

Redevelopment Proposal of 2 - 16 Clifton Down Road by THAT Group

Technical Review of Energy and Sustainability Statement  
for  
Clifton & Hotwells Improvement Society  
and  
Mall Garden's Residents Association

17 March 2019

## 1.0 Introduction

Bristol is committed to becoming carbon neutral by 2030 in 11 years time: Bristol is committed to an 80% reduction in CO<sub>2</sub> emissions by 2050. This building, if allowed and built, would actually add more than 70 thousand kilograms of CO<sub>2</sub> annually, amounting to some 2,100,000 kg of carbon dioxide emissions before that date.

It would have been hoped that a major design departure point would have been to design an energy conscious building that complied with and exceeded the minimum requirements set out in the Building Regulations and Planning Policy. It is the expectation of the local community that any new building on this site would be an exemplar in terms of sustainability as well as being a building that '*enhances and preserves*' the character of the Clifton Conservation Area. The building singularly fails on both counts.

The first priority set out in Bristol Planning Policy BCS 14 is '**1 Minimising Energy Requirements.**' Minimising energy requirements means exactly what it says: it does not mean merely reducing energy requirements below the current minimum levels set out in Part L2A of the Building Regulations. The heat transfer coefficients (U-values) proposed are merely orthodox ; they are very far removed from minimum U values.

In summary, there are major and fundamental problems with the design of this building from the point of view of energy requirements:

1.1 The average heat transfer coefficient (U value) of the external wall is estimated to be about 0.9 W/m<sup>2</sup>K. This figure is some **nine times greater** than the U value proposed for the roof (0.1 W/m<sup>2</sup>K) and about **six times worse** than the Passivhaus standard (a recognised standard for energy conscious design) minimum value for external walls (0.15 W/m<sup>2</sup>K).

1.2 Glazing represents over 60% of the total area of all four facades. The thermal transmission rate of the glazing proposed (U = 0.17 W/m<sup>2</sup>K) is about **eight times greater** than the thermal transmission rate for the walls (U = 1.35 W/m<sup>2</sup>K).

1.3 The excessive use of glass will also result in excessive **solar heat gains**.

1.4 Natural ventilation is not proposed ( a requisite of an energy conscious design): as a result, air conditioning will be required, resulting in very considerable additional energy. The applicants do not propose to use a renewable electricity supplier.

1.5 Section 4.13.6 of the Core Strategy requires the avoidance of mechanical ventilation, ie the use of natural ventilation.

1.6 Inadequate renewable energy generation is proposed, a mere 10% reduction of CO2 emissions from the residual energy usage. **BCS14 requires a minimum reduction of at least 20%.**

## 2.0 Bristol City Planning Policy Requirements

The introduction to policies BCS13, 14 & 15 states that Bristol City Council is committed to an 80% reduction in CO2 emissions by 2050. It must be expected that all new build projects make a very substantial contribution towards the achievement of this objective.

The implementation of this strategy '**will require the implementation of standards for sustainable energy and sustainable design and construction.**'

### 2.1 Policy BCS13

The policy requires that new development should (ie **must**) include:

**a.** High standards of energy efficiency including optimal levels of thermal insulation, passive ventilation, and cooling, passive solar design, and the efficient use of natural resources.

The proposal does **not** propose high standards of thermal insulation.

The proposal does **not** propose passive (ie natural) ventilation.

The proposal does **not** propose passive cooling.

The proposal is **not** a passive solar design.

The proposal does **not** promote the efficient use of natural resources: no recycled material are proposed on the construction.

**b.** The use of decentralised, renewable and low carbon energy supply systems.

The proposal does **not** include combined heat and power (CHP) system, or combined cooling, heat and power (CCHP)

The proposal does **not** include wind generation sited locally or remotely.

The proposal does **not** include passive solar heat generation.

The proposal does **not** include remote photo voltaic electricity generation. Only nominal pv generation (10%) is proposed due to the specific design of the building. Other built forms would be capable of far higher electricity generation.

**c.** The development should adapt to climate change through measures including site layout and design which provide resilience to climate change, measures to conserve water, the use of green infrastructure (two important tree have already been felled), and the avoidance of responses to climate impacts which lead to increases in energy use and CO2 emissions.

