Panther House and 156-164 Grays Inn Road

Panther House Developments Limited

Sustainability Assessment (and BREEAM Pre-assessment)

August 2019

MAX FORDHAM

Panther House

BREEAM Pre-assessment and Sustainability Statement

For Planning

12/8/19

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ISSUE HISTORY

Issue	Date	Description
1	9/8/19	Draft for comment
2	12/8/19	Issue for planning

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1.0 EXECUTIVE SUMMARY

This sustainability statement summarises the key measures proposed to meet the legislative and sustainable drivers to support the planning application for the new mixed use development of Panther House as well as reflecting the Client's objective of creating a sustainable development.

1.1 BREEAM

It has been agreed with Camden Council that only the office areas of Panther House will be assessed under BREEAM. Through discussions with the BRE, the BREEAM assessment strategy is to assess the new office elements under BREEAM New Construction (NC) 2014 under the existing assessment registration and the refurbished elements under BREEAM Refurbishment and Fit-out (RFO) 2014 under a new registration.

Through consultation with the Client and Design Team pre-assessment have been undertaken for both elements with the following targets:

- BREEAM NC 2014 - Office: **73.48%,** BREEAM **'Excellent'**, with a further 12.13% potentially available
- BREEAM RFO 2014 - Office: **74.22%,** BREEAM **'Excellent'**, with a further 11.86% potentially available

1.2 Energy

A separate Energy Statement has been provided as part of the planning documentation. In summary a fabric first approach has been taken with a focus on passive design. Energy efficient equipment has been specified along with photovoltaic panels and heat pumps to provide a low carbon energy solution.

1.3 Water

For the non-domestic elements of Panther House low consuming sanitaryware fittings will be specified to achieve the target of 2 credits under BREEAM Wat 01 'Water Consumption'. This equates to a 25% improvement over BREEAM's baseline water consumption.

The residential elements will be designed to limit water consumption to 105 litres per person per day. Indicative sanitaryware schedule have been provided demonstrating a route to achieving these targets.

1.4 Materials and Waste

Preference will be given to robustly manufactured, high performance products resilient to the potential impacts of climate change. A sustainable procurement plan will be developed to ensure that construction materials are responsibly sourced as far as possible.

A hierarchical waste management strategy of "prevent, reduce, reuse, and recycle" will be employed during the design, construction and operation of the building. A site waste management plan will be developed to ensure a thorough approach to waste control is maintained throughout construction.

1.5 Landscape and Infrastructure

With limited ecological value existing on site presently, the development will improve biodiversity through the inclusion of a green roof, also providing stormwater attenuation, and planter boxes on the Grays Inn Road building façade.

Panther House will be a car free development (bar accessible parking). The site is afforded excellent public transport accessibility will provide ample cycle storage provision and associated facilities as well as a digital travel plan provided to all users of the site promoting locally available sustainable transport methods.

1.6 Adaptation to Climate Change

The potential impacts of climate change have been considered within the design. The flood risk assessment includes the Environmental Agency's requirements of a 40% allowance for climate change.

Thermal modelling has been undertaken on predicted future weather files for London to assess the risk of overheating under potential future climate scenarios. This modelling has informed the cooling strategy for Panther House.

Thermal modelling has been carried out based on predicted future weather files for London that represent climate change scenarios.

2.0 INTRODUCTION

2.1 Sustainability Statement

The purpose of this document is to summarise the sustainability drivers for the mixed use Panther House development before describing the measures being undertaken to address these.

There is a separate Energy Statement that explores the energy strategy in more detail.

2.2 Proposed Development

The proposed Panther House development is a mixed development consisting of new build residential, office and ground floor retail space as well as the refurbishment of a portion of the existing building on-site into further office space.

Redevelopment of the site to include retention, refurbishment and part 2, part 3 storey roof extensions of Panther House; retention and refurbishment of the Tramshed at Brain Yard; demolition of 156 and 160-164 Gray's Inn Road and replacement with a 7 storey building to deliver 6,642m^2 (GIA) of employment (B1) uses across Panther House, the Tramshed and two levels of Gray's Inn Road, 229 m^2 of A1/A3 uses at the ground floor level of Gray's Inn Road and 7 residential units (C3) equating to 949 m^2 of GIA at the upper floors of the Gray's Inn Road building.

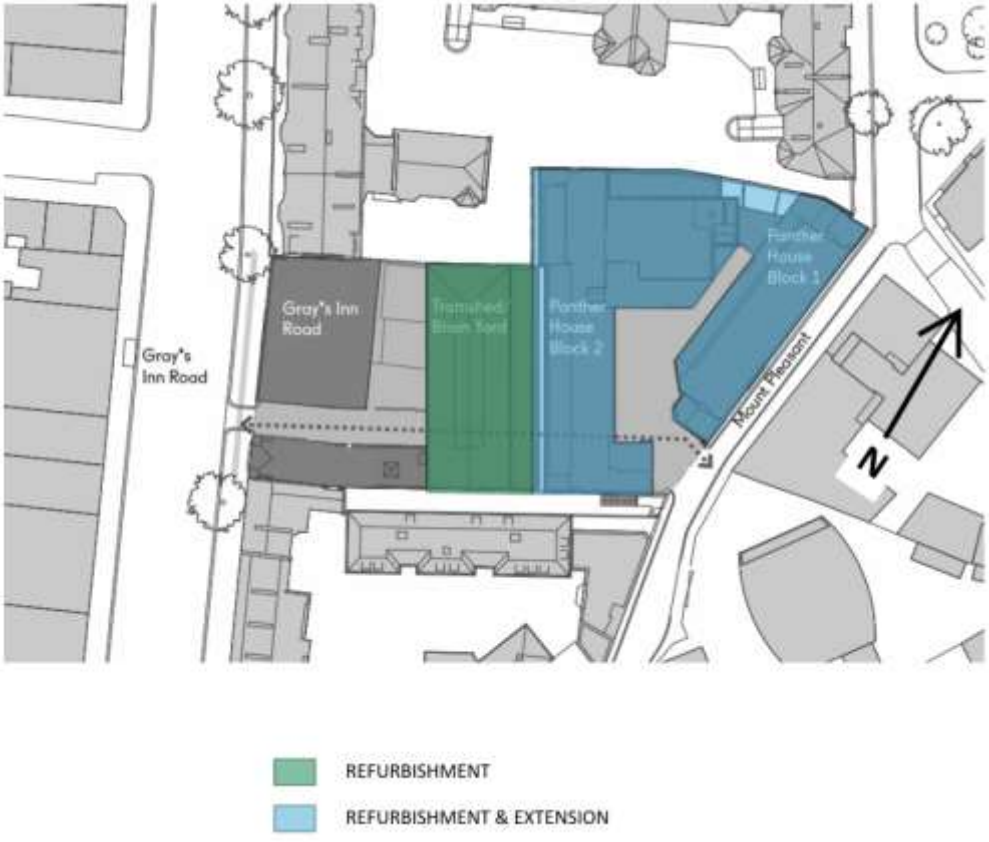

Figure 1: Site plan

2.3 Site Context

The proposed development site is located on Grays Inn Road in the London Borough of Camden and is afforded excellent public transport links. There is a bus stop directly outside the proposed Grays Inn Road entrance with further bus stops on Rosebury Avenue and Theobalds Road. Chancery Lane underground station is 500 meters south along Grays Inn Road and Holborn underground station 900 meters away. King's Cross St. Pancras with underground, national rail and Eurostar links is 1.2km north along Grays Inn Road. Farringdon underground and national rail station is 850m via Clerkenwell Road.

Grays Inn Walks Gardens, a popular lunch destination of many working in the area, is 250 meters west on Theobalds Road. There are many other points of interest within walking distance of the site including the Charles Dickens Museum, the Postal Museum at Mount Pleasant Mail Centre and the site itself is located at the north-west corner of the Hatton Garden Conservation Area.

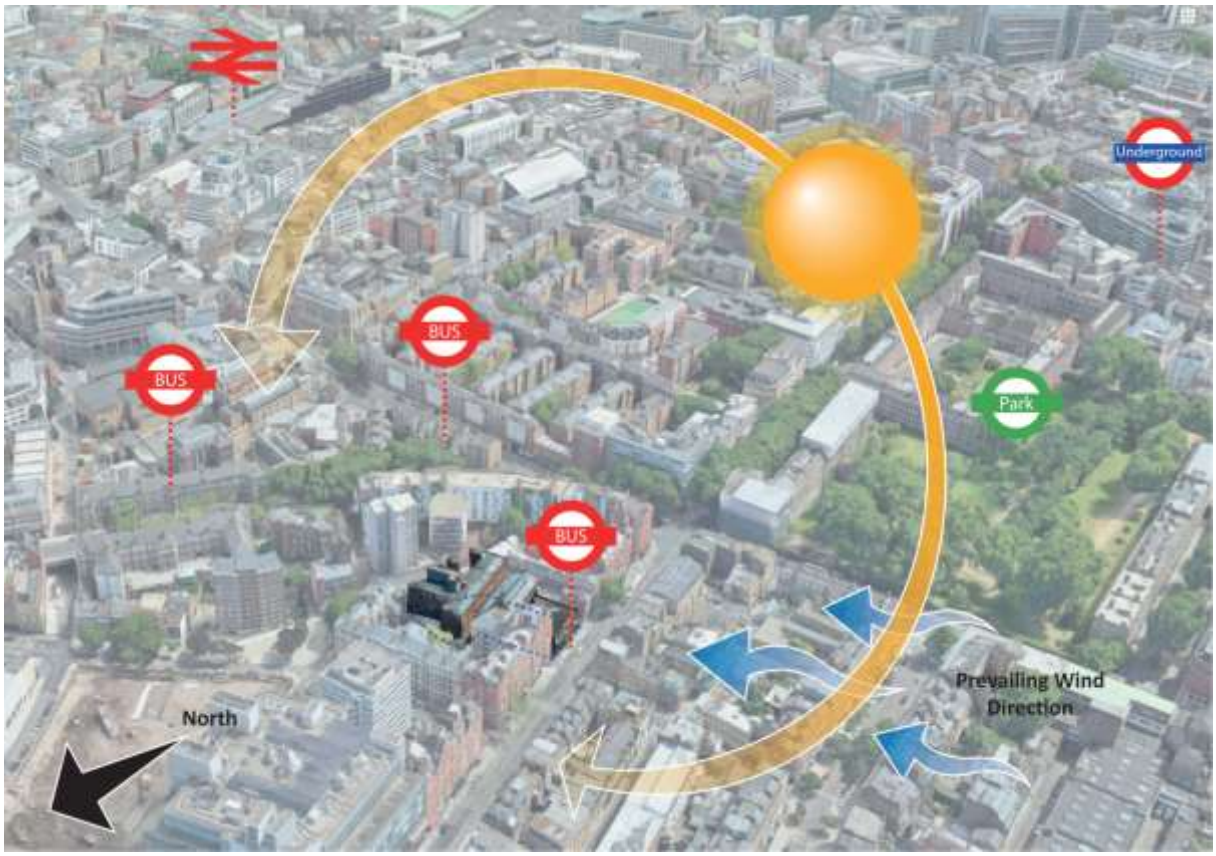

Figure 2: Local microclimate and selected amenities

3.0 LEGISLATIVE AND POLICY CONTEXT

The Building will be required to address a number of policy requirements. The range of policy types is vast, and the following section provides summary of the key requirements that are to be addressed as part of the Building development.

3.1 National Planning Policy

The relevant national, regional and local energy policy requirements have been considered when developing the proposals. The policy documentation provides detailed guidance, therefore only the main influencing policies are summarised below and subsequently referred to in this assessment.

Legislative Context
Under the Climate Change Act 2008, the Government put in place legally binding carbon reduction targets of 35% by 2020 and 80% by 2050, compared to 1990 levels.

The construction and operation of UK buildings account for approximately 60% of national carbon dioxide emissions. Therefore, planning legislation seeks to mitigate the impacts (in particular) of new construction in order to minimise these emissions and meet the national targets.

Building Regulations
Part L of the Building Regulations defines regulatory requirements for reducing the energy consumption of buildings. The overriding goal of these regulations is to ensure that responsible provision is made for the conservation of fuel and power in buildings by limiting heat gains and losses, providing suitably commissioned energy efficient building services with effective controls and by supplying sufficient information to enable the building to be operated efficiently.

The relevant requirements to the application are Part L2A, 'Conservation of fuel and power in new buildings, other than dwellings'.

These documents set minimum standards of energy efficiency and performance for relevant aspects of the building's configuration. They refer to relation 'Building Services Compliance Guides' which outline the minimum performance standards for the related building services installations.

The Building Regulations are the minimum requirements that are legally imposed, with the intention of addressing the carbon reduction targets. For domestic buildings they also define a minimum fabric efficiency requirement (not sited in planning policy).

National Policy & Assessment Methods
The National Planning policy framework (NPPF) sets out the overarching planning policies on the delivery of sustainable development through the planning system. This framework compels planning authorities to facilitate and promote good quality and sustainable development.

3.2 The London Plan - Current

The London Plan 'Spatial Development Strategy for Greater London', published in March 2015, forms the statutory development plan for Greater London. In it, the Mayor of London lays out the London-wide policy context within which London Boroughs should set their local planning policies.

All policies within the plan promote sustainable development, including mitigating and adapting to the impacts of climate change, as well as promoting health and equality within London.

A number of policies directly related to energy use within buildings and energy generation, which form an integral part of the London Plan.

Policy 5.1 'Climate Change Mitigation'
London's carbon dioxide emissions are to reduce by 60% (below 1990 levels) by 2025 and the GLA will monitor progress towards its achievement annually.

