

Revision	Date	Description	BY / QA
P01	26/10/23	Issued For Review	RG / AJ
P02	02/11/23	Issued For Planning	RG / AJ
P03	16/11/23	Updated For Planning	RG / AJ



72 Bed Care Home Leicester Road, Markfield

Project No.: 23053

Sustainability Statement



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1.0 Executive Summary

This sustainable construction and energy statement has been provided to demonstrate how the proposed development will comply with the planning policies of Charnwood Borough Council, as set out in the emerging 'Charnwood Local Plan 2021-37', submitted in draft in July 2021. In particular, this statement demonstrates how the development complies with the key elements of Policy CC4.

The proposed development includes the construction of a new build 70-bed care home at 2 Leicester Road, Coventry. The development shall be arranged over 3 storeys in total and include leisure facilities for dining and day activities, landscaped outdoor areas as well as bar, cinema and hairdressing facilities. Additionally suitable care, laundry, kitchen and plant areas will be provided to fully service the development.

The proposed development is planned to comprise approx. 3,752m².

In accordance with Charnwood Borough Council's planning policies the predicted energy consumption and CO₂ emissions have been reported after the implementation of the following hierarchy:

- ☪ 'Be Lean' – Use less energy
- ☪ 'Be Clean' – Supply energy efficiently
- ☪ 'Be Green' – Use renewable energy.

This statement, firstly, demonstrates how energy has been reduced as far as possible through the incorporation of passive and active measures including improving elemental U-values, improving air permeability, effective solar control, LED lighting throughout, heat recovery in ventilation systems, etc.

Following the energy demand reduction process, an appraisal has been undertaken to assess the feasibility of supplying energy efficiently. Whilst there are no known existing networks for energy or heat, it was identified that the use of centralized heat pumps to provide a heat network to generate the domestic hot water demand for the development could be utilized.

The final stage of the hierarchy considers installations of renewable energy technologies. Through appraisal detailed in section 4.6 of this statement it was determined an installation of Solar Photovoltaic panels would contribute energy and carbon emission reductions further to those that could be realized using air source heat pumps.

In accordance with the emerging Local Plan for Charnwood Borough, released in draft form in 2021, it is recommended to use the latest building regulations for the time of development to calculate CO₂ emissions reduction. In accordance with Chapter 7 of the local plan, SAP 10.2 carbon emissions factors utilised within current modelling software has been used to calculate CO₂ emissions compared with the Building Regulations Notional development.

On that basis, the report considers the latest carbon emissions factors utilised within Building Regulations Part L (2021) to report against in all sections of the hierarchy.

This statement also gives commentary on how the following sustainable construction aspects have been considered within the proposed development:

- ☪ Materials
- ☪ Renewable and Low Carbon Supply Systems
- ☪ Waste
- ☪ Sustainable Drainage Systems (SuDS)
- ☪ Water Efficiency
- ☪ Heat Island Effect
- ☪ Building Design
- ☪ Air Quality



2.0 Introduction

Chord Consult have been appointed by Charterpoint (LE67) Ltd to provide the following statement in order to inform the sustainability and energy credentials for the proposed development of a new 72-bed care home at Leicester Road, Markfield. The planned new development consists of 72 ensuite bedrooms with associated lounges, dining rooms, as well as a cinema, hairdresser and bar area. The development shall also comprise dedicated kitchen, laundry and plant areas, plus facilities for staff and general ancillary areas.

It is intended that the report will demonstrate that the requirements of Charnwood Borough Council's 'Charnwood Local Plan 2011-2028' Policy CS16. It is noted that the emerging 'Charnwood Local Plan 2021-37', submitted in draft in July 2021, provides updates to the policies contained within the current local plan. It is therefore the intention of this energy statement to demonstrate compliance with the emerging local plan, and in particular:

Policy CC4: Sustainable Construction

The development proposals are set out in figure one below.



Figure 1 – Proposed Site Plan

With the current emphasis placed on energy conservation and the use of Low or Zero Carbon (LZC) technologies, the applicant is keen to enhance the development's sustainability credentials.

