Balcap Re Ltd
Land to the rear of 159-163 Kings Cross Road
Energy & Sustainability Statement

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-	04/11/2016	Draft issue for comment
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-	10/11/2016	Final planning issue			
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1. Executive Summary

Low environmental impact will be key to the design of the proposed Land to the rear of 159-163 Kings Cross Road development. This energy and sustainability statement outlines the development's approach to sustainability, energy efficiency and renewable energy strategies in order to meet the London Borough of Camden and the GLA's planning requirements.

As a commercial office building of more than 500m², Land to the rear of 159-163 Kings Cross Road is required to achieve a BREEAM 'Excellent' standard under the London Borough of Camden, therefore this methodology was used to guide the design process. It considers the broad environmental concerns of climate change, pollution, impact on occupants and the wider community. It balances these with the need for a high quality, safe and healthy internal environment. These standards go beyond the requirements of the Building Regulations.

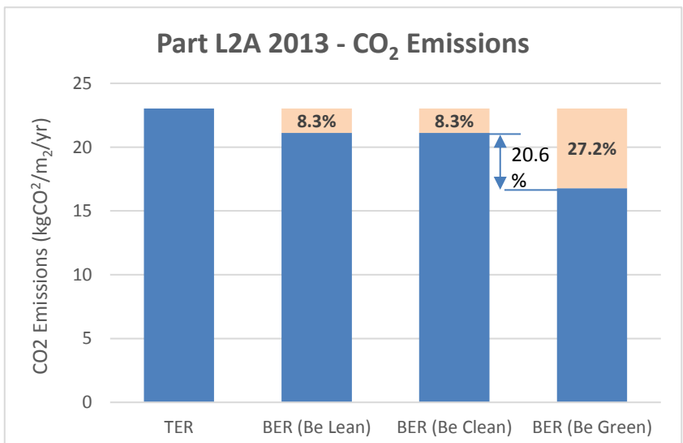
The following measures have been incorporated into the design:

- Thermal insulation levels for building fabric elements to be enhanced beyond minimum Building Regulation standards thereby substantially reducing the building's heat losses;
- Good solar control will be provided by the selection of glazing so as to avoid overheating in summer;
- The office spaces and reception/waiting area will be supplied with cooling by an efficient Variable Refrigerant Flow system with outdoor units located on the roof of the building within an acoustic enclosure;
- AHUs will have efficient heat recovery in order to reduce their load;
- The development will use low energy lighting throughout, including any display lighting in the reception area;
- Investigation into the feasibility of connecting to a district energy network as per Policy 5.6 of the London Plan indicates that there are no networks within viable connection distance of the development.
- Incorporation of Combined Heat and Power (CHP) into the development is not feasible as heating loads are insufficient and electrical loads are not constant. This would mean inefficient operation of the CHP.
- In accordance with Policy 5.7 of the London Plan, investigations into providing a proportion of the site's energy requirements through renewables were undertaken. Variable refrigerant flow (VRF) Air Source Heat Pumps can provide heating and cooling using energy from the external ambient air. In combination with a 10m² photovoltaic array, the carbon emissions savings through Low and Zero Carbon technologies over the Be Lean case is 20.6%, therefore complying with Camden Policy CS13.

Additional sustainable measures that feature in this development include:

- All insulation materials used within the proposed development will be selected to be CFC free both in manufacture and through their composition;
- All timber will be purchased from responsible forest sources;
- Recycling facilities will be provided on site for construction and operational waste;
- Water use will be minimised by the specification of water efficient taps, shower heads, dual flush toilets and low water use appliances;
- Water metering and leak detection alarms will be installed to monitor and minimise wastage;
- The construction site will be managed in an environmentally sound manner in terms of resource use, storage, waste management, pollution. A Site Waste management Plan (SWMP) will be produced for the works.

A BREEAM 2014 New Construction pre-assessment indicates a 'Excellent' rating is possible (refer to Appendix A).



Estimated CO_2 Emission Savings

Table 3: Carbon Dioxide Emissions after each stage of the Energy Hierarchy for non-domestic buildings	Carbon dioxide emissions for non-domestic buildings (Tonnes CO_2 per annum)	
	Regulated	Unregulated
Baseline: Part L 2013 of the Building Regulations	21.4	16.3
After energy demand reduction	19.6	16.3
After heat networks/CHP	19.6	16.3
After renewable energy	16.2	16.3

Table 4: Regulated carbon dioxide savings from each stage of the Energy Hierarchy for non-domestic buildings	Regulated CO2 savings	
	Tonnes CO_2 per annum	%
Savings from energy demand reduction	1.8	8.3%
Savings from CHP	0.0	0.0%
Savings from renewable energy	4.0	20.6%
Total Cumulative Savings	5.8	27.2%
Annual Savings from off-set payment	-	
(Tonnes CO_2)		
Cumulative savings for off-set payment	-	

GLA Carbon Dioxide for Offset Payments Tables

- The combination of the passive design measures and VRF heat pumps in the development achieves a 27.2% improvement over the baseline building TER performance.
- The development therefore complies with Part L of the Building Regulations.
- As a minor development, the building does not need to meet the 35% carbon emission reduction target under Policy 5.2 of the London Plan.
- The development does meet the requirements of Policy CS13 of the Camden Borough adopted Core Strategy and CPG3 by providing at least 20% (20.6%) of its energy through Low or Zero Carbon technologies.

Contents

2. Introduction

This Energy and Sustainability Statement has been prepared to accompany a planning application for the proposed Land to the rear of 159-163 Kings Cross Road development. It aims to meet the energy and climate change requirements of the London Borough of Camden and the Greater London Authority (GLA).

This report outlines the proposed sustainability and energy strategy for the Land to the rear of 159-163 Kings Cross Road redevelopment. Each of the initiatives has been assessed in terms of sustainability, a “rule of thumb” financial pay back implication, and suitability to the site.

The structure of this report is in accordance with the GLA’s London Plan 2015 and the GLA’s ‘Guidance on Preparing Energy Assessments’ document March 2016, which provides guidance on addressing the London Plan’s energy hierarchy.

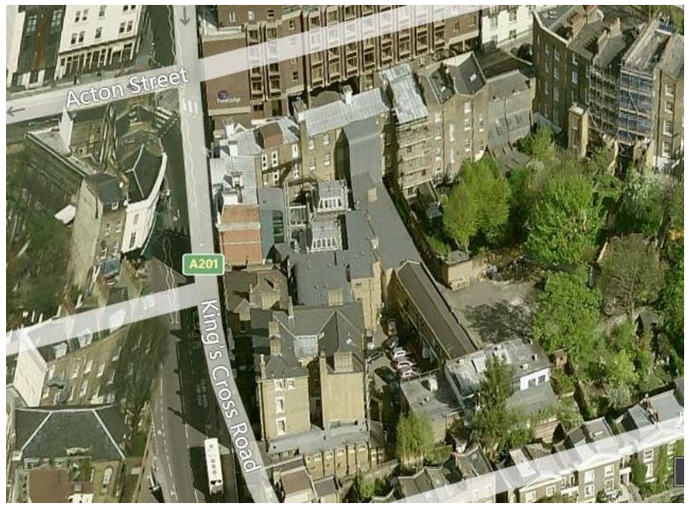
The principal objectives are to reduce the site’s contribution to the cause of climate change by minimising the emissions of CO_2, by reducing the site’s needs for energy and by providing some of the requirement by renewable/sustainable means. Issues such as water and waste, biodiversity, etc. have also been addressed in the present study.

The GLA London Plan and GLA Energy Strategy provide a useful tool against which to undertake energy and sustainability assessment. They have been used in an advisory nature secondary to the requirements of the London Borough of Camden, to help incorporate a number of energy efficiency measures into the proposed development.

To guide and benchmark this process, a preliminary BREEAM pre-assessment has also been performed.

The works for the office will be assessed under Part L2A of the Building Regulations.

Site Location



Birds eye view of the site

Ground floor plan

2.1 Description of Development

The proposed development will be four floors of office space including a basement level. It replaces an existing boiler house, which is to be demolished. Office spaces are spread across each floor with plant contained in the basement and 2nd levels.

The development totals 554m^2 meaning it qualifies as a minor development and therefore does not need to comply with the criteria of a major development under the GLA Plan.

Level	Floor Area (m^2)
Basement	98
Ground	198
First	178
Second	80
TOTAL	**554**

Building area schedule

3. Planning Policy

The National Planning Policy Framework (NPPF) was published in March 2012, which states a clear presumption in favour of sustainable development. The NPPF supports the transition to a low carbon future in a changing climate, taking full account of flood risk and coastal change, and encourages the reuse of existing resources, including conversion of existing buildings, and encourages the use of renewable resources.

The NPPF replaces PPS22 and in Section 10 outlines its energy and climate change policies. To support the move to a low carbon future, local planning authorities should:

- Plan for new development in locations and ways which reduce greenhouse gas emissions;
- Actively support energy efficiency improvements to existing buildings; and
- When setting any local requirement for a building's sustainability, do so in a way consistent with the Government's zero carbon buildings policy and adopt nationally described standards.

In determining planning applications, local planning authorities should expect new developments to:

- comply with adopted Local Plan policies on local requirements for decentralised energy supply unless it can be demonstrated that this is not feasible or viable; and
- take account of landform, layout, building orientation, massing and landscaping to minimise energy consumption;
- have a positive strategy to promote energy from renewable and low carbon sources;
- identify opportunities where development can draw its energy supply from decentralised, renewable or low carbon energy supply systems and for co-locating potential heat customers and suppliers.

The key focus of the NPPF is to support local and regional planning authorities.

3.1 The London Plan

The Greater London Authority (GLA) London Plan 2011, London Plan REMA October 2013, the Further Alterations to the London Plan (FALP) March 2015 and GLA's Guidance on Preparing Energy Assessments March 2016 document provide useful tools against which to undertake energy and sustainability assessments. For the purpose of this assessment they have been used in an advisory way complimentary to the requirements of the London Borough of Camden Council, to help incorporate a number of energy efficiency measures into the proposed development.

The London Plan sets out a number of core policies for major developments with regards to reducing CO_2 emissions and providing energy in a sustainable manner.

Policy 5.2: Minimising Carbon Dioxide Emissions - requires that major developments achieve a 35% improvement over the 2013 Building Regulation CO_2 Emission Target Emission Rate (TER).

Development proposals should make the fullest contribution to minimising carbon dioxide emissions in accordance with the following energy hierarchy:

- Be lean: use less energy
- Be clean: supply energy efficiently
- Be green: use renewable energy

Policy 5.6: Decentralised Energy - requires all major developments to evaluate the feasibility of connecting to existing or proposed district heating networks and where no opportunity existing consider a site wide Combined Heat and Power (CHP) systems.

Policy 5.7: Renewable Energy - requires that all major developments seek to reduce their CO_2 emissions by at least 20% through the use of onsite renewable energy generation wherever feasible. Individual development proposals will also help to achieve these targets by applying the energy hierarchy in Policy 5.2.

3.2 London Borough of Camden

The London Borough of Camden set out their approach to sustainable development through their Core Strategy, Development Policies and Supplementary Planning Documents. Core Strategy Policy 13 sets out the overarching approach to sustainability in the Borough, with the aims of mitigating and adapting to climate change, promoting local energy generation, managing water and reducing carbon dioxide emissions.

The Development Policies provide further detail as to how the Core Strategy policies can be achieved. In this instance *"Development Policy 22 – Promoting Sustainable Design and Construction"* provides the details as to how the targets of CS13 will be meet and states:

"The council will require development to incorporate sustainable design and construction measures. Schemes must:

- Demonstrate how sustainable development principles, including relevant measures set out in paragraph 22.5 below, have been incorporated into the design and proposed implementation; and
- Incorporate green or brown roofs and walls wherever suitable.

