPAQUE ELEMENTS

Element	Description	Thermal Mass, Cm	U-value
Internal Wall	Plaster, block, plaster	76	1.71
Internal Floor	Plaster ceiling, cavity, concrete, carpet	10	1.36

Table 3 – U-values for opaque elements

AIR PERMEABILITY

Air Permeability	Method	m ³ / m ² hr @ 50Pa	ach
AP target	Guide TM23	4	0.059

Table 4 – Air permeability

SYSTEM DESCRIPTION

System descriptions as agreed with Hopkins. The following table demonstrates the systems strategies.

Room Type	Ventilation Type	Heating / Cooling Type	DHW
Plant	NV	None	ASHP DHW
Store	NV	None	ASHP DHW
Store Hoist	NV	None	ASHP DHW
Store Linen	NV	None	ASHP DHW
Store Lockers	NV	None	ASHP DHW
Void	NV	None	ASHP DHW
Void Lift	NV	None	ASHP DHW
Void Riser	NV	None	ASHP DHW
Bedroom Premium	NV	LTHW Rads	ASHP DHW
Bedroom Sleeping room	NV	LTHW Rads	ASHP DHW
Circ Lobby	NV	LTHW Rads	ASHP DHW
Circ Stair	NV	LTHW Rads	ASHP DHW
Office Admin	NV	LTHW Rads	ASHP DHW
Office Manager	NV	LTHW Rads	ASHP DHW
Circ Corridor	MVHR	LTHW Rads	ASHP DHW
Laundry	MVHR	LTHW Rads	ASHP DHW
Lounge Small	MVHR	LTHW Rads	ASHP DHW
Nurse	MVHR	LTHW Rads	ASHP DHW
Office Chef	MVHR	LTHW Rads	ASHP DHW
Seating	MVHR	LTHW Rads	ASHP DHW
Reception	MVHR	LTHW Rads	ASHP DHW
Dining	MVHR	LTHW Rads	ASHP DHW
Staffroom	Extract	LTHW Rads	ASHP DHW
Bathroom Assisted	Extract	LTHW Rads	ASHP DHW
Change	Extract	LTHW Rads	ASHP DHW
Ensuite	Extract	LTHW Rads	ASHP DHW
Sluice	Extract	LTHW Rads	ASHP DHW
WC	Extract	LTHW Rads	ASHP DHW
WC Assisted	Extract	LTHW Rads	ASHP DHW
Store Wheelchair	Extract	None	ASHP DHW
Store Cleaners	Extract	None	ASHP DHW
Hair Salon	MVHR	LTHW Rads & Cooling	ASHP DHW
Activity	MVHR	LTHW Rads & Cooling	ASHP DHW
Cafe	MVHR	LTHW Rads & Cooling	ASHP DHW
Cinema	MVHR	LTHW Rads & Cooling	ASHP DHW
Lounge	MVHR	LTHW Rads & Cooling	ASHP DHW
Drugs	Extract	VRF Cooling/Heating	ASHP DHW
Kitchen	Supply & Extract	LTHW Coil	ASHP DHW
Store Dry	Supply	LTHW Coil	ASHP DHW

Table 5 - Heating and ventilation strategies

MECHANICAL SYSTEM EFFICIENCIES

System efficiencies as agreed with Hopkins

Ventilation System	SFP, W/l/s	Heat Exchange %
MVHR	1.1	80
Remote Extract Ventilation	0.3	N/A
Ensuite Extract Ventilation	0.11	N/A
Supply Only	0.4	N/A
Kitchen Supply & Extract	1.1	N/A
Cooling System	SEER	EER
	4.8	4
Heating System	SCOP	
	3.9	

Table 6 - Mechanical system efficiencies

Heat generated from ASHP for heating system with central time control, optimum start/stop, local temperature and weather compensation.

All pumps to be inverter driven, with sensors across pump.

Radiator systems to have local control through TRV.

Hot Water System	Delivery efficiency	Storage, l	Storage Losses, kW/l/day	Pipework Losses, W/m	DHWS secondary Pump power, kW	Loop length, m
HWS	1	1000	0.0075	8	0.15	250

Table 7 – Hot water system efficiencies

The hot water system is heated from an ASHP with a COP of 3.5 doing 100% of the load.

ELECTRICAL SYSTEM EFFICIENCIES

Power correction factor greater than 0.95

Room Type	Lighting level	Efficacy lm/W	LOR	Control
Plant	200	104	1	Manual
Store	150	108	1	PIR
Store Dry	150	108	1	PIR
Store Hoist	150	108	1	PIR
Store Linen	150	108	1	PIR
Store Lockers	150	108	1	PIR
Store Wheelchair	150	108	1	PIR
Void	None	None	None	None
Void Lift	None	None	None	None
Void Riser	None	None	None	None
Bedroom Standard/ Premium	300	111	1	Manual
Bedroom Sleeping room	300	111	1	Manual
Circ Lobby	150	110	1	Manual
Circ Stair	150	104	1	PIR
Office Admin	400	111	1	Abs
Office Manager	400	111	1	Abs
Staffroom	400	106	1	Abs
Circ Corridor	150	110	1	Manual
Laundry	400	104	1	Abs
Nurse	400	111	1	Abs
Office Chef	400	111	1	Abs
Seating	200	103	1	Manual
Bathroom Assisted	200	111	1	PIR
Change	200	106	1	PIR
Ensuite	200	117	1	PIR
Sluice	450	104	1	PIR
WC	200	106	1	PIR
WC Assisted	200	106	1	PIR
Store Cleaners	150	108	1	PIR
Activity	300	103	1	Abs
Cafe	300	110	1	Manual
Cinema	200	103	1	Abs
Dining	200	103	1	Abs
Hair Salon	450	111	1	Abs
Lounge	200	103	1	Abs
Reception	300	100	1	Manual
Drugs	450	104	1	Abs
Kitchen	500	104	1	Manual

Table 8 - Lighting gains and control

Parasitic power of occupancy not to exceed 0.1 W/m².

