Mercure Hotel, Bloomsbury
Camden

Sustainability Statement

Revision 1: December 2018

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1 Introduction

1.1 Background

1.1.1 This Statement supports and forms part of the planning application documentation submitted for the proposed extension of the Mercure London Bloomsbury Hotel, on Southampton Row, Camden. It has been prepared on behalf of Fairview Hotels, the Applicant, and describes the approach to sustainable design for the site.

1.1.2 It describes the planning policy requirements for the site, and outlines the targets that the development will aim to achieve. The solutions provided are described in as much detail as is possible at this application stage. Where specifics have not been possible, the overall approach and design standards are explained.

1.2 Site Description

1.2.1 The proposed development comprises an extension and alterations to the existing hotel, providing the hotel with additional accommodation. The hotel is located within the Bloomsbury Conservation Area, and as a result the design of the extension has been informed by expertise from the Iceni and pre-application advice from council officers. The size of the extension is $586m^2$ GIA.

1.2.2 The extension to the building is predominantly in the rear and side – away from the main Southampton Row thoroughfare, and as such the visual impact from the proposals will be minimised. The extension therefore primarily occupies the existing light well to the rear of the building and the elevation to Cosmo Place, with alterations to the existing roof space to provide additional accommodation too, with alterations to the existing mechanical and electrical infrastructure/systems necessary.

1.2.3 A detailed set of drawings accompany the application within the Design and Access Statement compiled Dexter Moren (architects), and the Planning Statement completed by DP9 describes the proposed changes in detail, and therefore we do not propose to provide them again here. An image of the existing building, and its location within Bloomsbury adjacent to Russell Square, are shown below.

Figure 1: Mercure Bloomsbury from Southampton Row

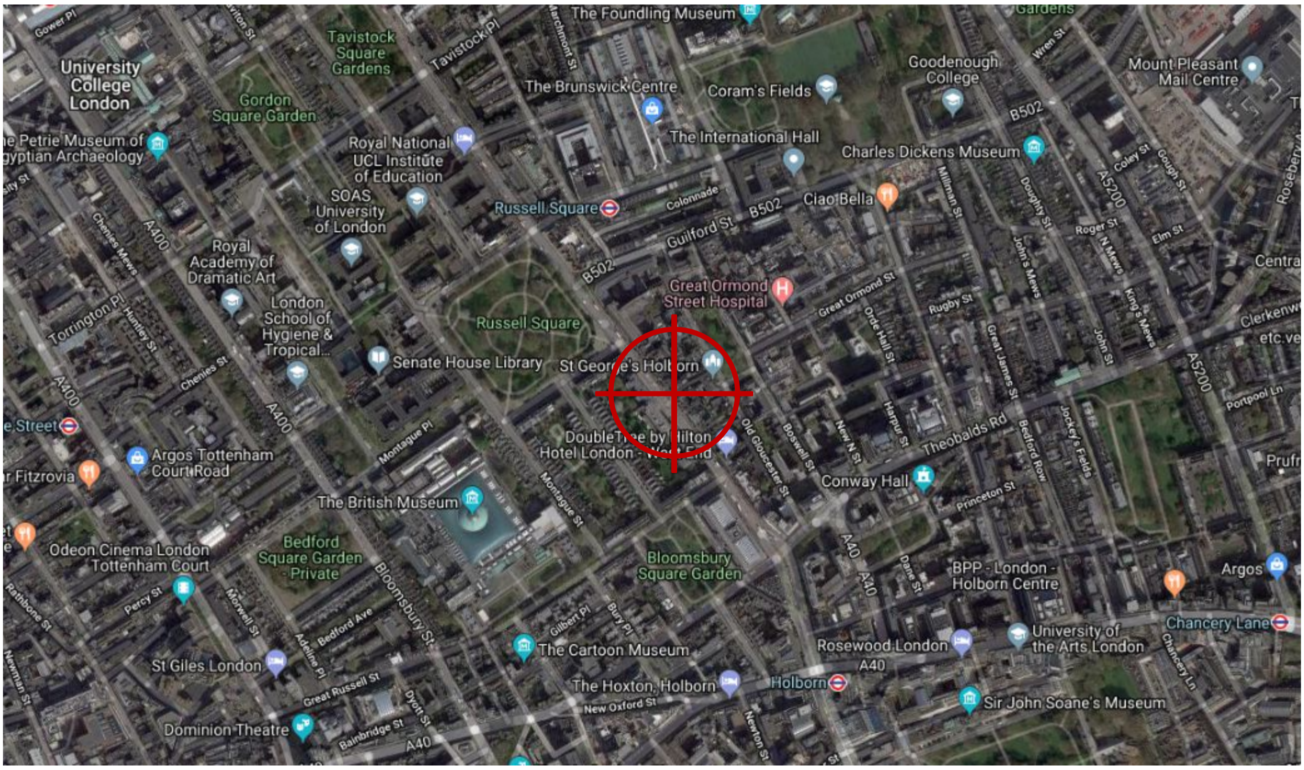


Figure 2: Location of proposed development

2 Sustainability Policy Review

2.1 National Level

2.1.1 The policy framework encouraging sustainable new development is comprehensive, at both a national and local level.

The National Planning Policy Framework (NPPF)

2.1.2 The NPPF contains a 'presumption in favour of sustainable development', which is defined by five principles as set out in the UK Sustainable Development Strategy described above. In order to clarify what sustainable development is, the Government has stated that it can play three critical roles:

- an economic role, contributing to a strong, responsive, competitive economy;
- a social role, supporting vibrant and healthy communities and;
- an environmental role, protecting and enhancing our natural, built and historic environment.

2.1.3 Emphasising design, the NPPF states that *"good design is a key aspect of sustainable development, is indivisible from good planning, and should contribute positively to making places better for people*." The NPPF sets out 12 core planning principles which "should underpin both plan-making and decision-taking", and of which five are particularly relevant to this document. In this context planning should:

- Seek to secure a high-quality of design and a good standard of amenity for occupants;
- Support the transition to a low-carbon future, take account of flood risk and coastal change and encourage the reuse of existing and renewable resources;
- Help conserve and enhance the natural environment and reduce pollution, allocating land of "lesser environmental value";
- Manage development to make full use of public transport, walking and cycling; and
- Take account of local strategies to improve health, social, and cultural wellbeing.

2.1.4 The Planning Policy Guidance to accompany the NPPF contains further details in how to respond to the NPPF, in particular the following are relevant to this report:

- Climate Change: which 'advises how planning can identify suitable mitigation and adaptation measures in plan-making and the application process to address the potential impacts of climate change'.
- Renewable and Low Carbon Energy: which 'assists local councils in developing policies for renewable energy in their local plans, and identifies the planning considerations for a range of renewable sources such as hydropower, active solar technology, solar farms and wind turbines'.

