
# SUSTAINABILITY STATEMENT

## BOLTON ROAD, BANBURY

JSP SUSTAINABILITY LTD
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## EXECUTIVE SUMMARY

- The proposed residential development at Bolton Road includes the construction of 80 no. retirement properties.
- The developer proposes to construct each property to an efficient fabric and building services specification.
- Photovoltaic arrays will be installed on the roof space of the building.
- Each home will achieve a low internal water consumption.

# 1 INTRODUCTION

JSP Sustainability Ltd has been commissioned by Churchill Retirement Living to prepare a Sustainability Statement to accompany the planning application for the proposed development at Bolton Road, Banbury. The application seeks permission for the construction of 80 no. retirement flats with associated communal space, landscaping and associated highway works.

This Statement provides details on the energy efficiency, renewable energy, water efficiency and material selection measures proposed by Churchill Retirement Living to address local policy and deliver a sustainable development. A number of documents have been used to complete this report. These include;

National Planning Policy Framework (NPPF) includes a presumption in favour of sustainable development. The Framework expands upon the guiding principles and objectives of a successful planning system. These include the building of a strong and competitive economy, delivering high quality housing, requiring good design and meeting the challenges of climate change.

Approved Document L1A sets fabric efficiency standards and together with SAP, establishes a maximum $CO_2$ emission rate for new build residential properties. The Approved Document is the Government's sustainable design benchmark in England.

Cherwell Local Plan 2011-2031 Part 1 includes policy ESD 1, Mitigating and Adapting to Climate Change, which requires “developments to reduce carbon emissions and use resources more efficiently, including water.”

Policy ESD 2, Energy Hierarchy and Allowable Solutions, promotes the Energy Hierarchy of reducing energy, supplying energy efficiently and making use of renewable technologies.

Policy ESD 3, Sustainable Construction, requires all new residential development to “incorporate sustainable design and construction technology to achieve zero carbon development through a combination of fabric energy efficiency, carbon compliance and allowable solutions in line with Government policy.”

Policy ESD 4, Decentralised Energy Systems, encourages the use of district heating or combined heat and power networks in development over 100 no. dwellings.

# 2 ENERGY STRATEGY

## 2.1 Policy Background and Proposals

Policy ESD 3 of the Local Plan requires the constructed development to adhere to national targets on sustainable development in line with the principals of the Energy Hierarchy;

- Lean - use less energy through energy efficiency;
- Clean - consume energy efficiently; and
- Green - generate energy from renewable sources.

The new retirement building at Bolton Road will be constructed to high standards of energy efficiency and a photovoltaic array will be installed on the roof of the building such that the development complies with the Building Regulations targets for the site.

## 2.2 Energy Efficiency Measures

The energy strategy at Bolton Road will adhere to the principles of the Energy Hierarchy. Listed below are some of the measures that will be incorporated into the detailed design of the scheme. These represent the lean and clean measures of the Hierarchy and aim to reduce energy demand and efficiently consume energy if necessary;

- The construction specification of the building will include high levels of insulation in the ground floor, external walls and roof spaces.
- The detailed construction design will incorporate intelligent junction design including from the Concrete Block Association and Accredited Details. This will reduce heat losses caused by thermal bridging.
- Each retirement flat and the communal areas will be heated by 100% efficient electric heating systems. This will future proof the development and lessen its impact on the environment into the future. The carbon footprint of the occupied building will decrease steadily in the years ahead as the National Grid continues to be decarbonised as part of the Government's 2050 net zero carbon energy strategy.
- Energy efficient lamps will be installed in every light fitting;
- Each entrance will be illuminated with an energy efficient external light;
- Each flat will be naturally ventilated using efficient decentralised system 3 extract fans to ensure the internal living environment will be healthy and comfortable;
- The SAP 2012 methodology takes into consideration the positive benefits of solar gain when assessing energy consumption. Each of the principal living rooms will have sufficient glazing to take advantage of solar gain; and
- The glazing specification will achieve an overall solar transmittance value, or g-value of 0.73, thereby assisting the potential for solar gain.

The table overleaf provides a summary of the energy efficiency standards to be achieved in the design and construction of the building;

**Table 1 – Specification Summary**

| Element | Part L | Enhanced Specification |
|---|---|---|
| **Wall** | 0.30W/$m^2$K | 0.23W/$m^2$K |
| **Party Walls** | 0.20W/$m^2$K | 0.00W/$m^2$K |
| **Cold Roof** | 0.20W/$m^2$K | 0.11W/$m^2$K |
| **Flat Roof** | 0.20W/$m^2$K | 0.20W/$m^2$K |
| **Floor** | 0.25W/$m^2$K | 0.12W/$m^2$K |
| **Glazing** | 2.00W/$m^2$K | 1.40W/$m^2$K |
| **Air Permeability** | 10 $m^3$/(h.$m^2$) @ 50 Pa | 5.0 $m^3$/(h.$m^2$) @ 50 Pa |

## 2.3 Site Energy Requirement and Emission Rate

The application proposes the construction of 80 no. 1 and 2 bedroom retirement flats across four floors. We have used benchmark figures for ground, mid and top floor flats on a similar Churchill Retirement Living development to give an accurate forecast of the site's baseline emission rate and energy requirement.

