Energy & Sustainability Statement

Client: TJAC Southampton Row LLC
c/o Halstead Associates
1 Athenaeum Road
Whetstone
London
N20 9AA

Project: Conversion of 150 Southampton Row, London WC1B 5AL

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Author: C.S. Jones MSc, BEng (Hons).

MES Energy Services
Newark Beacon,
Beacon Hill Office Park,
Cafferata Way,
Newark
Nottinghamshire NG24 2TN.

Tel: 01636 653 055 Fax: 01636 653 010
Email: info@mesenergyservices.co.uk
www.mesenergyservices.co.uk

SUSTAINABLE BUILDING SOLUTIONS

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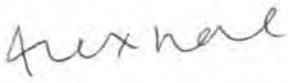
Signature			
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About *MES Energy Services*

***MES Energy Services* is an established consultancy practice specialising is providing sustainable building solutions throughout the UK.**

We offer a full range of services for both residential and commercial buildings from small individual properties through to highly complex mixed used developments.

We are an industry leader in delivering a professional, accredited and certified service to a wide range of clients including architects, developers, builders, housing associations & the public sector.

Employing highly qualified staff, our team comes from a variety of backgrounds within the construction industry with combined knowledge of building design, engineering, assessment, construction, development, research and surveying.

We are renowned for our creative thinking and always provide a high quality, honest and diligent service.

MES Energy Services maintains its position at the forefront of changes in building regulations as well as technological advances. Our clients, large or small are therefore assured of a cost effective, cohesive and fully integrated professional service.

About the Author

Chris Jones is Technical Director at *MES* and has over 12 years experience in sustainable construction. He holds an Honours Degree in Mechanical Engineering and a Masters Degree in Energy Efficient and Sustainable Building.

Contents

1.0 Executive Summary

1.1 The building at 150 Southampton Row, London is approximately 4000m^2 in floor area. It is currently in mixed use with retail to the ground floors and offices on the seven upper floors. The proposal being put forward for the planning application is for change of use of the upper floors to provide student accommodation consisting of 154 bedrooms and associated communal spaces. The design team are dedicated to providing a flexible; energy efficient, sustainable development suitable for both current and future needs which is sensitive to the environment.

1.2 The London Plan requires both residential and commercial developments involving refurbishment or change of use of an existing building to seek to reduce carbon dioxide emissions by at least 20% through the use of on-site renewable energy generation.

1.3 London Borough of Camden requires all major commercial development (this includes multi-residential developments) to achieve BREEAM certification to at least the 'Very Good' standard along with 60% of the un-weighted credits in both the energy and water categories and 40% in the materials Category. They also require developments to investigate the feasibility of connecting into district heating networks and meet a number of wider sustainable design criteria.

1.4 By following the 'energy hierarchy' the development will meet London Plan renewable energy targets through a combination of fabric efficiency measures and passive design principles along with specification of energy efficient and low carbon systems. The development will use heat pumps to provide space heating and cooling supplemented with solar thermal providing pre heating for the gas fired hot water boilers. These measures will ensure carbon emissions are reduced by approximately 60% and that 20% of the buildings energy comes from low carbon sources.

1.5 Initial studies indicated that opportunities for connection to district heating systems existed and required investigation. Networks currently exist at Euston Road to the north and Great Ormond Street Hospital to the east. A new network is also proposed for the Tybalds Estate to the south east of the site. Although the physical distance between the site and the three networks is not great installing connecting infrastructure would be prohibitively expensive and cause substantially disruption to the highway network and as such connection is not viable.

1.6 London Borough of Camden also requires the feasibility of CHP to be considered. In this case CHP has not proved to be viable due to the heating profile of the building given its proposed use. CHP requires a constant heat load throughout the year and this is not considered to be the case for the proposed development.

1.7 The proposal addresses a wide range of sustainability issues through a considered, integrated approach to its design. Key features include:

- Measures to reduce water consumption and minimize the risk of surface water flooding.
- Use of legally sourced sustainable materials.
- Reduction of waste and encouragement of recycling both during construction and from the building in use.
- Provision of facilities to encourage cycling and the use of public transport
- Reduction in potential for pollution from the buildings' construction and in use.
- Ensuring the safety and security of building users.
- Improving the ecological value of the site and providing/encouraging new habitats.

1.7 Opportunities and constraints specific to the application site with regard to BREEAM have been identified and this process has enabled the design team to commit to targeting BREEAM 'Very Good' for the development. Assessment under the BREEAM standard provides assurance that the proposed development will meet the highest sustainability standards applying best practice in regard to the key issues while going well beyond the minimum standards required by London Borough of Camden in respect to sustainable development.

2.0 Introduction

2.1 MES Energy Services have produced this Energy & Sustainability Statement for TJAC Southampton Row LLC to support a planning application to London Borough of Camden for redevelopment of the application site at 150 Southampton Row.

2.2 The report presents the solution that the design team, on behalf of the applicant, have taken towards achieving a high standard of sustainability and environmental performance. This Statement presents the features and measures which will contribute to sustainable development and an overall reduction in the environmental impact of the scheme during both construction and operation.

2.3 The purpose of this Sustainability Statement is to provide an independent overview of how sustainability will be promoted in order to meet the relevant planning policy requirements and sustainability targets placed upon the development. The statement assesses performance against local, regional and national benchmarks using recognised assessment methodologies.

2.4 The statement includes:

- A description of the proposed development
- A summary of relevant planning policy
- An assessment of the proposals performance in regard to planning policy requirements and against recognised sustainability benchmarks

3.0 Description of the development

3.1 The 150 Southampton Row building is approximately 4000m^2 in area. The building is currently mixed use with retail units to the lower ground and ground floors and office suites above. The site is located on Southampton Row in the Borough of Camden, London WC1B 5AL.

3.2 The proposal being put forward in the planning application is for change of use of the existing upper floors to new student accommodation consisting of bedrooms and communal facilities over eight floors. The retail use on the lower ground and ground floors will be retained.

3.3 More details of the proposed scheme are provided by others in the stand-alone planning statement and Design and Access Statement that also accompany the planning application.

3.4 Sustainability and environmental performance have been considered by the design team from the earliest stages of the schemes' development and as a result of this integrated approach the development will be both energy and resource efficient while improving biodiversity on the site. Sustainability of the development will be ensured by adopting recognised environmental standards; achieving BREEAM 'very good' rating.

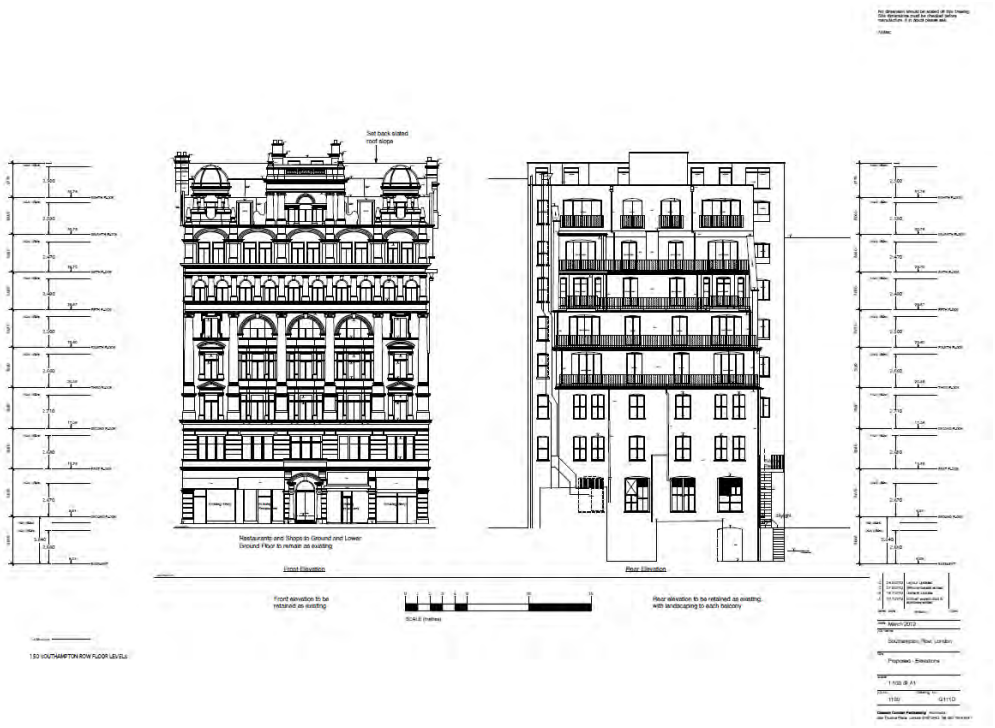

Figure 2.1: Proposed Development- Elevations.
(Casson Conder Partnership 2012)

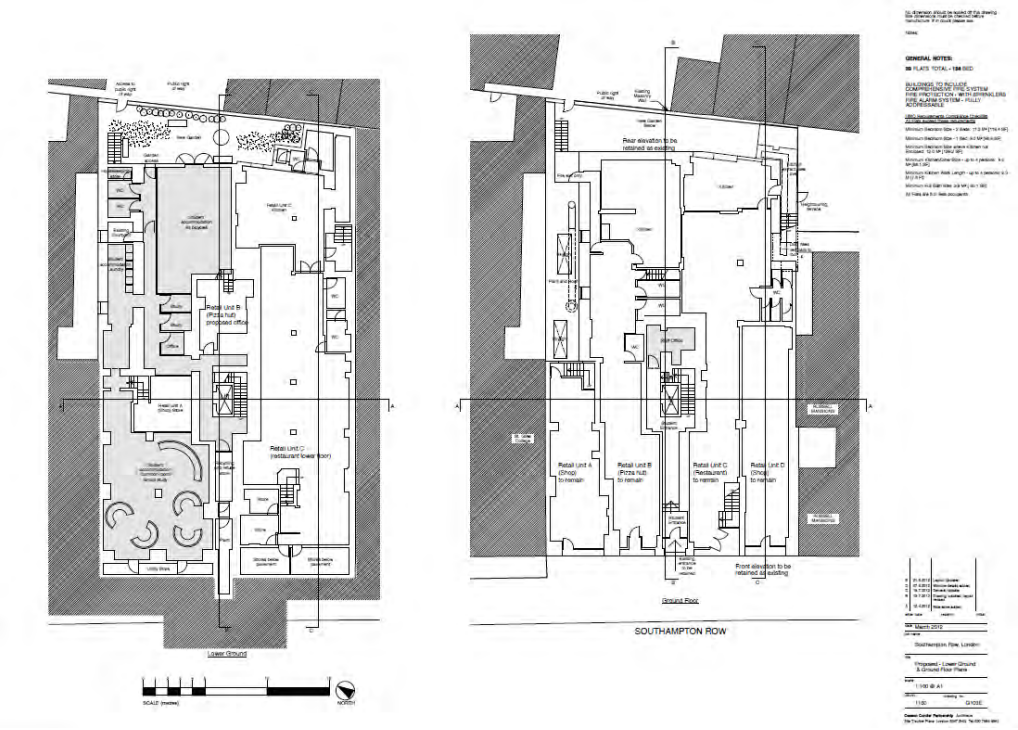

Figure 2.2: Proposed Development- Lower ground & Ground floor plans- Retail units. (Casson Conder Partnership 2012)