Building Regulations Standards

2.1.5 Part L Building Regulations 2013: the most recent changes to the Building Regulations took effect in April 2014, and the overall aim of the changes has been to deliver further reductions in CO_2 emissions resulting from new development. The changes result in a CO_2 saving of approximately 8-10% against 2010 Building Regulations standards. These - most recent changes

- introduced an additional fabric energy efficiency target, related to the heating energy performance of the buildings. This requires even more energy efficient design of the thermal envelope.

2.2 London Plan

2.2.1 The London Plan provides the overall planning framework for London, with local authorities interpreting this on a local basis within their own policy documentation / plans. Perhaps of most pertinence here is London Plan Policy 5.2, provided below:

> 'A: Development proposals should make the fullest contribution to minimising carbon dioxide emissions in accordance with the following energy hierarchy:
>
> Be lean: use less energy
> Be clean: supply energy efficiently
> Be green: use renewable energy
>
> B: The Mayor will work with boroughs and developers to ensure that major developments meet the following targets for carbon dioxide emissions reduction in buildings. These targets are expressed as minimum improvements over the Target Emission Rate (TER) outlined in the national Building Regulations [2010] leading to zero carbon residential buildings from 2016 and zero carbon non-domestic buildings from 2019.
>
> Residential buildings: 2013-2016 – 40%
> Non-Residential buildings: 2013-2016 – 40%
>
> C: Major development proposals should include a detailed energy assessment to demonstrate how the targets for carbon dioxide emissions reduction outlined above are to be met within the framework of the energy hierarchy.
>
> D: As a minimum, energy assessments should include the following details:
>
> > a calculation of the energy demand and carbon dioxide emissions covered by Building Regulations and, separately, the energy demand and carbon dioxide emissions from any other part of the development, including plant or equipment, that are not covered by the Building Regulations (see paragraph 5.22) at each stage of the energy hierarchy
> >
> > b proposals to reduce carbon dioxide emissions through the energy efficient design of the site, buildings and services
> >
> > c proposals to further reduce carbon dioxide emissions through the use of decentralised energy where feasible, such as district heating and cooling and combined heat and power (CHP)
> >
> > d proposals to further reduce carbon dioxide emissions through the use of on-site renewable energy technologies.
>
> E: The carbon dioxide reduction targets should be met on-site. Where it is clearly demonstrated that the specific targets cannot be fully achieved on-site, any shortfall may be provided off-site or through a cash in lieu contribution to the relevant borough to be ring fenced to secure delivery of carbon dioxide savings elsewhere.'

2.2.2 The London Plan Sustainable Design and Construction SPD updated this policy insofar as the target levels have been revised as a result of changes to Building Regulations in 2013/14. The SPG states that:

> 'To avoid complexity and extra costs for developers, the Mayor will adopt a flat carbon dioxide improvement target beyond Part L 2013 of 35% to both residential and non-residential development.'

2.2.3 However, this development does not fall within the category of major development from a London Plan perspective (it falls below the 1,000m^2 threshold for commercial development). Furthermore, as an extension to an existing building, connected into existing building services systems, located in a conservation area, the opportunities to address these targets are not only technically limited, but also the requirements for extensions of this type under Part L of the Building Regulations are considerably different to standalone new build development.

2.2.4 Therefore we suggest that the basis of assessment for sustainable development is driven by the local planning requirement rather than those implied by the London Plan.

2.3 Camden Local Plan 2017

2.3.1 The three key policies within the 2017 adopted Camden Local Plan for this document are as follows:

> **Policy CC1 Climate change mitigation**
> The Council will require all development to minimise the effects of climate change and encourage all developments to meet the highest feasible environmental standards that are financially viable during construction and occupation. We will:
>
> a. promote zero carbon development and require all development to reduce carbon dioxide emissions through following the steps in the energy hierarchy;
> b. require all major development to demonstrate how London Plan targets for carbon dioxide emissions have been met;
> c. ensure that the location of development and mix of land uses minimise the need to travel by car and help to support decentralised energy networks;
> d. support and encourage sensitive energy efficiency improvements to existing buildings;
> e. require all proposals that involve substantial demolition to demonstrate that it is not possible to retain and improve the existing building; and
> f. expect all developments to optimise resource efficiency.
>
> For decentralised energy networks, we will promote decentralised energy by:
> g. working with local organisations and developers to implement decentralised energy networks in the parts of Camden most likely to support them;
> h. protecting existing decentralised energy networks (e.g. at Gower Street, Bloomsbury, King's Cross, Gospel Oak and Somers Town) and safeguarding potential network routes; and
> i. requiring all major developments to assess the feasibility of connecting to an existing decentralised energy network, or where this is not possible establishing a new network.

To ensure that the Council can monitor the effectiveness of renewable and low carbon technologies, major developments will be required to install appropriate monitoring equipment.

Policy CC2 Adapting to climate change

The Council will require development to be resilient to climate change. All development should adopt appropriate climate change adaptation measures such as:

a. the protection of existing green spaces and promoting new appropriate green infrastructure;
b. not increasing, and wherever possible reducing, surface water runoff through increasing permeable surfaces and use of Sustainable Drainage Systems;
c. incorporating bio-diverse roofs, combination green and blue roofs and green walls where appropriate; and
d. measures to reduce the impact of urban and dwelling overheating, including application of the cooling hierarchy.
Any development involving 5 or more residential units or 500 sqm or more of any additional floorspace is required to demonstrate the above in a Sustainability Statement.

Sustainable design and construction measures

The Council will promote and measure sustainable design and construction by:

e. ensuring development schemes demonstrate how adaptation measures and sustainable development principles have been incorporated into the design and proposed implementation;
f. encourage new build residential development to use the Home Quality Mark and Passivhaus design standards;
g. encouraging conversions and extensions of 500 sqm of residential floorspace or above or five or more dwellings to achieve “excellent” in BREEAM domestic refurbishment; and
h. expecting non-domestic developments of 500 sqm of floorspace or above to achieve “excellent” in BREEAM assessments and encouraging zero carbon in new development from 2019.

Policy CC3 Water and flooding

The Council will seek to ensure that development does not increase flood risk and reduces the risk of flooding where possible. We will require development to:

a. incorporate water efficiency measures;
b. avoid harm to the water environment and improve water quality;
c. consider the impact of development in areas at risk of flooding (including drainage);
d. incorporate flood resilient measures in areas prone to flooding;
e. utilise Sustainable Drainage Systems (SuDS) in line with the drainage hierarchy to achieve a greenfield run-off rate where feasible; and
f. not locate vulnerable development in flood-prone areas.

Where an assessment of flood risk is required, developments should consider surface water flooding in detail and groundwater flooding where applicable.

Policy CC5 Waste

The Council will seek to make Camden a low waste borough. We will:

a. aim to reduce the amount of waste produced in the borough and increase recycling and the reuse of materials to meet the London Plan targets of 50% of household waste recycled/composted by 2020 and aspiring to achieve 60% by 2031;
b. deal with North London's waste by working with our partner boroughs in North London to produce a Waste Plan, which will ensure that sufficient land is allocated to manage the amount of waste apportioned to the area in the London Plan;
c. safeguard Camden's existing waste site at Regis Road unless a suitable compensatory waste site is provided that replaces the maximum throughput achievable at the existing site; and
d. make sure that developments include facilities for the storage and collection of waste and recycling.