The council will promote and measure the sustainable design and construction by:

- Expecting non-domestic developments of 500m^2 of floor space or above to achieve *"very good"* in BREEAM assessments and *"excellent"* from 2016 and encouraging zero carbon from 2019.
- Expecting a 20% reduction of carbon emissions from on-site renewable energy generation.

The council will require developments to be resilient to climate change by ensuring scheme include appropriate climate change adaption measures, such as:

- Summer shading and planting;
- Limiting run-off;
- Reducing water consumption;
- Reducing air pollution;
- No locating vulnerable uses in basements in floor-prone areas.

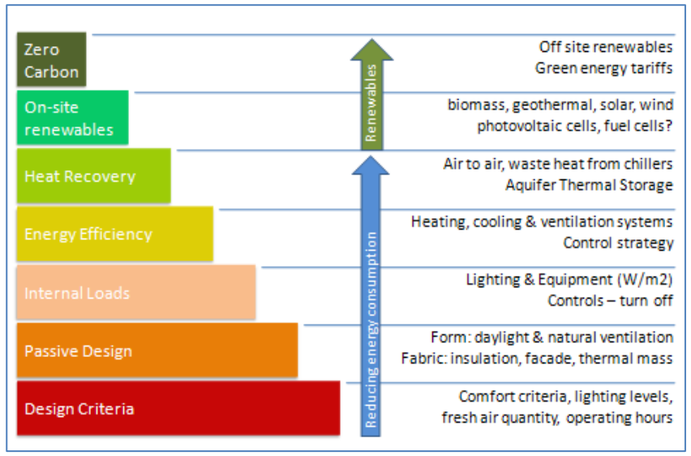
In addition to this policy, the Supplementary Planning Document *"Camden Planning Guidance 3 – Sustainability"* provides greater detail on the targets for developments and the approach that should be adopted in meeting these targets.

4. Energy Strategy

The design has been developed to reduce its annual energy consumption, with a corresponding reduction in annual CO_2 emissions.

The initial focus is on passive building measures such as high levels of insulation and air tightness, followed by energy efficiency. In order to achieve this, a “Steps to Low Carbon” methodology has been applied.

4.1 Passive Design



Steps to Low Carbon

Substantial reductions in energy usage for the scheme will be achieved through the consideration of the passive elements of the design, together with improved occupant comfort. The aim is to optimise the passive building elements and hence reduce the energy consumption associated with the mechanical systems. This is balanced between a range of requirements and accounting for factors such as site constraints and acoustic considerations.

Passive Solar Design – Day Lighting vs. Solar Control

Glazing types and window locations have been carefully considered, so that low angle winter solar gains and sun light are able to enter the space providing ‘free’ heating and lighting in winter. Solar gain is controlled in summer through solar coatings on the glazing to reduce the risk of ‘overheating’. This has been achieved by the careful selection of glazing types and areas.

The design of the office has large areas of glazing to give views to the outside and allow light penetration. The quantities of solar radiation entering the office spaces have been limited by the glazing specification, which will call for glass with high light transmission, but limited solar transmission.

Building Envelope

Improving the thermal insulation standards beyond the minimum Building Regulation standards will help to reduce the annual CO_2 emissions associated with all of the building’s heating and cooling systems, by limiting the heat loss through the building’s fabric.

All thermal elements will therefore be specified to achieve the standards indicated in the tables below.

Building Fabric Element	Design values	Regulations minimums
Floor area weighted U-value	0.22 W/m²K	0.25 W/m²K
Roof area weighted U-value	0.18 W/m²K	0.25 W/m²K
External wall area weighted U-value	0.22 W/m²K	0.35 W/m²K
Glazing area weighted U-value (including frame)	1.60 W/m²K	2.20 W/m²K
Glazing solar transmission G-value	0.40	-
Pedestrian entrance door U-value	2.20 W/m²K	2.20 W/m²K
Air permeability @ 50 Pascals	5 m³/hr/m²	10 m³/hr/m²

Thermal Bridging

Linear thermal bridge Ψ values if not considered carefully, will have a high conductivity which will require a greater enhancement of the other elements of the building envelope to compensate. Where this is not possible, all architectural details will be in accordance with the enhanced construction details listed on the Energy Trust website or as a minimum as per the requirements of Accredited Construction Details document.

Accredited Construction Details (ACD’s) have been developed to assist the construction industry to comply with the performance standards in Part L of the Building Regulations. They focus on issues concerning insulation continuity and airtightness and suggest a common approach to design, construction and testing methodology, and general improvements of the process.

Any new build areas will therefore consider the quality of thermal bridges in order to limit heat transfer through the fabric.

Air Permeability

An air pressure test will be carried out in order to determine the air leakage rates and take any remedial actions to improve it. An air leakage rate of 5m³/hr/m² at 50Pa will be targeted for the development. This compares with the Building Regulation minimum standards of 10m³/hr/m² at 50Pa.

Good air tightness will be achieved by prefabrication of a number of key building components under factory conditions, robust detailing of junctions and good building practices on site.

4.2 Energy Efficient Systems & Appliances

After assessing the contribution of the passive elements to the overall energy balance, the aim is to further reduce CO_2 emissions by selecting efficient mechanical and electrical systems and efficient controls to manage the energy used during operation. On the basis of good practice the following principles will be adopted throughout the proposed development where possible:

Eco-Labelled Goods

As lights and appliances account for about a third of the CO_2 emissions in development, where domestic appliances are installed energy efficient units will be incorporated, including A and A+ rated appliances.

White Goods Efficiency Rating

Low-Energy Lighting

The following lighting design parameters will be included as part of the tenant's fit out guide for any shell and core areas.

To reduce the energy consumption associated with artificial lighting, 100% of internal lighting fittings will be energy efficient with high luminous efficacies in excess of 90 luminaire lumens/circuit Watt in main office areas, with 70 lumens/circuit watt used in ancillary spaces.

Due to the enclosed nature of the site, daylighting has not been incorporated into the design.

HVAC System Plant Efficiencies

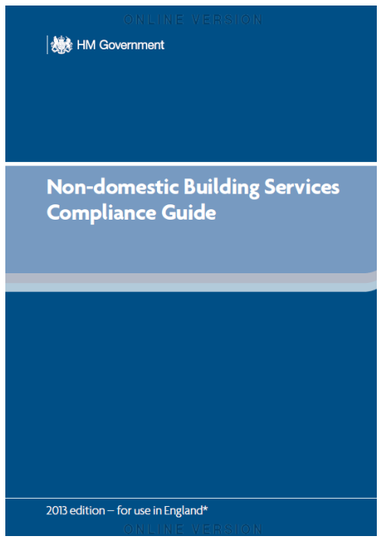
The design team will specify all equipment and plant to exceed the minimum requirements of the non-domestic HVAC guide. This provides guidance on the means of complying with the requirements of both Part L2a and Part L2b of the Building Regulations for conventional space heating systems, hot water systems and cooling systems.

Controls

The heating systems will be zoned to be controlled on a room-by-room basis, allowing fast local response to changes in loads. Appropriate lighting controls, including timers, and occupancy controls shall be specified where applicable for all internal lighting.

Energy Metering

Separate metering of the energy uses within the building, will help the building users identify areas of increased consumption. This will highlight potential energy-saving measures for the future, hence reducing the associated annual CO_2 emissions from these systems. All electrical and heat supplies will be metered using smart meters to enable building users and tenant to be responsible for their own consumption and hence CO_2 emissions.



Non-domestic Compliance Guide

5. Estimated Annual Energy Consumption

In accordance with the NPPF and the London Borough of Camden Council, the estimated energy consumption for the development has been calculated, in the first Be Lean instance, based on highly efficient fabric and services. The estimated energy consumption for the development has been based on the National Calculation Methodology (NCM) and calculated using the approved IES VE 2015 software.

5.1 Energy Consumption

The following services have been modelled in order to ascertain the effectiveness of the proposed building fabric and efficient services. The energy assessments have been carried out for the proposed scheme with the aforementioned passive and energy efficient measures.

Connection to a district heating network, the use of a combined heat and power (CHP) unit and integrating low and zero carbon technologies (LZCs) have been explored later in this assessment as per the steps of the Energy Hierarchy.

Space Heating System	Be Lean
Heating type	Central boilers, LTHW
Heating fuel	Gas
Heating emitter	Fan Coil Units
Heating SCoP	95.0%

Domestic Hot Water	Be Lean
DHW source	Central boilers, LTHW
DHW efficiency	95.0%
DHW delivery efficiency	95.0%
DHW storage tank volume (l)	500
Storage losses (kWh/(l*day))	0.0070

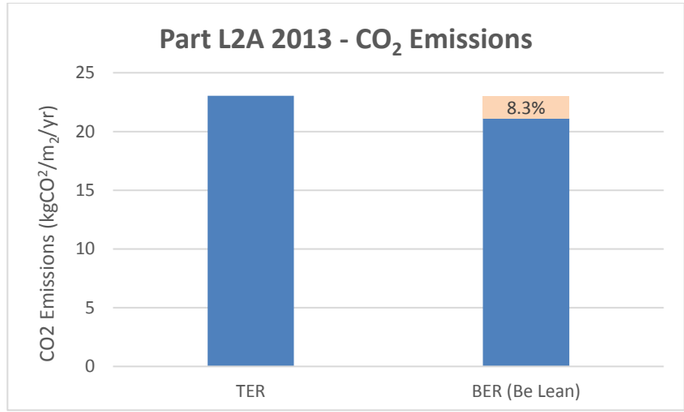
Space Cooling System	Be Lean
Cooling serving offices, reception	Chiller
Cooling fuel	Electricity
SEER	4.0

Mechanical Ventilation	Be Lean
Centralised FCU system Specific Fan Power (SFP) (W/l/s)	1.6
FCU system terminal units SFP (W/l/s)	0.25
Extract only SFP (W/l/s)	0.4
MVHR Heat Recovery Sensible Efficiency	75%
Leakage Standard	L2
Ductwork Leakage Standard	Class A
Pumping Arrangement	Variable Speed
Demand control ventilation	Speed control

Lighting Systems	Be Lean
Office and reception areas luminaire efficacy (luminaire lumens per circuit Watt)	90 lm/W
Circulation, WCs, showers luminaire efficacy (lm/W)	70 lm/W
Reception area display lighting luminaire efficacy (lm/W)	50 lm/W
Occupancy and photoelectric sensors parasitic power (W/m^2)	0.10
Auto-on Auto-off control with time-switch sensors in offices, reception, circulation, WCs, showers	
No daylighting dimming	
Constant illuminance control on office lighting	

Building Details	Be Lean
Full BMS with "Out of Range" warnings on HVAC and lighting systems	
Whole site electrical power factor	>0.95

The analysis indicates that the proposed development will perform better than the minimum requirements of the Building Regulations when compared to the notional benchmark building. The proposed building is achieving an improvement of 8.3% of the Target Emission Rate (TER).