Policy 5.2 'Minimising Carbon Dioxide Emissions'
Developments should reduce 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*

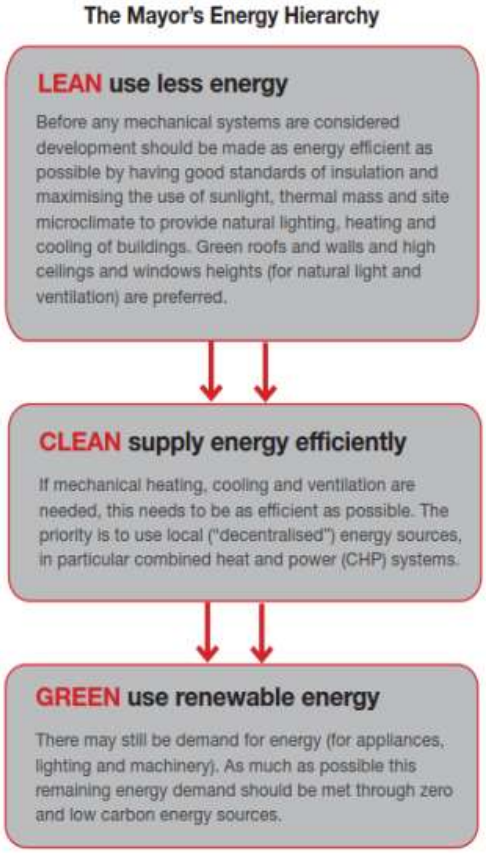

Figure 3: The London Plan 'Energy Hierarchy'

From 2016 all residential buildings are to be zero carbon.

Also all major development proposals should include a detailed energy assessment to demonstrate how the targets for carbon dioxide emissions reduction are to be met within the framework of the energy hierarchy.

The carbon dioxide reduction targets should be met on-site. Where it is clearly demonstrated that the targets cannot be fully achieved on-site, any shortfall may be provided off-site or through cash in contribution to the relevant borough to be ring fenced to secure delivery of carbon dioxide savings elsewhere.

Policy 5.3 'Sustainable Design & Construction
The highest standards of sustainable design and construction should be achieved to improve the environmental performance of new developments and to adapt to the effects of climate change over their lifetime.

Policy 5.6 'Decentralised Energy in Development Proposals'
Development proposals should evaluate the feasibility of Combined Heat and Power (CHP) systems, and where a new CHP system is appropriate examine the opportunities to extend the system beyond the site boundary.

Major development proposals should select energy systems in accordance with the following hierarchy:

- *Connecting to existing heating or cooling networks*
- *Site-wide CHP network*
- *Communal heating and cooling*

Policy 5.7 'Renewable Energy'
All major developments to reduce carbon dioxide emissions by at least 20% through the use of on-site renewable energy generation wherever feasible.

Policy 5.9 'Overheating and Cooling'
The Mayor seeks to reduce the impact of the urban heat island effect in London and encourages the design of places and spaces to avoid overheating and excessive heat generation and to reduce overheating due to the impacts of climate change and the urban heat island effect on an area wide basis.

In practice, the design of all new buildings in London must, where possible, adhere to the following hierarchy:

- *Using less energy, in particular adopting sustainable design and construction measures;*
- *Supplying energy efficiently, in particular prioritising decentralised energy generation;*
- *Using renewable energy; and*
- *Using less water and generate less waste and surface water.*

Policy 5.12 'Flood Risk Management'
Developments are to comply with the flood risk assessment and management requirements set out in the NPPF.

Policy 5.13 'Sustainable Drainage'
Developments should utilise Sustainable Urban Drainage Systems (SUDS), unless there are practical reasons for not doing so.

Policy 5.15 'Water Use and Supplies'
To protect and conserve water developments should minimise the use of mains water by incorporating water saving measures and equipment.

Development should minimise the use of mains water by:

a. *Incorporating water saving measures and equipment;*
b. *Designing residential development so that mains water consumption would meet a target of 105 litres or less per head per day.*

Section 3.7 'Climate Change'
Surface Water Management - Developers should consider the design of new basements and consider the impact new development will have on low lying land uses such as basements in adjoining and nearby developments.

Wherever practical, development should incorporate green roofs, soft landscaping specifically designed to maximise surface water attenuation and absorption, as well as retention measures designed into hard landscaping that slow the flow of water by holding it in situ.

Air Quality - Developments should be at least 'air quality neutral' and refer to the measures outlined within London Plan policy 7.14 and the Mayor's 'Air Quality Strategy'.

3.3 The London Plan - New

In December 2017 the GLA released the draft London Plan 2017. Consultation on the plan has closed with public examination due to take place between November 2018 and March 2019. The final London Plan revision is to be published in autumn 2019.

Policy SI1 'Improving Air Quality'

- All major developments need to demonstrate that they will be at least air quality neutral.
- All energy proposals should have emissions lower than those generated by ultra-low NOx emission gas boilers.
- Developments in Air Quality Focus Areas (AQFA) will be under particular scrutiny. Panther House does not fall within an AQFA.
- For major developments preliminary Air Quality Assessments (AQAs) should be carried out before designing the development to inform the design process.

Figure 4: Top - South Camden Air Quality Focus Areas with the Panther House site highlighted blue

Policy SI2 'Minimising Greenhouse Gas Emissions'

The existing requirements have been strengthened, and some aspirations of the previous plan have been clarified:

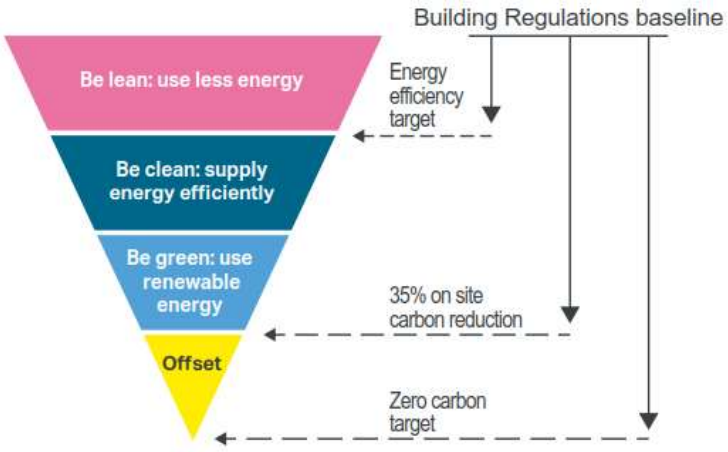

Figure 5: New London Plan's Energy Hierarchy

Be lean: use less energy and manage demand during operation

Be clean: exploit local energy resources (such as secondary heat) and supply energy efficiently and cleanly

Be green: maximise opportunities for renewable energy by producing, storing and using renewable energy onsite

Be seen: monitor, verify and report on energy performance

- Major developments to be net-zero carbon overall, although this can be achieved through off-site or offsetting payments.
- As with current London Plan at least a 35% reduction on building regulations must be achieved on site.
- For residential developments 10% of the reductions must be achieved through energy efficiency.
- For non-domestic 15% of reductions must be achieved through energy efficiency.
- Major development proposals should calculate and minimise carbon emissions of unregulated emissions.
- Development proposals referable to the Mayor should calculate whole lifecycle carbon emissions through a nationally recognised Whole Life-Cycle Carbon Assessment and demonstrate actions taken to reduce life-cycle carbon emissions.
- All developments to demonstrate how the development will achieve net-zero carbon on-site by 2050.
- All major developments to monitor and report on their energy use for 5 years after completion. It has suggested that DECs might be used to do this (currently only required for public buildings).
- **Gas-engine CHP will not be permissible in developments due to the new air quality standards and decarbonising electricity grid.**
- The Mayor recognises that Building Regulations use outdated carbon emission factors and that this will continue to cause uncertainty until they are updated by Government. Further guidance on the use of appropriate emissions factors will be set out in the Mayor's Energy Planning Guidance to help provide certainty to developers on how these policies are implemented.
- Demand-side response, specifically through installation of smart meters, minimising peak energy demand and promoting short-term energy storage, as well as consideration of smart grids and local micro grids where feasible, required.

Policy SI3 "Energy infrastructure"

Major development proposals within Heat Network Priority Areas should have a communal **low-temperature** heating system.

Requirement for an energy masterplan for large-scale developments (town centres and areas of multiple developments) which should consider:

1) *major heat loads (including anchor heat loads, with particular reference to sites such as universities, hospitals and social housing)*
2) *heat loads from existing buildings that can be connected to future phases of a heat network*
3) *major heat supply plant including possible opportunities to utilise heat from energy from waste plants*
4) *secondary heat sources*
5) *opportunities for low temperature heat networks*
6) *possible land for energy centres and/or energy storage*
7) *possible heating and cooling network routes*
8) *opportunities for futureproofing utility infrastructure networks to minimise the impact from road works*
9) *infrastructure and land requirements for electricity and gas supplies*
10) *implementation options for delivering projects, considering issues of procurement, funding and risk, and the role of the public sector.*
11) opportunities to maximise renewable electricity generation and incorporate demand-side response measures

The heat source for the communal heating system should be selected in accordance with the following **heating hierarchy:**

a) connect to local existing or planned heat networks
b) use available zero-emission or local secondary heat sources (in conjunction with heat pump, if required
c) use low-emission combined heat and power (CHP) (only where there is a case for CHP to enable the delivery of an area-wide heat network).
d) use ultra-low NOx gas boilers.

CHP and ultra-low NOx gas boiler communal or district heating systems to meet the requirements of policy SI1 (Air Quality).

Policy SI4 "Managing heat risk"

Show steps to minimise overheating and avoid active cooling:

1) *minimise internal heat generation through energy efficient design*
2) *reduce the amount of heat entering a building through orientation, shading, albedo, fenestration, insulation and the provision of green roofs and walls*
3) *manage the heat within the building through exposed internal thermal mass and high ceilings*
4) *provide passive ventilation*
5) *provide mechanical ventilation*
6) *provide active cooling systems.*

3.4 Camden Local Plan

Adopted on 3rd July 2017, the Camden Local Plan forms the basis for planning decisions and future development in the borough. In terms of sustainability the key policies 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 support centralised 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 buildings' and*
f. *Expect all developments to optimise resource efficiency.*

For decentralised energy networks, we will promote decentralised energy for:

g. *Working with local organisations and developers to implement decentralised energy networks in parts of Camden most likely to support them;*
h. *Protecting existing decentralised energy networks (e.g. at Gower Street, Bloomsbury, Kings Cross, Gospel Oak and Somers Town) and safeguarding potential network routes; and*

i. *Requiring all major development to assess the feasibility of connecting to an existing decentralised energy network, or where this is not possible establishing a new network.*

The 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 adapt 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 run-off through increasing permeable surfaces and the 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 500m^2 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 principals have been incorporated into the design and proposed implementation;*
f. *Encourage new build residential development to use the Home Quality Mark and Passivhaus standards;*
g. *Encouraging conversions and extensions of 500m^2 of residential floorspace or above or five or more dwellings to achieve 'Excellent' in BREEA domestic refurbishment; and*
h. *Expecting non-domestic development of 500m^2 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.

The Council will protect the borough's existing drinking water and foul water infrastructure, including the reservoirs at Barrow Hill, Hampstead Heath, Highgate and Kidderpore.

Policy CC4 'Air Quality'

The Council will ensure that the impact of development on air quality is mitigated and ensure that exposure to poor air quality is reduced in the borough.

The Council will take into account the impact of air quality when assessing development proposals, through the consideration of both the exposure of occupants to air pollution and the effect of the development on air quality. Consideration must be taken to the actions identified in the Council's Air Quality Action Plan.

Air Quality Assessments (AQAs) are required where development is likely to expose residents to high levels of air pollution. Where the AQA shows that a development would cause harm to air quality, the Council will not grant planning permission unless measures are adopted to mitigate the impact. Similarly, developments that introduce sensitive receptors (i.e. housing, schools) in locations of poor air quality will not be acceptable unless designed to mitigate the impact.

Development that involves significant demolition, construction or earthworks will also be required to assess the risk of dust and emissions impacts in an AQA and include appropriate mitigation measures to be secured in a Construction Management Plan.

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.*

4.0 POLICY RESPONSE - ENERGY STRATEGY

4.1 Passive Design

Building Layout, Orientation and Form
As far as possible, occupied spaces have been located around the perimeter of the building and above ground level to maximise occupant benefit from natural light and , where possible, natural ventilation.

Office space within the refurbished Tramshed will be located on the ground and mezzanine spaces lit by rooflights. As much as possible, plant space and stores will be located within the basement.

As well as facing Grays Inn Road itself, the Grays Inn Road portion of the development surrounds a sheltered courtyard space, allowing spaces to be daylit from both sides, as well as providing an accessible outdoor space for occupants. The rooftop extension to Panther House itself will feature a relatively narrow plan again to promote dual aspect daylighting.

In general buildings are rectangular in shape and therefore efficient building volume to façade area ratio minimising heat losses.

Building Fabric
A high specification building fabric will minimise both heat loss in summer and heat gain in the winter. The fabric will also be sealed well, preventing uncontrolled airflow with its associated heat losses and gains.

Solar gain will be minimised by specifying glazing with a low g-value.

Building Element	Building Regulations 2013 LA2 Minimum Standard	Proposed Target Standard
Solid external walls	0.35 W/m^2.K	0.18 W/m^2.K
Windows	2.20 W/m^2.K	1.60 W/m^2.K
Roof	0.25 W/m^2.K	0.15 W/m^2.K
Roof lights	2.20 W/m^2.K	1.60 W/m^2.K
New ground floor	0.25 W/m^2.K	0.18 W/m^2.K
External pedestrian doors	2.00 W/m^2.K	1.60 W/m^2.K
High use entrance doors	3.50 W/m^2.K	2.00 W/m^2.K
Vehicle access doors	1.50 W/m^2.K	1.50 W/m^2.K
Infiltration rate	10 m^3/h/m^2 @ 50 Pa	3-4 m^3/h/m^2 @ 50 Pa
Glazing G-value		0.4 (general)
Glazing light transmission		65% (general)

Table 1: Proposed building fabric specification

For the refurbished elements the lantern rooflight to the Tramshed is in poor condition and will be fully refurbished. The roof to the existing Panther House is assumed to be of old construction and poorly insulated when compared to modern standards. The extension will be placed directly atop making these roofs part of internal separating floors rather than external exposed elements.

Due to conservation issues there is a limit on what can be done to the existing wall fabric. The fabric will however be refurbished as far as possible, sealed well, and windows fitted with draft proofing to prevent uncontrolled airflow and therefore associated heat losses and gains.

Building Element	Building Regulations 2013 LA2 Minimum Standard	Proposed Target Standard
Air permeability	35 $m^3/m^2.h$	25 $m^3/m^2.h$
Glazing G-value	0.75	0.4
Roof	1.10 $W/m^2.K$	0.18 $W/m^2.K$

Thermal Mass
The new building currently proposed to be constructed from a reinforced concrete frame. This will lead to some thermal mass being incorporated within the fabric of the buildings. These elements will absorb heat during the day, and help to reduce the peak daytime cooling demand.