To this end, the proposed design will promote reduced CO₂ emissions from delivered energy consumption by minimising operational energy demand through passive and best-practice measures. LZC technologies will be incorporated into the design, as deemed appropriate, as part of an integrated services strategy as opposed to a 'bolt-on' approach. The energy strategy proposals for the development have been considered in line with the following hierarchy:

- Use less energy – referred to herein as 'Be Lean'
- Supply energy efficiently (i.e. low carbon technologies) – referred to herein as 'Be Clean'
- Use renewable energy – referred to herein as 'Be Green'

This report has been compiled to discharge the energy reduction requirements as set out by Charnwood Borough Council, in terms of demonstrating an exemplar sustainability strategy for the proposed development.



3.0 Planning Policy

3.1 Context

The following energy statement is provided to demonstrate compliance with Charnwood Borough Council Planning Policy “Policy CC4: Sustainable Construction”. The format of this statement follows the requirements set out in chapter 7 of the emerging plan which is intended as an update to the current ‘Charnwood Local Plan 2011 – 2028’. Importantly, this supplementary guidance is given in the context of National, Regional, and other local policies as highlighted below.

National Policy

- National Planning Policy (2021) – in particular Chapter 14
- National Planning Practice Guidance:
 - “Renewable and Low Carbon Energy”
 - “Climate Change”
- Future Homes Standard
- Building Regulations

Regional Policy

- Strategic Growth Plan Leicester and Leicestershire

Local Policy

- Charnwood Borough Council – Policy CC4: Sustainable Construction
- Charnwood Borough Council – Policy CS16: Sustainable Construction and Energy (to be replaced by CC4 above)
- Hinckley & Bosworth Borough Council – Policy CC01: Mitigating and Adapting to Climate Change
- Hinckley & Bosworth Borough Council – Policy DM1: Presumption in Favour of Sustainable Development (to be replaced by CC01 above)
- Hinckley & Bosworth Borough Council – Policy CC05: Sustainable Design and Construction Measures
- Hinckley & Bosworth Borough Council – Policy DM10: Development and Design (to be replaced by CC05 above).

3.2 Policy CC4: Sustainable Construction

We will adapt to and mitigate against the effects of climate change, by requiring all new developments and refurbishments to take account of sustainable development principles.

We will do this by:

- encouraging high standards of energy efficiency in sustainable construction processes including the use of materials with low embodied carbon and passive cooling and heating, optimal levels of thermal insulation, passive solar design and locally sourced and recycled materials;
- encouraging the use of renewable and low carbon supply systems and connection to low carbon heat networks;
- minimising construction waste, including designing out waste during the design stage, selecting sustainable and efficient building materials and reusing materials where possible;
- supporting developments that reduce waste, provide for accessible and unobtrusive sustainable waste management facilities such as refuse/ recycling/ composting bin storage and allow convenient waste collections;
- requiring that sustainable water management solutions such as sustainable drainage systems, green roofs and/or rainwater harvesting systems are incorporated into proposals, where viable;
- requiring residential development to meet the Building Regulations optional water efficiency requirement of 110 litres/per person per day;
- encouraging non-residential development in excess of 1,000sqm gross floorspace to achieve the equivalent of BREEAM 3 credits for water consumption as a minimum;



- combating the heat island effect by encouraging green roofs, green walls, increased tree cover, waterways and the suitable layout of external spaces;
- requiring the layout, orientation and design of buildings to improve efficiency of heating, cooling and lighting and to maximise the potential for daylight and passive solar gain;
- encouraging the design and layout of new buildings which enable low carbon energy generation to be installed from the start where viable, or at a later stage, including district heating;
- encouraging the effective use of land by reusing land that has been previously developed, provided that it is not of high environmental value; and
- supporting new development that protects environmental resources including local air quality and our most versatile agricultural land. We will expect major development proposals to demonstrate how the need to reduce emissions has influenced the design, layout and energy source used

3.3 Charnwood Borough Local Plan 2011-2028

The current local plan, adopted in 2015, sets out the core strategy for development in the Borough of Charnwood. The plan contains a similar policy, namely CS16: Sustainable Construction and Energy, connected to thoughtful architectural design, energy efficiency, promotion of renewables, reduction of waste and water efficiency.

The emerging Local Plan, currently in draft, adopts similar principles with a more modern strategy towards low carbon design. As the intent is that the emerging policy CC4 is set to replace the current CS16, the emphasis of this energy statement will base around compliance with policy CC4.

