New Oxford Street Ltd

21-31 New Oxford Street

Sustainability Statement

RP/230602/002

Planning | 5 September 2014

Job number 230602

Ove Arup & Partners Ltd
4 Pierhead Street
Capital Waterside
Cardiff CF10 4QP
United Kingdom
www.arup.com

ARUP

Contents

Appendices

Executive Summary

This report is the Sustainability Statement that is prepared on behalf of New Oxford Street Ltd. and submitted in support of the planning application for a mixed use scheme located at 21-31 New Oxford Street in the London Borough of Camden.

The sustainability statement provides details of the sustainable design and construction measures which have been adopted in the proposed design of the scheme.

The statement identifies relevant National, Regional and Local planning policy and outlines how the proposed design responds to these policies. In particular, the Sustainability Statement sets out how the design team proposes to reduce the energy, water and materials used in design and construction.

The design of the building has followed the energy hierarchy in order to reduce overall CO_2 emissions. A combination of passive design measures, efficient systems and appropriate renewable technologies are proposed which result in a 11% reduction in CO_2 emissions for the commercial scheme and 29% for the residential scheme against the Building Regulations Part L 2013 notional buildings. The development will have a centralised heating system serving both the commercial and residential elements and space for a future connection to a district heating system will be provided. Connection to an existing district heating scheme and sitewide CHP or CCHP have been considered but were not found to be feasible.

Potable water use will be reduced by using low flow fixtures and fittings and by reusing greywater. Surface water run-off will be reduced by 50% from the existing site condition through the use of landscaping on the roof and a “blue roof” system which attenuates water within the roof build up during periods of heavy rainfall.

The design team have sought to minimise the use of new materials by reusing as much of the existing structure as possible. The environmental impact of new materials will be assessed using the BREs Green Guide to Specification and suppliers operating third party certified environmental management systems will be sought.

The residential element of the scheme will target the Code for Sustainable Homes Level 4. The Commercial elements of the scheme will target BREEAM Very Good. Although the office part of the scheme will achieve a score in excess of the 70% required for BREEAM Excellent, the mandatory 25% reduction in CO_2 emissions for Excellent will not be achieved.

Although the design generally responds positively to local and regional sustainability policy, the building will not comply with a number of policies related to energy use and CO_2 emissions reduction. The design of the new building seeks to regenerate an underused site and to sensitively incorporate as much of the existing building structure as possible. The site and the form of the existing building have imposed a number of constraints on the energy reduction measures which can be implemented. These include very deep floor plates that restrict the use of natural daylight, noise from traffic which reduces the potential

for natural ventilation and floor to ceiling heights which limit the range of suitable servicing options.

The design team have sought to reduce energy use and CO_2 emissions as much as possible within these constraints and to balance the energy considerations with wider sustainability considerations such as the impact of construction traffic and materials use.

1 Description of Scheme

21-31 New Oxford Street is a former Royal Mail sorting office building situated on New Oxford Street in the London Borough of Camden.

The proposed development is for the remodelling, refurbishment and extension of the existing building in connection with the change of use to offices, retail and affordable housing along with associated highway, landscaping and public realm improvement works as described below.

The development includes the retention and recladding of the lower three floors of the building. The existing set back upper floors are proposed to be removed and reconstructed.

The majority of the building is proposed to be for flexible office use taking advantage of the existing double height internal spaces and inserting mezzanines around a new core.

The ground and lower ground floors will be animated with flexible retail use. The development will include the provision of active public uses at ground and lower ground floor levels to reactivate street frontages, with a mix of uses such as shops, cafés, galleries and restaurants

The proposed development includes up to 21 new affordable homes in the south east corner of the site fronting High Holborn.

The development includes public realm enhancement works including reopening Dunn's Passage, creating a new public open space on Museum Street and improving the surrounding public highway.

2 Methodology

The sustainability statement provides details of the sustainable design and construction measures which have been adopted in the proposed design of the scheme.