The existing building has significant thermal mass associated within the masonry work which will absorb heat during the day helping to reduce the peak daytime cooling demand.

Daylighting
The majority of occupied spaces for all building typologies are located on the perimeter of the building with the aim of maximising natural daylight and reducing the reliance on artificial lighting. Additional daylighting will be provided to the Tramshed by rooflights.

Ventilation
Fresh air, and as far as possible cooling, to the existing Panther House and its proposed extensions will be provided via natural ventilation, the long and narrow form of these floors lends itself perfectly to cross ventilation. No internal partitioning has been included within these areas (bar the core area of circulation, WCs, etc.) to further encourage cross ventilation.

The Grays Inn Road portion of the development cannot be natural ventilated due to noise and air pollution from Grays Inn Road so will be ventilated via a centralised mechanical ventilation scheme with heat recovery. This strategy will also extend to the Tramshed and Panther House basement and ground floors.

All occupied spaces will be provided with VRF system cooling. Where this is used in conjunction with natural ventilation windows sensors will be used to ensure that the two systems are not competing with each other.

4.2 Energy Efficiency

Energy Efficient Services
All specified building services are to be highly efficient in operation, exceeding the recommendations of Pat L. As part of this strategy all lighting will also be high efficiency/low energy consuming.

As noted above where natural ventilation is not possible, ventilation will be provided by mechanical ventilation with heat recovery, taking heat from the exhaust air and therefore reducing the building's heating requirements.

Energy Management
Smart meters will monitor energy use to allow the building occupants to understand and monitor where energy is being used. The extent of the monitoring will be as required by BREEAM Ene 02 'Energy Monitoring'.

4.3 Energy Savings from Demand Reduction

The above measures result in a reduction of regulated non-domestic carbon dioxide savings by 11% and 23% for the new build and refurbished commercial buildings respectively and the domestic by 8%.

4.4 District Heating

There are no existing heat networks available for Panther House to connect to. The CPG for Energy Efficiency and Adaption states where there is no intention for a development to form part of a wider decentralised energy network, a gas fired-CHP led energy strategy is not considered feasible. Therefore the possibility of using as gas-led CHP has also been dismissed.

An air source heat pump-led community heating and cooling strategy shall instead be specified. This is encouraged by the carbon factors defined by SAP10 and caters for the small and unaligned loads associated with the proposed uses on site.

4.5 Low and Zero Carbon Technologies

A Low and Zero Carbon Technology feasibility study has been undertaken for Panther House. Looking at all available technologies the study reviewed which were appropriate for the site, legislative context and building typology.

Based on the study a strategy incorporating photovoltaic arrays installed on the roof of Panther House 1 alongside a combined centralised heating and cooling VRF system. These technologies reduce the regulated non-domestic carbon dioxide savings by 31% and 39% for the new build and refurbished commercial buildings respectively and the domestic by 41% exceeding the 20% required by the London Plan.

5.0 POLICY RESPONSE - SUSTAINABILITY STRATEGY

5.1 Water

Residential Water Consumption
The current London Plan, policy 5.15 'Water Use and Supplies' requires that residential developments limit their mains water consumption to 105 litres per person per day (retained in the new London Plan as policy S15 'Water Infrastructure').

The residential sanitaryware specification has been developed to meet this target. Although the development is not to be assessed under BRE Home Quality Mark (HQM) the proposed sanitaryware specification has been inputted into the HQM's water efficiency calculator and confirms an internal water consumption of 104 litres per person per day:

Item	Capacity/Flow Rate	Litres per Person per Day
WC cistern	6 litres	8.76
	4 litres	11.84
WC taps	5 litres per minute	9.48
Bath	174 litre capacity	19.14
Shower	8 litres per minute	34.96
Kitchen sink taps	16 litres per minute, fitted with a flow restrictor a maximum of 12 litres per minute	15.64
Washing machine	5.625 litres per kg (load)	11.81
Dishwasher	0.8 litres per place setting	2.88
Water Softener	N/A	N/A
Water Consumption, litres per person per day		**104.2**

Table 2: Example proposed sanitaryware/kitchenware specification relevant to indoor water consumption. To be developed as the design develops

Non-residential Water Consumption
The current London Plan does not give a specific water consumption target for non-residential developments. However policy S15 of the proposed draft of the new London Plan (July 2019 post EIP version) requires development proposals to achieve at least the BREEAM 'Excellent' standard for water consumption of 1 credit, a 12.5% improvement over baseline water consumption. Both BREEAM pre-assessments for the NC and RFO portions of Panther House are targeting at least 2 credits (25% improvement) under Wat 01 through low consuming sanitaryware specifications.

To ensure this target is achieved the following 'worst case scenario' water consumption limits will be set where the component is specified:

Component	Maximum Flow Rate/Capacity
WC	4.5 litre effective flush volume (to be dual flush cisterns)
Wash hand basin taps	7.5 litres per minute
Showers	8 litres per minute
Baths	160 litres
Urinals (2 or more urinals)	3 litres/bowl/hour

Urinals (1 urinal only)	4 litres/bowl/hour
Kitchen tap: Kitchenette	7.5 litres per minute
Domestic sized dishwashers	13 litres/cycle
Domestic sized washing machines	50 litres/use
Waste disposal units	0 litres/minute
Commercial sized dishwashers	6 litres/rack
Commercial or industrial sized washing machines	10 litres/kg

Table 3: Table 2: Non-domestic sanitaryware item water consumption limits

Water Metering and Sub-metering
Each residential unit will have individual water sub-meters to allow residents to monitor their water consumption. The design of the non-domestic portion of the Panther House development will be flexible enough to allow for the individual sub-letting of each floor and the water metering strategy will reflect this.

Flood Risk and Surface Water Run-off
A site specific flood risk assessment has been undertaken and confirms that the site has a low risk from flooding from all sources.

With rainwater recycling not feasible, the extent of the existing buildings' foundations making infiltration systems not viable and no access to local watercourse, stormwater run-off has to drain into the local sewer network. A 50% run-off reduction target has been set and will be achieved through attenuation tanks and a green roof on Panther House 1.

5.2 Materials and Waste

Procurement of Materials
A sustainable procurement plan will be produced and followed by the Design Team and Contractor to ensure all materials are specified and sourced in a responsible and ethical manner. Responsible sourcing of materials will be ensured through the specification of FSC timber, ISO14001 certified products and the use of BRE's Framework Standard BES 6001 for the responsible sourcing of construction products where possible.

Functional Adaptability
To comply with the requirements of BREEAM Wst 06 a functional adaptability strategy was developed in a dedicated workshop attended by key members of the Client and Design Team.

Construction Waste
A hierarchical waste management strategy of "Prevent, Reduce, Reuse, and Recycle" will be employed during the design, construction and operation of the building. During the design phase this means striving for material efficiency and eliminating excessive material usage.

During construction a Site Waste Management Plan will be utilized to ensure a thorough approach to waste control is maintained. Operational waste is provided for, including facilities for recycling and storage, as per local plan and BREEAM requirements. An aspiration of 70% by volume (80% by tonnage) and 80% by volume (80% by tonnage) will be set for the diversion of non-demolition and demolition waste from landfill respectively for the new construction elements. For the refurbished elements a target of 95% by volume (90% by tonnage) and 90% by volume (95% by tonnage) will be set for the diversion of refurbishment/fit-out and demolition waste from landfill respectively.

Operational Waste
The development will provide appropriate levels of internal and external recyclable and non-recyclable waste in line with the London Borough of Camden's Design SPD (2019) which exceed BREEAM Wst 03 requirements.

5.3 Landscape and Infrastructure

Enhancing Biodiversity
An Ecologist was appointed to undertake an ecological appraisal of the existing site and found it to be of low value. As recommended by the Ecologist a green roof will be installed on Panther House 1.

In addition a series of planter boxes will be installed on the Grays Inn Road building façade. The result is an increase in the ecological species richness as a result of the proposed development.

Sustainable Transport
The proposed development will be 'car free' with only accessible car parking catered for.

Residential cycle storage is provided for residents and visitors, as well as storage for the retail units, at ground floor level and accessed via the Grays Inn Road frontage. The stores themselves will be separated with residential cycle storage located at the northern extent of the site and the retail at the southern extent of the site.

Office cycle storage will be located at basement level and will be in line with the new London Plan requirements, exceeding the requirements of BREEAM Tra 03. Cycling is further encouraged by the provision of extensive associated facilities at basement level including changing and shower facilities.

All users of the site will be provided with a digital travel plan providing information on local public transport, walking and cycling networks, contact details for taxi operators, local car club providers. For non-domestic users (office and retail staff) the pack will also provide information in any incentives and discounts available to them.

5.4 Overheating/Adaptation to Climate Change

The building is being designed with potential future climate change in mind. Thermal modelling has been carried out based on predicted future weather files for London that represent climate change scenarios.

CIBSE TM52 analysis has been completed for all of the spaces to be refurbished. This analysis considered a 2020 predicted weather file for London, and central cooling plant sized to provide an output of 400kW.

All spaces passed the analysis. By complying with the requirements of TM52 it is verified that the proposed ventilation and cooling strategy provides a comfortable internal environment for the occupants.

The risk of overheating will also be reduced via the following measures:

- Internal heat gains minimised by using low energy lighting
- Glazing film with a low g-value will be specified to reduce solar gains
- Solar gain is controlled by installing internal blinds in occupied spaces
- Local temperature control provided in all occupied spaces
- Solar shading provided by buildings extensions.

As per the requirements of BREEAM, specifically Wst 05 'Adaptation to Climate Change' a dedicated adaptation to climate change workshop was held developing a specific strategy to address the potential impacts of climate change.

The calculations presented within the Flood Risk Assessment include a 40% allowance for climate change, in line with the Environmental Agency's requirements.

6.0 BREEAM PRE-ASSESSMENT

6.1 Introduction to BREEAM

The Building Research Establishment Environmental Assessment Method (BREEAM) for New Construction and for Refurbishment and Fit-Out schemes help Clients and Local Authorities to set environmental targets and demonstrate environmental performance of new construction and refurbishments and fit-outs. To date, over 260,000 buildings have been BREEAM certified worldwide since it was first launched in 1990 Figure 6, below, illustrates countries in which BREEAM assessments have taken or are currently taking place.

Countries with BREEAM Certified Buildings

Countries which have developed their own BREEAM Scheme

Figure 6: Countries with BREEAM certified buildings

The following categories are assessed:

- Management;
- Health & Well-being;
- Energy;
- Transport;
- Water;
- Materials;
- Waste;
- Land use and Ecology; and
- Pollution

There is also an Innovation Category, where additional credits can be awarded for exemplary performance and any innovative features of the building project that are not assessed as standard in the other environmental sections. An application for these additional credits has to be made to the BRE for approval.

6.2 BREEAM Scope

Due to the complex nature of Panther House, the scope of the BREEAM Assessment has been discussed with both the BRE and London Borough of Camden Council.

Camden Council have agreed that due to the small scale of the retail area the retail aspect can forgo assessment leaving the office areas as the only non-domestic areas requiring BREEAM assessment.

When an assessed development consists of both new build and refurbishment elements BREEAM does provide the option of assessing the whole development under a single assessment with the assessment type dependent upon which forms the majority of the development. With both new build and refurbishment elements significant this would have a negative impact as a large portion of the building will have to be assessed under a scheme not designed for it.

Another option would be to create a single bespoke assessment however the process of developing the tailored framework is in terms of months. In addition a NC 2014 assessment had already been registered for Panther House under the previous application that the BRE agreed could be used for the revised scheme despite that difference in area.

Through discussions with the BRE it was determined that the most sensible assessment route would be to undertake two separate assessments;

- Keep the existing BREEAM New Construction 2014 registration to assess the new build elements; and
- Register an additional BREEAM Refurbishment and Fit-Out 2014 project to assess the refurbishment elements.

6.3 BREEAM RFO 2014 and Applicable Assessment Parts

The methodology for BREEA MRFO 2014 is different from a typical BREEAM assessment. The framework is split into four separate parts to allow each project to be assessed against only those parts that are within the scope of influence of the project works:

- Part 1: Fabric and structure
- Part 2: Core services
- Part 3: Local services
- Part 4: Interior design

The credit structure for BREEAM NC 2014 forms the basis of BREEAM RFO 2014. However based upon the parts assessed, certain credits that are not applicable to the scope of the project may be removed from the assessment.

The BREEAM RFO 2014 manual provides a questionnaire to determine which parts are applicable to the project. This was circulated amongst the Design Team and it was determined that the following parts should be assessed:

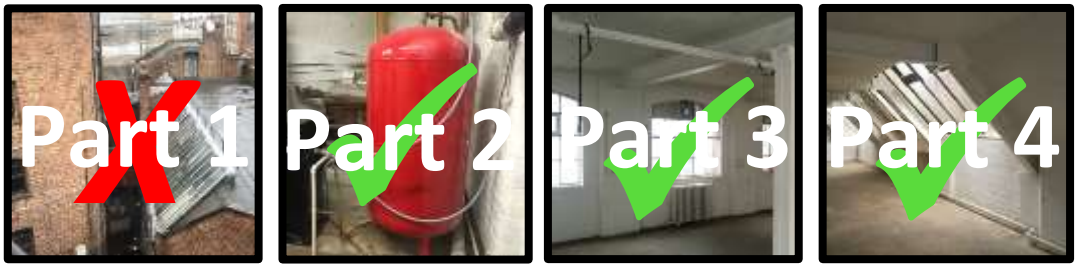

Figure 7: Parts to be assessed for Panther House under BREEAM RFO 2014

6.4 Assessment Stages

It is best practice to carry out a BREEAM Pre-Assessment at the earliest opportunity to establish the project's trajectory against the BREEAM certification requirements. The Pre-Assessment is not audited but is a design and risk assessment tool to help the project team determine better environmental outcomes. The BREEAM Assessor carries out the Pre- Assessment in consultation with the client and design team and it is a way of mitigating risks of non- compliance. It provides Authorities with assurance that the building proposals are in line with the targeted BREEAM rating. Two separate pre-assessments have been undertaken for Panther House; one for the NC elements and another for the RFO elements. The outcome of these are summarised below with the full pre-assessment presented in the appendices.

As part of the assessment scheme, two formal assessments will be required. The first assessment is to take place during design stages (Interim or Design Stage Certification). Design-based evidence such as specifications, drawings and commitments from the team are required as evidence at this stage.