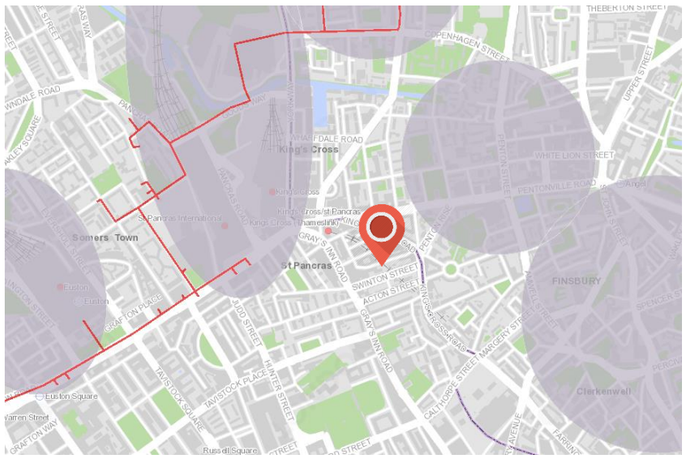
Development CO_2 Emissions

System	Part L 2013	
kgCO$_2$/m^2	TER	BER (Be Lean)
Heating	2.4	2.93
DHW	3.35	3.72
Cooling	1.87	2.55
Auxiliary	5.84	4.46
Lighting	9.57	7.45
Renewables	0	0
Total	**23.03**	**21.11**
	Improvement	**8.3%**
		Pass

6. Decentralised Energy Networks

The feasibility of connecting to an existing or proposed district network has been investigated for the site at Land to the rear of 159-163 Kings Cross Road in accordance with Policy 5.6 of the London Plan.

The London Heat Map indicates that there are no existing district heat networks in the vicinity of the development. A potential system is proposed for the future but not available at this time, nor is any time scale or information available defining the installation of this network. Therefore no connections will be made to any heating networks. Furthermore, given the small scale and tight property restraints of the project, it is not advised to set aside plant space and equipment for any future connection.



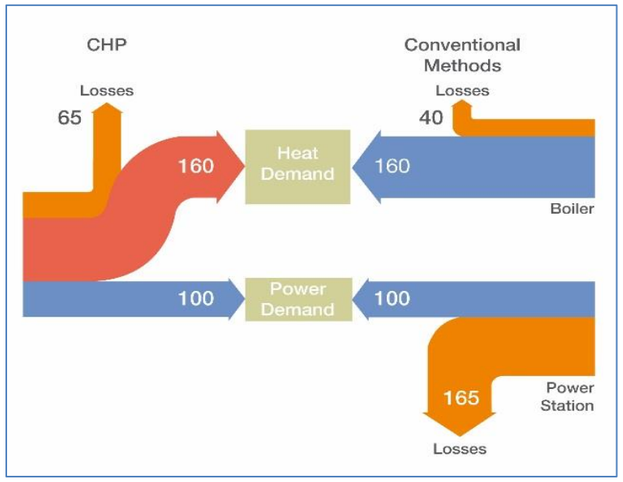
District Heating Networks in Proximity to the site (Yellow = installed, Red = proposed, Purple = potential)

7. Combined Heat & Power (CHP)

In accordance with the Mayor's Energy Hierarchy in Policy 5.6 the feasibility of a site wide CHP network has been investigated.

As outlined the development's heating requirements have been reduced via the use of increased thermal insulation and air tightness levels, supplemented by high efficiency heat recovery systems. The development's domestic hot water requirement is low due to the nature of office buildings and is being provided by point of use electrical units to reduce standing and distribution losses.

Hence, the base heat load for office is not sufficient to support the efficient operational of a CHP system. CHP is only suited for large developments with a constant heating and electrical load. CHP also creates issues with local air quality and NO_x emissions and therefore is considered impractical for this site.



CHP Efficiency Diagram

8. Low and Zero Carbon Energy

Policy CS13 of the Camden Borough Supplementary Planning Document requires that all developments seek to reduce their CO_2 emissions by at least 20% through the use of onsite renewable energy generation wherever feasible.

To investigate the feasibility of incorporating clean energy, the following technologies have been investigated to determine if any are suitable for delivering a reduction in the CO_2 emissions through renewables.

The feasibility of each of the energy sources listed has been assessed with regard to the potential contribution each could make to supply a proportion of the development's delivered energy requirement, whilst considering the technical, planning, land use and financial issues.

8.1 ASHP (Air Source Heat Pump)

Air source heat pumps exchange heat between the outside air and a building to provide space heating in winter and cooling in the summer months. The efficiency of these systems are inherently linked to the ambient air temperatures.

Heat pumps supply more energy than they consume, by extracting heat from their surroundings. Heat pumps can supply as much as 4kW of heat output for just 1kW of electrical energy input.

Typically there are two main types of air sourced heat pump systems, one which is refrigerant-based system (Variable Refrigerant Flow - VRF) and one which is water based system (Air to water heat pumps). VRF systems transfer heat from one location to another using refrigerant. The volume or flow rate of refrigerant is accurately matched to the required heating or cooling loads thereby saving energy and providing more accurate control.

The analysis indicates that if the conventional heating and cooling system was replaced with split and multi split VRF systems a 17.6% reduction over the Be Lean case in the development's annual CO_2 could be achieved, based on installing a VRF system with seasonal cooling efficiency (SEER) of 4.5 and heating seasonal efficiency (SCoP) of 3.5.

Therefore, a VRF heat pump system is proposed as part of the development.

8.2 GSHP (Ground Source Heat Pumps)

Ground source heat pumps require either horizontal trenches or vertical boreholes to be excavated in order to accommodate piles or loops. As the proposed development is on a site confined by surrounding buildings, it would be difficult to install any ground coupled systems and hence GSHP have been discounted from this assessment.

8.3 Biomass Heating

A base load biomass boiler would have to be integrated into a centralised energy strategy as a lead boiler in a modular arrangement with a number of conventional gas-fired boilers. Biomass boilers require significant space for storage and delivery of fuel which is not practical in central London for a building which has very little ground floor or basement space. They have higher particulate emissions than gas boilers which typically raises concerns with the Environment Agency as central London suffers from poor air quality. Therefore biomass boilers have not be considered feasible for the proposed development.

8.4 Solar Thermal

Solar thermal collectors utilises solar radiation to heat water for use in buildings. The optimum orientation for a solar collector in the UK is a south facing surface, tilted at an angle of 30º from the horizontal.

Solar collectors are typically designed to meet a development's base heat load, associated with its domestic hot water requirements. For hotel-type development these usually equates to 60-70% of the total DHW annual load, with the natural gas-fired boilers meeting the remainder of the load.

However, the building does not offer a significant amount of roof space to mount bulky solar collectors on. Additionally, surrounding buildings would likely cause excessive overshadowing, especially in winter when sun angles are lower and hot water demand is highest. For this reason solar thermal collectors have been discounted as an option.

8.5 Photovoltaic Panels

Photovoltaic cells convert solar energy directly into electricity. The cells consist of two layers of silicon with a chemical layer between. The incoming solar energy charges the electrons held within the chemical. The energised electrons move through the cell into a wire creating an electrical current.

As the majority of this development's energy load is electrical, PV is a good option as it reduces the need for high carbon intensity grid electricity.

A 10m^2 photovoltaic array was assessed to determine feasibility of reaching the 20% CO_2 reductions through renewable technologies policy requirement. It is assumed such an array could be located on the first of the south facing (170º from North) roof surfaces above the clerestory windows on the top floor (see image below). A preliminary analysis found that a south facing 10m^2 array at a module efficiency of 13% and an inclination of 30 degrees above horizontal would deliver a further 3.0% reduction of carbon emissions. In terms of energy, this is 1.4kWp and 1109 kWh/yr. This brings the total CO_2 savings due to LZCs to 20.6%. It is therefore recommended to include PVs in order to meet the 20% CO_2 reduction by LZCs policy.

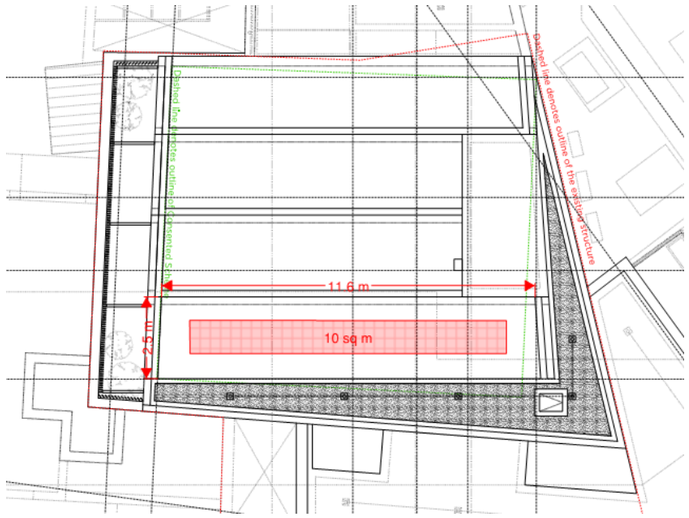


Diagram indicating proposed PV array location on roof

8.6 Wind Turbines

The output from wind turbines are highly sensitive to wind speed. Hence it is essential that turbines should be sited away from obstructions, with a clear exposure or fetch for the prevailing wind.

The urban location of the site within a conservation area coupled with the adjacent buildings will result in a turbulent flow regime across the site. As such it is not proposed to include wind turbines as part of the development.

9. Proposed Energy Strategy

We have followed the methodology of the Mayor's Energy Hierarchy with the estimated energy consumption for the development based on the National Calculation Methodology (NCM).

9.1 Energy Strategy

In accordance with the NPPF, the London Plan and local policy, an energy assessment based on the Building Regulations Part L2A 2013 standard has been undertaken.

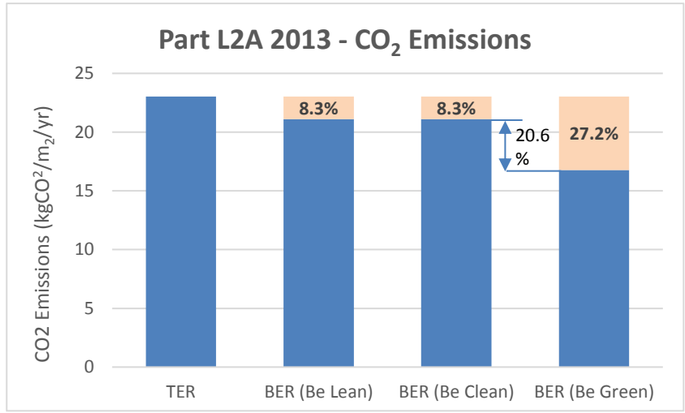
The office will be designed with high-performance insulation reducing heat losses with improved fabric U-values and improved detailing making the development significantly more air tight. Multi-split VRF air source heat pumps will provide the heating and cooling requirements of the building. AHUs will have highly efficient plate heat exchangers to reduce energy required to heat incoming fresh air. High efficiency water heaters will meet the DHW demand. Energy efficient lighting will reduce the electrical demand and metering will be used to allow the tenants to manage the performance of the development.

9.2 Low and Zero Carbon Energy Strategy

The feasibility of connecting to an existing or proposed district network has been investigated in line with the Mayor's Energy Hierarchy. The London Heat Map indicates that there are no operational district heating networks within proximity of the site. A future network is indicated on a nearby site but space has not been allocated in the energy centre to allow the development to connect to this network due to spatial restraints and low heating demands.

Similarly, CHP is not recommended as the heating load is low and electrical demand is not constant throughout the day, meaning efficient operation of a CHP is not possible.

Air Source Heat Pumps offered the most suitable means of integrating Low and Zero Carbon technologies into the building. As such they will be specified to provide space heating and cooling. A 10m² PV array at 13% module efficiency was found to generate 1,100kWh/yr of clean electricity. The inclusion of VRF and PV in the design enabled a 20.6% improvement over the Be Lean performance and means the building is now achieving a 27.2% total improvement over the Target Emission Rate (TER).