It is assumed that the metering will be in line with TM39 and that lighting will be sub-metered.

Display lighting with a minimum efficacy of 100 lm and time switching

RENEWABLES

There is a renewable system which is proposed is a PV system, modelled with the following outputs:

System	Output, kWh
PV	43,650

Table 9 – Renewable systems

The ASHP is also a renewable and is detailed in the mechanical system efficiencies section earlier.

RESULTS

The images below show the results from the BRUKL certificate, for the full certificate see the end of the report.

The CO₂ emission and primary energy rates of the building must not exceed the targets

Target CO ₂ emission rate (TER), kgCO ₂ /m ² annum	8.45
Building CO ₂ emission rate (BER), kgCO ₂ /m ² annum	6.6
Target primary energy rate (TPER), kWh/m ² annum	91.13
Building primary energy rate (BPER), kWh/m ² annum	70.32
Do the building's emission and primary energy rates exceed the targets?	BER =< TER BPER =< TPER

Figure 3 - Criterion 1

The spaces in the building should have appropriate passive control measures to limit solar gains in summer

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
0 00 Bedroom 02	NO (-62.3%)	NO
0 00 Bedroom 03	NO (-69.4%)	NO
0 00 Bedroom 04	NO (-69.4%)	NO
0 00 Bedroom 05	NO (-60.2%)	NO
0 00 Bedroom 06	NO (-60.2%)	NO
0 00 Bedroom 07	NO (-64.7%)	NO
0 00 Bedroom 08	NO (-79.2%)	NO
0 00 Bedroom 09	NO (-76.3%)	NO
0 00 Bedroom 10	NO (-66.9%)	NO
0 00 Bedroom 11	NO (-68.9%)	NO
0 00 Bedroom 12	NO (-66.3%)	NO
0 00 Bedroom 13	NO (-72.8%)	NO
0 00 Bedroom 14	NO (-70.4%)	NO
0 00 Bedroom 15	NO (-75%)	NO
0 00 Bedroom 16	NO (-72.3%)	NO
0 00 Bedroom Premium 01	NO (-83%)	NO
0 00 Bedroom Premium 17	NO (-79.3%)	NO
0 00 Bedroom Premium 18	NO (-61.7%)	NO
0 00 Bedroom Premium 19	NO (-61.7%)	NO
0 00 Bedroom Premium 20	NO (-84.2%)	NO
0 00 Cafe	NO (-34.7%)	NO
0 00 Dining Room	NO (-83.8%)	NO
0 00 Drugs	N/A	N/A
0 00 Lounge	NO (-51.5%)	NO
0 00 Nurse	N/A	N/A
0 00 Nurse 1	N/A	N/A
0 00 Office Admin	NO (-67.9%)	NO
0 00 Office Chef	N/A	N/A

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
0 00 Office Manager	NO (-66.3%)	NO
0 00 Reception	N/A	N/A
0 00 Seating	NO (-78.3%)	NO
0 00 Sleeping Room	NO (-74.4%)	NO
0 00 Staff Room	NO (-75.5%)	NO
1 00 Bedroom 21	NO (-87.1%)	NO
1 00 Bedroom 22	NO (-69.7%)	NO
1 00 Bedroom 23	NO (-76%)	NO
1 00 Bedroom 24	NO (-76.1%)	NO
1 00 Bedroom 25	NO (-68.8%)	NO
1 00 Bedroom 26	NO (-68.7%)	NO
1 00 Bedroom 27	NO (-71.3%)	NO
1 00 Bedroom 28	NO (-83%)	NO
1 00 Bedroom 29	NO (-79.4%)	NO
1 00 Bedroom 30	NO (-69.6%)	NO
1 00 Bedroom 31	NO (-71.8%)	NO
1 00 Bedroom 32	NO (-69.5%)	NO
1 00 Bedroom 33	NO (-75.7%)	NO
1 00 Bedroom 34	NO (-72.7%)	NO
1 00 Bedroom 35	NO (-77.2%)	NO
1 00 Bedroom 36	NO (-74.6%)	NO
1 00 Bedroom 41	NO (-88.5%)	NO
1 00 Bedroom 42	NO (-77.9%)	NO
1 00 Bedroom 43	NO (-79.1%)	NO
1 00 Bedroom 44	NO (-77.9%)	NO
1 00 Bedroom 45	NO (-80.8%)	NO
1 00 Bedroom 46	NO (-76.6%)	NO
1 00 Bedroom 47	NO (-76.3%)	NO
1 00 Bedroom 48	NO (-76.4%)	NO
1 00 Bedroom Premium 37	NO (-81.1%)	NO
1 00 Bedroom Premium 38	NO (-62.7%)	NO
1 00 Bedroom Premium 39	NO (-68.4%)	NO
1 00 Bedroom Premium 40	NO (-84.2%)	NO
1 00 Cinema	NO (-53.3%)	NO
1 00 Dining Room	NO (-65.3%)	NO
1 00 Drugs	N/A	N/A
1 00 Hair Salon	NO (-41.1%)	NO
1 00 Lounge 1	NO (-67.1%)	NO
1 00 Lounge 2	NO (-64.8%)	NO
1 00 Lounge 3	NO (-71%)	NO
1 00 Nurse	N/A	N/A
1 00 Nurse 1	N/A	N/A
1 00 Seating	NO (-78.1%)	NO
2 00 Activity	NO (-26%)	YES
2 00 Bedroom 49	NO (-79.9%)	NO
2 00 Bedroom 50	NO (-70.6%)	NO
2 00 Bedroom 51	NO (-80.7%)	NO
2 00 Bedroom 52	NO (-63.6%)	NO
2 00 Bedroom 53	NO (-63.5%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
2 00 Bedroom 54	NO (-64.5%)	NO
2 00 Bedroom 55	NO (-60.6%)	NO
2 00 Bedroom 56	NO (-69.9%)	NO
2 00 Bedroom 57	NO (-67.2%)	NO
2 00 Bedroom 58	NO (-72.4%)	NO
2 00 Bedroom 59	NO (-69.2%)	NO
2 00 Bedroom 60	NO (-81.8%)	NO
2 00 Bedroom 61	NO (-61.7%)	NO
2 00 Bedroom 62	NO (-82%)	NO
2 00 Bedroom 63	NO (-89.5%)	NO
2 00 Bedroom 64	NO (-77.9%)	NO
2 00 Bedroom 65	NO (-79.1%)	NO
2 00 Bedroom 66	NO (-89.5%)	NO
2 00 Bedroom 67	NO (-86.9%)	NO
2 00 Bedroom 68	NO (-76.2%)	NO
2 00 Bedroom 69	NO (-76.2%)	NO
2 00 Bedroom 70	NO (-77.2%)	NO
2 00 Dining Room	NO (-56.9%)	NO
2 00 Drugs	N/A	N/A
2 00 Lounge	NO (-63%)	NO
2 00 Nurse	N/A	N/A
2 00 Nurse 1	N/A	N/A