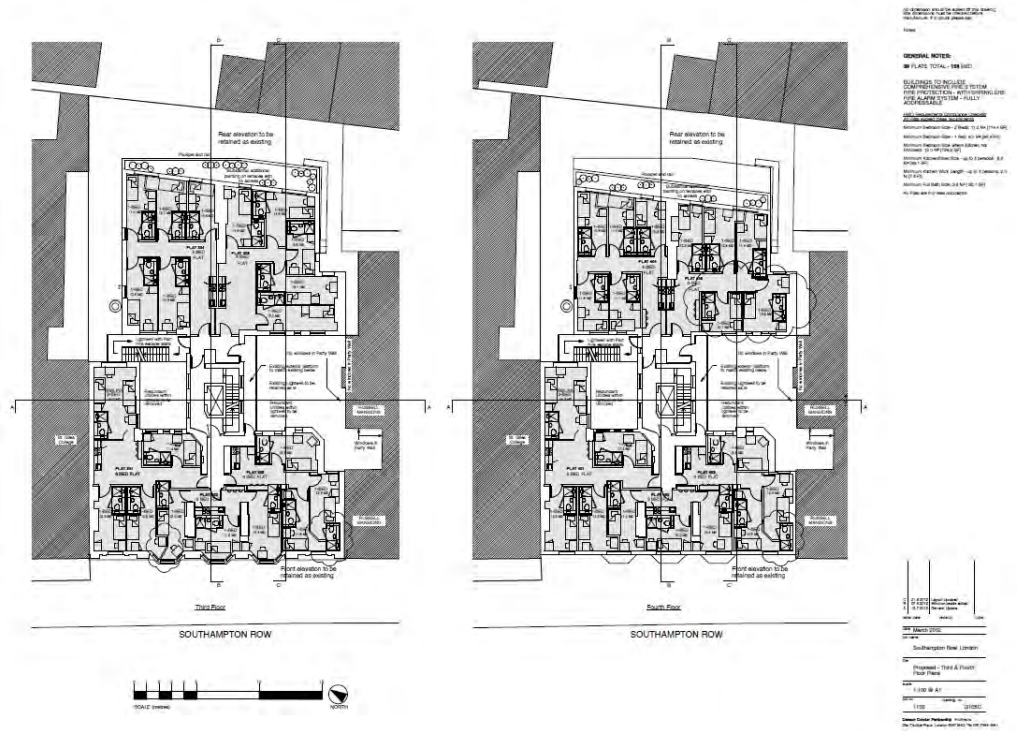

Figure 2.3: Proposed Development- Typical floor plans- Residential units. (Casson Conder Partnership 2012)

4.0 Planning Policy

National Planning Policy

4.1 In March 2012 the government introduced the National Planning Policy Framework (NPPF) which replaced a raft of previous policy guidance documents including PPS1 and PPS22 amongst others.

4.2 At the core of NPPF is a "*presumption in favour of sustainable development*" which should form the basis of all local planning policy and decision making. The documents states that: *"Pursuing sustainable development involves seeking positive improvements in quality of the built, natural and historic environment, as well as in people's quality of life, including (but not limited to):*

- *making it easier for jobs to be created in cities, towns and villages;*
- *moving from net loss of bio-diversity to achieving net gains for nature;*
- *replacing poor design with better design;*
- *improving the conditions in which people live, work, travel and take leisure; and,*
- *widening the choice of high quality homes."*

Regional Planning Policy

4.3 The Greater London Authority (GLA) was established in 2000. It covers the 32 London boroughs and the City of London. It is made up of a directly elected Mayor (the Executive) and a separately elected Assembly (to scrutinise the Mayor). Its principal purposes are to promote the economic and social development and the environmental improvement of Greater London.

4.4 The government has set out guidance and advice on the Mayor's planning duties and powers. His duties include producing a Spatial Development Strategy for London – called the London Plan – and keeping it under review.

4.5 The London Plan takes account of three crosscutting themes:

- The Health of Londoners
- Equality of Opportunity
- Contribution to Sustainable Development in the UK

4.6 The Plan was published in its original form in 2004 with subsequent

amendments in 2008 and more recently in 2011.

4.7 Supplementary documentation has been produced in support of the Plan giving further guidance on Sustainable Development in the form of:

- SPG: Sustainable Design & Construction
- Integrating renewable energy into new developments: toolkit for planners, developers and consultants

4.8 The current version of the London Plan contains several key policies relating to the promotion of sustainable new buildings including of specific relevance:

- Policy 3.5: Quality & Design of Housing supply
- Policy 5.1: Climate Change Mitigation
- Policy 5.2: Mitigating Carbon Dioxide emissions
- Policy 5.3: Sustainable Design and Construction
- Policy 5.5 Decentralised Energy Networks
- Policy 5.6 Decentralised Energy in Development Proposals
- Policy 5.7: Renewable Energy
- Policy 5.8: Innovative Energy Technologies
- Policy 5.9: Overheating and Cooling
- Policy 5.10: Urban Greening
- Policy 5.11: Green Roofs and Development Site Environs
- Policy 5.12: Flood Risk Management
- Policy 5.13: Sustainable Drainage
- Policy 5.14: Water Quality and Wastewater Infrastructure
- Policy 5.15: Water Use and Supplies

4.9 These are supported by Policies 5.16- 5.22 dealing with a variety of specific issue surrounding the management and reduction of waste.

4.10 The London Plan sets a number of specific targets for new developments along with specific details on how to demonstrate these will be met for new developments at the planning stage.

4.11 The specific requirements with regard to current energy and carbon dioxide emissions targets set out in the London Plan are:

- All development proposals should make fullest contribution to minimising carbon emissions in accordance with the energy

hierarchy: Be Lean - Be Clean - Be Green.

- It is presumed that all major development proposals will seek to reduce carbon dioxide emissions by at least 20% through the use of on-site renewable energy generation where feasible.
- Major development should be designed to include roof, wall and site planting, especially green roofs and walls where feasible.

Local Planning Policy

4.12 London Borough of Camden's Planning Guidance CPG: Sustainability is published in support of and to provide additional detail to the Councils Core Strategy.

4.13 All commercial development (this includes multi-residential development) is required to achieve BREEAM certification to at least the 'very good' standard and to achieve 60% of the un-weighted credits in both the energy and water categories along with 40% in the materials Category.

4.14 All developments are required to investigate the feasibility of (in order of priority):

- Connecting to an existing or planned decentralised energy scheme.
- Installing combined heat on power (CHP) or combined cooling, heat and power (CCHP).
- Providing a contribution to the expansion of a decentralise energy network
- Designing in the flexibility to connect to any future decentralised energy network.

5.0 Addressing Sustainability in the Proposal

5.1 A number of key objectives have been identified at national, regional and local level with regard to sustainable development at 150 Southampton Row. This document assesses the proposal against these targets.

Building Research Establishment Environmental Assessment Method (BREEAM)

5.2 BREEAM (Building Research Establishment's Environmental Assessment Method) is the world's leading and most widely used environmental assessment method for commercial and existing residential buildings, with over 115,000 buildings certified and nearly 700,000 registered. It sets the standard for best practice in sustainable design and has become the de facto measure used to describe a building's environmental performance.

5.3 Credits are awarded according to performance. These credits are then added together to produce a single overall score on a scale of Pass, Good, Very Good, Excellent and Outstanding.

5.4 BREEAM standard covers ten categories of sustainability:

- Management
- Health &Wellbeing
- Energy
- Transport
- Water
- Materials
- Waste
- Land Use and Ecology
- Pollution
- Innovation

5.5 The performance targets in BREEAM go beyond the minimum standard needed to satisfy Building Regulation or other legislation. The targets represent good or best practice in the field of sustainable design and procurement.

5.6 The rating benchmarks for the BREEAM Standards are:

- Unclassified <30%
- Pass ≥30%
- Good ≥45%
- Very Good ≥55%
- Excellent ≥70%
- Outstanding ≥85%

BREEAM Performance

5.7 All commercial & multi-residential development over 500m^2 within the London Borough of Camden is required to achieve BREEAM certification to at least the 'Very Good' standard and to achieve 60% of the un-weighted credits in both the energy and water categories along with 40% in the materials Category.

5.8 Opportunities and constraints specific to the application site with regard to BREEAM have been identified and this process has enabled the design team to commit to targeting BREEAM 'Very Good' for the development.

5.9 Assessment under this standard provides assurance that the proposed development will meet high sustainability standards applying best practice in regard to the key issues while going well beyond the requirements of Building Regulations.

5.10 A BREEAM pre assessment report is attached in the Appendix illustrating that the development as designed can achieve the required level of certification.

BREEAM Pre-Assessment summary		
Category	Unweight score	Weighted score
Management	58.33%	7.00%%
Health & Wellbeing	76.47%	11.47%
Energy	**69.57%**	13.22%
Transport	88.89%	7.11%
Water	**87.50%**	5.25%
Materials	**52.94%**	6.62%
Waste	25.00%	1.88%
Land use & Ecology	40.00%	4.00%
Pollution	54.55%	5.45%
Total	**'Very Good' rating**	**62.00%**

6.0 Key Environmental & Sustainability Issues

Energy

Land Use and Ecology

Materials

Pollution

Site management

Transport

Waste Management

Water Use

Health & Wellbeing

7.0 Energy

Sustainability Objective:

To reduce carbon emissions and the causes of climate change. To reduce pollution and the demand for precious resources by promoting energy efficiency and the use of low or zero carbon technologies generation.

7.1 A number of regional and local policies exist which promote energy efficiency and the use of renewable technologies.

7.2 The 2011 London Plan contains policies which set the following targets for new development within the 32 London boroughs:

- All development proposals should make fullest contribution to minimising carbon emissions in accordance with the energy hierarchy: Be Lean- Be Clean- Be Green.
- It is presumed that all major development proposals will seek to reduce carbon dioxide emissions by at least 20% through the use of on-site renewable energy generation where feasible.

7.3 In addition; London Borough of Camden's Planning Guidance (CPG) on Sustainability provides detail of how this is to be achieved within the Borough. The CPG adopts the Plan's targets for emission reduction and renewable generation while adding a BREEAM requirement and providing guidance on connection to decentralised energy networks.