Estimated CO_2 Emission Savings

Table 3: Carbon Dioxide Emissions after each stage of the Energy Hierarchy for non-domestic buildings	Carbon dioxide emissions for non-domestic buildings (Tonnes CO_2 per annum)	
	Regulated	Unregulated
Baseline: Part L 2013 of the Building Regulations	21.4	16.3
After energy demand reduction	19.6	16.3
After heat networks/CHP	19.6	16.3
After renewable energy	16.2	16.3

Table 4: Regulated carbon dioxide savings from each stage of the Energy Hierarchy for non-domestic buildings	Regulated CO2 savings	
	Tonnes CO_2 per annum	%
Savings from energy demand reduction	1.8	8.3%
Savings from CHP	0.0	0.0%
Savings from renewable energy	4.0	20.6%
Total Cumulative Savings	5.8	27.2%
Annual Savings from off-set payment	-	
(Tonnes CO_2)		
Cumulative savings for off-set payment	-	

GLA Carbon Dioxide for Offset Payments Tables

The combination of the passive design measures and VRF heat pumps in the development achieves a 27.2% improvement over the baseline building TER performance. The development therefore complies with Part L of the building regulations.

As a minor development, the building does not need to meet the 35% carbon emission reduction target under Policy 5.2 of the London Plan.

The development does meet the requirements of Policy CS13 of the Camden Borough Supplementary Planning Document by providing at least 20% (20.6%) of its energy through Low or Zero Carbon technologies.

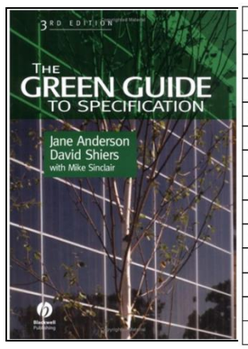
10. Materials

Building and construction activities worldwide consume 3 billion tons of raw material each year, which account for approximately 50% of total global consumption. Using green/sustainable building materials and products promotes conservation of dwindling non-renewable resources. In addition, integrating sustainable building materials into building projects can help reduce the environmental impacts associated with the extraction, transport, processing, fabrication, installation, reuse, recycling, and disposal of these source materials.

The aim for the proposed development will be for its overall environmental impact to be minimised through the specification of sustainable materials. As the proposed development consists of the refurbishment to an existing building, building elements should be reused where possible.

10.1 Environmental Impact of Materials

New materials with low overall environmental impact will be chosen and advice from the Green Guide to Specification will be taken into consideration for the selection. The Green Guide rates the environmental impact of different materials and components, taking into account factors like toxicity, ozone depletion, ease of recycling, waste disposal etc. Where viable, the new main elements in the building fabric and building services insulation will target achieving the higher ratings from the Green Guide.



Environmental Issue
Climate Change*
Water extraction
Mineral extraction
Stratospheric ozone depletion*
Human toxicity
Ecotoxicity to freshwater
Higher level nuclear waste
Ecotoxicity to land
Waste disposal
Fossil fuel depletion
Eutrophication*
Photochemical ozone creation*
Acidification*

10.2 Sustainable Timber

All timber used for basic or finishing building elements in the scheme will be sourced from responsibly managed and sustainable forests or plantations. Such timber products are the only truly renewable construction material in common use and growing trees also absorb and fix CO_2. Forests can also provide the habitat for a wide variety of plant and animal life, preserving important ecology and promoting biodiversity.

10.3 Locally Sustainable Materials

Where practical, materials should be sourced from local suppliers, reducing the environmental impacts and CO_2 emissions associated with transportation to the site.

10.4 Recycled Materials

The design team will assess the potential for incorporating recycled materials in the design and will aim to ensure that even where new materials are used, as much as possible can be recycled at the end of the buildings' life.

Specifying materials with a high-recycled content is also another method of saving processing or manufacturing energy. The recycled content of a material can be described as either post-consumer or post-industrial to indicate at what point in the life cycle a material is reclaimed.

10.5 Ozone Depletion and Global Warming

CFCs and HCFCs, compounds commonly used in insulation materials and refrigerants, can cause long-term damage to the Earth's stratospheric ozone layer, exposing living organisms to harmful radiation from the sun. They also significantly increase global-warming if they leak into the atmosphere. Following the Montreal Protocol, production and use of CFCs is no longer permitted and EC regulations will require phasing out of HCFCs by 2015. However, products that replace these gases are often still potent global warming contributors.

All insulation materials specified for the proposed scheme will have zero Ozone Depleting Potential and low Global Warming Potential, (GWP<5) in either manufacture or composition in line with the CfSH requirements. This will include insulation for building elements (roof, internal & external walls, floor) as well as insulation for hot water vessels and pipe or duct work.

11. Water Conservation

Water consumption in the UK has risen by 70% over the last 30 years. Trying to meet the increasing demand by locating new sources of water supply is both expensive and damaging to the environment. Therefore, the design team have focused on reducing the demand for water and managing the existing resources.

11.1 Demand Reduction and Water Efficiency

The aim is to minimise internal and external potable water use within the development. Good water management can contribute to reducing the overall level of water consumption maintaining a vital resource and having environmental as well as cost benefits in the life-cycle of the building. The following water saving measures are being considered:

Dual Flush Cisterns on WC's - These units have the ability to provide a single flush of 4L and/or a full flush of 6L.

Flow Restrictors to Taps - Flow restrictors reduce the volume of water discharging from the tap. Spray taps have a similar effect and are recommended to reduce both hot and cold-water consumption. Low flow taps in one of the above forms will be installed in all areas.

Low Flow Showers - The average shower uses 15 litres of water a minute, by restricting the output of the showers in the development to a maximum of 12 litres/ min a 20% water saving could be achieved.

Water Meters - In 1995 approximately 33,200 million litres of water a day were extracted in England and Wales, this increased to 44,130 million litres/day in 2001, and much of this was for domestic water supply. To reduce this figure, accurate information on usage is required for management of a building's consumption. Water meters will be specified on the main supply to each hotel suites.

12. Sustainable Urban Drainage

The site's drainage strategy will aim to reduce the impact of development on the natural drainage patterns, by retaining water on site by the incorporation Sustainable Urban Drainage techniques (SUDs).

As the site is currently completely impermeable with hard landscaping and building areas, the main aim for the development will be to improve the water retention of the site with landscaping to the roof terraces.

The Environment Agency's Flood Map indicates that the site is located within Flood Zone 1 and therefore there is no risk of flooding on the site.

Flood Map FOR Land to the rear of 159-163 Kings Cross Road

As a minimum, the development will be designed so that the peak rate of runoff into watercourses is no worse than the existing site's run off rate. This will comply with the Interim Code of Practice for Sustainable Urban Drainage Systems (SUDS) (CIRIA, 2004) or for at least the 1 year and 100 year return period events.

13. Waste Management

Buildings and building sites produce a significant amount of waste annually. Most of the waste produced in the UK is disposed of in landfill sites and only a small percentage of it is recycled or reused.

13.1 Waste Targets

Under EU legislation the UK less than a third of site waste should be sent for burial in landfill sites by 2020 and the figure at present is about 80%. To achieve this target a number of measures are implemented, including landfill tax, aiming to discourage disposal of waste to landfill. Good waste management is a key component of sustainable development. Reducing waste is an important means of:

- Reducing unnecessary expenditure;
- Reducing the amount of natural resources used for production of new materials;
- Reducing energy for waste disposal;
- Reducing levels of contamination and pollution arising from waste disposal.

The proposed development will minimise the impact of waste in the environment where possible.

13.2 Demolition & Construction

During the construction phase a large amount of waste material will be generated through construction, demolition and land clearing procedures. In building construction, the primary waste products in descending percentages are: wood, asphalt/concrete/masonry, drywall, roofing, metals, and paper products.

Prior to commencement on site a Site Waste Management Plan (SWMP) that complies with the requirements of current legislation and BREEAM will be prepared. This plan will identify the local waste haulers and recyclers, determine the local salvage material market, identify and clearly label site spaces for various waste material storage and require a reporting system that will quantify the results and set targets. As a minimum the SWMP will contain:

- The target benchmark for resource efficiency e.g. m^3 of waste per $100m^2$ or tonnes of waste per $100m^2$;
- Procedures and commitments for minimising non-hazardous waste in line with the benchmark;
- Procedures for minimising hazardous waste;
- Procedures for monitoring, measuring and reporting hazardous and non-hazardous site waste;
- Procedures for sorting, reusing and recycling construction waste into defined waste groups either on site or through a licensed external contractor;
- The name or job title of the individual responsible for implementing the above.

As the proposed development involves the change of use of an existing building, there is no requirement for new material to make up foundations.

13.3 Waste Management & Reporting in Operation

The detailed design phases will identify the potential waste streams that the development will produce. As a minimum, plans will be formulated to handle the separation, collection, and storage of common recyclable materials such as paper, glass, plastics, and metals. The collection points will be easily accessible to all of the users.

The main aim will be to recycle as much waste as possible; this will be achieved by making sure that waste recycling facilities are strategically placed in convenient locations. A strategy will be developed with consideration of how waste from the development can be recycled.

The space allocated for waste storage should be able to accommodate containers with at least the minimum volume recommended by British Standard 5906 (British Standards, 2005) based on a maximum collection frequency of once per week.

14. Environmental Management

14.1 Construction

Construction sites are responsible for significant impacts, especially at a local level. These arise from noise, potential sources of pollution and waste and other disturbances. Impacts such as increased energy and water use are also significant. Therefore attention is being given to site-related parameters with the aim to protect and enhance the existing site and its ecology.

The aim is to have a construction site managed in an environmentally sound manner in terms of resource use, storage, waste management, pollution and good neighbourliness. In consideration of this, a score of greater than 35 of out 50 will be targeted in the Considerate Constructors Scheme, with an aspiration to exceed 40 and no individual section achieving a score of less than 7.

Areas that can be taken into consideration in order to minimise the impact of the construction site on its surroundings and the global environment are as follows:

- Monitor, report and set targets for CO_2 or energy usage arising from site activities;
- Monitor, report and set targets for CO_2 or energy usage arising from transport to and from site;
- Monitor, report and set targets for water consumption arising from site activities;
- Monitor construction waste on site, sorting and recycling construction waste where applicable;
- Adopt best practice policies in respect of air and water pollution arising from site activities;
- Operates an Environmental Management System;
- Additionally, all timber used on site should be responsibly sourced.

15. Land Use and Ecology

The site currently comprises an existing building with the entire site made up of hard standing and no green spaces. As the proposed development is being constructed within the confines of the existing site there is little scope for increasing biodiversity, as the proposal is for a new roof top bar and plant enclosure. The design team will explore the potential for incorporating a green roof in the light well, subject to the structural and project feasibility, which will enhance the biodiversity of the site. As part of the roof top bar there will be an accessible amenity space which will be used for sitting with some planting to marginally enhance the ecology of the site.

16. Pollution

Global concern for environmental pollution has risen in recent years, as concentrations of harmful pollutants in the atmosphere are increasing. Buildings have the potential to create major pollution both from their construction and operation, largely through pollution to the air (dust emissions, NOx emissions, ozone depletion and global warming) but also through pollution to watercourses and ground water. The proposed development will aim to minimise the above impacts, both at the design stage and on-site.

16.1 Ozone Depletion

CFCs and HCFCs, compounds commonly used in insulation materials and refrigerants, can cause long-term damage to the Earth's stratospheric ozone layer, exposing living organisms to harmful radiation from the sun. They also significantly increase global-warming if they leak into the atmosphere. Following the Montreal Protocol, production and use of CFCs is no longer permitted and EC regulations meant that the use of HCFCs was phased out by 2015. However, products that replace these gases are often still potent global warming contributors. Where refrigerants are used for air-conditioning and comfort cooling they will be CFC and HCFC-free.