The proposal will result in even higher energy use and CO2 emissions as a result of rising temperatures and summer solar heating.

Minimal and ineffectual landscape measures are proposed: the scheme does not even envisage a roof terrace with shaded terraces and trees, nor a green wall. Instead the proposals envisages a roof covered in mechanical plant including air conditioning units to

counter the excessive solar heating in summer. There has been no consideration of remotely sited pv.

The Sustainability Statement singularly **fails** to demonstrate 'how it would contribute to mitigating and adapting to climate change and to meeting targets to reduce carbon dioxide emissions'. The Sustainability Statement also fails to address other relevant issues, for example embodied energy or recycled materials. Reuse of the existing massive concrete structure on site has not been considered.

**d.** The development should avoid adapting to the impacts of climate change in ways that would increase the city's carbon emissions, such as by the widespread **use of mechanical ventilation**.

**The proposal envisages 100% mechanical ventilation.**

## **2.2 Policy BCS 14**

The policy requires that new development should (ie must) include measures to reduce carbon dioxide emissions from energy use in accordance with the following energy hierarchy::

### **a. Minimising energy requirements**

The proposed heat transfer coefficient for walls is only 0.17 W/m<sup>2</sup>K.  
The proposed heat transfer coefficient for glazing is only 1.35 W/m<sup>2</sup>K.  
The proposed heat transfer coefficient for doors is only 1.5 W/m<sup>2</sup>K  
The proposed heat transfer coefficient for roofs is only 0.1 W/m<sup>2</sup>K  
The proposed heat transfer coefficient for the floor is only 0.18 W/m<sup>2</sup>K

These figures do not represent achievable minima; for example Passivhaus standards require minimum U values of windows to be less than 0.8 W/m<sup>2</sup>K. The Passivhaus minimum average wall (ie including windows and doors) heat transfer rate is 0.15 W/m<sup>2</sup>. It is estimated that the average U value for the external walls of this project is approximately 0.9 W/m<sup>2</sup>K. This is **six times worse** than the Passivhaus standard.

The average heat transfer coefficient (U value) of the external wall is estimated to be about 0.9 W/m<sup>2</sup>K. This figure is some nine times greater than the U value proposed for the roof (0.1 W/m<sup>2</sup>K) and about six times worse than the Passivhaus standard (a recognised standard for energy conscious design) minimum value for external walls (0.15 W/m<sup>2</sup>K).

### **b. Incorporating renewable energy sources**

Minimal renewable energy proposals (a 43 kWp array) are included that reduced carbon emissions that are 100% greater than the minimum policy requirements (20% reduction in carbon dioxide emissions from residual energy). The reason given by the services engineers is that '*this would not be appropriate for the setting of this development. It would be overbearing and visible from the street*'. The requirement for the designers of the project (FKBS) is to ensure that the renewable energy devices are fully integrated with the design so that they are appropriate and not overbearing.

No proposals have been made for remotely sited energy generation or for using electricity generated sustainably from the grid.

### **C Incorporating low-carbon energy sources.**

No proposals for low carbon energy sources have been put forward.

#### **The use of CHP or CCHP has not been properly considered and is not proposed.**

The heating and cooling systems have not been described and it has not been demonstrated that the selection has been made in accordance with the Council's heat priority.

Paragraph 4.14.6 of the Core Strategy states that a proposal for development (ie a planning application) *'should be accompanied by an energy strategy ... which should set out measures to reduce CO2 emissions from energy use in accordance with the energy hierarchy.'*

The strategy needs to:

Set out the projected annual energy demands for heat and power from the proposed development against the appropriate baseline (2006 Building Regulations Part L standards), along with the associated CO<sub>2</sub> emissions.

Show how these demands have been reduced via energy efficiency and low carbon energy sources such as CHP and district heating, and set out the CO<sub>2</sub> emissions associated with the residual energy demand.

Demonstrate how the incorporation of renewable energy sources will offset the CO<sub>2</sub> emissions arising from the residual energy demand.

## **3.0 The MZA Energy and Sustainability Statement**

The MZA 'Energy and Sustainability Statement' does not include an Energy Strategy that answers the requirement of the Policy.