3.4 Hinckley & Bosworth Borough Local Plan

The development site is primarily located within the Borough of Charnwood, However, there is slight encroachment into the Hinckley and Bosworth Borough. Therefore, whilst this energy statement aims to comply with the requirements of Charnwood Borough planning policies, reference is made to the policies of Hinckley and Bosworth Borough.

As with Charnwood Borough Council, Hinckley and Bosworth Borough Council have released an emerging local plan in draft for consultation to replace the current local plan adopted in 2016.

The emerging Hinckley & Bosworth Borough local plan places similar focus, to Charnwood Borough policy, relating to built form and orientation, low energy design and the incorporation of renewables to ultimately reduce carbon emissions further than Part L (2021) Building regulations.

With this in mind it is the design team's view that compliance with Charnwood Borough Council's emerging local plan policy will give suitable reference to Hinckley & Bosworth Borough Council's planning requirements.



4.0 Proposed Energy Strategy

4.1 Methodology

The Client should avoid, and the team would wish to avoid, a proposal coming forward whereby poor energy efficiency is employed but renewable technologies included, only to satisfy regulatory requirements. Consideration should be given to potential increased inefficiency at part load conditions and at times when renewable energy generation is not available in this respect.

The entire development is required to demonstrate compliance with Part L Volume 2 (2021 edition) of the building regulations. The predicted energy demand and CO₂ emissions for the development have been based upon bespoke dynamic simulation modelling. The results of such have been used for the basis of this statement and to provide evidence of compliance with Part L 2021.

The following hierarchy has been used to maximise the reduction in energy and carbon emissions: -

- ☐ 'Be Lean' – Use less energy
- ☐ 'Be Clean' – Supply energy efficiently
- ☐ 'Be Green' – Use renewable energy.

The proposed design will promote reduced CO₂ emissions from delivered energy consumption by minimising operational energy demand through passive and best-practice measures. LZC technologies will be incorporated into the design, as deemed appropriate, as part of an integrated services strategy as opposed to a 'bolt-on' approach.

4.1.1 Grid De-carbonisation

The latest edition of Part L (Conservation of Fuel and Power) of the Building Regulations, 2021 version, was implemented in June 2022 for all new buildings outside of the transition criteria, as set out within the Approved Documents. The new edition of Part L saw significant changes to carbon emission factors compared with the previous 2013 version, most notably, for electrical fuel. It is now accepted that due to the incorporation of alternative electrical generation, as opposed to fossil fuel power stations, the carbon intensity associated with producing electricity has significantly reduced. The table below shows a comparison of carbon emission factors, of various fuels, between the previous (2013) Part L Regulations and the current (2021) Regulations.

Fuel	Part L 2013 Carbon Emissions Factor	Part L 2021 Carbon Emissions Factor	% Reduction
Natural Gas	0.216	0.21	2.7
Grid Supplied Electricity	0.519	0.136 (year average)	73
LPG	0.241	0.241	0
Wood Pellets	0.039	0.053	-34
Wood Chips	0.016	0.023	-43

Table 1 – Part L (2021) Carbon Emissions Factors

The table above shows changes made to some of the fuel carbon emissions factors incorporated into Part L 2021. The list is not exhaustive and further information should be sought from the approved SAP 10.2 document. It does demonstrate; however, it is now far more attractive (from a CO₂ emissions perspective) to consider electrically driven solutions for heating and hot water generation. Furthermore, the carbon emissions associated with the electrical grid are forecasted to reduce further in the future which would then reduce the operational carbon emissions for buildings and predicted emissions for future developments.

4.2 Energy Benchmarking

To establish benchmarks by which energy demand and CO₂ emissions reduction of the development can be compared, estimated energy demand and CO₂ emissions have been calculated. The energy demand and CO₂ emissions of the 'Baseline' development for comparison is represented by the notional building as defined in Building Regulations via the NCM modelling guide. The energy demand and CO₂ emissions of the notional building are calculated through bespoke modelling of the proposed development. The data calculated within the Dynamic Simulation Model (DSM) software for the 'Notional'



development shall be used as the baseline for which the energy demand and CO₂ emissions of the actual proposed development is compared against.

An excerpt of the 'Energy Benchmarking Tool' output is shown below. The highlighted figures are proposed for use within this energy statement.