The statement identifies relevant National, Regional and Local planning policy and outlines how the proposed design responds to these policies. In particular, the Sustainability Statement sets out how the design team proposes to reduce the energy, water and materials used in design and construction.

A baseline policy review of relevant National, Regional and Local planning policy has been conducted and is included in Appendix A. Figure 1, adapted from Camden's Core Strategy document, highlights the key policy documents which are referenced in this statement and how they relate to each other.

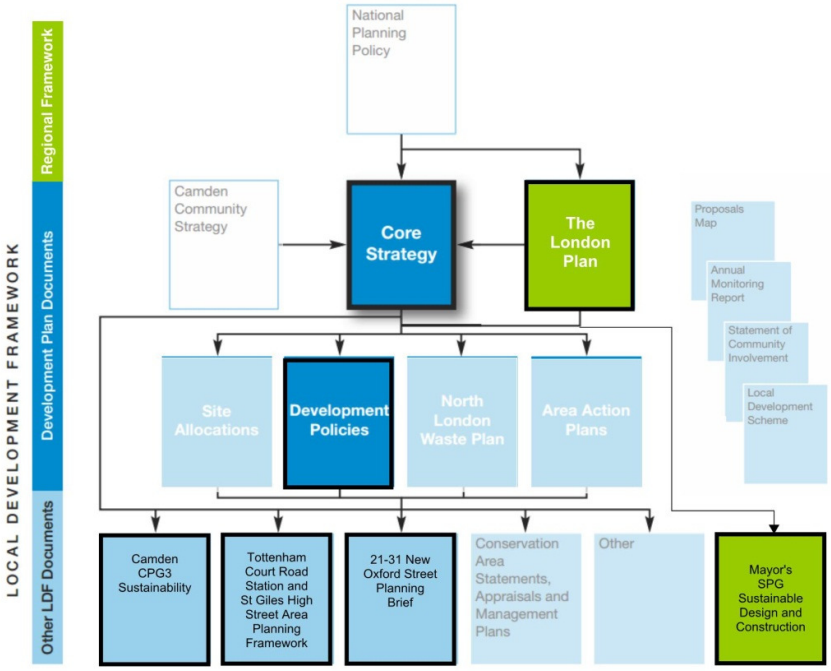

Figure 1 Summary of relevant regional and local planning documents

The structure of the Sustainability Assessment section of this document groups relevant policies under seven main headings to be addressed. These are Energy, Water, Materials and Waste, Sustainability Assessment Tools, Biodiversity, Flooding and Drainage and, Pollution and Construction Impacts.

The Sustainability Statement references other documents which are submitted in support of the planning application and should be read in conjunction with these referenced documents.

3 Sustainability Assessment

3.1 Energy

London Plan Policy 5.2, the Mayor's SPG on Sustainable Design and Construction, Camden's Policy CS13 and the Camden Planning Guidance on Sustainability (CPG 3) all require carbon dioxide emissions from the development to be minimised by following the steps in the energy hierarchy below:

1. Be Lean: Use Less Energy
2. Be Clean: Supply Energy Efficiently
3. Be Green: Use Renewable Energy

The project team's response to the energy hierarchy is outlined fully in the Energy Statement (REP-PLA-002) which is submitted as part of the application for planning permission. In total, it is proposed to reduce the regulated CO_2 emissions of the whole development by 11.5% against a Part L 2013 notional building baseline (regulated energy).

This section of the Sustainability Statement summarises the measures which are to be implemented in the design of the building and the effect of these measures on the overall CO_2 emissions of the development.

3.1.1 Be Lean: Use Less Energy

The development incorporates a number of passive measures to improve the overall energy efficiency of the building. These include:

- A high performance thermal envelope with triple glazing to the residential units.
- Careful detailing to reduce thermal bridges and improve air tightness.
- Varying the proportion of glazing on each façade and using solar control glazing to minimise the amount of unwanted solar gain in summer whilst maximising natural daylight.
- Winter gardens for the residential apartments to limit solar gains from high angle summer sun.
- The use of exposed, heavyweight materials to provide thermal mass which regulates internal temperatures.