2.4 Policy Discussion and Targets

BREEAM

2.4.1 Accompanying this Statement – as an Appendix, is a BREEAM 2018 report which has been completed by partners Southfacing Ltd explaining the standards of BREEAM that could be achieved within the wider constraints of the proposals. These constraints are considerable and as a result the council's aspiration to achieve the 'Excellent' standard on this development, despite exceeding the 500m^2 threshold, will not be possible. We have provided a brief summary of that Southfacing work within this document but the detail remains within the Appendix.

Energy and Emissions

2.4.2 The nature of the proposals – a hotel extension within a conservation area essentially only providing additional rooms, significantly restricts opportunities for creative use of energy supply options and the application of zero emission technologies. For example, hot water will need to continue to be supplied from the existing, functioning, gas boiler plant within the hotel. There is no opportunity for installing PV or solar thermal technologies on the development. The need to provide space heating and comfort cooling, however, does offer an opportunity for low carbon technologies, and the energy modelling undertaken does examine the use of heat pump systems. A 35% reduction in emissions, however, will not be possible on this development, for reasons explained in the Energy section.

Other Aspects

2.4.3 We have addressed a range of other sustainable design and construction issues within this document again as far as possible within the constraints, or within the context of what is applicable in this scenario. These include water use/efficiency, potential ecological improvements, climate change adaptation issues, etc.

3 The Energy Hierarchy

3.1 Introduction / Background

3.1.1 The nature of this development – an extension to an existing hotel – coupled with the highly constrained nature of the site (both physically and in relation to the location within a conservation area) – mean that they usual range of design and technology options available to developers are simply not viable here.

3.1.2 Nevertheless, the Applicant recognises that there is a real need to ensure that the proposed extension is as thermally efficient as possible, and that building services are the most efficiency available, where installed to the extension. This section therefore addresses the Energy Hierarchy as far as possible, within the context of these challenges.

3.2 The Energy Hierarchy – Reducing Demand

3.2.1 The overall approach to energy is to reduce ***demand*** for energy as far as possible through the creation of a thermally efficient, easily controlled and well designed extension to the existing hotel. This represents the first step of the Energy Hierarchy.

3.2.2 There is no flexibility in the way the building extension is oriented – the majority of the extension on the side/rear elevations of the building, and therefore designing for beneficial solar gain is generally not possible. The roof extension will of course be more accessible to direct sunlight, but again the proposals follow the line of the existing building. Of more importance, therefore, is the way in which the extension will be built, and how thermally efficient it is.

Thermal Specification

3.2.3 The integration of energy efficiency measures and improved thermal specifications will increase thermal performance of a building, but they also are a key consideration at design stage because they last the whole life of the building, unlike heating and renewable energy systems.

3.2.4 In addition, air tightness of a building is important in reducing heat loss, but also in the prevention of draughts. The target for the extension will be to ensure it is built with an air permeability rate of $5m^3/m^2$@50Pa or less. This will help reduce the burden on the heating system, improve the building's lifespan, reduce sound transmission through the structure and finally reduce energy use and carbon emissions.

Element	Building Regulations Limiting Value	Target U-value (W/m^2K)
Roof	0.20	0.10
Sloping ceiling / room in roof	0.20	0.15
External walls	0.30	0.20
Ground /exposed floors	0.25	≈0.12
Windows / glazing	2.00	1.40
External Doors	2.00	1.00

Factor	Recommended value
Thermal bridging	0.08 (Accredited Construction Details)
Air tightness (where testable)	$5m^3/m^2$@50Pa

Table 1: Summary of U-values and specifications (indicative)

Lighting and Fixtures

3.2.5 Additional energy savings will be made by maximising the efficiency of lighting, fixtures and fittings. All electric lighting will be energy efficient – using LED fittings/spotlights. Other fixtures and fittings will be specified that reduce hot water consumption with low and/or aerated flows.

Reducing Demand: Energy Results

3.2.6 This revision of the report responds to a comment from the Camden Sustainability Officer that energy hierarchy results were not supplied in the original version. Under 'normal' circumstances, where the entirety of the building was new build, we would be able to demonstrate what the Building Regulations Target Emission Rate – or minimum performance standard in terms of demand and emissions would be. However, the nature of the proposals – an extension to the existing building, integrated in part or in whole into the existing M&E infrastructure, and in a conservation area – means deriving robust SBEM calculations is not possible.

3.2.7 This is because the extension of a non-domestic building does not necessarily require full assessment using SBEM/BRUKL (the outputs of Part L calculations for new build non-domestic property), because compliance for extensions is generally achieved by following the requirements of Part L2B in terms of controlled fittings and new thermal elements. Based on the above specifications, the building would therefore comply with Regulations. There is also the possibility that a resulting EPC may not be necessary owing to the conservation area, but again that will be ultimately decided by Building Control.

3.2.8 Should planning be granted, then specific advice from the Building Control officer will be sought on the application of Building Regulations standards in the context of the proposals and the heritage/conservation area, and what needs to be achieved.

3.2.9 Because we cannot provide a Building Regulations, 'pre-energy efficiency enhancement' scenario, we have sought to demonstrate in Table 1 how each of the individual thermal elements of the building will significantly outperform the Building Regulations maxima. Our proposed 'baseline' therefore is already energy efficient and exceeds what would otherwise be required. The associated energy calculation is shown in Table 2, Energy Demands and Carbon Emissions. **Scenario 1** provides the estimated energy demands for the extension, using building simulation modelling, assuming the specification in Table 1 and connection to the existing gas boiler infrastructure.

3.3 The Energy Hierarchy – Supplying Energy Efficiently

District Heating

3.3.1 Gas CHP at a small scale is certainly an option for hotels, however in this case the space available for this plant in addition to peaking gas boilers is not available, and nor is it currently planned to replace the existing boiler system. Therefore it is not currently an option for this site.

3.3.2 Whilst we appreciate the council's wider aim of expanding district heating facilities across the area, it would nevertheless remain impractical at this stage to incorporate third party heating systems into the existing hotel services, unless there was a major overhaul planned of the existing plant room (which there isn't) that coincided with the availability of heat in this exact location from the heat network provider (which is currently unclear). The location and size of the existing plant room would not be conducive to heat network connection either. We do not think it would therefore be prudent or needed for the Applicant to explore this further.