7.4 The CPG strongly encourages development proposals to meet the following standards in accordance with Development Policy DP22- *promoting sustainable design and construction:*

Time period	**Minimum rating**	**Minimum standard for categories (% of un-weighted credits)**
2010-2012	'very good'	Energy 60% Water 60% Materials 40%
2013+	'excellent'	

7.5 The energy assessment is structured around the Energy Hierarchy which is generally accepted as the most effective way of reducing building carbon emissions. The three stage strategy targets energy use by concentration on the following:

- Reduce the need for energy- ***Be Lean***
- Use energy more efficiently- ***Be Clean***
- Supply energy from renewable sources- ***Be Green***

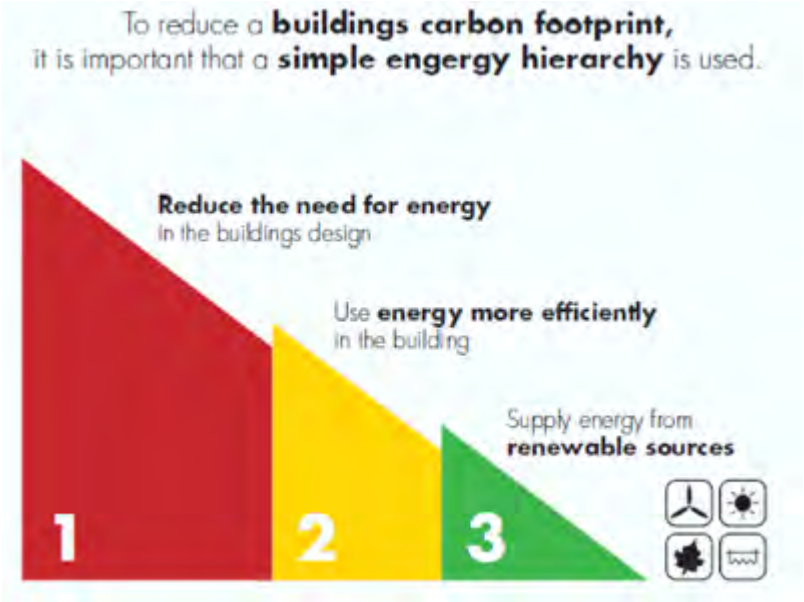

Figure 6.1: The Energy Hierarchy

Baseline Emissions

7.6 Using SBEM and DSM modelling baseline energy consumption for the proposed development using the existing fabric and M&E specification has been calculated.

Emissions	**kgCO_2/yr/m²**	**kgCO_2/yr.**
Regulated	102.7	410,800
Unregulated	6.4	25,600
Total		**436400**

Table 7.1: Baseline Emissions.

7.8 Building Regulations take account of energy used to heat, cool, light, provide hot water and ventilate the building. This is commonly called the 'regulated' energy use. Small power (domestic appliances, TV's, office equipment etc.) is not considered within these figures. For buildings such as this the

emissions from small power use are calculated by the SBEM software tool (although not included in the Part L output document). This calculation has been included in Table 7.1 using a carbon factor for grid supplied electricity of 0.517.

7.9 The baseline emissions are based on the existing building specification before upgrade. The following assumptions have been made in the calculations:

Fabric Specification

Walls: Solid masonry,	U-value: 1.31W/m^2/K
Roof: Concrete roof,	U-value: 2.58W/m^2/K
Doors: Min standard assumed	U-value: 2.2W/m^2/K
Existing Windows: Single glazed,	U-value: 5.23W/m^2/K
New windows: Part L standard	U-value: 1.8W/m^2/K

M&E Specification

Space heating: Air sourced heat pump	COP 2.0
Space Cooling; Air sourced heat pump	COP 2.5
DHW: Dedicated instantiations gas boiler	65% efficient
Lighting: T12 and incandescent lamps.	

Passive Design

7.10 A number of passive design measures have been incorporated into the proposed scheme in order to reduce total energy demand. Energy efficiency forms the base of the energy hierarchy and leads to better buildings that reduce their overall need for fuel to run them.

7.11 The proposed development is within an existing building on an urban site in central London. There is very little opportunity to orientate the building to benefit from passive solar design as the structure already exists and the opportunity for additional glazing is limited.

7.12 It is possible to design the internal layout in order to make the most of existing windows and this has been done by ensuring occupied spaces are located near to windows wherever possible. This reduces the requirement for artificial lighting by exploiting existing potential for natural daylight.

7.13 A natural ventilation strategy will be employed using the main star wells to draw fresh air up through the building into all occupied spaces. This will minimise or eliminate the requirement for mechanical background ventilation to provide fresh air in the building under normal operating conditions.

7.14 User controlled insulated blinds will be provided to all windows serving occupied spaces to control glare and reduce the chance of overheating as well as comfort from the cold..

7.15 All existing external building elements; floors, walls, roof and openings, will be upgraded with additional insulation. New elements will be specified to ensure a high thermal performance.

7.16 Building fabric improvements are designed to provide levels of thermal insulation beyond those required by Part L Building Regulations. A combination of additional insulation and improvements to glazing (thermal blinds to existing windows) will reduce the energy required to heat the building during the heating season while also reducing overheating in the summer and therefore reducing cooling loads.

7.17 A second SBEM/DSM model has been created taking account of fabric improvements to establish the emission reductions possible through passive improvements. The results are shown in table 7.2 below.

Emissions	**kgCO_2/yr/m^2**	**kgCO_2/yr.**
Baseline	109.1	436,400
Fabric Improvement	94.7	378,800
Reduction		**57,600 (13%)**

Table 7.2: Emission reductions achievable through fabric improvements.

7.18 This is based on the following improved fabric specification:

Walls: Solid- internally insulated	U-value: 0.32W/m^2/K
Roof: Existing+ additional insulation,	U-value: 0.19W/m^2/K
Doors: Min standard assumed	U-value: 2.2W/m^2/K
Existing Windows: Single glazed,	U-value: 5.23W/m^2/K
New windows: Part L standard	U-value: 1.8W/m^2/K

Use energy efficiently

7.19 The new residential accommodation and communal areas will all be fitted with a low energy, LED, lighting scheme. Lighting to communal spaces, circulation and stairwells will include adequate controls to maximise efficiency in the form of daylight sensing, proximity control or timed control, whichever proves most suitable to a given area.

7.20 The proposed HVAC system will utilise air sourced heat pumps providing space heating and cooling with gas boilers providing hot water. The system will be fully controlled by a Building Management System (BMS) to maximise efficiency and ensure adequate levels of environmental control to provide thermal comfort to building occupiers. Local control within the individual flats will be possible within limits set by the BMS. With a C.O.P. of 3.5 the proposed heat pumps will be of significantly higher efficiency than those currently serving the building as will the 91% efficient DHW boilers which are proposed.

7.21 A third SBEM/DSM model has been created taking account of energy efficiency upgrades to the M&E services to establish the emission reductions possible. The results are shown in table 7.3 below.

Emissions	**$kgCO_2/yr/m^2$**	**$kgCO_2/yr.$**
Baseline	109.1	436,400
Fabric Improvement	94.7	378,800
Improved system efficiency	56.6	226,400
Accumulated Reduction		**210,000 (48%)**

Table 7.3: Emission reductions achievable through fabric improvements and system efficiency.

7.22 This is based on the following improved M&E system specification:

Space heating: Air sourced heat pump COP 3.5

Space Cooling; Air sourced heat pump COP 3.5

DHW: Dedicated instantiations gas boiler 91% efficient

Lighting: 100% LED Lamps with efficient controls.

Decentralised energy

7.23 Camden's planning guidance requires that all developments investigate the feasibility of (in order of priority):

- Connecting to an existing or planned decentralised energy scheme.
- Installing combined heat on power (CHP) or combined cooling, heat and power (CCHP).
- Providing a contribution to the expansion of a decentralise energy network
- Designing in the flexibility to connect to any future decentralised energy network.

7.24 District heating networks are considered to provide more efficient energy delivery as network losses are often considerably less than conventional energy supplies. A 30% reduction in total energy demand could be expected from an 80% efficient CHP network when compared to traditional energy supplies as can be seen in Figure 7.4 below.

7.25 It is proposed by London Borough of Camden that decentralised energy could provide 20% of the Borough's energy by 2020 and that CHP could reduce carbon emissions by as much as 30-40%.

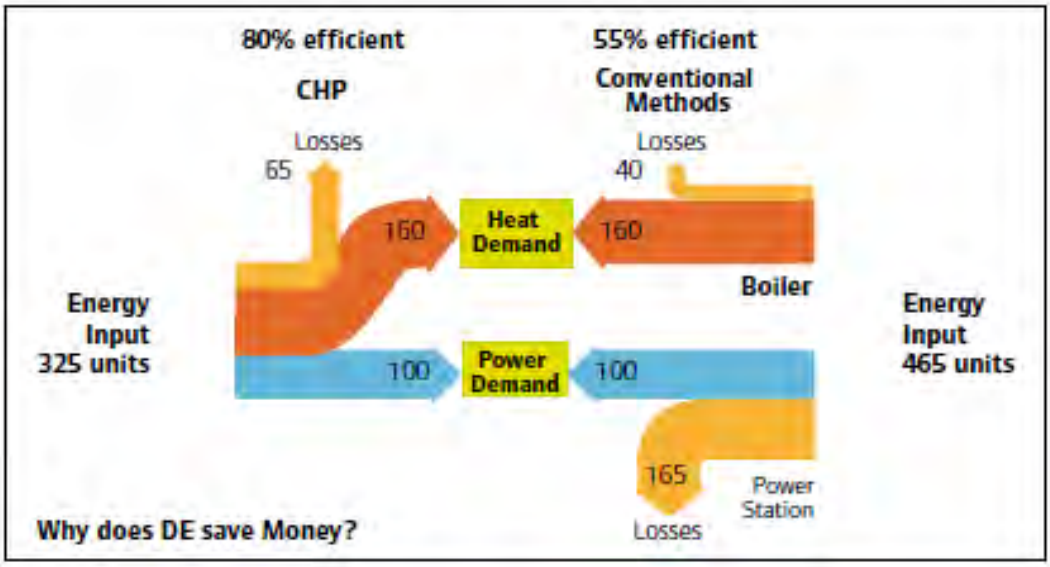

Figure 7.4: CHP v conventional energy supply.

7.26 There is an existing district heating network on Euston Road approximately 850m to the north of the site along Holborn Place. This can be seen on the London Heat Map section in Fig 7.5 below to the top left of the image. The site is marked by a blue cross in the centre of the image. Unfortunately the scale and cost of the work that would be required to connect to this

existing network considering the distance to the site and disruption that works would cause to traffic on Holborn Place make this option impractical.

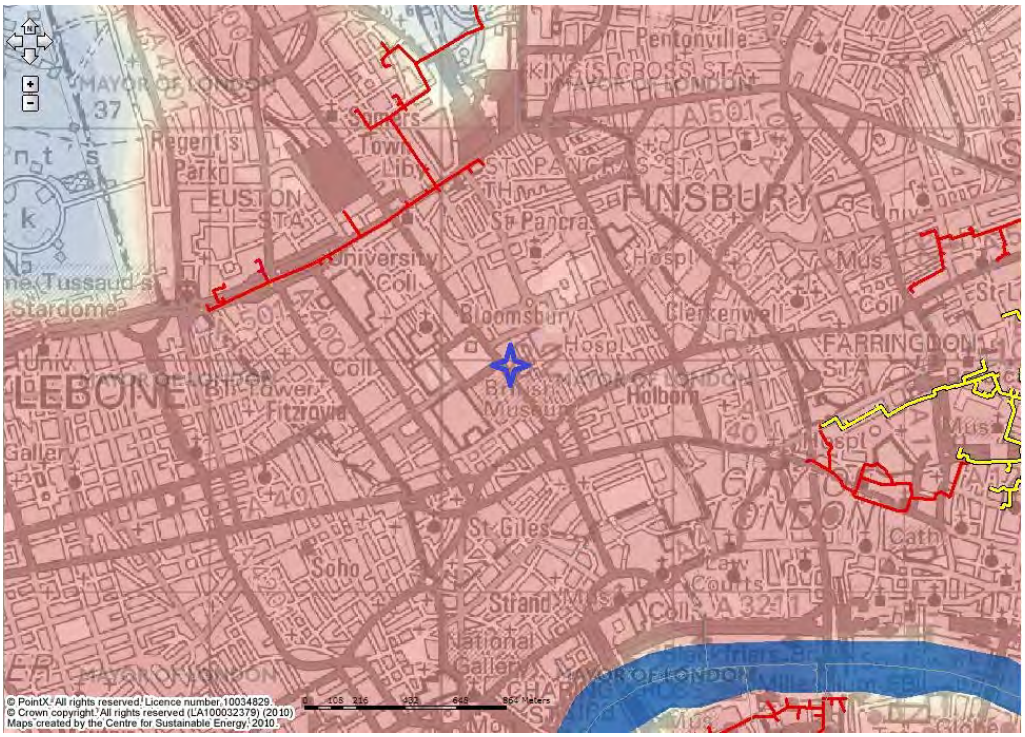

Figure 7.5: London Heat Map showing LTG network for Euston Road Area to the north west of the site.