These estimated energy consumptions are indicative only as a representation of national building stock; however, they shall be used as a guideline to assess the percentage of the building's total energy consumption and CO₂ emissions that could be reduced or offset by applying best practice energy efficiency measures and/or LZC technology solutions.

4.2.1 Estimated Energy Demands & CO₂ Emissions

To establish benchmarks by which energy and CO₂ reduction can be compared, a suitable baseline is required. The 'Baseline' development for comparison is represented by the notional building as defined in Building Regulations via the National Calculation Methodology (NCM) modelling guide. 'Benchmark' data has been derived from the bespoke modelling to provide the basis for a suitable baseline.

Energy demand and CO₂ emissions figures for the 'Baseline' development are taken from IES software modelling and shown in the table below:

Baseline Development	Gross Internal Area (GIA) (m ²)	Regulated Annual Energy Demand (kWh/yr)	Regulated Annual Emissions (kgCO ₂ /year)
Baseline	3,752	223,207	30,504

Table 2 – 'Baseline' Development Energy Demand and Carbon Dioxide (CO₂) Emissions

4.3 Energy Demand and CO₂ Emissions Analysis

For the purposes of demonstrating compliance with Building Regulations Part L, it is prudent for this report to reflect the benchmark data derived from approved Dynamic Simulation Model (DSM) software which uses government and industry agreed National Calculation Method (NCM) room templates containing standard operating conditions. This is due to the fact that demonstration of Part L compliance requires calculation of CO₂ emissions through approved software modelling.

4.4 'Be Lean' – Reduce Energy Demand Through Energy Efficiency Measures

Reducing energy usage is the first priority in the energy hierarchy. It is often the measure with least cost implications, and any reduction will, in turn, reduce the requirement for on-site generation from renewable energy sources.

Achieving the optimum use of energy throughout a building's life requires the implementation of passive design to reduce the need for energy associated with controlling the environment and efficient controls to assist in the occupant's use of energy.

Considering the current and forecasted de-carbonisation of the electrical grid, it is deemed prudent to seek solutions through the use of electrically fuelled services. Therefore, the proposed solutions throughout the implementation of the energy hierarchy considers the use of all-electric proposals.

The following 'Be Lean' design principles, in a combination of passive and active measures, are incorporated into the development:

Passive Measures

- Maximising daylighting in all areas. The glazing specification will be carefully considered, aiming to provide an optimum balance between passive solar heating, limiting summertime overheating and maximising the potential for natural daylight transmission ($L_t = 0.65 \text{ min.} / g = 0.37 \text{ max.}$).
- An air permeability of $3\text{m}^3/\text{hr}/\text{m}^2$ @ 50Pa will be targeted.
- The following 'U' values are proposed for the building fabric of the new building overleaf:



Element	Part L 2021 Limiting 'U' value (W/m ² K)	Proposed 'U' value (W/m ² K)	Betterment (%)
External Wall	0.26	0.15	42
Ground Floor	0.18	0.12	33
Roof (Flat / Pitched)	0.18 / 0.16	0.12	25 - 33
Glazing	1.6	1.4	12
Solid/Glazed Doors	1.6	1.4	12

Table 3 – Proposed U-Values

Active Measures

- Heating, ventilation and lighting systems to operate 'on demand' where practical.
- Practical zoning of HVAC systems.
- LED lighting to be adopted throughout with daylight-linked dimming and occupancy sensing as appropriate.
- All mechanical supply and extract ventilation will be delivered by high efficiency, low energy fans maximising heat recovery where possible through the ventilation units.
- Inverter driven pumps and pressure control-based commissioning.

4.5 'Be Clean' – Supply Energy Through Efficient Means (i.e. Low Carbon Technologies)

Charnwood Borough Council Planning Policy CC4 puts emphasis on the use of low carbon supply systems through heat networks in new developments and the design enabling the potential for installation or connection to district heating.

There are no known existing district heating networks within the local area of the proposed development.

Notwithstanding, thought should be given to on-site heat networks utilising low/zero carbon fuel technologies for wet heating systems. Given the ongoing decarbonisation of the electrical grid it is agreed as sensible to prioritise electrically driven solutions. Traditionally heat pumps have been very effective in providing highly efficient solutions for low temperature heating applications such as underfloor heating, maximising carbon emissions reduction, rather than temperatures suitable for sanitary use. However, more recently developed heat pumps for larger residential/commercial applications are proving to be an efficient, low carbon means of providing suitable temperatures for the production of space heating and domestic hot water which can be considered for any building type.