Space heating and domestic hot water

3.3.3 The proposals are for an extension to the existing building, and although there is currently no detailed mechanical and electrical design (which would be undertaken should planning permission be granted) the baseline solution would be to connect the extension into the existing plant to supply space heating and hot water. The hotel has a plant room in the basement that includes a functioning 400kW gas boiler system alongside a number of additional direct hot water heaters supplying hot water throughout the building. If, after a full M&E review, a replacement boiler would be necessary, this would provide a beneficial improvement to the energy performance of the whole site. At the point of installation, the existing boiler efficiency was around 85%, but this will have inevitably deteriorated in the intervening period. A new boiler – if required – would potentially have an efficiency in excess of 92%, and thus result in a reduction in energy use, energy costs and associated carbon emissions. Cold water boosting plant is also located in the basement, with heavy duty pumps ensuring adequate pressure throughout the building.

3.3.4 There is, however, another preferred option available in relation to the provision of space heating, identified in more detail in discussion of the third part of the Energy Hierarchy in Section 3.4 (Renewable and Low Carbon Systems), although a full M&E review will need to be undertaken and a comprehensive design carried out to in due course to confirm this preference.

Ventilation

3.3.5 Ventilation to rooms within the hotel is provided either by openable windows, or within bathrooms by mechanical fan extract. The existing communal areas – the restaurant for example – and the kitchen have dedicated mechanical extract to cope with the requirements of both the Building Regulations and those spaces. With the extension, it is likely that those mechanical systems will need to be adapted and/or extended given the location of the building works, but that is outwith the scope of this Statement.

3.3.6 We have therefore assumed that the approach to ventilation for the rooms, which make up the majority of the new floor space, will be similar to the existing arrangement, using openable windows and fan extract to bathrooms. Corridors however will need continuous mechanical extract systems of a form to be determined by the M&E engineer in due course.

Cooling Requirement

3.3.7 Each of the existing rooms within the hotel has the option to use mechanical cooling. This is currently provided by individual, external a/c units on the walls facing the lightwell (as shown in Figure 3), or by larger joint systems depending on the floor/room in question. Heat pump systems already provide some cooling and heating to communal areas such as the restaurant.

Figure 3: Existing hotel external a/c units

3.3.8 The ability to mechanically cool the rooms is an important commercial requirement within hotel environments – especially in this location – and whilst we would anticipate the ability to cool would only be used relatively infrequently over the course of a year, guests do expect a hotel of this quality to provide the facility as and when required.

3.3.9 There are number of important considerations that need to be mentioned here. Firstly, the extension itself will require the alteration/removal/relocation of many of the existing individual cooling systems. Many of these are already difficult to access, clean and maintain, and therefore will not be operating at maximum efficiency. The proposed design allows for their relocation and a new screen to be installed to enable them to be shielded from view, and thus improve the over aesthetic from that shown in Figure 3.

3.3.10 Where these need to be replaced, it would normally be sensible to consider a larger communal system to minimise number of systems, and to improve the overall energy efficiency of the existing building's infrastructure. However, locating a larger communal system will be challenging given the site constraints, and roof top plant will have a visual impact that will need to be dealt with to the satisfaction of the heritage/conservation perspective, and is highly likely to be unacceptable.

Supplying Energy Efficiently: Energy Results

3.3.11 As noted previously, the energy results for Scenario 1 in Section 3.5 should be used to understand the energy demands and associated emissions at this stage of the Energy Hierarchy.

3.4 The Energy Hierarchy – Renewable Energy & Low Carbon Systems

3.4.1 We have also considered a number of zero and low emission technologies for the development in line with the third part of the Energy Hierarchy. Given the nature of the proposals and the wider site constraints most remain infeasible, however brief summary of the thinking is provided below:

- Biomass boilers are completely impractical for this location, from space, access, fuel storage and air quality perspectives
- Solar thermal panels would contribute to the hot water demand for the building, but only where the existing hot water boilers are being replaced, and only where sufficient additional plant room space was available. Neither of these are the case, and the distance from the roof to the plant room is such that heat losses would increase, therefore we would not recommend installation
- We do not recommend roof mounted wind turbines in any scenario, but with unproven performance, built up surroundings and a conservation area, there is no basis for recommendation
- Ground source heating is not feasible in this location
- Photovoltaics: there is a small amount of roof space on the development which could be used for PV mounted on a low pitch so as to minimise heritage / visual / conservation impact. However, the monthly electricity demand for the site is in excess of 40,000kWh, and a PV system of a few kW (for which there is space) would have a negligible impact. That in itself is insufficient a reason NOT to install it of course, however we would strongly recommend that the available space is left available for brown roofs and / or plant associated with the preferred heating system described below.

3.4.2 The remaining technology, and ultimately preferred energy supply option, is to provide a VRF (air source) heat pump system to the extension to provide space heating rather than to bolt into the existing boiler system. The VRF system would enable both heating and cooling to be provided in a highly efficient manner, and would reduce the number of systems in the building (it would remove the need for radiators and associated pipework and provide both heating and cooling through the same system). It would need space and probably is best located on the roof or within the screened area on the rear wall, but from an efficient energy supply perspective, and on the sound assumption that the coefficient of performance (efficiency) of the system exceeds 2.5 (250%), this option outperforms the gas boiler scenario in terms of emissions.

3.4.3 Heat pumps are regarded as low carbon and should these be pursued to provide both space heating and cooling, will contribute considerably to a reduction in energy demand in kWh terms against a standard gas boiler and air conditioning unit scenario.

Renewable and Low Carbon Systems: Energy Results

3.4.4 The energy results for Scenario 2 in Section 3.5 should be used to understand the energy demands and associated emissions at this final stage of the Energy Hierarchy. These assume the VRF heat pump system will be installed for the extension to provide space heating and cooling.

3.5 Energy Hierarchy – Summary and Energy Calculations

3.5.1 Achieving the energy performance standards in the London Plan – requiring a 35% reduction in emissions against a 2013 Building Regulations scenario is completely impractical in the case of the proposals for this hotel, for reasons that have been explained in detail above. The site constraints, in particular those related to existing plant facilities and space availability, ultimately require that focus on the Energy Hierarchy should be in relation to ensuring that the building is as thermally efficient as possible, and that the required mechanical and electrical services provide further opportunities for improvement.

3.5.2 Overall, therefore, the constraints of the site limit the number of options available to the Applicant, and much will depend on detailed M&E design at a later stage. The approach to energy, and in compliance with the Local Plan, is to ensure that the extension itself is constructed as efficiently as possible, minimising heat loss. The installation of HVAC systems will reinforce the energy efficient nature of the building, and could also provide an overall improvement to the existing building too. Low carbon, rather than renewable energy systems, have been recommended for the extension (subject to M&E design), and we think this is a pragmatic approach to the requirements of the planning authority and wider the constraints of the site.

3.5.3 In order to provide calculations for this report, we have examined the 2 different energy supply scenarios in the process of modelling the building, and generated expected energy demands using the software. This is because an understanding of energy demands is still a requirement of energy statements, and this is the most accurate means of assessment at this stage in the process.

- Scenario 1 – Baseline Extension (energy efficient scheme with gas boiler)

Extension connected to existing boiler system, using same distribution (radiators, TRVs) in each room. Hot water connected to the existing system, but cooling using new individual AC units (reflecting existing). This is the scenario used for the first two stages of the Energy Hierarchy.