16.2 Internal pollutants

Volatile organic compounds (VOCs) are emitted as gases (commonly referred to as offgassing) from certain solids or liquids. VOCs include a variety of chemicals, some of which are known to have short-term and long-term adverse health effects. Concentrations of many VOCs are consistently higher indoors (up to ten times higher) than outdoors.

VOCs are emitted by a wide array of products numbering in the thousands. Examples include: paints and lacquers, paint strippers, cleaning supplies, pesticides, building materials, furnishings, adhesives, Urea-formaldehyde foam insulation (UFFI), pressed wood products (hardwood plywood wall panelling, particleboard, fibreboard) and furniture made with these pressed wood products.

'No' or 'low' VOC paints are available from most standard mainstream paint manufacturers. These 'eco-friendly' paints are made from organic plant sources and also powdered milk based products.

The design team will seek to select internal finishes and fittings with low or no emissions of VOCs and comply with European best practice levels as a minimum.

16.3 NOx emissions from boilers

Nitrous oxides (NOx) are emitted from the burning of fossil fuels and contribute to both acid rain and to global warming in the upper atmosphere. At ground level, they react to form ozone, a serious pollutant and irritant at low level. Burners in heating systems are a significant source of low-level NOx, while power stations (and therefore electric heating) are a significant source of NOx in the upper atmosphere.

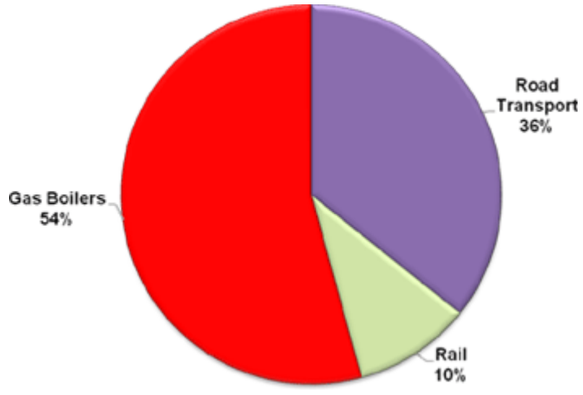


Figure 1 Breakdown of sources of NOx in the neighbouring Borough of Camden, for illustration (Source: London Borough of Camden)

The amount of NOx emissions varies between products. New gas boilers vary from 40 NOx/kWh to <70mg NOx/kWh (class 5). The proposed high efficiency water heaters will be specified to emit less than 40 NOx/kWh.

17. Green Transport

Transportation is the second largest source of CO_2 emissions in the UK after energy use in buildings and remains the main source of many local pollutants. Energy use and emissions from transport are growing at 4% per year, and at the same time, the effects of climate change are becoming more severe. There is growing pressure to control emissions from transport and sites without good access to public transport will be at much greater risk from these controls.

17.1 Site Location and Transport Options

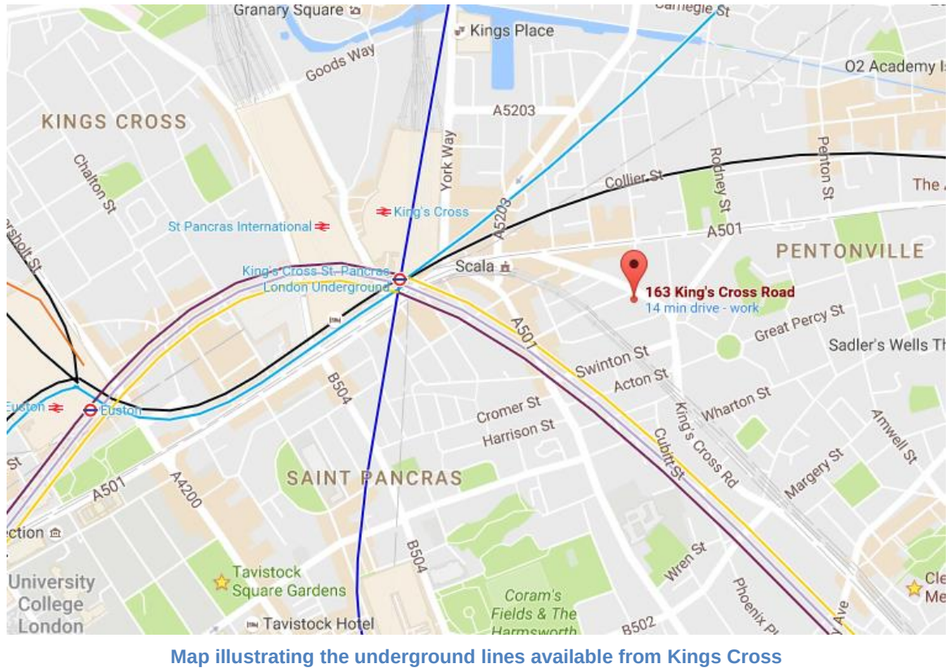
Land to the rear of 159-163 Kings Cross Road is located five minutes' walk to the East of Kings Cross St Pancras International Station. This station offers several major underground routes, providing strong connection between the site and the rest of London.

The international station also enables regional transport to other parts of the country and even across to mainland Europe.

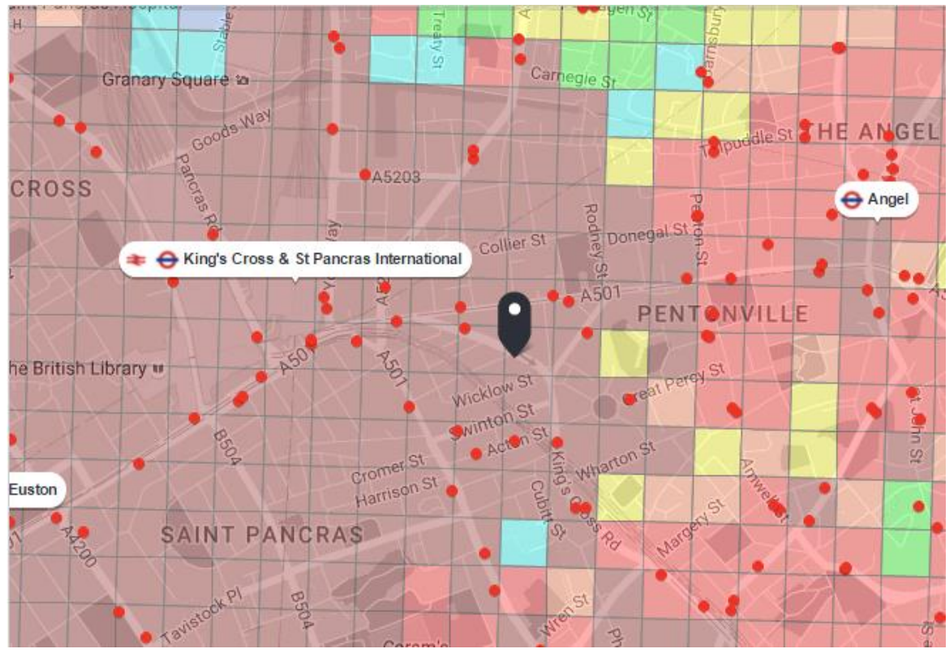
Additionally, a number of distinct bus services are available within a 100m radius of the Kings Cross site.

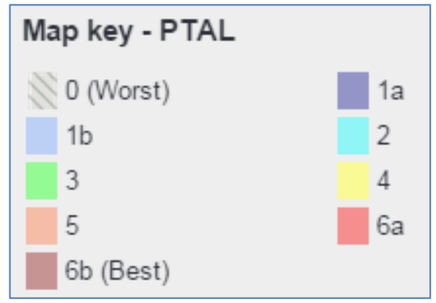
The Public Transport Accessibility Level for the development is 6b, the highest rating possible, indicating that the site has excellent public transport links.

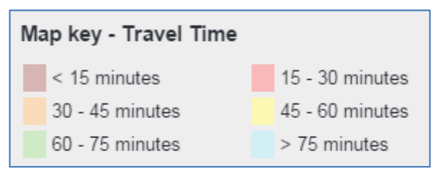
Several Santander cycle hire scheme stands are located within 200m of the development.



Map illustrating the underground lines available from Kings Cross







Transport rating map showing the site access options

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Appendix A – BREEAM Pre-assessment

BREEAM UK New Construction 2014 Assessment Report

BREEAM® UK

General information

BRE Assessment reference no.	to be confirmed
Client name	Balcap Re Ltd
Building end user/occupier	
Assessor name	K. Kumari
Assessors role	BREEAM AP
Assessor organisation	Cundall

Building details

Building name	159-163 Kings Cross Road
Building address	159-163 Kings Cross Road
	London
County	London Borough of Camden
Post code	WC1X 9BN
Country	England
Building type (main description)	Office
Building type (sub-group)	Office - General office building
Building floor area (GIA) m^2	550
Building floor area (NIFA) m^2	550
BREEAM scheme	New Construction
BREEAM version	2014 (SD5076)
BREEAM UK 2014 technical manual issue number	SD5076 Issue 4.0
Project type	New Construction (Fully fitted)
Assessment stage	Design (interim)
Location type	London Borough
Building services - heating system type	Air system
Building services - cooling system type	Air-conditioning
Building services - domestic hot water system type	Centralised supply and distribution

Building service - controls	Standard controls (time/temperature)
If applicable, does this industrial building have a heated or cooled operational area?	Option not applicable to building type
Does water heating contribute less than 10% of the buildings total energy consumption?	No
Commercial/industrial refrigeration and storage systems	No
Building user transportation systems (lifts and/or escalators)	Yes
Laboratory function/area and size category	No laboratory
Laboratory containment level	No laboratory
Fume cupboard(s) and/or other containment devices	No
Unregulated water uses present? (e.g. vehicle wash system, irrigation)	No
If applicable, will this healthcare building house inpatients?	Option not applicable to building type
If applicable, does this industrial building have an office area?	Option not applicable to building type
If applicable, does this building contain areas requiring SAP assessment?	Option not applicable to building type
If SAP used, what proportion of the building's total floor area (GIA) does it apply to?	Option not applicable to building type

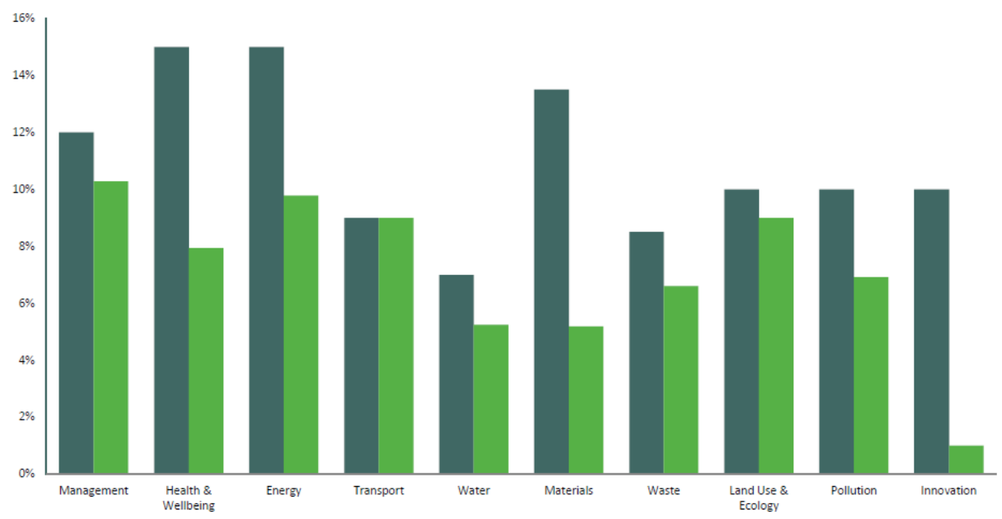
Project team details

Developer	TBC
Principal contractor	TBC
Architect	TBC
Project management	TBC
Building services	TBC
BREEAM Accredited Professional	Kavita Kumari
Other project team member 1	
Other project team member 2	
Other project team member 3	
Other project team member 4	