The final assessment will take place following Practical Completion (Post Construction Certification). A second batch of as-built information will be required that will confirm that the design stage information is valid. This will be carried out by a combination of on-site assessor auditing and additional as-built drawings / records. The general BREEAM process is outlined in Figure 8.

In both BREEAM NC 2014 and RFO 2014, there are minimum standards required for an 'Excellent' rating. These are summarised on the following page. The current status for the proposed building confirms that all mandatory requirements are being addressed.

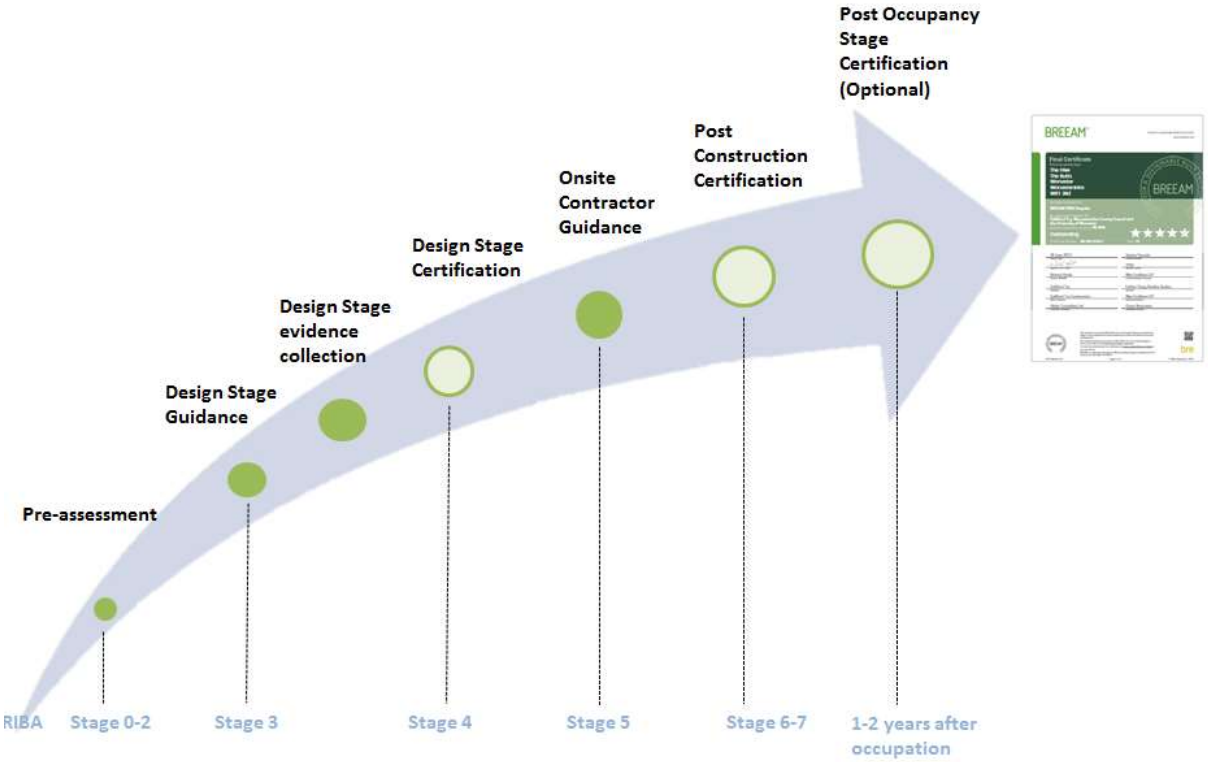

Figure 8: BREEAM assessment stages

6.5 Scoring Process

Credits are allocated under each category and a weighting is applied to determine an overall building score. The building will be allocated a rating of Unclassified, Pass, Good, Very Good, Excellent, or Outstanding as follows:

BREEAM Rating	Percent Score
Outstanding	85
Excellent	70
Very Good	55
Good	45
Pass	30
Unclassified	<30

Table 4: BREEAM ratings and required score

6.6 Section Weighting

The table outlines the weightings for each of the ten environmental sections included within both assessment and the value of each individual credit within each section. Not all credits are equal therefore and some can contribute more to the overall score than others.

Environmental Section	BREEAM NC 2014		BREEAM RFO 2014	
	Category Weighting	Credit Value	Category Weighting	Credit Value
Management	12.00%	0.57%	12.85%	0.76%
Health & Well-being	15.00%	0.88%	17.14%	0.90%
Energy	15.00%	0.65%	18.28%	0.76%
Transport	9.00%	1.00%	4.41%	0.88%
Water	7.00%	0.78%	7.06%	0.88%
Materials	13.50%	1.04%	16.54%	1.27%
Waste	8.50%	0.94%	8.27%	0.83%
Land Use & Ecology	10.00%	1.00%	5.29%	2.65%
Pollution	10.00%	0.77%	10.18%	1.02%
Innovation (additional)	10.00%	1.00%	10.00%	1.00%

Table 5: BREEAM environmental section weightings and individual credit values

6.7 Mandatory Credits and Requirements

Table 6 lists the mandatory credits and requirements for BREEAM 'Excellent' under both assessments.

Credit	Requirements	Design Stage Owner	Comments
Man 03: Responsible Construction Practices	One credit (considerate construction)	N/A	To be included within Contractor's Prelims.

Man 04: Commissioning & Handover	Criterion 10 (Building User Guide)	All	Commitment to the development of a visual and usable building user guide reflects design team sustainability aspirations.
Man 05: Aftercare	One credit (seasonal commissioning)	Contractor	To be included within Contractor's Prelims.
Ene 01: Reduction of Energy Use and Carbon Emissions	NC 2014 - Five credits RFO 2014 - Six credits	M&E	Current energy performance modelling shows that the NC 2014 elements achieve 5 credits and the RFO 2014 elements achieve 10 credits.
Ene 02: Energy Monitoring	One credit (first sub-metering credit)	M&E	Metering strategy to comply.
Wat 01: Water Consumption	One credit	Architect	Can typically be achieved through the specification of water efficient sanitaryware items. Low flow taps and showers and low flush volume WC cisterns to be specified.
Wat 02: Water Monitoring	Criterion 1 only	M&E	Relates to mains incoming water meter. Metering strategy to comply.
Mat 03: Responsible Sourcing of Materials	Criterion 1 only	Architect	All timber to be legally sourced.
Wst 03: Operational Waste	One credit	Architect	Provision of sufficient recyclable waste storage space appropriate to the size and type of development to be provided.
LE 03: Minimising Impact on Existing Site Ecology	One credit (NC 2014 only)	Architect	With no ecology on the existing site the ecology of the proposed development will at least show no negative change so credit achieved by default.

Table 6: Minimum BREEAM standards for 'Excellent'

Currently all of the above credits are targeted for both assessments. The BREEAM assessor will monitor these credits throughout the Design and Construction process closely to ensure they are accounted for in the design.

6.8 Buffer Score

It is typical that a BREEAM assessment will lose credits as the design progresses and there is always some credits where uncertainty exists, for instance it is difficult to predict how may credits can be achieved under Mat 01 'Life Cycle Impacts' until the required calculations have been done. Therefore both assessments for Panther House aim to target a score of 3-5% above the minimum score required to achieve 'Excellent'

6.9 Risk Rating

To allow the Design Team to monitor time critical, complex or hard to predict BREEAM issues each credit has been assigned a 'risk rating'; High, Medium, Low or Critical. Where a credit is listed as 'Critical' this is often due to action being required by a certain RIBA Stage of Works.

Risk/Status Category	Description	Symbol
Low Risk	Credits thought to be achievable, technically simple or have been shown	L

	historically to be low risk	
Medium Risk	The credit has some uncertainty in the predicted score at this stage and/or it is technically complex and therefore liable to non-compliance	M
High Risk	May be highly uncertain, expensive and historically has been found to be difficult to achieve	H
Critical	Requires immediate action	C

Table 7: Credit risk rating definitions

6.10 Panther House BREEAM Pre-Assessment

In collaboration with the Client and Design Team, a BREEAM pre-assessment has been undertaken outlining Panther House's route to BREEAM 'Excellent'. There has been an effort to avoid targeting credits for credits sake and prioritising credits that provide tangible benefit to the project and are in line with the overarching design aspirations.

The targeted score will be monitored throughout the Design and Construction Stages with the designated credit owners responsible for raising any potential issues to the BREEAM Assessor that could impact the targeted score.

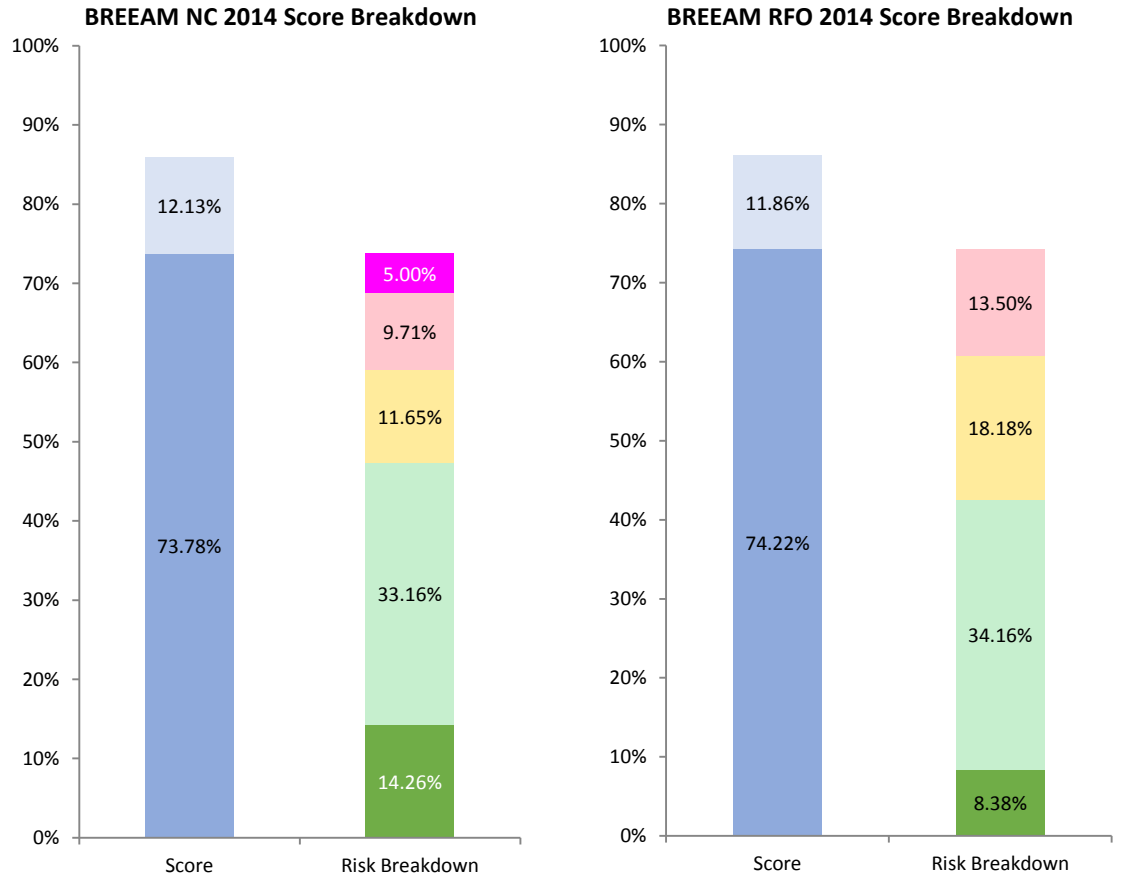

Figure 9: Left - Targeted, potential and risk rating breakdown for NC 2014, right - Targeted, potential and risk rating breakdown for RFO 2014

Both pre-assessment outlines a route to BREEAM 'Excellent' that includes a healthy buffer over the minimum score required to achieve BREEAM 'Excellent', **73.78%** and **74.22%** for the NC 2014 and RFO 2014 assessments respectively. Furthermore an additional **12.13%** and **11.86%** have been identified as potential credits for the NC

2014 and RFO 2014 assessments respectively. These are currently listed as potential for one or more of the following reasons:

- They may result in additional cost (e.g. the potential credit under Wat 01 would require more expensive sanitaryware items or the rainwater/greywater harvesting);
- They may not fully align with the aspirations of the project (e.g. some potential credits under Man 04 and Man 05 require a degree of extended aftercare and these discussions have not yet taken place) ;
- At this stage it is unclear whether the credit may be feasible for the project (e.g. third part consultation has taken place but the process has not yet been reviewed in terms of BREEAM so it is unclear whether all the consultation requirements for Man 01, credit #2 have been met).

6.11 Early Stage Credits

Under both assessments there are a number of credits that require action by RIBA Stages 1 and 2. While there is a choice as to whether these credits are targeted not targeting any will significantly reduce the ability to secure 'Excellent'. Table 8 provides a narrative on these credits where targeted.

Issue	Credit	Requirements	Actioned?	Evidence Provided
Man 01: Project Brief and Design	#1 - Stakeholder Consultation (project delivery)	Project delivery stakeholders have met to identify and define their roles	Yes	Client and Design Team have developed a roles and responsibilities matrix covering all requirements
	#3 - Sustainability Champion (design)	Appointment of Sustainability Champion to define BREEAM targets	Yes	Max Fordham LLP have been appointed as BREEAM APO
Hea 06: Safety and Security	#2 - Security of site and building	Consult Security Specialist to undertake a Security Needs Assessment	Yes	Architect has consulted a Designing Out Crime Officer. Consultation was compliant with Security Needs Assessment requirements
Ene 04: Low Carbon Design	#1 - Passive design analysis	Undertake passive design analysis	Yes	Max Fordham LLP have complete study
	#3 - Low and zero carbon technologies	Undertake low and zero carbon technology feasibility study	Yes	Max Fordham LLP have complete study
Wst 05: Adaptation to Climate Change	#1 - Structural and fabric resilience	Develop adaptation to climate change strategy	Yes	Actioned within a dedicated Client and Design Team workshop
Wst 06: Functional Adaptability	#1 - Functional adaptability	Develop functional adaptability strategy	Yes	Actioned within a dedicated Client and Design Team workshop
LE 04: Enhancing site ecology	#1 - Ecologist's report and recommendations	Appoint Ecologist to perform ecology appraisal and make enhancement recommendations	Ongoing	Ecological appraisal and resultant report complete. Ecologist to be re-engaged with to asses available credits within the Land Use and Ecology section

Table 8: Early stage BREEAM requirements

6.12 BREEAM Actions Undertaken To-date

Based on those actions already undertaken and particular credits that relate to the site location rather than the detailed design of the development itself, it has been possible to award a number of credits even at this early stage. To date the BREEAN NC 2014 and BREEAM RFO 2014 assessments for Panther House have an 'achieved score' (pre BRE QA) of 14.26% and 8.36% respectively.