Figure 4 - Criterion 3

CONCLUSION

The building achieves the design requirements for ADL Vol 2 2021 in relation to criterion 1 and criterion 3.

The proposed building achieves five ENE01 BREEAM credits under 2018 based on an estimate using the 2013 simulation, this need to be confirmed by an accredited BREEAM assessor.

This report outlines that the strategy can achieve compliance; during detail design this assessment needs to be reviewed and worked up as part of the design development.

APPENDIX 1 – MOORHILL CARE HOME BASE DESIGN BRUKL CERTIFICATE

Project name

230118 20975 Part L 2021 PV ASHP**As designed**

Date: Wed Jan 18 08:33:03 2023

Administrative information

Building Details

Address: Moorhill Road, Southampton,

Certifier details

Name: HDSgreentech Ltd LCEA 41943

Telephone number: 07738 946988

Address: The Old Dairy, 8 Blackfield Road, Fawley, SO45 1ED

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.18

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.18

BRUKL compliance module version: v6.1.d.0

Foundation area [m²]: 1208.8The CO₂ emission and primary energy rates of the building must not exceed the targets

Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum	8.45
Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	6.6
Target primary energy rate (TPER), kWh/m ² .annum	91.13
Building primary energy rate (BPER), kWh/m ² .annum	70.32
Do the building's emission and primary energy rates exceed the targets?	BER ≤ TER BPER ≤ TPER

The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

Fabric element	U _{a-Limit}	U _{a-Calc}	U _{i-Calc}	First surface with maximum value
Walls*	0.26	0.19	0.19	0000003B:Surf[1]
Floors	0.18	0.17	0.17	0000003B:Surf[0]
Pitched roofs	0.16	-	-	No pitched roofs in building
Flat roofs	0.18	0.15	0.15	00000020:Surf[1]
Windows** and roof windows	1.6	1.12	1.12	0000002A:Surf[1]
Rooflights***	2.2	-	-	No roof lights in building
Personnel doors [^]	1.6	2.2	2.2	0000004A:Surf[1]
Vehicle access & similar large doors	1.3	-	-	No vehicle access doors in building
High usage entrance doors	3	-	-	No high usage entrance doors in building

U_{a-Limit} = Limiting area-weighted average U-values [W/(m²K)]U_{i-Calc} = Calculated maximum individual element U-values [W/(m²K)]U_{a-Calc} = Calculated area-weighted average U-values [W/(m²K)]

* Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows.

** Display windows and similar glazing are excluded from the U-value check. *** Values for rooflights refer to the horizontal position.

[^] For fire doors, limiting U-value is 1.8 W/m²K

NB: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.

Air permeability	Limiting standard	This building
m ³ /(h.m ²) at 50 Pa	8	3

Building services

For details on the standard values listed below, system-specific guidance, and additional regulatory requirements, refer to the Approved Documents.

Whole building lighting automatic monitoring & targeting with alarms for out-of-range values	NO
Whole building electric power factor achieved by power factor correction	>0.95

1- _MH 03 Extract & LTHW Rads

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.9	-	0.2	-	-
Standard value	2.5*	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.					

2- _MH 01 NV & LTHW Rads

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.9	-	0.2	-	-
Standard value	2.5*	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.					

3- _MH 05 MVHR & LTHW Rads (VRV Cool)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.9	-	0.2	-	0.8
Standard value	2.5*	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.					

4- _MH 02 MVHR & LTHW Rads

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.9	-	0.2	-	0.8
Standard value	2.5*	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.					

5- _MH 06 Extract & VRV System

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.9	4.8	0	-	0.65
Standard value	2.5*	5	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.					

6- _MH 07 Supply & Extract & LTHW Coil Air

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.9	-	-	1.2	-
Standard value	2.5*	N/A	N/A	1.5^	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.					
^ Limiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.					