Overall Building Performance

Building name	159-163 Kings Cross Road
BREEAM rating	Excellent
Total Score	70.9%
Min. standards level achieved	Excellent level

Building Performance by Environment Section



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MANAGEMENT

Man 01 Project brief and design

No. of BREEAM credits available	4	Available contribution to overall score	2.29%
No. of BREEAM innovation credits available	0	Minimum standards applicable	No

Assessment Criteria	Compliant?	Credits available	Credits achieved
Stakeholder consultation (project delivery)	No	1	0
Stakeholder consultation (third party)	No	1	0
Sustainabilty champion (design)	Yes	1	1
Sustainabilty champion (monitoring progress)	Yes	1	1

Total BREEAM credits achieved	2
Total contribution to overall building score	1.14%
Total BREEAM innovation credits achieved	0
Minimum standard(s) level	N/A

Assessor comments/notes:

Man 02 Life cycle cost and service life planning

No. of BREEAM credits available	4	Available contribution to overall score	2.29%
No. of BREEAM innovation credits available	0	Minimum standards applicable	No

Assessment Criteria	Compliant?	Credits available	Credits achieved
Elemental life cycle cost (LCC)	Yes	2	2
Component level LCC plan	No	1	0
Capital cost reporting	Yes	1	1
Capital cost of the project		£/m²	

Total BREEAM credits achieved	3
Total contribution to overall building score	1.71%
Total BREEAM innovation credits achieved	0
Minimum standard(s) level	N/A

Assessor comments/notes:

Man 03 Responsible construction practices

No. of BREEAM credits available	6	Available contribution to overall score	3.43%
No. of BREEAM innovation credits available	1	Minimum standards applicable	Yes

Assessment Criteria	Compliant?	Credits available	Credits achieved
Is all site timber used in the project 'legally harvested and traded timber'?	Yes		
Environmental Management	Yes	1	1
Construction stage sustainability champion	Yes	1	1
Considerate construction	2	2	2
Monitoring of construction site impact (criterion 8)	Yes		
Utility consumption (water and energy)	Yes	1	1
Transport of construction materials and waste	Yes	1	1
Exemplary level criteria - considerate construction	No	1	0

Key Performance Indicators: Construction site energy use

Energy consumption (total) - site processes		Information not available at design stage
Energy consumption (intensity) - site processes		Information not available at design stage
Distance (total) - materials transport to site		Information not available at design stage
Distance (total) -waste transport from site		Information not available at design stage
Energy consumption (total) - materials transport to site		Information not available at design stage
Energy consumption (total) - waste transport from site		Information not available at design stage
Energy consumption (intensity) - materials transport to site		Information not available at design stage
Energy consumption (intensity) - waste transport from site		Information not available at design stage

Key Performance Indicators: Construction site greenhouse gas emissions

Process greenhouse gas emissions (total) - site processes		Information not available at design stage
Greenhouse gas emissions (intensity) - site processes		Information not available at design stage
Greenhouse gas emissions (total) - materials transport to site		Information not available at design stage
Greenhouse gas emissions (total) - waste transport from site		Information not available at design stage
Greenhouse gas emissions (intensity) - materials transport to site		Information not available at design stage
Greenhouse gas emissions (intensity) - waste transport from site		Information not available at design stage

Key Performance Indicators: Construction site use of freshwater resources

Use of freshwater resource (total) - site processes		Information not available at design stage
Use of freshwater resource (intensity) - site processes		Information not available at design stage

Total BREEAM credits achieved	6
Total contribution to overall building score	3.43%
Total BREEAM innovation credits achieved	0
Minimum standard(s) level	Outstanding level

Assessor comments/notes:

Man 04 Commisioning and handover

No. of BREEAM credits available	4	Available contribution to overall score	2.29%
No. of BREEAM innovation credits available	0	Minimum standards applicable	Yes

Assessment Criteria	Compliant?	Credits available	Credits achieved
Commissioning and testing schedule and responsibilities	Yes	1	1
Commissioning building services	Yes	1	1
Testing and inspecting building fabric	Yes	1	1
Handover - Has a Building User Guide been developed prior to handover?	Yes	1	1
Handover - Has a training schedule been prepared fo building occupiers/managers?	Yes		

Total BREEAM credits achieved	4
Total contribution to overall building score	2.29%
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	Outstanding level

Assessor comments/notes:

Man 05 Aftercare

No. of BREEAM credits available	3	Available contribution to overall score	1.71%
No. of BREEAM innovation credits available	1	Minimum standards applicable	Yes

Assessment Criteria	Compliant?	Credits available	Credits achieved
Aftercare support	Yes	1	1
Seasonal commissioning	Yes	1	1
Post occupancy evaluation	Yes	1	1
Exemplary level criteria	No	1	0

Total BREEAM credits achieved	3
Total contribution to overall building score	1.71%
Total BREEAM innovation credits achieved	0
Minimum standard(s) level	Outstanding level

Assessor comments/notes:

HEALTH & WELLBEING

Hea 01 Visual Comfort

No. of BREEAM credits available	4	Available contribution to overall score	3.53%
No. of BREEAM innovation credits available	1	Minimum standards applicable	No

Assessment Criteria	Compliant?	Credits available	Credits achieved
Glare control	No	1	0
Daylighting (building type dependant)	0	1	0
View out	No	1	0
Internal and external lighting levels, zoning and controls	No	1	0
Exemplary level daylighting	No	1	0

Total BREEAM credits achieved	0
Total contribution to overall building score	0.00%
Total BREEAM innovation credits achieved	0
Minimum standard(s) level	N/A

Assessor comments/notes:

Hea 02 Indoor Air Quality

No. of BREEAM credits available	5	Available contribution to overall score	4.41%
No. of BREEAM innovation credits available	2	Minimum standards applicable	No

Assessment Criteria	Compliant?	Credits available	Credits achieved
Min. sources of air pollution: indoor air quality plan	Yes	1	1
Ventilation	Yes	1	1
VOCs (products)	No	1	0
VOCs (post-construction)	Yes	1	1
Adaptability - potential for natural ventilation	No	1	0
Exemplary level VOCs (products)	0	2	0

Key Performance Indicators: Indoor air quality

Concentration levels of formaldehyde		Information not available at design stage
Total volatile organic compound (TVOC) concentration		Information not available at design stage

Total BREEAM credits achieved	3
Total contribution to overall building score	2.65%
Total BREEAM innovation credits achieved	0
Minimum standard(s) level	N/A

Assessor comments/notes:

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Hea 03 Safe containment in laboratories

Assessment issue not applicable

No. of BREEAM credits available	N/A	Available contribution to overall score	N/A
No. of BREEAM innovation credits available	N/A	Minimum standards applicable	N/A

Assessment Criteria	Compliant?	Credits available	Credits achieved
Objective risk assessment of laboratory facilities			
Laboratory containment devices and containment areas			
Containment level 2 and 3 labs			

Total BREEAM credits achieved	N/A
Total contribution to overall building score	N/A
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	N/A

Assessor comments/notes:

Hea 04 Thermal comfort

No. of BREEAM credits available	3	Available contribution to overall score	2.65%
No. of BREEAM innovation credits available	0	Minimum standards applicable	No

Assessment Criteria	Compliant?	Credits available	Credits achieved
Thermal modelling	Yes	1	1
Adaptability - for a projected climate change scenario	Yes	1	1
Thermal zoning and control	No	1	0

Key Performance Indicators	Thermal comfort	Adaptability - for a projected
Predicted Mean Vote (PMV)		
Predicted Percentage Dissatisfied (PPD)		

Total BREEAM credits achieved	2
Total contribution to overall building score	1.76%
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	N/A

Assessor comments/notes:

Hea 05 Acoustic Performance

No. of BREEAM credits available	3	Available contribution to overall score	2.65%
No. of BREEAM innovation credits available	0	Minimum standards applicable	No

Assessment Criteria	Credits	Credits available	Credits achieved
Acoustic performance standards and testing requirements	2	3	2

Total BREEAM credits achieved	2
Total contribution to overall building score	1.76%
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	N/A

Assessor comments/notes:

Hea 06 Safety and Security

No. of BREEAM credits available	2	Available contribution to overall score	1.76%
No. of BREEAM innovation credits available	0	Minimum standards applicable	No

Assessment Criteria	Compliant?	Credits available	Credits achieved
Safe external access	Yes	1	1
Security of site and building	Yes	1	1

Total BREEAM credits achieved	2
Total contribution to overall building score	1.76%
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	N/A

Assessor comments/notes:

CUNDALL

ENERGY

Ene 01 Reduction of energy use and carbon emissions

No. of BREEAM credits available	12	Available contribution to overall score	7.83%
No. of BREEAM innovation credits available	5	Minimum standards applicable	Yes

Ene 01 Calculator

Country of the UK where the building is located	England	Confirm building regulation and version used:	England Part L2A 2013

New Construction (Fully fitted)

Building floor area	550	m2
Notional building heating and cooling energy demand	106.20	MJ/m2 yr
Actual building heating and cooling energy demand	100.30	MJ/m2 yr
Notional building primary energy consumption	124.00	kWh/m2 yr
Actual building primary energy consumption	112.40	kWh/m2 yr
Target emission rate (TER)	23.03	kgCO2/m2 yr
Building emission rate (BER)	16.77	kgCO2/m2 yr
Building emission rate improvement over TER	27.2%	
Heating & cooling demand energy performance ratio (EPR_{DEM})	0.113	
Primary consumption energy performance ratio (EPR_{PC})	0.187	
CO_2 Energy performance ratio (EPR_{CO2})	0.279	
Overall building energy performance ratio (EPR_{NC})	0.578	

Where specified, please confirm the energy production from onsite or near site energy generation technologies	
Equivalent % of the building's 'regulated' energy consumption generated by carbon neutral sources and used to meet energy demand from 'unregulated' building systems or processes?	
Is the building designed to be 'carbon negative' ?	
If the building is defined as 'carbon negative' what is the total (modelled) renewable/carbon neutral energy generated and exported?	