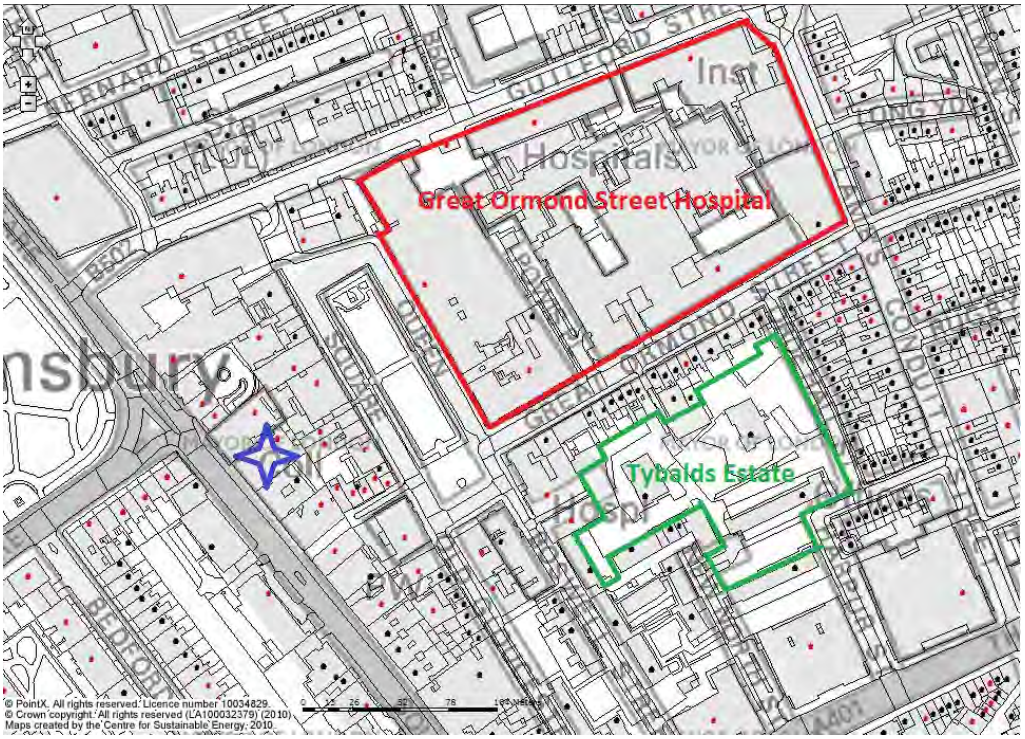

Figure 7.6: London Heat Map showing location of GOS Hospital and Tybalds Estate.

7.27 A second heating network exists at Great Ormond Street Hospital to the north east of the site. This new network forms a central part of the new energy strategy for the hospital which saw the construction of a new energy centre and replacement of much of the existing energy infrastructure. It is understood that the network produces a surplus of heat and the hospital are looking for opportunities for export. Again, as with the Euston Road network, the logistics of connecting to this scheme unfortunately make its consideration impractical. Although the distances involved are less than those to the Euston Road network there are obstacles between the sites, namely the buildings directly behind the development site on Queens Square along with the square itself, which would prevent connection by any practical route. This can be seen in Fig 7.6.

7.28 Extensive regeneration is proposed for The Tybalds Estate to the east of the development site over the coming years. This will see the 395 existing dwellings refurbished and creation of a number of new dwellings and community facilities. A centralised energy network is proposed for the scheme. As with the Great Ormond Street Hospital network it can be seen in Fig 6.4 that although the distance between the sites is not great at about 200m the number of obstacles between the sites makes connection impractical. It is also understood that the proposed energy scheme for the Tybalds Estate is in the final stages of development and the opportunity for connection is likely to have passed.

Communal CHP

7.29 CHP (or combined heat and power) provides both heat and electricity locally for use in a single building or larger heating network. As illustrated in figure 7.4 above, providing heat and electricity in this way has an efficiency benefit over conventional systems due to the relative inefficiency of grid supplied power.

7.30 Small to medium scale CHP most often uses purpose built or converted reciprocating internal combustion engines to drive a generator supplying three phase electricity. The efficiency of IC engines is relatively low because of the amount of energy lost as heat. In a CHP unit this otherwise waste heat is used to heat water. This water is used to provide space heating and DHW, either directly or via a heat exchanger.

7.31 With conventional CHP systems there is often a mismatch between heating load and heat supplied. To provide power a CHP unit must provide heat, if this heat cannot be utilised (during the summer for example) it must be dumped and the system becomes inefficient. For CHP to be viable there must be a relatively constant heating base load. This means that CHP is

normally only practical for building uses such as hospitals, leisure centres and swimming pools etc. In developments such as Southampton Row where there is not a constant heat demand CHP becomes unviable unless the unwanted heat can be exported. Although existing and proposed networks do exist near the development it would be impractical to connect to them as has already been discussed.

7.32 For the purpose of this report it is assumed that connection to existing or proposed heating networks will not be possible now or in the near future and neither will CHP be a viable proposition given the nature of the development. It is however possible to ensure that the DHW system is designed to allow for connection to a heating network should the opportunity arise. Such provision is recommended to future proof the development's energy strategy and help facilitate any potential expansion of existing heating networks or the creation of new ones.

Renewable technologies

7.33 Energy resources accepted as renewable or low carbon technologies are defined by the Department of Energy & Climate change Low Carbon Buildings Program. Those which are suitable for consideration in this case are:

- Solar photovoltaics
- Wind turbines
- Solar thermal hot water

Solar Photovoltaics

7.34 Photovoltaics (PVs) generate electricity from daylight in semi conducting cells normally made from silicon. PVs can normally generate electricity even on overcast days as they do not require direct sunlight to operate making them a viable technology for the UK. PV's are a simple technology requiring little in the way of maintenance and offer a proven way of generating zero carbon, renewable electricity.

Wind turbines

7.35 Wind turbines generate electricity via a conventional generator connected to turbine blades which are in turn powered by the prevailing wind. Given the location of the development, building mounted turbines would be required, and for this type of application vertical axis turbines are preferred for a variety of reasons. This is an existing building and the structural implications of mounting wind turbines to the buildings frame, both in terms of loading and vibration make wind turbines unviable. The planning implications of adding turbines to the building along with the viability given the urban location need also be considered.

Solar Thermal

7.36 The proposed development has a significant requirement for DHW at peak periods during the day. Solar water heating technology is well established and the reliability and relatively low maintenance of systems has made them a popular choice for both small scale domestic and larger commercial installations. In this case the orientation of the building is suitable the collector and as such solar thermal is considered to be a suitable technology for consideration in this case.

7.37 In this case a solar pre-heat system providing pre-heated water to the dedicated instantaneous gas DHW boilers is proposed. The Lochinvar system specified is capable of providing 40% of the DHW required. Water heated by solar panels is stored in large capacity caloirfiers. This Pre-heated water is then supplied to the gas boilers when there is a DHW demand decreasing the energy required to heat the water to the correct temperature. A similar (though smaller) system is shown in figure 7.7 below.

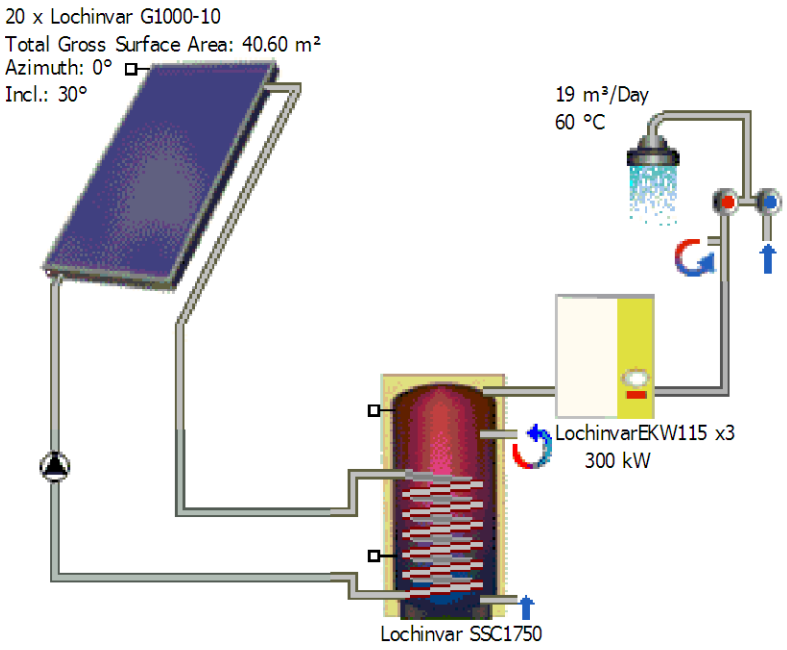

Figure 7.7: Typical solar pre-heating installation diagram.

7.38 Energy data taken from the SBEM calculations shows the breakdown of energy by end use as shown in Table 7.4

Annual energy consumption by end use (kWh/m²):	
Heating	24.66
Cooling	2.64
Lighting	17.56
Hot water	136.51
Equipment	12.32
Total	**193.70**

Table 7.4: Emission reductions achievable through fabric improvements and system efficiency.

It is clear that provision of DHW is the largest energy consumption for the development with a total of 136.51 kWh/m2/yr. This equates to a total of approximately 546,040kWh/yr. Assuming a carbon factor for mains gas of 0.198 (SAP2009) then total emissions from DHW are: 108,116kgCO_2/yr (27,03kgCO_2/yr/m^2). Up to 40% of this will be provided by the solar pre heating system and therefore a reduction of 10.81kgCO2/yr/m^2 could be anticipated. This equates to 19% of total energy demand.

Emissions	**kgCO_2/yr/m^2**	**kgCO_2/yr.**
Baseline	109.1	436,400
Fabric Improvement	94.7	378,800
Improved system efficiency	56.6	226,400
Solar DHW	45.8	183,200
Accumulated emission Reduction		**253,200 (58%)**
Contribution from renewables		**-43,200 (19%)**

Table 7.6: Emission reductions achievable through fabric improvements, system efficiency and renewable generation.