The building also utilises energy efficient systems. In the office areas, these will include:

- Low energy artificial lighting installation generally based upon LED luminaires
- Automated lighting controls with daylight linked and dimmable lighting control for perimeter zone together with presence detection control. Luminaires within the non-perimeter zones will be provided with presence detection.
- Variable speed drives on pumps and fans where appropriate
- Reduced specific fan power at central ventilation plant (1.6W/l/s)

- High efficiency natural gas fired boilers (96%)
- High efficiency water cooled chillers with cooling towers (SEER = 5.5)
- High efficiency heat recovery devices to all ventilation plant (75%)

The building services systems within the retail areas will be fitted out by the future tenant. However, the retail tenants are expected to be provided with a green lease which will set requirements for issues such as:

- High efficiency heating and cooling plant
- Efficient ventilation systems
- Efficient refrigeration strategies
- Efficient lighting installations.

In the residential apartments a Mechanical Ventilation and Heat Recovery (MVHR) system is proposed. This selection reflects the poor background acoustic and air quality levels, which preclude the use of a natural ventilation strategy in this location. Whilst this system consumes electricity in its operation, it does permit waste heat to be recovered from the extract air stream and re-used, thereby limiting the overall energy consumption of the system.

In addition to the use of a MVHR system, the proposed energy efficiency measures for the residential part of the development include the following:

- High efficiency natural gas fired boilers (92%)
- Highly efficient waste heat recovery in MVHR ventilation plant (91%)
- Low specific fan power from ventilation plant (0.4W/l/s)
- At least 75% of lighting fittings will be of the dedicated low energy type
- Well insulated domestic hot water storage cylinders

The residential apartments will not be provided with a mechanical comfort cooling system. Potential overheating issues will be addressed by providing a mechanical ventilation and heat recovery ventilation system which will operate at a slightly enhanced rate to provide acceptable summertime occupant comfort levels.

In total, passive design measures and efficient systems will deliver an estimated regulated CO_2 reduction of 18.2% for the residential element of the scheme and 8.4% for the commercial element.

3.1.2 Be Clean: Supply Energy Efficiently

London Plan Policies 5.5 and 5.6 and both the GLA and Camden Supplementary Planning Guidance support connection to existing decentralised energy networks or the creation of new networks where possible.

Analysis of the London Heat Map found that the proposed development is within the approximate connection radius of one existing heat network which serves the University of London. However, the University of London have confirmed in correspondence with the project team that there is insufficient capacity in that network to accommodate additional connections at the current time.

The University of London have indicated that the capacity of their system may be increased in the future. A planned district heat network was also identified around the British Museum which is located 500m from the development site.

Neither of these options is expected to be in place before the completion of the development at 21-31 New Oxford Street. However, to allow for a future connection, a space allowance has been made in the basement plant room to accommodate a future incoming heating main and associated plant.

The feasibility of CHP and CCHP provision on a sitewide basis is also assessed in the Energy Statement but was found to be unfeasible in view of the size and profile of the building's loads.

The office and residential elements of the building will therefore be served by high efficiency, centralised gas boilers for heating. The office development will use high efficiency water cooled chillers with cooling towers to generate cooling.

The retail tenants will provide their own heating and cooling plant allowing each to match their heating and cooling requirements to their operating hours and energy demand profiles.

3.1.3 Be Green: Use Renewable Energy

London Plan Policy 5.7 Camden's core strategy policy CS13 and development policy DP22 support the use of renewable energy technologies in developments. CPG 3 states that developments should aim to achieve a 20% reduction in CO_2 emissions through the use of on-site renewables. The feasibility of various renewable technologies is considered in full in the Energy Statement.

Both solar hot water heating and photovoltaic (PV) panels were found to be technically feasible for the development. The PV panels can potentially offer a greater emissions reduction potential per m² of roof area and it is for that reason they are proposed to be implemented for 21-31 New Oxford Street.

The development has identified an area of approximately 340m² that is suitable for PV panels. 300m² of these will be dedicated to the commercial element offering a commercial element carbon emissions reduction of around 2.6%. The remaining 40m² will be dedicated to the residential element, offering a residential element carbon emissions reduction of around 10.8%

3.2 Water

London Plan Policies 5.15, Camden's Core Strategy Policy CS13 and Development Policy DP23 require developments to be designed to be water efficient and to minimise the need for further water infrastructure.

The development will utilise water efficient fixtures and fittings to reduce potable water use.

The following flush and flow rates are proposed. Retail fixtures and fittings will be supplied by the tenant, but similar requirements are likely to be set in the lease agreement.

Fitting Type	Office	Residential
WC (effective flush volume, litres)	4.5	3.5
WHB Taps (litres/min)	4.0	3.0
Showers (litres/min)	9.0	9.0
Bath (capacity to overflow, litres)	n/a	175
Kitchen Taps (litres/min)	7.5	7.5
Domestic Washing Machines (litres per kg dry load per cycle)	n/a	7.5
Domestic Dishwashers (litres per setting per cycle)	n/a	1.25

Table 1 Proposed fitting flow rates

The residential development will achieve Code Level 4. A mandatory requirement of Code Level 4 is that the dwellings are designed to use a maximum of 105 litres of water per person per day. The above fixtures and fittings equate to a water use of 104 litres per person per day which meets the mandatory requirement of Code Level 4 and is in line with London Plan Policy 5.15.

In addition to efficient fixtures and fittings, the development will use greywater harvesting to further reduce potable water use. This will collect water from showers, baths and wash hand basins which will then be treated and used for toilet flushing. This is in line with the guidance in CPG3 which requires developments of more than 1,000m^2 or 10 residential units to include a greywater system.

The building will have water metering connected to the building management system which will also incorporate a major leak detection system. Individual dwellings will have water display meters.

The toilet and shower areas within the office space and the basement will be fitted with shut-off valves linked to presence detectors to shut off the water supply when the areas are unoccupied to prevent minor leaks.

Rainwater harvesting is not proposed for the development as greywater harvesting is already incorporated and there is limited flushing demand which can be met by recycled water. A combined rainwater/greywater system would require rainwater to be collected in the water harvesting tank at basement level and to be pumped back out of the building during times of heavy rainfall. This has energy, cost and space implications and increases the risk of flooding within the building due to tank overflow or pump failure.

3.3 Materials and Waste

London Plan policies 5.16 aims to minimise waste generation and encourage the reuse, recycling/composting and reduction in the use of materials. In addition, policy 5.17 states that developments should include suitable waste and recycling storage facilities. Furthermore, policy 5.20 sets targets for, and encourages the recycling or re-use of construction, demolition and excavation waste.

Camden's sustainability policies include Core Strategy policies CS13 and CS18, supported by Development Policy DP22, which seek to reduce waste and encourage recycling.

CPG 3 further sets out 5 key measures for sustainable material use in developments:

1. Managing existing resources;
2. Specifying materials using the Building Research Establishment's Green Guide to Specification;
3. Ensuring that materials are responsibly sourced;
4. Minimising the harmful effects of some materials on human health;
5. Ensuring that specified materials are robust and sensitive to the building type and age.

The design team's response to the above policies is set out below in line with this hierarchy.

3.3.1 Managing existing resources

As described in the Design and Access statement, the proposed design of the development will reuse a significant part of the existing building structure and sub-structure. Compared to demolishing and rebuilding the building, this will save approximately 15,800 tonnes of concrete and, 1,200 tonnes of steel which equates to a saving in embodied carbon of circa 3,500 tonnes CO_2.

The demolition contractor will be required to carry out a pre-demolition audit of the building to identify the materials on site which are to be removed and to identify how these will be reused or recycled. Although re-use on site will be restricted by the availability of storage space, the project will aim to achieve high rates of diversion from landfill with a minimum of 85% by volume diversion of non-hazardous waste from landfill.

The Principal Contractor will be required to develop a site waste management plan. This will outline measures to achieve the project's waste generation target of 6.5 tonnes of non-hazardous construction waste per 100m^2 of floor area. This target has been set in line with best practice benchmarks extracted from the BRE's SMARTWaste tool[1]. Co-mingled waste will be collected on site and will be removed by a licenced contractor to be sorted for recycling or disposal.

3.3.2 Green Guide to Specification

Both BREEAM and the Code for Sustainable Homes require major building materials to be assessed in terms of Green Guide to Specification performance.

CPG3 seeks for development projects of more than 500m^2 of any floorspace or more or 5 dwellings to achieve an area weighted average of A+ to B for the major building elements (roof, external walls, floor finishes, internal partitions and windows) in accordance with the BRE Green Guide to Specification.

Detailed material selections have not yet been made, however, based on the outline specification and previous project experience, it is expected that an area weighted average rating of A+ to B will be achievable for External Walls, Floor Finishes and Upper Floors.

[1] http://blog.tracker-plus.co.uk/wp-content/uploads/2013/11/2._SMARTWaste_data.ppt_Compatibility_Mode.pdf

Although every effort will be made to specify the lowest impact materials possible, it may not be possible to specify a roof which achieves a Green Guide rating of A+ to B and also meets the performance requirements for loading, thermal performance and attenuation. Similarly, windows will be specified to have the highest Green Guide rating possible within the performance constraints of the façade.

3.3.3 Ensuring that Materials are Responsibly Sourced

Wherever possible, material specifications will call for materials to be sourced from suppliers with third party responsible sourcing certification. This will include the following:

- Timber (including temporary site timber) will be FSC or PEFC certified.
- Concrete will be certified to BES6001 (minimum Very Good level)
- Reinforcing steel will be certified by the CARES Sustainable Reinforcement Scheme
- Plasterboard and framing will be certified to BES6001 (minimum Very Good rating)
- Insulation will have ISO14001 certification for both the product manufacture and key supply chain process

As the design progresses, other options to incorporate materials which are responsibly sourced will be investigated. There will be a target for products to have ISO14001 certification for the product manufacture as a minimum where this is available from a number of suppliers in the market.

3.3.4 Minimising the harmful effects of some materials on human health

Low volatile organic compound (VOC) materials will be specified for the following finishes in line with the requirements of BREEAM credit Hea 02:

- Paints, adhesives and varnishes
- Flooring and floor coverings
- Wall coverings
- Ceilings
- Any other wood finishes

Internal air quality testing will be carried out prior to handover of the building to verify that total VOC and formaldehyde levels are within acceptable limits.

3.3.5 Ensuring that specified materials are robust and sensitive to the building type and age

The project will target BREEAM materials credit 05 “Designing for Robustness”. During the detailed design stage, the Architect will carry out an assessment of the building to identify areas which are at particular risk of wear or damage such as vehicle movement areas and circulation spaces.

When these areas have been identified, appropriate protection measures and robust finishes will be specified.

3.3.6 Operational Waste

In addition to the above measures set out in the waste hierarchy, recycling of waste during the operation of the building has been considered and appropriate, accessible space for collection of recyclables has been provided for both the commercial and residential spaces as outlined in the design and access statement. Within the dwellings, dedicated recycling bins will be provided within the fitted kitchens in line with the requirements of the Code for Sustainable Homes.

3.4 Sustainability Assessment Tools

The Building Research Environmental Assessment Method (BREEAM) is an environmental assessment methodology for buildings. Most commonly, it is used to assess the design, procurement and construction of new buildings or buildings undergoing major refurbishment.