In light of the above, it is proposed that a central site energy centre shall be utilized to meet 100% of the space heating and hot water demand for the building. Hot water is generated via plate heat exchangers supplied on the primary side by highly efficient air source heat pumps. Also, the development incorporates a large enough internal plantroom to facilitate a connection to a district heat network should one come available by the end of the service life to the proposed plant.

4.6 Be Green – Utilise Renewable Energy Generation

The third stage of the energy hierarchy refers to the production of renewable and low/zero carbon energy, relating to the reduction in carbon emissions from on-site or near site renewables.

A range of approved renewable technologies have been appraised, considering the suitability, feasibility, size and capital cost of each system required to meet the target. For clarity, gas-fired solutions have not been considered in line with the UK's future energy strategy.

Renewable/LZC Technology	Pros / Benefits	Cons / Limitations	Considered for the Development (*)
Air Source Heat Pump (ASHP) ASHP systems utilise energy from the	High efficiency heating/cooling with Coefficient of Performance (COP) typically between	Acoustic/aesthetic impact of external plant	Included to serve heating and hot water for the development as described in Section 6.2.



surrounding air within the refrigeration cycle. Air-to-Water technology uses water as the medium to provide wet heating and domestic hot water. Air-to-Air technology provides heating and cooling via refrigerant (VRF) to building/ fresh air.	250% and 450% depending on technology and system. - Single system for simultaneous heating and cooling (air-to-air) - Major proportion of plant able to be located externally not affecting GIA - No need for gas or other fuels to development - Potential for continued Carbon Emission reduction of development following reduction in the electrical grid.	GWP of refrigerants to be considered	
Ground Source Heat Pump (GSHP) GSHP systems utilise more stable temperatures of the earth (below ground) as an energy store. This technology can provide heating and cooling to building similar to air-to-air heat pumps. Installations can be horizontal via buried services in a trench or vertical via 'boreholes'.	- High efficiency technology - Minimal maintenance to below-ground system. - External plant requirement reduces effect on GIA. - No need for gas or other fuels to development - Potential for continued Carbon Emission reduction of development following reduction in the electrical grid.	- Increased costs compared with Air Source. - Integration with foundations/coordination with below-ground services required at an early stage - Large external site area required for installation - Full ground survey required to determine suitable geology	
Solar Photovoltaic (PV) Panels Solar radiation converted into electrical energy through semi-conductor cells installed within a panel. Electrical Energy in AC form converted to DC electricity via an inverter and distributed to a building, electrical grid or stored in batteries.	- Simple integration to most developments - Low maintenance requirement - No ongoing costs aside from technology replacement (such as inverters) - Flexibility of installation on roofs, facades, standalone arrangements, etc.	- Shading from nearby buildings, structures, landscape, etc. affects panel performance - Inclination and orientation can also affect performance - Installation in conservation/heritage areas not always permissible - High embodied carbon technology	Yes
Solar Thermal Similar to PV using solar radiation to generate energy. In this technology the sun's energy is used to heat fluid for transfer into a development's domestic hot water (DHW) system.	- Low maintenance requirement limited predominantly to system pump and fluid pH. - Little on-going cost based on low maintenance requirement.	- As per PV above, plus; - To be sized for building DHW requirements which may not suit all development types with low hot water demand and reduced/no summer occupancy. - Temperature top-up often required from additional technology	
Wind Turbine Wind energy is used to turn a propeller, which in turn drives an alternator to generate electricity. Small	Little on-going cost based on low maintenance requirement.	Potential planning issues with aesthetics/noise	