Total BREEAM credits achieved	7
Total contribution to overall building score	4.57%
Total BREEAM innovation credits achieved	0
Minimum standard(s) level	Excellent level

Assessor comments/notes:

Ene 02 Energy monitoring

No. of BREEAM credits available	2	Available contribution to overall score	1.30%
No. of BREEAM innovation credits available	0	Minimum standards applicable	Yes

Assessment criteria	Compliant?	Credits available	Credits achieved
Sub-metering of major energy consuming systems	Yes	1	1
Sub-metering of high energy load and tenancy areas	Yes	1	1

Total BREEAM credits achieved	2
Total contribution to overall building score	1.30%
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	Outstanding level

Assessor comments/notes:

Ene 03 External lighting

No. of BREEAM credits available	1	Available contribution to overall score	0.65%
No. of BREEAM innovation credits available	0	Minimum standards applicable	No

Assessment criteria	Compliant?	Credits available	Credits achieved
External lighting specification	Yes	1	1

Total BREEAM credits achieved	1
Total contribution to overall building score	0.65%
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	N/A

Assessor comments/notes:

Ene 04 Low carbon design

No. of BREEAM credits available	3	Available contribution to overall score	1.96%
No. of BREEAM innovation credits available	0	Minimum standards applicable	No

Assessment criteria	Compliant?	Credits available	Credits achieved
Passive design analysis	Yes	1	1
Free cooling	No	1	0
Low and zero carbon technologies	Yes	1	1

KPI - Low and/or zero carbon energy generation

Total on-site and/or near-site LZC energy generation		kWh/yr

Total BREEAM credits achieved	2
Total contribution to overall building score	1.30%
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	N/A

Assessor comments/notes:

Ene 05 Energy efficient cold storage

Assessment issue not applicable

No. of BREEAM credits available	N/A	Available contribution to overall score	N/A
No. of BREEAM innovation credits available	N/A	Minimum standards applicable	N/A

Assessment criteria	Compliant?	Credits available	Credits achieved
Refrigeration energy consumption	No	N/A	N/A
Indirect greenhouse gas emissions	No	N/A	N/A

Total BREEAM credits achieved	N/A
Total contribution to overall building score	N/A
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	N/A

Assessor comments/notes:

Ene 06 Energy efficient transportation systems

No. of BREEAM credits available	3	Available contribution to overall score	1.96%
No. of BREEAM innovation credits available	0	Minimum standards applicable	N/A

Assessment criteria	Compliant?	Credits available	Credits achieved
Energy consumption	Yes	1	1
Energy efficient features	Yes	2	2

Total BREEAM credits achieved	3
Total contribution to overall building score	1.96%
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	N/A

Assessor comments/notes:

Ene 07 Energy efficient laboratory systems

Assessment issue not applicable

No. of BREEAM credits available	N/A	Available contribution to overall score	N/A
No. of BREEAM innovation credits available	N/A	Minimum standards applicable	N/A

Assessment criteria	Compliant?	Credits available	Credits achieved
Pre-requisite: Criterion 1 of Hea 03 - risk assessment of laboratory facilities			
Design specification			
Best Practice Energy Practices in Laboratories (table 27)			
Item b) Fan power			
Item c) Fume cupboard volume flow rates			
Item d) Grouping / isolation of high filtration/ventilation activities			
Item e) Energy recovery - heat			
Item f) Energy recovery - cooling			
Item g) Grouping of cooling loads			
Item h) Free cooling			
Item i) Load responsiveness			
Item j) Cleanrooms			
Item k) Diversity			
Item l) Room air-change rates			

Total BREEAM credits achieved	N/A
Total contribution to overall building score	N/A
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	N/A

Assessor comments/notes:

CUNDALL

Ene 08 Energy efficient equipment

No. of BREEAM credits available	2	Available contribution to overall score	1.30%
No. of BREEAM innovation credits available	0	Minimum standards applicable	No

Assessment criteria	Present?	Major impact
Ref A Small power and plug in equipment	No	
Ref B Swimming pool	No	
Ref C Communal laundry	No	
Ref D Data centre	No	
Ref E IT-intensive operation areas	No	
Ref F Residential areas	No	
Ref G Healthcare	No	
Ref H Kitchen and catering facilities	No	

	Compliant	Credits available	Credits achieved
Significant majority contributors BREEAM compliant	No	2	0

Total BREEAM credits achieved	0
Total contribution to overall building score	0.00%
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	N/A

Assessor comments/notes:

Ene 09 Drying space

Assessment issue not applicable

No. of BREEAM credits available	N/A	Available contribution to overall score	N/A
No. of BREEAM innovation credits available	N/A	Minimum standards applicable	N/A

Assessment criteria	Compliant?	Credits available	Credits achieved
Residential internal/external drying space and fixings			

Total BREEAM credits achieved	N/A
Total contribution to overall building score	N/A
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	N/A

Assessor comments/notes:

TRANSPORT

Tra 01 Public Transport Accessibility

No. of BREEAM credits available	3	Available contribution to overall score	3.00%
No. of BREEAM innovation credits available	0	Minimum standards applicable	No

Building type category (for purpose of Tra01 issue assessment)	Business (office/industrial)

Assessment Criteria	Compliant	Credits available	Credits achieved
Public transport accessibility index	8.00	3	3
Building dedicated bus service			N/A

Total BREEAM credits achieved	3
Total contribution to overall building score	3.00%
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	N/A

Assessor comments/notes:

Tra 02 Proximity to Amenities

No. of BREEAM credits available	1	Available contribution to overall score	1.00%
No. of BREEAM innovation credits available	0	Minimum standards applicable	No

Assessment Criteria	Compliant?	Credits available	Credits achieved
Close proximity and accessible to applicable amenities	Yes	1	1

Total BREEAM credits achieved	1
Total contribution to overall building score	1.00%
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	N/A

Assessor comments/notes:

CUNDALL

Tra 03 Cyclist facilities

No. of BREEAM credits available	2	Available contribution to overall score	2.00%
No. of BREEAM innovation credits available	0	Minimum standards applicable	No

Building type category (for purpose of Tra03 issue assessment)	Business - (office/Industrial)
Number of compliant cycle storage spaces provided	7
Cyclist facilities provided	Showers and changing facilities

Assessment Criteria	Compliant?	Credits available	Credits achieved
Cycle storage spaces	Yes	2	2
Cyclist facilities	Yes		

Total BREEAM credits achieved	2
Total contribution to overall building score	2.00%
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	N/A

Assessor comments/notes:

Tra 04 Maximum Car Parking Capacity

No. of BREEAM credits available	2	Available contribution to overall score	2.00%
No. of BREEAM innovation credits available	0	Minimum standards applicable	No

Building type category (for purpose of Tra04 issue)	Business - (office/Industrial)
Buildings Accessibility Index (sourced from issue Tra01)	8

Assessment Criteria	Compliant?	Credits available	Credits achieved
Maximum parking capacity	Yes	2	2

Total BREEAM credits achieved	2
Total contribution to overall building score	2.00%
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	N/A

Assessor comments/notes:

Tra 05 Travel Plan

No. of BREEAM credits available	1	Available contribution to overall score	1.00%
No. of BREEAM innovation credits available	0	Minimum standards applicable	No

Assessment Criteria	Compliant?	Credits available	Credits achieved
Transport plan based on site specific travel survey/assessment	Yes	1	1

Total BREEAM credits achieved	1
Total contribution to overall building score	1.00%
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	N/A

Assessor comments/notes:

WATER

Wat 01 Water Consumption

No. of BREEAM credits available	5	Available contribution to overall score	4.38%
No. of BREEAM innovation credits available	1	Minimum standards applicable	Yes

Please select the calculation procedure used	Standard approach

Standard approach data

Water Consumption from building micro-components		L/person/day
Water demand met via greywater/rainwater sources		L/person/day
Total net water consumption		L/person/day
Improvement on baseline performance	40.00%	%

Key Performance Indicator - use of freshwater resource

Total net Water Consumption		m3/person/yr
Default building occupancy		

Alternative approach data

Overall microcomponent performance level achieved	

Total BREEAM credits achieved	3
Total contribution to overall building score	2.63%
Total BREEAM innovation credits achieved	0
Minimum standard(s) level	Outstanding level

Assessor comments/notes:

Wat 02 Water Monitoring

No. of BREEAM credits available	1	Available contribution to overall score	0.88%
No. of BREEAM innovation credits available	0	Minimum standards applicable	Yes

Assessment Criteria	Compliant?	Credits available	Credits achieved
Water meter on the mains water supply to the building(s)	Yes	1	1
Metering/monitoring equipment on supply to plant/building areas	Yes		
Pulsed output or other open protocol communication output	Yes		
Existing BMS connection	N/A		

Total BREEAM credits achieved	1
Total contribution to overall building score	0.88%
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	Outstanding level

Assessor comments/notes:

Wat 03 Water Leak Detection and Prevention

No. of BREEAM credits available	2	Available contribution to overall score	1.75%
No. of BREEAM innovation credits available	0	Minimum standards applicable	No

Assessment Criteria	Compliant?	Credits available	Credits achieved
Leak detection on building's mains water supply	Yes	1	1
Flow control device to each sanitary area/facility	Yes	1	1

Total BREEAM credits achieved	2
Total contribution to overall building score	1.75%
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	N/A

Assessor comments/notes:

Wat 04 Water Efficient Equipment

Assessment issue not applicable

No. of BREEAM credits available	N/A	Available contribution to overall score	N/A
No. of BREEAM innovation credits available	N/A	Minimum standards applicable	N/A

Assessment Criteria	Compliant?	Credits available	Credits achieved
Has a meaningful reduction in unregulated water demand been achieved?			

Total BREEAM credits achieved	N/A
Total contribution to overall building score	N/A
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	N/A

Assessor comments/notes:

MATERIALS

Mat 01 Life Cycle Impacts

No. of BREEAM credits available	5	Available contribution to overall score	5.19%
No. of BREEAM innovation credits available	3	Minimum standards applicable	No

Assessment Criteria

Total Mat01 credits achieved	
Total Mat01 points achieved	
Number of building elements assessed	
Exemplary level compliant?	
Has IMPACT compliant software been used?	

Key Performance Indicator - embodied green house gas emissions by element	Total area of element m^2	Total impact $kgCO_2$ eq.	Area of element impact data relevant to m^2
External walls			
Windows			
Roof			
Upper floor construction			
Internal wall			
Floor finishes/coverings			

Key Performance Indicator - embodied green house gas emissions for building (assessed elements only)

Total embodied green house gas emissions for building (by assessed elements)	Missing data	$kgCO_2$ eq.		$kgCO_2$ eq./m^2
Proportion of applicable building elements that data reported covers				

Total BREEAM credits achieved	0
Total contribution to overall building score	0.00%
Total BREEAM innovation credits achieved	0
Minimum standard(s) level	N/A

Assessor comments/notes:

Mat 02 Hard Landscaping and Boundary Protection

No. of BREEAM credits available	1	Available contribution to overall score	1.04%
No. of BREEAM innovation credits available	0	Minimum standards applicable	No

Assessment Criteria	Compliant?	Credits available	Credits achieved
External hard landscaping and boundary protection	Yes	1	1

Total BREEAM credits achieved	1
Total contribution to overall building score	1.04%
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	N/A

Assessor comments/notes:

Mat 03 Responsible Sourcing

No. of BREEAM credits available	4	Available contribution to overall score	4.15%
No. of BREEAM innovation credits available	1	Minimum standards applicable	Yes

Assessment Criteria	Compliant	Credits available	Credits achieved
All timber and timber based products are 'Legally harvested and trader timber'	Yes		
Is there a documented sustainable procurement plan	Yes	1	1
Percentage of available responsible sourcing of materials points achieved	0.00%	3	0
Please confirm the route used to assess Mat03	Route 3: Combination of routes		

Total BREEAM credits achieved	1
Total contribution to overall building score	1.04%
Total BREEAM innovation credits achieved	0
Minimum standard(s) level	Outstanding level

Assessor comments/notes:

Mat 04 Insulation

No. of BREEAM credits available	1	Available contribution to overall score	1.04%
No. of BREEAM innovation credits available	0	Minimum standards applicable	No

Assessment Criteria		Credits available	Credits achieved
Embodied impact - insulation index	3.00	1	1

Total BREEAM credits achieved	1
Total contribution to overall building score	1.04%
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	N/A

Assessor comments/notes:

Mat 05 Designing for durability and resilience

No. of BREEAM credits available	1	Available contribution to overall score	1.04%
No. of BREEAM innovation credits available	0	Minimum standards applicable	N/A