APPENDIX A - BREEAM NC 2014 PRE-ASSESSMENT

BREEAM New Construction 2014

Max Fordham

Assessment Type	Fully Fit-out
Project Stage	RIBA Stage 2
Assessor Name	Neil Cogan
Desired Rating	Excellent
Desired Score	75.00%

Project Name	Panther House	
Building Type	Office	
Achieved Score	14.26%	Unclassified
Target Score	73.78%	Excellent
Potential Score	85.90%	Excellent

Category	BREEAM Issue	Credit Number	General Requirements	Stage Requirements	Minimum Requirements	Available		Achieved		Targeted		Potential	Risk
						Credits	Percent	Credits	Minimum Requirements	Credit	Minimum Requirements	Credit	
	Man 01 - Project Brief and Design	#1 - Stakeholder Consultation (project delivery)	Prior to completion of the Concept Design, all team members involved in decision making process for the project must meet to define their roles and responsibilitiesfor each key phase of the project covering a minimum list of points detailed in the manual and the project team must demonstrate how the contributions and outcomes of this consultation process has influenced the brief.	**Must occur no later than RIBA Stage 2**		1	0.57%			1			L
		#2 - Stakeholder Consultation (third party)	During design brief preparation, all relevant parties and bodies are identified and consulted with by the design team - evidence must be gathered that these consultations were incorporated into the design. Consultation plan must be prepared that includes timescale and method of consultation.	**Must occur no later than RIBA Stage 2**		1	0.57%					1	C
		#3 - Sustainability Champion (design)	No later than early RIBA Stage 1, Sustainability Champion is appointed to facilitate setting of BREEAM performance targets. BREEAM target must be contractually agreed between client and project team no later than RIBA Stage 2. Project must undergo Design Stage Certification assessment.	**Must occur no later than Stage 1**		1	0.57%			1			L
		#4 - Sustainability Champion (monitoring progress)	Credit #3 has been achieved. Sustainability Champion is appointed to monitor progress against the agreed BREEAM performance targets throughout the design process and formally report progress to the client and design team. Sustainability Champion must attend key design team meetings and prepare regular written reports.			1	0.57%			1			L
	Man 02 - Life Cycle Cost and Service Life Planning	#1 - Elemental Life Cycle Cost (LCC)	An elemental life cycle cost (LCC) analysis has been carried out, at RIBA Stage 2. The LCC analysis shows an outline plan based on the building's basic structure and envelope, appraising a range of options and based on multiple cash flow scenario's e.g.. 20, 30, 50+ years and the fabric and servicing strategy for the project outlining services component and fit-out options (if-applicable) over a 15-year period, in the form of an 'elemental LCC Plan'	**Must occur no later than RIBA Stage 2**		2	1.14%						
		#2 - Component Level LCC Plan	A component level LCC plan has been developed by the end of RIBA Stage 4 and includes the following component types in line with PD 156865:2008 (where present): envelope, services, finishes, external spaces. Demonstrate how the component level LCC plan has been used to influence building and systems design/specification to minimise life cycle costs and maximise critical value	**Must occur no later than RIBA Stage 4**		1	0.57%			1			M
		#3 - Capital Cost Reporting	Report the capital cost for the building in pounds per square metre (£/m2), via the BREEAM Assessment Scoring and Reporting tool, Assessment Issue Scoring tab, Management section.			1	0.57%			1			L

Category	BREEAM Issue	Credit Number	General Requirements	Stage Requirements	Minimum Requirements	Available		Achieved		Targeted		Potential	Risk
						Credits	Percent	Credits	Minimum Requirements	Credit	Minimum Requirements	Credit	
Management	Man 03 - Responsible Construction Practices	Pre-requisite - Timber Procurement	All timber and timber-based products used on the project are 'legally harvested and traded timber' (see Relevant definitions)			-	-			-			L
		#1 - Environmental Management	Principle contractor operates a compliant Environmental Management System concerning their main operations and implement best practice pollution prevention policies and procedures on site in accordance with Pollution Prevention Guidelines.			1	0.57%			1			L
		#2 - Sustainability Champion (construction)	Sustainability Champion is appointed to monitor the project to ensure ongoing compliance with the relevant sustainability performance/process criteria and BREEAM targets throughout the Construction, Handover and Close out stages and formally report progress to the client and design team. Sustainability Champion must attend key design team meetings and submit a final post construction stage assessment report.			1	0.57%			1			L
		#3 - Considerate Construction	The principal contractor has used a 'compliant' organisational, local or national considerate constructors scheme and their performance against the scheme has been confirmed by independent assessment and verification. Under CCS scheme one credit can be awarded for a score between 25 and 34 with at least 5 in each section, and two credits for a score between 35 and 39 with at least 7 in each section.		1	2	1.14%		No	2	Yes		L
		★ Exemplar Performance	Exemplary Level of Practice achieving a score of 40 or above			1	1.00%			1			M
		#4 - Monitoring of construction-site impacts	Responsibility has been assigned to an individual(s) for monitoring, recording and reporting energy use and water consumption resulting from all on-site construction processes (and dedicated off-site monitoring) throughout the build programme.			1	0.57%			1			L
		#5 - Transport of Construction Materials and Waste	Responsibility has been assigned to an individual for monitoring, recording, and reporting data on transport movements and impacts resulting from delivery of the majority of construction materials to site and construction waste from site.			1	0.57%			1			M
	Man 04 - Commissioning and Handover	#1 - Commissioning and Testing Schedule and Responsibilities	Project team member appointed to monitor and programme pre-commissioning, commissioning, and where necessary, re-commissioning. Main contractor accounts for commissioning programme, responsibilities, and criteria within main programme of works.	**Must occur no later than RIBA Stage 4**		1	0.57%			1			L
		#2 - Commissioning Building Services	Specialist Commissioning Manager must be appointed during design stage (by either client or contractor) for complex systems in order to give design input. Note the Specialist Commissioning Manager is a specialist contractor rather than a general sub-contractor.			1	0.57%			1			H
		#3 - Testing and Inspecting Building Fabric	Credit #1 has been achieved. The integrity of the building fabric is quality assured through completion of post construction testing and inspection. Dependent on building type this can be demonstrated through the completion of a thermographic survey as well as airtightness test and inspection by a qualified professional. Any defects must be rectified prior to building handover/close out.			1	0.57%					1	H
		#4 - Handover	Building User Guide is developed for distribution to the building occupiers and premises managers. A training schedule is prepared for building occupiers/premises managers containing the building's design intent, aftercare provision, introduction/demonstration of installed systems and key features, introduction to the Building User Guide, maintenance requirements.		#10 - Building User Guide	1	0.57%		No	1	Yes		L
	Man 05 - Aftercare	#1 - Aftercare Support	Energy and water consumption data is collected for at least 12 months after occupation and data is analysed. A contract is in place for building aftercare support.			1	0.57%					1	
		#2 - Seasonal Commissioning	Seasonal Commissioning over a 12 month period once building becomes occupied.		1	1	0.57%		No	1	Yes		H
		#3 - Post Occupancy Evaluation	Client makes commitment to carry out a Post Occupancy Evaluation (POE) one year after building occupation to gain building performance feedback. It should be carried out by an independent third part			1	0.57%					1	
		★ Exemplar Performance	Occupancy satisfaction, energy and water consumption monitoring for 3 years post occupancy			1	1.00%			1			M
					Totals - Base	**21**	**12.00%**	**0**		**15**		**4**	
					Total - Innovation	**2**	**2.00%**	**0**		**2**		**0**	

Category	BREEAM Issue	Credit Number	General Requirements	Stage Requirements	Minimum Requirements	Available		Achieved		Targeted		Potential	Risk
						Credits	Percent	Credits	Minimum Requirements	Credit	Minimum Requirements	Credit	
Health and Well-being	Hea 01 - Visual Comfort	#1 - Glare Control	Potential for disabling glare has been designed out of all relevant building areas using a glare control strategy. The glare control strategy avoids increasing lighting energy consumption and use or location of shading does not conflict with the operation of lighting control systems.			1	0.88%			1			L
		#2 - Daylighting	The building achieves good practice daylighting relevant to the building function to ensure appropriate levels of natural light for the building occupants The relevant building areas meet good practice daylight factor(s) and other criterion OR The relevant building areas meet good practice average and minimum point daylight illuminance criteria			1	0.88%			1			M
		★ Exemplar Performance	The building achieves exemplar performance daylight factors relevant to the building function to ensure appropriate levels of natural light for the building occupants			1	1.00%						
		#3 - Views Out	95% of the floor area in each relevant building area is within 7m of a wall which has a window or permanent opening that provides an adequate view out. The window/opening must be ≥ 20% of the surrounding wall area where the room depth is greater than 7m.			1	0.88%			1			M
		#4 - Internal and External Lighting Levels, Zoning and Control	Internal and External lighting provides luminance levels in accordance with the SLL Code for Lighting 2012. For areas where computer screens are regularly used, the lighting design complies with CIBSE Lighting Guide 7 sections 3.3, 4.6, 4.7, 4.8 and 4.9. External lighting provided is specified in accordance with BS 5489-1:2013 Lighting of roads and public amenity areas.			1	0.88%			1			L
	Hea 02 - Indoor Air Quality	#1 - Indoor Air Quality (IAQ) Plan	Indoor air quality Plan (IAQ) produced.			1	0.88%			1			L
		#2 - Ventilation	Building has been designed to minimise the concentration and recirculation of pollutants in the building.			1	0.88%						
		#3 - Volatile Organic Compound (VOC) Emission Levels (products)	VOC levels for all paints and varnishes, and at least 5 of the 7 remaining listed product categories of BREEAM table 18 have been met.			1	0.88%			1			L
		#4 - Volatile Organic Compound (VOC) Emission Levels (post	Formaldehyde and VOC concentration levels are tested post-construction. High levels must be remediated in accordance with the IAQ plan.			1	0.88%					1	H
		★ Exemplar Performance	All seven remaining products categories listed in Table 18 meet the testing requirements and emission levels criteria for VOCS. Product types B-F, as listed in Table 18, will have a low formaldehyde emissions level (less than 0.06µg/m³ air).			1	1.00%						
		★ Exemplar Performance	All seven remaining products categories listed in Table 18 meet the testing requirements and emission levels criteria for VOCS. Product types B-F, as listed in Table 18, will have a low formaldehyde emissions level (less than 0.01µg/m³ air).			1	1.00%						
		#5 - Potential for Natural Ventilation	The building ventilation strategy is designed to be flexible and adaptable to potential building occupant needs and climatic scenarios..			1	0.88%						
	Hea 04 - Thermal Comfort	#1 - Thermal Modelling	Thermal modelling has been carried out and ensures design achieves criteria as set out in CIBSE Guide A Environmental Design			1	0.88%			1			L
		#2 - Adaptability - for a Projected Climate Change Scenario	Credit #1 has been achieved and the modelling has been undertaken against a projected climate change scenario. Project team are to demonstrate how the building has been adapted, or designed to be easily adapted in the future using utilise passive solutions			1	0.88%					1	H
		#3 - Thermal Zoning and Controls	Credit #1 has been achieved and thermal modelling has informed the temperature control strategy in terms of zoning, amount of occupant control, how the systems will interact with each other, and need for accessible building user attenuated manual override for any automatic systems.			1	0.88%			1			L
	Hea 05 - Acoustic Performance	#1 - Sound insulation	Ensure that the building's sound insulation meets the appropriate standards for its purpose			1	0.88%			1			H
		#2 - Internal indoor ambient noise levels	Ensure that the building's internal indoor ambient noise levels meet the appropriate standards for its purpose			1	0.88%			1			H
		#3 - Reverberation	Ensure that the building's reverberation times meet the appropriate standards for its purpose			1	0.88%			1			H
	Hea 06 - Safety and Security	#1 - Safe Access	Proper cycle lanes, footpaths, pedestrian lighting are incorporated into the design. Delivery areas are not directly accessed through general parking areas and have their own vehicle manoeuvring areas.			1	0.88%			1			M
		#2 - Security of Site and Building	Consultation with a Suitably Qualified Security Consultant no later than RIBA Stage 2. Final design must incorporate suggestions from SQSS and must confirm to either Secured by Design and/or Safer Parking Scheme (actual certification not required)	**Consultation must occur no later than RIBA Stage 2**		1	0.88%	1		1			
					Totals - Base	**17**	**15.00%**	**1**		**13**		**2**	
					Total - Innovation	**3**	**3.00%**	**0**		**0**		**0**	