scale can be roof-mounted (up to 2kW typically) or pole mounted for domestic use (up to 6kW typically). Commercially and standalone technologies can range typically from 10kW to 500kW (medium scale) and higher outputs.	Excess electricity can be exported to the grid.	- Structural / vibration impact on building needs to be assessed - Better suited to open sites to reduce potential for downstream turbulence caused by nearby buildings.	
Bio-Renewable Energy Sources Wood-fuel boilers relying on automated fuel feed to generate heat energy. Storage is provided for fuel (such as wood chip or pellet) with a dedicated mechanical system transporting the fuel to the boiler for combustion. Are highly efficient, clean and almost carbon neutral (the tree-growing process effectively absorbs the CO ₂ that is emitted during combustion). Automated systems require mechanical fuel handling and a large storage silo	- Can be considered almost carbon neutral on basis that growing trees for fuel absorbs CO₂ emitted in boiler use - Uses fuels with lowest carbon emission factors - Running costs	- Availability of fuel supply and delivery frequency requires investigation - High maintenance requirement - Significant plant space for boiler, storage and automated feed system required	
Fuel Cells Hydrogen and oxygen combined in a controlled chemical reaction. The resulting energy is converted to electricity by fuel cells.	- Highly efficient electrical generation - Clean process in terms of minimal pollution	- Prohibitively expensive - Technology risk associated with early stages of commercialisation for fuel cells.	

Table 4 – Renewable/LZC Technology Options Appraisal

* Key

Green indicates considered within the development's energy strategy.

Amber indicates possible feasibility following further design consideration.

Red indicates not feasible for the development.

The current and forecasted grid decarbonisation, outlined in Section 4.1 above, promotes electrically driven solutions in lieu of gas-fired solutions considering the carbon emissions for the development. The benefit of utilising Heat Pumps within the development has been discussed in the 'Be Clean' stage of this energy hierarchy.

The table above highlighted that PV arrays are suitable and proposed for the scheme due to its simple integration into building design, and ability to generate electricity for on-site use without unnecessary difficulties or disproportionate cost. Preliminary energy modelling indicates the development would benefit from an array in the order of 170m².



5.0 Energy and CO₂ Emissions Results

The proposed design promotes reduced CO₂ emissions from delivered energy consumption by minimising operational energy demand through passive and best-practice measures. LZC technologies will be incorporated into the design, as deemed appropriate, as part of an integrated services strategy as opposed to a 'bolt-on' approach. The energy strategy proposals for the development have been considered in line with the principles employed at each stage of the following hierarchy:

- ☐ 'Be Lean' – highly efficient building fabric, mechanical ventilation with heat recovery, LED lighting, etc.
- ☐ 'Be Clean' – highly efficient Air-to-Water Heat Pumps for heating and hot water generation
- ☐ 'Be Green' – roof mounted PV installation of 170m².

Energy consumption and Carbon Dioxide (CO₂) emissions are taken from bespoke dynamic simulation modelling (DSM) for the proposed development is shown in the table below:

	Gross Internal Area (GIA) (m ²)	Regulated Annual Energy Demand (kWh/yr)	Regulated Annual Emissions (kgCO ₂ /year)
Baseline	3,752	223,207	30,504
Proposed Development	3,752	219,417	30,054
Reduction over Baseline	-	3,790	450

Table 5 – 'Proposed' Development Energy Demand and Carbon Dioxide (CO₂) Emissions



6.0 Sustainable Construction

6.1 Materials

Currently proposed materials for the development are red facing and Buff bricks, white render or white artificial stone band where aesthetically beneficial on the elevations in combination with white uPVC doors and windows. The pitched roof shall incorporate concrete slate tiles and ridge tiles. Accessories such as fascia board, gutters and RVPs shall be grey uPVC.

Consideration of local sourcing and the potential to use recycled materials shall be given where feasible. Ensuring all building materials are fit for purpose to ensure a long life expectancy for the building shall be given first priority. Structural timber shall be incorporated into the roof structure. Where possible/feasible, other products with a low embodied carbon shall be specified.

6.1.1 Thermal Performance

In order to drive down the heating demand, an exemplar level of thermal performance to the building envelop will be required. Part L sets out limiting values for insulation performance of envelop elements as the absolute minimum acceptable levels but, it is accepted that significant improvement on these levels is required to both satisfy the Part L calculation and provide optimum reduction of energy demand to reduce the required generation via low carbon supply. The targeted U-values for the development are detailed in section 4.4 of this statement. Excessive levels of air leakage within a building cause heat loss which, in turn, has an adverse effect the building's energy efficiency and thermal performance. Meeting the specified targets for air tightness is a key requirement for building contractors to be fully Part L compliant. As with the performance of the thermal envelope, significantly bettering the limiting value allowed within Part L – $8\text{m}^3/\text{hr}/\text{m}^2$ @ 50Pa – is needed to satisfy the Part L calculation. In this instance, an air permeability of $3.0\text{m}^3/\text{hr}/\text{m}^2$ @ 50Pa is targeted.