- Scenario 2 – VRF Heat Pump System

Extension uses 'standalone' space heating/cooling system, connected to multi-split VRF providing heating and cooling; DHW from the existing boiler. Heat/cooling distributed via ceiling cassette in each room. These are the results for Stage 3 of the Energy Hierarchy.

Results

3.5.4 The results of the energy demand calculations are provided below.

ENERGY DEMANDS (MWh/a)								
	DHW	Space Heating	Total Gas	Cooling	Auxiliary + Lights	Fans/pumps	Total electricity	Total energy
Scenario 1	42.96	8.78	**51.74**	1.06	19.38	0.43	**20.87**	**72.61**
Scenario 2	42.96	1.38	**44.34**	0.68	19.38	0.41	**20.47**	**64.81**
CO_2 EMISSIONS ($kgCO_2/a$)								
	DHW	Space Heating	Total Gas CO_2	Chillers	Lights	Fans/pumps	Total electricity CO_2	Total CO_2
Scenario 1	8,248	1,685	**9,934**	546	10,000	221	**10,768**	**20,703**
Scenario 2	8,248	264	**8,513**	350	10,000	211	**10,562**	**19,075**

Table 2: Energy demands and carbon emissions

Energy Demand Impact

3.5.5 Over the course of a month, the hotel currently uses a total of just over 40MWh of electricity, equating to 500MWh per year. In gas terms, the figure is far more variable over a year, with 90-100MWh/month in winter and 45-50MWh/month in summer. Annually, the demand equates to around 825MWh of gas. Therefore, whilst the floor area will increase by around 21%, overall annual energy demand (currently 1,325MWh) is only anticipated to increase by around 5-6%.

4 Sustainable Water Management

4.1 Potable Water Consumption

4.1.1 The management of water in the proposed development will follow the principles of the water hierarchy:

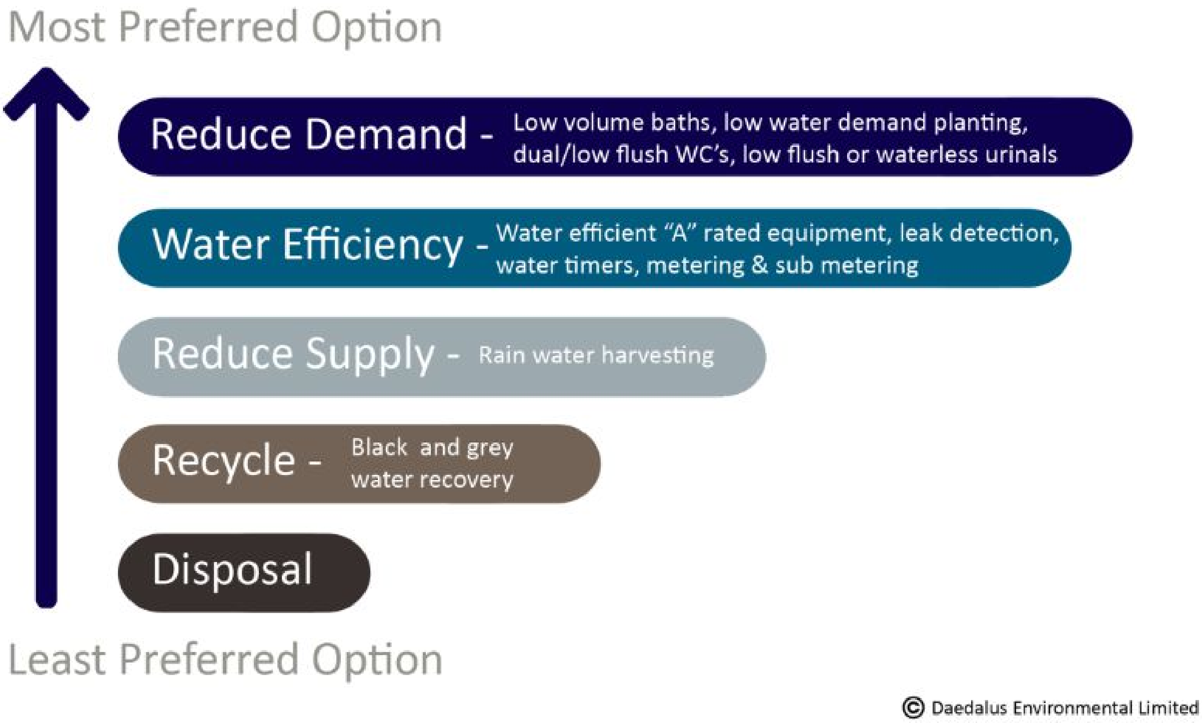


Figure 4: The water hierarchy

4.2 Water Reduction Measures

4.2.1 The Applicant is acutely aware of the need to minimise the impact of development of a resource which is becoming increasingly scarce. The means by which this will be achieved is through controlled flow fixtures and fittings, which will be specified as part of the fit out of the extension. Aerated taps and reduced flow showers are prime examples of the options available. Low and dual flush WCs will also be installed to all bathrooms, with 6/3l flush volumes.

4.2.2 In relation to grey water recycling opportunities, the planned hotel extension will be connected in to the existing water supply system. There is no space available to install a rain or greywater recycling system within the existing envelope of the hotel, and as the extension is to be built above existing development, there is no option to install grey/rainwater storage tanks below ground. Therefore in this case water recycling will not be installed within the proposals.

5 Climate Change Adaptation

5.1 Background

Warmer Temperatures

5.1.1 The orientation and shading of the extension will mean that the potential impact of drier hotter summers – with more direct sunlight – will be minimal. As shown above in the overheating assessment, whilst we have not modelled future climate scenarios at this stage, we have been able to address the minimal issues with changes to the glazing specification.

5.1.2 The use of high thermal mass construction techniques – exposed concrete finishes etc – is also unfortunately impractical on this site, where a lightweight construction will probably be implemented. In addition to any improved glazing, we would also recommend that rooms with southerly orientations are fitted with blinds (we would recommend shutters as the best method of reducing solar gain in warmer climates, but this is highly unlikely to be approved from a heritage perspective).

Heavier Rainfall

5.1.3 In simple terms, we would also recommend rainwater downpipes that are slightly larger in cross section, enabling a greater volume of rainfall to be transported effectively from roof spaces in periods where we expect more frequent intensive rainfall events. The design of these fixtures will of course need to be in keeping with heritage requirements and the conservation area. Enabling this transportation reduces the risk of water ingress and damp, and unexpected penetration of construction details. The installation of a brown roof – if pursued – would also have a small mitigating impact on the volume of rainfall from the building, and also a small cooling impact on the structure during periods of sunshine.