Category	BREEAM Issue	Credit Number	General Requirements	Stage Requirements	Minimum Requirements	Available		Achieved		Targeted		Potential	Risk
						Credits	Percent	Credits	Minimum Requirements	Credit	Minimum Requirements	Credit	
Energy	**Ene 01 - Reduction of Energy Use and Carbon Emissions**	#1 - Energy Performance	Design achieves a minimum Energy Performance Ratio on a scale of 0.075 to 0.90 (1 - 12 credits available).		5	12	7.83%		No	5	Yes	7	H
		★ Exemplar Performance	The development generates an excess of renewable or carbon neutral energy in excess to its own demands in terms of both regulated and unregulated energy			1	1.00%						
	Ene 02 - Energy Monitoring	#1 - Sub-metering of Major Energy Consuming Systems	Energy metering systems are installed that enable at least 90% of the estimated annual energy consumption of each fuel to be assigned at various end-use categories of energy consuming systems. The energy consuming systems in buildings with a total useful floor area greater than 1,000m2 are metered using an appropriate energy monitoring and management system		1	1	0.65%		No	1	Yes		L
		#2 - Sub-metering of High Energy Load and Tenancy Areas	An accessible energy monitoring and management system or separate accessible energy sub-meters with pulsed or other open protocol communication outputs to enable future connection to an energy monitoring and management system are provided, covering a significant majority of the energy supply to tenanted areas or, in the case of single occupancy buildings, relevant function areas or departments within the building/unit			1	0.65%			1			L
	Ene 03 - External Lighting	#1 - External Lighting	Energy efficient external light fittings are specified for external areas of the development and are only on when required.			1	0.65%			1			L
	Ene 04 - Low Carbon Design	#1 - Passive Design Analysis	The first Hea 04 Thermal Comfort credit has bee achieved and the design team has carried out analysis of the proposed building design/development to influence decisions made during Concept Design stage and identify opportunities for the implementation of passive design solutions. The building uses passive design measures to reduce total energy demand of the building.	**Must occur no later than RIBA Stage 2**		1	0.65%	1		1			
		#2 - Free Cooling	Credit #1 has been achieved and the passive design analysis also includes an analysis of free cooling and identifies opportunities for the implementation of free cooling solutions with any of the compliant free cooling strategies specified			1	0.65%						
		#3 - Low and Zero Carbon Technologies	LZC feasibility study carried out no later than RIBA Stage 2 with a local LZC technology/technologies specified in line with the recommendations of the feasibility study. The LZC technology/technologies accounts for at least 5% of overall building energy demand and/or CO2 emissions.	**Must occur no later than RIBA Stage 2**		1	0.65%	1		1			
	Ene 06 - Energy Efficient Transportation Systems	#1 - Energy Consumption	Analysis for transportation demand and energy consumption for lifts, escalators, and/or moving walkways takes place. Strategy with lowest energy consumption is to be specified.			1	0.65%			1			L
		#2 - Energy Efficient Features	Credit #1 has been achieved and compliant energy efficient features are specified			2	1.30%			2			L
	Ene 08 - Energy Efficient Equipment	#1 - Energy Efficient Equipment	Energy efficient equipment specified for small power and plug-in equipment, swimming pools, laundry, kitchen, IT intensive areas, etc. Requires an analysis showing the total annual unregulated energy demand of the development and its operation and ways to reduce consumption.			2	1.30%			2			L
					Totals - Base	**23**	**15.00%**	**2**		**15**		**7**	
					Total - Innovation	**5**	**5.00%**	**0**		**0**		**0**	

Category	BREEAM Issue	Credit Number	General Requirements	Stage Requirements	Minimum Requirements	Available		Achieved		Targeted		Potential	Risk
						Credits	Percent	Credits	Minimum Requirements	Credit	Minimum Requirements	Credit	
Transport	**Tra 01 - Public Transport Accessibility**	#1 - Accessibility Index	Credits awarded on a sliding scale based on the proximity of the buildings' accessibility to the public transport network. An Accessibility Index (AI) is determined by the Tra 01 Calculator Tool. AI must be ≥ 2 to achieve AI credit. 3 credits awarded for an AI ≥ 8. Development with a low AI score can achieve 1 credit if the building has a dedicated bus service or shuttle.			3	3.00%	3		3			
	Tra 02 - Proximity to Amenities	#1 - Proximity to Amenities	Building located in close proximity to local amenities which are likely to be frequently required and used by building occupants and where building type is indicated to have core amenities at least two of them must be provided as part of the total number required as per Table 31 of the BREEAM manual			1	1.00%	1		1			
	Tra 03 - Cyclist Facilities	#1 - Cycle Storage	Compliant cycle storage spaces that meet the minimum levels set out in Table 32 of the BREEAM manual.			1	1.00%			1			M
		#2 - Cycle Facilities	#1 is achieved. Provide two of the four options: 1) showers, 2) changing facilities, 3) lockers, 4) drying space for clothes. Showers: 1 for every 10 cycle storage spaces, subject to a minimum provision of one shower. Changing facilities: appropriately sized for the number of users, must be able to hang or store clothes (e.g. benches or hooks). Toilet cubicles do not comply. Lockers: at least equal to the number of cycle spaces required. A dedicated drying space for the drying of wet clothes.			1	1.00%			1			M
	Tra 04 - Maximum Car Parking Capacity	#1 - Car Parking Capacity	Credits awarded on a sliding scale based on the proximity of the buildings' accessibility to the public transport (Accessibility Index) network and how many car parking spaces are provided. A development with no parking associated with it (i.e. it relies on public car parks adjacent or near the site) receives full credits by default.			2	2.00%	2		2			
	Tra 05 - Travel Plan	#1 - Travel Plan	A travel plan is developed specifically for the site as part of the feasibility and design stages which considers all types of travel relevant to the building type and users. Travel plan must include a package of measures that have been used to steer the design of the development in order to meet the travel plan objectives and minimise car-based travel patterns.			1	1.00%			1			L
					Totals - Base	**9**	**9.00%**	**6**		**9.00**		**0**	
Water	**Wat 01 - Water Consumption**	#1 - Water Consumption	Credits awarded on a sliding scale based on the percentage improvement in water usage over a baseline notional building. Must use the Wat 01 calculator to determine final number of credits awarded. Minimum for one credit is 12.5% improvement, 5 credits awarded for 55% improvement or better. The following domestic scale water consuming components are included: WCs, urinals, taps, showers, baths, dishwashers, washing machines. Grey water and rainwater collection systems are taken into account in the calculator tool.		1	5	3.89%		No	2	Yes	1	L
		★ Exemplar Performance	The development demonstrates a 65% improvement over baseline building water consumption			1	1.00%						
	Wat 02 - Water Monitoring	#1 - Water Monitoring	Where a water meter with a pulsed output will be installed on the mains supply to each building/unit. Water-consuming plant or building areas that consume 10% or more of the building's total water demand must be fitted with sub meters or have water monitoring equipment with pulsed output enabling it to connect to a BMS system. If the site has an existing BMS belonging to the same owner as the new development, the meters must be connected to this system.		Criterion 1 only	1	0.78%		No	1	Yes		L
	Wat 03 - Water Leak Detection	#1 - Leak Detection System	Leak detection system capable of detecting a major water leak on the mains water supply within the building and between the building and the utilities water meter.			1	0.78%			1			L
		#2 - Flow Control Devices	One of the following types of flow control devices is fitted to each WC area/facility to ensure water only supplied when needed: time controller, programmed time controller, volume controller, presence detector, or central control unit. Criteria does not apply to single WC - in these instances, shut-off could be provided via the same switch that controls the lighting.			1	0.78%			1			L
	Wat 04 - Water Efficient Equipment	#1 - Water Efficient Equipment	Design team has identified all unregulated water demands that could be realistically mitigated or reduced. Systems or processes have been identified to reduce the unregulated water demand, and demonstrate, through either good practice design or specification, a meaningful reduction in the total water demand of the building.			1	0.78%			1			L
					Totals - Base	**9**	**7.00%**	**0**		**6**		**1**	
					Total - Innovation	**1**	**1.00%**	**0**		**0**		**0**	

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Category	BREEAM Issue	Credit Number	General Requirements	Stage Requirements	Minimum Requirements	Available		Achieved		Targeted		Potential	Risk
						Credits	Percent	Credits	Minimum Requirements	Credit	Minimum Requirements	Credit	
Materials	**Mat 01 - Life Cycle Impacts**	#1 - Life Cycle Impacts	Credits are determined by the Green Guide to Specification for the major building/finishing elements and the Mat 01 Calculator Tool. For Offices, this includes external walls, windows, roof, upper floor slabs, and floor finishes/covers. Green Guide ratings are based on a score of E to A+, where more points are gained with A+.			6	5.79%			2		1	L
		★ Exemplar Performance	Exemplar performance demonstrated by either the Green Guide to Specification			1	1.00%						
		★ Exemplar Performance	Exemplar performance demonstrated by life cycle assessment software			2	2.00%						
	Mat 02 - Hard Landscaping and Boundary Protection	#1 - Hard Landscaping and Boundary Protection	At least 80% of the external hard landscaping and boundary protection (combined) achieves A or A+ rating, as defined by the Green Guide to Specification			1	0.96%			1			M
	Mat 03 - Responsible Sourcing of Materials	Pre-requisite - Legally Sourced Timber	All timber and timber based products used on the project is 'Legally harvested and traded timber'.		#1 - Timber Procurement	-	-		No	-	Yes		L
		#1 - Sustainable Procurement Plan	The principal contractor sources materials for the project in accordance with a sustainable procurement plan.			1	0.96%			1			M
		#2 - Responsible Sourcing of Materials (RSM)	Up to 3 credits can be awarded where the applicable building materials (refer to Table - 44 of BREEAM 2014 Manual) are responsibly sourced in accordance with the BREEAM 2014 methodology.			3	2.89%			1			M
		★ Exemplar Performance	Exemplar levels of responsible sourcing in accordance with the BREEAM 2014 methodology			1	1.00%						
	Mat 04 - Insulation	#1 - Embodied Impact	All new insulation specified for external walls, ground floor, roof, and building services must be assessed. The Insulation Index for the building insulation is > 2.5, as determined by the Mat 04 Calculator Tool.			1	0.96%			1			L
	Mat 05 - Designing for Durability and Resilience	#1 - Protecting Vulnerable Parts of the Building from Damage and Degradation	Areas of the building identified, both internal and external, where vehicular, trolley, and pedestrian movement occur. Design must incorporate suitable durability and protection measures to prevent damage to vulnerable parts of the building. An analysis must also be done to assess protection for exposed materials to degradation.			1	0.96%			1			M
					Totals - Base	**14**	**13.50%**	**0**		**7**		**1**	
					Total - Innovation	**3**	**3.00%**	**0**		**0**		**0**	

Waste	**Wst 01 - Construction Waste Management**	#1 - Construction Resource Efficiency	There is a compliant Resource Management Plan. Where demolition must occur, a compliant pre-demolition audit must take place. Non-hazardous construction waste (excluding demolition and excavation waste) generated by the building's design and construction meets or exceeds resource efficiency benchmarks as set out in the BREEAM 4014 Manual. The less waste generated by area or weight earns more credits.		0	3	2.83%			2			H
		#2 - Diversion of Resources from Landfill	The following percentages, at a minimum, of non-demolition and demolition waste (where applicable) generated by the project have been diverted from landfill: Non-demolition - 70% by volume or 80% by weight. Demolition - 80% by volume or 90% by weight.			1	0.94%			1			L
		★ Exemplar Performance	The development achieves exemplar levels of waste generation and diversion from landfill			1	1.00%						
	Wst 02 - Recycled Aggregates	#1 - Recycled Aggregates	The percentage of high grade aggregate that is recycled or secondary aggregate, specified in each application (present) must meet the following minimum % levels (by weight or volume) to contribute to significant use of (25% or more) secondary or recycled aggregates in high-grade building aggregate uses. High grade uses include structural frame, floor slabs, base for paved areas, pipe bedding, gravel landscaping, etc. Aggregates must be either obtained on site, obtained from a waste processing centre within a 30km radius of site, or obtained from a non-construction post-consumer or post-industrial by-product (i.e. fly ash or slag).			1	0.94%						
		★ Exemplar Performance	The percentage of high grade aggregate that is recycled or secondary aggregate exceeds best practice			1	1.00%						
	Wst 03 - Operational Waste	#1 - Operational Waste	Where dedicated, accessible, and properly sized storage space is provided for recycling. Where consistent generation in large volumes of waste or compostable materials are generated, compactors, balers, and/or composting vessels or facilities with water outlet must be provided.		1	1	0.94%		No	1	Yes		L

Category	BREEAM Issue	Credit Number	General Requirements	Stage Requirements	Minimum Requirements	Available		Achieved		Targeted		Potential	Risk
						Credits	Percent	Credits	Minimum Requirements	Credit	Minimum Requirements	Credit	
	Wst 04 - Speculative Floor and Ceiling Finishes	#1 - Speculative Floor and Ceiling Finishes	Office building types only 1. For tenanted areas (where the future occupant is not known), prior to full fit-out works, carpets, other floor finishes and ceiling finishes have been installed in a show area only. 2. In a building developed for a specific occupant, that occupant has selected (or agreed to) the specified floor and ceiling finishes			1	0.94%			1			L
	Wst 05 - Adaptation to Climate Change	#1 - Structural and Fabric Resilience	Conduct a climate change adaptation to climate change strategy appraisal for structural and fabric resilience by the end of Concept Design by carrying out a systematic risk assessment to identify and evaluate the impact on the building over its projected life cycle from expected extreme weather conditions arising from climate change.	**Must occur no later than RIBA Stage 2**		1	0.94%			1			L
		★ Exemplar Performance	A holistic approach to the design and construction of the current building's life cycle, to mitigate against the impacts of climate change.			1	1.00%						
	Wst 06 - Functional Adaptability	#1 - Functional Adaptability	Client and design team to undertake a building-specific functional adaptation strategy study by Concept Design which includes recommendations for measures in to be incorporated to facilitate future adaptation.	**Must occur no later than RIBA Stage 2**		1	0.94%			1			L
					Totals - Base	**9**	**8.50%**	**0**		**7**		**0**	
					Total - Innovation	**3**	**3.00%**	**0**		**0**		**0**	
Land Use and Ecology	**LE 01 - Site Selection**	#1 - Previously Occupied Land	At least 75% of the proposed footprint is on ab area of land which has previously been occupied by industrial, commercial or domestic buildings or fixed surface infrastructure.			1	1.00%	1		1			
		#2 - Contaminated Land	Site is deemed to be significantly contaminated as confirmed by a contaminated land specialist's site investigation, risk assessment, and appraisal. Client must confirm that remediation has occurred in accordance with the remediation strategy set out by the contaminated land specialist.			1	1.00%						
	LE 02 - Ecological Value of Site and Protection of Ecological Features	#1 - Ecological Value of Site	Land within the Construction Zone is defined as being of Low Ecological Value (by using the BREEAM checklist, or by a Suitable Qualified Ecologist).			1	1.00%	1		1			
		#2 - Protection of Ecological Features	All existing features of ecological value will be retained and protected during construction.			1	1.00%	1		1			
	LE 03 - Minimising Impact on Existing Site Ecology	#1 - Change in Ecological Value 1	One credit awarded where change in ecological value of site is less than zero but equal to or greater than minus 9, i.e. a minimal change. Must be proven by either using the LE 03/LE 04 Calculator Tool, or by a Suitably Qualified Ecologist (SQE).		1	1	1.00%		No	1	Yes		C
		#2 - Change in Ecological Value 2	Two credits awarded where the change in ecological value of the site is equal to or greater than zero, i.e. no negative change. Must be proven by either using the LE 03/LE 04 Calculator Tool, or by a Suitably Qualified Ecologist.			1	1.00%			1			C
	LE 04 - Enhancing Site Ecology	#1 - Ecologist's Report and Recommendations	Suitable Qualified Ecologist (SQE) is appointed no later than RIBA Stage 1 to report on enhancing and protecting the ecology of the site. SQE must provide an Ecology Report based on a site visit. General recommendations made by SQE must be implemented.	**SQE must be appointed no later than RIBA Stage 1**		1	1.00%			1			C
		#2 - Increase in Ecology Value	#1 is achieved. Recommendations of the Ecology Report for enhancement and protection have been implemented, and the SQE confirms that this will result in an increased ecological value of 6 plant species or greater. LE 03/LE 04 Calculator Tool has been used using actual plant species numbers.			1	1.00%					1	C
	LE 05 - Long Term Impact on Biodiversity	#1 - Long Term Impact on Biodiversity	Suitable Qualified Ecologist (SQE) is appointed prior to commencement of activities on site. SQE confirms compliance with all UK/EU legislation relating to protection and enhancement of ecology, and a 5year landscape/management plan is produced and the Client and the Contractor carry out a number of actions to minimise the longer term impact of the site. Number of applicable actions (from the list of potential actions in the BREEAM Technical Guide p. 346) determines the number of credits achievable in this issue.			2	2.00%			2			C
					Totals - Base	**10**	**10.00%**	**3**		**8**		**1**	