1- _MH 20 ASHP DHW

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	3.5	0.008
Standard value	1	N/A

Zone-level mechanical ventilation, exhaust, and terminal units

ID	System type in the Approved Documents
A	Local supply or extract ventilation units
B	Zonal supply system where the fan is remote from the zone
C	Zonal extract system where the fan is remote from the zone
D	Zonal balanced supply and extract ventilation system
E	Local balanced supply and extract ventilation units
F	Other local ventilation units
G	Fan assisted terminal variable air volume units
H	Fan coil units
I	Kitchen extract with the fan remote from the zone and a grease filter

NB: Limiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.

Zone name	SFP [W/(l/s)]										HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I		Zone	Standard
Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1			
0 00 Cafe	-	-	-	0.8	-	-	-	-	-	-	-	N/A
0 00 Corridor 1	-	-	-	0.8	-	-	-	-	-	-	-	N/A
0 00 Corridor 2	-	-	-	0.8	-	-	-	-	-	-	-	N/A
0 00 Corridor 3	-	-	-	0.8	-	-	-	-	-	-	-	N/A
0 00 Corridor 4	-	-	-	0.8	-	-	-	-	-	-	-	N/A
0 00 Corridor 5	-	-	-	0.8	-	-	-	-	-	-	-	N/A
0 00 Corridor 6	-	-	-	0.8	-	-	-	-	-	-	-	N/A
0 00 Corridor 7	-	-	-	0.8	-	-	-	-	-	-	-	N/A
0 00 Corridor 8	-	-	-	0.8	-	-	-	-	-	-	-	N/A
0 00 Corridor 9	-	-	-	0.8	-	-	-	-	-	-	-	N/A
0 00 Dining Room	-	-	-	0.8	-	-	-	-	-	-	-	N/A
0 00 Kitchen	-	-	-	-	-	-	-	-	0.3	-	-	N/A
0 00 Laundry	-	-	-	0.8	-	-	-	-	-	-	-	N/A
0 00 Lounge	-	-	-	0.8	-	-	-	-	-	-	-	N/A
0 00 Nurse	-	-	-	0.8	-	-	-	-	-	-	-	N/A
0 00 Nurse 1	-	-	-	0.8	-	-	-	-	-	-	-	N/A
0 00 Office Chef	-	-	-	0.8	-	-	-	-	-	-	-	N/A
0 00 Reception	-	-	-	0.8	-	-	-	-	-	-	-	N/A
0 00 Seating	-	-	-	0.8	-	-	-	-	-	-	-	N/A
1 00 Cinema	-	-	-	0.8	-	-	-	-	-	-	-	N/A
1 00 Corridor 1	-	-	-	0.8	-	-	-	-	-	-	-	N/A
1 00 Corridor 2	-	-	-	0.8	-	-	-	-	-	-	-	N/A
1 00 Corridor 3	-	-	-	0.8	-	-	-	-	-	-	-	N/A
1 00 Corridor 4	-	-	-	0.8	-	-	-	-	-	-	-	N/A
1 00 Corridor 5	-	-	-	0.8	-	-	-	-	-	-	-	N/A
1 00 Corridor 6	-	-	-	0.8	-	-	-	-	-	-	-	N/A
1 00 Corridor 7	-	-	-	0.8	-	-	-	-	-	-	-	N/A

Zone name	SFP [W/(l/s)]									HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I		
Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1	Zone	Standard
1 00 Dining Room	-	-	-	0.8	-	-	-	-	-	-	N/A
1 00 Hair Salon	-	-	-	0.8	-	-	-	-	-	-	N/A
1 00 Lounge 1	-	-	-	0.8	-	-	-	-	-	-	N/A
1 00 Lounge 2	-	-	-	0.8	-	-	-	-	-	-	N/A
1 00 Lounge 3	-	-	-	0.8	-	-	-	-	-	-	N/A
1 00 Nurse	-	-	-	0.8	-	-	-	-	-	-	N/A
1 00 Nurse 1	-	-	-	0.8	-	-	-	-	-	-	N/A
1 00 Seating	-	-	-	0.8	-	-	-	-	-	-	N/A
2 00 Activity	-	-	-	0.8	-	-	-	-	-	-	N/A
2 00 Corridor 1	-	-	-	0.8	-	-	-	-	-	-	N/A
2 00 Corridor 2	-	-	-	0.8	-	-	-	-	-	-	N/A
2 00 Corridor 3	-	-	-	0.8	-	-	-	-	-	-	N/A
2 00 Corridor 4	-	-	-	0.8	-	-	-	-	-	-	N/A
2 00 Corridor 5	-	-	-	0.8	-	-	-	-	-	-	N/A
2 00 Corridor 6	-	-	-	0.8	-	-	-	-	-	-	N/A
2 00 Corridor 7	-	-	-	0.8	-	-	-	-	-	-	N/A
2 00 Dining Room	-	-	-	0.8	-	-	-	-	-	-	N/A
2 00 Lounge	-	-	-	0.8	-	-	-	-	-	-	N/A
2 00 Nurse	-	-	-	0.8	-	-	-	-	-	-	N/A
2 00 Nurse 1	-	-	-	0.8	-	-	-	-	-	-	N/A

General lighting and display lighting		General luminaire	Display light source	
Zone name		Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m²]
	Standard value	95	80	0.3
0 00 Assisted Bathroom 2		111	-	-
0 00 Bathroom Assisted 1		111	-	-
0 00 Bedroom 02		111	-	-
0 00 Bedroom 03		111	-	-
0 00 Bedroom 04		111	-	-
0 00 Bedroom 05		111	-	-
0 00 Bedroom 06		111	-	-
0 00 Bedroom 07		111	-	-
0 00 Bedroom 08		111	-	-
0 00 Bedroom 09		111	-	-
0 00 Bedroom 10		111	-	-
0 00 Bedroom 11		111	-	-
0 00 Bedroom 12		111	-	-
0 00 Bedroom 13		111	-	-
0 00 Bedroom 14		111	-	-
0 00 Bedroom 15		111	-	-
0 00 Bedroom 16		111	-	-
0 00 Bedroom Premium 01		111	-	-
0 00 Bedroom Premium 17		111	-	-

General lighting and display lighting		General luminaire	Display light source	
Zone name		Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m ²]
	Standard value	95	80	0.3
0 00 Bedroom Premium 18		111	-	-
0 00 Bedroom Premium 19		111	-	-
0 00 Bedroom Premium 20		111	-	-
0 00 Cafe		110	-	-
0 00 Change Kitchen		106	-	-
0 00 Change Staff		106	-	-
0 00 Corridor 1		110	-	-
0 00 Corridor 2		110	-	-
0 00 Corridor 3		110	-	-
0 00 Corridor 4		110	-	-
0 00 Corridor 5		110	-	-
0 00 Corridor 6		110	-	-
0 00 Corridor 7		110	-	-
0 00 Corridor 8		110	-	-
0 00 Corridor 9		110	-	-
0 00 Dining Room		103	-	-
0 00 Drugs		104	-	-
0 00 EnSuite 02		117	-	-
0 00 EnSuite 03		117	-	-
0 00 EnSuite 04		117	-	-
0 00 EnSuite 05		117	-	-
0 00 EnSuite 06		117	-	-
0 00 EnSuite 07		117	-	-
0 00 EnSuite 08		117	-	-
0 00 EnSuite 09		117	-	-
0 00 EnSuite 10		117	-	-
0 00 EnSuite 11		117	-	-
0 00 EnSuite 12		117	-	-
0 00 EnSuite 13		117	-	-
0 00 EnSuite 14		117	-	-
0 00 EnSuite 15		117	-	-
0 00 EnSuite Premium 01		117	-	-
0 00 EnSuite Premium 17		117	-	-
0 00 EnSuite Premium 18		117	-	-
0 00 EnSuite Premium 19		117	-	-
0 00 EnSuite Premium 20		117	-	-
0 00 EnSuite Sleeping Room		117	-	-
0 00 EnSuite16		117	-	-
0 00 Hoist 1		108	-	-
0 00 Hoist 2		108	-	-
0 00 Kitchen		104	-	-
0 00 Laundry		104	-	-
0 00 Lobby		110	-	-

General lighting and display lighting		General luminaire	Display light source	
Zone name		Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m²]
	Standard value	95	80	0.3
0 00 Lockers		108	-	-
0 00 Lounge		103	-	-
0 00 Nurse		111	-	-
0 00 Nurse 1		111	-	-
0 00 Office Admin		111	-	-
0 00 Office Chef		111	-	-
0 00 Office Manager		111	-	-
0 00 Plant Room		104	-	-
0 00 Reception		100	100	1.08
0 00 Seating		103	-	-
0 00 Sleeping Room		111	-	-
0 00 Sluice		104	-	-
0 00 Staff Room		106	-	-
0 00 Stair 1		104	-	-
0 00 Stair 2		104	-	-
0 00 Store Bed 04		108	-	-
0 00 Store Bed 09		108	-	-
0 00 Store Cleaners		108	-	-
0 00 Store Dry		108	-	-
0 00 Store Linen		108	-	-
0 00 Store Stair 2		108	-	-
0 00 Store Wheelchair		108	-	-
0 00 WC Assisted 1		106	-	-
0 00 WC Assisted 2		106	-	-
0 00 WC Kitchen		106	-	-
0 00 WC Visitor		106	-	-
1 00 Assisted Bathroom 2		111	-	-
1 00 Bathroom Assisted 1		111	-	-
1 00 Bedroom 21		111	-	-
1 00 Bedroom 22		111	-	-
1 00 Bedroom 23		111	-	-
1 00 Bedroom 24		111	-	-
1 00 Bedroom 25		111	-	-
1 00 Bedroom 26		111	-	-
1 00 Bedroom 27		111	-	-
1 00 Bedroom 28		111	-	-
1 00 Bedroom 29		111	-	-
1 00 Bedroom 30		111	-	-
1 00 Bedroom 31		111	-	-
1 00 Bedroom 32		111	-	-
1 00 Bedroom 33		111	-	-
1 00 Bedroom 34		111	-	-
1 00 Bedroom 35		111	-	-

General lighting and display lighting		General luminaire	Display light source	
Zone name		Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m ²]
	Standard value	95	80	0.3
1 00 Bedroom 36		111	-	-
1 00 Bedroom 41		111	-	-
1 00 Bedroom 42		111	-	-
1 00 Bedroom 43		111	-	-
1 00 Bedroom 44		111	-	-
1 00 Bedroom 45		111	-	-
1 00 Bedroom 46		111	-	-
1 00 Bedroom 47		111	-	-
1 00 Bedroom 48		111	-	-
1 00 Bedroom Premium 37		111	-	-
1 00 Bedroom Premium 38		111	-	-
1 00 Bedroom Premium 39		111	-	-
1 00 Bedroom Premium 40		111	-	-
1 00 Cinema		103	-	-
1 00 Corridor 1		110	-	-
1 00 Corridor 2		110	-	-
1 00 Corridor 3		110	-	-
1 00 Corridor 4		110	-	-
1 00 Corridor 5		110	-	-
1 00 Corridor 6		110	-	-
1 00 Corridor 7		110	-	-
1 00 Dining Room		103	-	-
1 00 Drugs		104	-	-
1 00 Ensuite 21		117	-	-
1 00 EnSuite 22		117	-	-
1 00 EnSuite 23		117	-	-
1 00 EnSuite 24		117	-	-
1 00 EnSuite 25		117	-	-
1 00 EnSuite 26		117	-	-
1 00 EnSuite 27		117	-	-
1 00 EnSuite 28		117	-	-
1 00 EnSuite 29		117	-	-
1 00 EnSuite 30		117	-	-
1 00 EnSuite 31		117	-	-
1 00 EnSuite 32		117	-	-
1 00 EnSuite 33		117	-	-
1 00 EnSuite 34		117	-	-
1 00 EnSuite 35		117	-	-
1 00 EnSuite 36		117	-	-
1 00 EnSuite 41		117	-	-
1 00 EnSuite 42		117	-	-
1 00 EnSuite 43		117	-	-
1 00 EnSuite 44		117	-	-

General lighting and display lighting		General luminaire	Display light source	
Zone name		Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m²]
	Standard value	95	80	0.3
1 00 EnSuite 45		117	-	-
1 00 EnSuite 46		117	-	-
1 00 EnSuite 47		117	-	-
1 00 EnSuite 48		117	-	-
1 00 EnSuite Premium 37		117	-	-
1 00 EnSuite Premium 38		117	-	-
1 00 EnSuite Premium 39		117	-	-
1 00 EnSuite Premium 40		117	-	-
1 00 Hair Salon		111	-	-
1 00 Hoist 1		108	-	-
1 00 Hoist 2		108	-	-
1 00 Lounge 1		103	-	-
1 00 Lounge 2		103	-	-
1 00 Lounge 3		103	-	-
1 00 Nurse		111	-	-
1 00 Nurse 1		111	-	-
1 00 Seating		103	-	-
1 00 Sluice		104	-	-
1 00 Stair 1		104	-	-
1 00 Stair 2		104	-	-
1 00 Store Bed 09		108	-	-
1 00 Store Bed 24		108	-	-
1 00 Store Bed 42		108	-	-
1 00 Store Bed 44		108	-	-
1 00 Store Linen		108	-	-
1 00 WC Assisted 2		106	-	-
1 00 WC Assisted 1		106	-	-
1 00 WC Assisted 3		106	-	-
1 00 Wheel Chair Store		108	-	-
2 00 Activity		103	-	-
2 00 Assisted Bathroom 2		111	-	-
2 00 Bathroom Assisted 1		111	-	-
2 00 Bedroom 49		111	-	-
2 00 Bedroom 50		111	-	-
2 00 Bedroom 51		111	-	-
2 00 Bedroom 52		111	-	-
2 00 Bedroom 53		111	-	-
2 00 Bedroom 54		111	-	-
2 00 Bedroom 55		111	-	-
2 00 Bedroom 56		111	-	-
2 00 Bedroom 57		111	-	-
2 00 Bedroom 58		111	-	-
2 00 Bedroom 59		111	-	-

General lighting and display lighting		General luminaire	Display light source	
Zone name		Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m ²]
	Standard value	95	80	0.3
2 00 Bedroom 60		111	-	-
2 00 Bedroom 61		111	-	-
2 00 Bedroom 62		111	-	-
2 00 Bedroom 63		111	-	-
2 00 Bedroom 64		111	-	-
2 00 Bedroom 65		111	-	-
2 00 Bedroom 66		111	-	-
2 00 Bedroom 67		111	-	-
2 00 Bedroom 68		111	-	-
2 00 Bedroom 69		111	-	-
2 00 Bedroom 70		111	-	-
2 00 Corridor 1		110	-	-
2 00 Corridor 2		110	-	-
2 00 Corridor 3		110	-	-
2 00 Corridor 4		110	-	-
2 00 Corridor 5		110	-	-
2 00 Corridor 6		110	-	-
2 00 Corridor 7		110	-	-
2 00 Dining Room		103	-	-
2 00 Drugs		104	-	-
2 00 EnSuite 49		117	-	-
2 00 EnSuite 50		117	-	-
2 00 EnSuite 51		117	-	-
2 00 EnSuite 52		117	-	-
2 00 EnSuite 53		117	-	-
2 00 EnSuite 54		117	-	-
2 00 EnSuite 55		117	-	-
2 00 EnSuite 56		117	-	-
2 00 EnSuite 57		117	-	-
2 00 EnSuite 58		117	-	-
2 00 EnSuite 59		117	-	-
2 00 EnSuite 60		117	-	-
2 00 EnSuite 61		117	-	-
2 00 EnSuite 62		117	-	-
2 00 EnSuite 63		117	-	-
2 00 EnSuite 64		117	-	-
2 00 EnSuite 65		117	-	-
2 00 EnSuite 66		117	-	-
2 00 EnSuite 67		117	-	-
2 00 EnSuite 68		117	-	-
2 00 EnSuite 69		117	-	-
2 00 EnSuite 70		117	-	-
2 00 Hoist 1		108	-	-