**Table 2 – Bolton Road Energy Requirement**

| | Energy Requirement (kWh/yr) |
|---|---|
| **RESIDENTIAL** | |
| Space Heating | 108,100.73 |
| Hot Water | 135,979.43 |
| Fans | 3,903.63 |
| Lights | 28,336.57 |
| **TOTAL** | **276,320.36** |
| **COMMUNAL SPACES** | |
| Space Heating | 57,624.36 |
| Water Heating | 9,993.89 |
| Fans & Aux | 37,114.62 |
| **Total** | **104,704.50** |

**Table 3 – Bolton Road Emission rate**

| | $CO_2$ Emissions (kg/year) |
|---|---|
| **RESIDENTIAL** | |
| Part L Target | 125,060.52 |
| Calculated | 143,430.98 |
| **COMMUNAL SPACES** | |
| Part L Target | 49,406.60 |
| Calculated | 53,296.59 |

The calculations confirm the building will have a forecasted energy requirement of 381,024.82kWh/year and associated $CO_2$ emissions of 196,727.57kg/year. The development proposals require further measures to offset an additional 22,260.45kg/year of $CO_2$ to comply with the Building Regulations.

## 2.4 Fabric Energy Efficiency

The specification summarised overleaf was modelled in SAP to determine the Target Fabric Energy Efficiency Rating and Dwelling Fabric Energy Efficiency Rating of the building. The table below summarises the calculations.

**Table 4 – Bolton Road Energy Efficiencies**

| | Target Fabric Energy Efficiency (kWh/year) | Fabric Energy Efficiency (kWh/year) |
|---|---|---|
| Ground Floor | 50,233.30 | 44,830.19 |
| Mid Floor | 67,397.62 | 61,513.31 |
| Top Floor | 57,116.47 | 49,358.53 |
| | | |
| TOTAL | **174,747.40** | **155,702.02** |

The calculations confirm that the building will achieve a FEE betterment of 19,045.37kWh/year or 10.90% over the Building Regulations Part L.

## 2.5 Photovoltaic Panels

Churchill Retirement Living will install a sizeable photovoltaic array on the proposed roof of the building to generate 43,647.94kWh/year of electricity and offset 22,260.45kg/year of $CO_2$. The size of array will be determined at the detailed design stage when accurate SAP and SBEM calculations will be carried out as part of the Building Regulations submission. However, initial calculations confirm that a 50.8kWp PV array will be necessary.

# 3 DISTRICT HEATING

Policy EDS 4 requires the appraisal of district heating or combined heat and power for applications of 100 no. dwellings or more. The present application is for 80 no. dwellings though the wider site has an allocation of 200 no. dwellings. However, we understand that there are no imminent applications to deliver the additional dwellings. Though the policy allows for the appraisal of "simple" district heating, in practice a district heating network must include combined heat and power (CHP) if it is to pass Part L and SAP.

In brief a CHP system works as follows;

- A boiler consumes a primary fuel, typically gas or biomass, producing high pressure steam which is used to power a turbine, which in turn is connected to an electricity generator. The electricity produced can be consumed by the serviced development or exported to the National Grid.
- The heat which is given off by the turbine and the flue gases are recovered to provide space and hot water heating for the serviced community.
- Supplementary boilers are usually needed to meet peaks in heating and hot water demand.

## 3.1 Viability for an ESCo

The supply and management of heat networks is unregulated and as such Churchill Retirement Living would require an installed CHP network at Bolton Road to be adopted by a Heat Trust registered ESCo. The Heat Trust, established in 2015, is a common standard in quality and level of customer service that heat suppliers should deliver to customers. Heat Trust regulated contracts cover responsibilities such as;

- Sales & marketing
- Tariffs and customer charges (standard charge and unit charge)
- Customer Administration
- Billing
- Service provision
- Customer care
- Compliants procedure

For a heat network to be adopted by an ESCo under the terms of the Heat Trust it must be of a scale that allows for the ESCo to recover the costs of supply and operation of the network over a 25-30 year period, by billing customers according to Heat Trust pricing guidelines. These guidelines place a gap on the per unit charge of energy relative to the wholesale cost of fuel, thereby ensuring that heat network customers are not open to price hikes or inflated energy bills relative to the free market cost of energy. As a general rule of thumb, a network servicing 600 or more **apartments** is judged to be of sufficient scale to be adopted by an ESCo under the

terms of the Heat Trust. For a housing lead scheme, this figure is inflated to 1000 homes due to the extra infrastructure and capital costs involved in servicing a housing development. A development with fewer homes is therefore commercially unviable or can only be made viable if it is adopted outside Heat Trust guidelines thereby exposing future homeowners to uncapped or unregulated energy costs. A scheme of 80 no. flats or even 200 no. homes is unlikely to ever be adopted within the Heat Trust guidelines.