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Category	BREEAM Issue	Credit Number	General Requirements	Stage Requirements	Minimum Requirements	Available		Achieved		Targeted		Potential	Risk
						Credits	Percent	Credits	Minimum Requirements	Credit	Minimum Requirements	Credit	
Pollution	**Pol 01 - Impact of Refrigerants**	Pre-requisite - Guidelines Compliance #2 - Impact of Refrigerant	All systems (with electric compressors) must comply with the requirements of BS EN 378:2008 and have a Direct Effect Life Cycle CO_2 of ≤ 100kgCO_2e/kW (2 credits) or ≤ 1000kgCO_2e/kW cooling capacity (1 credit).			2	1.54%			1			L
		#3 - Leak Detection	Permanent automated refrigerant leak detection system or an in-built automated diagnostic procedure for detecting leakage has been installed.			1	0.77%			1			L
	Pol 02 - NOx Emissions	#1 -NOx Emissions	Plant installed to meet delivered heating has a low dry NOx emission level: ● ≤ 100mg/kWh - 1 credit ● ≤ 70mg/kWh - 2 credit ● ≤ 40mg/kWh - 3 credit			3	2.31%			1		1	H
	Pol 03 - Surface Water Run-off	#1 - Flood Resilience	Site is Low Flood Risk which is confirmed by a site-specific Flood Risk Assessment (2 credits), or if site is medium or high flood risk and not in a Functional Floodplain, and ground level of building and access to building and site are at least 600mm above the design flood level (1 credit) - must be confirmed by Flood Risk Assessment.			2	1.54%	2		2			
		Pre-requisite - Appropriate Consultant	Appropriate Consultant appointed			1	0.77%	1		1			
		#2 - Surface Water Run-Off	Appropriate consultant appointed to carry out the following analysis: Peak run-off from site to watercourses is no greater for developed site than it was for pre-developed site - calcs should include allowance for climate change.										
		#3 - Surface Water Run-Off	Appropriate consultant appointed to carry out the following analysis: Flooding will not occur in event of local drainage system failure and either: post development run-off volume, over development lifetime, is no greater than it would have been prior to development - any additional predicted volume for the 100yr 6hr event must be prevented from leaving the site. OR, justification from the consultant that the first option is not achievable and post-development run-off rate is reduced to a limiting discharge. Calcs should include allowance for climate change.			1	0.77%	1		1			
		#4 - Minimising Watercourse Pollution	Appropriate consultant appointed to carry out the following analysis: no discharge from developed site for rainfall up to 5mm. All delivery areas designed in compliance with current best practice planning guidance. If project does not include any areas that are sources of pollution, credit achieved by default.			1	0.77%						
	Pol 04 - Reduction of Night Time Light Pollution	#1 - Reduction of Night Time Light Pollution	Where the external lighting design is compliant with ILE guidance for the reduction of night time pollution and is automatically switched off between 2300 and 0700.			1	0.77%			1			L
	Pol 05 - Reduction of Noise Pollution	#1 - Reduction of Noise Pollution	Noise sources from development do not exceed ambient noise levels. Noise impact assessment to be BS 4142 compliant. Credit achieved by default where there are no noise sensitive areas or buildings within 800m radius of development.			1	0.77%			1			L
					Totals - Base	**13**	**10.00%**	**4**		**9**		**1**	
Innovation	**Innovation**	★ Approved Innovation	One innovation credit can be awarded for each innovation application approved by BRE Global, where the building complies with the criteria defined within an Approved Innovation Application Form. This category provides opportunities for exemplary performance and innovation to be recovnised that are not included within the current credit criteria.			1	1.00%						

APPENDIX B - BREEAM RFO 2014 PRE-ASSESSMENT

BREEAM Refurbishment & Fitout 2014

Panther House Office Refurbishment

Project Stage	**RIBA Stage 2**
Assessor Name	**Neil Cogan**
Desired Rating	**Excellent**
Desired Score	**75.00%**
Date	**09/08/2019**

Achieved Score	**8.38%**	**Unclassified**
Target Score	**73.22%**	**Excellent**
Potential Score	**84.22%**	**Excellent**

Category	BREEAM Issue	Credit Number	General Requirements	Stage Requirements	Minimum Requirements	Available		Achieved		Targeted		Potential	Risk
						Credits	Percent	Credits	Minimum Requirements	Credit	Minimum Requirements	Credit	
	Man 01 - Project Brief and Design	#1 - Stakeholder Consultation (project delivery)	Prior to completion of the Concept Design, a clear sustainability brief is set out and roles and responsibilities must be specifically outlined.	**Must occur no later than RIBA Stage 2**		1	0.79%			1			L
		#2 - Stakeholder Consultation (third party)	During design brief preparation, all relevant parties and bodies are identified and consulted with by the design team - evidence must be gathered that these consultations were incorporated into the design. Consultation plan must be prepared that includes timescale and method of consultation.	**Must occur no later than RIBA Stage 2**		1	0.79%					1	C
		#3 - Sustainability Champion (design)	No later than early RIBA Stage 1, Sustainability Champion is appointed to facilitate setting of BREEAM performance targets. BREEAM target must be contractually agreed between client and project team no later than RIBA Stage 2. Project must undergo Design Stage Certification assessment.	**Must occur no later than RIBA Stage 1**		1	0.79%			1			L
		#4 - Sustainability Champion (monitoring progress)	Credit #3 has been achieved. Sustainability Champion is appointed to monitor progress against the agreed BREEAM performance targets throughout the design process and formally report progress to the client and design team. Sustainability Champion must attend key design team meetings and prepare regular written reports.	**Must occur no later than RIBA Stage 2**		1	0.79%			1			L
	Man 02 - Life Cycle Cost and Service Life Planning	#1 - Elemental Life Cycle Cost (LCC)	An elemental life cycle cost (LCC) analysis has been carried out, at RIBA Stage 2. The LCC analysis shows an outline plan based on the building's basic structure and envelope, appraising a range of options and based on multiple cash flow scenario's e.g.. 20, 30, 50+ years and the fabric and servicing strategy for the project outlining services component and fit-out options (if-applicable) over a 15-year period, in the form of an 'elemental LCC Plan'.	**Must occur no later than RIBA Stage 2**		2	1.59%						
		#2 - Component Level LCC Plan	A component level LCC plan has been developed by the end of RIBA Stage 4 and includes the following component types in line with PD 156865:2008 (where present): envelope, services, finishes, external spaces. Demonstrate how the component level LCC plan has been used to influence building and systems design/specification to minimise life cycle costs and maximise critical value.	**Must occur no later than RIBA Stage 4**		1	0.79%			1			M
		#3 - Capital Cost Reporting	Report the capital cost for the building in pounds per square metre (£/m^2), via the BREEAM Assessment Scoring and Reporting tool, Assessment Issue Scoring tab, Management section.			1	0.79%			1			L

Management	Man 03 - Responsible Construction Practices	Pre-requisite - Timber Procurement	All timber and timber-based products used on the project are 'legally harvested and traded timber' (see Relevant definitions)			-	-			-			L
		#1 - Environmental Management	Principle contractor operates a compliant Environmental Management System concerning their main operations and implement best practice pollution prevention policies and procedures on site in accordance with Pollution Prevention Guidelines.			1	0.79%			1			L
		#2 - Sustainability Champion (construction)	Sustainability Champion is appointed to monitor the project to ensure ongoing compliance with the relevant sustainability performance/process criteria and BREEAM targets throughout the Construction, Handover and Close out stages and formally report progress to the client and design team. Sustainability Champion must attend key design team meetings and submit a final post construction stage assessment report.			1	0.79%			1			L
		#3 - Considerate Construction	The principal contractor has used a 'compliant' organisational, local or national considerate constructors scheme and their performance against the scheme has been confirmed by independent assessment and verification. Under CCS scheme one credit can be awarded for a score between 25 and 34 with at least 5 in each section, and two credits for a score between 35 and 39 with at least 7 in each section.		1	2	1.59%		No	2	Yes		L
		★ Exemplar Performance - Considerate Construction	Exemplary Level of Practice achieving a score of 40 or above			1	1.00%			1			M
		#4 - Monitoring of construction-site impacts	Responsibility has been assigned to an individual(s) for monitoring, recording and reporting energy use and water consumption resulting from all on-site construction processes (and dedicated off-site monitoring) throughout the build programme.			1	0.79%			1			L
		#5 - Transport of Construction Materials and Waste	Responsibility has been assigned to an individual for monitoring, recording, and reporting data on transport movements and impacts resulting from delivery of the majority of construction materials to site and construction waste from site.			1	0.79%			1			M
	Man 04 - Commissioning and Handover	#1 - Commissioning and Testing Schedule and Responsibilities	Project team member appointed to monitor and programme pre-commissioning, commissioning, and where necessary, re-commissioning. Main contractor accounts for commissioning programme, responsibilities, and criteria within main programme of works.	**Must occur no later than RIBA Stage 4**		1	0.79%			1			L
		#2 - Commissioning Building Services	Specialist Commissioning Manager must be appointed during design stage (by either client or contractor) for complex systems in order to give design input.			1	0.79%			1			H
		#4 - Handover	Building User Guide is developed for distribution to the building occupiers and premises managers. A training schedule is prepared for building occupiers/premises managers containing the building's design intent, aftercare provision, introduction/demonstration of installed systems and key features, introduction to the Building User Guide, maintenance requirements.		#10 - Building User Guide	1	0.79%		No	1	Yes		L
					Totals - Base	**17**	**13.48%**	**0**		**14**		**1**	
					Total - Innovation	**1**	**1.00%**	**0**		**1**		**0**	

Health and Well-being	Hea 01 - Visual Comfort	#1 - Glare Control	Potential for disabling glare has been designed out of all relevant building areas using a glare control strategy. The glare control strategy avoids increasing lighting energy consumption and use or location of shading does not conflict with the operation of lighting control systems.			1	0.99%			1			L
		#2 - Daylighting	The building achieves good practice daylighting relevant to the building function to ensure appropriate levels of natural light for the building occupants The relevant building areas meet good practice daylight factor(s) and other criterion OR The relevant building areas meet good practice average and minimum point daylight illuminance criteria			3	2.97%			2		1	H
		★ Exemplar Performance	The building achieves exemplar performance daylight factors relevant to the building function to ensure appropriate levels of natural light for the building occupants			1	1.00%						
		#3 - Views Out	95% (for two credits) or 80% (for one credit) of the floor area in relevant building areas is within 7m of a wall which has a window or permanent opening that provides an adequate view out. The window/opening must be ≥ 20% of the surrounding wall area where the room depth is greater than 7m.			2	1.98%			1		1	M
		#4 - Internal and External Lighting Levels, Zoning and Control	Internal and External lighting provides luminance levels in accordance with the SLL Code for Lighting 2012. For areas where computer screens are regularly used, the lighting design complies with CIBSE Lighting Guide 72 sections 3.3, 4.6, 4.7, 4.8 and 4.9. External lighting provided is specified in accordance with BS 5489-1:2013 Lighting of roads and public amenity areas.			1	0.99%			1			L
	Hea 02 - Indoor Air Quality	#1 - Indoor Air Quality (IAQ) Plan	Indoor air quality Plan (IAQ) produced.			1	0.99%			1			L
		#2 - Ventilation	Building has been designed to minimise the concentration and recirculation of pollutants in the building.			1	0.99%						
		#3 - Volatile Organic Compound (VOC) Emission Levels (products)	VOC levels for all paints and varnishes, and at least 5 of the 7 remaining listed product categories of BREEAM table 18 have been met.			1	0.99%			1			L
		#4 - VOC Emission Levels (post construction)	Formaldehyde and VOC concentration levels are tested post-construction. High levels must be remediated in accordance with the IAQ plan.			1	0.99%					1	H
		★ Exemplar Performance	Minimising sources of air pollution - volatile organic compound (VOC) emission levels (products)			1	1.00%						
		★ Exemplar Performance	Minimising sources of air pollution - volatile organic compound (VOC) emission levels (products)			1	1.00%						
		#5 - Potential for Natural Ventilation	The building ventilation strategy is designed to be flexible and adaptable to potential building occupant needs and climatic scenarios..			1	0.99%						L
	Hea 04 - Thermal Comfort	#1 - Thermal Modelling	Thermal modelling has been carried out and ensures design achieves criteria as set out in CIBSE Guide A Environmental Design			1	0.99%			1			M
		#2 - Adaptability - for a Projected Climate Change Scenario	Credit #1 has been achieved and the modelling has been undertaken against a projected climate change scenario. Project team are to demonstrate how the building has been adapted, or designed to be easily adapted in the future using utilise passive solutions.			1	0.99%					1	L
		#3 - Thermal Zoning and Controls	Credit #1 has been achieved and thermal modelling has informed the temperature control strategy in terms of zoning, amount of occupant control, how the systems will interact with each other, and need for accessible building user attenuated manual override for any automatic systems.			1	0.99%			1			L
	Hea 05 - Acoustic Performance	#1 - Sound Insulation	Ensure that the building's sound insulation meets the appropriate standards for its purpose			1	0.99%			1			H
		#2 - Indoor Ambient Noise Levels	Ensure that the building's internal indoor ambient noise levels meet the appropriate standards for its purpose			1	0.99%			1			H
		#3 - Reverberation	Ensure that the building's reverberation times meet the appropriate standards for its purpose			1	0.99%			1			H
	Hea 06 - Safety and Security	#1 - Security of Site and Building	Consultation with a Suitably Qualified Security Consultant no later than RIBA Stage 2. Final design must incorporate suggestions from SQSS and must confirm to either Secured by Design and/or Safer Parking Scheme (actual certification not required)	**Consultation must occur no later than RIBA Stage 2**		1	0.99%	1		1			
					Totals - Base	**19**	**18.83%**	**1**		**13**		**4**	
					Total - Innovation	**3**	**3.00%**	**0**		**0**		**0**	