Assessment Criteria	Compliant?	Credits available	Credits achieved
Protecting vulnerable parts of the building from damage	Yes	1	1
Protecting exposed parts of the building from material degradation	Yes		

Total BREEAM credits achieved	1
Total contribution to overall building score	1.04%
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	N/A

Assessor comments/notes:

Mat 06 Material efficiency

No. of BREEAM credits available	1	Available contribution to overall score	1.04%
No. of BREEAM innovation credits available	0	Minimum standards applicable	No

Assessment Criteria	Compliant?	Credits available	Credits achieved
Material optimisation measures investigated and implemented at relevant stages	Yes	1	1

Total BREEAM credits achieved	1
Total contribution to overall building score	1.04%
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	N/A

Assessor comments/notes:

CUNDALL

WASTE

Wst 01 Construction Waste Management

No. of BREEAM credits available	4	Available contribution to overall score	3.78%
No. of BREEAM innovation credits available	1	Minimum standards applicable	Yes

Assessment Criteria	Compliant?
Construction resource management plan	Yes
Compliant Pre-demolition audit	Yes
Does the excavation waste meet the exemplary level requirements?	No

Key Performance Indicators - Construction Waste

Measure/units for the data being reported	volume		
Non-hazardous construction waste (excluding demolition/excavation)	3.00	m3/100m2	Note: If data not available then insert
Total non-hazardous construction waste generated	16.50	m3	Note: At the design stage of assessme
Non-hazardous non-demolition const. waste diverted from landfill	30.00%	%	Note: At the design stage this will be a
Total non-hazardous non-demolition const. waste diverted from landfill	4.95	m3	Note: At the design stage of assessme
Total non-hazardous demolition waste generated		m3	Note: At the design stage this will be a
Non-hazardous demolition waste diverted from landfill		%	Note: At the design stage this will be a
Total non-hazardous demolition waste to disposal	INA	m3	Note: At the design stage of assessme
Material for reuse		m3	Note: At the design stage this will be a
Material for recycling		m3	Note: At the design stage this will be a
Material for energy recovery		m3	Note: At the design stage this will be a
Hazardous waste to disposal		m3	Note: At the design stage this will be a

Total BREEAM credits achieved	3
Total contribution to overall building score	2.83%
Total BREEAM innovation credits achieved	0
Minimum standard(s) level	Outstanding level

Assessor comments/notes:

Wst 02 Recycled Aggregates

No. of BREEAM credits available	1	Available contribution to overall score	0.94%
No. of BREEAM innovation credits available	1	Minimum standards applicable	No

Assessment Criteria	Total
Total % of high-grade aggregate that is recycled/secondary aggregate	0%

% of high-grade aggregate that is recycled/secondary aggregate - by application

Structural frame	
Bitumen/hydraulically bound base, binder and surface courses	
Building foundations	
Concrete road surfaces	
Pipe bedding	
Granular fill and capping	

Total BREEAM credits achieved	0
Total contribution to overall building score	0.00%
Total BREEAM innovation credits achieved	0
Minimum standard(s) level	N/A

Assessor comments/notes:

Wst 03 Operational Waste

No. of BREEAM credits available	1	Available contribution to overall score	0.94%
No. of BREEAM innovation credits available	0	Minimum standards applicable	Yes

Assessment Criteria	Compliant?	Credits available	Credits achieved
Segregation and storage of operational recyclable waste volumes	Yes	1	1
Static waste compactor(s) or baler(s)	N/A		
Vessel(s) for composting suitable organic waste	N/A		

Total BREEAM credits achieved	1
Total contribution to overall building score	0.94%
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	Outstanding level

Assessor comments/notes:

Wst 04 Speculative Floor and Ceiling Finishes

No. of BREEAM credits available	1	Available contribution to overall score	0.94%
No. of BREEAM innovation credits available	0	Minimum standards applicable	No

Assessment Criteria	Compliant?	Credits available	Credits achieved
Speculative floor and ceiling finishes are installed in a show area only	Yes	1	1

Total BREEAM credits achieved	1
Total contribution to overall building score	0.94%
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	N/A

Assessor comments/notes:

Wst 05 Adaption to climate change

No. of BREEAM credits available	1	Available contribution to overall score	0.94%
No. of BREEAM innovation credits available	1	Minimum standards applicable	N/A

Assessment Criteria	Compliant?	Credits available	Credits achieved
Adaption to climate change - structural and fabric resilience	Yes	1	1
Exemplary level - responding to adaptation to climate change	Yes	1	1

Total BREEAM credits achieved	1
Total contribution to overall building score	0.94%
Total BREEAM innovation credits achieved	1
Minimum standard(s) level	N/A

Assessor comments/notes:

Wst 06 Functional adaptability

No. of BREEAM credits available	1	Available contribution to overall score	0.94%
No. of BREEAM innovation credits available	0	Minimum standards applicable	N/A

Assessment Criteria	Compliant?	Credits available	Credits achieved
Functional adaptability	Yes	1	1

Total BREEAM credits achieved	1
Total contribution to overall building score	0.94%
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	N/A

Assessor comments/notes:

LAND USE & ECOLOGY

LE 01 Site Selection

No. of BREEAM credits available	2	Available contribution to overall score	2.00%
No. of BREEAM innovation credits available	0	Minimum standards applicable	No

Assessment Criteria	Compliant?	Credits available	Credits achieved
Previously occupied land	Yes	1	1
Contaminated land	No	1	0

Total BREEAM credits achieved	1
Total contribution to overall building score	1.00%
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	N/A

Assessor comments/notes:

CUNDALL

LE 02 Ecological Value of Site and Protection of Ecological Features

No. of BREEAM credits available	2	Available contribution to overall score	2.00%
No. of BREEAM innovation credits available	0	Minimum standards applicable	No

Ecological value of the land defined using	A Suitably Qualified Ecologist

Assessment Criteria	Compliant?	Credits available	Credits achieved
Land of low ecological value	Yes	1	1
Protection of ecological features	Yes	1	1

Total BREEAM credits achieved	2
Total contribution to overall building score	2.00%
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	N/A

Assessor comments/notes:

LE 03 Mitigating Ecological Impact

No. of BREEAM credits available	2	Available contribution to overall score	2.00%
No. of BREEAM innovation credits available	0	Minimum standards applicable	Yes

Data sourced for calculating the change in ecological value from	Suitably Qualified Ecologist site survey of plant species

Assessment Criteria

Change in ecological value	0.00	Plant species richness

Total BREEAM credits achieved	2
Total contribution to overall building score	2.00%
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	Outstanding level

Assessor comments/notes:

LE 04 Enhancing Site Ecology

No. of BREEAM credits available	2	Available contribution to overall score	2.00%
No. of BREEAM innovation credits available	0	Minimum standards applicable	No

Assessment Criteria	Compliant?	Credits available	Credits achieved	
Suitably Qualified Ecologist appointment (SQE)	Yes	2	2	
Ecologist's report and recommendations	Yes			
Increase in ecological value	6			Plant species richness

Total BREEAM credits achieved	2
Total contribution to overall building score	2.00%
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	N/A

Assessor comments/notes:

LE 05 Long Term Impact on Biodiversity

No. of BREEAM credits available	2	Available contribution to overall score	2.00%
No. of BREEAM innovation credits available	0	Minimum standards applicable	No

Assessment Criteria	Compliant?	Credits available	Credits achieved
Suitably qualified ecologist (SQE) appointed	Yes	2	2
Landscape and habitat management plan	Yes		
Number of applicable measures	1		
Number of applicable measures implemented	1		

Total BREEAM credits achieved	2
Total contribution to overall building score	2.00%
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	N/A

Assessor comments/notes:

CUNDALL

POLLUTION

Pol 01 Impact of Refrigerants

No. of BREEAM credits available	3	Available contribution to overall score	2.31%
No. of BREEAM innovation credits available	0	Minimum standards applicable	No

Assessment Criteria		Credits available	Credits achieved
Refrigerant containing systems installed in the assessed building?	Yes	2	2
BS EN 378:2008 and IoR Ammonia Refrigeration Systems CoP (where applicable)?	Yes		
Global Warming Potential of the specified refrigerant(s) 10 or less?	Yes		
Total Direct Effect Life Cycle CO_2eq. emissions from the system		kgCO2eq/kW coolth capacity	
Cooling/Heating capacity of the system		kW	
BREEAM compliant refrigerant leak detection and containment	No	1	0

Total BREEAM credits achieved	2
Total contribution to overall building score	1.54%
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	N/A

Assessor comments/notes:

Pol 02 NO_x Emissions

No. of BREEAM credits available	3	Available contribution to overall score	2.31%
No. of BREEAM innovation credits available	0	Minimum standards applicable	No

Assessment Criteria

NO_x emission level - space heating	10.00	mg/kWh
NO_x emission level - cooling	10.00	mg/kWh
NOx emission level - water heating	10.00	mg/kWh
Does this building meet BREEAM's definition of a highly insulated building?	N/A	
Energy consumption: heating and hot water		kWh/m2 yr

Total BREEAM credits achieved	3
Total contribution to overall building score	2.31%
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	N/A

Assessor comments/notes:

Pol 03 Surface Water Run off

No. of BREEAM credits available	5	Available contribution to overall score	3.85%
No. of BREEAM innovation credits available	0	Minimum standards applicable	No

Assessment Criteria	Compliant?	Credits available	Credits achieved
Annual probability of flooding	Low	2	2
Flood Risk Assessment	Yes		
Surface water run off – peak rate	No	1	0
Surface water run off – volume, attenuation and/or limiting discharge	No	1	0
Minimising watercourse pollution	No	1	0

Total BREEAM credits achieved	2
Total contribution to overall building score	1.54%
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	N/A

Assessor comments/notes:

Pol 04 Reduction of Night Time Light Pollution

No. of BREEAM credits available	1	Available contribution to overall score	0.77%
No. of BREEAM innovation credits available	0	Minimum standards applicable	No

Assessment Criteria	Compliant?	Credits available	Credits achieved
External lighting specification	Yes	1	1

Total BREEAM credits achieved	1
Total contribution to overall building score	0.77%
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	N/A

Assessor comments/notes:

Pol 05 Noise Attenuation

No. of BREEAM credits available	1	Available contribution to overall score	0.77%
No. of BREEAM innovation credits available	0	Minimum standards applicable	No

Assessment Criteria	Compliant	Credits available	Credits achieved
Noise-sensitive areas/buildings within 800m radius of the development	Yes	1	1
Noise impact assessment and, if applicable, noise attenuation measures	Yes		

Total BREEAM credits achieved	1
Total contribution to overall building score	0.77%
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	N/A

Assessor comments/notes:

INNOVATION

Inn 01 Innovation

No. of BREEAM innovation credits available	10	Available contribution to overall score	10.00%
		Minimum standards applicable	No

Assessment Criteria	Compliant?	Credits available	Credits achieved
Man 03 Responsible construction practices	No	1	0
Man 05 Aftercare	No	1	0
Hea 01 Visual Comfort	No	1	0
Hea 02 Indoor Air Quality	No	2	0
Ene 01 Reduction of energy use and carbon emissions	No	5	0
Wat 01 Water Consumption	No	1	0
Mat01 Life Cycle Impacts	No	3	0
Mat03 Responsible Sourcing of Materials	No	1	0
Wst01 Construction Waste Management	No	1	0
Wst02 Recycled Aggregates	No	1	0
Wst 05 Adaption to climate change	Yes	1	1

Number of 'approved' innovation credits achieved?	

Total BREEAM innovation credits achieved	1
Total contribution to overall building score	1.00%
Minimum standard(s) level	N/A

Assessor comments/notes: