Environmental Sustainability Plan

Zone A Building

King's Cross Central General Partner Ltd and Google UK Limited

May 2017

King's Cross

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1 Introduction

Mott MacDonald has been instructed to produce an Environmental Sustainability Plan to accompany the Reserved Matters Submission for the proposed Zone A Building occupying the whole of Development Zone A within the King's Cross Central (KXC) development site in North London. This Environmental Sustainability Plan describes the strategies that have been incorporated in the design of the proposed building in response to the conditions of the Outline Planning Permission granted on the 22nd of December 2006 (ref. 2004/2307/P).

In particular, this document provides information in response to planning conditions 17, 45 and 48 of the aforementioned planning permission, providing details of the strategies included in the design proposals with a view to achieve a very high standard of sustainability. Furthermore, it details how relevant obligations included within sections AA, Y and Z of the S106 Agreement will be met.

This Environmental Sustainability Plan is to be read in conjunction with and in the context of all the other documents accompanying the planning application submission for the proposed Zone A Building, including the Urban Design Report (UDR) and the Planning Compliance Report. This Plan also includes the BREEAM and LEED pre-assessments undertaken for the development. These are addressed in Section 3.5 herein and further details are given in Appendix B, C and D.

2 Executive Summary

The Zone A Building is located in the southern part of the main site of the King's Cross Central (KXC) development site. King's Cross Central (KXC) is an area to the north of King's Cross and St. Pancras Stations, which has been redeveloped over the last decade as a mixed use urban neighbourhood.

The Zone A Building occupies a prominent location in the southern half of the KXC development site. It is wedged between King's Cross Station and its railway track, to the east, and the King's Boulevard, to the west. The German Gym, the Stanley Building, and Buildings B2, B4 and B6, all of which have been approved and are now occupied, line the western side of the King's Boulevard. The Eastern Goods Yard ('EGY'), which includes the Granary Building and Granary Square, lie to the north of the Regent's Canal and Goods Way.

The proposed Zone A Building comprises a single, predominantly office building of 7 to 11 storeys, above retail uses at ground floor and two levels of basement. The office use will include ancillary uses for 4,500 members of staff and their visitors, including cafes, gym and pool facilities, a covered multi-use games area (MUGA), an events centre and staff training facilities. At roof level, landscaped terraces and a walking 'Trim Track' will provide outdoor amenity and recreation space for employees. The existing access ramp will provide service access to the basement areas, as well as to the existing Shared Service Yard. The Zone A Building will provide accommodation for Google UK Ltd's UK Headquarters, with a mix of different retailers at ground floor.

The proposed building will provide a total floorspace of 80,819 m² (GEA), excluding basement. Of this, 76,137 m² will be office space, and 4,376 m² will be retail space. The basement floorspace, which is spread across two levels, will equal 11,054 m².

The project team for Zone A has worked closely with the Applicants, King's Cross Central General Partners Ltd. (KCCGPL) and the prospective occupier, Google UK Ltd, to realise a very high standard of sustainability and a high-quality environment for its staff and visitors. The approach taken for every aspect of the proposed building's design includes passive and active measures to maximise the building's sustainability.

As a new commercial development, the Zone A Building will be subject to the requirements of Schedule 1 of the Building Regulations. In particular, all envelope, fittings, HVAC and lighting equipment will need to show compliance with *Part L: Conservation of Fuel and Power* of Schedule 1. Approved Document Part L2A, 2013 edition incorporating 2016 amendments will be used as reference to meet these requirements. This document is referred to as Part L 2013 throughout this document.

The combination of passive design and very energy efficient measures and the sourcing of heat and power from the low-carbon district energy system result in a very high overall annual carbon reduction of 22.0% compared to the prevailing Building Regulations (Part L 2013) baseline.

Other key environmental sustainability measures include grey water recycling, rainwater attenuation and reuse via a blue roof system, low flow water fittings, greenery and amenity rooftop facilities for staff, thorough energy and water metering and monitoring and use of materials with a low environmental impact.

The building has already been registered and will be assessed under the BREEAM (Building Research Establishment Environmental Assessment Method) 2014 New Construction scheme. Furthermore, even though not required under the Outline Planning Permission, the project has also been registered and will be assessed against LEED (Leadership in Energy and Environmental Design) v4, an internationally recognised certification programme for green buildings. The project team is committed to achieving BREEAM and LEED ratings of 'Excellent' and 'Gold' respectively, but with an aspiration to achieve higher 'Outstanding' and 'Platinum' ratings.

The main environmental and sustainability measures that are proposed are summarised below.

2.1 Condition 17(A): Energy efficiency measures

Passive Design

- Heat losses are limited across the building via a compact building form.
- Glazing specification has been selected in line with solar exposure analysis and dynamic thermal simulation, in order to provide adequate levels of solar control (low g-value) and visible light transmittance (VLT). This strategy is expected to reduce cooling, heating and artificial lighting demands.
- Solar heat gains are reduced in summer via appropriate shading measures (overhangs, vertical solid timber fins and internal shading incorporating a two-blind system). This strategy is also expected to reduce glare discomfort while maintaining high levels of internal daylight.
- Bespoke construction details are designed to reduce the risk of uncontrolled infiltration.
- Heat losses are reduced due to thermal bridges by developing bespoke construction details for critical element junctions.

- The ceilings of the building will feature an exposed concrete soffit ceiling that can act as thermal mass helping stabilising the internal temperatures by flattening daily cooling load peaks.
- The specification of the envelope ensures compliance with the prevailing Building Regulations (Part L 2013) for new non-domestic buildings. The U-values adopted at this early design stage meet or exceed the minimum Part L 2013 requirements.
- Green roofs are incorporated as a means to achieve the targeted U-values and help reduce the urban heat island effect.

Active Design

- Energy efficient lighting will be installed throughout the building. The majority of internal light fittings will be energy efficient light-emitting diode (LED) with advanced demand-led controls (daylight dimming sensors to utilise natural daylight, occupancy sensors, time control option for all internal and external lighting).
- Air distribution system will meet high levels of airtightness and fan power efficiency.
- Highly efficient supply and extract fans and pumps with variable speed motors with multiple pressure sensors will be specified.
- Separate accessible energy sub-meters will be installed to facilitate the monitoring of substantial energy uses and high energy demand areas within the building.
- A building management system (BMS) will be installed to monitor and control the building services, thus minimising energy-inefficient operation
- The mechanical ventilation strategy will allow high levels of heat recovery from the exhaust air to be used to heat the supply air, thus dramatically minimising the need for additional heating in winter. Ventilation will be provided from centralised dedicated air handling units (AHU) utilising a thermal wheel to reclaim heat and coolth from the exhaust air that would otherwise be lost to atmosphere.
- The AHUs can be used in free cooling mode when the external conditions are adequate.
- Demand control ventilation based on CO₂ and occupancy sensing. The ventilation system will be provided with damper controls based on gas sensors.
- Space heating and domestic hot water (DHW) will be provided from the local King's Cross District Heating Network.
- Space cooling will be provided from energy efficient water cooled chillers.
- Energy-efficient lifts will be installed to reduce transport-related energy consumption.

2.2 Condition 17(B): Reduction in carbon emissions

- Through the building design and technology energy efficiency measures the building is able to reduce the annual regulated CO₂ emissions by 129.3tCO₂/year, which equates to 6.1% carbon savings compared to the emissions permitted under the prevailing Building Regulations (Part L 2013). This complies with the requirements set by Obligations 6 and 7 of Section X of the S106 Agreement (at least 5% lower than Part L of the prevailing Building Regulations, using good passive design and energy efficiency measures only)
- Carbon savings achieved through the building design and technology energy efficiency measures along with the incorporation of a photovoltaic array with an output of 19,800 kWh annually on the roof (disregarding the carbon savings that will be achieved by utilising the low carbon local district energy system) are 6.5% compared to the prevailing Building Regulations (Part L 2013) baseline.

2.3 Condition 17(C): Provision of green and/or brown roofs

- Although Development Zone A has not been identified as a priority zone for green and/or brown roofs on Parameter Plan KXC 021 of the Outline Planning Permission, accessible landscaped areas for staff and visitors are proposed at roof level.
- The landscaped terraces cover an area of 9,492 m² with a balance of 60% hard landscape and 40% soft landscape. The soft area on the roof is approximately 3,779m² which includes lawn and wildflower planting.
- The roof landscape design includes four main character areas/levels. The potential to enhance biodiversity and attract wildlife has been considered and incorporated in the design.

2.4 Condition 17(D): Energy supply

- The connection to the low-carbon district energy supply system will allow the Zone A Building to take advantage of the low-carbon benefits associated with combined heat and power. The district energy system will meet all of the heating and hot water demand for the office building. Heating, cooling and domestic hot water for each retail unit will be provided by the tenant.
- The combined heat and power (CHP) engines within the Energy Centre will also generate electrical power, which will offset a significant percentage of the building's demand.
- The Energy Centre will include: 3No. 1.8MW_{th} gas fired CHP, a thermal store integral to the CHP operating hours strategy and 3No. 9MW_{th} gas boilers.
- The use of a low-carbon energy supply and the building design and technology energy efficiency measures as described under Section 3.1 herein result in the Zone A Building achieving an overall reduction in CO₂ emissions of 21.5% against the Part L 2013 TER.
- A photovoltaic array with an output of 19,800 kWh annually is proposed on the roof, contributing to a further 0.5% carbon reductions against Part L 2013.
- In total, the proposed design achieves 22.0% carbon savings compared to the prevailing Building Regulations (Part L 2013) baseline.

2.5 Condition 17(E): BREEAM rating

- The proposed KXC Zone A development has been registered and will be assessed under the BREEAM New Construction 2014 scheme.
- The proposed Zone A Building should go beyond planning requirements set out by Condition 17(E) (at least a 'Very Good' rating), targeting a rating of 'Excellent' for the general office areas, with an aspirational rating of 'Outstanding' to be achieved upon completion, and 'Very Good' for the retail 'Shell-only' parts of the building.
- The pre-assessment undertaken by the BREEAM assessor indicates a current predicted score of 86.64% (i.e. an 'Outstanding' rating) for the general office areas and 63.9% (i.e. a 'Very good' rating) for the retail 'Shell-only' areas.
- Although LEED is not referred to in Condition 17(E), Google UK Limited has requested that the KXC Zone A Building is tested against these additional standards, in line with their corporate standards, with a view to achieving the highest possible rating (i.e. 'Platinum').
- The KXC Zone A development has also been registered and will be assessed under the LEED v4 for Building Design and Construction (LEED v4 BD-C) scheme.
- The initial pre-assessment undertaken by the appropriate consultant indicated a predicted score of 62 points, equivalent to a 'Gold' rating, with the aspirational highest rating of 'Platinum' to be achieved on completion.

2.6 Condition 17(F): Wildlife features

- Proposals for vegetated areas at roof level are expected to enhance the ecological value of the site, providing new habitats that will have the potential to attract wildlife.
- The soft area on the roof is approximately 3,779m² which includes lawn and wildflower planting.
- The Plateau level of the roof landscape proposals has been designed with a view to enhance biodiversity, with the use of meadows, woodland floor planting and points of rainwater collection to attract wildlife, such as insects and birds, and the installation of beehives.
- A wide band of trees and tall shrubs will line the western edge protecting wildlife and people from dominant south-west winds.
- Further advice will be sought from a qualified ecologist regarding bird and bat species that are present in the area and potential proposals for suitable type of boxes to be installed on site.

2.7 Condition 45: Drainage

- The peak water discharge flows for the Zone A development are 632l/s and 33.1/s for surface water and foul water respectively.
- The drainage networks have been designed on SUDS principles providing an overall peak flow reduction of 10% (based on a 1 in 30-year storm).
- The drainage infrastructure of the Zone A development has been designed so that the permissible discharges set out in the Outline Planning Permission are not exceeded.

2.8 S106 – Section AA: Water

- High standards of water efficiency are targeted through the specification of efficient water consuming components, such as low flow dual flush WCs, and the inclusion of a greywater system.
- Consumption is expected to be reduced by 60% against typical water consumption and result in all available credits being achieved under the relevant BREEAM category.
- Specification of a greywater recycling system is included in the proposals to offset nonpotable water uses by serving the WC flushing.
- A blue roof system is proposed for rainwater collection and reuse for irrigation at the point of collection. The efficient irrigation system in conjunction with the selection of native/adapted vegetation is expected to reduce potable water use for external landscaping by 50%.
- The blue roof system will also retain water at the roof level, acting as a stormwater attenuation measure. The blue roof system will help mitigate flood risk on-site.

2.9 S106 – Section Y: Construction materials and waste

Under BREEAM, the project is targeting two credits for construction resource efficiency, which means that the appointed principal contractor must achieve a benchmark of 6.5 tonnes or less of waste generated per 100 m² (gross internal floor area).

A target for the diversion of waste from landfill has also been set in line with the BREEAM requirements, which is at least 80% (by tonnes) of non-hazardous construction waste is diverted from landfill.

2.10 S106 – Section Z: Waste

BREEAM criteria recommend that based upon the size of the development, at least 20m2 of floor area should be dedicated to the storage of operational recyclable waste volumes, in addition to any storage for general waste. Current plans indicate that the actual provision will exceed this target meaning that there will be more than sufficient capacity to store the development's operational waste volumes. There will be storage containers for multiple recyclable waste streams, including mixed paper, corrugated cardboard, glass, plastics, and metals, as required by the LEED criteria.

3 Response to Planning Conditions

3.1 Condition 17(A): Energy efficiency measures

"The Environmental Sustainability Plan shall explain how the proposed building design(s) realise(s) opportunities to include design and technology energy efficiency measures."

3.1.1 Overview

The Zone A Building has been designed with energy efficiency being one of the key drivers from the outset.

Whilst the offsetting of CO_2 emissions associated with the electrical energy, heating and hot water consumption of the building will be provided via the low-carbon district energy system, the project team recognises the need to reduce the energy demand and consumption of the Zone A Building when in use through the application of the following design methodologies:

- **Passive Design**: The use of the building form and structure (thermal mass) as well as highly efficient façade systems which have been designed in consideration of the orientation and sun angles in order to reduce cooling loads and artificial lighting energy demand.
- Active Design: The specification of energy efficient equipment (e.g. intelligent and energy efficient lighting systems, mechanical ventilation with heat recovery, variable speed pumping, etc.), all monitored and controlled by a Building Energy Management System (BEMS) to maximise energy efficient operation of the Zone A Building.

By embracing passive and active design measures, the Zone A Building will also be 'futureproofed' to ensure it is adaptable to climate change and the future operational needs of the tenant, and is capable of accommodating future low/zero carbon technologies.

3.1.2 Passive Design

3.1.2.1 Building form and context

The Zone A Building occupies a prominent location in the southern half of the KXC development site. It is wedged between King's Cross Station and its railway track, to the east, and the King's Boulevard, to the west. The German Gym, the Stanley Building, and Buildings B2, B4 and B6, all of which have been approved and are now occupied, line the western side of the King's Boulevard. The Eastern Goods Yard ('EGY'), which includes the Granary Building and Granary Square, lie to the north of the Regent's Canal and Goods Way.

The King's Cross railway lines are located at a lower level enabling the whole East elevation to benefit from solar heat gains during the heating season, daylight and external views. Buildings located on the opposite side of the King's Boulevard will block part of the incoming solar gains and daylight from the west, during the afternoons and evenings.

The adjacent buildings have been taken into consideration when designing the proposed building facade, maximising the incoming daylight and controlling solar gains in relation to the seasons (i.e. heating or cooling) and orientation.

The compact building form of the Zone A Building results in minimum exposed external envelope area, thereby limiting heat losses across the building.

3.1.2.2 Façade design and fabric specification

The shape of the plot creates two large glazed facades facing East and West. In order to minimise excessive solar gains in summer, the building design incorporates solar control glass and appropriate shading measures (overhangs, vertical solid timber fins and internal shading), resulting in reduced cooling loads in the summer, while maintaining a comfortable indoor environment.

The glazing specification has been selected for each façade orientation in line with solar exposure analysis and dynamic thermal simulation, in order to provide adequate levels of solar control (low g-value) and visible light transmittance (VLT). This strategy is expected to reduce cooling, heating and artificial lighting demands.

The solid vertical wooden panels have been placed in the façade at office levels, to reduce solar gains and glare discomfort. Internal shading is provided to further reduce potential glare into the office areas. A two-blind system has been designed to provide increased daylight to the space. A top down deployed blind will reduce the potential for glare from direct sunlight, whilst a bottom up blind, with greater transparency, will reduce glare from indirect sources, all the while maintaining high levels of internal daylight.

The above design measures have been incorporated to allow adequate daylight into the building, reducing the dependence on artificial lighting and providing clear views out.

Heat losses are mitigated with the specification of triple glazed panels in the main office areas of the building and double glazing for the roof-top amenity spaces. The roof and external walls feature highly efficient thermal insulation, whilst green roofs are provided to achieve the targeted U-values and help reduce the urban heat island effect. The specification of the envelope ensures compliance with the prevailing Building Regulations (Part L 2013) for new non-domestic buildings. The U-values adopted at this early design stage meet or exceed the minimum Part L2A 2013 requirements (Table 1).

Bespoke construction details will be designed to reduce the risk of uncontrolled infiltration and achieve a design air permeability of 3m³/hr/m² @ 50Pa. Additionally, heat losses from thermal bridges will be reduced by developing bespoke construction details for critical element junctions.

Figure 1: 3D thermal model (IES VE 2015)



Source: Atelier Ten

Building	Part L2A limiting	Proposed	Window	Window light
Envelope	U-values	U-values	g-values	transmittance
External wall	0.35 W/(m ² .K)	0.25 W/(m ² .K)		
Basement wall	0.25 W/(m ² .K)	0.25 W/(m ² .K) ¹		
Roof	0.25 W/(m ² .K)	0.25 W/(m ² .K)		
Ground floor	0.25 W/(m ² .K)	0.25 W/(m ² .K)		
Basement floor	0.25 W/(m ² .K)	0.25 W/(m ² .K) ²		
Opaque curtain wall elements	2.20 W/(m ² .K)	1.20 W/(m ² .K) ³		
Window office	2.20 W/(m ² .K)	1.20 W/(m ² .K)	0.24	0.45
Window amenity	2.20 W/(m ² .K)	1.60 W/(m ² .K)	0.28	0.55
Window ground floor (East)	2.20 W/(m ² .K)	1.20 W/(m ² .K)	0.18	0.40
Window ground floor (North/West/South)	2.20 W/(m ² .K)	1.20 W/(m ² .K)	0.38	0.70
Window retail	2.20 W/(m ² .K)	1.60 W/(m ² .K)	0.38	0.70
Source: Atelier Ten				

Table 1: Limiting Part L 2013 and proposed envelope parameters

¹ U-value calculated without the insulating effect of the soil.

² U-value calculated without the insulating effect of the soil.

³ The solid wooden panels between windows are considered part of the frame and are thus compared against the limiting U-value for a window.

3.1.2.3 Thermal mass

The ceilings of the building will feature an exposed concrete soffit ceiling that can act as thermal mass, helping to stabilise the internal temperatures by flattening daily cooling peak loads. Thermal mass absorbs heat from its surroundings, thereby resulting in occupants feeling cooler during the warmer days of the year.

Night time ventilation/cooling allows the building to benefit from thermal mass by purging the heat stored within the thermal mass during the day. This allows for a reduction of daily peak cooling loads and therefore, annual cooling demand and consumption. However, it is to be noted that the potential for the implementation of an appropriate and effective cooling strategy will be subject to operational usage constraints.

3.1.3 Active Design

3.1.3.1 BMS

A Building Management System (BMS) will be provided to control and monitor the building engineering systems and services throughout the development, provide feedback of plant, system performance, monitoring and energy management of the system. The BMS will analyse this data to enable optimum use of the engineering facilities within the development with minimum of human intervention, and with the minimum of energy consumption.

The BMS will operate on the converged IP network provided by Google (NetOps), with controllers/outstations also configured to the same network. It is envisaged the BMS system will be linked to the central Google facilities control centre in Mountain View alongside other similar facilities in Europe (should they be developed).

3.1.3.2 Ventilation systems

A mechanical ventilation strategy is proposed for the Zone A Building.

Ventilation will be provided from centralised dedicated air handling units (AHU) utilising a highly efficient heat recovery system to recover heat and coolth from the exhaust air that would otherwise be lost to atmosphere. Therefore, the high levels of heat recovery from the exhaust air will be used to heat the supply air, thus dramatically minimising the need for additional heating in winter.

Fresh air intake and supply air distribution ductwork will be thermally insulated and will meet high levels of airtightness and fan power efficiency. Highly efficient supply and extract fans and pumps with variable speed motors and multiple pressure sensors will be specified.

Very high ventilation rates of 16 litres/second/person will be provided for the occupied spaces, beyond CIBSE good practice standard of 10 litres/s/p, and beyond British Council for Offices (BCO) recommendation of 12 litres/s/p, to encourage health and wellbeing of occupants. The specific fan power of the AHUs will be 2.0 W/(I/s) and the specific fan power of the Fan Coil Units (FCU) and trench units will be 0.15 W/(I/s).

In large spaces, such as perimeter offices (including meeting rooms), lobbies and event spaces, AHUs will supply tempered fresh air to a ducted underfloor system. This method of air distribution fits well in with the double and triple height spaces of the Zone A Building, providing tempered air close to the occupied (lower) space.

The underfloor air supply ventilation solution provides additional benefits, including producing minimal air movement and providing good thermal comfort in the occupied levels, whilst

reducing energy usage. The latter is achieved by conditioning only the occupied part of each space at low level and by the fact that the underfloor supply air is of an elevated temperature compared to conventional systems. This approach will result in very low annual cooling energy consumption for a building of this scale.

In the Wellness and Fitness Centre and staff café areas and kitchens, dedicated AHUs will distribute fresh air to individual Variable Air Volume (VAV) boxes, linked to temperature and carbon dioxide sensors within those spaces so as to ensure efficient delivery of fresh air.

The AHUs can also be used in free cooling mode when the external conditions are adequate.

All the AHUs will interface with a Building Management System (BMS) in order to monitor and control the building services, thus avoiding energy-inefficient operation.

Office Ventilation

Upon receipt of a demand signal (either occupied period from time clock or manual command from BMS operator's station), the BMS shall enable each associated AHU. Motorised dampers will be commanded open. Once end switches are made, the supply and extract fans shall be run. The BMS will modulate heat recovery wheels, recirculating dampers, heating and cooling coil valves as necessary to maintain the respective supply air temperature and CO₂ setpoints. The AHU control functions will include morning boost, cool down and frost protection routines, as well as standard operation.

Each AHU will be individually metered.

Ground Plane, Basement and Amenity Space Ventilation

Upon receipt of a demand signal, the BMS shall enable each associated AHU. Motorised dampers will be commanded open. Once end switches are made, the supply and extract fans shall be run. The BMS will modulate heat recovery wheels, recirculating dampers, heating and cooling coil valves as necessary to maintain the respective supply air temperature and CO₂ setpoints.

Each AHU will be individually metered.

Toilet Extract

Toilet extract fans will operate as variable volume with inverter drive, modulated to maintain a differential pressure set point at the base of the respective riser. Motorised dampers in the duct branches on each foor will switch between partially open (background vent) when the space is unoccupied and fully open (boost) when the passive infrared sensor (PIR) in the common lobby on each floor is activated.

Each fan will be individually metered.

Perimeter Trench Units, Fan Coils and Downflow Units (CRAC units)

Units will each be provided with unitary controllers to modulate fan speed and heating and cooling coil valve actuator positions. Temperature sensors will be provided on both intake and discharge side of each unit. The controller will communicate unit status (run/off/fault), fan speed, valve position, intake and discharge temperatures and temperature set point to the BMS.

Figure 2: Ventilation strategy



3.1.3.3 Cooling systems

Comfort cooling will be available across the permanently occupied areas of the building. Cooling demand will be met through the use of high efficiency, water cooled chillers located within the basement, and linked to the wet cooling towers on the roof top. A plate heat exchanger between the condenser water and chilled water circuits will be provided for free cooling during winter and mid-season, when the external conditions are adequate.

Cooling will be supplied via a ducted underfloor system in the office areas, meeting rooms, lobbies and event spaces and using a VAV system in the amenity, kitchen and staff cafe areas. Trench units shall provide cooling to the perimeter zones of the office floors. A separate dedicated water cooled chiller will be provided to serve the IT spaces, such as intermediate distribution facility (IDF) rooms. Any cooling required for the retail areas will be provided by the tenant.

The whole cooling system will be linked to the BMS system and will have separate accessible energy sub-meters installed to facilitate the monitoring of substantial energy uses and high demand areas within the building.

Each chiller will be provided with open protocol packaged controls. Upon receipt of a demand single, the BMS will enable the lead chiller. The associated lead chilled water and condenser water pumps will be commanded to start. Once flow is proved, the chiller will carry out its own diagnostic checks and start. The chiller controller will modulate the chiller output to maintain a constant CHW flow temperature.

A free cooling plate heat exchanger allows the transfer of coolth between the condenser water system and the chilled water system (CHW) system directly.

Each chiller and pump set will be individually metered

Each cooling tower will be individually metered for both electrical and water consumption.

3.1.3.4 Heating systems

Space heating and domestic hot water (DHW) will be sourced from the local King's Cross District Heating Network. Heating will be available accross all the permanently occupied areas of the building. It will be supplied via a ducted underfloor system in the office areas, meeting rooms, lobbies and event spaces and using a VAV system in the amenity, kitchen and cafe areas.

Perimeter spaces adjacent to large glazed facades, will have trench heating units to ensure thermal comfort and avoid draughts during winter. The circulation spaces adjacent to the Sports Hall (MUGA) will be provided with trench units to provide local heating. Heating for the retail areas will be provided by the tenant via electricity provided to each retail space. No connection to the district heating network will be provided for the retail units.

While entrances and exits are lobbied, air curtains will be provided to all entrances and exits within the building as at peak times both lobby doors may effectively be open due to heavy traffic. Air curtains will be provided with Low Temperature Hot Water (LTHW) heating coils, fed from the fan coil LTHW circuit. Air curtains will be vertical bespoke architectural column heaters (located either side of each entrance doorway) or horizontal units mounted above entrance door.

The whole heating system will be linked to the BEMS system and will have separate accessible energy sub-meters installed to facilitate the monitoring of substantial energy uses and high demand areas within the building.

3.1.3.5 Lighting systems and substantial energy uses

Energy efficient lighting will be installed throughout the building. The majority of internal light fittings will be energy efficient light-emitting diode (LED) with advanced demand-led controls.

Daylight dimming sensors will be provided for spaces adjacent to windows to give precedence to natural daylight. Occupancy sensors will be installed in circulation areas, storage spaces, IDF, toilets, changing rooms, Wellness and Fitness Centre, the ancillary Events Centre, office and meeting rooms. All internal and external lighting will be time controllable.

Energy-efficient lifts will be installed to reduce transport-related energy consumption.

All lighting with the development is to be automatically controlle either directly or via lighting control panels. Each luminaire will be individually addressable and dimmable in response to daylight levels. Lighting to external roof top amenity space will be provided by the same system with interface to weather station readings for external daylight compensation and clock adjustment. Plant and service areas will be connected to the BMS for fault reporting but be controlled by local occupancy sensors with on-off control only.

3.1.3.6 Electrical systems

Centralised power factor correction is provided to achieve 0.95 or better.

All fan and pump motors are provided with high efficiency inverterdrives for variable speed control. This enables systems to eb turned down at part load.

Photovoltaic panels are also included in the scheme for renewable energy generation.

3.2 Condition 17(B): Reduction in carbon emissions

"The Environmental Sustainability Plan shall explain the reduction in carbon emissions achieved through these building design and technology energy efficiency measures, compared with the emissions permitted under the national Building Regulations prevailing at the time the application(s) for approval of reserved matters are submitted."

The Zone A Building is primarily an office building, with retail uses on the ground floor. As such, it falls within the remit of Building Regulations Approved Document L2A (AD L2A). The Zone A Building carbon emissions have been calculated using the National Calculation Methodology (NCM) 2013. The Department for Communities and Local Government (DCLG) approved dynamic simulation modelling (DSM) software for EPC and Part L 2013, IES VE 2015.2.2.0, has been used.

The calculation results indicate that the notional building emission levels are 2,1219 tCO₂/year (Table 2). By applying the proposed building design and technology energy efficiency measures (i.e. the proposed passive and active measures as described under Section 3.1 above), the building is able to reduce the annual regulated CO₂ emissions by 129.3tCO₂/year (Table 3), which equates to 6.1% carbon savings compared to the emissions permitted under the prevailing Building Regulations (Part L 2013). This complies with the requirements set by Obligations 6 and 7 of Section X of the KXC S106 Agreement, which sets a target for each new building to achieve carbon emissions at least 5% lower than Part L of the prevailing Building Regulations (i.e. 2013 with 2016 amendments) using good passive design and energy efficient measures.

Results indicate that with the incorporation of a photovoltaic array with an output of 19,800 kWh annually on the roof, the building is able to achieve a further reduction of 9.6tCO₂/year, which equates to 0.4% further savings compared to the Part L 2013 baseline.

Therefore, the combined carbon savings achieved through the building design and technology energy efficiency measures described under Section 3.1, herein along with the incorporation of photovoltaic panels on the roof, but disregarding the carbon savings that will be achieved by utilising the low carbon local district energy system, equate to 6.5% compared to the prevailing Building Regulations (Part L 2013) baseline

Table 2: Regulated CO₂ emissions

	Regulated CO ₂ emissions
	(tonnes CO ₂ /annum)
Baseline: Part L 2013	2129
After building design and technology energy efficiency measures (passive and active design measures)	2,208

Table 3: Regulated CO₂ emission savings

	Regulated CO ₂ emission savings	
	(tonnes CO₂/annum)	%
Savings from building design and technology energy efficiency measures (passive and active design measures)	129.3	6.1
Savings from photovoltaic panels	9.6	0.4
Cumulative savings from building design and technology energy efficiency measures (passive and active design measures) + PVs	138.9	6.5

Business as Usual Benchmark (ECON 19)

Section X of the KXC Section 106 Agreement includes an obligation to carry out the development with the objective of achieving a site-wide 32% reduction in carbon emissions compared to the 'Business as Usual Benchmark', as identified in the Energy Assessment which supported the outline planning application (2005). For office buildings, the relevant benchmark is ECON19, which includes process loads such as catering facilities, data rooms etc. consumed within the building. This contrasts with Part L of the Building Regulations which excludes small power. The impact of small power is dependent on the fit-out of the building and the occupier's own requirements.

Since the completion of the Section 106 Agreement in 2006, Part L of the Building Regulations has been updated to include more stringent requirements in terms of the energy efficiency of a building and is now considered the primary method of assessment for a building's performance. By meeting the requirements of the current Part L (2010), the building will be achieving a reduction in carbon emissions that meets (and indeed exceeds), the ECON19 Business as Usual Benchmark set out in the original KXC Energy Assessment, thus making a contribution to the achievement of the 32% target set out in the Section 106 Agreement.

3.3 Condition 17(C): Provision of green and/or brown roofs

"The Environmental Sustainability Plan shall explain the specification for any green and/or brown roofs."

Development Zone A has not been identified as a priority zone for green and/or brown roofs⁴ on Parameter Plan KXC 021 of the Outline Planning Permission. Nonetheless, accessible landscaped areas for staff and visitors are proposed at roof level (see Figure 3 below).

The total green roof area will equate to 3,779 m², which will cover approximately 40% of the total roof area, which will consist of lawn and wildflower planting. The inclusion of a green roof in the Zone A Building design is intended to provide a highly vegetated environment with a number of programmed spaces to allow for an intimate contact with nature and the open sky within the dense urban fabric.

The roof landscape design includes four main character areas (Plateau, Fields, Gardens, Headland) defined by the concept of landscape evolution. These are detailed further in Table 4 below. It is to be noted that the potential to enhance biodiversity and attract wildlife has been carefully considered for this design

Accessibility and flexibility of the design has also been considered; a ramp and walkway element will connect the various levels, whilst a tray system is designed to contain the soil volumes and ensure the longevity and adaptability of the roof planting.



Figure 3: Proposed landscaping and amenity areas at roof level

Source: Stage 3 Report, Volume 3, January 2017

⁴ The term 'green roof' is defined in the Revised Development Specification (2005) as both intensive ornamental roof gardens and extensive roofs with more naturalistic plantings or self-established vegetation. The term 'brown roof' refers to roof areas where ruderal vegetation (vegetation associated with disturbed sites) is allowed to colonise low fertility substrates like those found in the rubble of demolished buildings.

Character Areas	Principles	Function	Design
Plateau	 Largest open space on the roof at 3570m² Sits on level 12 	 Trim trail with exercise stations at regular intervals Seating/garden rooms cut-out into the wild landscape Amphitheatre with 180° views to the Regents Canal, Granary Square and the London skyline 	 Simple in terms of planting but will bring much valued biodiversity Meadows, woodland floor planting and points of rain water collection will attract wildlife such as insects and birds Bee-hives Wind buffer tree and tall shrub planting along the western side Two large lawn circles to accommodate large seasonal events or regular fitness and recreation classes
Fields	 Amenity space of 1240m² Sits on level 11 above the multi-use games area (MUGA) Connected to the Café with a direct tunnel access 	 Seating area for up to 200 people Movable planters/grow beds Outdoor barbeque 	 Predominantly hard space Wind buffer tree planting along the western side Planted beds raised off the ground to accommodate trees and shrubs Storage and maintenance rooms under mini-slope structures
Garden	 Amenity space of 800m² Sits on level 10 above the pool and Wellness & Fitness Centre Also accessed through the upper floor of the MUGA 	 Predominantly green space Lawn area capable of holding small crowds and gatherings 	 Based on the principles of an English walled garden High planter boxes on three sides Large lawn area at its heart bordered by a large planted bed with a rich planting mix Wind buffer tree planting along the western side Long seats provided using planter elevations
Headland	 Split into 2 levels Upper side sits on level 8 with direct access to and from the Wellness & Fitness Centre Lower side sits on level 7 with access from the Flexible Meeting Area 	 Predominantly hard space Views of the London skyline and KXC area Mid-level deck for exercise, stretching and yoga classes Timber amphitheatre 	 Thin decked area Wind buffer tree and tall shrub planting along the western side wide seating steps from level 8 to level 7 with step access on both sides Step free access to both levels from inside the building

Table 4: Roof landscape character areas

3.4 Condition 17(D): Energy supply

"The Environmental Sustainability Plan shall explain how energy shall be supplied to the building(s), highlighting:

- how the building(s) relate(s) to the site-wide strategy for district heating incorporating trigeneration from distributed combined heat and power;
- how the building(s) relate(s) to the strategy for using biofuel boilers to supplement the energy supplied through district heating systems;
- the assessment of the cost-effectiveness and reliability of the supply chain for biofuels; and
- any other measures to incorporate renewables."

The Energy Centre, which forms part of Building T1 at KXC, has already been constructed and partially commissioned to meet the heat and hot water demand of the first occupiers at KXC. KCCGPL and its partners have also established the Energy Services Company (ESCo) to run the district heating and install the necessary heat and power distribution infrastructure that form the King's Cross District Heating Network. The King's Cross District Heating Network will provide space heating and hot water to the Zone A Building, contributing to the overall savings in carbon emissions against the Part L2A target emission rate (TER). The combined heat and power (CHP) engines within the Energy Centre will also generate electrical power (to be fed into the National Grid), which will offset a significant percentage of the building's demand.

The Energy Centre will include:

- 3No. 1.8MWth gas fired CHP,
- a thermal store integral to the CHP operating hours strategy and
- 3No. 9MW_{th} gas boilers.

It is assumed that the Energy Centre providing district heating operates using 60% of the heating from the CHP and 40% from the gas boilers, and the carbon emission factor should be taken as 0.097 kgCO₂/kWh. A primary energy factor of 0.437 has been estimated for the district heating network.

It is assumed that future provision will be made to accommodate biomass boilers within the King's Cross District Heating Network. In order to be able to assess the impact of biomass in terms of energy and carbon emissions, it would be necessary to know the balance between the CHP, boilers and biomass boilers and calculate the carbon and primary energy factors. The future inclusion of biomass boilers or fuel cells within the energy centre will likely lead to further carbon reductions.

3.4.1 Carbon emission savings from the District Heating Network

Taking into account the carbon savings produced by the incorporation of building design and technology energy efficiency measures as described under Section 3.1 above, in addition to the connection of the building to the district heating network, the design is able to reduce the annual regulated CO_2 emissions by 458.84 t CO_2 /year (Table 5), which equates to a total of 21.5% carbon savings compared to the prevailing Building Regulations (Part L 2013) baseline.

Table 5: Regulated CO₂ emission savings

	Regulated CO:	emission savings
	(tonnes CO ₂ /annum)	%
Savings from building design and technology energy efficiency measures (passive and active design measures)	129.3	6.1
Savings from district heating	329.5	15.5
Cumulative savings from building design and technology energy efficiency measures (passive and active design measures) + district heating	458.8	21.5

3.4.2 Carbon emission savings from renewable technologies

A photovoltaic array with an output of 19,800 kWh annually will be installed on the roof to generate zero carbon electricity and meet a small part of the Zone A Building's electricity demand.

With the incorporation of photovoltaics on the roof, the building is able to reduce the annual regulated CO_2 emissions by 9.6 t CO_2 /year, contributing to 0.4% carbon savings compared to the prevailing Building Regulations (Part L 2013) baseline. In total, the proposed design achieves carbon savings of 468.4 t CO_2 /year (Table 6), which equates to 22.0% carbon savings compared to the prevailing Building Regulations (Part L 2013) baseline (see Figure 4 below).

Table 6: Regulated CO₂ emission savings

	Regulated CO₂ emission savings		
	(tonnes CO ₂ /annum)	%	
Savings from building design and technology energy efficiency measures (passive and active design measures)	129.3	6.1	
Savings from district heating	329.5	15.5	
Savings from photovoltaic panels	9.6	0.4	
Cumulative savings from building design and technology energy efficiency measures (passive and active design measures) + district heating + PVs	468.4	22.0	







Source: Atelier Ten

3.4.3 Assessment of available renewable technologies

Although there are no planning targets relating specifically to the KXC Development Zone A for the incorporation of renewable technologies in terms of carbon emission reduction or energy production, a number of technologies have been examined for the Zone A Building.

3.4.3.1 Wind

The possibility of installing a wind turbine on the Zone A Building to provide electricity has been taken into consideration.

The main factor affecting the output of wind turbines is the average wind speed. This varies for different areas of the UK but increases with the height of the turbine above ground level. The local topography and the existing and future developments surrounding the Zone A Building can have an impact on the local wind speeds. The wind maps from the Met Office have been used to predict the approximate wind speed in the locality of the Zone A Building. The estimated annual mean wind speed is in the range of 0.5 to 1.5m/s.

Currently, Renewable UK, formerly named British Wind energy Association (BWEA), suggests wind turbines operate with a wind speed of 4m/s, but produce useful amounts of energy if the average wind speed is of at least 5m/s throughout the year. The wind speed in Development

Zone A is quite far below the minimum average wind speed needed to operate a turbine efficiently throughout the year.

Stand-alone wind turbines taller than 10m have not been considered due to the maximum permitted height limits set by Parameter Plan KXC 014 of the Outline Planning Permission. In addition, surrounding buildings would impact the efficiency of any type of wind turbine applicable to Development Zone A.

Due to planning and technical constraints, this technology is not considerd to be viable for the Zone A Building.

3.4.3.2 Biomass

The incorporation of a biomass heating system as part of the King's Cross District Heating Network to provide space heating, domestic hot water and additional electricity is being investigated.

3.4.3.3 Solar thermal

It would be possible to install solar thermal collectors on the roof of the Zone A Building, to provide a percentage of the hot water demand. However, as such a system could not be sized to meet total heating demand due to limited available roof area. Further, due to the existence of the local district heating network described at length above, the incorporation of solar collectors is not required. It was therefore deemed more carbon efficient to install photovoltaic panels or landscaped amenity space on the proposed building.

3.4.3.4 Air source heat pumps

Air source heat pumps (ASHPs) are considered a renewable source when they are used for heating in addition to cooling. ASHPs have lower seasonal cooling efficiencies than the proposed water cooled chillers, and, due to the existence of a local district heating network, the installation of ASHPs for the provision of heating is not deemed necessary.

3.4.3.5 Ground source heat pumps

Even though ground source heat pumps (GSHPs) are run on electricity, they are considered renewable because they extract energy for heating and cooling from the ground. However, due to the existence of a local district heating network, the installation of GSHPs is not required, and is not seen as a viable option as the district heating system would cover the site's heat loads, making the thermal balance of the heat flows into and out of the ground difficult to achieve. GSHPs require deep excavations having an impact on the construction process, capital cost and schedule of construction; therefore this system has not been considered for the Zone A Building.

3.4.3.6 Photovoltaic panels

The option of integrating photovoltaic panels on the unshaded roofs of the building to provide electricity has been assessed. Due to the absence of surrounding buildings taller than the proposed Zone A Building, there is a large available non-shaded roof area that can and will be used for solar collection. A photovoltaic array with an output of 19,800 kWh annually is therefore proposed.

3.5 Condition 17(E): BREEAM rating

"The Environmental Sustainability Plan shall explain how the proposed building(s) have been designed to achieve a BREEAM and/or Ecohomes rating of "very good" (or an equivalent assessment method and rating) or better."

The proposed KXC Zone A development has been registered and will be assessed under both the BREEAM and LEED schemes, the widely recognised environmental assessment methods in the UK and U.S. respectively. Environmental performance targets for the project are set beyond the requirements set by Condition 17(E).

3.5.1 BREEAM overview

BREEAM is a widely recognised environmental assessment method for buildings and communities in the UK. It sets the standard for best practice in sustainable design, construction and operation and has become one of the most comprehensive and widely recognised measures of a building's environmental performance.

A BREEAM assessment uses recognised measures of performance, which are set against established benchmarks, to evaluate a building's specification, design, construction and use. The measures used represent a broad range of categories and criteria including aspects related to energy and water use, the internal environment (health and well-being), pollution, transport, materials, waste, ecology and management processes.

The Zone A Building has been registered and will be assessed under the BREEAM New Construction 2014 scheme. As appropriate, the office and ground floor retail uses will be assessed separately, with the latter being assessed as 'Shell only', since the retail units will be fit out only once the Zone A Building is completed.

However, the large majority of the building will accommodate office space, to which this BREEAM assessment applies. The project team is committed to going beyond the requirement of this condition and to achieve a minimum rating of 'Excellent', but with an aspiration to reach 'Outstanding', and to reaching 'Very Good' for the retail 'shell only' elements of the building.

The pre-assessment undertaken by the BREEAM assessor for the general office areas of the proposed Zone A Building indicates a current predicted score of 86.64% (i.e. an 'Outstanding' rating), as summarised in Figure 5 overleaf and set out in Appendix B. This goes well beyond both the planning condition and project targets, which require a 'Very Good' and 'Excellent' rating respectively.

The initial pre-assessment undertaken for the 'Shell-only' retail uses of the proposed Zone A Building indicates a current predicted score of 63.9% (i.e. a 'Very good' rating), as summarised in Figure 6 overleaf and set out in Appendix C. This is in line with the relevant planning condition and project targets.

The approach taken for every aspect of the proposed building's design includes passive and active measures maximising the building's sustainability. The expected performance of the KXC Zone A Building against all relevant categories, as also described elsewhere in this plan, demonstrates the inclusion of sustainability best practice features as set out in Figures 5 and 6 overleaf.

Figure 5: KXC Zone A Building: BREEAM Pre-assessment (General office areas)



Potential BREEAM rating: Outstanding

There is a planning requirement for the project to achieve BREEAM 'Very Good'. However, it is Google's aspiration to achieve BREEAM 'Outstanding', with a minimum target of 'Excellent'. This report presents the current status of the project in terms of likely BREEAM rating and continues to be updated on a regular basis, as the submission process progresses. Based upon discussions with the design team up to this point, the current projected likely score is 86.64%, just over the 85% threshold required for 'Outstanding'. This report only covers the office element of the building, the retail element will be assessed separately. The planning requirement of 'Very Good' also applies to this space. A preliminary pre-assessment was carried with the design team which determined a projected likely score of 63.9%, well above the 55% threshold required for 'Very Good'. For full details, please see the report 'BREEAM-UK-NC-2014-Pre_Assessment-Estimator-v4.2 RETAIL (Shell Only)' which has been provided separately.

Summary of BREEAM credits

Category	Credits available	Available score	Individual credit weighting	Credits likely	Credits possible	Likely score	Possible score	Credits secured
Man	21	12.00%	0.57%	18	18	10.29%	10.29%	1.71%
Hea	17	15.00%	0.88%	13	15	11.47%	13.24%	0.00%
Ene	25	15.00%	0.60%	20	20	12.00%	12.00%	0.00%
Tra	9	9.00%	1.00%	9	9	9.00%	9.00%	4.00%
Wat	9	7.00%	0.78%	9	9	7.00%	7.00%	0.00%
Mat	13	13.50%	1.04%	9	9	9.35%	9.35%	0.00%
Wst	9	8.50%	0.94%	7	7	6.61%	6.61%	0.94%
Le	10	10.00%	1.00%	10	10	10.00%	10.00%	1.00%
Pol	13	10.00%	0.77%	9	10	6.92%	7.69%	3.08%
Inn	10	10.00%	1.00%	4	5	4.00%	5.00%	0.00%
Total	136	110%		108	112	86.64%	90.17%	10.73%

Performance of Each Category



Source: BREEAM Project Report, Mott Macdonald, 20 January 2017

BREEAM UK New Construction 2	2014 Pre-Assessment Estimator: Indicative Rating & Building Performance	BREEAM UK
Overall Building Performance		
Building name	KGX1 Retail	
Indicative BREEAM rating	Very Good	
Indicative Total Score	63.9%	
Min. standards level achieved	Very Good level	
with, statidards lever achieved		

Figure 6: KXC Zone A Building: BREEAM Pre-assessment 'Shell Only' (Retail)

Building Performance by Environment Section



No. credits Indicative no. % credits Section Indicative Environmental Section Section Score available credits Achieved achieved Weighting Management 15 9 60.00% 12.50% 7.50% Health & Wellbeing 8 5 62.50% 10.00% 6.25% 16 2 12.50% 14.50% 1.81% 9 7 77.78% 11.50% 8.94% Transport Water 3 3 100.00% 4.00% 4.00% Materials 13 9 69.23% 17.50% 12.11% Waste 8 6 75.00% 11.00% 8.25% Land Use & Ecology 10 7 70.00% 13.00% 9.10% Pollution 83.33% 6.00% 5.00% 6 5 10.00% N/A 10 1 1

Biedic

Assessment Rating KPIs

18/11/2016 Source: Retail BREEAM Pre-assessment Report, Mott Macdonald, 18 November 2016 Section 2 - Page 1

BREEAM°

3.5.2 LEED Overview

LEED is one of the most popular green building certification programs used worldwide and has been developed by the U.S. Green Building Council (USGBC). It is an internationally accepted standard for design, operation and construction of high performance green buildings, ensuring the buildings are environmentally compatible, provide a healthy work environment and are profitable.

Similarly to BREEAM, the LEED rating system is organised into categories addressing issues relating to site sustainability, water efficiency, energy and atmosphere, materials and resources and indoor environmental quality, although it places higher weighting on some of these issues, in particular energy and air quality. An additional category, 'Innovation in Design', addresses sustainable building expertise as well as design measures not covered under the aforementioned categories.

Although LEED is not referred to in Condition 17(E), Google UK Limited has requested that the Zone A Building be assessed against this well-known building rating method, in line with their corporate standards, and with a view to achieving the highest possible rating (i.e. 'Platinum').

The Zone A Building has been registered and will be assessed under the LEED v4 for Building Design and Construction (LEED v4 BD-C) scheme.

The initial pre-assessment undertaken by the appropriate consultant (see Appendix D) indicates a predicted LEED score of 62 points, equivalent to a 'Gold' rating, with the aspirational highest rating of 'Platinum' to be achieved on completion, as shown in Figure 7 opposite.

Figure 7: KXC Zone A Building: LEED Pre-assessment



This report presents a summary of performance for the KGX1 project against the requirements of the LEED rating system. The likelihood of achieving each credit has been aligned with current project design considerations.



Source: LEED Project Report, Mott Macdonald, 04 January 2017

3.6 Condition 17(F): Wildlife features

"The Environmental Sustainability Plan shall explain the incorporation of bird boxes, bat roosts and other wildlife features on buildings."

The landscaped terraces at roof level are designed as amenity and recreation spaces for the use of the building's members of staff and their visitors. It measures 300 metres in length and varies in width from 20 to 60 metres. The roof covers a total area of 9,492 m², with a balance of roughly 60% hard landscape and 40% soft landscape. The design concept is based around four character areas, the Plateau, Field, Garden and Headland.

These measures will significantly enhance the ecological value of the submission site and of KXC generally, providing new habitats that will have strong potential to attract wildlife.

The soft area on the roof is approximately 3,779m² which includes lawn and wildflower planting.

The Plateau has been designed with particular thought on how to enhance biodiversity. The use of meadows, woodland floor planting and rainwater collection points at this level will attract wildlife such as insects and birds. The installation of beehives is also included in the proposals. These will also play an important part of the life on the Plateau, with collection of honey, workshops with the staff working in the building and sharing of honey related products.

In order to create the perfect environment for biodiversity and human use, a wide band of tree and tall shrubs will line the western edge protecting wildlife and people from dominant southwest winds.

Further advice will be sought from a qualified ecologist regarding bird and bat species that are present in the area and potential proposals for suitable type of boxes to be installed on site.

3.7 Condition 45: Drainage

"The new drainage infrastructure within the site shall be designed to achieve a combined (storm and foul) peak discharge to the existing combined sewers of 2292 l/s or less."

3.7.1 Site wide drainage infrastructure

The figure of 2292 l/s in the wording of Condition 45 describes the maximum peak (storm and foul) discharge which is permissible for the site as a whole to discharge to the existing combined sewers. The peak discharge will be split between the Camden Sewer and York Way Sewer (for Northern Area) and the Camley Sewer / Fleet Sewer (for the Southern Area).

The cumulative peak discharge from the many building plots and areas of infrastructure will exceed 2292 I/s under certain weather conditions. In these instances, the site wide drainage infrastructure, including online and offline attenuation (see below), will attenuate peak flows discharging from individual plots, adopted highway and public realm, enabling cumulative peak flows to be reduced to 2292 I/s or less.

The site wide surface and foul water disposal strategy can be summarised as follows:

- To provide separate surface and foul water networks, combining only at the final manhole prior to connection into the existing Thames Water sewerage network;
- To provide online attenuation (for example oversized pipe work) and offline attenuation (for example proprietary modular underground storage systems / tanks) to buffer peak flows generated within the site down to the agreed discharge rates into the existing Thames Water sewerage network;
- To ensure that no above ground flooding occurs during the worst case 1 in 30-year storm event;
- To ensure that no internal building flooding occurs during the worst case 1 in 100-year (+20%) storm event;
- To accord with PPS 25 and Sewers for Adoption 6th Edition;
- To discharge at various locations into the sewerage network; and
- To design the above infrastructure such that combined surface and foul water flows do not exceed 2292 I/s during a 1 in 30 storm event.

The site wide drainage infrastructure at King's Cross Central can be described in terms of three drainage infrastructure areas, incorporating both building plots and infrastructure/public realm. These are described under Table 7 below

Drainage infrastructure area	Plot developments	Infrastructure / Public realm
Eastern Goods Yard	The Granary Complex, Q1, Q2, R1, R3, R4, R5, R6, R7, R8, 50% of T1, T2, J1, H1, K1, K2, K3, K4 and 50% of I1.	Stable Street, Wharf Road, Handyside Street, Granary Square, Cubitt Park and Handyside Gardens.
Southern Area Infrastructure	A1, A2, A3, A4, A5, B1, B2, B3, B4, B5, B6, D1, E1, F1 and V1.	The Boulevard, Goods Way, Station Square and Pancras Square.
Remainder of the Northern Area including the Triangle Site	50% of I1, M1, M2, M3, N1, P1, P2, S1, S2, S3, S4, S5, T3, T4, T5, T6 and W1.	Canal Reach and Cubitt Square.

Table 7: Drainage infrastructure areas

Source: PBA

Table 8 identifies the assumed peak foul and surface water flows from each of the building plots which underpins the design of the site-wide infrastructure. The foul water figures are based on CIRIA 177 Variable Peaking Factor and the assumed foul water discharges from various land uses identified in Table 9. The surface water peak flows are based on a 1 in 30-year storm. It should be noted that it is most unlikely that the foul and surface water peak discharges from each individual plot will coincide with each other.

Assumed Peak Flows (I/s)	
Surface water (1 in 30-year event)	Foul water
68.8	6.62
94	6.62
122	6.62
155	6.62
193	6.62
118	23.2
63	5.5
263	11.2
112	10.7
169.2	12.5
130	10.5
40	5.8
48	3.2
45	2.4
59	6.0
1680	124.1
	Assumed Peak F Surface water (1 in 30-year event) 68.8 94 122 155 193 63 263 112 169.2 130 40 43 59 1680

Table 8: Peak surface and foul	water flows for the Southern Area
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Source: PBA

Generally, foul water discharges represent small but consistent flows subject to diurnal patterns. For example, residential properties will exhibit two peaks within their diurnal flow pattern, one in the morning and one in the early evening.

Surface water discharges, on the other hand exhibit extreme variations in flow, directly related to rainfall intensity.

The surface water discharge from each plot development will have its own unique hydrograph (identifying the variation between flow and time – the peak of which only lasting for a few minutes in most cases). Each one of these peaks (within the hydrographs) combine within the main drainage infrastructure at different points in time during the storm event creating an averaged flow within the pipe network.

These flows will discharge into the Thames Water network via flow hydraulic controls at the downstream end of each network. These hydraulic controls limit the discharges to a combined maximum of 2292l/s. Where the plot development discharges combine to produce flows in excess of the maximum allowable discharge, water will be held within the drainage infrastructure which has been specifically sized to accommodate these flows.
Land use	Demand options	Discharge to sewer (I/day/hd)	l/s/head	Operational hours	Population density (m ² per person)
Residential	-	152	0.0023457	18	36.2
Student Accommodation	-	152	0.0023457	18	19.5
Retail	Large retail	26.6	0.0009236	8	40
Food/Drink	Customer/day 2hr sittings	28.5	0.0009896	8	1.4
Education	General	19	0.0006597	8	10
Business	Without canteen	41	0.0014236	8	12
Hotel		133	0.0046181	8	20
Leisure	Sports club	142.5	0.0049479	8	40

Table 9: Foul water discharge parameters from various land uses

Source: PBA

3.7.2 Drainage infrastructure relating to Plots A1 to A5

Plots A1 to A5 (Development Zone A) are serviced by the Southern Area drainage systems (Table 7), which discharge via restricted discharges in to the combined Thames Water Camley Sewer/Fleet Sewer. The drainage networks have been designed on SuDS principles providing an overall peak flow reduction of 10% (based on a 1 in 30-year storm).

Thames Water has approved the surface and foul water discharges into the Camley Sewer/Fleet Sewer for the networks serving these plots. The approved discharges reflect the assumptions described in Tables 8 and 9 (above). The assumed surface water and foul water peak flows for plots A1 to A5 (Zone A) are set out in Table 8 above. The peak water discharge flows for the Zone A development are 632I/s and 33.1I/s, for surface water, and foul water respectively.

It should be noted that the figures in Table 8 do not specifically include public realm areas. However, the Southern Area public realm was included in the hydraulic model used during the design of the infrastructure to ensure that each of the drainage sub catchments (buildings and public realm) are attenuated and the flows into the combined Thames Sewer are restricted so that the permissible discharges set out in the Outline Planning Permission are not exceeded.

4 Response to S106 Obligations

4.1 S106 – Section AA: Water

Section AA of the S106 Agreement places obligations for the Developer to use reasonable endeavours to:

- "incorporate within the detailed design of the Development water efficiency measures such that those designs secure at least forty per cent (40%) of the potable water consumption credits available under the BREEAM/EcoHomes methodologies which represents a reduction of approximately twenty to thirty per cent (20-30%) against typical water consumption";
- "incorporate within each phase of the Development one or more of the following alternative water supplies to meet five per cent (5%) or more of the non-potable needs of such phase:
 - a. groundwater abstraction;
 - b. greywater and blackwater recycling;
 - c. rainwater harvesting"; and
- "ensure that the design for the treatment of storm water runoff within the Development incorporates, where practicable, filtration, attenuation and other techniques that are consistent with the then best practice advice on SUDs, to control the timing and volume of flows."

4.1.1 Water Efficiency

The BREEAM criteria for water consumption have been used as a benchmark for the project, to reduce the consumption of potable water for sanitary use in the proposed building.

The Zone A Building will achieve high standards of water efficiency with water-efficient fixtures, such as dual flush WCs, water efficient taps and showers. The following water-efficient fixtures will be specified for the building:

- WC: dual flush 4/3.5 l/flush;
- Lavatory faucet: 1.89 l/min;
- Shower: 4.73 l/min.

Provision for the installation of a greywater system is also included in the design proposals. This will be used as a means of off-setting non-potable water demand from water consuming components that would otherwise be supplied using potable water. It is proposed that the greywater will be used to serve the WC flushing.

At this stage, it is estimated that the proposed measures will reduce water consumption by 60% against typical water consumption and result in all of the 5 credits being achieved under the relevant BREEAM category. The design team has further allowed for the aspiration to achieve the relevant innovation credit available, by demonstrating exemplary performance under the water consumption category once completed, which would represent a 65% improvement against baseline building water consumption being achieved.

4.1.2 Alternative Water Supplies

As already stated in 4.1.1 above, the inclusion of a greywater recycling system is included in the proposals so as to off-set non-potable water demand and therefore reduce potable water

31

consumption. It is proposed that greywater is collected from washing hand basins and showers to be reused for toilet flushing.

In addition to that, a blue roof system (see Figure 8 below) is proposed for the Zone A Building. Rainwater will be collected on the roof and reused for irrigation at the point of collection. The use of efficient irrigation system in combination with the selection of native/adapted vegetation is expected to reduce potable water use for external landscaping by 50%.

4.1.3 Sustainable Urban Drainage (SuDS)

A blue roof system has been included as part of the proposed design to manage runoffs from rainfalls. The development is aiming to attenuate a minimum of 79 m³, which necessitates a drainage layer at roof level covering at area of at least 1632m². This will achieve the level of attenuation expected for LEED and BREEAM purposes.

The blue roof system will help mitigate flood risk on-site and reduce potable water use for irrigation without having to specify stormwater harvesting tank, which will take up space in the basement and incur pump energy for pumping up the collected rainwater in the basement for reuse on the roof landscaped area. The blue roof system is proposed in the 'Plateau' area at the roof level.



Figure 8: Blue Roof System (Permavoid)

4.2 S106 – Section Y: Construction materials and waste

Section Y of the S106 Agreement places obligations for the Developer to:

- "implement the Construction Materials and Purchasing Strategy";
- "apply the Construction Materials and Purchasing Strategy in agreeing specifications and targets in contracts with contractors, designers and suppliers of services in relation to construction of buildings within the Development";
- "use reasonable endeavours to minimise packaging waste associated with the delivery of construction materials for the buildings within the Development";
- "use reasonable endeavours to produce topsoil and subsoil within the Development using subsoil and crushed rubble from the Site combined with organic composts, green composts and organic waste streams for use in areas of landscaping in order to avoid where practicable importing soils"; and
- "use reasonable endeavours to achieve the Construction Targets during the construction of the Development."

4.2.1 Construction Materials and Purchasing Strategy

The materials selection strategy will use relevant BREEAM criteria as a benchmark. It is intended that materials with ratings of A or A+, as defined in the BRE's Green Guide to Specification, will be specified for the following building elements to the extent possible:

- External walls;
- Windows;
- Roof;
- Upper floor slab;
- Internal Walls;
- Floor finishes / coverings.
- Insulation; and,
- Hard landscaping and boundary protection.

Where available, materials which have obtained an Environmental Product Declaration (EPD) will be included in the specification for the project. Whilst also contributing to an uplift in BREEAM score, specifying products with EPDs also demonstrates the project's commitment to communicate the life-cycle environmental impact of construction materials with transparency.

Products will also be procured in line with the BREEAM responsible sourcing criteria, which require that any products specified meet the following:

- Procured from suppliers with an ISO 14001 certified Environmental Management System for key process;
- Procured from suppliers with an ISO 14001 certified Environmental Management System for key process and supply chain extraction process;
- Certified under BES 6001; and,
- For metals, certified under the CARES SCS scheme or Eco-reinforcement scheme.

All timber and timber based products used on the project will be Legally harvested and traded timber, and will have achieved FSC or PEFC Chain of Custody certification.

4.2.2 Materials Health and Transparency

The development will be implementing Google's 'Healthy Materials Program' to assess the potential health impact of construction materials on occupants' health and wellbeing. The main focus of this initiative is to obtain full disclosure of ingredients contained in the materials specified and installed as part of the proposed development. This increased transparency will be highly beneficial to the development's occupants, as well as the wider construction industry.

4.2.3 Packaging Waste

It is intended that packaging waste relating to transportation and delivery of construction materials on site will be kept to a minimum and wherever possible re-used or recycled.

Packaging waste will be included in the waste targets, as highlighted in Section 2.9 above. Under BREEAM, the project is targeting two credits for construction resource efficiency, by achieving a benchmark of 6.5 tonnes or less of waste generated per 100m² (gross internal floor area).

A target for the diversion of waste from landfill has also been set to 95% diversion, going well beyond BREEAM requirements of 80% (by tonnes) of non-hazardous construction waste diverted from landfill.

4.2.4 Soil

Section to be completed as landscaping strategy progresses.

4.3 S106 – Section Z: Waste

Section Z of the S106 Agreement places obligations for the Developer to:

- "provide occupiers of the Development with Waste Information Packs and use reasonable endeavours to obtain feedback regarding the success or popularity of the initiatives contained within such Packs";
- "use reasonable endeavours to incorporate within the detailed design of commercial and leisure buildings within the Development best practice design solutions that provide for waste segregation and storage areas and will use reasonable endeavours to maintain such solutions as are implemented"; and
- "provide and maintain segregated waste containers within the Public Realm Areas at suitable locations and in appropriate numbers."

4.3.1 Waste Information Packs

In order to minimise operational waste generated by the building's use and to ensure that any waste strategy put in place will be followed by the building's users, Waste Information Packs will be distributed to occupiers.

4.3.2 Design Solutions

Operational waste will be considered, in line with the requirements of BREEAM UK New Construction 2014. Specifically, the Zone A Building will include dedicated spaces for the storage and segregation of various recyclable waste streams. In addition, these spaces will be sized appropriately for the building size and projected volumes of operational waste.

Appendices

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A. Part L Analysis

A.1 Overview

The carbon emissions are calculated using National Calculation Methodology (NCM) and Government approved carbon emissions modelling software tools i.e. IES VE version 2015.2.2.0.

The carbon emission estimations presented herein are the result of calculations based on reasonable assumptions about the performance of the building elements and services. These assumptions as well as the achievements in terms of energy consumption and CO₂ emissions are subject to changes and further refinement as the design develops.

A.1.1 Part L requirements

The Approved Document Part L2A is intended to give guidance on how to satisfy Part L (Conservation of fuel and power in new buildings other than dwellings) of the Building Regulations for new non-domestic buildings.

Compliance with Part L 2013 (with 2016 amendments) is demonstrated herein by meeting Criterion 1, 2 and 3 at this early stage:

Criterion 1. Achieving target emissions rate (TER)

The calculated CO₂ emission rate for the building (BER) for the building must not be greater than the target emission rate (TER), i.e. BER \leq TER.

Criterion 2. Limits on design flexibility

The performance of the building fabric and services should be no worse than the limits set out in Part L 2013. Atelier Ten has negotiated the relaxation of Criterion 2 for the solid wooden panels that form part of the main façade. It has been agreed that these solid elements are part of the frame system and need to be compared against the limiting U-value of a window, rather than an external wall.

A reasonable limit for the design air permeability of 3.0m³/(h.m²) at 50Pa has been adopted at this design stage. Achievement of this target will need to be demonstrated by undertaking air-pressurisation test at post-construction stage.

Design limits for building services must be applied as set out in the 2013 edition of the "Nondomestic Building Services Compliance Guide".

Criterion 3. Limiting the effects of heat gains in summer

For every space in the building where this criterion applies, the solar gain through the glazing aggregated over the period from April to September inclusive must not be greater than the limiting solar gain calculated based on the benchmark glazing types as described by the NCM modelling guide 2013.

The solar gain limit is calculated and checked on a zone by zone basis in the actual/proposed building. Any zone in the actual/proposed building that is either mechanically cooled or has an

activity that is flagged in the NCM activity database as "occupied" space must be assessed against this criterion.

For the purposes of demonstrating compliance with Criterion 3, circulation spaces and other areas of transient occupancy, such as toilets, as well as spaces that are not intended for occupation are excluded.

Due to particularities of Criterion 3, the triple height warehouse spaces could only be compared against a single height space, therefore, making compliance strenuous. Atelier Ten worked with the Building Control officer to create a compliance approach that would meet the intent of the regulations as interpreted by Part L 2013, even though it diverges from the specific wording.

Two alternative interpretations and calculation methodologies were agreed:

- Adopt the reference for Criterion 3 to be agnostic as to internal configuration, allowing a reference strip of glazing per floor of accommodation;
- Adopt "whole building calculations" as opposed to space by space calculations for Criterion 3 compliance.

To reflect this "whole building" approach and to allow for flexibility in façade design to reflect local conditions within the building, it is further proposed that compliance is assessed across the whole building rather than against individual spaces such that:

• \sum (solar flux of spaces) $\leq \sum$ (solar flux limit under Criterion 3 of each space)

A.2 Building model and operational parameters

The model is divided into a number of zones in line with corresponding activity areas. Each activity type corresponds to a number of default parameters in line with the National Calculation Methodology (NCM) database and guidance, which the tool uses to calculate the energy consumption. These parameters include occupancy profile, temperature set points, heat gains from people, lighting and equipment, and fresh air requirement.

A number of reasonable assumptions where made. These will need to be refined as the design progresses. They may have an impact on the CO_2 emission reduction but the compliance with all the requirements of Part L 2013 for new non-domestic buildings will not be compromised.

The performance of the external envelope (e.g. U-values, g-values), including external walls, roof, ground floor, external doors, external windows, is better than the minimum standards set out in Part L 2013 for new non-domestic buildings. The heating, cooling, ventilation, domestic hot water (DHW) and lighting systems are modelled in line with the MEP outline specification by Atelier Ten.

Solar loads vary daily and depend on seasonal and weather conditions, and will affect loads which are accounted for in the thermal modelling process, such as solar transmission, conduction and building heat transfer. These are presented in the model by virtue of the weather data file, in this case the CIBSE London Test Reference Year (TRY) data.

Figure 9: 3D thermal model (IES VE 2015)



Source: Atelier Ten

A.3 Carbon emission reduction calculation

Criterion 1. Achieving target emissions rate (TER)

The Target Emissions Rate (TER) must be lower than the Building Emissions Rate (BER).

The carbon emissions of the notional building (TER) were calculated to be 22.23 kgCO₂/year. The carbon emissions of the actual design (BER) were calculated to be 17.34 kgCO_2 /year.

The results from the dynamic model calculations indicate a 22.0% total reduction in CO_2 emissions from the building.

The building complies with Criterion 1.

Criterion 2. Limits on design flexibility

Criterion 2 limits to design flexibility ensure that a minimum level of performance is achieved for the envelope, DHW, heating, ventilation and air conditioning (HVAC) systems and lighting for all buildings and designs.

All envelope properties, fittings, HVAC systems and lighting have been specified to comply with the Part L2A Building Regulations requirements. The proposed and the limiting U-values set out in the Part L Building Regulations (Table 10) have been used to determine the Building Emission Rate (BER) and the Notional Building Target Emission Rate (TER) respectively. Final values may differ slightly from those set out here as a result of final detailing and procurement, but overall target values are expected to be generally maintained.

The Zone A Building therefore complies with Criterion 2.

Building Envelope	Part L2A limiting U-values	Proposed U-values	Window g-values	Window light transmittance
External wall	0.35 W/(m ² .K)	0.25 W/(m ² .K)		
Basement wall	0.25 W/(m ² .K)	0.25 W/(m ² .K) ⁵		
Roof	0.25 W/(m ² .K)	0.25 W/(m ² .K)		
Ground floor	0.25 W/(m ² .K)	0.25 W/(m ² .K)		
Basement floor	0.25 W/(m ² .K)	0.25 W/(m ² .K) ⁶		
Opaque curtain wall elements	2.20 W/(m ² .K)	1.20 W/(m ² .K) ⁷		
Window office	2.20 W/(m ² .K)	1.20 W/(m ² .K)	0.24	0.45
Window amenity	2.20 W/(m ² .K)	1.60 W/(m ² .K)	0.28	0.55
Window ground floor (East)	2.20 W/(m ² .K)	1.20 W/(m ² .K)	0.18	0.40
Window ground floor (North/West/South)	2.20 W/(m ² .K)	1.20 W/(m ² .K)	0.38	0.70
Window retail	2.20 W/(m ² .K)	1.60 W/(m ² .K)	0.38	0.70
Source: Atelier Ten				

Table 10: Limiting Part L 2013 and proposed envelope parameters

Note: These are general fabric performances and are subject to minor modification during the final design and procurement process

Criterion 3. Limiting the effects of heat gains in summer

The limiting heat gains standards are achieved via provision of low g-value glazing.

The results indicated in Table 11, show that the whole building complies with Criterion 3 following the agreed alternative calculation methodology, as explained previously $(\sum(solar \ flux \ of \ spaces) \le \sum(solar \ flux \ limit \ under \ Criterion \ 3 \ of \ each \ space)).$

Table 11: Criterion 3

	Solar gain actual (kWh)	Solar gain notional (kWh)
Total solar gains	876,966	2184670
% improvement (actual/notional)	59%	

Source: Atelier Ten

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⁷ The opaque elements of the façade are considered part of the framing system frame and are thus compared against the limiting Uvalue for a curtain wall.

B. BREEAM Pre-assessment (Offices)





Google KGX1

BREEAM Project Report

20 January 2017

MOTT MACDONALD

BREEAM Project Summary

Project Name:	Google KGX1				
Project description :	BREEAM Certification				
Rating system used :	BREEAM 2014 for New Construction				
Date of latest issue :	20 January 2017				

Current predicted BREEAM score: 86.64%

Current predicted BREEAM rating: Outstanding

Potential BREEAM rating: Outstanding

There is a planning requirement for the project to achieve BREEAM 'Very Good'. However, it is Google's aspiration to achieve BREEAM 'Outstanding', with a minimum target of 'Excellent'. This report presents the current status of the project in terms of likely BREEAM rating and continues to be updated on a regular basis, as the submission process progresses. Based upon discussions with the design team up to this point, the current projected likely score is 86.64%, just over the 85% threshold required for 'Outstanding'. This report only covers the office element of the building, the retail element will be assessed separately. The planning requirement of 'Very Good' also applies to this space. A preliminary pre-assessment was carried with the design team which determined a projected likely score of 63.9%, well above the 55% threshold required for 'Very Good'. For full details, please see the report 'BREEAM-UK-NC-2014-Pre_Assessment-Estimator-v4.2 RETAIL (Shell Only)' which has been provided separately.

Summary of BREEAM credits

Category	Credits available	Available score	Individual credit weighting	Credits likely	Credits possible	Likely score	Possible score	Credits secured
Man	21	12.00%	0.57%	18	18	10.29%	10.29%	1.71%
Hea	17	15.00%	0.88%	13	15	11.47%	13.24%	0.00%
Ene	25	15.00%	0.60%	20	20	12.00%	12.00%	0.00%
Tra	9	9.00%	1.00%	9	9	9.00%	9.00%	4.00%
Wat	9	7.00%	0.78%	9	9	7.00%	7.00%	0.00%
Mat	13	13.50%	1.04%	9	9	9.35%	9.35%	0.00%
Wst	9	8.50%	0.94%	7	7	6.61%	6.61%	0.94%
Le	10	10.00%	1.00%	10	10	10.00%	10.00%	1.00%
Pol	13	10.00%	0.77%	9	10	6.92%	7.69%	3.08%
Inn	10	10.00%	1.00%	4	5	4.00%	5.00%	0.00%
Total	136	110%		108	112	86.64%	90.17%	10.73%

Performance of Each Category



Likely score

Available score



BREEAM Project Scorecard

Potential Rating: Outstanding

(Likely + Possible credits)

20 January 2017

Pass: 30% to 44%, Good: 45% to 54%, Very Good: 55% to 69%, Excellent: 70% to 84%, Outstanding: >85%

		Current Credit							
Credit	Available	L	ikely	Po	ssible	Credit title	Primary Responsibility	Action by	Status / Comments
		pts	%	pts	%				
Managem	ient						1		
Man 01	4	1	0.57%	0	0.00%	Project Brief and Design	Argent		No Evidence Provided
Man 02	4	4	2.29%	0	0.00%	Life Cycle Cost and Service Life Planning	G&T / Principal Contractor		In Progress
Man 03	6	6	3.43%	0	0.00%	Responsible Construction Practices	Principal Contractor		No Evidence Provided
Man 04	4	4	2.29%	0	0.00%	Commissioning and Handover	Principal Contractor		No Evidence Provided
Man 05	3	3	1.71%	0	0.00%	Aftercare	Principal Contractor/Google		No Evidence Provided
TOTA	L Category	18	10.29%						
Health an	d Wellbeir	na							
Hea 01		2	1 76%	1	0.88%	Visual Comfort			In Progress
Hoa 02	5	4	3 53%	0	0.00%	Indoor Air Quality	BDP		In Progress
Hop 04	2	+	2.65%	0	0.00%	Thermal Comfort	Δ10		In Progress
Hoa 05	2	3	2.05%	0	0.00%		A IU Sandy Brown		No Evidence Provided
	3	3	2.05%	0	0.00%		BDP / Argent / Corperstone /		
Hea 06	2	1	0.88%	1	0.88%	Safety and Security	Goodle		In Progress
ΤΟΤΑ	L Category	13	11.47%						
	.3- 1								
Energy									
Ene 01	12	8	4.80%	0	0.00%	Reduction of Energy Use and CO ₂ Emissions	Team		In Progress
Ene 02	2	2	1.20%	0	0.00%	Energy Monitoring	A10		No Evidence Provided
Ene 03	1	1	0.60%	0	0.00%	External Lighting	BDP		No Evidence Provided
Ene 04	3	2	1.20%	0	0.00%	Low Carbon Design	A10		In Progress
Ene 05	2	2	1.20%	0	0.00%	Energy Efficient Cold Storage	SHW		No Evidence Provided
Ene 06	3	3	1.80%	0	0.00%	Energy Efficient Transportation Systems	Sweco		No Evidence Provided
Ene 08	2	2	1.20%	0	0.00%	Energy Efficient Equipment	Google / SWH		No Evidence Provided
TOTA	L Category	20	12.00%						
Transpor									
Tra 01	3	3	3.00%	0	0.00%	Public Transport Accessibility	MM		Closed Out
Tra 02	1	1	1.00%	0	0.00%	Proximity to Amenities	Δraent		Closed Out
Tra 03	י ס	2	2 00%	0	0.00%	Cyclist Facilities	BDP		
Tra 04	2	2	2.00%	0	0.00%	Maximum Parking Capacity	BDP		No Evidence Provided
Tra 05		1	1.00%	0	0.00%	Travel Plan	Argent / Transport Consultant		
TOTA		0	0.00%	0	0.00%	11 avel Flatt			ากการเป็นการเรา
		9	9.00%						
Water									
Wat 01	5	5	3.89%	0	0.00%	Water Consumption	A10 / BDP		In Progress
Wat 02	1	1	0.78%	0	0.00%	Water Monitoring	A10		No Evidence Provided
Wat 03	2	2	1.56%	0	0.00%	Water Leak Detection	A10		No Evidence Provided
Wat 04	1	1	0.78%	0	0.00%	Water Efficient Equipment	Gillespies		No Evidence Provided
TOTA	L Category	9	7.00%				· · · · · · · · · · · · · · · · · · ·		
Matariala									
Materials		0	2 1 0 9/	0	0.009/	Life Cuele Impacts			
Mat 01	5	3	3.12%	0	0.00%	Line Cycle Impacts			
Mat 02	1	1	1.04%	0	0.00%	Page and Scaping and Boundary Protection			
Mat 03	4	2	2.08%	0	0.00%	Responsible Sourcing of Materials	Principal Contractor		
Mat 04	1	1	1.04%	0	0.00%		BDF / A10		
Mat 05	1	1	1.04%	0	0.00%	Designing for Robustness	BDP		No Evidence Provided
Mat 06	1	1	1.04%	0	0.00%	Material Efficiency	BDP / BIG		In Progress
TOTA	L Category	9	9.35%						
Waste									
Wst 01									
	4	3	2.83%	0	0.00%	Construction Waste Management	Principal Contractor		No Evidence Provided
Wst 02	4	3 0	2.83%	0	0.00%	Construction Waste Management Recycled Aggregates	Principal Contractor		No Evidence Provided No Evidence Provided

Wst 04	1	1	0.94%	0	0.00%	Speculative Floor and Ceiling Finishes	BDP / BIG / Google	No Evidence Provided
Wst 05	1	1	0.94%	0	0.00%	Adaptation to Climate Change	AKT II	Closed Out
Wst 06	1	1	0.94%	0	0.00%	Functional Adaptability	BDP	In Progress
TOTAL	Category	7	6.61%					

Land Use and Ecology										
LE01	2	2	2.00%	0	0.00%	Site Selection	Argent		In Progress	
LE02	2	2	2.00%	0	0.00%	Ecological Value of Site	Argent / Ecologist / Principal Contractor		No Evidence Provided	
LE03	2	2	2.00%	0	0.00%	Minimising Impact on Site Ecology	Argent / Ecologist		No Evidence Provided	
LE04	2	2	2.00%	0	0.00%	Enhancing Site Ecology	Argent / Ecologist		No Evidence Provided	
LE05	2	2	2.00%	0	0.00%	Long Term Impact on Biodiversity	Argent / Ecologist / Principal Contractor		No Evidence Provided	
	<u>~ ·</u>									

TOTAL Category 10 10.00%

1 0.94%

Wst 04

Pollution								
Pol 01	3	2	1.54%	1	0.77%	Impact of Refrigerants	A10	No Evidence Provided
Pol 02	3	0	0.00%	0	0.00%	NOx Emissions	-	No Evidence Provided
Pol 03	5	5	3.85%	0	0.00%	Surface Water Run Off	Gillespies	In Progress
Pol 04	1	1	0.77%	0	0.00%	Reduction of Night Time Light Pollution	BDP	No Evidence Provided
Pol 05	1	1	0.77%	0	0.00%	Reduction of Noise Pollution	Sandy Brown	No Evidence Provided
TOTAL	<u> </u>	•		-		-		

TOTAL Category 9 6.92%

Innovation		
Innovation	4 4.00% 1 1.00%	No Evidence Provided



Management

lssue ref.	Credit title	Resp. Party	Key actions	Evidence Required	Likely credits	Impact on final score (Likely)	Possible credits	Impact on final score (Possible)
MAN 01	Project Brief and Design	Argent	 One Credit - Stakeholder Consultation (Project Delivery) (Likely) Prior to completion of the Concept Design (RIBA Stage 2 or equivalent), the project delivery stakeholders have met to identify and define their roles, responsibilities and contributions for each of the key phases of project delivery. One Credit - Stakeholder Consultation (Third Party) (Not Targeted) Prior to completion of the Concept Design stage, all relevant third party stakeholders have been consulted by the design team and this covers the minimum consultation content. The project must demonstrate how the stakeholder contributions and outcomes of the consultation exercise have influenced or changed the Initial Project Brief and Concept Design. Prior to completion of the detailed design (RIBA Stage 4, Technical Design or equivalent), consultation feedback has been given to, and received by, all relevant parties. One Credit - Sustainability Champion (Design) (Not Targeted) A Sustainability Champion has been appointed to facilitate the setting and achievement of BREEAM performance target(s) for the project. The design stage Sustainability Champion is appointed to perform this role during the feasibility stage (Stage 1, Preparation and Brief stage, as defined by the RIBA Plan of Work 2013 or equivalent). One Credit - Sustainability Champion (Monitoring Progress) (Not Targeted) A Sustainability Champion is appointed to monitor progress against the agreed BREEAM performance target(s) throughout the design process and formally report progress to the client and design team. 	 One Credit - Stakeholder Consultation (Project Delivery) Consultation plan setting out the process and scope of the consultation. Minutes from early stage meetings, demonstrating early stage contribution of project team. One Credit - Stakeholder Consultation (Third Party) A list of the stakeholders consulted. A consultation plan setting out the process and the scope of the consultation. Agenda/minutes from consultation meetings. Documentation demonstrating consultation feedback and subsequent actions. One Credit - Sustainability Champion Design The Sustainability Champion appointment letter, as well as documentation confirming that the defined BREEAM performance target(s) has been formally agreed between the client and design/project team no later than the Concept Design Stage (RIBA Stage 2 or equivalent). This could be demonstrated by: Meeting Minutes Recorded Correspondence BREEAM AP Reports Reevant sections/clauses in the building specification One Credit - Sustainability Champion (Monitoring Progress) The Sustainability Champion appointment letter as well as documentation confirming the Sustainability Champion will monitor progress against the agreed BREEAM performance target(s) throughout the design progress to the client and design team. This could take the form of the evidence described above. 	1	0.57%	0	0.00%
MAN 02	Life Cycle Cost and Service Life Planning	G&T / Principal Contractor	Two Credits - Elemental Life Cycle Cost (LCC) (Likely) An elemental life cycle cost (LCC) analysis has been carried out, at Process Stage 2 (equivalent to Concept Design - RIBA Stage 2) together with any design option appraisals in line with 'Standardised method of life cycle costing for construction procurement' PD 156865:2008. One Credit - Component Level LCC Plan (Likely) A component level LCC plan has been developed by the end of Process Stage 4 (equivalent to Technical Design – RIBA Stage 4) in line with PD 156865:2008 and includes the following component types (where present): a. Envelope, e.g. cladding, windows, and/or roofing b. Services, e.g. heat source cooling source, and/or controls c. Finishes, e.g. walls, floors and/or ceilings d. External spaces, e.g. alternative hard landscaping, boundary protection. One Credit - Capital Cost Reporting (Likely) Report the capital cost for the building in pounds per square metre (£k/m2), via the BREEAM Assessment Scoring and Reporting tool, Assessment Issue Scoring tab, Management section.	Two Credits - Elemental Life Cycle Cost (LCC) Elemental life cycle cost plan One Credit - Component Level LCC Plan Component level life cycle cost plan One Credit - Capital Cost Reporting BREEAM Assessment Scoring and Reporting tool reporting the capital cost for the building in pounds per square metre (£k/m2).	4	2.29%	0	0.00%

Notes and comments

The early stage stakeholder consultation for project delivery has already taken place, to close out the credit records of this consultation prior to the completion of Stage 2 will be required. Argent to provide the Project Execution Plan which should have recorded this consultation and sets out the roles and responsibilities on the project.

Due to the confidential nature of the development, it is not thought that appropriate third party consultation has taken place.

A BREEAM AP was not appointed prior to the end of Stage 1 as required by the Sustainability Champion credits.

An Elemental Life Cycle Cost analysis was commissioned and carried out prior to the end of Stage 2. G&T have provided the report and it is compliant with the criteria.

There should be no issue with producing a Component Level LCC Plan prior to the end of Stage 4. It is still to be decided whether this will be carried out by G&T or the Contractor once appointed. Either option is suitable.

The project's predicted Capital Cost/m² has been provided.

MAN 03	Responsible Construction Practices	Principal Contractor	Pre-requisite (Likely) All timber and timber based products used on the project is 'Legally harvested and traded timber' One Credit - Environmental Management (Likely) The principal contractor operates an environmental management system (EMS) covering their main operations and implement best practice pollution prevention policies and procedures on-site in accordance with Pollution Prevention Guidelines, Working at construction and demolition-sites: PPG6. One Credit - Sustainability Champion (Construction) (Likely) A Sustainability Champion is appointed to monitor the project to ensure ongoing compliance with the relevant sustainability performance/process criteria, and therefore BREEAM target(s), during the Construction, Handover and Close Out stages (as defined by the RIBA Plan of Works 2013, stages 5 and 6). Up to Two Credits - Considerate Construction (Likely) Where the principal contractor has used a 'compliant' organisational, local or national considerate construction scheme and their performance against the scheme has been confirmed by independent assessment and verification. Up to Two Credits - Monitoring of Construction-Site Impacts (Likely) Responsibility has been assigned to an individual(s) for monitoring, recording and reporting energy use, water consumption and transport data (where measured) resulting from all on-site construction processes (and dedicated off-site monitoring) throughout the build programme. To ensure the robust collection of information, this individual(s) must have the appropriate authority and responsibility to request and access the data required. Where appointed, the Sustainability Champion could perform this ro	A signed and dated letter or relevant section/clauses of the building specification confirming a commitment to meet the relevant criteria.	6	3.43%	0	0.00%
MAN 04	Commissioning and Handover	Principal Contractor	 One Credit - Commissioning and Testing Schedule and Responsibilities (Likely) A schedule of commissioning and testing that identifies and includes a suitable timescale for commissioning and re-commissioning of all complex and non-complex building services and control systems and testing and inspecting building fabric. All commissioning activities are carried out in accordance with current Building Regulations, BSRIA1 and CIBSE2 guidelines and/or other appropriate standards, where applicable. Where a building management system (BMS) is specified. One Credit - Commissioning Building Services (Likely) For buildings with complex building services and systems, a specialist commissioning manager is appointed during the design stage with responsibility for: a. Undertaking design reviews and giving advice on suitability for ease of commissioning. b. Providing commissioning management input to construction programming and during installation stages. c. Management of commissioning, performance testing and handover/post-handover stages. One Credit - Testing and Inspecting Building Fabric (Likely) The integrity of the building fabric, including continuity of insulation, avoidance of thermal bridging and air leakage paths is quality assured through completion of post construction testing and inspection. Dependent on building type or construction, this can be demonstrated through the completion of a thermographic survey as well as an airtightness test and inspection. One Credit - Handover (Likely) A Building User Guide (BUG) is developed prior to handover for distribution to the building occupiers and premises managers. A training schedule is prepared for the occupiers and timed appropriately around handover and proposed occupatio	 One Credit - Commissioning and Testing Schedule and Responsibilities A Commissioning Schedule which provides details of responsibility. One Credit - Commissioning Building Services A specialist commissioning manager letter of appointment during the design stage confirming role and responsibilities. One Credit - Testing and Inspecting Building Fabric Letter of commitment to carry out thermographic survey. One Credit - Handover Signed and dated commitment by the client/developer or future building occupier to produce a Building User Guide. The Training Schedule. 	4	2.29%	0	0.00%
MAN 05	Aftercare	Principal Contractor Google	One Credit - Aftercare Support (Likely) There is (or will be) operational infrastructure and resources in place to provide aftercare support to the building occupier(s). These should include: 1. Introduction Meeting 2. Training 3. Weekly on site attendance from support team 3. Helpline There is (or will be) operational infrastructure and resources in place to co-ordinate the collection and monitoring of energy and water consumption data for a minimum of 12 months, once the building is occupied. One Credit - Seasonal Commissioning (Likely) Seasonal commissioning activities will be completed over a minimum 12-month period, once the building becomes substantially occupied. One Credit - Post Occupancy Evaluation (Likely) The client or building occupier makes a commitment to carry out a post-occupancy evaluation (POE) exercise one year after initial building occupation.	One Credit - Aftercare Support Relevant section/clause of the building contract or a signed and dated commitment to provide the required aftercare support services. Evidence of a commitment to collect and monitor energy and water consumption data for a minimum of 12 months after occupation. One Credit - Seasonal Commissioning Appointment letter(s) and/or commissioning responsibilities schedule. One Credit - Post Occupancy Evaluation A signed and dated commitment by the client/developer to ensure a POE will be carried out.	3	1.71%	0	0.00%
		•		Total Section Score:	18	10.29%	0	0.00%

These criteria for this issue have been included in the Contractor tender documentation.

The criteria for this issue have been included in the Contractor tender documentation.

Please note that in order to show compliance with the Commissioning Building Services credit, the Specialist Commissioning Manager must be appointed during the design stage.

The criteria for this issue has been included in the Contractor tender documentation, aside from the Post Occupancy Evaluation credit. Google must confirm a commitment to carry this out.

Summary of BREEAM requirements: Health and Wellbeing

Health and Wellbeing

ls: re	sue ef.	Credit title	Resp. Party	Key actions	Evidence Required	Likely credits	Impact on final score (Likely)	Possible credits	Impact on final score (Possible)
HE	EA 01	Visual comfort	Atelier Ten	One Credit - Glare Control (Likely) The potential for disabling glare has been designed out of all relevant building areas using a glare control strategy, either through building form and layout and/or building design measures. One Credit (Plus One Exemplary) - Daylighting (Unlikely) The relevant building areas meet the following good practice daylight factor(s): 1. Average Daylight Factor of 2% for at least 80% of the floor area. 2. A uniformity ratio of at least 0.3 or a minimum point daylight factor of at least 0.3 times the relevant average daylight factor. 3. At least 80% of the room has a view of sky from desk or table top height and the room depth criterion d/w +d/HW < 2/(1-RB) is satisfied.	Glare Control Relevant section/clauses of the building specification or contract. Window Schedule Details of glare control method. Daylighting Design drawings. Daylight calculations. Views Out Design drawings and calculations Internal and External Lighting Design drawings and/or room data sheets/schedules Relevant section/clauses of the building specification or contract OR a letter of formal confirmation of compliance from the relevant design team member.	2	1.76%	1	0.88%
HE	EA 02	Indoor air quality	Principal Contractor Atelier Ten	One Credit - Indoor Air Quality (IAQ) Plan (Likely) Produce an Indoor Air Quality Plan which considers the following; - Removal of contaminant sources; - Dilution and control of contaminant sources; - Procedures for pre-occupancy flush out; - 3rd part testing and analysis. One credit- Ventilation (Likely) - Provide fresh air into the building in accordance with the relevant standard - The building's air intakes and exhausts are over 10m apart and intakes are over 20m from sources of external pollution; OR - The location of the building's air intakes and exhausts, in relation to each other and external sources of pollution, is designed in accordance with BS EN 13779:2007 Annex A.2 - In naturally ventilated buildings/spaces: openable windows/ventilators are over 10m from sources of external pollution. Areas of the building subject to large and unpredictable or variable occupancy patterns have carbon dioxide (CO2) or air quality sensors specified. In mechanically ventilated buildings/spaces: sensor(s) are linked to the mechanical ventilation system and provide demand-controlled ventilation to the space.	One Credit - Indoor Air Quality (IAQ) Plan Copy of the Indoor Air Quality Plan is required. <u>One credit- Ventilation</u> Relevant section/clauses of the building specification or contract, design drawings detailing the location of the building air intakes and external sources of pollution.	4	3.53%	0	0.00%

Notes and comments

Blinds may not be used in the building, but there are other design measures that can be used to show compliance with the Glare Control credit. BREEAM gives examples of building integrated measures (e.g. low eaves), bioclimatic design and external shading.

At this stage, it is thought that the daylighting credit will be difficult to achieve due to the location and orientation of the building. However, calculations will be carried out as the design develops to determine if there is any chance of compliance.

With regards to the views out, analysis by BDP has found that the majority of areas in the building meet the requirements. MM have received confirmation from the BRE that the kitchen spaces can be excluded from the calculations. Plans and calculations to be provided once the layouts of the workstations have been finalised.

The internal and external lighting requirements are likely to be integrated into the building design. It is important that all relevant standards are met and the lighting is zoned appropriately with compliant occupant controls.

An Indoor Air Quality Plan is required, this should be included the Contractor tender documentation.

The ventilation credit is thought to be likely at this stage, as the building's air intakes and exhausts are an appropriate distance apart and intakes are over 20 metres from sources of external air pollution. There will be some air intakes facing a street, but this is pedestrianised so this should not affect compliance.

The relevant testing and emission level standards are now met by most products, so the VOC products credit will very likely be met. BDP to include the requirements within the specifications.

Testing is required at the post construction / pre-occupancy stage and was noted as being a Droid Avenger requirement. This therefore means that it will most likely be mandatory to undertake.

MM sent a query to BRE to determine if phased testing is acceptable. The BRE responded that it would be possible to phase the testing over different floors depending on when they are to be occupied, however for any credits to be awarded all spaces that are covered by the assessment would need to be compliant. On this basis, the credit can be included in the likely score.

The building will not be adopting a natural ventilation strategy.

Thermal modelling of the building will be carried out, Atelier Ten believe it should be feasible to include a projected climate change scenario in the modelling to achieve the second credit.

Once the modelling is complete a thermal control strategy detailing the thermal zones and controls will be produced.

The credit requirements have been sent to Sandy Brown and they will develop the required evidence accordingly.

MM and BDP have discussed the requirements for the Safe Access credit and believe that an argument can be made that construction of a dedicated cycle lane on site would be impractical, due to the short distance between the site boundary and the entrance to the bicycle ramp. MM have sent to a query to the BRE to determine if this approach would be acceptable. They responded that since access to the building occurs through a pavement that is shared with the public domain, we would not expect provision of cycle lanes, as this would be impractical. Therefore this credit can be included in the likely score. BDP Ground Team to collate the required information.

MM confirm that recommendations made by Cornerstone must be incorporated in the design to meet the Security credit. If not, justification must be given as to why these cannot be included - economic reasons are not acceptable.

Additional recommendations have been provided by Cornerstone. BDP/BIG to demonstrate that these will be implemented in to the project's design.

Summary of BREEAM requirements: Energy

Energy

lssue ref.	Credit title	Resp. Party	Key actions	Evidence Required	Likely credits	Impact on final score (Likely)	Possible credits	Impact on final score (Possible)
ENE 01	Reduction of Energy Use and CO2 emissions	Team	Up to Twelve Credits - Energy performance (8 credits Likely) Calculate the Energy Performance Ratio for New Construction (EPR _{Nc}). To achieve 'Very Good', a EPRnc of at least 0.075 would be required To achieve 'Excellent', a EPRnc of at least 0.375 would be required. To achieve 'Outstanding', a EPRnc of at least 0.60 would be required.	A copy of the Building Regulations Output Document from the approved software. The output documents must be based on the design stage of analysis. A copy of the Building Regulations Output	8	4.80%	0	0.00%
ENE 02	2 Energy monitoring	Atelier Ten	One Credit - Sub-metering of major energy consuming systems (Likely) Major energy consuming systems (where present) should be monitored using either a Building Energy Management System (BEMS) or separate accessible energy sub-meters with a pulsed output to enable future connection. The end energy use is identifiable to the building user through labelling or data outputs. One Credit - Sub-metering of high energy load and tenancy areas (Likely) An accessible energy monitoring and management system or separate accessible energy sub-meters with pulsed or other open protocol communication outputs to enable future connection to an energy monitoring and management system are provided, covering a significant majority of the energy supply to tenanted areas or, in the case of single occupancy buildings, relevant function areas or departments within the building/unit.	Specification document or technical drawing confirming energy-consuming systems and their rated outputs; metering arrangements for each system, type and location of meter specified.	2	1.20%	0	0.00%
ENE 03	B External lighting	BDP	The average initial luminous efficacy of the external light fittings within the construction zone is not less than 60 luminaire lumens per circuit Watt. All external light fittings are automatically controlled for prevention of operation during daylight hours and presence detection in areas of intermittent pedestrian traffic. (Likely)	 Marked up site plan and building elevations showing the location and purpose of all external light fittings. Lighting specification or lighting designer's calculations confirming the lamp lumens/circuit watt for each type of fitting as well as the colour rendering index (where appropriate) The external lighting control strategy 	1	0.60%	0	0.00%
ENE 04	Low Carbon Design	Atelier Ten	One Credit - Passive Design (Likely) The project team carries out an analysis of the existing fabric, form, site location and outline scheme design to influence decisions made during Concept Design stage (RIBA Stage 2 or equivalent). Demonstrate a meaningful reduction in the total energy demand through the use of passive design solutions. One Credit - Free Cooling (Not Targeted) The passive design analysis carried out includes an analysis of free cooling and identifies opportunities for the implementation of free cooling solutions. The building uses ANY of the free cooling strategies listed by BREEAM to reduce the cooling energy demand, i.e. it does not use active cooling. One Credit - Low Zero Carbon Feasibility Study (Likely) A feasibility study has been carried out by the completion of the Concept Design stage (RIBA Stage 2 or equivalent) by an energy specialist (see Relevant definitions) to establish the most appropriate recognised local (on-site or near-site) low or zero carbon (LZC) energy source(s) for the building/development. A local LZC technology/technologies has/have been specified for the building/development in line with the recommendations of this feasibility study and this method of supply results in a meaningful reduction in regulated carbon dioxide (CO2) emissions.	One Credit - Passive Design Results from the passive design analysis including the analysis of free cooling and identified opportunities for the implementation of passive design solutions. The team demonstrate a meaningful reduction in the total energy demand through the use of passive design solutions. One credit - Free Cooling Copy of the specification/design documentation showing the use of free cooling in the development. One Credit - Low Zero Carbon Feasibility Study A copy of the feasibility study report Marked up design plans or specifications confirming the proposed installation of LZC technology and manufacturers technical data (details or calculations) stating the carbon savings as a result.	2	1.20%	0	0.00%
ENE 05	Energy efficient cold storage	SeftonHorn Winch	One Credit - Refrigeration energy consumption (Likely) 1. The refrigeration system, its controls and components have been designed, installed and commissioned in accordance with the relevant standards (see BREEAM manual). 2. The refrigeration plant has been commissioned to comply with the criteria for commissioning outlined in BREEAM issue Man 04 Commissioning and handover. One Credit - Indirect greenhouse gas emissions (Likely) The installed refrigeration system demonstrates a saving in indirect greenhouse gas emissions (CO2 eq.) over the course of its operational life.	One credit - Refrigeration energy consumption A copy of the specification showing that all refrigeration systems and controls have been designed in accordance with the Code of Conduct for carbon reduction in the refrigeration retail sector1 (see Other information) and BS EN 378-2 and using robust and tested refrigeration systems/components, normally defined as those included on the Enhanced Capital Allowance (ECA) Energy Technology Product List (ETPL) or an equivalent list.	2	1.20%	0	0.00%

Notes and comments

There have been a number of recent updates regarding this issue and A10 have provided revised calculations and options for consideration. S106 requirements are more stringent than BREEAM, meaning that achieving 8 points (a minimum requirement for Outstanding) will be mandatory in order to meet the planning obligations. If the lighting efficacy can be increased then no PVs would be required to reach this.

A10's calculations show that it will be very difficult to achieve any further credits at this stage.

Both credits under this issue should be achieved, as these criteria also form part of the Google Project Requirements.

If appropriate light fittings are specified, the required lighting levels should not be strenuous to meet.

All external lighting should be automatically controlled and have presence detection in areas of intermittent pedestrian traffic.

Atelier Ten have carried out a passive design analysis, this was included as part of the Stage 2 report.

There will be displacement ventilation in the building, but it will not be provided to every occupied space. Therefore the free cooling credit cannot be achieved.

Atelier Ten included the LZC feasibility study as part of the Stage 2 report.

In order to close out the credits, confirmation is required of how much the passive design measures will reduce energy demand and what area of PVs will be installed. Discussions on these aspects of the design are still ongoing, so this information can be provided once they have been finalised.

MM have discussed the credit requirements with SeftonHornWinch. The manufacturer they propose to use for the Cold Store rooms will be able to demonstrate compliance with criteria.

ENE 06	Energy efficient transportation systems	Sweco	One Credit - Energy Consumption (Likely) An analysis of the transportation demand and usage patterns for the building to be carried out by the design team to determine the optimum number and size of lifts (including counter-balancing ratio). The energy consumption has been calculated in accordance with BS EN ISO 25745 Energy performance of lifts, escalators and moving walks, Part 2 : Energy calculation and classification for lifts Two Credits - Energy Efficient Features (Likely) The three energy-saving features that offer potential energy savings should be specified. Where the use of regenerative drives is demonstrated to save energy, they are specified	One Credit - Energy Consumption A copy of the relevant report or documentation detailing the analysis undertaken and findings/recommendations. Two Credits - Energy Efficient Features A copy of the lift specification and the energy saving features that were specified for the lifts.	3	1.80%	0	0.00%
ENE 08	Energy Efficient Equipment	Google, SeftonHorn Winch	Two credits (Likely) Identify the building's unregulated energy consuming loads and estimate their contribution to the total annual unregulated energy consumption of the building, assuming a typical/standard specification. Identify the systems and/or processes that use a significant proportion of the total annual unregulated energy demand of the development and its operation.	A copy of the specification confirming the make and model of all white goods to be provided. Manufacturer's literature confirming the EU Energy Efficiency Labelling Scheme energy rating for all white goods to be provided.	2	1.20%	0	0.00%
				Total Section Score:	20	12.00%	0	0.00%

MM have discussed the credit requirements with Sweco. They will be able to produce the required evidence.

The vertical transportation design is currently being updated in line with Google requirements.

Credit looks at procurement of office equipment which will primarily form part of the Google fit-out requirement. Relates to all equipment, including VC equipment. It has been identified that if P.G. 2.4 is followed, the criteria can be met as long as it can be demonstrated that all equipment meet Energy Star standards.

A10 have undertaken preliminary TM54 calculations and note that kitchen equipment is the largest contributor of unregulated energy (compared to the swimming pool). MM reviewed the Stage 2 report and confirm this is correct. It should be checked that these calculations are still applicable now the design has progressed.

MM have discussed in further detail with SHW who will approach manufactures that can provide equipment to meet the requirements.



Summary of BREEAM requirements: Transport

Transport

lssue ref.	Credit title	Resp. Party	Key actions	Evidence Required	Likely credits	Impact on final score (Likely)	Possible credits	Impact on final score (Possible)
TRA 01	Public transport accessibility	MM	Up to Three Credits - Accessibility Index (3 credits likely) The Accessibility Index is determined by entering the following information in to the BREEAM Tra 01 calculator: a. The distance (m) from the main building entrance to each compliant public transport node b. The public transport type(s) serving the compliant node e.g. bus or rail c. The average number of services stopping per hour at each compliant node during the operating hours of the building for a typical day.	As the site is in Greater London, MM can use Transport for London's Planning Information Database to calculate the Transport Accessibility Index for the project.	3	3.00%	0	0.00%
TRA 02	Proximity to amenities	Argent	One Credit (Likely) Confirmation that the building is located within 500m of the following amenities; - Outdoor space - Post office - Pharmacy - GP / Medical centre - Childcare facility or school - Grocery shop / food store; - leisure/fitness/sports centre. - Cash Machine;	A marked up scaled map highlighting the location of the assessed building, the location and type of amenities, the safe pedestrian route to the amenities.	1	1.00%	0	0.00%
TRA 03	Cyclist Facilities	BDP	One Credit - Cycle Storage (Likely) The maximum occupancy of the building must be determined, to allow the calculation of the number of cycle spaces required to meet compliance. One Credit - Cyclist Facilities (Likely) Cyclist facilities, including showers and changing rooms, to be present onsite. The number of these required will be determined depending upon the occupancy.	A site plan and design details confirming the number, type, dimensions and layout of spaces and location of cycle storage. Relevant specification clauses detailing the lighting in accordance with relevant British Standard Details of building occupancy or net let table floor area. Design drawings or specifications detailing the number of showers; the changing room provision; secure locker locations, dimensions and numbers; and the provision of drying space.	2	2.00%	0	0.00%
TRA 04	Maximum Parking Capacity	BDP	Up to Two Credits - Car parking capacity (Likely) The building's car parking capacity is below the maximum allowance calculated based on BREEAM requirements.	A site plan or copy of the specification confirming: Number and type of parking spaces provided for the building and relevant documentation or correspondence from the design team or client confirming the number of building users.	2	2.00%	0	0.00%
TRA 05	Travel plan	Transport Consultant, Argent	One Credit - Travel plan (Likely) A travel plan has been developed as part of the feasibility and design stages. A site specific travel assessment/statement has been undertaken to ensure the travel plan is structured to meet the needs of the particular site. The travel plan includes a package of measures to encourage the use of sustainable modes of transport and movement of people and goods during the buildings operation and use. If the occupier is known, they must be involved in the development of the travel plan and they must confirm that the travel plan will be implemented post construction and be supported by the buildings management in operation.	A copy of the site specific transport survey/assessment. A copy of the travel plan. A marked up copy of the site plan demonstrating examples of recommendation of the plan that have been implemented. Letter of commitment to implement the Travel Plan upon occupation of the proposed development, including a named member of staff who will act as Coordinator of the Travel Plan.	1	1.00%	0	0.00%
				Total Section Score:	9	9.00%	0	0.00%

Notes and comments

Transport for London's Planning Information Database calculates that the project has achieved all 3 credits.

A map of the wider to site highlighting the pedestrian routes to local services has been provided.

Both credits have been targeted as likely, BDP have provided the below numbers during the original pre-assessment: 408 spaces

40 showers

400 lockers

Confirmation is required that these numbers are still correct.

Drawings showing the locations of the cycle spaces and facilities will be required to close out the credits. BDP Ground Team to issue evidence.

There will be no car parking on site, aside from some disabled spaces, therefore both credits will be achieved. BDP Basement Team to issue plans.

The King's Cross Estate ATP complies with the BREEAM criteria. To close out the credit, the client must confirm that they will implement the Travel Plan post construction.



Summary of BREEAM requirements: Water

Water

lssue ref.	Credit title	Resp. Party	Key actions	Evidence Required	Likely credits	Impact on final score (Likely)	Possible credits	Impact on final score (Possible)
WAT 01	Water consumption	Atelier Ten	Up to Five Credits - Water Consumption (5 credits Likely) (Exemplary Performance possible) Please specify the performance of the building's domestic water-consuming components so the data can be inputted into the Wat 01 Calculator.	A copy of relevant sections of the sanitary ware specification and/or manufacturer's details confirming the type and amount of fittings and controls installed. Effective flow volumes and the number of fittings required to fill in the calculator. Copy of the Wat 01 Calculator	5	3.89%	0	0.00%
WAT 02	Water monitoring	Atelier Ten	One Credit - Water Monitoring (Likely) 1. The specification of a water meter on the mains water supply to each building; this includes instances where water is supplied via a borehole or other private source. 2. Water-consuming plant or building areas, consuming 10% or more of the building's total water demand, are either fitted with easily accessible sub-meters or have water monitoring equipment integral to the plant or area. 3. Each meter (main and sub) has a pulsed or other open protocol communication output to enable connection to an appropriate utility monitoring and management system, e.g. a building management system (BMS), for the monitoring of water consumption. 4. If the construction zone is within a site that has an existing BMS, the pulsed/digital water meter(s) for the construction zone must be connected to the existing BMS	A copy of the specification clause confirming the specification and type of water meter(s) and the connection to the BMS.	1	0.78%	0	0.00%
WAT 03	Water leak detection an	d Atelier Ten	One Credit - Leak Detection System (Likely) A permanent, automated leak detection to be fitted on the mains water supply. The system must be able to alert building occupants of a leak, identify different flow and therefore leakage rates, be programmable to suit the owner/occupiers' water consumption criteria, designed to avoid false alarms caused by normal operation of large water-consuming plant. One Credit - Flow Control Devices (Likely) Flow control devices on each WC area/facility to be included in the design.	A copy of relevant specification clauses confirming the scope and performance of leak detection systems; Design drawings; Manufacturer's details confirming the technical specification of the specified systems.	2	1.56%	0	0.00%
WAT 04	Water efficient equipment	Gillespies	One Credit (Likely) Confirmation required as to whether there is an irrigation system to be included within the project scope. If a system is to be included, evidence is required to demonstrate / confirm that the system is BREEAM compliant.	Documentation detailing the planting and irrigation strategy; Relevant section / clauses of the building specification or contract; AND/OR Design drawings; Manufacturers product details.	1	0.78%	0	0.00%
				Total Section Score:	9	7.00%	0	0.00%

Notes and comments
The client has made the decision that vacuum drainage will not be used in the ouilding.
MM have carried out calculations to determine current performance. As it stands, greywater and 4.5/3 litre dual flush WCs could be utilised to achieve 5 credits and exemplary performance.
A10 will now be updating their water balance calculations to set out the different options.
A mains water meter and sub-meters are planned for the building. It should be ensured that water-consuming plant or building areas, consuming 10% or more of the building's total water demand, are fitted with easily accessible sub- meters.
The requirements for a leak detection system can be included in the metering strategy for the building. Flow control devices to the WC areas will be included n the design.
MM have received confirmation from the BRE that internal irrigation does fall under the scope of this issue, however it is thought that the system specified will meet the BREEAM criteria.
Gillespies are aware of the criteria and will keep them in mind when specifying the irrigation system.



Summary of BREEAM requirements: Materials

Materials

l	lssue ref.	Credit title	Resp. Party	Key actions	Evidence Required	Likely credits	Impact on final score (Likely)	Possible credits	Impact on final score (Possible)
	MAT 01	Life cycle impacts	BDP	Up to Six Credits - Green Guide Rating (3 credits likely) Details of the materials to be specified for the following element types to be provided; - External walls; - Windows; - Roof; - Upper floor slab; - Internal Walls; - Floor finishes / coverings. The green guide rating of each material must be provided. Architect to specify materials with a GGR of A or A+ where feasible. Green Guide ratings for the specification(s) of each element can be found at www.thegreenguide.org.uk Assessor to input details of materials in Mat01 calculator to determine number of credits which can be awarded.	Specifications confirming a detailed description of each applicable element and its constituent materials; Green Guide rating and element number for each specification assessed; Design drawings or specification detailing location and area (m ²) of each applicable element. A copy of the output from the BREEAM Mat 01 Calculator tool.	3	3.12%	0	0.00%
Ī	MAT 02	Hard landscaping and boundary protection	BDP	One credit - Green Guide Rating (Likely) Where at least 80% of all external hard landscaping and 80% of all boundary protection (by area) in the construction zone achieves an A or A+ rating, as defined in the Green Guide to Specification. Green Guide ratings for the specification(s) of each element can be found at www.thegreenguide.org.uk	Specifications confirming a detailed description of each applicable element and its constituent materials; Green Guide rating and element number for each specification assessed; Design drawings or specification detailing location and area (m ²) of each applicable element.	1	1.04%	0	0.00%
ľ	MAT 03	Responsible Sourcing of Materials	Principal Contractor Principal Contractor Team, Principal Contractor	Pre-Requisite (Likely) All timber used on the project to be sourced in accordance with the UK Government's Timber Procurement Policy. One Credit - Sustainable procurement plan (Likely) The principal contractor sources materials for the project in accordance with a documented sustainable procurement plan. Up to 3 credits - Responsible Sourcing of Materials (1 credit likely) Credits available where specified materials comprising the main building elements are responsibly sourced in accordance with at least one BREEAM approved responsible sourcing scheme.	 Pre-requisite A letter of intent confirming that timber shall be sourced from suppliers capable of providing certification to the level required for the particular tier. Sustainable procurement plan Copy of the sustainable procurement plan. Responsible sourcing of materials Design plan or specification confirming the location of elements and materials specified and details of the materials specified. Documentary evidence detailing how the calculator tool has been completed e.g. specifications, certificates. Completed copy of the Mat 03 Calculator tool. 	2	2.08%	0	0.00%
ľ	MAT 04	Insulation	BDP, A10	One Credit - Embodied impact (Likely) All new insulation specified for use within the following building elements must be assessed; 1. External Walls; 2. Ground Floor; 3. Roof; 4. Building Services. The Insulation Index for the building fabric and services insulation is the same as or greater than 2.5. The Green Guide rating of each material must be provided, along with the area and thickness of material used.	Marked up design plans/elevations and relevant specification clauses detailing the location of insulating materials and the area and thickness (or volume) specified. Manufacturer's technical details confirming the thickness and thermal conductivity of the insulating materials specified.	1	1.04%	0	0.00%
Ī	MAT 05	Designing for robustness	BDP	One Credit (Likely) Identification of areas, both internally and externally, where vehicular, trolley and pedestrian movement occur. Suitable durability and protection measures to be specified to prevent damage to vulnerable parts of the building. The relevant building elements incorporate appropriate design and specification measures to limit material degradation due to environmental factors.	Marked up design drawings illustrating vulnerable areas/parts of the building and the durability measures specified to protect those areas. Evidence of discussions and design measures implemented to prevent degradation of materials from environmental factors.	1	1.04%	0	0.00%
	MAT 06	Material Efficiency	BDP, BIG	One Credit (Likely) Opportunities have been identified, and appropriate measures investigated and implemented, to optimise the use of materials in building design, procurement, construction, maintenance and end of life. The above is carried out by the design/construction team in consultation with the relevant parties at each of the following RIBA stages: a. Preparation and Brief b. Concept Design c. Developed Design d. Technical Design e. Construction	Written confirmation that opportunities will be identified, and appropriate measures investigated and implemented, to optimise the use of materials in building design, procurement, construction, maintenance and end of life a the relevant RIBA stages.	1	1.04%	0	0.00%
						9	9.35%	0	0.00%

Notes and comments

3 credits is an indicative target for now as this is common level of performance for office buildings.

Products with EPDs do help to uplift the score under this issue, and so it is something to keep in mind while specifying materials as it also goes towards LEED compliance. No further credits are to be deemed likely at this stage but consideration should be given as the design progresses.

BDP to include the requirements within the specifications.

There will be no boundary protection on site, so only the hard landscaping will be applicable to this credit. It must be ensured that these materials are either A or A+.

BDP to include the requirements within the specifications.

These requirements should be included in the Contractor tender documents. One credit under the responsible sourcing of materials is an indicative target for now.

It has been identified by G&T that achieving these two extra credits may limit the variety of materials that can be specified by the design team. G&T have identified that an extra £2.5 million would be required to secure these credits.

BDP to include the requirements within the specifications.

This credit should be achieved - careful consideration should be given to choosing products with high green guide ratings if possible.

BDP to provide evidence on how vulnerable parts of the building will be protected. MM will provide examples of what sort of information is required.

Arup to provide documentation detailing how exposed parts of the building will be protected from material degradation due to environmental factors.

MM have discussed the requirements further with BDP and BIG. It should be ensured that discussions and decisions on optimising the use of materials in building design, procurement, construction, maintenance and end of life, have been recorded at each Stage.



Summary of BREEAM requirements: Waste

Waste

lssue ref.	Credit title	Resp. Party	Key actions	Evidence Required	Likely credits	Impact on final score (Likely)	Possible credits	Impact on final score (Possible)
WST 01	Construction waste management	Principal Contractor	Up to three credits - Construction Resource efficiency (2 credits Likely) (1 credit not targeted) Produce a Resource Management Plan (RMP), reduce and record construction waste. Principal Contractor to specify waste generation and diversion targets in line with the team's BREEAM expectations. One credit - Diversion of resources from landfill (Likely) Divert demolition and construction waste from landfill to meet the team's BREEAM targets Exemplary Level Criteria (Unlikely) The following outlines the exemplary level criteria to achieve an innovation credit for this BREEAM issue: Non-hazardous construction waste generated by the building's design and on-site construction and off-site manufacture or fabrication (excluding demolition and excavation waste) is no greater than the exemplary level resource efficiency benchmark. The percentage of non-hazardous construction (on-site and dedicated off-site manufacture/fabrication), demolition and excavation waste (if relevant) diverted from landfill meets or exceeds the exemplary level percentage benchmark. All key waste groups are identified for diversion from landfill in the RMP.	 A copy of the compliant Resource Management Plan containing the appropriate bench marks, commitments and procedures and, where relevant a copy of the pre-demolition OR A copy of relevant specification clauses that require the principal contractor to produce a RMP in line with requirements; contains the detailed requirements with respect to resource efficiency benchmarks and targets and procedures to be included in the RMP. A consistent record of all demolition and construction waste generated, along with diversion / recycling rates. Include details of waste management and recycling facility. 	3	2.83%	0	0.00%
WST 02	Recycled Aggregates	AKT II	One Credit - Recycled Aggregates (Not targeted) The total amount of recycled or secondary aggregate specified, is greater than 25% (by weight or volume) of the total high grade aggregate specified for the development. Where the minimum level is not met for an application, all the aggregate in that application must be considered as primary aggregate when calculating the total high grade aggregate specified.	A copy of the relevant specification or contract clause confirming recycled and secondary aggregate use requirements for the project OR Calculation confirming the amount of recycled or secondary aggregate to be used. Formal written confirmation from the design team or main contractor of the source of recycled/secondary aggregates and that the required amount and quality can be obtained from this source.	0	0.00%	0	0.00%
WST 03	Operational waste	BDP	One Credit - Operational Waste (Likely) Centralised waste storage area should be present on site for the segregation and storage of recyclables. The space must be clearly labelled to assist with segregation, accessible to building occupants or facilities operators, and of a capacity appropriate to the building's size and number of occupants. Total area (m2) of the storage area should be an appropriate size to meet BREEAM criteria.	Marked up building site plan confirming the location and size of the dedicated recyclable storage area and the storage area for general waste, as well as other waste facilities present. Project team meeting minutes / letter confirming likely building waste streams and indicative volumes.	1	0.94%	0	0.00%
WST 04	Speculative Floor and Ceiling Finishes	BDP, BIG, Google	One credit - Speculative floor and ceiling finishes (Likely) For tenanted areas (where the future occupant is not known), prior to full fit-out works, carpets, other floor finishes and ceiling finishes have been installed in a show area only. In a building developed for a specific occupant, that occupant has selected (or agreed to) the specified floor and ceiling finishes.	Design drawings and/or relevant section/clauses of the building specification or contract. AND/OR A letter from the client, project team or building user where the future occupant is known.	1	0.94%	0	0.00%
WST 05	Adaptation to climate change	AKT II	One Credit - Structural and Fabric Resilience (Likely) Conduct a climate change adaptation strategy appraisal for structural and fabric resilience by the end of Concept Design (RIBA Stage 2 or equivalent) including a systematic (structural and fabric resilience specific) risk assessment to identify and evaluate the impact on the building over its projected life cycle from expected extreme weather conditions arising from climate change and, where feasible, mitigate against these impacts.	Provide a copy of the climate change adaptation strategy appraisal.	1	0.94%	0	0.00%
WST 06	Functional adaptability	BDP	One Credit - Functional Adaptability (Likely) A building-specific functional adaptation strategy study has been undertaken by the client and design team by Concept Design (RIBA Stage 2 or equivalent), which includes recommendations for measures to be incorporated to facilitate future adaptation. Functional adaptation measures have been implemented (RIBA Stage 4 or equivalent) ir accordance with the functional adaptation strategy recommendations, where practical and cost effective. Omissions have been justified in writing to the assessor.	Functional adaptation strategy. Evidence showing how these functional adaptation measures have been implemented into the design of the building, e.g. drawings or written narratives.	1	0.94%	0	0.00%
				Total Section Score:	7	6.61%	0	0.00%

Notes and comments These requirements have been included in the Contractor tender documentation. Two credits is a realistic target for construction resource efficiency, but anything beyond this will be difficult for the Contractor to achieve due to the constraints of the site. G&T have conducted a feasibility assessment for the use of recycled aggregates and determined that this credit would be very difficult to achieve based on industry feedback. Based on this the credit will not be targeted. There is likely to be a suitably sized storage space for recyclables on site. As the building will be over 5,000m² and have catering areas, BREEAM recommends that at least 20m² should be dedicated to the storage of operational recyclable waste volumes. BDP Basement Team to provide plans and details of what storage will be available for the different types of recyclables. If Google is satisfied with the finishes specified, then confirmation from them is all that would be required to close out this credit. AKT have produced a design note setting out the Structural and Fabric Resilience Strategy for the building, based on the likely weather hazards identified. The Stage 2 report proposed a variety of functional adaptation measures for consideration.

In order for the credit to be fully closed out, it must be demonstrated that these measures have been integrated into the design of the building prior to the end of Stage 4.

Summary of BREEAM requirements: Land Use and Ecology

Land Use and Ecology

lssue ref.	Credit title	Resp. Party	Key actions	Evidence Required	Likely credits	Impact on final score (Likely)	Possible credits	Impact on final score (Possible)
LE 01	Site selection	Argent	 One Credit - Previously Occupied Land (Likely) At least 75% of the proposed development's footprint is on an area of land which has previously been occupied by industrial, commercial or domestic buildings or fixed surface infrastructure. One Credit - Contaminated Land (Likely) A site investigation, risk assessment and appraisal have deemed land within the site to be affected by contamination. The site investigation, risk assessment and appraisal have identified the degree and source of the contamination, as well as options for remediation. Remediation was carried out in compliance with the relevant standards. 	 Previously Occupied Land Existing site plan and/or site photographs confirming previous land use and area (m²) of that use. A proposed site plan showing the location and footprint of the proposed development and temporary works. Contaminated Land A copy of the site investigation and assessment report. Evidence of remediation works in compliance with the relevant standards. 	2	2.00%	0	0.00%
LE 02	Protection of ecological features	Argent, Ecologist Principal Contractor	One Credit - Ecological Value of Site (Likely) Suitably Qualified Ecologist to identify the land as being of 'low ecological value' within an ecological assessment report, based on a site survey. One Credit - Protection of Ecological Features (Likely) All existing features of ecological value surrounding construction zone and site boundary to be adequately protected by barriers. Contractor to construct ecological protection prior to any preliminary site construction or preparation works.	One Credit - Ecological Value of Site A copy of the Ecologist's report confirming the low ecological value of the site and recommended protection of ecological features surrounding the construction zone. Confirmation of Ecologist's qualifications. One Credit - Protection of Ecological Features Written confirmation of the protection measures put in place and that they are in line with BS42020: 2013.	2	2.00%	0	0.00%
LE 03	Minimising impact on existing site ecology	Argent, Ecologist	Up to Two Credits - Change in Ecological Value (2 credits likely) SQE to include details for input into the BREEAM LE03 calculator : Where a Suitably Qualified Ecologist (SQE) has been appointed and, based on their site survey, they confirm the following and either the assessor or ecologist inputs this data in to the BREEAM LE 03/LE 04 calculator: - Broad habitat types that define the landscape of the assessed site in its existing pre- developed state and proposed state. - Area of the existing and proposed broad habitat plot types - Average total taxon (plant species) richness within each habitat type.	Design drawings including proposed and existing site plan / survey and a completed copy of LE03/04 Calculator signed and dated by the ecologist.	2	2.00%	0	0.00%
LE 04	Enhancing site ecology	Argent, Ecologist Ecologist and Google	One Credit - Ecologist's Report and Recommendations (Likely) An SQE has been appointed and reported on enhancing and protecting the ecology of the site. The general recommendations of the ecology report, which should be produced based on a site survey at RIBA Stage 2, to be implemented by the project team. One Credit - Increase in Ecological Value (Likely) The general recommendations of the ecology report have been implemented into the final design and will result in an increase of six plant species or greater and this is calculated using the BREEAM LE 03/LE 04 calculator.	One Credit - Ecologist's Report and Recommendations A copy of the Ecologist's report Design drawings including proposed and existing site plan / survey. One Credit - Increase in Ecological Value Written confirmation from the client / design team confirming how the ecologist's recommendations will be implemented. A completed copy of the LE03/04 Calculator to determine number of credits.	2	2.00%	0	0.00%
LE 05	Long term impact on biodiversity	Argent, Ecologist and Principal Contractor	 Up to two credits (2 credits likely) 1. An SQE appointed and confirms all relevant legislation has been complied too. 2. Produce a landscape and habitat management plan to cover the first 5 years after project completion - to be handed to building occupants. 3. The amount of additional criteria met will determine the number of credits achieved Many of these are the responsibility of the appointed Principal Contractor. 	A copy of the site's landscape and habitat management plan; OR Relevant sections / clauses of the building specification or contract confirming its development and scope; OR A letter from the client confirming a commitment to produce the management plan and its' scope. A letter of commitment from the Principal Contractor confirming that they will undertake / meet the additional requirements. Must specifically state which are targeted.	2	2.00%	0	0.00%
				Total Section Score:	10	10.00%	0	0.00%

Notes and comments
Documentation previously collected has been provided and demonstrates compliance with the previously occupied land credit.
It is understood that criteria can be met through previous reporting and remediation works. Argent to provide contamination and remediation report. This may require a review and quick update before being sent.
Argent have advised that an Ecologist will be appointed and an ecological assessment carried out. MM have sent Argent the detailed criteria to allow a clear scope to be set out.
Argent to advise when the Ecologist has been appointed.
The criteria for the protection of ecological features should be included in the Contractor tender documentation, if this is determined by the Ecologist as a relevant requirement.
Argent have advised that an Ecologist will be appointed and an ecological
assessment carried out. MM have sent Argent the detailed criteria to allow a clear scope to be set out.
Argent to advise when the Ecologist has been appointed.
Argent have advised that an Ecologist will be appointed and an ecological assessment carried out. MM have sent Argent the detailed criteria to allow a clear scope to be set out.
Argent to advise when the Ecologist has been appointed.

Argent have advised that an Ecologist will be appointed and an ecological assessment carried out. MM have sent Argent the detailed criteria to allow a clear scope to be set out.

Argent to advise when the Ecologist has been appointed.

The additional requirements deemed applicable to the project by the Ecologist should be included in the Contractor tender documentation.



Summary of BREEAM requirements: Pollution

Pollution

lssu ref.	e Credit title	Resp. Party	Key actions	Evidence Required	Likely credits	Impact on final score (Likely)	Possible credits	Impact on final score (Possible)
POL	01 Impact of refrigerants	Atelier Ten, SHW	Up to Two Credits - Impact of Refrigerants (1 credit likely) (1 credit possible) Two credits Systems using refrigerants have Direct Effect Life Cycle CO2 equivalent emissions (DELC CO2e) of ≤100 kgCO2e /kW cooling/heating capacity. OR The air-conditioning or refrigeration systems are installed the refrigerants used have a Global Warming Potential (GWP) ≤10. One credit Systems using refrigerants have Direct Effect Life Cycle CO2 equivalent emissions (DELC CO2e) of ≤1000 kgCO2e /kW cooling/heating capacity One Credit - Leak Detection (Likely) A refrigerant leak detection and containment system should be included within the specification.	Copies of the relevant specification clauses confirming either the absence of refrigerant in the development or the types of refrigerant to be used. Manufacturer's information confirming the GWP of each refrigerant. Completed copy of the Pol 01 calculator tool Specification detailing the leak detection system.	2	1.54%	1	0.77%
POL	12 NOx emissions	-	Up to three credits (Not Targeted) Where the plant installed to meet the building's delivered heating and hot water demand has, under normal operating conditions, a NOx emission level (measured on a dry basis a 0% excess O2) as follows: ≤ 100 mg/kWh = 1 Credit ≤ 70 mg/kWh = 2 Credits ≤ 40 mg/kWh = 3 Credits	Relevant specification clauses confirming the type of heating system(s) installed. t Manufacturer's details confirming the dry NOx emissions rate in mg/kWh (Where more than one system is providing heat and calculations are required to confirm the average NOx emission rate)	0	0.00%	0	0.00%
POL	3 Surface water Run off	Gillespies	Up to Two Credits - Flood Resilience (2 credits likely) Where a site-specific flood risk assessment (FRA) confirms the development is situated in a flood zone that is defined as having a low annual probability of flooding (in accordance with current best practice national planning guidance). The FRA must take all current and future sources of flooding into consideration OR In a medium/high risk zone appropriate flood resilience and resistance measures are put in place. Two Credits - Surface Water Run-off (2 credits likely) An appropriate consultant confirms drainage measures are specified to ensure that the peak rate of run-off from the site to the watercourses (natural or municipal) is no greater for the developed site than it was for the pre-development site. This should comply at the 1-year and 100-year return period events. Flooding of property will not occur in the event of local drainage system failure (caused either by extreme rainfall or a lack of maintenance). One Credit - Minimising Watercourse Pollution (Likely) There is no discharge from the developed site for rainfall up to 5mm (confirmed by the Appropriate Consultant). In areas with a low risk source of watercourse pollution, an appropriate level of pollution prevention treatment is provided, using appropriate SuDS techniques.	 Flood Resilience A copy of the flood map or flood risk assessment confirming the flood zone or annual probability of flooding in the site location. A copy of the flood risk assessment and site plans confirming: the design flood level for the site; the design ground levels for all developed areas of the site; safe access and escape routes. Correspondence from the appropriate statutory body confirming a reduced annual probability of flooding due to flood defences where applicable. Surface Water run off credits Consultant's report containing all information necessary to demonstrate compliance including: Type and storage volume (L) of the drainage measures. Total area of hard surfaces (m2) Peak/volume flow rates (l/s) pre and post development for the return periods. Additional allowance for climate change designed into the system. Immising Watercourse Pollution Consultant's report detailing the design specifications, calculations and drawings to support the 5mm rainfall discharge criteria. Design drawings and/or relevant section/clauses of the building specification or contract indicating: High and low risk areas of the site Specification of SUDS, source control system soil/petrol interceptors and shut off valves as appropriate. 	5	3.85%	0	0.00%

Notes and comments

A10 have advised that HFO1234ze is being considered as a replacement for R134a for the refrigerant chiller. This refrigerant has a very low GWP which would reduce the Direct Effect Life Cycle CO_2 equivalent emissions (DELC CO_2 e) to below100 kgCO₂e/kW cooling/heating capacity.

However, A10 have identified that this will reduce the chiller efficiency, which will affect the energy performance of the building as assessed under Ene 01. As achieving 8 credits for Ene 01 is a minimum standard required for Outstanding, it is important that complying with this Pol 01 credit will not have a negative impact.

MM have discussed the credit requirements with SeftonHornWinch, who confirm that the catering equipment will be specified in line with the Pol 01 requirements.

District heating will be utilised by the building. District heating systems usually have NOx emission rates higher than required by BREEAM. The NOx emissions provided by Metropolitan confirm this to be the case.

Therefore compliance will not be met.

These flood resilience and surface water run-off credits have been documented on a site wide basis by PBA. Compliance with these credits has been achieved.

However, compliance with the minimising watercourse pollution credit cannot be achieved on a site wide basis, as some criteria will not be met. This must be documented specifically for the KGX1 site. Gillespies to advise how the green roof will affect compliance.

POL 04	Reduction of night time light pollution	BDP	One credit (Likely) The external lighting strategy has been designed in compliance with Table 2 (and its accompanying notes) of the ILP Guidance notes for the reduction of obtrusive light, 2011. All external lighting (except for safety and security lighting) can be automatically switched off between 23:00 and 07:00. If safety or security lighting is provided and will be used between 23:00 and 07:00, this part of the lighting system complies with the lower levels of lighting recommended during these hours in Table 2 of the ILP's Guidance notes.	Design drawings, along with the relevant section / clauses of the specification or alternatively the external lighting design data / calculations. M&E engineer to provide indicative examples of where and how the external lighting design strategy complies with the assessment criteria.	1	0.77%	0	0.00%
POL 05	Reduction of noise pollution	Sandy Brown	 One Credit (Likely) 1. When there are no noise-sensitive areas within 800m of the development OR 2. A noise impact assessment should be undertaken by a qualified acoustician in compliance with BS 7445:1991 to measure existing background noise levels and rate the noise level resulting from the new development. Acoustician to be appointed and carry out this assessment. 	Site plan highlighting all existing and proposed noise-sensitive buildings local to (and within) the site boundary; Proposed sources of noise from the new development; Distance (m) from these buildings to the assessed development. A copy of the acousticians report to include the acoustician's qualifications and professional status Relevant specification clauses requiring a noise assessment in compliance with BS4142:1997 by a suitably qualified acoustician; OR Formal written confirmation from the design team confirming the same.	1	0.77%	0	0.00%
				Total Section Score:	9	6.92%	1	0.77%

The ILP Guidance Notes should not be too challenging to achieve, however MM can provide further guidance to the team if necessary.

The credit requirements have been sent to Sandy Brown and they will develop the required evidence accordingly.



Summary of BREEAM requirements: Innovation

Innovation

lssue ref.	Credit title	Resp. Party	Key actions	Evidence Required	Likely credits	Impact on final score (Likely)	Possible credits	Impact on final score (Possible)
Innovati	Innovation	Project Team	 Man 03 - Responsible Construction Practices (Likely) The Principal Contract achieves a CCS score of at least 40, with a score of at least 7 in each section. Man 05 - Aftercare (Likely) There is (or will be) operational infrastructure and resources in place to co-ordinate the following activities at quarterly intervals for the first three years of building occupation: Collection of occupant satisfaction, energy consumption and water consumption data. Analysis of the data to check the building is performing as expected and make any necessary adjustments to systems controls or to inform building user behaviours. Setting targets for reducing water and energy consumption and monitor progress towards these. Feedback any 'lessons learned' to the design team and developer for use in future projects. Provision of the actual annual building energy, water consumption and occupant satisfaction data to BRE. Wat 01 - Water Consumption (Possible) This can be achieved where a 65% improvement can be shown. This would be in line with the Droid Avengers requirements. Mat 01 - Life Cycle Impacts (Two Credits Likely) Where the design team has used an IMPACT compliant software tool (or equivalent) to measure the environmental impact of the building. Where the design team can demonstrate how the use of an IMPACT compliant software (or equivalent) has benefited the building information model (BIM) from the IMPACT compliant software tool (or equivalent) for the assessed building to BRE Global. 	As defined within existing BREEAM issues. One innovation credit can be awarded for each innovation application approved by BRE Global, where the building complies with the criteria defined within an Approved Innovation application form.	4	4.00%	1	1.00%
				Total Section Score:	4	4.00%	1	1.00%

Notes and comments

Man 03 Exemplary Performance criteria have been inputted into the Contractor tender documentation.

Man 05 will require client involvement. This will purely be a monitoring exercise, there are targets to be met and the data will not be made public. This should be a relatively straightforward credit to achieve. Argent to check Google would be content to carry this out.

MM have carried out calculations to determine current performance. As it stands, greywater and 4.5/3 litre dual flush WCs could be utilised to achieve 5 credits and exemplary performance.

Sturgis have confirmed that they have worked on the Mat 01 Exemplary performance requirements before. They have previously received confirmation from the BRE that their software tool is compliant with the criteria.

Sturgis to carry out the assessment to show compliance.

M MOTT MACDONALD

Recommendations

Project title:	Google KGX1
Project description:	BREEAM Recommendations
Rating system used:	BREEAM New Construction 2014
Date of latest issue:	20 January 2017

Outlined below are the additional credits that are believed to be within reach of the project based on our understanding of the current design and construction approach.

These credits have been grouped based on the relative cost and programme implications associated with them. Credits that have not been included below have been deemed too onerous or costly

Current predicted score: 86.64%	Current predicted BREEAM rating: Outstanding (with no margin)
Indicative Score - Low impact: 88.52%	Modified predicted rating: Outstanding (with margin-recommended)
Indicative Score - Low and Medium impact: 89.40%	Modified predicted rating: Outstanding (with margin-recommended)
Indicative Score - Low, Medium and High impact: 94.33%	Modified predicted rating: Outstanding
Indicative Score - Low, Medium, High and Unknown impact: 94.33%	Modified predicted rating: Outstanding

BREEAM Credit	Additional credits achievable	Contribution to final score	Notes				
Additional credits with low cost, programme or technical implications							
Hea01 - Visual Comfort	1	0.88%	With regards to the views out, analysis by BDP has found that the majority of areas in the building meet the requirements, and MM have received confirmation from the BRE that the kitchen spaces can be excluded from the calculations. As the layout of the building may change throughout the design, this will be monitored to see how it affects compliance.				
Wat01 - Water consumption (Exemplary Performance)	1	1.00%	MM have carried out calculations to determine current performance. As it stands, greywater and 4.5/3 litre dual flush WCs could be utilised to achieve 5 credits and exemplary performance.				
TOTAL	2	1.88%					
Addition	al credits with	medium cos	st, programme or technical implications				
Hea06 - Safety and Security (Security)	1	0.88%	MM confirm that recommendations made by Cornerstone must be incorporated in the design to meet the Security credit. If not, justification must be given as to why these cannot be included - economic reasons are not acceptable. Additional recommendations have been provided by Cornerstone. BDP/BIG to demonstrate that these will be implemented in to the project's design.				
TOTAL	1	0.88%					
Additio	onal credits wit	th high cost,	programme or technical implications				
Mat01 - Life Cycle Impacts	2	2.08%	Products with EPDs do help to uplift the score under this issue, and so it is something to keep in mind while specifying materials as it also goes towards LEED compliance. No further credits are to be deemed likely at this stage but consideration should be given as the design progresses				

Mat03 - Responsible Sourcing of Materials	2	2.08%	It has been identified by G&T that achieving these two extra credits may limit the variety of materials that can be specified by the design team. G&T have identified that an extra $\pounds2.5$ million would be required to secure these credits				
Pol01 - Impact of Refrigerants	1	0.77%	A10 have advised that HFO1234ze is being considered as a replacement for R134a for the refrigerant chiller. This refrigerant has a very low GWP which would reduce the Direct Effect Life Cycle CO ₂ equivalent emissions (DELC CO ₂ e) to below100 kgCO ₂ e/kW cooling/heating capacity. However, A10 have identified that this will reduce the chiller efficiency, which will affect the energy performance of the building as assessed under Ene 01. As achieving 8 credits for Ene 01 is a minimum standard required for Outstanding, it is important that complying with this Pol 01 credit will not have a negative impact.				
TOTAL	5	4.93%					
Additional credits with unknown cost, programme or technical implications							
TOTAL	0	0.00%					





Issue and revision record

Revision	Date	Originator	Checker	Approver	Description
0	5th July 2016	L. Aminu	A. Courreges	E. Gulacsy	Stage 2 issue
1	23rd September 2016	L. Aminu	J. Binks	E. Gulacsy	Updated issue
2	12th October 2016	L. Aminu	J. Binks	E. Gulacsy	Updated issue
3	24th October 2016	L. Aminu	J. Binks	E. Gulacsy	Updated issue
4	20th January 2017	L. Aminu	J. Binks	E. Gulacsy	Stage 3 issue
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C. BREEAM Pre-assessment (Retail)

Overall Building Performance

Building name	KGX1 Retail
Indicative BREEAM rating	Very Good
Indicative Total Score	63.9%
Min. standards level achieved	Very Good level

Building Performance by Environment Section



Section score available

	No. credits	Indicative no.	% credits	Section	Indicative
Environmental Section	available	credits Achieved	achieved	Weighting	Section Score
Management	15	9	60.00%	12.50%	7.50%
Health & Wellbeing	8	5	62.50%	10.00%	6.25%
Energy	16	2	12.50%	14.50%	1.81%
Transport	9	7	77.78%	11.50%	8.94%
Water	3	3	100.00%	4.00%	4.00%
Materials	13	9	69.23%	17.50%	12.11%
Waste	8	6	75.00%	11.00%	8.25%
Land Use & Ecology	10	7	70.00%	13.00%	9.10%
Pollution	6	5	83.33%	6.00%	5.00%
Innovation	10	1	10.00%	N/A	1

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BREEAM® UKI



KGX1 Retail	63.90%	Very Good	Very Good level	
Building name	Building score (%)	Building rating	Ainimum standards level achieved	

MANAGEMENT

No. of BREEAM credits available	4	Available contribution to overall score	3.33%
AM innovation credits available	0	Minimum standards applicable	No

	Compliant?	Credits available	Credits achieved
keholder consultation (project delivery) take place?	Yes	1	1
ll stakeholder consultation (third party) take place?	No	1	0
//ill a sustainability champion (design) be assigned?	No	1	0
bility champion (monitoring progress) be assigned?	No	1	0
Total BREEAM credits achieved 1			
ribution to overall building score 0.83%			
EAM innovation credits achieved 0			

Ing			
o. of BREEAM credits available	4	Available contribution to overall score	3.33%
M innovation credits available	0	Minimum standards applicable	No

ent Issue	
oy Assessm	
Performance k	
Building	

18/11/2016



Minimum standard(s) level N/A



	Compliant?	Credits available	Credits achieved
ental life cycle cost (LCC)analyses be carried out?	No	2	0
Will a component level LCC plan be developed?	No	1	0
Will the predicted capital cost be reported?	Yes	1	1
Expected capital cost of the project (if available)		E/m ²	

1	0.83%	N/A	N/A
otal BREEAIM credits achieved	ution to overall building score	M innovation credits achieved	Minimum standard(s) level

Early stage credit (Elemental Life Cycle Analysis) To Total contribu Total BREEAN Will an elem Assessment Criteria Comments/notes:

Building Performance by Assessment Issue
BREEAM®

5.00%	Yes
Available contribution to overall score	Minimum standards applicable
9	1
p. of BREEAM credits available	M innovation credits available

	Compliant?	Credits available	Credits achieved
ne project 'legally harvested and traded timber'?	Yes		
compliant Environmental Management System?	Yes	1	1
ction stage sustainability champion be assigned?	Yes	1	1
be used by the principal contractor? (One credit J. Two credits where 'compliance' is significantly exceeded.)	2	2	2
nstruction site impacts be metered/monitored?	Yes		
site utility consumption be metered/monitored?	Yes	1	1
on materials and waste be metered/monitored?	Yes	1	1
Will exemplary level criteria be met?	Yes	1	1

Energy consumption (total) - site processes	Energy consumption (intensity) - site processes	Distance (total) - materials transport to site	Distance (total) -waste transport from site	gy consumption (total) - materials transport to site	gy consumption (total) - waste transport from site	nsumption (intensity) - materials transport to site	onsumption (intensity) - waste transport from site	

emissions (total) - materials transport to site s emissions (total) - waste transport from site issions (intensity) - materials transport to site issions (intensity) - waste transport from site	ccione (intencity) - materiale transport to cite	emissions (total) - materials transport to site		ouse gas emissions (intensity) - site processes
s emissions (total) - waste transport from site			emissions (total) - materials transport to site	ouse gas emissions (intensity) - site processes emissions (total) - materials transport to site

Use of freshwater resource (total) - site processes

Use

:y) - site processes	9	5.00%	1	Outstanding level
of freshwater resource (intensit	Fotal BREEAM credits achieved	oution to overall building score	M innovation credits achieved	Minimum standard(s) level

Information not available at design stage Information not available at design stage

Information not available at design stage Information not available at design stage Information not available at design stage Information not available at design stage Information not available at design stage Information not available at design stage

Information not available at design stage Information not available at design stage

Building Performance by Assessment Issue

Comments/notes:

Total contri **Total BREE**

Key Performance Indicators: Construction site use of freshwater resources

5 D Greenhous Greenhous Greenhouse ga Greenhouse ga

Key Performance Indicators: Construction site greenhouse gas emissions Process

Energ Ener Energy co Energy co

Key Performance Indicators: Construction site energy use

No. of BREEA

Man 03 Responsible construction practices

Assessment Criteria

Is all site timber used in

Will/does the principal contractor operate

Will a constr

Will a considerate construction schem where 'compliance' has been achiev

b

പ Will Wil

Will transport of construct







0.83%	Yes	
Available contribution to overall score	Minimum standards applicable	
1	0	
o. of BREEAM credits available	M innovation credits available	

Credits achieved

Credits available

Compliant?

		1			
		1			
		Yes			
nd responsibilities be developed & accounted for?	Will a commissioning manager be appointed?	Will the building fabric be commissioned?	ilding user guide be developed prior to handover?	ule be prepared for building occupiers/managers?	

Will a training schedul	le be prepared for building occu	upiers/managers?	
TT	otal BREEAM credits achieved	1	
Total contrib	vution to overall building score	0.83%	
Total BREEA	M innovation credits achieved	N/A	
	Minimum standard(s) level	N/A	
ments/notes:			
05 Aftercare			

o. of BREEAM credits available	N/A	Available contribution to overall score	N/A
M innovation credits available	N/A	Minimum standards applicable	N/A

Credits achieved

Credits available

Compliant?

Assessment issue not applicable

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	Total cont	suilding Performance by Assessment Issue
		Builc

Will aftercare support be provided to building occupiers? Will seasonal commissioning occur over 12months once substantially occupied? Will a post occupancy evaluation be carried out 1 year after occupation?

Will exemplary level criteria be met?

N/A N/A

Total BREEAM credits achieved ibution to overall building score

Assessment Criteria

No. of BREE/

Man

Man 04 Commisioning and handover

No No. of BREEAN

Assessment Criteria

Will commissioning schedule a

Will a bu

Comi

0 Total BREEAM innovation credits achieved Minimum standard(s) level N/A



Comments/notes:



5.00%	No	
Available contribution to overall score	Minimum standards applicable	
4	1	
No. of BREEAM credits available	No. of BREEAM innovation credits available	

vide adequate glare control for building users?020dits will be targeted for the daylighting criteria?020n provide adequate view out for building users?Yes11nd controls be specified in accordance with the relevant CIBSE Guides/British Standards?Yes11Will exemplary level criteria be met?No100		rieveu
Jits will be targeted for the daylighting criteria? 0 2 0 I provide adequate view out for building users? Yes 1 1 Ind controls be specified in accordance with the relevant CIBSE Guides/British Standards? Yes 1 1 Will exemplary level criteria be met? No 1 0 0		
provide adequate view out for building users? Yes 1 nd controls be specified in accordance with the relevant CIBSE Guides/British Standards? Yes 1 Will exemplary level criteria be met? No 1	2	0
Ind controls be specified in accordance with the relevant CIBSE Guides/British Standards? Yes 1 Mill exemplary level criteria be met? No 1 0	1	1
Will exemplary level criteria be met? No 1 1 0	1	1
	1	0
	;	

2	2.50%	0	N/A
Total BREEAM credits achieved	ibution to overall building score	AM innovation credits achieved	Minimum standard(s) level

				pollutants in the building?	ncentration and recirculation of
				ise air pollution?	and building designed to minim
	Credits achieved	Credits available	Compliant?		
No	standards applicable	Minimum		N/A	d innovation credits available
1.25%	ition to overall score	Available contribu		1). of BREEAM credits available

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Hea 02 Indoor Air Quality

Assessment Criteria Will the des How ma

HEALTH & WELLBEING

Hea 01 Visual Comfort

Will the design p How many cr Will the desi

Will internal/external lighting levels, zonin

Total contri

Total BREE

Comments/notes:



eet the VOC testing and emission levels required?	Ċ			
total VOC levels be measured post construction?	l l			
ave the potential to provide, natural ventilation?	SNO S	1	0	
exemplary level VOCs (products)criteria be met?	C;			

Will the relevant products be specified to mee Will formaldehyde and to Will the building be designed to, or hav	Will e Key Performance Indicators: Indoor air quality	Total vo To Total contribu Total BREEAM	Comments/notes:		
--	--	--	-----------------	--	--

	II bildilt:	
al modelling of the design be carried out?		

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

ble

		Assessment issue not applice

				be carried out?	Will thermal modelling of the design	
	Credits achieved	Credits available	Compliant?		sment Criteria	Assess
No	standards applicable	Minimum		N/A	No. of BREEAM innovation credits available	
N/A	ution to overall score	Available contribu		N/A	No. of BREEAM credits available	
ue not applicable	Assessment issu				4 Thermal comfort	Hea 04

No. of BREEAM credits available	N/A		Available contribu	ution to overall score	N/A
No. of BREEAM innovation credits available	N/A		Minimum	standards applicable	N/A
		Compliant?	Credits available	Credits achieved	
ssment of proposed laboratory facilities' design be c	completed?				
allation of fume cupboards and containment devices practice	s meet best standards?				
el 2 & 3 labs meet best practice safety & performan	ice criteria?				
		-			
Total BREEAM credits achieved	N/A				
Total contribution to overall building score	N/A				
Total BREEAM innovation credits achieved	N/A				

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Assessment issue not applicable

Hea 03 Safe containment in laboratories

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Key Performance Indicators: Thermal comfort

Ť

Assessment Criteria

Will an objective risk assessment of prop

ne Will the manufacture & installation of fur Will containment level 2 & 3 labs me

Tota Total contributi Total BREEAM i

N/A

Minimum standard(s) level

Comments/notes:



INA	INA		
Mean Vote (PMV)	Dissatisfied (PPD)	4	N/A
Predicted	Predicted Percentage	Total BREEAM credits achieved	oution to overall building score

N/A N/A

Predicted Predicted Percentage
Total BREEAM credits achieved
Total contribution to overall building score
Total BREEAM innovation credits achieved
Minimum standard(s) level
Comments/notes:



oution to overall score 1.25%	ו standards applicable No	Credits achieved
Available contrib	Minimum	Credits Credits available
1	0	
f BREEAM credits available	novation credits available	

Hea 05 Acoustic Performance

			1 75%	lition to overall building score
			1	otal BREEAM credits achieved
			erberation times?	c. Rev
			nbient noise level	b. Indoor ar
1	1	1	. Sound insulation	J
			requirements for:	
			Idards and testing	iate acoustic performance star

		Credits	1						Compliant?	Yes	NO			
Ţ	4 0		dards and testing equirements for: Sound insulation nbient noise level erberation times?	1 1.25% N/A N/A			2	0		 pedestrians and cyclists? 	ty considerations accounted for?	1	1.25%	
No. of BREEAM credits available	No. of BREEAM innovation credits available	Assessment Criteria	Will the building meet the appropriate acoustic performance stand r a. b. Indoor am c. Reve	Total BREEAM credits achievedTotal contribution to overall building scoreTotal BREEAM innovation credits achievedMinimum standard(s) level	Comments/notes:	Hea 06 Safety and Security	No. of BREEAM credits available	No. of BREEAM innovation credits available	Assessment Criteria	Where external site areas are present, will safe access be designed for	Will a suitably qualified security consultant be appointed and securi	Total BREEAM credits achieved	Total contribution to overall building score	

		_
	2.50%	NO
	Available contribution to overall score	Minimum standards annlicahle
	2	C
	of BREEAM credits available	innovation credits available

Credits achieved	1	0
Credits available	1	1
Compliant?	Yes	No
	will safe access be designed for pedestrians and cyclists?	ultant be appointed and security considerations

No. of BREEAM credits available	
No. of BREEAM innovation credits available	0
Assessment Criteria	
Will the building meet the appropriate acoustic performance sta	andards and t
b. Indoor	a. Sound inst ambient nois
C. Re	everberation
Total BREEAM credits achieved	1
Total contribution to overall building score	1.25
Total BREEAM innovation credits achievec	N/A
Minimum standard(s) leve	I N/A
Comments/notes:	
Hea 06 Safety and Security	
No. of BREAM cradits available	C
No of BRFFAM innovation credits available	
Assessment Criteria	
Where external site areas are present, will safe access be designed	for pedestria
Will a suitably qualified security consultant be appointed and secu	ب urity consider
	accounte
Total BREEAM credits achieved	
Total contribution to overall building score	1 259
Total BRFFAM innovation credits achieved	

Minimum standard(s) level N/A



Comments/notes: Early stage credit (Security)

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0	0.00%	0	Very Good level
Total BREEAM credits achieved	Total contribution to overall building score	Total BREEAM innovation credits achieved	Minimum standard(s) level

Where specified, please confirm the energy production from onsite or near site energy generation technologies	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' ?	ed as 'carbon negative' what is the total (modelled) renewable/carbon neutral energy generated and exported?

Building floor area	m2
ng and cooling energy demand	MJ/m2yr
ng and cooling energy demand	MJ/m2yr
g primary energy consumption	
g primary energy consumption	
Target emission rate (TER)	
Building emission rate (BER)	
on rate improvement over TER	
ergy performance ratio (EPR _{ED})	
ergy performance ratio (EPR _{PC})	
gy performance ratio (EPR _{co2})	
srgy performance ratio (EPR _{NC})	

Building Performance by Assessment Issue

If the building is defined

Equivalent % of the building's 'regulated' er

Overall building en

CO₂ Ene **Building emiss** Heating & cooling demand en Primary consumption er

Actual building heat Notional buildin Actual buildir

Notional building heat

New Construction (shell only)

ENERGY

Ene 01 Reduction of energy use and carbon emissions

No. of BREEAM innovation credits available

No. of BREEAM credits available

ഹ 12

10.88%Yes

Available contribution to overall score

Minimum standards applicable

0

How do you wish to assess the number of BREEAM credits achieved for this issue? Define a target number of BREEAM credits achieved

Select the target number of BREEAM credits for the Ene01 issue:

Ene 01 Calculator

Country of the UK where the building is located

Confirm building regulation and

version to be used:



18/11/2016

Comments/notes:



Assessment issue not applicable

No. of BREEAM credits available EAM innovation credits available	N/A 0		Available contrib Minimum	ution to overall score standards applicable	
		Compliant?	Credits available	Credits achieved	
to monitor energy use from major l	building services systems?				
I to monitor energy use by tenant/k	building function areas?				
					1
Total BREEAM credits achieved	N/A				
cribution to overall building score	N/A				
EAM innovation credits achieved	N/A				
Minimum standard(s) level	N/A				_

0.91%	No	
Available contribution to overall score	Minimum standards applicable	
7	0	
No. of BREEAM credits available	AM innovation credits available	

	Compliant?	Credits available	Credits achieved
REEAM criteria?	Yes	1	1
-			
0.91%			
N/A			
N/A			
	REEAM criteria? 1 0.91% N/A N/A	Compliant? KEEAM criteria? Yes Ves 0.91% N/A N/A	Compliant? Credits available REAM criteria? Yes 1 1 0.91% N/A N/A

	nents/notes:	ng Performance by Assessment Issue
	Comments	Building Per

Ene 02 Energy monitoring





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

Assessment issue not applicable

th a feasibility study carried out b concept Design stage (RIBA Stage	by the completion 2 or equivalent)?	NO	1	0	
tion					
o Jz I oti z non vol vol z l oti z no l ct		VIV			
ונפו חוו-אונה פווח/חו וובפו -אונה דדר ב	energy generation	EV.I			
Total BREEAM credits achieved	1				
bution to overall building score	0.91%				
AM innovation credits achieved	N/A				
Minimum standard(s) level	N/A				



2.72%	No	
Available contribution to overall score	Minimum standards applicable	
£	0	
No. of BREEAM credits available	No. of BREEAM innovation credits available	

Ene 04 Low carbon design

Credits achieved

Credits available

Compliant?

-

-

Yes

design stage (RIBA stage 2 or equivalent)?

0

-

N0

Building Performance by Assessment Issue

Assessment criteria

Will free cooling measures be implemented in the whole building in line with the passive design analysis? line with an analysis be carried out during concept of the C Will a LZC technology be specified in line wit KPI - Low and/or zero carbon energy generai 10 Total contri Total BREE/ Will passive design measures be used in No. of BREE Ene 05 Energy efficient cold storage Assessment criteria Early stage credits Comments/notes:

© ∑	
A	
U	
K	

ned, installed & commissioned in a Bl	accrodance with REEAM criteria?	
ate a saving in indirect greenhouse	e gas emissions?	
Total BREEAM credits achieved	N/A	
ibution to overall building score	N/A	
AM innovation credits achieved	N/A	
Minimum standard(s) level	N/A	



olicable
a
not
issue
Assessment

No. of BREEAM credits available	N/A		Available contribu	tion to overall score	N/A
No. of BREEAM innovation credits available	N/A		Minimum	standards applicable	N/A
iteria		Compliant?	Credits available	Credits achieved	
portation system analysis be carried out to determine and specify th nortation system and specify the specify	e optimum y efficient?				
Will the relevant energy-efficient features criter	'ia be met?				
	V 1 V				

N/A	N/A	N/A	N/A
SREEAM credits achieved	tion to overall building score	M innovation credits achieved	Minimum standard(s) level

Available contribution to overall score N/A	Minimum standards applicable N/A	
N/A	N/A	
o. of BREEAM credits available	M innovation credits available	

Assessment issue not applicable

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

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

Credits available Credits achieved Compliant?

of Hea 03 - risk assessment of laboratory facilities	nts & performance criteria been confirmed during e initial project brief to minimise energy demand?	Practice Energy Practices in Laboratories (table 27)	ill the laboratory meet criteria item b) Fan power?	criteria item c) Fume cupboard volume flow rates?	<pre>3 / isolation of high filtration/ventilation activities?</pre>	atory meet criteria item e) Energy recovery - heat?	ory meet criteria item f) Energy recovery - cooling?

sment Issue
by Asses
erformance
Building P.

18/11/2016

	Best	~	Will the laboratory	Will the lab meet item d) Groupin	Will the labor	Will the laborat	
--	------	---	---------------------	-----------------------------------	----------------	------------------	--

ē Pre-requisite: Criterion 1 Have the occupants' laboratory requireme the preparation of th

Assessment criteria

Ene 07 Energy efficient laboratory systems

Comments/notes:

Ene 06 Energy efficient transportation systems

Assessment cri

Will a trans

Total contri **Total BREE**



Will the laboratory meet criteria item g) Grouping of co	oling loads?	
Will the laboratory meet criteria item h) Fr Will the laboratory meet criteria item i) Load resor	ee cooling?	
will the laboratory meet criteria item j) Cl	eanrooms?	
Will the laboratory meet criteria item k Will the laboratory meet criteria item l) Room air-ch) Diversity? ange 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	
Comments/notes:		
Comments/motes:		
Building Performance by Assessment Issue		18/11/



N/A	N/A
Available contribution to overall score	Minimum standards applicable
N/A	N/A
lo. of BREEAM credits available	AM innovation credits available

Assessment issue not applicable

							Credits achieved							
							Credits available							
							Compliant							
s swimming pool?	mmunal laundry?	ef D Data centre?	operation areas?	Residential areas?	Ref G Healthcare?	catering facilities?		e above meet the	BREEAM criteria?	N/A	N/A	N/A	N/A	
	Ref C Co	R	Ref E IT-intensive	Ref F I		Ref H Kitchen and o		to 'unregulated' energy us		BREEAM credits achieved	n to overall building score	novation credits achieved	linimum standard(s) level	

Assessment issue not applicable

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

Major impact

Present

Ref A Small power and plug in equipment?

'unregulated' energy use?

2
\triangleleft
R
\mathbf{m}

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	by Assessment Issue	
ent criteria	erformance	
Assessme	Building P	

No. of BREE/

Ene 09 Drying space

Comments/notes:

Total BREEAM inn
Total contribution
Total B

Will the significant majority contributor(s)

Ene 08 Energy efficient equipment

Assessment criteria

Which of the following will be present and likely to be a/the major contributor to



external drying space and fixi	ngs be provided?
al BREEAM credits achieved	N/A
ion to overall building score	N/A
innovation credits achieved	N/A
Minimum standard(s) level	N/A

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Tol Total contribut Total BREEAM

Comments/notes:



6.39%	No
Available contribution to overall score	Minimum standards applicable
S	0
No. of BREEAM credits available	EEAM innovation credits available

Reta	
sue assessment)	
iose of Tra01 iss	
ategory (for purp	
category (for purpose of Tra01 issue assessment) R	

ed			
Credits achiev	5	N/A	
Credits available	Ľ	D	
Compliant	18.00		
	Indicative public transport accessibility index (AI):	Will the building have a dedicated bus service?	

AI	Indicative Accessibility Index for pre-assessment
0	Poor or no public transport provision
1	A single BREEAM compliant public transport node available
2	Some BREEAM compliant public transport nodes/services available
4	A selection of BREEAM compliant public transport nodes/services available
8	Good provision of public transport i.e. small urban centre / suburban area
10	Very Good provision of public transport i.e. small/medium urban centre
12	Excellent provision of public transport, i.e. medium urban centre
18	Excellent provision of public transport, i.e. large urban/metropolitan city centre
	Total BREEAM credits achieved 5

18/11/2016

Tra 02 Proximity to Amenities

l otal contribution to overall building sc	score
Total BREEAM innovation credits achiev	nieved
Minimum standard(s) le) level

6.39%

N/A N/A

Total BRE
Total con

Assessment Criteria

Tra 01 Public Transport Accessibility

TRANSPORT

No. of BR

Building type



core 1.28%	able No	ed
oution to overall so	n standards applic	Credits achiev
Available contrib	Minimum	Credits available
		Compliant?
1	0	
lo. of BREEAM credits available	AM innovation credits available	

oximity of and accessible to appl	icable amenities?	Yes	1	1
Total BREEAM credits achieved	1			
bution to overall building score	1.28%			
AM innovation credits achieved	N/A			
Minimum standard(s) level	N/A			

No. of BREEA	sment Criteria Will the building be in close pro	Total contril	Total BREEA	ients/notes:	
	Assessment Cr			Comments/no	



core 2.56%	able No
Available contribution to overall s	Minimum standards applic
2	0
No. of BREEAM credits available	No. of BREEAM innovation credits available

Tra 03 Cyclist facilities

Building type category (for purpose of Tra03 issue assessment)	etail – Shopping centre / retail park
How many compliant cycle storage spaces will be provided?	0
What cyclist facilities will be provided?	lease select

		Compliant?	Credits available	Credits achieved
Cycle	storage spaces	No	ſ	c
	Cyclist facilities	No	7	O
EEAM credits achieved	0			
o overall building score	0.00%			
vation credits achieved	N/A			
imum standard(s) level	N/A			

N/A	Minimum standards applicable	N/A	AM innovation credits available
N/A	Available contribution to overall score	N/A	lo. of BREEAM credits available
not applicable	Assessment issue		

N/A	N/A	
Available contribution to overall score	Minimum standards applicable	
N/A	N/A	e of Tra04 issue)
of BREEAM credits available	M innovation credits available	ilding type category (for purpos

ļ	lding type category (for purpose of Tra04 issue)	e Accessibility Index (sourced from issue Tra01)	

Credits achieved

Credits available

Compliant?

18/11/2016

met?

Building Performance by Assessment Issue

Will BREEAM's maximum parking capacity criteria for the building type/Accessibility Index be Assessment Criteria

Build Building's indicative

No. o No. of BREEAM i

Tra 04 Maximum Car Parking Capacity

Total contri Total BREE/ Assessment Criteria Comments/notes:

) >	
	4	ζ
Ì	1	
	Y	1

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

o. of BREEAM credits available	N/A	Available contribution to overall score	N/A
M innovation credits available.	N/A	Minimum standards applicable	N/A
bo DDEFANA crodite to be achieved			
THE BAEEAINI CLEMICS TO BE ACTIVEVED			
he calculation procedure used			

No. of BREEAM credits available 1		Available contribu	ution to overall score	1.28%
No. of BREEAM innovation credits available 0		Minimum	standards applicable	No
Assessment Criteria	Compliant?	Credits available	Credits achieved	
Will a transport plan based on site specific travel survey/assessment be develope	d? Yes	1	1	
Total BREEAM credits achieved 1				
Total contribution to overall building score 1.28% Total BBEEAM incorrection credits achieved N/A				
N/A Minimum standard(s) level N/A				
Comments/notes:				
WATER				
Wat 01 Water Consumption			Assessment issue	e not applica
No. of BREEAM credits available N/A	ļ	Available contribu	ution to overall score	N/A
No. of BREEAM innovation credits available N/A		Minimum	standards applicable	N/A
How do you wish to assess the BREEAM credits to be achieved for this issu	le?			
Please select the calculation procedure used				
Standard approach data				
Water Consumption from building micro-componer	its	_		

icable

. of BREEAM credits available	1		Available contribu	ution to overall score	1.28%
A innovation credits available	0		Minimum	standards applicable	No
		Compliant?	Credits available	Credits achieved	
pecific travel survey/assessment t	be developed?	Yes	1	1	
otal BREEAM credits achieved	1				
ution to overall building score	1.28%				
A innovation credits achieved	N/A				
Minimum standard(s) level	N/A				

Tra 05 Travel Plan





iter demand met via greywater/rainwater sources	Total net water consumption	Improvement on baseline performance	

Key Performance Indicator - use of freshwater resource

incy	
Default building occupa	
	Default building occupancy

		Total BREEAM credits achieved N/A
Ove		

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

-
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Alternative approach data

Comments/notes:



Available contribution to overall score 1.33%	Minimum standards applicable Yes	Compliant? Credits available Credits achieved	Yes 1 1 1		Yes	
able 1	able 0		oply to the building(s)?	supply to any relevant plant/building areas?	have a pulsed output?	
No. of BREEAM credits avail	Vo. of BREEAM innovation credits avail		e a water meter on the mains water sup	ig equipment be specified on the water	Will all specified water meters	محصم مدمم مناالما مالند ممتعد معملهم

Wat 02 Water Monitoring

Assessment Criteria

1									
Yes		Yes	N/A						
o the building(s)?	ly to any relevant it/building areas?	a pulsed output?	connected to the BMS?	1	1.33%	N/A	N/A		
Will there be a water meter on the mains water supply t	Will metering/monitoring equipment be specified on the water supple	Will all specified water meters have	site/building has an existing BMS connection, will all pulsed meters be	Total BREEAM credits achieved	Total contribution to overall building score	Total BREEAM innovation credits achieved	Minimum standard(s) level	ents/notes:	

	Available contribution to overall score 1.33%

1.33%	No	
ition to overall score	standards applicable	Credits achieved
Available contribu	Minimum	Credits available
		Compliant?
-	0	
40. OT BREEAIVI CREDITS AVAIIADIE	AM innovation credits available	

	-		
be installed on the building's mains water supply?	Yes	1	1
devices be installed in each sanitary area/facility?			
Total BREEAM credits achieved 1			

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18/11/2016

Total contributic Total BREEAM ir

1.33% N/A

Will flow control

Will a mains water leak detection system

Assessment Criteria

No. of BREE/

Wat 03 Water Leak Detection and Prevention

ပိ

Minimum standard(s) level N/A



Section 3 - Page 30

18/11/2016

Comments/notes:



	Credits achieved	Credits available	Compliant?		
No	standards applicable	Minimum		No	AM innovation credits available
1.33%	ution to overall score	Available contribu		1	Jo. of BREEAM credits available

wat u4 water emicient equipment No of BRFFAM credits available 1		ble contributio	on to overall score	
No. of BREEAM innovation credits available No		Minimum sta	andards applicable	
Assessment Criteria	Compliant? Credits	s available	Credits achieved	
Has a meaningful reduction in unregulated water demand been achieved?	Yes	1	1	
Total BREAM credits achieved1Total contribution to overall building score1.33%Total BREEAM innovation credits achievedN/AMinimum standard(s) levelN/AComments/notes:N/A				
MAIEKIALS				
Mat 01 Life Cycle Impacts				
No. of BREEAM credits available 5	Availa	ble contributio	on to overall score	
No. of BREEAIM Innovation credits available 3		Minimum sta	andards applicable	
How do you wish to assess the number of BREEAM credits to be achieved for this issue?	efine the number of Mat	01 credits acr	nieved	
Assessment Criteria Predicted total Mat01 credits achieved Predicted total Mat01 points achieved	в			
Number of building elements assessed Green Guide exemplary level compliant? Has IMPACT compliant software been used?				
Kev Derformance Indicator - embodied green house gas emissions hv element	Total area of Total element m ² kσC	l impact Do en	Area of element impact data relevant to m ²	
Ney remoninance managor - emboured green mouse gas emissions by element. External walls		2 ² eq.	2	

REAM credits available 5 Available contril Available contril vation credits available 3 Available contril	ution to overall score 6.73% standards applicable No
M credits to be achieved for this issue? Define the number of Mat 01 credits	achieved

innovation credits available 3		Minimum	standards applicable	No
REEAM credits to be achieved for this issue?	Define the numbe	r of Mat 01 credits	achieved	
Predicted total Mat01 credits achieved	£			
Predicted total Mat01 points achieved				
Number of building elements assessed				
Green Guide exemplary level compliant?				
Has IMPACT compliant software been used?				
			Area of element	
	Total area of	Total impact	impact data	
ouse gas emissions by element	element m ²	$kgCO_2$ eq.	relevant to m ²	
External walls				
	18/11/2	016		



	Windows			
	Roof			
Upper 1	floor construction			
	Internal wall			
Floor	finishes/coverings			
sen house gas emissions for buildin	ıg (assessed elemer	its only)		
se gas emissions for building (by as	ssessed elements)	Missing data	kgCO ₂ eq.	kgCO ₂ eq./m ²
plicable building elements that dat	a reported covers			
Total BREEAM credits achieved	c			
tribution to overall building score	4.04%			
EAM innovation credits achieved	0			
Minimum standard(s) level	N/A			

Key Performance Indicator - embodied green Total embodied green house	Total BREE	Comments/notes:				
--	------------	-----------------	--	--	--	--

BREEAM®

Mat 02 Hard Landscaping and Boundary Protection

No. of BREEAM credits available	1		Available contribu	ution to overall score	1.35%
No. of BREEAM innovation credits available	0		Minimum	standards applicable	No
		Compliant?	Credits available	Credits achieved	
landscaping and boundary protection achieve	a Green Guide A or A+ rating?	Yes	1	1	
Total BREEAM credits achieved	1				
Total contribution to overall building score	1.35%				
Total BREEAM innovation credits achieved	N/A				
Minimum standard(s) level	N/A				

o. of BREEAM credits available	4	Available contribution to overall score	5.38%
M innovation credits available	1	Minimum standards applicable	Yes

	Compliant	Credits available	Credits achieved	
products are 'Legally harvested and trader timber'	Yes			
ere a documented sustainable procurement plan?	Yes	1	1	
responsible sourcing of materials points achieved	18.00%	£	1	
Please confirm the route used to assess Mat03	Route 1: Lowest R	SCS point score		
Total BREEAM credits achieved 2				
bution to overall building score 2.69%				

Minimum standard(s) level Outstanding level

0

vssessment Issue	
4	
مَ	
Performance	
рg	
ldi	
Bui	

Assessment Criteria Will ≥80% of all external hard landscaping and boundary protection achieve Total BREEAM credits achieved Total contribution to overall building score Total BREEAM innovation credits achieved Minimum standard(s) level	Comments/notes:	Mat 03 Responsible Sourcing No. of BREEAM credits available No. of BREEAM innovation credits available	Assessment Criteria All timber and timber based products are 'Legally harvested a Is there a documented sustainable p Percentage of available responsible sourcing of materia Please confirm the route use Total BREEAM credits achieved Total contribution to overall building score Total BREEAM innovation credits achieved Minimum standard(s) level
---	-----------------	--	--





18/11/2016

Comments/notes:



1.35%	No	Note: An insulatio
ution to overall score	standards applicable	Credits achieved 1
Available contribu	Minimum sta	Credits available
		2.50
1	0	insulating index?
No. of BREEAM credits available	No. of BREEAM innovation credits available	What is the building's targeted

ICe		
Vo. of BREEAM credits available 1 Ava	Available contribution to overall score	1.35%
AM innovation credits available 0	Minimum standards applicable	N/A

		Compliant?	Credits available	Credits achieved
be specified and installed to vul	Inerable areas of the building?	Yes	Ţ	ç
oe specified and installed to expc	<pre>>sed parts of the building?</pre>	Yes	4	-
otal BREEAM credits achieved	1			
ution to overall building score	1.35%			
M innovation credits achieved	N/A			
Minimum standard(s) level	N/A			

Comments/notes:

Will suitable durability/protection measures be specified and installed to ex Total BREEAM credits achieved Total contribution to overall building score Total BREEAM innovation credits achieved Minimum standard(s) level
Will suitable durability/protection measures be specified and installed to ex
Will suitable durability/protection measures be specified and installed to v
No. of BREEAM innovation credits available No. of BREEAM innovation credits available
Mat 05 Designing for durability and resilience

Total contrik Total BREEA Comments/notes:

Mat 04 Insulation

Assessment Criteria



	ı

verall score 1.35%	s applicable No	achieved
ailable contribution to o	Minimum standard	dits available Credits
Ava		Compliant? Cre
1	0	
No. of BREEAM credits available	AM innovation credits available	

e identified & implemented during	g all RIBA stages?	Yes	1	
Total BREEAM credits achieved	1			
ibution to overall building score	1.35%			
AM innovation credits achieved	N/A			
Minimum standard(s) level	N/A			

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ssessment
nce by A
erformar
Building F





No. of BREEAM credits available	4		Available contribution to overall score	5.50%	
No. of BREEAM innovation credits available	1		Minimum standards applicable	Yes	
sess the number of BREEAM credits to be achieved fo	or this issue?	Define a target nur	mber of BREEAM credits		
elect the number of BREEAM credits being targeted fo	or issue Wst 01:	3	BREEAM Wst01 Innovation credits:	0	

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Construction resource management plan	Compliant Pre-demolition audit	n waste meet the exemplary level requirements?	

or energy recovery	waste to disposal	ß	4.13%	0	Outstanding level
Material fo	Hazardous	otal BREEAM credits achieved	ution to overall building score	A innovation credits achieved	Minimum standard(s) level

Note: At this stage this will be a target k Note: At this stage this will be a target k Note: At this stage this will be a target k Note: At this stage this will be a target k Note: At this stage this will be a target t Note: At this stage this will be a target k Note: At this stage this will be a target k Note: At the pre-assessment stage this Note: At the pre-assessment stage this Note: At the pre-assessment stage this

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Wst 01 Construction Waste Management

How do you wish to as

Select the number of BREEAM credits being targeted for issue Wst 01:

Assessment Criteria

Does the excavation

Key Performance Indicators - Construction Waste

Non-hazardous Non-hazardous cor Total non-hazardous

Non-

Tot Total contribut Total BREEAM

Comments/notes:



1.38%	No	
Available contribution to overall score	Minimum standards applicable	
1	Ч	
lo. of BREEAM credits available	AM innovation credits available	

No. of BREEAM credits available	
No. of BREEAM innovation credits available	
Assessment Criteria	Total
What is the target total % of high-grade aggregate that will be recycled/secondary agg	regate?
% of high-grade aggregate that is recycled/secondary aggregate - by application	
Structur Bitumen/hydraulically bound base, binder and surface Building four	ll frame courses dations
Concrete road Pipe Granular fill and	unaces bedding capping
Total BREEAM credits achieved 0	Ì
Total contribution to overall building score 0.00	%
Total BREEAM innovation credits achieved 0	
Minimum standard(s) level N/	T
Comments/notes:	
Wst 03 Operational Waste	
No. of BREEAM credits available	ļ
No. of BREEAM innovation credits available	
Assessment Criteria	Compliant?
Will operational recyclable waste volumes be segregated and	stored? Yes
Will static waste compactor(s) or baler(s) be specified where appr	priate? Yes
Will vessel(s) for composting suitable organic waste where appr	priate? Yes
Building Performance by Assessment Issue	18/1

No. of BBFFAM credits avail	ble 1	
No. of BREEAM innovation credits avail	ole 1	
Assessment Criteria		
What is the target total % of high-grade aggregate that will be recycled	secondary aggi	Le
% of high-grade aggregate that is recycled/secondary aggregate - by ap	lication	
Bitumen/hydraulically bound base, bind	Structura Structura Building foun oncrete road s Pipe t	cc su idi
video otikozo AAAIta letet		
Total contribution to overall building s		2
Total BREEAM innovation credits achie	ed 0	
Minimum standard(s) l	vel N//	∢
Comments/notes:		
Wst 03 Operational Waste		
No. of BREEAM credits avail	ble 1	
No. of BREEAM innovation credits avail	ble 0	
Assessment Criteria		
Will operational recyclable waste volumes be s Will static waste compactor(s) or baler(s) be specifi Will vessel(s) for compositing suitable organic was	gregated and d where appro	st pp
wiii vessens) tot composining suitable organity was Building Performance by Assessment Issue	ב אוובוב מחחום	2

No. of BREEAV racidits available 1 Available contribution to overall sco Minimum standards application 1 Available contribution to overall sco Mat is the target total % of high-grade aggregate that will be recycled/secondary aggregate that size courds Total Mat is the target total % of high-grade aggregate that will be recycled/secondary aggregate that size courds Total % of high-grade aggregate that is recycled/secondary aggregate that and racions Structural frame % of high-grade aggregate that is recycled/secondary aggregate to a surface courses Structural frame % of high-grade aggregate that is recycled/secondary aggregate to a surface courses Structural frame % of high-grade aggregate that is recycled/secondary aggregate to a surface courses Structural frame % of high-grade aggregate that is recycled/secondary aggregate to a surface courses Structural frame % of high-grade aggregate that is recycled/secondary aggregate Structural frame % of high-grade aggregate that is recycled/secondary aggregate Structural frame % of high-grade aggregate to a surface courses Structural frame % of high-grade aggregate to a surface courses Structural surface courses % of high-grade aggregate that is recycled/secondary aggregate Structural surface % of high-grade aggregate to a surface of the surface Structural surface % of the secondary Structural surface
No. of BREAM innovation credits available 1 Minimum standards application Mat is the target total % of high-grade aggregate that will be recycled/secondary aggregate that will be recycled/secondary aggregate that will be recycled/secondary aggregate that is recycled/secondary aggregate that recycle aggregate aggregate that recycle aggregate aggregate that recycle aggregate aggregate that recycle aggregate aggregate aggregate that recycle aggregate aggregate that recycle aggregate aggregate aggregate that recyc
Model Total Mart is the target total % of high-grade aggregate that will be recycled/secondary aggregate? Total Model Structural frame % of high-grade aggregate that is recycled/secondary aggregate? Structural frame % of high-grade aggregate that is recycled/secondary aggregate - by application Structural frame % of high-grade aggregate that is recycled/secondary aggregate - by application Structural frame % of high-grade aggregate that is recycled/secondary aggregate Structural frame % of high-grade aggregate that is recycled/secondary aggregate Structural frame % of high-grade aggregate that is recycled/secondary aggregate Structural frame % of high-grade aggregate that is recycled/secondary aggregate Structural frame % of high-grade aggregate that is recycled/secondary aggregate Structural frame % of high-grade aggregate that is recycled/secondary index achieved Other % of high-grade aggregate that is recycled/secondary aggregate Other % of high-grade aggregate that is recycled/secondary aggregate Other % of high-grade aggregate that is recycled/secondary aggregate Other % of high-grade aggregate
What is the target total % of high-grade aggregate that will be recycled/secondary aggregate that is recycled/secondary aggregate - by application Sumeri/hydraultaly bound base, binder a structural frame structural frame structural frame building foundations Concrete road surgess Construction to overall building score Construction to overall building score Minimum standard(s) level Minimum standard(s) level
% of high-grade aggregate that is recycled/secondary aggregate - by application Bitumen/Inydraulically bound base, binder and sufface courses Bitaling foundations Pipe bedding Fipe beddin
Structural frame Entumen/hydraulically bound base, binder and surface courses Bitumen/hydraulically bound base, binder and surface courses Endiding coundations Concreter oad surface Concreter oad surface Concreter oad surface Pipe bedding Concreter oad surface Dimonations Total BREEAM credits achieved 0 Minimum standard(s) level 0
Total BREEAM credits achieved 0 Total contribution to overall building score 0.00% Total BREAM innovation credits achieved 0 Minimum standard(s) level N/A
Total BREEAM credits achieved 0 Total contribution to overall building score 0.00% Total BREEAM innovation credits achieved 0.00% Minimum standard(s) level 0
omments/notes:
ver us operational waste No. of BRFFAM credits available 1 Available contribution to overall sco
No. of BREEAM innovation credits available 0 0 Minimum standards applicab
ssessment Criteria Credits available Credits achieved
Will operational recyclable waste volumes be segregated and stored? Yes 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
Will vessel(s) for composting suitable organic waste where appropriate? Yes Yes
uilding Performance by Assessment Issue 18/11/2016


1	1.38%	N/A	Outstanding level
Total BREEAM credits achieved	bution to overall building score	AM innovation credits achieved	Minimum standard(s) level

ontril	REE/		
Total co	Total B		ent Issue
			Assessme
		otes:	and by
		nents/nc	ig Perfort
		Comn	Buildir



Assessment issue not applicable

Wst 04 Speculative Floor and Ceiling Finishes				Assessment issue	not applicable
No. of BREEAM credits available	N/A		Available contribut	tion to overall score	N/A
No. of BREEAM innovation credits available	N/A		Minimum s	tandards applicable	N/A
Assessment Criteria		Compliant?	Credits available	Credits 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				

	Compliant?	Credits available	Credits achieved
gy appraisal for structural and fabric resilience be d of Concept Design (RIBA Stage 2 or equivalent)?	Yes	1	1
ponding to adaptation to climate change be met?			
Total BREEAM credits achieved 1			

	Ŧ
No. of BREEAM innovation credits available	N/A
Assessment Criteria	
Will a climate change adaptation strategy appraisal for structural and fabi conducted by the end of Concept Design (RIBA Stage 2	ric resilience be or equivalent)?
Will exemplary level criteria – Responding to adaptation to climate c	change be met?
Total BREEAM credits achieved	1
Total contribution to overall building score	1.38%
Total BREEAM innovation credits achieved	0
Minimum standard(s) level	N/A

Building Performance by Assessment Issue

Comments/notes:

Wst 05 Adaption to climate change

Comments/notes:





1.38%	N/A
Available contribution to overall score	Minimum standards applicable
1	0
No. of BREEAM credits available	EAM innovation credits available

	LAND USE & ECOLOGY
	LAND USE & ECOLOGY
	LAND USE & ECOLOGY
LAND USE & ECOLOGY	

Building Performance by Assessment Issue

2

Available contribution to overall score 2.60%

available
credits
ovation
AM inno

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Minimum standards annlicable

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Assessment Criteria	Compliant?	Credits available	Credits achieved	
Will at least 75% of the proposed development's footprint be located on previously occupied land?	Yes	1	1	
Is the site deemed to be significantly contaminated?	No	1	0	
Total BREEAM credits achieved 1				
Total contribution to overall building score 1.30%				
Total BREEAM innovation credits achieved N/A				
Minimum standard(s) level N/A				

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Comments/notes:



ment Criteria	Compliant?	Credits available	Credits achieved	
Can the land within the construction zone be defined as 'land of low ecological value'?	Yes	1	1	
Will all features of ecological value surrounding the construction zone/site boundary be protected?	Yes	1	1	
Total BREEAM credits achieved 2				
Total contribution to overall building score 2.60%				
Total BREEAM innovation credits achieved N/A				
Minimum standard(s) level N/A				

Assessment Criteria

No. of BREEAM credits available	Available contribution to overall score 2.60%
AM innovation credits available 0	Minimum standards applicable Yes
for calculating the change in ecological value fro	m Suitably Qualified Ecologist site survey of plant species
ological value as a result of the sites developmen	t? ≥0 species (i.e. no negative change) Plant species rich
Total BREEAM credits achieved 2	

2.60%

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Total contribution to overall building score

What is the likely change in ecold

Assessment Criteria

Data sourced

No. of BREEAN

LE 03 Mitigating Ecological Impact

Total contri	Total BREE				
		mments/notes:			

Con

LE 02 Ecological Value of Site and Protection of Ecological Features



Total BREEAM innovation credits achieved N/A Minimum standard(s) level Outstanding level

18/11/2016

Comments/notes:

Building Performance by Assessment Issue



 of BREEAM credits available 		Available contribu	ution to overall score	2.60%	
M innovation credits available 0		Minimum	standards applicable	No	
	Compliant?	Credits available	Credits achieved		
vinted to report on enhancing and protecting site ecology	Yes	2	0		
st's general recommendations be implemented	No				
•					

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

Early stage credit (Elemental Life Cycle Analysis) Comments/notes:

	1	
		¢

				2.00%
AM innovation credits available 0		Minimum	standards applicable	No
	Compliant?	Credits available	Credits achieved	
ited to monitor/minimise impacts of site activiti	ies	ſ	ſ	
on biodiversit	y؟ الحاد	7	7	

	Compliant?	Credits available	Credits achieved
d to monitor/minimise impacts of site activities	, vec	ſ	ſ
on biodiversity?	res	7	7
plan be produced covering at least the first five	M		
<pre>wmpletion in accordance with British Standards?</pre>	res		
ures to improve biodiversity confirmed by SQE:	5		
Number of applicable measures implemented:	5		
tal BREEAM credits achieved			

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18/11/2016

2.60%

ibution to overall building score

years after project Number of applicable me

Will a landscape and habitat manageme

Will a Suitably Qualified Ecologist be appoir **Assessment Criteria**

No. of BREE/

LE 05 Long Term Impact on Biodiversity

LE 04 Enhancing Site Ecology

No. of BREEAN

Assessment Criteria

Will a suitably qualified ecologist be appo

Will the suitably qualified ecologist's general recommendations be implemented? What is the targeted/intended improvement in ecological value as a result of enhancement

Total BRE Total cont



N/A N/A Total BREEAM innovation credits achieved Minimum standard(s) level Section 3 - Page 46

18/11/2016

Comments/notes:

Building Performance by Assessment Issue



18/11/2016

NO_x emission level - cooling NO_x emission level - space heating

-: .

Will a refrigerant leak detection and containment system be specified/installed? Cooling/Heating capacity of the system

Assessment issue not applicable

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

Pol 01 Impact of Refrigerants

POLLUTION

of BREEAIM Credits available	N/A	Available contribution to overall score	
innovation credits available	N/A	Minimum standards applicable	

Credits achieved

Credits available

BREEAM®

ng Performance by Assessment Issu	he
ng Performance by Assessment	SSI
ng Performance by Assessme	ц
ng Performance by Assessn	ne
ng Performance by Asse	SSL
ng Performance by As	sse
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ng Performance	ð
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ng Perfo	E
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Assessment Criteria

Refrigerant containing systems installed in the assessed building? Global Warming Potential of the specified refrigerant(s) 10 or less? What is the target range Direct Effect Life Cycle CO2eq. emissions for the system? Ammonia Refrigeration Systems Code of Practice? Do all systems (with electric compressors) comply with the requirements of BS EN 378:2008 (parts 2 & 3) & where refrigeration systems containing ammonia are installed, the loR Total Total contributio Total BREEAM in No. of BREE Pol 02 NO_x Emissions **Assessment Criteria** Comments/notes:

S	
A	
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 water heating llated building? and hot water 	N/A N/A N/A N/A	
NOx emission level Does this building meet BREEAM's definition of a highly insu Energy consumption: heating	Total BREEAM credits achievedTotal contribution to overall building scoreTotal BREEAM innovation credits achievedMinimum standard(s) level	Comments/notes:

Building Performance by Assessment Issue



5.00%	No
Available contribution to overall score	Minimum standards applicable
ъ	0
o. of BREEAM credits available	M innovation credits available

ria	Compliant?	Credits available	Credits achieved
What is the actual/likely annual probability of flooding for the assessed site?	Low	C	Ĺ
Will a Flood Risk Assessment be undertaken?	Yes	7	7
Will the site meet the BREEAM criteria for peak rate surface water run off?	Yes	1	τ
eet the criteria for surface water run off volume, attenuation and/or limiting		Ţ	۲
discharge?	1es	Ŧ	Ŧ
designed to minimise watercourse pollution in accordance with the BREEAM		Ţ	U
criteria?	DN1	T	D

Will the site meet the BR Will the site meet the BR

Assessment Criteria

Will the site be designed to minimise watercourse pollution in accordance v	discharg with the BREEA
	criteri
Total BREEAM credits achieved	4
Total contribution to overall building score	4.00%
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	N/A
comments/notes:	
ol Of Dodination of Nicht Time I into the Dollintica	

		_

Will the site be designed to minimise watercours Total contribution Total BREEAM inn M omments/notes:	ol Of Boduction of Nicht Time Licht Dollution
---	---

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

teria	Compliant?	Credits available	Credits achieved	
Will the external lighting specification be designed to reduce light pollution	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				

Building Performance by Assessment Issue

18/11/2016

Assessment Cri

No. of BRE

Pol 03 Surface Water Run off

No. of BREE/



18/11/2016

Comments/notes:

BREEAM®

Assessment issue not applicable

					ASSESSITIETT ISSUE	e not appilo
	No. of BREEAM credits available	N/A		Available contrib	ution to overall score	N/A
	No. of BREEAM innovation credits available	N/A	l	Minimum	standards applicable	N/A
ssessment Criteria Will there be noise-s	sensitive areas/buildings within 800m radius of t	ne development?	Compliant	Credits available	Credits achieved	
Will a noise impact assessn	ment be carried out and, if applicable, noise atter	uation measures specified?				
	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				
omments/notes:						
	No. of BREEAM innovation credits available	10		Available contrib Minimum	ution to overall score standards applicable	10.00% No
ssessment Criteria			Compliant?	Credits available	Credits achieved	
	Man 03 Responsible cons	ruction practices	Yes	1	1	
		Man 05 Aftercare	N/A	N/A	0	
	Hea (1 Visual Comfort	No	1	0	
	Hea 02 I	ndoor Air Quality	N/A	N/A -	0	
	Ene 01 Reduction of energy use and Wat 01 Wa	carbon emissions ter Consumption	NO	5 N/A		
	Matol I Matol	ife Cycle Impacts	ON ON	5		
	Mat03 Responsible Sou	cing of Materials	ON N		0	

ation credits available	10	Available contribution to overall score	10.00%
		Minimum standards applicable	No

03 Responsible construction practices	Compliant? Yes	Credits available 1	Credits achieved 1
Man 05 Aftercare	N/A	N/A	0
Hea 01 Visual Comfort	No	1	0
Hea 02 Indoor Air Quality	N/A	N/A	0
on of energy use and carbon emissions	No	5	0
Wat 01 Water Consumption	No	N/A	0
Mat01 Life Cycle Impacts	No	3	0
t03 Responsible Sourcing of Materials	No	1	0

18/11/2016

Building Performance by Assessment Issue



Wst01 Construction Waste Management	No	1	0
Wst02 Recycled Aggregates	No	1	0
Wst 05 Adaption to climate change	N/A	N/A	0
Number of 'ap	proved' innovation	<pre>credits achieved?</pre>	

ycled Aggregates o climate change	1 1.00% N/A		
Wst01 Construction Was Wst02 Recy Wst 05 Adaption to	Total BREEAM innovation credits achieved Total contribution to overall building score Minimum standard(s) level		

D. LEED Pre-assessment







LEED Project Report





LEED Project Summary



It is Google's aspiration for the project to pursue LEED certification. As such, the target of achieving LEEDv4 Gold has been set for the project requiring compliance to be met with a minimum of 60 points. This report presents a summary of performance for the KGX1 project against the requirements of the LEED rating system. The likelihood of achieving each credit has been aligned with current project design considerations. Please note, there are no planning requirements associated with LEED certification.



Project Team:

	Company	Short	Named individual(s)
Owner:	Google	Client	Andrew Martin
Architect:	HS / BIG / BDP	Arch	ES/RK/JM
Mech Engineer:	Atelier Ten	M.Eng	Younha Rhee
Civil Engineer:	AKT II	C.Eng	David Illingworth
Landscape Architect:	Gillespies	L.Arc	Jaime Macfarlane
Ecologist	TBC	Eco	TBC
Transport Consultant	TBC	Tra	TBC
Electrical Engineer:	BDP Lighting	E.Eng	TBC
Acoustician	Sandy Brown	Acou	Ed Farrer
Commissioning Agent:	FPC	CXA	Dean Francis
Project Manager :	Argent	PM	Michael Morgan
Contractor:	TBC	Cont.	TBC
Energy Modelling:	Atelier Ten	EnMod	Meredith Davey
LEED Energy Modelling	Mott MacDonald	EnModL	Matthew Collin
LEED AP :	Mott MacDonald	LEED	Jessica Binks

Definition of credit likelihood categories:

Likely	Credit is usually easily achieved as a matter of best practice or by virtue of site selection
Possible	No information received yet or technical difficulties are expected
Difficult	Credit can only be achieved at high capital expense or great technical difficulty
No	Credit is not applicable or cannot be achieved by virtue of the project's characteristics





LEED Project Summary

Project title:	Google KGX1
Project description :	LEED Certification
Rating system used :	LEED v4 BD+C
Date of latest issue :	17 January 2017

The following changes have been made since the last issue of this report on 26 September, 2016;

Total points previously reported;

60 Gold

Changes to credit likelihood

Availab	le Likely	Possible	Difficul	40 K			
2	2 🗲	<u> </u>	0	0	EQc4	Design	Indoor Air Quality Assessment
1	0	0 -	-0	→ 1	EQc5	Design	Thermal Comfort

1	2	0	0	0	Summary of additional points			
1	1 62 Resulting change in score, equating to LEED Gold rating							



LEED Project Scorecard

Current Predicted Rating:	GOLD
Potential Rating:	PLATINUM
(Likely + Possible credits)	-

17 January 2017

Certified: 40 to 49 points, Silver: 50 to 59 points, Gold: 60 to 79 points, Platinum: >80 points

Current Credits							Primary			
Credit	Augilahla	Libraha	Dessible	Difficult	Nie	Phase	Credit Title	Responsibil	Action by	Status / Comments
	Available	сікеіу	Possible	Difficult	INO			ity		
Integrat	ive proce	ess								
IP c 1	1	0	1	0	0	Design	Integrative process	PM	Client	
Locatio	n and Tra	insportatio	on					-		
LT c 1	1	1	0	0	0	Design	Sensitive land protection	Client	Arch	
LT c 2	2	2	0	0	0	Design	High priority site	Client	Arch	
LT c 3	5	5	0	0	0	Design	Surrounding density and diverse uses	Arch	Arch	
LT c 4	5	5	0	0	0	Design	Access to quality transit	Tra	Client	
LT c 5	1	0	1	0	0	Design	Bicycle facilities	Arch	Arch	
LT c 6	1	1	0	0	0	Design	Reduced parking footprint	Client	Arch	
LT c 7	1	0	0	1	0	Design	Green vehicles	Client	Arch	
Sustain	able Sites	S								
SS p 1	Pre-req	0	0	0	0	Construction	Construction activity pollution prevention	Cont.	Cont.	
SS c 1	1	1	0	0	0	Design	Site assessment	Eco	EC0	
SS C 2	2	2	0	0	0	Design	Site development - protect or restore habitat	ECO	L.Arc	
SS C 3	1	1	0	0	0	Design	Open space	L.AIC		
SS C 4	3	0	3	0	0	Design	Railwater management	0.Elly Arch		
<u>55 C 5</u>	2	2	0	1	0	Design	light pollution reduction	E Eng		
Water F	fficiency	0	0		0	Design		L.LIIY		
WE n 1	Pre-reg	0	0	0	0	Design	Outdoor water use reduction	I Arc	I Arc	
WEn 2	Pre-reg	0	0	0	0	Design	Indoor water use reduction	Arch	Arch	
WE n 3	Pre-reg	0	0	0	0	Design	Building-level water metering	M.Eng	LFFD	
WE c 1	2	0	2	0	0	Desian	Outdoor water use reduction	L.Arc	L.Arc	
WEc 2	6	4	2	0	0	Desian	Indoor water use reduction	Arch	Arch	
WE c 3	2	2	0	0	0	Design	Cooling tower water use	M.Eng	M.Eng	
WEc 4	1	1	0	0	0	Design	Water metering	M.Eng	M.Eng	
Energy	and Atmo	osphere				J J		5	5	
EAp 1	Pre-req	0	0	0	0	Construction	Fundamental commissioning	CXA	Client	
EAp 2	Pre-req	0	0	0	0	Design	Minimum energy performance	M.Eng	LEED	
ЕАр З	Pre-req	0	0	0	0	Design	Building-level energy metering	M.Eng	M.Eng	
EAp 4	Pre-req	0	0	0	0	Design	Fundamental refrigerant management	M.Eng	M.Eng	
EAc 1	6	6	0	0	0	Construction	Enhanced commissioning	CXA	CXA	
EAc 2	18	3	3	12	0	Design	Optimize energy performance	EnModL	M.Eng	
EAc 3	1	1	0	0	0	Design	Advanced energy metering	M.Eng	N/A	
EAc 4	2	0	0	2	0	Design	Demand response	Client	M.Eng	
EAc 5	3	0	2	1	0	Design	Renewable energy production	Client	M.Eng	
EAc 6	1	1	0	0	0	Design	Enhanced refrigerant management	M.Eng	M.Eng	
EAc 7	2	2	0	0	0	Design	Green power and carbon offsets	Client	N/A	
Material	s and Re	sources						l		
MRp1	Pre-req	0	0	0	0	Design	Storage and collection of recyclables	Arch	Client	
MR p 2	Pre-req	0	0	0	0	Construction	Waste management planning	Cont.	Cont.	
MR c 1	5	0	3	0	2	Construction	Building life-cycle impact reduction	Arch	Arch	
MR c 2	2	2	0	0	0	Construction	BPDO - environmental product declarations	Arch	Arch	
	2	1	0	1	0	Construction	BPDO - sourcing of raw materials	Arch	Arch	
	2	2	0	0	0	Construction	Waste management	Arch	Arch	
Indoor	- nviropm	ental Qua		U	0	Construction		Cont.	Cont.	
EQ p 1	Pre-reg			0	0	Design	Minimum IAQ performance	M Eng	M Eng	
	Pre-reg	0	0	0	0	Design	Environmental tobacco smoke control	Client	Client	
	2	2	0	0	0	Design	Enhanced indoor air quality strategies	M.Eng	M.Fng	
EQ c 2	3	3	0	0	0	Construction	Low-emitting materials	Arch	Arch	
EQ c 3	1	1	0	0	0	Construction	Construction IAQ Management Plan	Cont.	Cont.	
EQ c 4	2	2	0	0	0	Construction	Indoor air quality assessment	Cont.	Cont.	
EQ c 5	1	0	0	0	1	Design	Thermal comfort	M.Eng	M.Eng	
EQ c 6	2	2	0	0	0	Design	Interior lighting	E.Eng	E.Eng	
EQ c 7	3	0	0	3	0	Design	Daylight	Arch	M.Eng	
EQ c 8	1	0	0	1	0	Design	Quality views	Arch	Arch	
EQ c 9	1	0	1	0	0	Design	Acoustic performance	Arch	N/A	
Innovati	ion									
ID c 1	1	1	0	0	0	Design	Innovation in Design: TBC	LEED	LEED	
ID c 1	1	1	0	0	0	Design	Innovation in Design: TBC	Arch	Arch	
ID c 1	1	0	0	1	0	Design	Innovation in Design: TBC	Client	Client	
ID c 1	1	0	0	1	0	Design	Innovation in Design: TBC	LEED	LEED	
ID c 1	1	0	0	1	0	Design	Innovation in Design: TBC	Cont.	LEED	
ID c 2	1	1	0	0	0	Design	LEED [®] Accredited Professional	LEED	LEED	
Regiona	al Priority	/								
RP c 1	1	1	0	0	0	Design	Regional Priority: Sensitive Land Protection	LEED	LEED	
RP c 1	1	1	0	0	0	Design	Regional Priority: Protect or Restore Habitat (2 pt thre	LEED	LEED	
RP c 1	1	0	1	0	0	Design	Regional Priority: Rainwater Management (2 pt thresh	LEED	LEED	
RP c 1	1	0	1	0	0	Design	Regional Priority: Optimise Energy Performance (8 pt	LEED	LEED	

110 62 82 107 110





Integrative Process



Integrative Process

Beginning in pre-design and continuing throughout the design phases, identify and use opportunities to achieve synergies across disciplines and with this credit have been undertaken throughout building systems described below. Use the analyses to inform the owner's project requirements (OPR), basis of design (BOD), design documents, and construction documents.

Energy-Related Systems

Perform a preliminary "simple box" energy modelling analysis before the completion of schematic design (RIBA Stage 2) that explores how to reduce energy loads in the building and accomplish related sustainability goals.

> Assess at least two potential strategies associated with each of the following: site conditions, massing and orientation, envelope, lighting levels, thermal comfort, process loads, operational parameters. > Document how the above analysis informed design and building form decisions in the project's brief and design including: building site, programme, building geometry, orientation, envelope, services, etc.

It is thought that many of the criteria associated the preliminary stages of the project, as A10 have produced a number of reports and studies relating to solar shading, vacuum drainage and preliminary energy modelling. MM to review this in detail and advise whether compliance is feasible or whether additional work is required.

1

1

Arch

Water-Related Systems

Perform a preliminary water budget analysis before the completion of schematic design (RIBA Stage 2) that explores how to reduce potable water loads in the building and accomplish related sustainability goals. > Assess and estimate the project's potential non-potable water supply sources and water demand volumes, including the following: Indoor water demand, outdoor water demand, process water demand, supply sources. > Document how the above analysis informed design and building form decisions in the project's brief and design including: plumbing systems, sewage, rainwater management, landscaping and irrigation, roofing systems, etc.

Deliverables

Complete the LEED Integrative Process Worksheet







Location and Transportation



Sensitive L	and Protection	1 Arch	1
LTc1	Locate the development footprint on land that has been previously developed or that does not meet the following criteria for sensitive land: - Prime farmland - Floodplains as legally recognized by a local authority - Habitat for threatened or endangered species - Water bodies within 30 meters - Wetlands within 15 meters Projects in Europe may use the Directive 2007/60/EC definition of floods with a medium probability (likely return period ≥ 100 years). Projects in Europe may use the Natura 2000 network of protected areas and the European Red List.	There is no change in strategy - a brief narrative describing the previous development of the site, immediately prior to this project, is required to close out the credit. MM to coordinate this.	Notes
	Deliverables Site map(s) showing project boundary, development footprint, any previous development, any sensitive areas, and any minor improvements in required buffers. Explanation of the previous development on the site.		
High Priorit	tv Site	2 PM	2
LTc2	 Option 1. Historic district (1 point) Locate the project on an infill location in a historic district. Option 2. Priority designation (1 point) Locate the project on one of the following (local equivalent) a site listed by the EPA National Priorities List a Federal Empowerment Zone site a Federal Enterprise Community site etc. 	A report detailing the level of site contamination and proposed remediation strategies has been produced. It is noted that some remediation was undertaken as part of Project Queen, and as the land was under the same ownership at that time it should assist with demonstrating that the credit is achievable. Compliance with option 3 is therefore now deemed likely. Argent to provide details of previous studies.	Notes

remediation to the satisfaction of that authority.

Option 3. Brownfield remediation (2 points)

Deliverables

Vicinity map or other documentation confirming previously developed land within 1/2 mile from site (Option 1) or priority site designation (Option 2)

Locate on a brownfield where soil or groundwater contamination has been identified, and where the local authority requires its remediation. Perform

Documentation from authority declaring existence of specific contamination and confirming that remediation has been or will be completed to its satisfaction

Ø	Surroundin	g Density and Dive	rse Uses		5			Arch	5
		Option 1. Surroundin Locate on a site whose of the project boundary AND/OR	g density (2–3 points) surrounding existing den meets the LEED require	nsity within a ¼-mile radius ments.	There is co Option 1: It should r requirements	urrently no <i>3 points lik</i> not be diffi ents for cor re of build	change in st <i>ely</i> cult for the p mbined densi	rategy. roject to meet the ity of 8,035 sqm	
LTc3		Option 2. Diverse use Construct or renovate building's main entrance entrance of four to sev publicly available diver	•s (1–2 points) a building or a space with ce is within a ½-mile walki ren (1 point) or eight or mo rse uses.	in a building such that the ng distance of the main ore (2 points) existing and	Option 2: Uses with Supermar pharmacy station, pr	ct include: renience store, ool, post office, fire office.	Notes		
		Deliverables							
		Area plan or map show and non-residential bu within ¼-mile radius (C	ving project site and locati ildings)ption 1).	ion of existing residential					
		Description of the prev	rious development on the	site (Option 1).					
		Area plan or map show walking routes (Option	ving project site, location a 2).	and type of each use, and					
	Access to C	Quality Transit			5			Arch	5
		Locate any functional e existing or planned bus mile walking distance of heavy rail stations, cor Calculate the total nur	entry of the project within a s, streetcar, or informal tra of existing or planned bus nmuter rail stations or ferr mber of trips for all service	a ¼-mile walking distance of ansit stops, or within a ½- rapid transit stops, light or terminals. as combined.	There is constrategy. and busy able to ea	urrently no Due to its l undergroui rn all avail:	change to th ocation near nd hubs, the able credits.	ne proposed to 2 train stations project should be	
LTc4		Up to 5 points are awa Weekday trips 72 144 360	rded based on the numbe Weekend trips 40 108 216	er of daily trips: Points 1 3 5	To docum demonstr hubs are r be require completed	ent compli ating pede: equired. T ed to allow d.	ance, site pla strian routes rain and bus the credit fo	ans and maps to the transport schedules will also rm to be	Notes
		Deliverables							
		Map showing project, proutes and distances to	project boundary, transit s o those stops.	top locations, and walking					
		Timetables or other se	rvice-level documentation	l.					
		Map showing attendan	ce boundary.						
M	Bicycle Fac	ilities				1		Arch	1
c5		Bicycle network Design or locate the prestorage is within a 180 bicycle network that co - 10 diverse uses - a bus stop, light or her terminal.	oject such that a function -meter walking distance o innects to at least one of t avy rail station, commute	al entry and/or bicycle or bicycling distance from a the following: r rail station, or ferry	The property not change report; - 4500 fr - 500 fr - 2000 fr - 1000 fr	osed occupa ed since th Googlers m ot desk-ba Googler gro visitor upp	ancy of the p le previous it hax desks sed bund visitors er floors	roject space has eration of this	No
LT		All destinations must b the project boundary.	e within a 3-mile (4800-m	eter) bicycling distance of	- 24/7 c The LEED	occupancy requireme	nt should be	between 180-200	otes

Bicycle storage and shower rooms

Provide short-term bicycle storage for at least 2.5% of all peak visitors, but no fewer than four storage spaces per building.

Provide long-term bicycle storage for at least 5% of all regular building occupants, but no fewer than four storage spaces per building. Provide at least one on-site shower with changing facility for the first 100 regular building occupants and one additional shower for every 150 regular building occupants thereafter.

Short-term bicycle storage must be within 30 meters walking distance of any main entrance. Long-term bicycle storage must be within 30 meters walking distance of any functional entry.

cycle spaces, but it is believed that the local planning requirements are more stringent than LEED and so compliance with this aspect of the credit should not be an issue.

It is the requirement for the bicycle network which may be difficult to meet. MM have reviewed the existing and planned networks, and it is the project location which may make it difficult to document as there doesn't appear to be an existing network within 180m of a functional entry of the building. Given the pedestrianised nature of the surrounding area this may be difficult to prove but further consideration will be given to this to determine the viability of compliance.

Deliverables

Vicinity map showing bicycle network and route and distance along network to eligible destination(s)

Site plan showing bicycle storage locations. Include walking route and bicycling route to school boundary for school projects.

Calculations for storage and shower facilities

	Reduced Parking Footprint Arch	1
LTc6	Do not exceed the minimum local code requirements for parking capacity. AND Provide parking capacity that is a percentage reduction below the base ratios recommended by the Parking Consultants Council, as shown in the Institute of Transportation Engineers' Transportation Planning Handbook, 3rd edition, Tables 18-2 through 18-4. Case 2. Dense and/or transit-served location Projects earning 1 or more points under either LT Credit Surrounding Density and Diverse Uses or LT Credit Access to Quality Transit must achieve a 40% reduction from the base ratios.	Notes
	AND Provide preferred parking for carpools for 5% of the total parking spaces after reductions are made from the base ratios.	
	Deliverables	
	Site plan indicating parking areas and preferred parking spaces.	
	Calculations demonstrating threshold achievement.	
	Drawings or photographs of signage or pavement markings indicating reserved status of preferred parking areas.	
Ø	Green vehicles	1
LTc7	Designate 5% of all parking spaces used by the project as preferred parking for green vehicles. Green vehicles are defined as those meeting the Euro 6 limit values or achieving a minimum green score of 45 on the American Council for an Energy Efficient Economy (ACEEE) annual vehicle rating guide. In addition to preferred parking for green vehicles, meet one of the following two options for alternative-fuel fuelling stations: Option 1. Electric vehicle charging Install electrical vehicle supply equipment (EVSE) in 2% of all parking spaces used by the project. Option 2. Liquid, gas, or battery facilities Install liquid or gas alternative fuel fuelling facilities or a battery switching station capable of refuelling a number of vehicles per day equal to at least	Notes

Deliverables

2% of all parking spaces.

Parking or site plan indicating main building entrance, preferred parking spaces, and alternative-fuel fuelling stations; calculations based on total parking capacity.

For preferred parking spaces and electric vehicle charging spaces, photographs of signage or pavement marking.

For electrical connectors, manufacturers' product specifications indicating

charge level, compliance with relevant standard, and Internet addressability.

17 January 2017





Sustainable Sites



×	Construction Activity Pollution Prevention	C.Eng	Ρ
SSp1	Create and implement an Erosion and Sedimentation Control (ESC) Plan for all construction activities associated with the project. The ESC Plan shall conform to the erosion and sedimentation requirements of the 2012 EPA Construction General Permit OR local erosion and sedimentation control standards and codes, whichever is more stringent. The Plan shall describe the measures implemented to accomplish the following objectives: • Erosion and sedimentation control • Stabilization • Pollution prevention	It is the responsibility of the Civil Engineer to develop a project specific ESC plan. The plan should be based upon local standards and site conditions. The plan should then be passed to the Principal Contractor for further development and implementation during site activities. MM to discuss specific requirements with AKT / Argent ahead of contractor appointment.	Notes
	Deliverables		
	Description of compliance with EPA CGP or comparison of local standards and codes with EPA CGP.		
	Project drawings of erosion and sedimentation control measures and phasing of works etc. (see prerequisite document for detail).		
	Documentation on implementation of the erosion and sedimentation control plan (photos, inspection logs, reports, corrective actions).		

Site Assessment

Complete and document a site survey or assessment that includes the following information:

- **Topography**. Contour mapping, unique topographic features, slope stability risks.

- **Hydrology**. Flood hazard areas, delineated wetlands, lakes, streams, shorelines, rainwater collection and reuse opportunities, TR-55 initial water storage capacity of the site (or local equivalent).

Climate. Solar exposure, heat island effect potential, seasonal sun angles, prevailing winds, monthly precipitation and temperature ranges.
Vegetation. Primary vegetation types, greenfield area, significant tree

mapping, threatened or endangered species, unique habitat, invasive plant species.

- **Soils**. Natural Resources Conservation Service soils delineation, U.S. Department of Agriculture prime farmland, healthy soils, previous

1

An ecological assessment of the site was completed for Project Queen, and it is also confirmed that an ecologist will be appointed to undertake a similar exercise as part of this project.

MM to liaise with ecologist upon appointment to ensure scope of works is in line with specific LEED requirements. Credit is therefore deemed likely. 1

Eco

development, disturbed soils (or local equivalent standards).

Human use. Views, adjacent transportation infrastructure, adjacent properties, construction materials with existing recycle or reuse potential.
Human health effects. Proximity of vulnerable populations, adjacent physical activity opportunities, proximity to major sources of air pollution.

The survey or assessment should demonstrate the relationships between the site features and topics listed above and how these features influenced the project design; give the reasons for not addressing any of those topics.

Deliverables

Site survey or assessment plan or map.

Site assessment worksheet or equivalent narrative.





Sustainable Sites



Site Development: Protect or Restore Habitat	2		L.Arc	2
Preserve and protect from all development and construction activity 40% of the greenfield area on the site (if such areas exist). AND	Due to the curr expected to be the requirement considering the	rent condition of the difficult to achieve onts of this credit, esp	site, it is not compliance with ecially	
Option 1. On-site restoration (2 points)	roof.		e vegetateu	
Using native or adapted vegetation, restore 30% (including the building footprint) of all portions of the site identified as previously disturbed. Projects that achieve a density of 1.5 floor-area ratio may include vegetated roof surfaces in this calculation if the plants are native or adapted, provide habitat, and promote biodiversity.	The Landscape planting strate ensure that nat incorporated w MM to continu	Architect should con gy during the early p tive and adapted spe /here viable. le to liaise with L. Arc	nsider the roject stages to ecies are chitect to discuss	Notes
Restore all disturbed or compacted soils that will be revegetated within the project's development footprint to meet the following requirements:	e specific require	ements.		
- Soils (imported and in situ) must be reused for functions comparable to their original function.				
 Imported topsoils or soil blends designed to serve as topsoil may not include the following: Soils defined as prime farmland 				
 Soils from other greenfield sites, unless by-product of construction. Restored soil must meet the LEED criteria of reference soils in 				
categories 1–3 and meet the criteria of either category 4 or 5: 1. organic matter				
 compaction infiltration rates biological function 				
5. chemical characteristics				
Project teams may exclude vegetated landscape areas that are				
constructed to accommodate rainwater infiltration from the vegetation and				

soils requirements, provided all such rainwater infiltration areas are treated consistently with SS Credit Rainwater Management.

Option 2. Financial support (1 point)

Provide financial support equivalent to at least \$0.40 per square foot (US\$4 per square meter) for the total site area (including the building footprint).

Financial support must be provided to a nationally or locally recognized land trust or conservation organization within the same EPA Level III ecoregion or the project's state (or within 100 miles of the project [160 kilometres] for projects outside the U.S.).

Deliverables

Provide site plans that highlight the protected or restored site area and list native and adapted plant species.

Native or adapted vegetation calculations.

Description of disturbed or compacted soils to be revegetated.

Greenfield area calculations and description of greenfield area protection.

Financial support calculations.





Sustainable Sites



X	Open Space	1			L.Arc	1
	Provide outdoor space greater than or equal to 30% of the total site area (including building footprint). A minimum of 25% of that outdoor space must be vegetated (turf grass does not count as vegetation) or have overhead vegetated canopy.	Much of t vegetated project to	he roof s I roof, an demons	space is to be id so this she strate compl	e accessible ould enable the iance with this credit	
2003	 The outdoor space must be physically accessible and be one or more of the following: a pedestrian-oriented paving or turf area with physical site elements that accommodate outdoor social activities; a recreation-oriented paving or turf area with physical site elements that encourage physical activity; a garden space with a diversity of vegetation types and species that provide opportunities for year-round visual interest; a garden space dedicated to community gardens or urban food production; preserved or created habitat that meets the criteria of SS Credit Protect or Restore Habitat and also includes elements of human interaction. 					Notes
	For projects that achieve a density of 1.5 floor-area ratio (FAR), and are physically accessible, extensive or intensive vegetated roofs can be used toward the minimum 25% vegetation requirement, and qualifying roof-based physically accessible paving areas can be used toward credit compliance.					
	Deliverables					
	Provide area of the vegetated open space provided by the project. Project site/landscape drawings highlighting the dedicated vegetated open space.					
	Description of how open space is physically accessible and meets area type criteria.					
	Open space and vegetated area calculations and floor area ratio					

Rainwater Management

Option 1. Percentile of rainfall events

Path 1. 95th percentile (2 points)

In a manner best replicating natural site hydrology processes, manage on this credit. site the runoff from the developed site for the 95th percentile of regional or MM have discussed options and strategy with AKT local rainfall events using low-impact development (LID) and green II, A10 and Gillespies. Currently the inclusion of infrastructure. attenuation in the basement is not a viable solution for the project, and so the team are reviewing the Path 2. 98th percentile (3 points) attenuation capability of the vegetated roof. Achieve Path 1 but for the 98th percentile of regional or local rainfall Upon project registration, MM will query the siteevents, using LID and green infrastructure. wide approach with the USGBC. Compliance remains possible at this stage.

There is no change in strategy in that Option 1 Path 3 is expected to be the most viable approach for

C.Eng

3

Notes

3

Path 3. 85th Percentile - Zero lot line projects only (3 points) Applies to zero lot line projects in urban areas with a minimum density of 1.5 FAR.

Use daily rainfall data and the methodology in the EPA Technical Guidance on Implementing the Stormwater Runoff Requirements for Federal Projects under Section 438 of the Energy Independence and Security Act to determine the 95th percentile amount.





Sustainable Sites



Option 2. Natural land cover conditions (3 points)

Manage on site the annual increase in runoff volume from the natural land cover condition to the post developed condition.

Deliverables

Rainfall data and rainfall events calculator or calculations for the chosen percentile storm.

Runoff volume calculations.

Plans, details, or cross sections depicting site conditions and GI or LID strategies, highlighting topography, direction of water flow, and area of site that each facility addresses.

Narrative confirming measures qualify as GI or LID.

Calculations for volume of rainwater managed by GI or LID strategies.

Documents illustrating natural land cover conditions.

%	Heat Island	Reduction	2 Arch	2
SSc5		Option 1. nonroof and roof (2 points) Meet the following criterion: Non-roof measures (m2) / 0.5 + High reflectance roof (m2) / 0.75 + Vegetated roof (m2) / 0.75 > Total site paving area + Total roof area	There is no change to the original strategy for this credit. The extent of the vegetated coverage currently included in the proposed design is likely to enable compliance with this credit.	Notes
		 Alternatively, an SRI and SR weighted average approach may be used to calculate compliance. <u>Nonroof measures</u> Install plants that provide shade over paving areas within 10 years of planting. Install vegetated planters. Provide shade with structures covered by energy generation systems. Provide shade with architectural devices or structures that have a three-year aged solar reflectance (SR) value of at least 0.28. If three-year aged value information is not available, use materials with an initial SR of at least 0.33 at installation. Provide shade with vegetated structures. 		

- Use paving materials with a three-year aged solar reflectance (SR) value of at least 0.28. If three-year aged value information is not available, use materials with an initial SR of at least 0.33 at installation.

- Use an open-grid pavement system (at least 50% unbound).

High-reflectance roof

Use roofing materials that have an SRI equal to or greater than the values in Table 1. Meet the three-year aged SRI value. If three-year aged value information is not available, use materials that meet the initial SRI value. Type Slope Initial SRI 3-year SRI Low-sloped roof $\leq 2:12$ 82 64 Steep-sloped roof > 2:12 39 32





SSc6

Sustainable Sites



Option 2. parking under cover (1 point)

Place a minimum of 75% of parking spaces under cover. Any roof used to shade or cover parking must (1) have a three-year aged SRI of at least 32 (if three-year aged value information is not available, use materials with an initial SRI of at least 39 at installation), (2) be a vegetated roof, or (3) be covered by energy generation systems.

Deliverables

Nonroof and roof area calculations.

Site plan(s) with elements and measurements, including LEED project boundary, building footprint, roof and hardscape area, and area of each roof and nonroof measure.

Manufacturer's documentation of SRI, SR, and paving permeability.

Light Pollution Reduction

Meet uplight and light trespass requirements, using either the backlightuplight-glare (BUG) method (Option 1) or the calculation method (Option 2). Projects may use different options for uplight and light trespass.

Meet these requirements for all exterior luminaires located inside the project boundary (except those listed under "Exemptions"), based on the following:

- The photometric characteristics of each luminaire when mounted in the same orientation and tilt as specified in the project design.

- The lighting zone of the project property determined by the Illuminating Engineering Society and International Dark Sky Association (IES/IDA) Model Lighting Ordinance (MLO) User Guide.

UPLIGHT

Option 1. BUG rating method

Do not exceed the LEED requirements for luminaire uplight ratings, based on the specific light source installed in the luminaire, as defined in IES TM-15-11, Addendum A.

Option 2. calculation method

Do not exceed the following percentages of total lumens emitted above horizontal: 0% (zone LZ0, LZ1), 1.5% (LZ2), 3% (LZ3), 6% (LZ4).

BDP identify that there will be areas of uplighting on the site, but the soffit will likely deflect much of this light and so compliance with this aspect of the credit will not be impacted.

1

However, the retail space will likely be illuminated at night and there may be an issue with the spill from interior lighting.

MM and BDP will investigate the viability of this credit further as the design progresses.

E.Eng

AND

LIGHT TRESPASS

Option 1. BUG rating method

Do not exceed the LEED requirements for luminaire backlight and glare ratings, based on the specific light source installed in the luminaire, as defined in IES TM-15-11, Addendum A.

Option 2. calculation method

Do not exceed the following vertical illuminances at the lighting boundary. 0.5 lux (LZ0, LZ1), 1 lux (LZ2), 2 lux (LZ3), 6 lux (LZ4). Vertical illuminances must be calculated on vertical planes running parallel to the lighting boundary, with the normal to each plane oriented toward the property and perpendicular to the lighting boundary, extending from grade level to 10 meters above the height of the highest luminaire.





Sustainable Sites



Delivera	ıbles
Site lightir applicable	ng plan with boundaries, elements, location of fixtures, and e measurements.
Luminaire	e schedule showing uplight ratings (Uplight Option 1)
Projects w	vith internally illuminated exterior signage only: provide maximum
Iuminance	e data.
Luminaire	e schedule showing backlight and glare ratings and mounting
heights (T	Frespass Option 1).
Calculatio	ons for lumens per luminaire and lumens emitted above
horizontal	I (Uplight Option 2).
Greatest v	vertical illuminance value for each vertical calculation plane at
lighting bo	oundary (Trespass Option 2).







Water Efficiency



*	Outdoor Wa	ater Use Reduction	L.Arc	Р
		Reduce outdoor water use through one of the following options. Nonvegetated surfaces, such as permeable or impermeable pavement, should be excluded from landscape area calculations. Athletic fields and playgrounds (if vegetated) and food gardens may be included or excluded at the project team's discretion.	Landscape architect to advise regarding the project's approach with regards to irrigation for the vegetated roof. Although the inclusion of rainwater harvesting will help reduce potable water demand in line with Option 2 of this credit,	
WEp1		 Option 1. No irrigation required Show that the landscape does not require a permanent irrigation system beyond a maximum two-year establishment period. Option 2. Reduced irrigation Reduce the project's landscape water requirement by at least 30% from the calculated baseline for the site's peak watering month. Reductions must be achieved through plant species selection and irrigation system efficiency, as calculated by the Environmental Protection Agency (EPA) WaterSense Water Budget Tool. 	strong consideration should be given to the specification of plant species as this will impact compliance. MM, AKT II and Gillespies to continue discussions as design progresses.	Notes
		Deliverables		
		Site plan showing vegetated areas (Option 1).		
		Narrative for plant species and water requirements (Option 1).		
		Site plan showing location and size of landscape zones (Option 2).		

Water Budget Tool report (Option 2).

Indoor Water Use Reduction

Employ strategies that in aggregate use 20% less water than the water use baseline calculated for the building.

Appliances, equipment, and processes within the project scope must meet the LEED requirements and standards.

Preliminary calculations have been done, showing performance of different options being considered. All exceed the pre-requisite.

Notes

Arch

Ρ

Product cutsheets, manufacturers' information. Indoor water use calculator.

Building-Level Water Metering

Install permanent water meters that measure the total potable water use for the building and associated grounds. Meter data must be compiled into monthly and annual summaries; meter readings can be manual or automated.

Commit to sharing with USGBC the resulting whole-project water usage data for a five-year period beginning on the date the project accepts LEED certification or typical occupancy, whichever comes first.

There has been no change to the proposed strategy - a comprehensive metering strategy will be implemented for the development. MM and A10 will discuss in further detail as the project design progresses.

Deliverables

Meter declaration.

Sharing commitment.

Ep2

Notes



Water Efficiency

Likely	Possible	Difficult	40	Available
7	4	0	0	11

Jour Wa	ater Use Reduction			2		L	Arc	2
WEC1	Reduce outdoor water use th Nonvegetated surfaces, such should be excluded from land playgrounds (if vegetated) an at the project team's discretion Option 1. No irrigation requ Show that the landscape doe beyond a maximum two-year	rough one of the following options. as permeable or impermeable pavement, dscape area calculations. Athletic fields and d food gardens may be included or excluded on. ired (2 points) s not require a permanent irrigation system establishment period.	Landscape approach vegetated rainwater water den strong cor specificati complianc	e architect with regar roof. Alth harvesting nand in line nsideration on of plant ce.	to advise a ds to irrigat ough the ir s will help r e with Opti should be t species as	s to the proj tion for the nclusion of educe potab on 2 of this o given to the s this will imp	ject's ble credit, e pact	Notes
	Option 2. Reduced irrigatio Reduce the project's landsca from the calculated baseline Reductions must first be achi irrigation system efficiency as Agency (EPA) WaterSense V	n (1-2 points) pe water requirement (LWR) by at least 50% for the site's peak watering month. eved through plant species selection and s calculated in the Environmental Protection Vater Budget Tool.	There is a internal ir this is not that this c innovation	current de rigation sys applicable ould be co n in design	sign propo stem, howe to LEED. T nsidered as - MM to re	sal to include ever we conf There is the p s part of an eview further	e an firm that potential r.	
	Additional reductions beyond combination of efficiency, alto scheduling technologies. Percentage reduction 50% 100%	30% may be achieved using any ernative water sources, and smart Points 1 2	Compliand	ce remains ion is unde	possible u rtaken.	ntil further		
	Deliverables							

See WEp1

	Indoor Water Use Reduction		4	2		M.Eng	6
	Employ strategies that in ag baseline calculated for the water savings percentage f Percentage Reduction Poir	ggregate use less water than the water use building (not including irrigation). The minimum or each point threshold is as follows: its	It is confir being incl currently use.	med that v uded withi reviewing	vacuum dra n the proje options, su	ainage is no longer ect design. A10 are ch as greywater re-	
WECZ	25% 30% 35% 40% 45% 50%	1 2 3 4 5 6 (exc. school, retail, hospitality, health)	MM have performa project - p remains a	provided s nce of vario project tea n likely tar	some calcu ous options m to reviev get for the	lations to show the s available for the v. Four points time-being.	Notes

AND (Schools, Retail, Hospitality and Healthcare ONLY)

Appliance and process water

Install equipment within the project scope that meets the LEED minimum requirements. All applicable equipment must meet the standard.

Schools, Retail, and Healthcare projects can earn a second point for meeting the requirements.

Deliverables

See WEp2



Water Efficiency

7 4 0 0 11	Likely	Possible	Difficult	40	Available
	7	4	0	0	11

Cooling Tower Water Use 2 Arch 2 For cooling towers and evaporative condensers, conduct a one-time The design team confirm that cooling towers will potable water analysis, in order to optimize cooling tower cycles. Measure be used in the project. at least the following five control parameters: A10 have been in touch with manufacturers - and it Parameter Maximum level is concluded that bleed water re-use is not a viable EC3 Ca (as CaCO₃) 1,000 ppm õ approach. However, it is possible to include within 1,000 ppm Total alkalinity es the specification that the water treatment levels ≧ SiO₂ 100 ppm need to achieve LEED compliance. CI-250 ppm Based on this, compliance with this credit is now 2,000 µS/cm Conductivity deemed likely. MM and A10 to liaise further with manufacturers and will advise on the Calculate the number of cooling tower cycles by dividing the maximum documentation required for LEED. allowed concentration level of each parameter by the actual concentration level of each parameter found in the potable makeup water. Limit cooling tower cycles to avoid exceeding maximum values for any of these parameters. 1 point: Maximum number of cycles achieved without exceeding any filtration levels or affecting operation of condenser water system (up to maximum of 10 cycles). 2 points: Achieve a minimum 10 cycles by increasing the level of treatment in condenser or make-up water OR Achieve the number of cycles for 1 point and use a minimum 20% recycled nonpotable water **Deliverables** Potable water analysis results and narrative. Cycles of concentration calculations Nonpotable water calculations (2 points) Water treatment calculations (2 points) Water Metering **M.Eng** 1 1

Install permanent water meters for two or more of the following water subsystems, as applicable to the project:

- Irrigation. Meter water systems serving at least 80% of the irrigated landscaped area.

- Indoor plumbing fixtures and fittings. Meter water systems serving at least 80% of the indoor fixtures and fitting described in WE Prerequisite Indoor Water Use Reduction, either directly or by deducting all other measured water use from the measured total water consumption of the building and grounds.

As noted in WEp3 there has been no change in strategy. A comprehensive water metering strategy will be implemented within the project. Compliance therefore remains likely - MM to discuss specific requirements with A10 to ensure criteria are met within the design documentation.

- **Domestic hot water**. Meter water use of at least 80% of the installed domestic hot water heating capacity.
- **Boiler** with aggregate projected annual water use of 378 500 litres or 150 kW.
- Reclaimed water. Meter reclaimed water, regardless of rate.
- **Other process water**. Meter at least 80% of expected daily water consumption for process end uses.

Deliverables

Water metering strategy narrative.

17 January 2017





Energy and Atmosphere



*	Fundamental Commissioning and Verification	СХА	Р
	Commissioning Process ScopeFacility Performance Consulting (FPCComplete the following commissioning (Cx) process activities for mechanical, electrical, plumbing, and renewable energy systems and assemblies, in accordance with ASHRAE Guideline 0-2005 and ASHRAE Guideline 1.1–2007 for HVAC&R Systems, as they relate to energy, water, indoor environmental quality, and durability.Facility Performance Consulting (FPC appointed as the project Commission (CxA).	c) have been ning Authority irements to nsidered.	Notes
	- Develop the OPR. - Develop a BOD		
EAp1	 The commissioning authority (cxa) must do the following: Review the OPR, BOD, and project design. Develop and implement a Cx plan. Confirm incorporation of Cx requirements into the construction documents. Develop construction checklists. Develop a system test procedure. Verify system test execution. Maintain an issues and benefits log throughout the Cx process. Prepare a final Cx process report. Document all findings and recommendations and report directly to the owner throughout the process. Commissioning Authority By the end of the design development phase, engage a commissioning authority with the following qualifications: The CxA must have documented commissioning process experience on at least two building projects. The CxA may be a qualified employee of the owner, an independent consultant, or an employee of the design or construction firm who is not part of the project's design or construction team. For projects smaller than 1 860 square meters, the CxA may be a qualified member of the design or construction team. 		

Current Facilities Requirements and Operations and Maintenance Plan

In all cases, the CxA must report his or her findings directly to the owner.

Prepare and maintain a current facilities requirements and operations and maintenance plan that contains the information necessary to operate the building efficiently. The plan must include the following:

- sequence of operations for the building
- building occupancy schedule
- equipment run-time schedules
- set points for all HVAC equipment
- set lighting levels throughout the building
- minimum outside air requirements
- seasonal, weekly, daily set point changes
- systems narrative describing the M&E systems and equipment
- preventive maintenance plan
- commissioning program

Deliverables





Energy and Atmosphere



CxA previous experience Confirmation of OPR and BOD contents. List of systems to be commissioned. Verification of CxA activities and reviews. Cx plan. Documentation of testing and verification. CFR, O&M plan. Cx report.

Minimum Energy Performance

M.Eng Option 1. Whole Building Energy Simulation The Part L calculation has been revised since the Demonstrate a 5% improvement in the proposed building performance last issue and the building is performing better than rating for new buildings, or a 3% for major renovations, or 2% for core and initially expected. However, it is difficult to relate a shell, compared with the baseline building performance rating. Part L calculation to ASHRAE 90.1. MM are awaiting Calculate the baseline building performance rating according to the for the facade re-design to be complete before building performance rating method in Appendix G of finalising the development of the preliminary ANSI/ASHRAE/IESNA Standard 90.1-2010 (with errata) using a computer ASHRAE model, and will advise on the results simulation model for the whole building project. accordingly. The likelihood of credits for LEED have therefore not changed at this stage, and we

still expect that the performance will be sufficient to meet this pre-requisite.

Deliverables

Input-output reports from modelling software.

Energy consumption / demand for end use and fuel type.

Building-Level Energy Metering

Install new or use existing building-level energy meters, or submeters that There has been no change to the initial strategy. can be aggregated to provide building-level data representing total building energy consumption (electricity, natural gas, chilled water, steam, fuel oil, propane, biomass, etc.). Utility-owned meters capable of

There is a comprehensive metering strategy proposed for the building, with clear guidance outlined in the Google Project Requirements (GPR).

EAp2

Ρ

M.Eng

Ρ

Votes

aggregating building-level resource use are acceptable.

Commit to sharing with USGBC the resulting energy consumption data and electrical demand data (if metered) for a five-year period beginning on the date the project accepts LEED certification or typical occupancy, whichever comes first. At a minimum, energy consumption must be tracked at one-month intervals.

Deliverables

Confirmation of permanently installed meters.

Letter of commitment.

Confirmation of data sharing source.

Compliance with this pre-requisite is therefore anticipated.

MM to liaise with A10 to ensure all requirements have been captured in the design documentation.





Energy and Atmosphere



Fundament	al Refrigerant Management	M.Eng	Р
EAp4	Zero use of chlorofluorocarbon (CFC)-based refrigerants in new heating, ventilating, air conditioning and refrigeration (HVAC&R) systems. When reusing existing base building HVAC equipment, complete a comprehensive CFC phase-out conversion prior to project completion. Phase-out plans extending beyond the project completion date will be considered on their merits.	The use of CFC-based refrigerants is banned in the UK, and so compliance with this pre-requisite will be achieved by default. A10 and Sefton Horn Winc (catering consultant) to provide schedule of equipment.	h Notes
	Deliverables		
	Equipment type.		
	Refrigerant type.		
	Confirmation that no new or existing equipment contains CFCs.		
	CFC conversion or replacement plan (if phase-out required).		
	Refrigerant leakage rate, quantity (if phase-out required).		
	Phase-out completion date (if phase-out required).		

*	Enhanced Commissioning	6			СХА	6
EAc1	 Implement, or have in place a contract to implement, the following commissioning process activities in addition to those required under EA Prerequisite Fundamental Commissioning and Verification. Commissioning authority The CxA must have documented commissioning process experience or at least two building projects with a similar scope of work. The experience must extend from early design phase through at least 10 months of occupancy; The CxA may be a qualified employee of the owner, an independent consultant, or a disinterested subcontractor of the design team. 	As noted Consultin Commiss Due to tir with thes	under EAp: g (FPC) hav ioning Auth ning of the e credits ar	L, Facility Performand te been appointed as tority for the project. ir appointment, com e now deemed likely	ce oliance	Notes
	 Option 1. Enhanced systems commissioning (3-4 points) Path 1: Enhanced commissioning (3 points) The commissioning authority must do the following: Review contractor submittals. Verify inclusion of systems manual requirements in construction documents. Verify inclusion of operator and occupant training requirements in construction documents. 					

- Verify systems manual updates and delivery.
- Verify operator and occupant training delivery and effectiveness.
- Verify seasonal testing.
- Review building operations 10 months after substantial completion.
- Develop an on-going commissioning plan.
- Include all enhanced commissioning tasks in the OPR and BOD.





Energy and Atmosphere



Path 2: Enhanced and monitoring-based commissioning (4 points)	
Achieve Path 1.	
AND Develop monitoring-based procedures and identify points to be measured	
and evaluated to assess performance of energy- and water-consuming	
systems.	
Include the procedures and measurement points in the Cx plan. Address	
the following:	
- roles and responsibilities	
- measurement requirements	
- points to be tracked, frequency and duration for trend monitoring	
- limits of acceptable values for tracked points and metered values	
- elements used to evaluate performance	
- training to prevent errors	
- planning for repairs needed to maintain performance	
AND/OR Ontion 2 Envelope commissioning (2 points)	
Commissioning authority must complete the following:	
- Review contractor submittals.	
- Verify inclusion of systems manual requirements in construction	
documents.	
- Verify inclusion of operator and occupant training requirements in	
construction documents.	
- Verify systems manual updates and delivery.	
- Verify operator and occupant training delivery and effectiveness.	
- Verify seasonal testing.	
- Nevelop an on-going commissioning plan	
Deliverables	
List of all tasks completed as part of Cx activities.	
Training outline and participation list.	
Confirmation of systems manual delivery.	
Ongoing Cx plan.	
Inclusion of monitoring and tracking in Cx plan.	
Inclusion of envelope in Cx plan.	

Optimize Energy Performance




Energy and Atmosphere

Option 1. Whole Building Energy Simulation (1–18 points) Demonstrate a percentage improvement in the proposed building performance rating compared with the baseline building performance rating. Calculate the baseline building performance according to Appendix G of ANSI/ASHRAE/IESNA Standard 90.1-2010 with errata using a computer simulation model for the whole building project. The minimum energy cost savings percentage for each point threshold is as follows:

New Buildings	Core & shell	Points
6%	3%	1
8%	5%	2
10%	7%	3
12%	9%	4
14%	11%	5
etc.		

Option 2. Prescriptive compliance: ASHRAE Advanced Energy Design Guide (1–6 points)

Implement and document compliance with the applicable recommendations and standards in Chapter 4, Design Strategies and Recommendations by Climate Zone, for the appropriate ASHRAE 50% Advanced Energy Design Guide and climate zone. For projects outside the U.S., consult ASHRAE/ASHRAE/IESNA Standard 90.1–2010, Appendixes B and D, to determine the appropriate climate zone.

Deliverables

Please provide a narrative highlighting energy saving measures incorporated in the building design focusing on building envelope, mechanical, lighting, hot water, and all energy efficiency measures. Include a table listing baseline and proposed comparisons of all model variables that are different. Demonstrate how much lower (by a percentage) the design energy cost is as compared to the energy cost budget as defined in ASHRAE/IESNA 90.1-2010. Compare local code requirements to proposed building characteristics if applicable. Provide a completed and signed copy of the Energy Cost Budget (ECB) Compliance Form along with sample output from the energy model summary.



The Part L calculation has been revised since the last issue and the building is performing better than initially expected. However, it is difficult to relate a Part L calculation to ASHRAE 90.1. MM are awaiting for the facade re-design to be complete before finalising the development of the preliminary ASHRAE model, and will advise on the results accordingly. The likelihood of credits for LEED has therefore not changed at this stage, but this will be monitored as the design and modelling exercise progresses. There is potential to uplift the likely score under this issue.







Energy and Atmosphere

Install advanced energy metering for the following:
all whole-building energy sources used by the building
any individual energy end uses that represent 10% or more of the total annual consumption of the building.

The advanced energy metering must have the following characteristics. . Meters must be permanently installed, record at intervals of one hour or less, and transmit data to a remote location.

. Electricity meters must record both consumption and demand. Wholebuilding electricity meters should record the power factor, if appropriate. . The data collection system must use a local area network, building automation system, wireless network, or comparable communication infrastructure.

. The system must be capable of storing all meter data for at least 36 months.

Deliverables

List of all advanced meters to be installed, including type, energy source metered

Manufacturers' datasheets



There has been no change to the proposed strategy. The requirements of this credit form part of the GPR, and in addition to this both Google MTV and Security are very keen to have remote access, which we anticipate will ensure compliance is met. MM to liaise with A10 as the design progresses to ensure documentation is in line with the specific LEED requirements.

Votes

Demand Response 2 2 **M.Eng** Design building and equipment for participation in demand response There has been no change to the initial strategy. programs through load shedding or shifting. Demand response programmes are currently not available in the UK and so only Case 2 is applicable Case 1. Demand response program available (2 points) to this project. However, Google have not Participate in an existing demand response (DR) program and complete previously expressed an interest in implementing the required activities. such a programme during their early discussions with A10. Case 2. Demand response program not available (1 point) Provide infrastructure to take advantage of future demand response programs or dynamic, real-time pricing programs and complete the following activities. otes - Install interval recording meters with communications and ability for the building automation system to accept an external price or control signal. - Develop a comprehensive plan for shedding at least 10% of building estimated peak electricity demand. Peak demand is determined under EA

Include the DR processes in the scope of work for the commissioning authority, including participation in at least one full test of the DR plan.
Contact local utility representatives to discuss participation in future DR programs.

Deliverables

Proof of enrolment in DR program.

Evidence of ability to shed 10% of peak demand.

Prerequisite Minimum Energy Performance.

Confirmation that system is capable of receiving and acting on external signal.

Action plan for meeting reduction requirement during event.

Inclusion of DR in CxA systems testing plan





Energy and Atmosphere



M.Eng 2 1 3 Use on-site renewable energy systems to offset building energy cost. It is now likely that PV panels will be required in Calculate project performance by expressing the energy produced by the order for the project to achieve certain planning renewable systems as a percentage of the building annual energy cost obligations. Two of the three points have been and using the table below to determine the number of points achieved. deemed possible for the time being, as where the Use the building annual energy cost calculated in EA Credit 1 or use the technology is required for S106 and BREEAM, Department of Energy (DOE) Commercial Buildings Energy Consumption compliance with this may be achieved by default at Survey (CBECS) database to determine the estimated electricity use. no additional cost. lotes % Renewable Energy Points (Except CS) Points (CS) 1% 1 1 3% 2 2 5% 3 3 10% **Deliverables**

Renewable system rated capacity.

Calculations to determine energy generated.

Equivalent cost of renewable energy produced.

Enhanced Refrigerant Management

Option 1. No refrigerants or low-impact refrigerants (1 point) Do not use refrigerants, or use only refrigerants (naturally occurring or synthetic) that have an ozone depletion potential (ODP) of zero and a global warming potential (GWP) of less than 50. OR

Option 2. Calculation of refrigerant impact (1 point)

Select refrigerants that minimize or eliminate the emission of compounds that contribute to ozone depletion and climate change. The combination of all new and existing base building and tenant HVAC&R equipment that serve the project must comply with the following formula: LCGWP + LCODP x $10^5 \le 13$ (SI Units).

A10 propose to use HFO1234ze as a replacement for R134A for the chiller refrigerant use, and confirm that they have experience where this allowed a credit to be achieved for LEED. However the chiller efficiency drop must be tested before confirming this approach. MM met SHW to discuss specific requirements - they are in the early stages of liaising with manufacturers and so hope to be able to meet specific LEED compliant systems. Compliance with this credit is therefore thought likely.

1

Notes

1

M.Eng

Deliverables

Equipment type, cooling capacity, quantity and life expectancy. Refrigerant schedule with refrigerant type and charge. Leakage rate

🛠 Green Power and Carbon Offsets	2				Client	2
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Energy and Atmosphere

Engage in a contract for qualified resources that have come online since January 1, 2005, for a minimum of five years, to be delivered at least annually. The contract must specify the provision of at least 50% or 100% of the project's energy from green power, carbon offsets, or renewable energy certificates (RECs).

All purchases of green power shall be based on the quantity of energy consumed, not the cost.

Projects in Europe may use the following approved standards in place of Green-e Energy:

- EKOenergy

- Guarantees of Origin (GOs) with additional parameters

For more information, please see http://www.ekoenergy.org

Points are awarded based on the percentage of total energy addressed by green power and / or offsets: 50%: 1 point 100%: 2 points

Deliverables

Annual electricity and nonelectricity energy use calculations.

Calculations showing required REC, green power, or carbon offsets for targeted point threshold.

Purchase contract or letter of commitment showing REC, green power, or carbon offsets for targeted point threshold.

Green-e equivalency documentation, if not Green-e certified.



Google MTV have a centralised carbon offset contract in place and are able to provide offsets for entire project spaces. From past experience, compliance with both credits under this issue is therefore feasible.

The total and final floor area, as recorded throughout the LEED submission, is required by the [e]-team to allow the relevant documentation to be produced. MM to liaise with the [e]-team once this is done.







Materials and Resources



	Storage and	I Collection of Recyclables					Arch	Ρ
		Provide dedicated areas accessible to waste haulers and building occupants for the collection and storage of recyclable materials for the entire building. Collection and storage areas may be separate locations.	There has prerequisi BREEAM o	been no cl ite. The re criteria.	nange to th quirement	ne strategy s are simila	for this ar to the	
MRp1		Recyclable materials must include mixed paper, corrugated cardboard, glass, plastics, and metals. Take appropriate measures for the safe collection, storage, and disposal of two of the following: batteries, mercury- containing lamps, and electronic waste.						Notes
		Deliverables						
		Verification of recycled material types.						
		Narrative describing recycling storage and collection strategies.						
		Floor plans indicating recycling storage and collection areas.						

X	Constructio	n and Demolition Waste Management Planning				Cont.	Ρ
		Develop and implement a construction and demolition waste management plan:	This is currently stand Main Contractor will	dard practi be respon	ice in the U sible for pr	JK. The roducing	
MRp2		 Establish waste diversion goals for the project by identifying at least five materials (both structural and non-structural) targeted for diversion. approximate a percentage of the overall project waste that these materials represent. Specify whether materials will be separated or commingled and describe the diversion strategies planned for the project. Describe where the materials will be taken and how the recycling facility will process the material. 	and implementing th requirements have b tender documents.	is manage een includ	ment plan ed in the c	- ontractor	Notes
		Provide a final report detailing all major waste streams generated, including disposal and diversion rates.					
		Alternative daily cover (ADC) does not qualify as material diverted from disposal. Land-clearing debris is not considered construction, demolition, or renovation waste that can contribute to waste diversion.					

Deliverables

Construction waste management plan.

Total construction waste.





MRc1

Materials and Resources



2

Arch

Building Life-Cycle Impact Reduction

Demonstrate reduced environmental effects during initial project decisionmaking by reusing existing building resources or demonstrating a reduction in materials use through life-cycle assessment. Achieve one of the following appointment of a specialist consultant to options.

Option 1. historic building reuse (5 points)

Option 2. renovation of abandoned or blighted building (5 points) Maintain at least 50%, by surface area, of the existing building structure, enclosure, and interior structural elements for buildings that meet local criteria of abandoned or are considered blight. The building must be renovated to a state of productive occupancy. Up to 25% of the building surface area may be excluded from credit calculation because of deterioration or damage.

Option 3. building and material reuse (2–4 points)

Reuse or salvage building materials from off site or on site as a percentage of the surface area. Include structural elements, enclosure materials, and permanently installed interior elements. Exclude from the calculation window assemblies and any hazardous materials that are remediated as a part of the project.

Points	Points C&S
2	2
3	3
4	5
	Points 2 3 4

Option 4. whole-building life-cycle assessment (3 points)

For new construction (buildings or portions of buildings), conduct a life-cycle assessment of the project's structure and enclosure that demonstrates a minimum of 10% reduction, compared with a baseline building, in at least three of the following six impact categories, one of which must be global warming potential: Global warming potential, ozone depletion, acidification of land and water, eutrophication, formation of tropospheric ozone, resource depletion.

No impact category assessed as part of the life-cycle assessment may increase by more than 5% compared with the baseline building. Use the same life-cycle assessment software tools and data sets to evaluate both the baseline building and the proposed building, and report all listed impact categories. Data sets must be compliant with ISO 14044.

There is no change to the previous strategy. Only option 4 is considered feasible and it requires the undertake a full-life cycle assessment of the project.

3

Sturgis Carbon Consultants have been appointed to undertake this role and are currently working on the carbon analysis of the project.

The LEED requirements note that an old BRE tool can be used however this is now outdated, and so we are going to put a query to the USGBC to ask whether the approach being taken by Sturgis is acceptable. We will do this as soon as the project is registered with the USGBC.

It is thought that compliance with this will be deemed likely once we have clarification from the USGBC with regards to our approach.

5

Deliverables

Narrative describing abandoned or blighted status.

Reused elements table and calculations.

Description of LCA assumptions, scope, and analysis process for baseline building and proposed building.

Life-cycle impact assessment summary showing outputs of proposed building with percentage change from baseline building for all impact indicators.





Materials and Resources



*	Building Product Disclosure and Optimization — EPD	2 Cont.	2
MRc2	 Option 1. environmental product declaration (EPD) (1 point) Use at least 20 different permanently installed products sourced from at least five different manufacturers that meet one of the disclosure criteria below. Product-specific declaration (ISO 14044 with cradle to gate scope) are value at 25% of a product for the purpose of the calculation. Environmental Product Declarations (ISO 14044, EN 15804) Industry-wide EPDs are valued at 50% of a product Product-specific EPDs (Type III) are valued at 100% of a product USGBC approved program. 	It is recognised that products with EPDs will benefit compliance with this credit as well as the Mat01 credit of BREEAM. All materials will be tracked in the 'Materials Tracker' spreadsheet which will help to ensure there are a sufficient number of products with EPDs. Compliance is therefore still deemed likely.	Notes
	Option 2. Multi-attribute optimization (1 point) Use products that comply with one of the criteria below for 50%, by cost, of the total value of permanently installed products in the project. Products will be valued as below.	I	
	 Third party certified products that demonstrate impact reduction below industry average in at least three of the following six impact categories are valued at 100% of their cost for credit achievement calculations: Global warming potential, ozone depletion, acidification of land and water, eutrophication, formation of tropospheric ozone, resource depletion. USGBC approved program Products that comply with other USGBC approved multi-attribute frameworks. 		
	For credit achievement calculation, products sourced (extracted, manufactured, purchased) within 100 miles (160 km) of the project site are valued at 200% of their base contributing cost.		
	Structure and enclosure materials may not constitute more than 30% of the value of compliant building products.		
	Deliverables		

EPD and LCA reports or compliant summary documents for 100% of products contributing toward credit.







Materials and Resources



*	Building Product Disclosure and Optimization—Sourcing of Raw Materials	1		1	Cont.	2	
MRc3	 Option 1. raw material source and extraction reporting (1 point) Use at least 20 different permanently installed products from at least five different manufacturers that have publicly released a report from their raw material suppliers with a commitment to responsible sourcing. Products sourced from manufacturers with self-declared reports are valued at 50% of a product for credit achievement. Third-party verified corporate sustainability reports (CSR) which include environmental impacts of extraction operations and activities associated with the manufacturer's product and the product's supply chain, are valued 100% of a product for credit achievement calculation. Acceptable CSR frameworks include the following: Global Reporting Initiative (GRI) Sustainability Report OECD Guidelines for Multinational Enterprises U.N. Global Compact: Communication of Progress ISO 26000: 2010 Guidance on Social Responsibility USGBC approved program. 	 There has been no change to the proposed compliance strategy. Option 1 is deemed difficult to achieve due to uncertainty around the availability of products meeting the LEED requirements. This can be further investigated with the supply chain. Option 2 gives the option of using materials with a high percentage of recycled content. This option is believed to be achievable in the current UK market. All materials and manufacturers will be recorded in the materials tracker spreadsheet. 					
	 Option 2. leadership extraction practices (1 point) Use products that meet at least one of the responsible extraction criteria below for at least 25%, by cost, of the total value of permanently installed building products in the project. Extended producer responsibility (valued at 50%) Bio-based materials meeting Sustainable Agriculture Standard (100%) Wood products FSC compliant (100%) Materials reuse (100%) Recycled content (100% for post-consumer, 50% for pre-consumer) Other USGBC approved program. For credit achievement calculation, products sourced (extracted, manufactured, and purchased) within 100 miles (160 km) of the project site are valued at 200% of their base contributing cost.						

MR building product disclosure and optimization calculator.

List of products, cost, extraction location, recycled content, etc.

Corporate sustainability reports for 100% of products contributing toward credit.





Materials and Resources



*	Building Product Disclosure and Optimization — Material Ingredients 2 Arch	2
MRc4	Option 1. material ingredient reporting (1 point)It is recognised that the Healthy MaterialsUse at least 20 different permanently installed products from at least five different manufacturers that use any of the following programs to demonstrate the chemical inventory of the product to at least 0.1% (1000 ppm).It is recognised that the Healthy Materials requirements for the project are more stringent than the LEED criteria, meaning that compliance with both credits is deemed likely.• Manufacturer Inventory: Publicly available for all ingredients. • Health Product Declaration. • Cradle to Cradle. • Other USGBC approved programs AND/ORIt is recognised that the Healthy Materials requirements for the project are more stringent than the LEED criteria, meaning that compliance with both credits is deemed likely.	Notes
	 Option 2. Material ingredient optimization (1 point) Use products that document their material ingredient optimization using the paths below for at least 25%, by cost, of the total value of permanently installed products in the project. GreenScreen v1.2 Benchmark with full list of ingredients to 100ppm. Assessed with GreenScreen List Translator are valued at 100%. Full GreenScreen assessment are valued at 150% Cradle to Cradle Certified. Cradle to Cradle v2 Gold: valued at 100%. Cradle to Cradle v2 Flatinum: 150% Cradle to Cradle v3 Silver: 100% Cradle to Cradle v3 Gold or Platinum: 150% International Alternative Compliance Path – REACH Optimization. Products that contain no ingredients listed on the REACH Authorization or Candidate list: valued at 100% AND/OR 	
	Option 3. Manufacturer Supply Chain Optimization (1 point) Use building products for at least 25%, by cost, of the total value of permanently installed products in the project that: - Are sourced from product manufacturers who engage in validated and robust safety, health, hazard, and risk programs which at a minimum document at least 99% (by weight) of the ingredients used to make the building product or building material, and - Are sourced from product manufacturers with independent third party verification of their supply chain where processes are in place to manage chemical ingredients: . communicate and transparently prioritize chemical ingredients. . identify, document, and communicate information on health, safety and	

environmental characteristics.

. implement measures to manage the health, safety and environmental hazard and risk.

. optimize health, safety and environmental impacts when designing and improving chemical ingredients.

. communicate, receive and evaluate chemical ingredient safety and stewardship information along the supply chain.

. Safety and stewardship information about the chemical ingredients is publicly available from all points along the supply chain.

Products meeting Option 3 criteria are valued at 100% of their cost for the purposes of credit achievement calculation.





Materials and Resources



For credit achievement calculation of options 2 and 3, products sourced (extracted, manufactured, purchased) within 100 miles (160 km) of the project site are valued at 200% of their base contributing cost. For credit achievement calculation, the value of individual products compliant with either option 2 or 3 can be combined to reach the 25% threshold but products compliant with both option 2 and 3 may only be counted once.

Deliverables

MR building product disclosure and optimization calculator.

Documentation of chemical inventory.

Verification of ingredient optimization.

Documentation of supply chain optimization.

×	Construction and Demolition Waste Management	2			C	Cont.	2
MRC7	 Option 1. diversion (1-2 points) Path 1. divert 50% and three material streams (1 point) Divert at least 50% of the total construction and demolition material; diverted materials must include at least three material streams. Path 2. divert 75% and four material streams (2 points) Divert at least 75% of the total construction and demolition material; diverted materials must include at least four material streams. Option 2. reduction of total waste material (2 points) Do not generate more than 12.2 kilograms of waste per square meter of the building's floor area. 	These cro the GPR significan Complian deemed Specific r MC tend	These credit requirements are aligned with both the GPR and BREEAM criteria, whilst being significantly less demanding than both. Compliance with both of these credits is therefor deemed likely. Specific requirements have been included in the MC tender documents.				Notes
	Deliverables						
	Track and record total and diverted waste amounts and material streams.						
	Documentation of recycling rates for commingled facilities.						
	Justification narrative for use of waste-to-energy strategy.						
	Documentation of waste-to-energy facilities adhering to relevant EN standards.						

Total waste per area







EQp1

Indoor Environmental Quality



Minimum Indoor Air Quality Performance Ventilation The proposed strategy re Mechanically ventilated spaces previous discussions. The

Meet the minimum requirements of either one of the following standards: - ASHRAE 62.1–2010, Sections 4–7.

- EN 15251–2007 (for Indoor environmental input parameters)
- EN 13779–2007 (for performance requirements)

Naturally ventilated spaces

Determine the minimum outdoor air opening and space configuration requirements using the natural ventilation procedure from ASHRAE
Standard 62.1–2010 or a local equivalent, whichever is more stringent.
Confirm that natural ventilation is an effective strategy based on CIBSE AM10.

Monitoring

Mechanically ventilated spaces

For VAV systems: provide a direct outdoor airflow measurement device capable of measuring the minimum outdoor air intake flow. This device must measure the minimum outdoor air intake flow with an accuracy of +/–10% of the design minimum outdoor airflow rate, as defined by the ventilation requirements above. An alarm must indicate when the outdoor airflow value varies by 15% or more from the outdoor airflow setpoint.
For constant-volume systems, balance outdoor airflow to the design minimum outdoor airflow rate defined by ASHRAE Standard 62.1–2010. Install a current transducer on the supply fan, an airflow switch, or similar monitoring device.

Naturally ventilated spaces

Comply with at least one of the following strategies:

- Provide a direct exhaust airflow measurement device capable of measuring the exhaust airflow. This device must measure the exhaust airflow with an accuracy of +/-10% of the design minimum exhaust airflow rate. An alarm must indicate when airflow values vary by 15% or more from the exhaust airflow setpoint.

- Provide automatic indication devices on all natural ventilation openings intended to meet the minimum opening requirements. An alarm must

M.Eng P

The proposed strategy remains the same as previous discussions. The ventilation requirements are aligned with the GPR and so compliance with this pre-requisite will be achieved. A10 to confirm whether the GPR also includes provision of OAFMDs.

indicate when any one of the openings is closed during occupied hours. - Monitor carbon dioxide (CO_2) concentrations within each thermal zone. CO_2 monitors must be between 900 and 1 800 millimetres above the floor and within the thermal zone. CO_2 monitors must have an audible or visual indicator or alert the building automation system if the sensed CO_2 concentration exceeds the setpoint by more than 10%. Calculate appropriate CO_2 set points using the methods in ASHRAE 62.1–2010, Appendix C.

Deliverables

Completed ventilation table with vent calculations demonstrating compliance with the relevant standards.

Confirmation that project has MERV 11 or higher filters.

Ventilation rate procedure or CEN calculations and documentation of assumptions for calculation variables.





Indoor Environmental Quality



Environm	ental Tobacco Smoke (ETS) Control				Client	Р
EQp2	 OPTION 1 Prohibit smoking in the building. Locate any exterior designated smoking areas at least 7.5 meters away from entries, outdoor air intakes and operable windows. OR Other options have been omitted for simplicity as they are not relevant to this project. 	Compliance law, howev the externa communica located and	e will be a ver additic al smoking ate the po d visible n	chieved by onal attenti g policy - w licy with si ear to all e	default as per UK ion must be paid to e need to clearly gnage which is ntrances.	Notes
	Deliverables Option 1: Confirm smoking prohibited on site and provide evidence of signage communicating the exterior smoking policy. OR Option 1: Confirm smoking prohibited inside building and within 7.5m of doors, windows or air intakes and a site plan/map showing the location of the designated outdoor smoking/non-smoking areas.					

Enhanced Indoor Air	r Quality Strategies	2		M.Eng	2
Option 1. Comply w (additiona	Enhanced IAQ strategies (1 point) ith the following requirements, as applicable. Il information will be provided to the design team)	The proje There ha previous	ect will be e s been no p strategy.	ntirely mechanically ventilated. proposed changes to the	
Mechanica A. <u>entrywa</u> B. <u>interior</u> pressure t C. <u>filtration</u>	ally ventilated spaces: <u>ay systems</u> : permanent 3m entryway systems <u>cross-contamination prevention</u> : Sufficient exhaust and negati to rooms where hazardous chemicals may be present. <u>n</u> : MERV 13 or F7.	Ve Option 1 . Entrywa . Interior applicabl will inclu be handl	Kely are expected to be provided. amination may not be onfirm whether the building where hazardous chemicals will		
Naturally	ventilated spaces:	. Filtratio	n requirem	ents are part of the GPR.	
A. <u>entrywa</u> D. <u>natural</u>	ay systems. ventilation design calculations: Follow CIBSE AM10.	Option 2 . Increase	: 1 credit lil ed ventilatio	k ely on rates are required by the	
5 Mixed-mo A. <u>entrywa</u> B. interior	ode systems: ay systems.	GPR. . CO ₂ sen	sors in occu	upied areas may be included in	No

C. filtration.

D. <u>natural ventilation design calculations</u> E. <u>mixed-mode design calculations</u>: comply with CIBSE Applications

Manual 13–2000.





Indoor Environmental Quality



Option 2. Additional enhanced IAQ strategies (1 point)

Comply with the following requirements, as applicable (select one):

Mechanically ventilated spaces.

- A. exterior contamination prevention: air pollutant levels below thresholds
- B. increased ventilation: increase ventilation rates by 30% above EQp1.
- C. carbon dioxide monitoring: Monitor CO₂ in densely occupied spaces
- D. additional source control and monitoring: monitor other contaminants.

Naturally ventilated spaces.

- A. exterior contamination prevention;
- D. additional source control and monitoring
- E. natural ventilation room by room calculations: Follow CIBSE AM10

Mixed-mode systems.

- A. exterior contamination prevention
- B. increased ventilation
- D. additional source control and monitoring
- E. natural ventilation room-by-room calculations.

Deliverables

Scaled floor plans showing locations and measurements of entryway systems.

List of rooms with hazardous chemicals, areas, exhaust rate, separation method.

Filters schedules highlighting MERV rating for all units supplying outdoor air.

Natural ventilation / mixed mode: calculations and narrative demonstrating appropriate strategies.

CO₂ monitoring: list of densely occupied spaces, space type, floor plans showing sensors location, design CO₂ levels and narrative.

Low-Emitting Materials

As previously noted, the requirements for this

Arch

Option 1. Product Category Calculations

Achieve the LEED threshold level of compliance with emissions and content credit are closely aligned with both BREEAM and standards for 2 to 6 of the 7 product categories (further information will be the GPR. As such, compliance should not be provided).

Option 2. Budget Calculation Method

If some products in a category do not meet the criteria, project teams may use the budget calculation method. Determine the percentage of compliant products in each category: walls,

flooring, ceilings, insulation and calculate the overall % compliance.

Percentage	Points
≥ 50% and < 70%	1
≥ 70% and < 90%	2
≥ 90%	3

challenging. Sustainability credentials for each product will be recorded as the project progresses on the

Sustainability Materials Tracker.

3

Deliverables

Product information with VOC levels and emission tests results.





Indoor Environmental Quality



🛠 Construction Indoor Air Quality Management Plan 1 Cont. 1 Develop and implement an Indoor Air Quality (IAQ) Management Plan There is no change to the proposed strategy - the associated with the construction and preoccupancy phases of the building. requirements for this credit are aligned with those in BREEAM, and so it is likely that one document / During construction, meet or exceed all applicable recommended control plan can be produced to cover both disciplines. measures of the Sheet Metal and Air Conditioning National Contractors It will be the responsibility of the main contractor Association (SMACNA) IAQ Guidelines for Occupied Buildings. to produce and implement this plan, and so the - Protect absorptive materials stored on-site and installed from moisture requirements for this have been included in the EQc3 Notes damage. Contractor tender documents. - Do not operate permanently installed air-handling equipment during construction unless MERV 8 / F5 filters are installed at each return air grille and return or transfer duct inlet opening such that there is no bypass around the filtration media. Replace all filtration media with the final design filtration media immediately before occupancy. - Prohibit smoking within 8m of the building during construction. **Deliverables** IAQ management plan or detailed checklist, highlighting non-smoking policy. Narrative describing protection measures for absorbent materials. Annotated photographs of indoor air and environmental quality measures. Record of filtration media.

🛠 Indoor Air Quality Assessment

EQc4

Option 1. Flush-out (1 point)

Path 1. Before occupancy

Install new filtration media and perform a building flush-out by supplying a total air volume of 4,270m³/m² of outdoor air while maintaining an internal temperature of at least 15°C and no higher than 27°C and relative humidity no higher than 60%.

Path 2. During occupancy

If occupancy is desired before the flush-out is completed, the space may be occupied only after delivery of a minimum of $1,100m^3/m^2$ of outdoor air. Once the space is occupied, it must be ventilated at a minimum rate of 1.5 $l/s/m^2$. During each day of the flush-out period, ventilation must begin at least 3 hours before occupancy and continue during occupancy. These conditions must be maintained until a total of 4 270m³/m² of outdoor air has been delivered to the space. OR

The Droid Avengers include a number of targets relating to indoor air quality and requires air quality testing - this is therefore somewhat in line with the LEED criteria.

2

2

Votes

Cont.

G&T confirm that an allowance has been made within the cost plan, as such compliance is deemed likely at this stage of the project.

Option 2. Air testing (2 points)

After construction ends and before occupancy, but under ventilation conditions typical for occupancy, conduct baseline IAQ testing using protocols consistent with LEED requirements. Demonstrate that contaminants do not exceed the maximum concentrations required by LEED.

Deliverables	
Flush-out report.	
IAQ testing report.	





Indoor Environmental Quality



Þ	Thermal Comfort	1 M.Eng	1				
	 Thermal comfort design Design HVAC systems and the building envelope to meet the requirements of ASHRAE Standard 55-2010, Thermal Comfort Conditions for Human Occupancy or equivalent (ISO 7730:2005, EN 15251:2007). Thermal comfort control Provide individual thermal comfort controls for at least 50% of individual occupant spaces. Provide group thermal comfort controls for all shared multioccupant spaces, and for any individual occupant spaces without individual controls. 	A10 explored the possibility of integrating individual occupant thermal control in the early stages of design but this has since been deemed unfeasible. Likelihood has therefore been moved to 'no'.					
	Deliverables						
	Description of weather data used to determine operative temperatures, relative humidity, outdoor temperatures.						
	Plots or calculation results verifying that design parameters meet ASHRAE Standard 55–2010.						
	List of spaces by type, quantity, and controls						
	Narrative describing design strategy used in each space.						

al al	Interior Lighting	2			Arch	2
EQc6	Option 1. Lighting control (1 point) Provide individual lighting controls for 90% (minimum) of the building occupants to enable adjustments to suit individual task needs and preferences with at least three lighting levels (On, Off, Mid-level). AND Provide lighting system controllability for all shared multi-occupant spaces to enable lighting adjustment that meets group needs and preferences. AND/OR	BDP confirm that there is a task based lighting strategy currently proposed. Individuals will have control of their own lighting, thus demonstrating compliance with option 1 - this is therefore deemed likely.				
	 Option 2. Lighting quality (1 point) Choose four of the following strategies: A. use light fixtures with a luminance of less than 2,500 cd/m² between 45 and 90 degrees from nadir. B. use light sources with a CRI of 80 or higher. C. use light sources that have a rated life of at least 24,000 hours (for 75%) 	Option 2 i design bu undertake to develo with calcu	s also deer t further ca en to confii p the floor ilations.	med likely at thi alculations shou rm this. MM to area schedule -	is stage of the IId be work with BDP this will assist	

of total connected lighting load).

D. use direct-only overhead lighting for 25% or less of the total connected lighting load for all regularly occupied spaces.

E. for 90% of the regularly occupied floor area, average surface reflectance: 85% for ceilings, 60% for walls, and 25% for floors.

F. select furniture finishes with average surface reflectance: 45% for work surfaces, and 50% for movable partitions.

G. For 75% of the regularly occupied floor area, meet ratio of average wall surface illuminance (excluding fenestration) to average work plane (or surface, if defined) illuminance that does not exceed 1:10. Must also meet strategy E, strategy F, or demonstrate area-weighted surface reflectance of 60% for walls.

H. For 75% of the regularly occupied floor area, meet ratio of average ceiling illuminance (excluding fenestration) to work surface illuminance that does not exceed 1:10. Must also meet strategy E, strategy F, or demonstrate area-weighted surface reflectance of 85% for ceilings.

Deliverables





Option 2. Simulation: Illuminance Calculations (1–2 points) Demonstrate through computer modelling that illuminance levels will be between 300 lux and 3,000 lux for 9 a.m. and 3 p.m for the floor area below: % floor area **Points** 75% 1 2 90%

Demonstrate through annual computer simulations that annual sunlight exposure of 1000 lux for more than 250 hours of occupied time of no more

Option 3. Measurement (2-3 points)

2

3

than 10% is achieved.

Achieve illuminance levels between 300 lux and 3,000 lux for the floor area below:

% floor area	Points
75%	2
90%	3

Deliverables

55%

75%

Floor plans highlighting regularly occupied spaces.

List of glare-control devices for all windows with their control mechanism.

List of compliant spaces with their annual summary values for sDA and ASE.

Geometric plots from simulations.

Narrative or output file describing daylight simulation program, simulation inputs, and weather file.

List of compliant spaces with their calculated illuminance values.





Indoor Environmental Quality



	Quality Views	1 Arch	1
	Achieve a direct line of sight to the outdoors via vision glazing for 75% of a regularly occupied floor area.	II There is no proposed change to the strategy at this stage. Initial discussions suggest that the	
EQc8	Additionally, 75% of all regularly occupied floor area must have at least two of the following four kinds of views: - multiple lines of sight to vision glazing in different directions at least 90 degrees apart - views that include at least two of the following: (1) flora, fauna, or sky; (2) movement; and (3) objects at least 25 feet from the exterior of the glazing - unobstructed views located within the distance of three times the head height of the vision glazing - views with a view factor of 3 or greater, as defined in "Windows and Offices; A Study of Office Worker Performance and the Indoor Environmer Views into interior atria may be used to meet up to 30% of the required area.	complexity of the internal layout could make this credit challenging. MM and BDP to review as the design progresses.	Notes
	Deliverables		
	Sections, elevations, diagrams, renderings, or photos indicating sight lines to glazing do not encounter permanent interior obstructions.		
	Floor plans or diagrams identifying regularly occupied spaces.		
	Multiple sight lines for each regularly occupied space.		
	Sight lines and area indicating three times head height.		
	Area with view factor of 3 or greater.		
	Method for determining view factor for each typical occupant location.		

Acoustic Performance

HVAC Background noise

Achieve a background noise level of 35 dBA or less from HVAC systems in MM to continue discussions with Sandy Brown as classrooms and other core learning spaces.

Compliance with this credit is still deemed possible. the design progresses.

Acou

1

Notes

1

See EQp3 for methodology and standards.

Sound Transmission

Meet the composite sound transmission class (STCC) ratings listed in Table 1, or local building code, whichever is more stringent.

Reverberation Time

Meet the reverberation time requirements provided by the LEED v4 standard (adapted from Table 9.1 in the Performance Measurement Protocols for Commercial Buildings) For an office building, the requirements are as follows: Private office, conference rooms : <0.6 T60 at 500Hz, 1000Hz and 2000Hz Open plan office: <0.8 T60 at 500Hz, 1000Hz and 2000Hz





Indoor Environmental Quality



Sound Reinforcement and Masking Systems

Sound Reinforcement

For all large conference rooms and auditoriums seating more than 50 persons, evaluate whether sound reinforcement and AV playback capabilities are needed.

If needed, the sound reinforcement systems must meet the following criteria:

- A speech transmission index (STI) of at least 0.60 or common intelligibility scale (CIS) rating of at least 0.77 at representative points within the area of coverage to provide acceptable intelligibility.

- A minimum sound level of 70 dBA.

- Maintain sound-level coverage within +/-3 dB at the 2000 Hz octave band throughout the space.

Masking Systems

For projects that use masking systems, the design levels must not exceed 48 dBA. Ensure that loudspeaker coverage provides uniformity of +/–2 dBA and that speech spectra are effectively masked.

Deliverables

Occupied spaces sound level values, calculations, measurement narrative or manufacturer data.

Noise reduction narrative.

STC ratings for space adjacencies.

Reverberation time criteria for each room.





	Likely	Possible	Difficult	40	Availa	ble
Innovation in Design	3	0	3	0	6	
Innovation in Design: Access to Quality Transit	1				Arch	1
Innovation in Design: Reduced Parking Footprint	1				Arch	1
Innovation in Design: TBC			1		Arch	1
Innovation in Design: TBC			1		Arch	1
Innovation in Design:TBC			1		Arch	1
LEED® Accredited Professional	1				LEED	1





	Likely	Possible	Difficult	40	Available	e
Regional Priority	2	2	0	0	4	
* Regional Priority: Sensitive Land Protection	1				LEED	1
Regional Priority: Protect or Restore Habitat (2 pt threshold)	1				LEED 1	1
* Regional Priority: Rainwater Management (2 pt threshold)		1			LEED	1
* Regional Priority: Optimise Energy Performance (8 pt threshold)		1			LEED 1	1





Recommendations

Project title:	Google KGX1
Project description :	LEED Certification
Rating system used :	LEED v4 BD+C
Date of latest issue :	17 January 2017

Current predicted score: 62

Current predicted rating: GOLD

Additional points needed for Platinum: 18

The current predicted score of **62** is based upon our understanding of the initial design proposals, and ongoing discussions with the project team.

The following recommendations will help the team align the design with the LEED criteria and present a number of credits that could be earned to provide the required buffer for the desired LEED rating. These recommendations have been classified in 4 categories based on our assessment of associated cost implications. All cost implications are understood to come in addition to the inherent cost of achieving a BREEAM 'Excellent' rating.

_	Additional credits	Credit		dditional Credit credits		Submission phase	Credit criteria	Primary responsibility	Notes
				No	or Low cost or programme	e implicatio	าร		
	2	WE c	1	Design	Outdoor water use reduction	L. Architect	Landscape architect to review requirements and advise. Although RWH will assist compliance, strong consideration must be given to the planting strategy		
	4	SS c	4	Design	Rainwater management.	Civil Engineer / L. Architect	The requirements for this credit are relatively stringent but may not be too different from what is already being targeted. Note: Compliance with this credit would yield one additional point in the RP category.		
	3	MR c	1	Design	Life-cycle impact reduction	MM / SCP	Sturgis Carbon Profiling have now been appointed, and so compliance with these three points may be possible. MM raise query with USGBC to determine whether SCP's approach is compliant		

 Modified predicted score: 71
 Modified predicted rating: GOLD

 Image: Section of the state of the s

2	WE	С	2	Design	Indoor water use reduction	M. Engineer	Calculations confirm that earning an additional 2 points under this issue would require specific design measures such as greywater re-use. This is currently being reviewed but will likely be a significant re- design and potential cost uplift.			
2	EA	С	2	Design	Optimise energy performance	ASHRAE Modeller	Current likely score: 3 points The project could potentially earn an additional 2 points with limited cost implications. This is dependent on the outcome of an initial ASHRAE Energy Model.			
1	EQ	С	9	Design	Acoustic performance	Acoustician	Feasibility of this credit remains to be confirmed by the acoustician. It is possible that this credit may be a no-cost option.			
Modified	predic	ted s	score	77	Modified predicted	ed rating: GC)LD			
					High cost or programme i	mplication				
3	EA	С	2	Design	Optimise energy performance	M. Engineer / ASHRAE Modeller	Current likely score: 3 points Possible score with limited cost: 5 points An increased score under this credit (potentially up to 8-10 points) will likely have significant cost implications. Team are currently looking into the potential of PV panels on the roof, to meet both BREEAM and S106.			
3	EA	С	5	Design	Renewable energy production	M. Engineer / ASHRAE Modeller	It is likely that PV panels will be included in the design to ensure that the S106 and BREEAM targets can be achieved. It may therefore be the case that some points can be achieved under LEED by default. A10 to advise on PV requirement as the design and modelling progresses.			
3	EQ	С	7	Design	Daylight	M. Engineer	Compliance is still deemed difficult, however the team agree that it should remain as a credit to consider and will be reviewed once the daylight modelling exercise is complete. If meeting rooms can be excluded it is likely to help compliance.			
Modified	Modified predicted score: 86 Modified predicted rating: PLATINUM									
		Ad	ditio	nal credits v	vith unknown cost, progra	mme or tech	nnical implications			
							No cost credit. Depends on presence of a			

Investigate presence of compliant

No cost credit. Depends on presence of a compliant bicycle network. MM are in the

1	LT	С	5	Design	bicycle network.	Architect	process of reviewing existing around KGX and also future proposals.





Issue and revision record

Revision	Date	Originator	Checker	Approver	Description
0	05 July 2016	A.Courreges	J Holland	E.Gulacsy	Stage 2 Issue
1	23 September 2016	J. Binks	L. Aminu	E.Gulacsy	Update
2	17 January 2017	J. Binks	L. Aminu	E.Gulacsy	Stage 3 Issue

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