General lighting and display lighting		General luminaire	Display light source	
Zone name		Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m ²]
	Standard value	95	80	0.3
2 00 Hoist 2		108	-	-
2 00 Lounge		103	-	-
2 00 Nurse		111	-	-
2 00 Nurse 1		111	-	-
2 00 Sluice		104	-	-
2 00 Stair 1		104	-	-
2 00 Stair 2		104	-	-
2 00 Store Bed 66		108	-	-
2 00 WC Assisted 1		106	-	-
2 00 WC Assisted 2		106	-	-
2 00 WC Assisted 3		106	-	-
2 00 Wheel Chair Store		108	-	-

The spaces in the building should have appropriate passive control measures to limit solar gains in summer

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
0 00 Bedroom 02	NO (-62.3%)	NO
0 00 Bedroom 03	NO (-69.4%)	NO
0 00 Bedroom 04	NO (-69.4%)	NO
0 00 Bedroom 05	NO (-60.2%)	NO
0 00 Bedroom 06	NO (-60.2%)	NO
0 00 Bedroom 07	NO (-64.7%)	NO
0 00 Bedroom 08	NO (-79.2%)	NO
0 00 Bedroom 09	NO (-76.3%)	NO
0 00 Bedroom 10	NO (-66.9%)	NO
0 00 Bedroom 11	NO (-68.9%)	NO
0 00 Bedroom 12	NO (-66.3%)	NO
0 00 Bedroom 13	NO (-72.8%)	NO
0 00 Bedroom 14	NO (-70.4%)	NO
0 00 Bedroom 15	NO (-75%)	NO
0 00 Bedroom 16	NO (-72.3%)	NO
0 00 Bedroom Premium 01	NO (-83%)	NO
0 00 Bedroom Premium 17	NO (-79.3%)	NO
0 00 Bedroom Premium 18	NO (-61.7%)	NO
0 00 Bedroom Premium 19	NO (-61.7%)	NO
0 00 Bedroom Premium 20	NO (-84.2%)	NO
0 00 Cafe	NO (-34.7%)	NO
0 00 Dining Room	NO (-83.8%)	NO
0 00 Drugs	N/A	N/A
0 00 Lounge	NO (-51.5%)	NO
0 00 Nurse	N/A	N/A
0 00 Nurse 1	N/A	N/A
0 00 Office Admin	NO (-67.9%)	NO
0 00 Office Chef	N/A	N/A

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
0 00 Office Manager	NO (-66.3%)	NO
0 00 Reception	N/A	N/A
0 00 Seating	NO (-78.3%)	NO
0 00 Sleeping Room	NO (-74.4%)	NO
0 00 Staff Room	NO (-75.5%)	NO
1 00 Bedroom 21	NO (-87.1%)	NO
1 00 Bedroom 22	NO (-69.7%)	NO
1 00 Bedroom 23	NO (-76%)	NO
1 00 Bedroom 24	NO (-76.1%)	NO
1 00 Bedroom 25	NO (-68.8%)	NO
1 00 Bedroom 26	NO (-68.7%)	NO
1 00 Bedroom 27	NO (-71.3%)	NO
1 00 Bedroom 28	NO (-83%)	NO
1 00 Bedroom 29	NO (-79.4%)	NO
1 00 Bedroom 30	NO (-69.6%)	NO
1 00 Bedroom 31	NO (-71.8%)	NO
1 00 Bedroom 32	NO (-69.5%)	NO
1 00 Bedroom 33	NO (-75.7%)	NO
1 00 Bedroom 34	NO (-72.7%)	NO
1 00 Bedroom 35	NO (-77.2%)	NO
1 00 Bedroom 36	NO (-74.6%)	NO
1 00 Bedroom 41	NO (-88.5%)	NO
1 00 Bedroom 42	NO (-77.9%)	NO
1 00 Bedroom 43	NO (-79.1%)	NO
1 00 Bedroom 44	NO (-77.9%)	NO
1 00 Bedroom 45	NO (-80.8%)	NO
1 00 Bedroom 46	NO (-76.6%)	NO
1 00 Bedroom 47	NO (-76.3%)	NO
1 00 Bedroom 48	NO (-76.4%)	NO
1 00 Bedroom Premium 37	NO (-81.1%)	NO
1 00 Bedroom Premium 38	NO (-62.7%)	NO
1 00 Bedroom Premium 39	NO (-68.4%)	NO
1 00 Bedroom Premium 40	NO (-84.2%)	NO
1 00 Cinema	NO (-53.3%)	NO
1 00 Dining Room	NO (-65.3%)	NO
1 00 Drugs	N/A	N/A
1 00 Hair Salon	NO (-41.1%)	NO
1 00 Lounge 1	NO (-67.1%)	NO
1 00 Lounge 2	NO (-64.8%)	NO
1 00 Lounge 3	NO (-71%)	NO
1 00 Nurse	N/A	N/A
1 00 Nurse 1	N/A	N/A
1 00 Seating	NO (-78.1%)	NO
2 00 Activity	NO (-26%)	YES
2 00 Bedroom 49	NO (-79.9%)	NO
2 00 Bedroom 50	NO (-70.6%)	NO
2 00 Bedroom 51	NO (-80.7%)	NO
2 00 Bedroom 52	NO (-63.6%)	NO
2 00 Bedroom 53	NO (-63.5%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
2 00 Bedroom 54	NO (-64.5%)	NO
2 00 Bedroom 55	NO (-60.6%)	NO
2 00 Bedroom 56	NO (-69.9%)	NO
2 00 Bedroom 57	NO (-67.2%)	NO
2 00 Bedroom 58	NO (-72.4%)	NO
2 00 Bedroom 59	NO (-69.2%)	NO
2 00 Bedroom 60	NO (-81.8%)	NO
2 00 Bedroom 61	NO (-61.7%)	NO
2 00 Bedroom 62	NO (-82%)	NO
2 00 Bedroom 63	NO (-89.5%)	NO
2 00 Bedroom 64	NO (-77.9%)	NO
2 00 Bedroom 65	NO (-79.1%)	NO
2 00 Bedroom 66	NO (-89.5%)	NO
2 00 Bedroom 67	NO (-86.9%)	NO
2 00 Bedroom 68	NO (-76.2%)	NO
2 00 Bedroom 69	NO (-76.2%)	NO
2 00 Bedroom 70	NO (-77.2%)	NO
2 00 Dining Room	NO (-56.9%)	NO
2 00 Drugs	N/A	N/A
2 00 Lounge	NO (-63%)	NO
2 00 Nurse	N/A	N/A
2 00 Nurse 1	N/A	N/A

Regulation 25A: Consideration of high efficiency alternative energy systems

Were alternative energy systems considered and analysed as part of the design process?	YES
Is evidence of such assessment available as a separate submission?	YES
Are any such measures included in the proposed design?	YES

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Floor area [m ²]	3777.3	3777.3
External area [m ²]	5058.8	5058.8
Weather	SOU	SOU
Infiltration [m ³ /hm ² @ 50Pa]	3	3
Average conductance [W/K]	1279.72	1874.72
Average U-value [W/m ² K]	0.25	0.37
Alpha value* [%]	25.09	10

* Percentage of the building's average heat transfer coefficient which is due to thermal bridging

Building Use

% Area Building Type

Retail/Financial and Professional Services
 Restaurants and Cafes/Drinking Establishments/Takeaways
 Offices and Workshop Businesses
 General Industrial and Special Industrial Groups
 Storage or Distribution
 Hotels

100 Residential Institutions: Hospitals and Care Homes

Residential Institutions: Residential Schools
 Residential Institutions: Universities and Colleges
 Secure Residential Institutions
 Residential Spaces
 Non-residential Institutions: Community/Day Centre
 Non-residential Institutions: Libraries, Museums, and Galleries
 Non-residential Institutions: Education
 Non-residential Institutions: Primary Health Care Building
 Non-residential Institutions: Crown and County Courts
 General Assembly and Leisure, Night Clubs, and Theatres
 Others: Passenger Terminals
 Others: Emergency Services
 Others: Miscellaneous 24hr Activities
 Others: Car Parks 24 hrs
 Others: Stand Alone Utility Block

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	5.69	8.76
Cooling	0.1	0.05
Auxiliary	8.62	6.69
Lighting	21.34	19.07
Hot water	23.15	26.83
Equipment*	53.14	53.14
TOTAL**	58.9	61.4

* Energy used by equipment does not count towards the total for consumption or calculating emissions.

** Total is net of any electrical energy displaced by CHP generators, if applicable.

Energy Production by Technology [kWh/m²]

	Actual	Notional
Photovoltaic systems	11.55	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
<i>Displaced electricity</i>	<i>11.55</i>	<i>0</i>

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	72.58	88.43
Primary energy [kWh/m ²]	70.32	91.13
Total emissions [kg/m ²]	6.6	8.46

HVAC Systems Performance

System Type	Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEFF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Central heating using water: radiators, [HS] ASHP, [HFT] Electricity, [CFT] Electricity									
Actual	41.1	0	3.3	0	3	3.48	0	3.9	0
Notional	68.1	0	6.8	0	1.7	2.78	0	----	----
[ST] Central heating using water: radiators, [HS] ASHP, [HFT] Electricity, [CFT] Electricity									
Actual	23.5	0	1.9	0	15.4	3.48	0	3.9	0
Notional	25.7	0	2.6	0	12	2.78	0	----	----
[ST] Central heating using air distribution, [HS] ASHP, [HFT] Electricity, [CFT] Electricity									
Actual	0	0	0	0	32.5	3.39	0	3.9	0
Notional	0	0	0	0	47	2.78	0	----	----
[ST] Central heating using water: radiators, [HS] ASHP, [HFT] Electricity, [CFT] Electricity									
Actual	14.6	0	1.2	0	13.7	3.48	0	3.9	0
Notional	13.3	0	1.3	0	7.1	2.78	0	----	----
[ST] Split or multi-split system, [HS] ASHP, [HFT] Electricity, [CFT] Electricity									
Actual	0	154.3	0	12.6	1.3	3.63	3.41	3.9	4.8
Notional	0	93.5	0	5.6	1.7	2.78	4.63	----	----
[ST] Central heating using water: radiators, [HS] ASHP, [HFT] Electricity, [CFT] Electricity									
Actual	336.9	0	26.9	0	5.3	3.48	0	3.9	0
Notional	371	0	37.1	0	4.8	2.78	0	----	----
[ST] No Heating or Cooling									
Actual	0	0	0	0	0	0	0	0	0
Notional	0	0	0	0	0	0	0	----	----

Key to terms

Heat dem [MJ/m2]	= Heating energy demand
Cool dem [MJ/m2]	= Cooling energy demand
Heat con [kWh/m2]	= Heating energy consumption
Cool con [kWh/m2]	= Cooling energy consumption
Aux con [kWh/m2]	= Auxiliary energy consumption
Heat SSEFF	= Heating system seasonal efficiency (for notional building, value depends on activity glazing class)
Cool SSEER	= Cooling system seasonal energy efficiency ratio
Heat gen SSEFF	= Heating generator seasonal efficiency
Cool gen SSEER	= Cooling generator seasonal energy efficiency ratio
ST	= System type
HS	= Heat source
HFT	= Heating fuel type
CFT	= Cooling fuel type

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