6.1.2 Solar Shading

Whilst maximising the daylighting provision contributes to reduced energy demand associated with artificial lighting and improved health & well-being of the occupants, the effect of solar heat gain in occupied spaces must also be considered and overcome. The glazing specification to these areas will include a G-Value (solar transmission) not greater than 0.37 and a Lt Value (light transmission) not less than 0.7 to provide an optimum balance between light transmission and protection of solar gain to mitigate effects of summertime overheating.

6.1.3 Passive Cooling and Thermal Mass

Due to its ability to absorb and store heat, heavyweight construction products (i.e. concrete) can be used to passively cool buildings, reducing the energy consumed by air conditioning and/or reducing the risk of overheating.

Using thermal mass to provide passive cooling is one of the most significant ways that building fabric material can be used to enhance the CO₂ performance of the building. Exposed thermal mass (or painted) inside a building will soak up excess heat during the day, providing thermal inertia against temperature fluctuations, reducing or eliminating the need for mechanical cooling. Heat retained by the thermal mass is removed overnight by ventilating the building with cool night air (night purging).

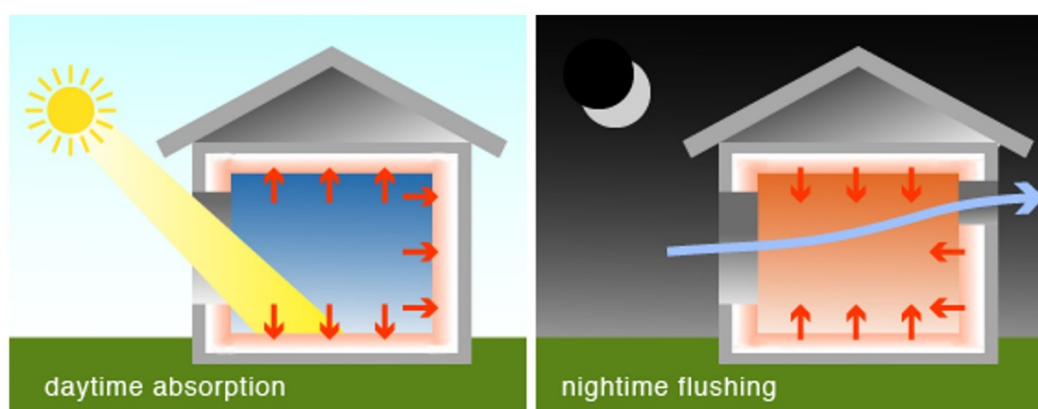


Figure 2 – Principles of Night Purging using Thermal Mass



6.2 Renewable and Low Carbon Supply Systems

Sections 4.5 and 4.6 of this statement describe the low carbon and renewable systems proposed for the development in the form of Air Source Heat Pumps and Solar PV installations.

6.3 Waste

Waste from construction sites is one of the largest contributors to landfill in the UK and, therefore, diverting this wherever possible is a key objective of the proposals.

Due to the intensity of development there is potential for a large volume of material to be removed from site during earthworks. It is intended that the material removed would be used as part of bulk fill to other areas of the site if the material is deemed suitable.

In order to ensure waste is diverted from landfill sites wherever possible, the development will consider and incorporate the following strategies:

- Site Waste Management Plan (SWMP)
- Operational Waste Strategy

6.4 Sustainable Drainage Systems (SuDS)

The site is unsuitable for plot specific infiltration style drainage, due to the prevailing Geology. A single attenuation facility will be provided which will manage run off from the site to pre development levels. The attenuated outfall will discharge to an existing watercourse. Permeable paving will be utilised in car parking areas to help improve water quality.

6.5 Water Efficiency

The design of the domestic water services installations and selection of associated sanitaryware will be undertaken with the primary aim of reducing the overall water consumption of the development, considering the following strategies:

- Wash Hand Basin outlets to be fitted with flow restrictors to limit the peak flow rate to 6 litres / minute.
- Sink outlets to be fitted with flow restrictors to limit the peak flow rate to 7 litres / minute.
- Showers to be fitted with flow restrictors to limit the peak flow rate to 8 litres / minute.
- Where white goods are specified – such as dishwashers – water efficient appliances will be considered.