Code for Sustainable Homes (CSH) is an assessment methodology for new build dwellings which is owned by the department for Communities and Local Government and is administered by various service providers including the BRE.

Both assessment schemes consider site and building level environmental issues in the following categories: Energy, Water, Waste, Materials, Pollution, Ecology, Management and Health and Wellbeing. CSH separately considers Surface Water Run-Off while BREEAM has additional sections dedicated to transport issues and innovation.

Camden's Core Strategy policy CS13, notes that BREEAM and the Code for Sustainable Homes provide helpful assessment tools for general sustainability. Camden's Development Policy DP22, *Promoting Sustainable Design and Construction,* requires applications for new build housing between 2013 and 2015 to meet Code for Sustainable Homes Level 4. It also requires applications for non-domestic developments of more than 500m^2 submitted before 2016 to achieve BREEAM "Very Good".

Section 9.8 of CPG3 strongly encourages compliance with DP22 for domestic buildings and reiterates the requirement for Level 4 above. It also requires that the dwellings achieve 50% of the unweighted credits in the each of the Energy, Water and Materials categories. Section 9.11 also encourages compliance with DP22 for non-domestic buildings but states that the minimum rating from 2013 should be "Excellent". It also requires that the building achieves 60% of the unweighted credits in the Energy category and 40% of the unweighted credits in both the Water and Materials categories.

The Mayor of London's SPG on Sustainable Design and Construction also references BREEAM and the Code for Sustainable Homes as a means of demonstrating compliance with some regional planning policy. In particular, BREEAM and the Code for Sustainable Homes are referenced in relation to responsible sourcing of materials, robustness of materials, "healthy" materials, water use and air quality (NOx emissions).

Appendix 4 of the Mayor's SPG lists Housing SPG design standards which are relevant to Sustainable Design and Construction. Code for Sustainable Homes Level 4 compliance is listed as a Good Practice measure in section 6.1.1.

The applicant has appointed BREEAM and Code for Sustainable Homes Assessors and pre-assessments for the scheme have been carried out. These are presented in Appendices B-D. A summary of the assessment details and project targets is shown below:

Assessment Scheme	Registration Number	Target Rating	Target Scoring
BREEAM New Construction 2011 (Office)	BREEAM-0049-7446	Very Good (min score 55%)	73.83% Total 40.7% Energy Credits 77.8% Water Credits 75.0% Materials Credits
BREEAM New Construction 2011 (Retail)	BREEAM-0051-4448	Very Good (min score 55%)	59.45% Total 40.7% Energy Credits 66.7% Water Credits 53.8%% Materials Credits
Code for Sustainable Homes 2010 (Dwellings)	BRE-00024295-DS-001-00	Level 4 (min score 68%)	72.65% Total 71.0% Energy Credits 50.0% Water Credits 50.0% Materials Credits

Table 2 Target BREEAM and CSH scores

The above summary shows that both the commercial and residential spaces within the development will comply with the core strategy and development policies outlined above. The percentage score requirements for Water and Materials credits outlined in Camden's Planning Guidance 3 document will be met. The percentage score requirement for Energy will also be met in the residential element of the scheme.

The requirement for BREEAM Excellent and 60% of the Energy credits available in Camden's Planning Guidance 3 document will not be met for the commercial aspect of the development. Although the office space is likely to achieve a BREEAM score of more than 70% (the threshold for Excellent), the mandatory Excellent requirement to achieve a 25% reduction in CO_2 emissions will not be met due to the constraints of the existing building. These include the following:

- The footprint of the existing building results in a very deep plan office space which limits the amount of floor plate that can be provided with adequate natural daylight
- The height of the existing floors result in a less efficient artificial lighting installation as the higher luminaires result in additional losses requiring additional lumens to be generated making the overall lighting installation more energy intensive.
- The existing floors are to be provided with interstitial mezzanine floors. These floors have potentially constrained floor to ceiling heights and require careful coordination of architecture, structure and building services solutions to maximise the achievable height of these spaces. This careful

coordination limits the range of building services solutions that can be applied.