### **3.1 Executive Summary**

MZA state that the purpose of their report is to *'support the planning application for the development of the vacant site on Clifton Down Road by summarising the proposed energy efficiency and sustainability measures proposed for the development.'*

What this statement makes clear is that they do not even seek to demonstrate compliance with the high level aims and objective of Planning policy nor even the quantifiable Policy requirements.

It is stated, **misleadingly**, that the 'improvements' in U values together with PVs 'will allow the site to reduce carbon emissions from the baseline Part L compliance by the 20% requirement.' The requirement ( BCS 14 4.14.8 ) is in fact the reduction in carbon emissions by means of 'on-site renewable energy sources in order to achieve a 20% reduction in CO<sub>2</sub> emissions from residual energy use in the development.' **As the table presented in 5.5 of the MZA report makes clear, the saving achieved on residual carbon emissions is only 10%.**

**The MZA summary does not reveal the fact that the proposal fails to meet the 20% reduction target and by some 100%.**

### 3.2 Introduction

The report states, as if of fact, that the development will consist of an M&S Food 'unit' ie shop. In fact the new Clifton Foodhall is planned to open in Whiteladies Road in March 2019.

### 3.3 Regulation, Policy and performance Targets

The report addresses matters of compliance with **Building Regulations** which requires a completely separate application and consent. The proposed thermal transmission rates (U-values) are revealed.

The report notes the need for compliance with local policy: **BC14, BCS15 and BCS16** but fails to demonstrate compliance. Indeed the report makes it clear that the proposal does not comply with BCC policy requirements.

Mention only is made of Chapter 14 of the **National Planning Policy Framework** and states that the policy 'makes it a requirement for the built environment to reduced CO<sub>2</sub> emissions and energy demand, and to promote renewable energy.' Chapter 14 does not exist in the NPPF. The relevant chapter is chapter 10.

There are no further references to the NPPF in the MZA report.

The NPPF however states:

95 'when setting any local requirement for a building's sustainability, do so in a way consistent with the **Government's zero carbon buildings policy** and adopt nationally described standards'.

96 'In determining planning applications, local planning authorities should expect new development to:

- comply with adopted Local Plan policies on local requirements for decentralised energy supply unless it can be demonstrated by the

applicant, having regard to the type of development involved and its design, that this is not feasible or viable; and

- take account of landform, layout, building orientation, massing and landscaping to minimise energy consumption.

The building is not a passive solar energy design. It does not take advantage of the potential for solar gain on the Clifton Down Road elevation which faces WSW or the SSE elevation. The elevation facing NNW and ESE are fenestrated in exactly the same way as those with overshadowed northerly orientations.

### **3.4 Zero Carbon Technologies (LZC) Feasibility Study**

It is considered that no or insufficient thought has been given to at least two of the seven possible technologies identified by MZA.

It is considered that an independent report should be commissioned to investigate.

### **3.5 Initial Simplified Building Energy Model (SBEM) Modelling**

### **3.6 Building Regulations**

Part L2A of the Building Regulations (Conservation of Fuel and Power in New Buildings other than Dwellings) is referenced by BCC's planning policies. The Regulations refer to three design standards: 1. a target Emission Rate (TER), 2. Design Flexibility and 3. Limiting the Effects of Heat Gains in Summer.

#### **1. Target Emission Rate (TER)**

The SBEM calculations have been carried out to check compliance with Building Regulations. The building as proposed is stated to pass the current Building Regulations from the point of view of emission targets, although the maximum U values permitted under L2A do not appear to be correct.

The report fails to compare alternative designs, constructions or energy systems.

It is clear that the building as designed is not intended to be a zero carbon building nor a low energy design.

The building is to be mechanically and not naturally ventilated and it is to be provided with air conditioning. The building has not been designed to either maximise useful solar gains nor designed to minimise the effects of heat gains in

summer as required by the Building Regulations ( L2A Criterion 3 ). The intention is to limit heat gains in order to reduce the need for air conditioning.

The Regulations state that: *'the developer should work with the design team to specify what constitutes an acceptable indoor environment in the particular case, and carry out the necessary design assessments to develop solutions that meet the agreed brief.'*

The proposed construction proposes heat transfer coefficients for walls of some **0.17 W/m<sup>2</sup>K** and for glazing only **1.35 W/m<sup>2</sup>K**. These U values are far too high to achieve the objectives set out in Bristol's planning policies.