The above measures will help support the development's good practise approach of limiting the maximum water demand target to 110 litres / person / day.

The development will conserve water usage through the following measures in accordance with the water (Wat) credits of BREEAM:

- Specification of low flow water outlets (as above).
- Major leak detection system installed on the incoming water main to the development.

6.6 Heat Island Effect

The main part of the garden/s is facing East and will be partly shaded by the building in the hottest hours of the day. Landscape design could provide further shade with new trees planted in this area. Existing trees and vegetation along the south and west boundaries will provide some shading and new trees could provide further shading in these areas.

6.7 Building Design

The linearity of the proposed development is dictated by the site along Leicester Road. A new single access to the site is provided on the southwest part of the site, where parking facilities are provided. This arrangement allows minimal disruption of the existing scrub and trees present along the south boundary and the retention of natural grassland and natural habitats on the north and east parts of the site. The site slopes down from Leicester Road to the northern boundary and the ground



floor level sits below the road level (road levels vary approx. from +1.4m to +1.8m). From this level the care home is 2 storey with a mansard roof. Below the ground floor, on the west side, a lower level is provided for the back-of-house facilities. The care home is designed to reflect the local vernacular and the rural character of the site. Both in terms of style and materials, the scheme is being sensitively designed with the site's surrounding in mind and to reflect and complement the character of the surrounding area. The proposed development will sit comfortably within the site without impacting views to and from the site.

6.8 Air Quality

All heating and hot water for the development is supplied by non-combustible systems, i.e electricity, which therefore does not negatively impact local air quality.

The lower ground floor kitchen will therefore require separate mechanical supply and exhaust ventilation ducted to a kitchen canopy within the space to provide the ventilation. The discharge from the kitchen / catering extract systems is to terminate upwards at high velocity above roof level in accordance with DEFRA guidance and recommendations to mitigate potential risk associated with recirculation of catering odours.

The ventilation scheme proposal will be developed with all necessary cognisance of DEFRA Guidance on Control of Noise and Odour from Commercial Kitchen Exhaust Systems, relevant CIBSE guidance and the recommendations of HVCA DW172. In this respect the kitchen ventilation design and odour control strategy will include the following key aspects: -

- The kitchen ventilation canopy will incorporate coarse / grease filtration.
- The odour abatement strategy will be exhaust stack dispersion and dilution through the induction of fresh air into the discharge plume.
- The commercial kitchen exhaust will discharge vertically upwards above roof level in line with best practice.
- The exhaust terminal will be sized to provide an efflux velocity of between 12 – 15m/s in line with DW172 and DEFRA recommendations for odour dispersal.



7.0 Recommendations and Conclusions

In order to demonstrate that the planning requirements of Charnwood Borough Council can be met by the proposed new 72-bed care home development, the well-structured energy hierarchy has been followed.

In the first stage of the energy hierarchy (Be Lean) a number of passive and high efficiency measures have been applied to contribute to reducing the energy consumption of the proposed new development through improving the thermal envelope, system efficiencies etc. It has therefore been demonstrated that the development has maximised energy demand reduction as far as practicable whilst considering a balance against potential air quality constraints, noise, etc with servicing choices.

In the second stage of the energy hierarchy (Be Clean), it has been determined that connection onto existing district heat networks is not yet feasible for this particular development, and therefore has not been considered within this statement. It should be noted, however, that a communal heat network is proposed in the form of centralized heating and hot water generation using air source heat pumps to generate low temperature hot water heating thermally stored to generate domestic hot water instantaneously. Furthermore, the proposed air source heat pump strategy could accept future connection to a DHN with minimal remedial works to the plant installation and the end of the service life of proposed plant.

In the third stage of the energy hierarchy (Be Green) it is considered that in addition to utilising air source heat pump (ASHP) technology via air-to-water heat pumps, a Solar Photovoltaic (PV) installation will further demonstrate the sustainable credentials of the development.

In addition to the energy measures outlined within this statement, the key aspects of Planning Policy CC4: Sustainable Construction have been considered and the appropriate measures incorporated within the proposed development have been detailed within section 6.0.