### 3.2 CHP, Part L 2021 and the Future Homes Standards

The Government has confirmed that from 2025 all new homes should be heated from a low carbon heat source, preferably heat pumps powered by grid electricity. Homes adhering to this specification will be "zero carbon ready" at the point of first occupation and will progress to zero carbon in line with the decarbonisation of the National Grid. In time the space heating and hot water demand of all existing homes will also have to be electrified, again preferably from a zero-carbon technology. This presents particular problems for CHP networks.

The Climate Change Committee, in their 2019 "UK Housing: Fit for the future?" publication estimated that some 93% of all district CHP installations in the UK are powered by natural gas. Such installations will have to be converted to a low carbon source or fundamentally redesigned. Biomass is the only alternative to gas, but many questions remain over its true sustainability as a low carbon fuel. In the Climate Change Committee's 2018 "Biomass in a low carbon economy" publication, the Government was advised to bring to an end the use of biomass as a fuel source for energy generation and heat. The UK, and the world, has a finite supply of biomass. This should be prioritised for other uses, particularly those which lock in or store carbon for many years. In the absence of biomass, one is left with contentious solutions such as waste incineration or experimental solutions such as hydrogen.

Energy generated from the combustion of a fuel or incineration of waste typically has a combined heat and power efficiency in the region of 80-85%, with the heat component in the region of 40-45%. In addition, there is also consideration of network looses known as the "Distribution Loss Factor" in SAP 10. Together, the comparatively low heat efficiency, and the inclusion of a distribution loss factor, make compliance with the Primary Energy Target difficult. The Target Recipe for Part L 2021 assumes a heating system efficiency of 89.5%. The draft FHS Recipe assumes an efficiency of 250%. In the FHS consultation the Government confirmed it would drop proposals for Technology Factors, which would have eased compliance for heat networks in SAP 10. Instead, the Government confirmed that "new homes connected to heat networks will need to meet the full primary energy, emission and fabric energy efficiency rate."

All the above highlights that any district network at the site should not be fuelled by a combustion process. It is unlikely to deliver compliance with Part L or the Future Homes Standards and this is particularly important if the further 120 no. homes are ever to come forward for development. To insist on connection to a network which cannot deliver compliance with the Building Regulations would compromise any development proposals.

In the absence of this, one is left with commercial grade heat pump networks, fuelled by grid electricity. However, there are no clear benefits to a heat pump network over small scale heat pumps or other electric systems servicing individual homes. Both will achieve high efficiencies and both will be zero carbon ready, progressing to zero carbon in time. Heat networks would suffer from heat loss in distribution and could potentially require additional energy consumption to compensate for such losses to deliver the equivalent level of space and hot water energy to each home.

At the present time it is not advisable to install a district network at the application site. Not only is the development of insufficient scale, but a “traditional” combustion CHP network would not comply with forthcoming Part L changes and would require considerable investment in the future to transition to a low carbon network. An alternative heat pump network is also ill advised for the application site. The previous section of this Statement confirms Churchill Retirement Livings proposals for electric heating and on-site renewable energy generation as being compliant with the Building Regulations and “zero carbon ready”.

# 4 WATER EFFICIENCY

Approved Document G of the Building Regulations requires each new home to achieve a water consumption rate of no more than 125 litres per person per day. Churchill Retirement Living proposes to incorporate low flow sanitary ware and eco-sanitary products into the design of each property to achieve a low water consumption rate. This strategy will permanently reduce water consumption. The tables below summarise the proposed flow rates and capacities and the water efficiency calculation.