The average heat transfer coefficient (U value) of the external wall is estimated to be about **0.9 W/m<sup>2</sup>K**. This figure is some **nine times greater** than the U value proposed for the roof (**0.1 W/m<sup>2</sup>K**) and about **six times worse** than the Passivhaus standard (a recognised standard for energy conscious design) minimum value for external walls (**0.15 W/m<sup>2</sup>K**).

One of the principle reasons for the poor energy performance of the building is the very high proportion of glazing. Glazing represents **over 60%** of the total area of all four facades. The thermal transmission rate of the glazing proposed (**U = 0.17w/mwK**) is about **eight times greater** than the thermal transmission rate for the walls (**U = 1.35 W/m<sup>2</sup>K**). Whilst it would be possible to increase the thermal performance of solid walls, it is very difficult and expensive to increase the thermal performance of the glazing. By such means as triple glazing it might be possible to improve on the u value by at least 40 %. ( $U < 0.8 \text{ W/m}^2\text{K}$ ). However, the carbon emission would still be far too high. The reason lies in the fundamental design of the building: the **over glazing results both in excessive and unacceptable heat losses** and in **soar heat gains** that requires air conditioning.

### 3. Limiting the Effects of Heat Gains in Summer

Natural ventilation is not proposed ( a requisite of an energy conscious design): the building is clad with fixed glazing. There are no windows.

The proposal is or an over-glazed international style retail complex which would suffer from excessive solar gain, requiring cooling to maintain comfortable temperature internally. As the building has not been designed to be naturally ventilated, as a carbon neutral building would be, it will be necessary to provide air conditioning units that would be sited on the roof of this building. Such units would not only create considerable carbon emissions, they would be unsightly and create unwelcome noise.

Section 2.53 of Part L2A states that *'reasonable provision for limiting solar gain through the building fabric would be demonstrated by showing that, for each space in the building that is either occupied or mechanically cooled, the solar gains through the glazing aggregated over the period from April to September inclusive are no greater than would occur through one of the following reference glazing systems with a defined total solar energy transmittance (g-value) calculated according to BS EN 410.'* The Regulations cite 4 reference gazing systems. The relevant system would be *'an east-facing façade with full-width glazing to a height of 1.0 m having a framing factor of 10 per cent and a normal*

solar energy transmittance (g-value) of 0.68.'

The proposed building has full-width glazing to a height of 2.55m on the ground floor. It is estimated that the solar gain on the east elevation on the ground floor would be approximately 2.5 times the maximum allowable and that **the elevations are therefore over-glazed by a factor of the order of 2.5.**

The proposed building has full-width glazing to a height of 2.05m on the first floor. It is estimated that the solar gain on the east elevation on the first floor would be approximately 2.0 times the maximum allowable and that **the elevations are therefore over-glazed by a factor of the order of 2.**

The proposed building has full-width glazing to a height of 2.15m on the second floor. It is estimated that the solar gain on the east elevation on the second floor would be approximately 2.1 times the maximum allowable and that **the elevations are therefore over-glazed by a factor of the order of 2.1.**

**In order to achieve compliance with Part L2A of the Building Regulations, to limit solar gains alone, a total redesign would be necessary. It would be best practice to ensure compliance with the Building Regulations before the submission of a planning application because compliance has a profound effect on the design and appearance of the building as all architects and their energy consultants know well.**

The air conditioning that this particular design requires would result in very considerable additional energy costs and consequent carbon emissions unless Green electricity is used. The applicants do not propose to use a renewable electricity supplier. As a result only 30% of the electricity required will have been generated by renewables.

Section 4.13.6 of the Core Strategy however **requires the avoidance of mechanical ventilation**, ie the use of natural ventilation.

Inadequate renewable energy generation is proposed, a mere 10% reduction of CO2 emissions from the residual energy usage. **BCS14 requires a minimum reduction of at least 20%.**

## **4.0 Conclusion**

The proposal fails to address C21 climate change concerns; it fails to comply with the mandatory requirements of planning policy and the Building Regulations.