- As the new upper levels will be supported from the existing structure and substructure, there is a requirement to minimise the additional weight imposed by the new build elements. As a result this limits the extent of thermal mass which can be incorporated.
- The re-use of the existing structure also limits which low and zero carbon technologies are considered viable as described in the Energy Statement.

The retail space will achieve a BREEAM Very Good score and therefore will also not meet the CPG3 requirement for Excellent. The retail areas are to be developed as shell and core spaces for which BREEAM requires the tenant to comply with measures that are outside the scope of the developer. The predicted score for the retail reflects the complexities of passing the BREEAM requirements on to the tenant through a legally binding Green Lease.

3.5 Biodiversity

London Plan Policies 2.18 and 5.10 seek to increase the provision of green space in the region. Policy 5.11 specifically encourages developers to include planting and green roofs on their developments. In addition, London plan policy 7.19 directs that development should avoid areas of ecological value and should seek to promote and enhance the ecological value of existing sites.

Camden's development policy 22 states that schemes must incorporate green or brown roofs and green walls wherever suitable. This is supported by section 10 of CPG 3. Core Strategy Policy CS15 also aims to protect and enhance open spaces and promote biodiversity.

The developer has appointed an Ecologist to guide the project team's response to these policies.

A phase 1 habitat survey was carried out in October 2013 by an Ecologist from Arup. The survey found that the site is comprised entirely of built structure and hardstanding with a small number of street trees present along the pavement within the site boundary. No native species or species of known value to local wildlife were identified on the site.

The survey did not identify the presence of protected species or those subject to the provisions of legislation within or adjacent to the site. However, the basement areas of the building were assessed as having the potential to support hibernating bats and the plant rooms on the roof of the building contained features that could be used by roosting bats during the summer. A further, more detailed inspection for evidence of bats was undertaken by the Ecologist in November 2013. No bat activity was recorded on any of the bat recorders therefore it was concluded that it is unlikely that the building is being used by bats.

With respect to birds, the site was found to afford limited nesting potential for common species such as gulls and feral pigeons. The Ecologist has made recommendations for the protection of such nesting birds and roosting bats which will be incorporated in the Contractor's obligations.

The Ecologist's overall conclusion was that the site has low ecological value. The development will therefore aim to enhance the Ecological value of the site as

much as possible and will provide a net increase in the number of species on the site, with a particular focus on native plants and those of benefit to local wildlife.

Intensively landscaped roof terraces are proposed on levels 5 and 9 of the building. The proposed planting for these terraces includes sedum blanket, groundcover and climbing plants, shrubs and trees. A green wall area in Dunn's Passage is also proposed in the Landscape Strategy. Species selection will be made in line with the recommendations of the Ecologist.

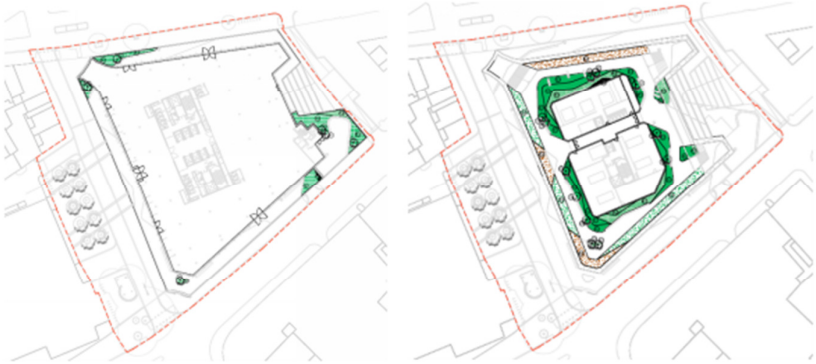

Figure 2 Level 5 and Level 9 Landscaped Areas

3.6 Flooding and Drainage

London Plan Policy 5.12 Flood Risk Management requires developments to comply with the flood risk assessment and management requirements set out in PPS25 over the lifetime of the development and to have regard to measures proposed in Thames Estuary 2100 and Catchment Flood Management Plans.