**Table 5 – Flow Rates & Capacities**

| Fitting | |
|---|---|
| **Toilets** | 4.5 & 3 litre dual flush |
| **WHB Taps** | 4 litres/min |
| **Kitchen Taps** | 5 litres/min |
| **Bath** | 195 litres |
| **Shower** | 8 litres/min |

**Table 6 - Water Efficiency Calculation**

| Installation Type | Unit of Measurement | Capacity/Flow Rate (1) | Use Factor (2) | Fixed Use (litres/ person/ day) (3) | Litres per Person day. =[(1) x (2)] +(3) (4) |
|---|---|---|---|---|---|
| WC (Dual Flush) | Full Flush (litres) | 4.50 | 1.46 | 0.00 | 6.57 |
| | Part Flush (litres) | 3.00 | 2.96 | 0.00 | 8.88 |
| Taps (excluding kitchen tap) | Flow rate (litres/min) | 4.00 | 1.58 | 1.58 | 7.90 |
| Bath (where shower present) | Capacity to overflow (litres) | 195 | 0.11 | 0.00 | 21.45 |
| Shower (where bath present) | Flow rate (litres/min) | 8.00 | 4.37 | 0.00 | 34.96 |
| Kitchen/utility room sink taps | Flow rate (litres/min) | 5.00 | 0.44 | 10.36 | 12.56 |
| Washing machine | Litres/kg dry load | 8.17 | 2.10 | 0.00 | 17.16 |
| Dishwasher | Litres/place setting | 1.25 | 3.60 | 0.00 | 4.50 |
| **TOTAL** | **(5)** | | | | 113.98 |

| | | |
|---|---|---|
| **(5)** | **Total Internal Water Consumption** | 113.98 |
| **(6)** | **Normalisation Factor** | 0.91 |
| **(7)** | **Internal Water Consumption [(5) x (6)]** | 103.72 |
| **(8)** | **External Water Use** | 5.00 |
| **(9)** | **Part G Water Consumption [(8) + (7)]** | 108.72 |

An internal water consumption of 108.72 litres per person per day is calculated.

# 5 MATERIAL SELECTION

Churchill Retirement Living and its contractors operate an ethical timber procurement policy which has at its core a commitment to purchase legally and sustainably sourced timber. Suppliers of timber must produce full Chain of Custody Certificates right through the supply chain; from the initial timber yard, manufacturing process, transformation and distribution. Secure certificates must be produced by valid accrediting bodies – FSC, PEFC, CSA, SFI & MTCC.

When specifying materials at the design stage the sustainable credentials of a product are rated alongside their affordability, lifecycle costs, durability, availability and ease of use. This exercise guarantees Churchill Retirement Living gives due consideration to the environmental impact of materials at the earliest design and procurement stage.

As part of the review of the proposed Sustainability Strategy the environmental impact of the proposed build specification was assessed against the BRE Green Guide. The Guide assesses the relative environmental impact of construction materials commonly used in buildings. Materials are given an overall rating of A+ to E, based on Life Cycle Assessments using the BRE's Environmental Profiles Methodology. The table below summarises the ratings anticipated;

**Table 7 – Green Guide Rating**

| | Description | Green Guide Reference | Rating |
|---|---|---|---|
| External Wall | Brickwork outer leaf, insulation, concrete blockwork inner leaf, cement mortar, plasterboard on dabs, paint | 806170615 | A+ |
| Party Wall | Twin leaf 100mm min. solid medium dense blocks (1350-1600kg/$m^3$), with 100mm min. cavity including proprietary glass wool acoustic roll, type A wall ties, with gypsum-based board (9.8kg/$m^2$) on dabs and paint to each side | 1118190007 | C |
| Ground Floor | Screed on solid concrete floor on bonded insulation | 820100036 | D |
| Party Floor | Sand, cement screed on resilient layer on precast concrete floor with proprietary ceiling system | 1229550009 | D |
| Internal Wall | Timber stud, plasterboard, paint | 809760003 | A+ |
| Glazing | PVC-U window, double glazed | 813100009 | A |
| Roof | Timber josts, plywood decking, vapour control layer, insulation, single ply water proofing membrane | 1212540085 | A+ |

# 6 EVALUATION

Churchill Retirement Living is required by policies ESD 1, 2 and 3 of the Cherwell Local Plan to construct the development at Bolton Road, Banbury to a strategy adhering to the principals of the Energy Hierarchy and capable of complying with national targets on $CO_2$ emissions. JSP Sustainability was instructed by the developer to review the sustainable development proposals for the site. Full details on the strategy are included on the previous pages, however the key conclusions are;

- The buildings will be constructed to a specification which incorporates insulation levels and fixings achieving u-values significantly beyond the benchmarks in Part L;
- The energy efficiency measures proposed will achieve a 10.90% saving over the Building Regulations Target Fabric Energy Efficiency metric;
- A PV array capable of generating 43,647.94kWh/year of electricity and offsetting 22,260.45kg/year of $CO_2$ will be installed on the roof of the building;
- Each home will achieve a water consumption rate less than 110 litres per person per day or less; and
- An ethical timber procurement policy will operate at the application site.

On the basis that the measures proposed by Churchill Retirement Living will achieve a sustainable development in line with national and local policy, we can recommend the approval of these measures by Cherwell District Council.