Drier Summer Periods

5.1.4 The water section describes the approach to minimising potable water use, which is a responsibility of all parties as we move towards a changed climate with longer periods of drought. The site however has no landscaping or green space irrigation requirements, and so the focus will need to be entirely on the building and its internal uses. Over time and as the building is refurbished, the opportunity for introducing water saving appliances and fittings arises and it is at this point that the opportunity should be taken to further adapt to the changing climate.

5.2 Overheating

Overheating Risk

5.2.1 Policy CC2 requires that all non-domestic buildings over 500m^2 are modelled to demonstrate that the cooling hierarchy has been applied. 8.43 of the Local Plan describes the hierarchy as follows:

- Minimise internal heat generation through energy efficient design;
- Reduce the amount of heat entering a building in summer through orientation, shading, albedo, fenestration, insulation and green roofs and walls;

- Manage the heat within the building through exposed internal thermal massand high ceilings;
- Passive ventilation;
- Mechanical ventilation; and
- Active cooling.

5.2.2 Taking these one at a time, energy efficient building performance has been described in more detail above, and following the modelling of the building using dynamic thermal modelling software (IES VE), measures have been recommended to limit the level of external heat gain. These are described in more detail below. It is currently planned that all windows will be openable to facilitate passive ventilation of the spaces, although wet areas will be mechanically ventilated. Where cooling is provided, it will not be traditional air conditioning, rather it will be comfort cooling provided by highly efficient VRF heat pump systems.

5.2.3 As well as the planning requirement, it remains the Applicant's preference that natural systems are considered before mechanical, and to understand the background to that decision modelling is therefore ultimately necessary. It is therefore important to ensure that the need for mechanical cooling is minimised on a day-to-day basis, and moreover will reduce emissions and help minimise running costs in the future. Overheating also forms part of the requirements for Part L2 of the Building Regulations, if that is applied in due course.

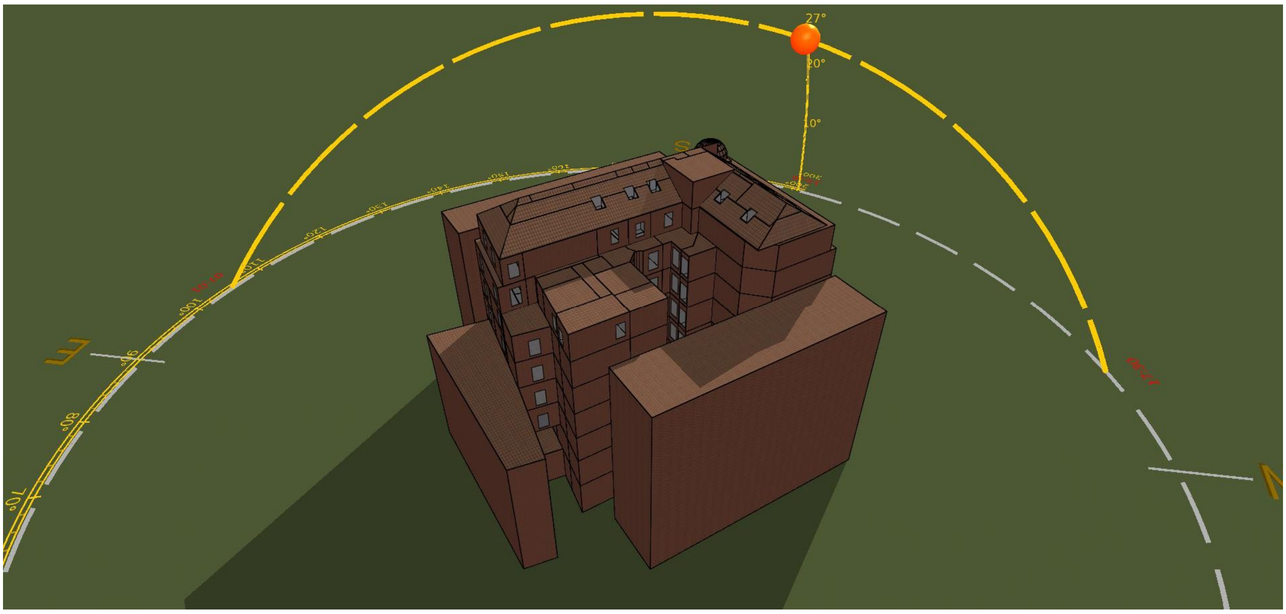
5.2.4 In order to complete this analysis we have used IES <Virtual Environment> software and associated modules to establish key data in relation to the risk. The basis for the overheating analysis is the CIBSE Guide *TM52: Limits of Thermal Comfort Avoiding Overheating in European Buildings* (CIBSE, 2013). Within TM52 there are 3 criteria against which overheating risk and impact are assessed, and in order to be compliant with the guidance **any given *occupied* space must pass two of these three**, which (drawn verbatim from the Guide) are:

(1) The first criterion sets a limit for the number of hours that the operative temperature can exceed the threshold comfort temperature (upper limit of the range of comfort temperature) by 1 K or more during the occupied hours of a typical non-heating season (1 May to 30 September).

(2) The second criterion deals with the severity of overheating within any one day, which can be as important as its frequency, the level of which is a function of both temperature rise and its duration. This criterion sets a daily limit for acceptability.

(3) The third criterion sets an absolute maximum daily temperature for a room, beyond which the level of overheating is unacceptable.

(CIBSE, 2013)