Energy	Ene 01 - Reduction of Energy Use and Carbon Emissions	#1 - Energy Performance	Whole building energy model (up to 15 credits available) Elemental level energy model (up to 12 credits available)		6	15	11.63%		No	10	Yes		H
		★ Exemplar Performance	The development generates an excess of renewable or carbon neutral energy in excess to its own demands in terms of both regulated and unregulated energy			3	3.00%						
	Ene 02 - Energy Monitoring	#1 - Sub-metering of Major Energy Consuming Systems	Energy metering systems are installed that enable at least 90% of the estimated annual energy consumption of each fuel to be assigned at various end-use categories of energy consuming systems. The energy consuming systems in buildings with a total useful floor area greater than 1,000m2 are metered using an appropriate energy monitoring and management system		1	1	0.78%		No	1	Yes		L
		#2 - Sub-metering of High Energy Load and Tenancy Areas	An accessible energy monitoring and management system or separate accessible energy sub-meters with pulsed or other open protocol communication outputs to enable future connection to an energy monitoring and management system are provided, covering a significant majority of the energy supply to tenanted areas or, in the case of single occupancy buildings, relevant function areas or departments within the building/unit			1	0.78%			1			L
	Ene 03 - External Lighting	#1 - External Lighting	Energy efficient external light fittings are specified for external areas of the development and are only on when required.			1	0.78%			1			L
	Ene 04 - Low Carbon Design	#1 - Passive Design Analysis	The first Hea 04 Thermal Comfort credit has bee achieved and the design team has carried out analysis of the proposed building design/development to influence decisions made during Concept Design stage and identify opportunities for the implementation of passive design solutions. The building uses passive design measures to reduce total energy demand of the building.	**Must occur no later than RIBA Stage 2**		1	0.78%	1		1			
		#2 - Free Cooling	Credit #1 has been achieved and the passive design analysis also includes an analysis of free cooling and identifies opportunities for the implementation of free cooling solutions with any of the compliant free cooling strategies specified	**Must occur no later than RIBA Stage 2**		1	0.78%						
		#3 - Low and Zero Carbon Technologies	LZC feasibility study carried out no later than RIBA Stage 2 with a local LZC technology/technologies specified in line with the recommendations of the feasibility study. The LZC technology/technologies accounts for at least 5% of overall building energy demand and/or CO2 emissions,	**Must occur no later than RIBA Stage 2**		1	0.78%	1		1			
	Ene 06 - Energy Efficient Transportation Systems	#1 - Energy Consumption	Analysis for transportation demand and energy consumption for lifts, escalators, and/or moving walkways takes place. Strategy with lowest energy consumption is to be specified.			1	0.78%			1			L
		#2 - Energy Efficient Features	Credit #1 has been achieved and compliant energy efficient features are specified			2	1.55%			2			L
	Ene 08 - Energy Efficient Equipment	#1 - Energy Efficient Equipment	Energy efficient equipment specified for small power and plug-in equipment, swimming pools, laundry, kitchen, IT intensive areas, etc. Requires an analysis showing the total annual unregulated energy demand of the development and its operation and ways to reduce consumption.			2	1.55%			2			L
					Totals - Base	**26**	**20.16%**	**2**		**20**		**0**	
					Total - Innovation	**5**	**5.00%**	**0**		**0**		**0**	

Transport	Tra 01 - Sustainable Transport Solutions	#1 - Accessibility Index	Up to 3 credits can be awarded in combination from one or both of the following options: Option 1: Credits awarded on a sliding scale based on the proximity of the buildings' accessibility to the public transport network. An Accessibility Index (AI) is determined by the Tra 01 Calculator Tool. Option 2:Where alternative transport measures in BREEAM Refurbishment and Fit-out, Tra 01, Table 35 are provided, credits can be awarded based upon the number of measures implemented as detailed in BREEAM Refurbishment and Fit-out, Tra 01, Table 33			3	2.78%	3		3			
	Tra 02 - Proximity to Amenities	#1 - Proximity to Amenities	Building located in close proximity to building-type-specific local amenities which are likely to be frequently required and used by building occupants.			1	0.93%	1		1			
	Tra 03 - Cyclist Facilities	#1 - Cycle Storage	Compliant cycle storage spaces that meet the minimum levels set out in Table 32 of the BREEAM manual.			1	0.93%			1			M
		#2 - Cycle Facilities	#1 is achieved. Provide two of the four options: 1) showers, 2) changing facilities, 3) lockers, 4) drying space for clothes. Showers: 1 for every 10 cycle storage spaces, subject to a minimum provision of one shower. Changing facilities: appropriately sized for the number of users, must be able to hang or store clothes (e.g. benches or hooks). Toilet cubicles do not comply. Lockers: at least equal to the number of cycle spaces required. A dedicated drying space for the drying of wet clothes.			1	0.93%			1			M
	Tra 05 - Travel Plan	#1 - Travel Plan	A travel plan is developed specifically for the site as part of the feasibility and design stages which considers all types of travel relevant to the building type and users. Travel plan must include a package of measures that have been used to steer the design of the development in order to meet the travel plan objectives and minimise car-based travel patterns.			1	0.93%			1			L
					Totals - Base	**7**	**6.48%**	**4**		**7.00**		**0**	
Water	Wat 01 - Water Consumption	#1 - Water Consumption	Credits awarded on a sliding scale based on the percentage improvement in water usage over a baseline notional building. Must use the Wat 01 calculator to determine final number of credits awarded. Minimum for one credit is 12.5% improvement, 5 credits awarded for 55% improvement or better. The following domestic scale water consuming components are included: WCs, urinals, taps, showers, baths, dishwashers, washing machines. Grey water and rainwater collection systems are taken into account in the calculator tool.		1	5	4.16%		No	2	Yes	1	L
		★ Exemplar Performance	Exemplar performance in water consumption reduction			1	1.00%						
	Wat 02 - Water Monitoring	#1 - Water Monitoring	Where a water meter with a pulsed output will be installed on the mains supply to each building/unit. Water-consuming plant or building areas that consume 10% or more of the building's total water demand must be fitted with sub meters or have water monitoring equipment with pulsed output enabling it to connect to a BMS system. If the site has an existing BMS belonging to the same owner as the new development, the meters must be connected to this system.		Criterion 1 only	1	0.83%		No	1	Yes		L
	Wat 03 - Water Leak Detection	#1 - Leak Detection System	Leak detection system capable of detecting a major water leak on the mains water supply within the building and between the building and the utilities water meter.			1	0.83%			1			L
		#2 - Flow Control Devices	One of the following types of flow control devices is fitted to each WC area/facility to ensure water only supplied when needed: time controller, programmed time controller, volume controller, presence detector, or central control unit. Criteria does not apply to single WC - in these instances, shut-off could be provided via the same switch that controls the lighting.			1	0.83%			1			L
					Totals - Base	**8**	**6.66%**	**0**		**5**		**1**	

Materials	Mat 01 - Life Cycle Impacts	#1 - Life Cycle Impacts	Project Lifecycle Assessment Study (up to 6 credits) OR Elemental Assessment of Environmental Performance Information using the Mat01 Calculator (up to 4 credits)			6	6.94%			4		2	M
	Mat 03 - Responsible Sourcing of Materials	Pre-requisite - Legally Sourced Timber	All timber and timber based products used on the project is 'Legally harvested and traded timber'.		#1 - Timber Procurement	-	-		No	-	Yes		L
		#1 - Sustainable Procurement Plan	The principal contractor sources materials for the project in accordance with a sustainable procurement plan.			1	1.16%			1			M
		#2 - Responsible Sourcing of Materials (RSM)	Up to 3 credits can be awarded where the applicable building materials (refer to Table - 44 of BREEAM 2014 Manual) are responsibly sourced in accordance with the BREEAM 2014 methodology.			3	3.47%			2		1	M
		★ Exemplar Performance	Exemplar performance in responsible sourcing			1	1.00%						
	Mat 04 - Insulation	#1 - Embodied Impact	All new insulation specified for external walls, ground floor, roof, and building services must be assessed. The Insulation Index for the building insulation is > 2.5, as determined by the Mat 04 Calculator Tool.			1	1.16%			1			L
	Mat 05 - Designing for Durability and Resilience	#1 - Protecting Vulnerable Parts of the Building from Damage and Degradation	Areas of the building identified, both internal and external, where vehicular, trolley, and pedestrian movement occur. Design must incorporate suitable durability and protection measures to prevent damage to vulnerable parts of the building.			1	1.16%			1			L
	Mat 06 - Material Efficiency	#1 - Material Efficiency	Design/Construction team must identify, investigate and implement measures to optimise material use at all stages of the project.	**Must be undertaken at RIBA Stages 1, 2, 3, and 4**		1	1.16%						
					Totals - Base	**13**	**15.03%**	**0**		**9**		**3**	
Waste	Wst 01 - Project Waste Management	#1 - Pre-refurbishment audit	There is a compliant Resource Management Plan. Where demolition must occur, a compliant pre-demolition audit must take place. Non-hazardous construction waste (excluding demolition and excavation waste) generated by the building's design and construction meets or exceeds resource efficiency benchmarks as set out in the BREEAM 4014 Manual. The less waste generated by area or weight earns more credits	**Must be undertaken During Concept Stage**	0	1	0.87%						
		#2 - Reuse and Direct Recycling of Materials	The following percentages, at a minimum, of non-demolition and demolition waste (where applicable) generated by the project have been diverted from landfill: Non-demolition - 70% by volume or 80% by weight. Demolition - 80% by volume or 90% by weight.			2	1.73%					1	M
		#3 - Resource Efficiency	Develop and implement a compliant Resource Management Plan to minimising waste, and record and report accurate data on waste arisings. Meet or exceed the resource efficiency benchmarks in Table 61.			3				2		1	M
		#4 - Diversion of Resources from Landfill	The percentage of non-hazardous construction and demonlition waste generated have been diverted from landfill as per BREEAM Refurbishment and Fit-out 2014, Wst 01, Table 63.			1				1			M
		★ Exemplar Performance	The development achieves exemplar levels of waste generation and diversion from landfill.			1	1.00%						
	Wst 03 - Operational Waste	#1 - Operational Waste	Where dedicated, accessible, and properly sized storage space is provided for recycling. Where consistent generation in large volumes of waste or compostable materials are generated, compactors, balers, and/or composting vessels or facilities with water outlet must be provided.		1	1	0.87%		No	1	Yes		L
	Wst 04 - Speculative Floor and Ceiling Finishes	#1 - Speculative Floor and Ceiling Finishes	Office building types only 1. For tenanted areas (where the future occupant is not known), prior to full fit-out works, carpets, other floor finishes and ceiling finishes have been installed in a show area only. 2. In a building developed for a specific occupant, that occupant has selected (or agreed to) the specified floor and ceiling finishes			1	0.87%			1			L
	Wst 06 - Functional Adaptability	#1 - Functional Adaptability	Client and design team to undertake a building-specific functional adaptation strategy study by Concept Design which includes recommendations for measures in to be incorporated to facilitate future adaptation.	**Must occur no later than RIBA Stage 2**		1	0.87%			1			L
					Totals - Base	**10**	**8.67%**	**0**		**6**		**2**	
					Total - Innovation	**1**	**1.00%**	**0**		**0**		**0**	

Pollution	Pol 01 - Impact of Refrigerants	Pre-requisite - Guidelines Compliance	All systems (with electric compressors) must comply with the requirements of BS EN 378:2008 and have a Direct Effect Life Cycle CO_2 of ≤ 100kgCO_2e/kW (2 credits) or ≤ 1000kgCO_2e/kW cooling capacity (1 credit).			2	2.14%			1			L
		#3 - Leak Detection	Permanent automated refrigerant leak detection system or an in-built automated diagnostic procedure for detecting leakage has been installed.			1	1.07%			1			L
	Pol 02 - NOx Emissions	#1 -NOx Emissions	Plant installed to meet delivered heating has a low dry NOx emission level: ● ≤ 100mg/kWh - 1 credit ● ≤ 70mg/kWh - 2 credit ● ≤ 40mg/kWh - 3 credit			3	3.20%			1		1	M
	Pol 03 - Flood Risk Management	#1 - Flood Risk Management	If the site is low flood risk: 1) Flood maps show low annual probability of flooding; *OR* 2) The project meets the requirements for avoidance of flooding in accordance with BREEAM Checklist 1, e.g. where the refurbishment or fit-out zone is of a floor level that is 0.3m higher than the obtained/ estimated flood level and safe access/escape routes are available/present, etc.			2	2.14%	2		2			
	Pol 04 - Reduction of Night Time Light Pollution	#1 - Reduction of Night Time Light Pollution	Where the external lighting design is compliant with ILE guidance for the reduction of night time pollution and is automatically switched off between 2300 and 0700.			1	1.07%			1			L
	Pol 05 - Reduction of Noise Pollution	#1 - Reduction of Noise Pollution	Noise sources from development do not exceed ambient noise levels. Noise impact assessment to be BS 4142 compliant. Credit achieved by default where there are no noise sensitive areas or buildings within 800m radius of development.			1	1.07%			1			L
					Totals - Base	**10**	**10.68%**	**2**		**7**		**1**	
Innovation	Innovation	★ Approved Innovation	One innovation credit can be awarded for each innovation application approved by BRE Global, where the building complies with the criteria defined within an Approved Innovation Application Form			0	0.00%						

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