7.39 Although heat pumps are listed as renewable technologies; when used for heating and cooling they need to have a very high coefficient of performance before they should be considered due to the electrical energy they use in operation

and the associated emissions. In this case, although a COP of 3.5 is achievable for the system proposed (see Appendix) the heat pumps will not be included in the calculation of renewable contribution.

7.40 Biomass is also listed as a low carbon technology but issues surrounding smoke and NO_x emissions along with the logistics of fuel delivery make it unsuitable for most developments in metropolitan areas.

Summary of Energy Strategy

7.41 The energy strategy considered is based on the Energy Hierarchy.

7.42 The building fabric will be improved beyond current regulatory requirements by improving levels of insulation and improving existing openings.

7.43 Passive design features have been incorporated including designing internal layouts to maximise the use of natural light and high thermal insulation to reduce energy demand and help moderate internal temperatures throughout the year. A natural ventilation strategy will be used to provide fresh air to occupied spaces.

7.44 Energy efficient lighting and heating systems will be installed which use less energy and have suitable control so as to be operated at optimum performance while providing a comfortable internal environment.

7.45 It is intended to use solar thermal DHW pre-heating which will reduce energy consumption (in terms of carbon emissions) by 19% when compared to conventional energy supply. This will also allow for connection to a district heating network at some point in the future, should the opportunity arise.

7.46 The estimated savings anticipated from implementing this energy strategy on the baseline energy demand for the development can be seen in Table 7.7 below. It is anticipated that these measures in combination would easily exceed the required 25% reduction in emissions compared to the base case.

Summary of emission reductions & contribution from renewables		
Total emission reduction over baseline	253,200kgCO2/yr	**58%**
Contribution from renewables	-43,200kgCO2/yr	**19%**

Table 7.7: Total estimated emission savings due to energy efficiency measures and contribution from renewables.

7.47 The suggested energy strategy would comply with regional and local planning policy energy efficiency and renewable generation criteria as well as meeting or exceeding ENE1 energy requirements for BREEAM

7.48 Further detail of the wider energy strategy is provided in the BREEAM Pre assessment report included in the Appendix, a brief summary follows:

- Sub-meters will be provided for all substantial energy uses.
- All external lighting will be energy efficient and controlled for the presence of daylight.
- All provided equipment will be energy efficient based on the EU energy efficiency rating system.
- All residential accommodation will be provided with at least 2m of drying line per bedroom.

8.0 Land Use & Ecology

Sustainability Objective:

To protect, maintain and enhance existing biodiversity and habitats. To create new habitats to add value to the landscape in order to improve the urban environment.

8.1 The current site has low ecological value and any undertaking to improve upon this, however small, will have a positive ecological impact.

8.2 The proposal is for reuse of the existing building and as such 100% of the land will be reused.

8.3 It is intended that the site ecology will be improved by adding a green roof and quasi green walls (stepped balconies) to the development in line with the guidance in CPG3. This will be implemented in such a way as to maximise the potential ecological benefit in the limited space available providing a diversity of habitat where previously one did not exist.

8.4 A full ecology survey will be prepared if required following approval of the planning application as part of the BREEAM assessment process. This will confirm the sites ecological value, identify any features which may exist and need protection and detail ways in which the site ecology can be enhanced to maximum effect.

8.5 This strategy complies with both regional and local planning policy along with the guidance in CPG3 and the requirements of the BREEAM assessment.

9.0 Materials

Sustainability Objective:

To reduce the impact of construction on natural resources by using sustainable, legally sourced product.

9.1 Building materials have a significant impact when the embodied energy and resources used in their manufacture, transport and disposal are considered. Responsible sourcing of materials can have a real beneficial effect on the embodied impact of the final development.

9.2 The building will use construction techniques that reduce the buildings environmental impact in terms of resource use and embodied energy. This will be led by the Building Research Establishment's *Green Guide to Materials Specification*.

9.3 All basic building elements will be specified to rate from A+ to D in the Green Guide with an aspiration to specify no elements with a rating lower than C.

9.4 All relevant materials in basic and finishing elements will be responsibly and legally sourced from certified suppliers using sustainable raw materials where possible.

9.5 Wherever possible reused and recycled materials will be sourced. As this is a major refurbishment the building frame and façade will be retained almost intact reducing the need for additional materials.

9.6 All materials will be sourced from local suppliers where possible to reduce transport miles and support the local supply chain.

9.7 Materials containing chemicals which are harmful to health or the environment will be avoided wherever possible.

9.8 All insulation materials will be chosen to have a low embodied impact relative to their thermal properties.

9.9 The design will include protection to vulnerable parts of the building such as areas with high pedestrian traffic in order to increase the service life of finishes and structure.

9.10 This strategy complies with both regional and local planning policy along with the guidance provided in CPG3 and the requirements of CSH and BREEAM assessment.

9.11 Further detail is provided in the BREEAM Pre assessment report included in the appendix.

10.0 Pollution

Sustainability Objective:

To reduce the environmental impact of atmospheric, watercourse, noise and sound pollution.

10.1 There are a variety of forms of environmental pollution that can potentially arise from the construction and use of buildings. A significant proportion is airborne in the form of dust, fumes and chemicals. Other forms of pollution include unwanted noise or light.

10.2 As discussed further in Section 11.0 best practice will be used during the construction phase to ensure that environmental pollution due to construction work will be minimised.

10.3 Efforts will be made to ensure the environmental impact of the materials used for the build will be reduced through responsible sourcing and reduced wastage.

10.4 The use of materials that's manufacture or installation requires the use of harmful global warming chemicals will be avoided.

10.5 HVAC systems will be specified to incorporate automatic drain-down and storage of refrigerant in the event of a detected leakage in order to minimise the risk of environmental contamination due to accidental spillage.

10.6 The BREEAM assessment process will be used to set targets and ensure standards are maintained throughout the build process with regard to all aspects of pollution.

11.0 Site Management

Sustainability Objective:

To use sustainable construction methods and encourage best practice in building delivery.

11.1 In accordance with the standards set out in BREEAM, best practice will be used during construction so as to reduce the impact of works on the surrounding environment.

11.2 The construction site will be managed so as to reduce resource use, energy for site operations, water consumption, waste and pollution.

11.3 A system of monitoring, target setting and reporting will be put in place to ensure standards are met.

11.4 A system of commissioning will be instigated by the design team to ensure that all installed M&E plant is fully commissioned on installation and that this is followed up by further seasonal commissioning of heating and cooling systems for at least the first 12 months after completion.

11.5 A building user guide will be provided to building end users to ensure they are provided with adequate information to enable effective use of the building and its systems. This will be tailored for both building managers and occupiers to ensure all building users fully understand the buildings operation so as to encourage efficient use.

11.6 The local police CPDA will be consulted for their advice regarding the buildings physical security in relation to the Secure by design standard.

12.0 Transport

Sustainability Objective:

To reduce pollution and congestion levels. To encourage walking, cycling and the use of public transport.

12.1 As around 30% of UK energy use is associated with transport, developments of this nature that can encourage a reduction in car use have a positive impact on the environment both through a reduced reliance on precious fossil fuel resources and a reduction in harmful emissions.

12.2 The central location of the development means that it is close to local amenities and has excellent public transport links, with regular bus services on Southampton Row. Russell Square tube station is within 500m and Kings Cross and Euston Railway Station are both within walking distance of the site. The need to rely on a car for both commuting and other regular local and longer journeys is minimised.

12.3 By providing no car parking spaces the building users will be further encouraged to use alternative means of transport.

12.4 Secure cycle storage is provided to facilitate local community cycle use located within 300m of site.

13.0 Waste management

Sustainability Objective:

To reduce waste going to landfill through material efficiency, recycling and sustainable construction methods.

13.1 A key part of sustainability is to manage resources efficiently. Reducing the amount of waste created and maximising resource efficiency during demolition, construction and during the building's lifetime is fundamental to providing sustainable developments.

13.2 Efforts to reduce construction waste generally will concentrate on reducing site waste together with increasing reuse and recycling of waste that cannot be avoided in an effort to reduce volumes going to landfill.

13.3 This will be implemented through a Site Waste Management Plan developed to meet legislative requirements and those of the BREEAM assessment process.

13.4 Adequate facilities will be provided for the storage and recycling of household and business waste and this in conjunction with the adoption of the Local Authority collection scheme for waste and recycling will encourage occupants to minimise waste going to landfill.

13.5 Ensuring targets set for waste reduction during the construction stage and during the buildings lifetime are met will be managed through BREEAM assessment procedure.

14.0 Water Use

Sustainability Objective:

Conserve water through efficiency measures and recycling. Mitigating against increases in flood risk due to reduction in permeable areas and climate change.

14.1 Water is a precious commodity even in the UK and with ever increasing demand for clean drinking water measures need to be taken to safeguard future supplies.

14.2 Approximately 50% of the water consumed in domestic dwellings is not used for consumption, (the percentage is even higher in many commercial buildings) it is for washing, and flushing of toilets etc. Rainwater harvesting is proposed to supply water for flushing WCs. Measures to reduce the amount of potable water used for these activities reduce the demand for potable water and make better use of this limited resource

14.3 In accordance with the requirements of BREEAM, minimum standards will be set for sanitary fittings. A reduction in water use will be achieved through a combination of efficiency measures, including the specification of efficient fittings and dual flush toilets.

14.4 A water meter will be fitted to the mains supply with a pulsed output to enable connection to the BMS

14.5 All external areas of planting will be naturally irrigated using a rain water system of irrigation.

14.6 The proposed development will ensure that water resource use is efficient and no increased risk of flooding will be incurred due to development.

14.7 Initial investigations suggest that the site is in Zone 1 of the Environment Agency Flood Map. (See figure 13.1 below).

Figure 13.1: Environment Agency Flood Map for WC1B 5AL.

14.8 As the site is previously developed with all areas not within the building footprint surfaced with impermeable materials it is not anticipated that redevelopment would cause any increase in run-off from the site.

14.9 The design team are committed to delivering a development goes beyond simply retaining current levels of run-off and have as such included measure which further mitigate against surface water flooding. In line with the recommendations of BREEAM a number of measures will be put in place to attenuate any potential run-off from the site and control discharge. As discussed in the ecology chapter a green roof is planned which will act as a Sustainable Urban Drainage System (SUD). This will have a direct effect of controlling discharge from the site. Rainwater harvesting, discussed above will also act as an additional SUD. By allowing for the storage and use of rainwater on site rather than allowing it to discharge directly into the existing drainage system.

14.10 The proposed surface water management strategy will meet regional and local planning requirements and those of BREEAM. It is anticipated that potential run-off from the site will be significantly reduced post development.

15.0 Health & Wellbeing

Sustainability Objective:

To provide comfortable working and living spaces that promotes a healthy environment and which is adaptable to changing needs.

15.1 Health and wellbeing considers the environment provided for building users and how this promotes healthy happy lives.

15.2 Within the limitations of the existing building, all occupied spaces are designed and orientated in such a way as to provide the maximum amount of natural daylight, sunlight and external views to occupied spaces thus adding to the internal environment.