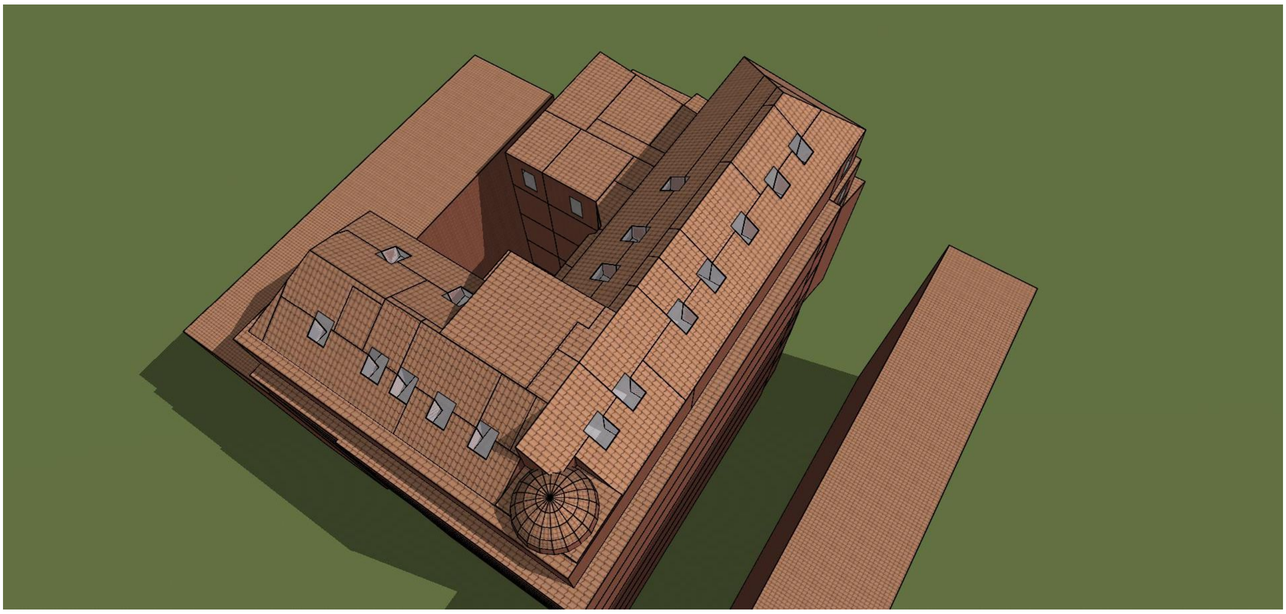


Figure 5: IES VE model screenshots

5.2.5 Buildings are assessed on the basis of no cooling present, to understand how they perform under standard scenarios. The results of the assessment are as follows. Under a standard specification (or baseline scenario, which included the ability to open windows and secure an element of 'free' or natural cooling) many of the rooms failed the overheating test. The issue relates to the level of heat gain through (primarily) the rooflights in the uppermost floor, although heat gain is experienced by those new rooms lower down in some cases too.

5.2.6 We then retested these with an upgraded specification on the glazing, reducing the g-value (the amount of heat emitted through the glass reduces with a lower g-value), and this then improved the situation, although some rooms continued to fail. The final passive solution application was to assume the installation of internal blinds, which further reduced the impact.

5.2.7 At this point, whilst the issue is not entirely resolved, the approach very much reflects the cooling hierarchy and the Applicant has gone as far as it can in terms of passive measures before the application of mechanical cooling. The provision of such cooling however will be through the most efficient means possible – and potentially through the VRF heat pump option described above. The results of the final analysis are provided below – including the glazing and blind 'upgrades'. A total of 45 occupied spaces within the extension were analysed for performance.

Passed:					
Room Name	Occupied days (%)	Criteria 1 (%Hrs Top-Tmax>=1K)	Criteria 2 (Max. Daily Deg.Hrs)	Criteria 3 (Max. DeltaT)	Criteria failing
room 803	100.0	2.8	16.0	4.0	2
room 804	100.0	2.3	15.0	3.0	2
room 711	100.0	1.2	10.0	2.0	2
room 713	100.0	0.0	0.0	0.0	-
room 712	100.0	0.3	3.0	1.0	-
room 612	100.0	0.5	5.0	1.0	-
room 614	100.0	1.0	9.0	2.0	2
room 613	100.0	0.3	3.0	1.0	-
room 615	100.0	0.8	5.0	2.0	-
room 616	100.0	0.0	0.0	0.0	-
room 618	100.0	0.0	0.0	0.0	-
room 601 part	100.0	0.8	9.0	2.0	2
room 617	100.0	0.0	0.0	0.0	-
room 517	100.0	0.0	0.0	0.0	-
room 519	100.0	0.0	0.0	0.0	-
room 501 part	100.0	0.4	4.0	1.0	-
room 518	100.0	0.0	0.0	0.0	-
room 513	100.0	0.0	0.0	0.0	-
room 512	100.0	0.8	5.0	1.0	-
room 417	100.0	0.0	0.0	0.0	-
room 419	100.0	0.0	0.0	0.0	-
room 401 part	100.0	0.3	3.0	1.0	-
room 418	100.0	0.0	0.0	0.0	-
room 413	100.0	0.0	0.0	0.0	-
room 412	100.0	0.5	5.0	1.0	-
room 316	100.0	0.0	0.0	0.0	-
room 318	100.0	0.0	0.0	0.0	-
room 301 part	100.0	0.2	2.0	1.0	-
room 317	100.0	0.0	0.0	0.0	-
room 312	100.0	0.0	0.0	0.0	-
room 311	100.0	0.0	0.0	0.0	-
room 216	100.0	0.0	0.0	0.0	-
room 218	100.0	0.0	0.0	0.0	-
room 201 part	100.0	0.2	2.0	1.0	-
room 217	100.0	0.0	0.0	0.0	-
room 212	100.0	0.0	0.0	0.0	-
room 211	100.0	0.0	0.0	0.0	-
room 114	100.0	0.0	0.0	0.0	-
room 116	100.0	0.0	0.0	0.0	-
room 101 part	100.0	0.0	0.0	0.0	-
room 115	100.0	0.0	0.0	0.0	-
Failed:					
Room Name	Occupied days (%)	Criteria 1 (%Hrs Top-Tmax>=1K)	Criteria 2 (Max. Daily Deg.Hrs)	Criteria 3 (Max. DeltaT)	Criteria failing
room 801	100.0	3.1	18.0	4.0	1 & 2
room 802	100.0	20.9	31.0	7.0	1 & 2 & 3
room 805	100.0	4.6	18.0	4.0	1 & 2
room 806	100.0	9.3	23.0	5.0	1 & 2 & 3

Table 3: Overheating Risk and Mitigation: Enhanced Specification

5.3 Ecological Enhancements: Brown Roof System

5.3.1 There is no ecological value currently within the hotel boundary, and the levels of biodiversity are correspondingly negligible. The only current opportunity for introducing any level of biodiversity within the development is to implement the brown roof option, which will be subject to heritage and plant / equipment considerations described previously.

5.3.2 Introducing green roofs on the roof (given shape, maintenance access, structural challenges, drainage etc) will be highly problematic. However, subject to heritage feedback, structural assessment and the prioritised requirement for roof top equipment/plant identified above, it should be possible to implement a lightweight, very low maintenance brown roof on the proposed flat roof space.

5.3.3 A brown roof will provide some level of opportunity for invertebrates, and as a result foraging opportunities will emerge for a variety of bird species. By no means will this be intensively planted, or indeed planted at all, but rather involves the addition of recycled spoil materials that will encourage natural colonisation and improved biodiversity over the longer term. As a simple brown roof, left to self seed and colonise, the vegetation will not be of significant ecological value but will represent and improvement over the current scenario. It may be possible to add value to the vegetation through wildflower seed planting, but consideration will need to be given to any required maintenance as a result.

5.3.4 This approach to biodiversity we think is an appropriate and proportional response to the issue, maximising the opportunity within the constraints of the site itself.

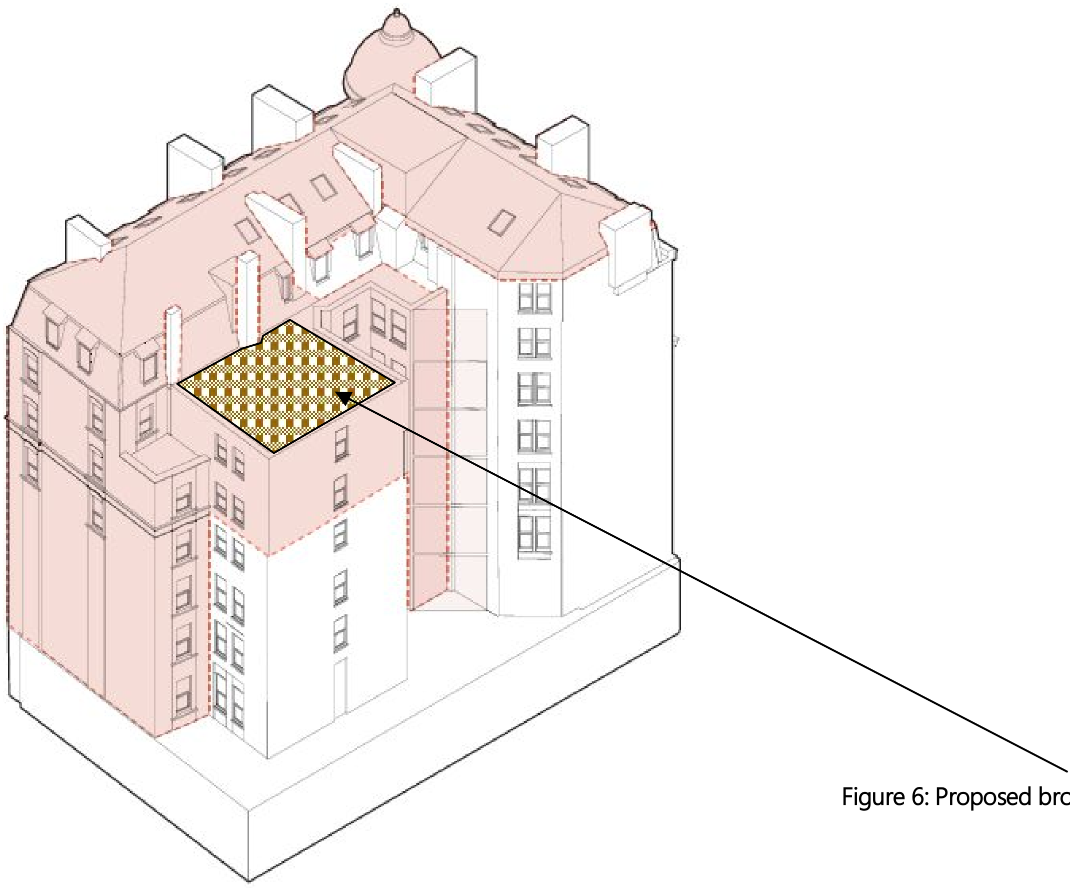


Figure 6: Proposed brown roof location

Figure 7: Mature brown roof system

5.4 Flood Risk and Surface Water Management

5.4.1 There is no increase in footprint nor is there any removal of green space as a result of the proposals. The impact on managing rainfall and flooding is therefore likely to be negligible, and as such the Applicant has not submitted a drainage report to accompany this application.

5.4.2 In line with local plan policy CC2(b), this development does not increase surface water runoff (and indeed there will be some small increase in the level of rainwater retention through the introduction of the brown roof – see above for more details. The application of SUDS – other than the brown roof – is not relevant for the proposals. The management of rainwater run-off will therefore be through the existing system.

5.5 Waste Management

5.5.1 The legislative requirements for construction waste management are founded in a number of EU Directives and have been actively implemented in the UK. The Applicant recognises that waste needs to be sustainably managed during the construction process, and will appoint licensed waste management contractors with a proven record of delivering high levels of recycling. In addition and in line with the Waste Hierarchy, the Applicant will require contractors to implement strict management processes for waste on site, including:

- An efficient building form will minimise the amount of on-site manufactured components required to reduce waste generated.
- During construction planning, identifying suitable locations (if available) for the separation and storage of waste prior to removal from site, to encourage higher levels of recycling
- Strict management of waste by site operatives through site induction and ongoing training / site talks

- Proactively identifying opportunities for the on-site reuse of materials, identifying a key individual responsible for doing so. The individual will also be responsible for delivering the overall waste management strategy for the development
- Scaffolding, hoarding and other such materials to be removed from site for use on subsequent construction projects

5.5.2 From an operational perspective, the additional waste arising from the site will primarily be related to hotel rooms, and volumes will depend on occupancy levels, but is not expected to result in substantial additional waste. The hotel's existing waste removal provision/contract will be extended to cover any additional waste from the extension.

6 BREEAM

6.1.1 The requirement for the building to be assessed under BREEAM applies for all development exceeding 500m^2. The extension is comprises a gross internal floor area of 586m^2 and therefore this requirement applies in principle. Together with partners Southfacing Ltd, we have undertaken a detailed pre-assessment of the proposals under BREEAM 2018, the most up to date version of the framework and the one which would apply in the case of the proposals.

6.1.2 The nature of the development and the constraints of the site, however, preclude the ability of the proposed extension to achieve a BREEAM Excellent rating, for a range of reasons that are explained within the accompanying BREEAM Appendix. For example, achieving the minimum energy / carbon emissions performance standard required by BREEAM Excellent is not going to be possible.

6.1.3 Based on our understanding of the proposals and using feedback from different members of the design team, if the building is to be assessed under BREEAM it would most likely achieve a rating of Pass, and only with significant additional cost and effort could it achieve a rating of 'Good'. As such the Applicant is not – at this stage - proposing to exceed the 'Pass' standard.

7 Summary

7.1.1 Camden has developed a set of policies and guidance in relation to issues of Sustainable Design and Construction which have been adopted in its Local Plan 2017, and which are described within this document. Wherever possible we have sought, within this document, to explain how they are being addressed within the context of this proposed hotel extension, and the associated constraints that exist when building within this location.

7.1.2 The proposed extension at the Mercure Bloomsbury is highly physically constrained. The hotel is located within a conservation area, which brings design challenges from a heritage and conservation perspective, and the space available for the 586m^2 increase in floor area is only possible through a creative, subtle and sensitive approach to architecture. Issues of architectural quality are dealt with in the Design and Access Statement accompanying the application, but a number of technical challenges remain, in particular in relation to services provision.

7.1.3 This Statement has sought to address these, and begin the process of identifying potential solutions, whilst examining wider opportunities for integrating sustainable design principles into the development. Indeed whilst the Applicant will have a number of technical issues to face, in many ways these actually offer potential improvements to the overall performance of the building, especially in energy terms, but also in its response to a changing climate, potentially improved biodiversity, and more efficient water use on a 'per head' basis. A detailed survey of existing, and design for new, services will be required in due course, and this will of course inform the final specification of plant, equipment, fixtures and fittings. This will build on the work to date but at this early planning application phase is not yet viable to undertake.

7.1.4 Within the broad context of the site's constraints, the Applicant is committed to ensuring the building is extended using these principles of sustainable design and construction, and the approach put forward meets as far as reasonably possible, the requirements of Camden's planning policy framework.

8 Appendix A: BREEAM Pre-Assessment Report

8.1.1 Provided / issued separately.