The proposal for an over-glazed international style retail complex will suffer from excessive heat loss for much of the year and excessive solar gain in summer that will require mechanical cooling to maintain comfortable temperature internally.

Such a building type has no place in Clifton nor the UK nor any other city in the world. Such an old fashioned building type it has to be said is or soon will be completely obsolete. It would do no credit to Bristol, and fly in the face of the aspirations of the City's former Green City status.

## Appendix

### BCC Planning Policies

#### **Policy BCS13**

Development should contribute to both mitigating and adapting to climate change, and to meeting targets to reduce carbon dioxide emissions.

Development should mitigate climate change through measures including:

High standards of energy efficiency including optimal levels of thermal insulation, passive ventilation and cooling, passive solar design, and the efficient use of natural resources in new buildings.

The use of decentralised, renewable and low-carbon energy supply systems.

Patterns of development which encourage walking, cycling and the use of public transport instead of journeys by private car.

Development should adapt to climate change through measures including:

Site layouts and approaches to design and construction which provide resilience to climate change.

Measures to conserve water supplies and minimise the risk and impact of flooding.

The use of green infrastructure to minimise and mitigate the heating of the urban environment.

Avoiding responses to climate impacts which lead to increases in energy use and carbon dioxide emissions.

These measures should be integrated into the design of new development.

New development should demonstrate through Sustainability Statements how it would contribute to mitigating and adapting to climate change and to meeting targets to reduce carbon dioxide emissions by means of the above measures.

#### **Policy BCS14**

Proposals for the utilisation, distribution and development of renewable and low-carbon sources of energy, including large-scale freestanding installations, will be encouraged. In assessing such proposals the environmental and economic benefits of the proposed development will be afforded significant weight, alongside considerations of public health and safety and impacts on biodiversity, landscape character, the historic environment and the residential amenity of the surrounding area.

Development in Bristol should include measures to reduce carbon dioxide emissions from energy use in accordance with the following energy hierarchy:

1. Minimising energy requirements;
2. Incorporating renewable energy sources;
3. Incorporating low-carbon energy sources.

Consistent with stage two of the above energy hierarchy, development will be expected to provide sufficient renewable energy generation to reduce carbon dioxide emissions from residual energy use in the buildings by at least 20%. An exception will only be made in the case where a development is appropriate and necessary but where it is demonstrated that meeting the required standard would not be feasible or viable.

The use of combined heat and power (CHP), combined cooling, heat and power (CCHP) and district heating will be encouraged. Within Heat Priority Areas, major development will be expected to incorporate, where feasible, infrastructure for district heating, and will be expected to connect to existing systems where available.

New development will be expected to demonstrate that the heating and cooling systems have been selected according to the following heat hierarchy:

1. Connection to existing CHP/CCHP distribution networks
2. Site-wide renewable CHP/CCHP
3. Site-wide gas-fired CHP/CCHP
4. Site-wide renewable community heating/cooling
5. Site-wide gas-fired community heating/cooling
6. Individual building renewable heating

### **Policy BCS15**

Sustainable design and construction will be integral to new development in Bristol. In delivering sustainable design and construction, development should address the following key issues:

Maximising energy efficiency and integrating the use of renewable and low-carbon energy;

Waste and recycling during construction and in operation;

Conserving water resources and minimising vulnerability to flooding;

The type, life cycle and source of materials to be used;

Flexibility and adaptability, allowing future modification of use or layout, facilitating future refurbishment and retrofitting;

Opportunities to incorporate measures which enhance the biodiversity value of development, such as green roofs.

New development will be required to demonstrate as part of the Sustainability Statement submitted with the planning application how the above issues have been addressed. For major development and development for health or education uses, the Sustainability Statement should include a BREEAM and/or Code for Sustainable Homes assessment. Additionally, in the case of a super-major development, a BREEAM for Communities assessment will be required.

From 2016 residential development will be expected to meet Level 6 of the Code for Sustainable Homes. For non-residential development, also from 2016, a BREEAM "Excellent" rating will be expected.

All new development will be required to provide satisfactory arrangements for the storage of refuse and recyclable materials as an integral part of its design. Major developments should include communal facilities for waste collection and recycling where appropriate.

New homes and workplaces should include the provision of high-speed broadband access and enable provision of Next Generation broadband