15.3 Glare control will be provided to occupied spaces in the form of user controlled blinds/curtains.

15.4 Occupied spaces will be naturally ventilated.

15.5 Thermal modelling will be used to ensure the design provides appropriate levels of thermal comfort. All occupied spaces will have individual control for conditioning. This will be centrally controlled by a BMS.

15.6 All internal and external lighting will be designed to the recommended CIBSE standards.

15.7 Finishing elements will be chosen which do not contain harmful chemicals.

15.8 The design will ensure that the risk of airborne & waterborne legionella is minimised.

15.9 Every practical effort will be made to minimise sound transmission both from the external environment and between individual units. The measures employed will go well beyond current Building Regulation standards for minimising sound transmission.

15.10 Residential spaces have been designed to be adaptable and accessible in order to accommodate occupier's needs including provision of space for a home office.

15.11 The BREEAM assessment will be used to ensure that targets set for health and wellbeing are achieved.

16.0 Summary & Conclusions.

16.1 The proposal will comply with all national, regional and local planning requirements with regard to energy and sustainability paying particular attention to the requirements of the London Plan and its supporting documents along with London Borough of Camden' Planning Guidance (CPG): Sustainability

16.2 Through implementation of the Energy Hierarchy total carbon emissions will be reduced by an estimated 58%.

16.3 In line with London Plan requirements; an estimated 19% of total energy consumption will be provided from renewable sources.

16.4 At this point in time it is not possible to connect into an existing heating network, nor is there any plan to extend the proposed Euston Road network to within a viable distance of the development within the next five years.

16.5 Design flexibility will allow for connection to future heating networks should such an opportunity arise.

16.6 CHP is not a practical solution for this development given the energy profile for the building and the absence of any opportunity to export heat at this point in time.

16.7 The proposed scheme will achieve BREEAM certification of at least 'Very Good' and also meet London Borough of Camden Targets for Unweight scores in the Energy, Water and Materials categories.

16.8 Opportunities and constraints specific to the application site have been identified and this process has enabled the design team to commit to providing an energy efficient, sustainable proposal suited to its location and use. This provides assurance that the proposed development will meet the highest sustainability standards applying best practice in regard to the key issues while going well beyond the requirements of Building Regulations.

Appendix:

Sample thermal modelling results & input data.

BREEAM Pre Assessment

Sample thermal modelling results & input data.

Southampton Row thermal modelling input data and calculation outputs.						
	AS EXISTING		**PROPOSED_FABRIC**		**PROPOSED_HVAC**	
U-values [W/m2.K]						
	description	***U-value***	***description***	***U-value***	***description***	***U-value***
walls	solid massonry wall (430mm)	1.31	exst. wal + insu & plaster	0.32	exst. wal + insu & plaster	0.32
Floor	ground floor slab	0.28	ground floor slab	0.28	ground floor slab	0.28
Roof	concrete flat roof	2.58	Proposed roof (new offices)	0.19	Proposed roof (new offices)	0.19
Door	assumed min. stds	2.2	assumed min. stds	2.2	assumed min. stds	2.2
Glazing	exist_single glazing	5.23	exist_single glazing	5.23	exist_single glazing	5.23
	new glazing	1.8	new glazing	1.8	new glazing	1.8
roof lights						
Space conditioning						
	location: Bedrooms	*COP*		COP		COP
	heat pumps	2	Heat pumps	3.5	Heat pumps	3.5
	Heating	2.5	Heating	3.5	Heating	3.5
	Cooling		Cooling		Cooling	
Lighting						
T12	92% of the building		same as as-existing		55 Luminaire Lumens/W	
CFL	near the lifts					
Incandescent lamps	5%					
55 Luminaire Lumens/W	none					
Permeability		25	25		25	
DHW						
	Hot water generator	COP	Hot water generator	COP	Hot water generator	COP
heating system	through gas boiler	0.65	through gas boiler	0.65	through gas boiler	0.91
storage		none		none		none
Renewabales						
	none		none		none	
Summary options			**BER** KgCO2/m2/y		**Energy consumption kWh/m2/yr**	
	1 as existing		102.7		338.6	
	2 propoed_Fabric only		88.3		310.92	
	3 propoed_Fabric only_HVAC		50.2		181.38	
Estimated total floor area = 4822 sqm						
			Energy consumption excl. equipments kWh/m2			
	1 as existing				326.28	
	2 propoed_Fabric only				298.58	
	3 propoed_Fabric only_HVAC				169.08	
Results Seventh Floor only. The energy consumption results concern only the seventh floor						
this energy is in lieu of a temporary benchmark to be used as a baseline to extrapolate						
the overall building's energy consumption						

BREEAM Pre Assessment- 150 Southampton Row

Indicative Overall BREEAM Score
62.00%

BREEAM Rating Benchmarks

PASS	≥30%
GOOD	≥45%
VERY GOOD	≥55%
EXCELLENT	≥70%
OUTSTANDING*	≥85%

	Minimum BREEAM Standards				
	Pass	Good	Very Good	Excellent	Outstanding
Achieved?	YES	YES	YES	NO	NO

Ref	Title	Multi-residential Criteria	Number of BREEAM credits available	Total predicted BREEAM credits achieved	Minimum required credits by BREEAM issue and rating					Notes
Management										
Man 1	Commissioning	One credit where evidence provided demonstrates that an appropriate project team member has been appointed to monitor commissioning on behalf of the client to ensure commissioning will be carried out in line with current best practice. Two credits where, in addition to the above, evidence provided demonstrates that seasonal commissioning will be carried out during the first year of occupation, post construction (or post fit out).	2	1	1	1	1	1	2	**A system of commissioning will be instigated by the design team to ensure that all installed M&E plant is fully commissioned on installation and that this is followed up by further seasonal commissioning of heating and cooling systems for at least the first 12 months after completion.**
Man 2	Considerate Constructors	One credit where evidence provided demonstrates that there is a commitment to comply with best practice site management principles. Two credits where evidence provided demonstrates that there is a commitment to go beyond best practice site management principles.	2	0	-	-	-	1	2	**Credit not sought**
Man 3	Construction Site Impacts	One credit where evidence provided demonstrates that 2 or more of items a-g (listed below) are achieved. Two credits where evidence provided demonstrates that 4 or more of items a-g (listed below) are achieved. Three credits where evidence provided demonstrates that 6 or more of items a-g are achieved: a. Monitor, report and set targets for CO2 or energy arising from site activities b. Monitor, report and set targets for CO2 or energy arising from transport to and from site c. Monitor, report and set targets for water consumption arising from site activities d. Implement best practice policies in respect of air (dust) pollution arising from the site e. Implement best practice policies in respect of water (ground and surface) pollution occurring on the site f. Main contractor has an environmental materials policy, used for sourcing of construction materials to be utilised on site g. Main contractor operates an Environmental Management System. One additional credit where evidence provided demonstrates that at least 80% of site timber is responsibly sourced and 100% is legally sourced.	4	4	-	-	-	-	-	**In accordance with the standards set out in BREEAM, best practice will be used during construction so as to reduce the impact of works on the surrounding environment. A system of monitoring, target setting and reporting will be put in place to ensure standards are met.**
Man 4	Building user guide	One credit where evidence provided demonstrates the provision of a simple guide that covers information relevant to the tenant/occupants and non-technical building manager on the operation and environmental performance of the building.	1	1	-	-	-	1	1	**A building user guide will be provided to building end users to ensure they are provided with adequate information to enable effective use of the building and its systems. This will be tailored for both building managers and occupiers to ensure all building users fully understand the buildings operation so as to encourage efficient use.**

Man 6	Consultation	One credit where evidence provided demonstrates that consultation has been, or is being, undertaken and feedback given to the local community and building users. In addition, advice should also have been sought from any relevant national and local history, archaeological bodies or military history groups regarding the heritage value of the building/site/surroundings. Two credits where, in addition to the above, evidence provided demonstrates that changes to the design and/or action has been taken as a result of the above consultation process. This should include the protection of any parts of the building (or site) having historic or heritage value in accordance with independent advice from the relevant body.	**2**	**0**	-	-	-	-	-	**Credit not sought**
Man 8	Security	One credit where evidence provided demonstrates that an Architectural Liaison Officer (ALO) or Crime Prevention Design Advisor (CPDA) from the local police force has been consulted at the design stage and their recommendations incorporated into the design of the building and its parking facilities (if relevant).	**1**	**1**	-	-	-	-	-	**The local police CPDA will be consulted for their advice regarding the buildings physical security in relation to the Secure by design standard.**

		Indicative Mangement (weighted) Section Score	**7.00%**								
Health & Wellbeing											
Hea 1	Daylighting	One credit where evidence provided demonstrates that at least 80% of floor area in each occupied space is adequately daylit.	**1**	**0**	-	-	-	-	-	**Within the limitations of the existing building, all occupied spaces are designed and orientated in such a way as to provide the maximum amount of natural daylight, sunlight and external views to occupied spaces thus adding to the internal environment.However no credits are assumed in this issue.**
Hea 2	View Out	One credit where evidence provided demonstrates that all relevant building areas have an adequate view out.	**1**	**0**	-	-	-	-	-	**Within the limitations of the existing building, all occupied spaces are designed and orientated in such a way as to provide the maximum amount of natural daylight, sunlight and external views to occupied spaces thus adding to the internal environment.However no credits are assumed in this issue.**
Hea 3	Glare Control	One credit where evidence provided demonstrates that an occupant-controlled shading system (e.g. internal or external blinds) is fitted in relevant building areas.	**1**	**1**	-	-	-	-	-	**Glare control will be provided to occupied spaces in the form of user controlled blinds/curtains.**
Hea 4	High frequency lighting	One credit where evidence provided demonstrates that high frequency ballasts are installed on all fluorescent and compact fluorescent lamps.	**1**	**1**	1	1	1	1	1	**It is assumed all lighting will be LED**
Hea 5	Internal and external lighting levels	One credit where evidence provided demonstrates that all internal and external lighting, where relevant, is specified in accordance with the appropriate maintained illuminance levels (in lux) recommended by CIBSE.	**1**	**1**	-	-	-	-	-	**All internal and external lighting will be designed to the recommended CIBSE standards.**
Hea 7	Potential for natural ventilation	One credit where evidence provided demonstrates that fresh air is capable of being delivered to the occupied spaces of the building via a natural ventilation strategy, and there is sufficient user-control of the supply of fresh air.	**1**	**1**	-	-	-	-	-	**Occupied spaces will be provided with natural ventilation strategy using the main staiwells to provide ventillation air at the ground floor which will be circulated to the whole building and ventilated through external vents in each space..**
Hea 8	Indoor air quality	One credit where air intakes serving occupied areas avoid major sources of external pollution and recirculation of exhaust air.	**1**	**0**	-	-	-	-	-	**Credit not sought**
Hea 9	Volatile Organic Compounds	One credit where evidence provided demonstrates that the emissions of VOCs and other substances from key internal finishes and fittings comply with best practice levels.	**1**	**1**	-	-	-	-	-	**Finishing elements will be chosen which do not contain harmful chemicals.**
Hea 10	Thermal comfort	One credit where evidence provided demonstrates that thermal comfort levels in occupied spaces of the building are assessed at the design stage to evaluate appropriate servicing options, ensuring appropriate thermal comfort levels are achieved.	**1**	**1**	-	-	-	-	-	**Thermal modelling will be used to ensure the design provides appropriate levels of thermal comfort.**
Hea 11	Thermal zoning	One credit where evidence provided demonstrates that local occupant control is available for temperature adjustment in each occupied space to reflect differing user demands.	**1**	**1**	-	-	-	-	-	**All occupied spaces will have individual control for conditioning. This will be centrally controlled by a BMS.**
Hea 12	Microbial contamination	One credit where evidence provided demonstrates that the risk of waterborne and airborne legionella contamination has been minimised.	**1**	**1**	1	1	1	1	1	**The design will ensure that the risk of airborne & waterborne legionella is minimised.**
Hea 15	Outdoor Space	One credit where evidence demonstrates the provision of an adequate outdoor amenity space accessible for use by the building's occupants	**1**	**0**	-	-	-	-	-	**Credit not sought**
Hea 20	Home Office	One credit for the provision of a space and services which allows the occupants to set up a home office in a quiet room	**1**	**1**	-	-	-	-	-	**Residential spaces have been designed to be adaptable and accessible in order to accommodate occupier's needs including provision of space for a home office.**

Hea 21	Sound Insulation	One credit where evidence demonstrates that: - airborne sound insulation values are at least 3dB higher - impact sound insulation values are at least 3dB lower OR Three credits where evidence demonstrates that - airborne sound insulation values are at least 5dB higher - impact sound insulation values are at least 5dB lower OR Four credits where evidence demonstrates that - airborne sound insulation values are at least 8dB higher - impact sound insulation values are at least 8dB lower Than the performance standards set out in the Building Regulations for England and Wales, AD E (2003 edition, with ammendments on 2004) Default cases Four credits for detached dwellings Three credits for attached dwellings where separating walls or floors only occur between non-habitable rooms	**4**	**4**	-	-	-	-	-	**Every practical effort will be made to minimise sound transmission both from the external environment and between individual units. The measures employed will go well beyond current Building Regulation standards for minimising sound transmission**
		Indicative Health & Wellbeing (weighted) Section Score	**11.47%**							

Energy

Ene 1	Reduction of CO2 Emissions	Up to fifteen credits where evidence provided demonstrates an improvement in the energy efficiency of the building's fabric and services and therefore achieves lower building operational related CO2 emissions.	**15**	**8**	-	-	-	6	10	**Sample SBEM calculations on a typical floor suggest theat an EPC rating of 41 can be achieved.**
Ene 2	Sub-metering of Substantial Energy Uses	One credit where evidence provided demonstrates the provision of direct sub-metering of energy uses within the building.	**1**	**1**	-	-	1	1	1	**Sub-meters will be provided for all substantial energy uses**
Ene 4	External Lighting	One credit where energy-efficient external lighting is specified and all light fittings are controlled for the presence of daylight.	**1**	**1**	-	-	-	-	-	**All external lighting will be energy efficient and controlled for the presence of daylight**
Ene 5	Low zero carbon technologies	One credit where evidence provided demonstrates that a feasibility study considering local (on-site and/or near site) low or zero carbon (LZC) technologies has been carried out and the results implemented. Two credits where evidence provided demonstrates that the first credit has been achieved and there is a 10% reduction in the building's CO2 emissions as a result of the installation of a feasible local LZC technology. Three credits where evidence provided demonstrates that the first credit has been achieved and there is a 15% reduction in the building's CO2 emissions as a result of the installation of a feasible local LZC technology. Or alternatively: A maximum of one credit where evidence provided demonstrates that a contract with an energy supplier is in place to provide sufficient electricity used within the assessed building/development to meet the above criteria from a 100% renewable energy source. (Note: a standard Green Tariff will not comply)	**3**	**3**	-	-	-	1	1	**27% of total energy demand will be provided by solar thermal DHW pre-heating**
Ene 15	Provision of Energy Efficient Equipment	Up to two credits are available: One credit where evidence provided demonstrates that all domestic scale fridges, freezes and fridge/freezers have an A+ rating under hte EU Energy Efficiency Labelling Scheme One additional credit available where evidence provided demonstrates that: - domestic washing machines and dishwashers have an A rating AND - domestic washer dryers and tumble dryers have a B rating under the EU Energy Efficiency Labelling Scheme AND commercial scale laundry facilities within the development will maximise opportunities for energy efficient operation Or alternatively: A maximum of one credit available where no (or not all) white goods are provided but information on the EU Energy Labelling Scheme of efficient white goods is provided to residential aspects of the building	**2**	**2**	-	-	-	-	-	**All provided equipment will be energy efficient based on the EU energy efficiency rating system.**
Ene 18	Drying space	One credit where evidence provided demonstrates that: **Self contained dwellings:** Space with posts and footings, or fixings capable of holding: - 1-2 bedrooms: 4m+ of drying line - 3+ bedrooms: 6m of drying line AND/OR **Individual bedrooms:** Space with posts and footings, or fixings capable of holding: - 2m+ of drying line per bedroom	**1**	**1**	-	-	-	-	-	**All residential accommodation will be provided with at least 2m of drying line per bedroom.**

Indicative Energy (weighted) Section Score **13.22%**

Transport

Tra 1	Provision of public transport	Up to three credits are awarded on a sliding scale based on the assessed buildings' accessibility to the public transport network.	3	3	-	-	-	-	-	**The central location of the development means that it is close to local amenities and has excellent public transport links, with regular bus services on Southampton Row. Russell Square tube station is within 50m and Kings Cross and Euston Railway Station are both within walking distance of the site.**
Tra 2	Proximity to amenities	Up to two credits are available: One credit where evidence provided demonstrates that the building is located within 500m of key accessible local amenities appropriate to the building type and its users One additional credit where evidence provided demonstrates that the building is located within 1000m of at least 5 additional accessible local amenities appropriate to the building type and its users	2	2	-	-	-	-	-	**The central location of the development means that it is close to local amenities**
Tra 3	Cyclist Facilities	One credit where evidence is provided to demonstrate that there is adequate provision of: a. covered, secure and well lit cycle racks for staff and residents b. secure storage for wheelchairs and electric buggies	1	1	-	-	-	-	-	**Secure cycle storage has also been provided to facilitate journeys to and from the building by both the residents and commercial users.**
Tra 4	Pedestrian and cycle safety	One credit where evidence provided demonstrates that the site layout has been designed in accordance with best practice to ensure safe and adequate pedestrian and cycle access.	1	0	-	-	-	-	-	**There are no pedestrian of cycling routes within the development**
Tra 6	Maximum car parking capacity	Up to two credits are available: Where evidence provided demonstrates that the number of parking spaces provided for the building has been limited First credit **For Sheltered housing and care homes:** Where evidence provided demonstrates that there is no more than one parking space provided for every **four** building users **For all other users:** Where evidence provided demonstrates that there is no more than one parking space provided for every **three** building users Second credit **For Sheltered housing and care homes:** Where evidence provided demonstrates that there is no more than one parking space provided for every five building users **For all other users:** Where evidence provided demonstrates that there is no more than one parking space provided for every four building users	2	2	-	-	-	-	-	**No car parking is provided**

Indicative Transport (weighted) Section Score **7.11%**

Water

Wat 1	Water Consumption	Up to five credits are available: Four credits available where evidence provided demonstrates that the specification includes taps, urinals, WCs and showers that consumes less potable water in use than standard specifications for the same specifications for the same type of fittings. One additional credit available where evidence provided demonstrates that the specification of systems that collect, store and, where necessary treat, rainwater or greywater for WC and urinal flushing purposes.	5	5	-	1	1	1	2	**In accordance with the requirements of BREEAM, minimum standards will be set for sanitary fittings. A reduction in water use will be achieved through a combination of efficiency measures, including the specification of efficient fittings and dual flush toilets.**
Wat 2	Water meter	One credit where evidence provided demonstrates that a water meter with a pulsed output will be installed on the mains supply to each building/unit.	1	1	-	1	1	1	1	**A water meter will be fitted to the mains supply with a pulsed output to enable connection to the BMS**
Wat 3	Major leak detection	One credit where evidence provided demonstrates that a leak detection system is specified or installed on the building's water supply.	1	0	-	-	-	-	-	**Credit not sought**
Wat 6	Irrigation systems	One credit where evidence provided demonstrates that a low-water irrigation strategy/system has been installed, or where planting and landscaping is irrigated via rainwater or reclaimed water.	1	1	-	-	-	-	-	**All external areas of planting will be naturally irrigated using a low water irrigation system.**

Indicative Water (weighted) Section Score **5.25%**

Materials

Mat 1	Materials Specification (major building elements)	Up to six credits are available, determined by the Green Guide to Specification ratings for the major building elements.	6	4	-	-	-	-	-	All basic building elements will be specified to rate from A+ to D in the Green Guide with an aspiration to specify no elements with a rating lower than C.
Mat 2	Hard landscaping and boundary protection	One credit where evidence provided demonstrates that at least 80% of the combined area of external hard landscaping and boundary protection specifications achieve an A or A+ rating, as defined by the Green Guide to Specification.	1	1	-	-	-	-	-	At least 80% of hardlandscaping will be specified to rate from A to A+ in the Green Guide with an aspiration for all hardlandscaping to meet this standard.
Mat 3	Re-use of building façade	One credit is awarded where evidence provided demonstrates that at least 50% of the total façade (by area) is reused and at least 80% of the reused façade (by mass) comprises in-situ reused material.	1	1	-	-	-	-	-	Wherever possible reused and recycled materials will be sourced. As this is a major refurbishment the building frame and façade will be retained almost intact reducing the need for additional materials.
Mat 4	Re-use of building structure	One credit is awarded where evidence provided demonstrates that a design reuses at least 80% of an existing primary structure and for part refurbishment and part new build, the volume of the reused structure comprises at least 50% of the final structure's volume.	1	1	-	-	-	-	-	Wherever possible reused and recycled materials will be sourced. As this is a major refurbishment the building frame and façade will be retained almost intact reducing the need for additional materials.
Mat 5	Responsible sourcing of materials	Up to 3 credits are available where evidence provided demonstrates that 80% of the assessed materials in the following building elements are responsibly sourced: a. Structural Frame b. Ground floor c. Upper floors (including separating floors) d. Roof e. External walls f. Internal walls g. Foundation/substructure h. Staircase Additionally 100% of any timber must be legally sourced.	3	0	-	-	-	-	-	Credit not sought
Mat 6	Insulation	One credit where evidence provided demonstrates that thermal insulation products used in the building have a low embodied impact relative to their thermal properties, determined by the Green Guide to Specification ratings. One credit where evidence provided demonstrates that thermal insulation products used in the building have been responsibly sourced.	2	1	-	-	-	-	-	All insulation materials will be chosen to have a low embodied impact relative to their thermal properties.
Mat 7	Designing For Robustness	One credit where protection is given to vulnerable parts of the building such as areas exposed to high pedestrian traffic, vehicular and trolley movements.	1	1	-	-	-	-	-	The design will include protection to vulnerable parts of the building such as areas with high pedestrian traffic in order to increase the service life of finishes and structure.
Mat 8	Responsible sourcing of materials - finishing elements	Up to 2 credits are available where evidence provided demonstrates 80% of the assessed materials in the following finishing elements are responsibly sourced: a. Stairs b. Windows c. External and internal doors d. Skirting e. Panelling f. Furniture g. Fascias h. Any other significant use Additionally 100% of any timber must be legally sourced.	2	0	-	-	-	-	-	Credit not sought

Indicative Materials (weighted) Section Score **6.62%**

Waste

Wst 1	Construction Site Waste Management	Up to three credits are available where evidence provided demonstrates that the amount of non-hazardous construction waste (m3/100m2 or tonnes100m2) generated on site by the development is the same as or better than good or best practice levels. One credit where evidence provided demonstrates that a significant majority of non-hazardous construction waste generated by the development will be diverted from landfill and reused or recycled.	4	0	-	-	-	-	-	Efforts to reduce construction waste generally will concentrate on reducing site waste together with increasing reuse and recycling of waste that cannot be avoided in an effort to reduce volumes going to landfill.This will be implemented through a Site Waste Management Plan developed to meet legislative requirements and those of the CSH and BREEAM.
Wst 2	Recycled aggregates	One credit where evidence provided demonstrates the significant use of recycled or secondary aggregates in 'high-grade' building aggregate uses.	1	0	-	-	-	-	-	Very little oportunity will arrise for using recycled aggregates as the original frame and façade are to be retained.

Wst 3	Recyclable waste storage	Up to two credits are available: One credit where storage space is provided for recyclable household waste in each: • Self contained dwelling/bedsit • Communal kitchen or other suitable communal room One additional credit where a central, dedicated space is provided for the storage of the building's recyclable waste streams	**2**	**2**	-	-	-	1	1	**Adequate facilities will be provided for the storage and recycling of household and business waste and this in conjunction with the adoption of the Local Authority collection scheme for waste and recycling will encourage occupants to minimise waste going to landfill.**
Wst 5	Composting	One credit where individual home composting facilities are provided for individual dwellings/communal kitchens AND Where evidence provided demonstrates there is a vessel on site for composting food waste, and adequate storage for such waste generated by the building's users and operation OR Where space or access is limited, there is a dedicated space for compostable food waste to be stored prior to removal and composting at an alternative site.	**1**	**0**	-	-	-	-	-	**Credit not sought.**

Indicative Waste (weighted) Section Score **1.88%**

Land Use & Ecology

LE1	Re-use of land	One credit where evidence provided demonstrates that the majority of the footprint of the proposed development falls within the boundary of previously developed land.	**1**	**1**	-	-	-	-	-	**The proposal is for reuse of the existing building and as such 100% of the land will be reused.**
LE2	Contaminated land	One credit where evidence provided demonstrates that the land used for the new development has, prior to development, been defined as contaminated and where adequate remedial steps have been taken to decontaminate the site prior to construction.	**1**	**0**	-	-	-	-	-	**There is no evidence that the site is on contaminated land.**
LE3	Ecological value of site AND Protection of ecological features	One credit where evidence provided demonstrates that the construction zone is defined as land of low ecological value and all existing features of ecological value will be fully protected from damage during site preparation and construction works.	**1**	**1**	-	-	-	-	-	**The site is assumed to have low ecological value**
LE4	Mitigating Ecological impact	Up to two credits are available: One credit where evidence provided demonstrates that the change in the site's existing ecological value, as a result of development, is minimal. Two credits where evidence provided demonstrates that there is no negative change in the site's existing ecological value as a result of development.	**2**	**2**	-	-	1	1	1	**The current site has low ecological value and any undertaking to improve upon this, however small, will have a positive ecological impact. It is intended that the site ecology will be improved by adding a green roof and quasi green walls (stepped balconies) to the development in line with the guidance in CPG3. This will be implemented in such a way as to maximise the potential ecological benefit in the limited space available providing a diversity of habitat where previously one did not exist.**
LE5	Enhancing Site Ecology	Up to three credits are available: One credit where the design team (or client) has appointed a suitably qualified ecologist to advise and report on enhancing and protecting the ecological value of the site; and implemented the professional's recommendations for general enhancement and protection of site ecology. Two credits where, in addition to the above, there is a positive increase in the ecological value of the site of up to (but not including) 6 species. Three credits where, in addition to the above, evidence is provided to demonstrate a positive increase in the ecological value of the site of 6 species or greater.	**3**	**0**	-	-	-	-	-	**It is assumed that this credit will not be sought, however steps will be taken as detailed above (LE4) to improve site ecology.**
LE6	Long term impact on biodiversity	One credit where the client has committed to achieving the mandatory requirements listed below and at least two of the additional requirements. Two credits where the client has committed to achieving the mandatory requirements listed below and at least four of the additional requirements.	**2**	**0**	-	-	-	-	-	**Credit not sought.**

Indicative Land Use & Ecology (weighted) Section Score **4.00%**

Pollution

Pol 1	Refrigerant GWP - Building services	One credit where evidence provided demonstrates the use of refrigerants with a global warming potential (GWP) of less than 5 or where there are no refrigerants specified for use in building services.	1	0	-	-	-	-	-	**Main HVAC system uses refrigerants- Credit not sought.**
Pol 2	Preventing refrigerant leaks	Up to two credits are available: One credit where evidence provided demonstrates that refrigerant leaks can be detected or where there are no refrigerants specified for the development. One credit where evidence provided demonstrates that the provision of automatic refrigerant pump down is made to a heat exchanger (or dedicated storage tanks) with isolation valves. Or where there are no refrigerants specified for the development.	2	2	-	-	-	-	-	**HVAC systems will be specified to incorporate automatic drain-down and storage of refrigerant in the event of a detected leakage in order to minimise the risk of environmental contamination due to accidental spillage.**
Pol 4	NOx emissions from heating source	Up to three credits are available: One credit where evidence provided demonstrates that the dry NOx emissions from delivered space heating energy are ≤100 mg/kWh (at 0% excess O2). Two credits where evidence provided demonstrates that the dry NOx emissions from delivered space heating energy are ≤70 mg/kWh (at 0% excess O2). Three credits where evidence provided demonstrates that the dry NOx emissions from delivered space heating energy are ≤40 mg/kWh (at 0% excess O2).	3	0	-	-	-	-	-	**The main HVAC system used air sourced heat pumps. Credit not sought.**
Pol 5	Flood risk	Two credits where evidence provided demonstrates that the assessed development is located in a zone defined as having a low annual probability of flooding. One credit where evidence provided demonstrates that the assessed development is located in a zone defined as having a medium or high annual probability of flooding AND the ground level of the building, car parking and access is above the design flood level for the site's location. One further credit where evidence provided demonstrates that surface water run-off attenuation measures are specified to minimise the risk of localised flooding, resulting from a loss of flood storage on site due to development.	3	3	-	-	-	-	-	**Initial investigations suggest that the site is in Zone 1 of the Environment Agency Flood Map. Rainwater harvesting will be provided to supply water for flushing WCs**
Pol 6	Minimising watercourse pollution	One credit where evidence provided demonstrates that effective on site treatment such as Sustainable Drainage Systems (SUDs) or oil separators have been specified in areas that are or could be a source of watercourse pollution.	1	1	-	-	-	-	-	**Rainwater harvesting (see Pol5) and green roof (se LE4) form the SUD strategy for the building.**
Pol 7	Reduction of Night Time Light Pollution	One credit where evidence provided demonstrates that the external lighting design is in compliance with the guidance in the Institution of Lighting Engineers (ILE) Guidance notes for the reduction of obtrusive light, 2005.	1	0	-	-	-	-	-	**Although no external lighting is proposed; for the purpose of this assessment the credit is not sought.**

Indicative Pollution (weighted) Section Score	**5.45%**

Innovation - Exemplary Level Criteria

Innovation	Man 2: Considerate Constructors	Where post construction, a Considerate Constructors Scheme certificate can be provided demonstrating that the site achieved CCS Code of Considerate Practice with a score of at least 36. OR Where post construction, the site has complied in full with the alternative, independently assessed scheme, and the alternative scheme addresses all the mandatory and optional items in Checklist A2.	**1**		
Innovation	Hea 1: Daylighting	At least 80% of the floor area (for the building spaces/room identified above in the standard requirements) has an average daylight factor of 3% in multi-storey buildings and 4% in single-storey buildings.	**1**		
Innovation	Ene 1: Reduction of CO2 emissions	One additional innovation credit can be awarded where evidence provided demonstrates the building is designed to be a carbon neutral building as defined by the NCM (i.e. in terms of building services energy demand), as follows: a. A new building achieves a CO2 index less than 0 on the benchmark scale. b. A refurbished building achieves a CO2 index equal to or less than 0 on the benchmark scale. Two additional innovation credits can be awarded where evidence provided demonstrates the building is designed to be a True zero carbon building (in terms of building services and operational energy demand).	**2**		
Innovation	Ene 5: Low or Zero Carbon Technologies	A local LZC energy technology has been installed in line with the recommendations of a compliant feasibility study and this method of supply results in a 20% reduction in the building's CO2 emissions.	**1**		
Innovation	Wat 2: Water Meter	Where sub meters are fitted to allow individual water-consuming plant or building areas to be monitored such as cooling towers, car washes, catering areas, etc. If the building does not have any major water consuming plant this exemplar credit is not available. Each sub meter has a pulsed output to enable connection to a Building Management System (BMS) for the monitoring of water consumption. In addition to the above, for sites with multiple departments e.g. large health centres or acute hospitals, separate pulsed sub meters are fitted on the supply to the following areas where present: a. Staff and public areas b. Clinical areas and wards c. Letting areas: On the water supply to each tenant unit d. Laundries e. Main production kitchen f. Hydrotherapy pools g. Laboratories h. CSSD/HSDU, pathology, pharmacy, mortuary and any other major process water user.	**1**		
Innovation	Materials Specification	One exemplary BREEAM credit can be awarded as follows: a. Where assessing four or more applicable building elements, the building achieves at least two points additional to the total points required to achieve maximum credits under the standard BREEAM requirements. b. Where assessing fewer than four applicable building elements, the building achieves at least one point additional to the total points required to achieve maximum credits under the standard BREEAM requirements.	**1**		
Innovation	Responsible Sourcing of Materials	Where, in addition to the standard BREEAM requirements, 95% of the applicable materials, comprised within the applicable building elements, have been responsibly sourced.	**1**		
Innovation	Wst 1 Construction Site Waste Management	Where non-hazardous construction waste generated by the building's development meets or exceeds the resource efficiency benchmark required to achieve three credits (as outlined in the guidance). Where at least 90% by weight (80% by volume) of non-hazardous construction waste and 95% of demolition waste by weight (85% by volume) (if applicable) generated by the build has been diverted from landfill and either: a. Reused on site (in-situ or for new applications) b. Reused on other sites c. Salvaged/reclaimed for reuse d. Returned to the supplier via a 'take-back' scheme e. Recovered from site by an approved waste management contractor and recycled. Where all key waste groups are identified for diversion from landfill at pre-construction stage SWMP	**1**		

Innovation - BREEAM Accredited Professional

Innovation BREEAM Accredited Professional	Up to two credits are available for the comprehensive use of a BREEAM Accredited Professional (AP) throughout project work stages.	**2**		

Indicative Innovation (weighted) Section Score **0.00%**