London Plan Policy 5.13 *Sustainable Drainage* requires developments to utilise sustainable urban drainage systems (SUDS) unless there are practical reasons for not doing so, to aim to achieve greenfield run-off rates, and to ensure that surface water run-off is managed as close to its source as possible in line with the following drainage hierarchy:

1. Store rainwater for later use
2. Use infiltration techniques, such as porous surfaces in non-clay areas
3. Attenuate rainwater in ponds or open water features for gradual release
4. Attenuate rainwater by storing in tanks or sealed water features for gradual release
5. Discharge rainwater direct to a watercourse
6. Discharge rainwater to a surface water sewer/drain
7. Discharge rainwater to the combined sewer.

London Plan Policy 5.14 *Water Quality and Wastewater Infrastructure*, requires adequate provision to be made for waste water infrastructure, and that water quality is protected and improved.

Camden's Development Policy DP22 *Promoting Sustainable Design and Construction* requires developments to be resilient to climate change by including

appropriate climate change adaption measures including reducing water consumption and limiting run-off.

Camden's Development Policy DP23 *Water*, encourages developments to reduce their water consumption, the pressure on the combined sewer network and the risk of flooding.

The Mayor of London's Supplementary Planning Guidance on Sustainable Design and Construction sets out the Mayor's priorities for developers as following the SUDs hierarchy, moving towards greenfield run-off rates, considering all sources of flooding and providing mitigation measures where appropriate.

The Camden Planning Guidance 3 document requires all sites in Camden over one hectare or 10,000m^2 to have a Flood Risk Assessment in line with Planning Policy Statement 25. Although the development site is less than one hectare, a Flood Risk Statement has been produced to fulfil the Flood Risk requirements for BREEAM and the Code for Sustainable Homes. The statement evaluates the risk of flooding from all relevant sources including fluvial, tidal, ground water, surface water and infrastructure failure.

The development site is not within the areas at risk from surface water flooding outlined in Camden's Development Policies Map 2.

The Flood Risk Statement concludes that the risk of flooding is generally low although there is at present a risk of basement flooding due to the poor condition of the rainwater and foul drainage services. The statement recommends a package of measures which are to be included in the development works to mitigate this risk including descaling of the drainage system's components, repairs to valves and new pumps.

The SUDs hierarchy set out in CPG 3 has been addressed in the design of the building as shown below:

1. Use Infiltration Techniques

The footprint of the developed building extends to the boundary of the land owned by the developer, therefore there is no opportunity to use landscaping that will allow water to infiltrate directly into the subsoil. Appropriate materials and landscaping will be proposed for the redevelopment of Museum Street which is adjacent to the building and within the development site but ultimately, material selection for this area will be dependent on the requirements of the local authority.

2. Attenuate rainwater in ponds or open water features for gradual release

As noted above, the footprint of the redeveloped building extends to the boundary of the land owned by the developer which limits opportunities to use ponds or other open water features.

3. Collect and store rainwater in tanks or sealed water features for gradual release

The design team's proposals use the roof area to attenuate rainwater from the development and reduce the surface water run-off rate to 50% of the pre-development site run-off. The current rainwater flow rate from the building footprint (4,150 m^2) at a 1:100 year rainfall intensity of 53mm /hr is 61.10 l/sec. This will be reduced to 30.55 l/sec.

As outlined in section 3.5, the roof design incorporates planting at levels 5 and 9. In practice, the landscaping will attenuate some rainwater. However, this is not included in calculations of the surface water run-off as the soil may be saturated at the time of a peak rainfall event.

The design therefore also incorporates a "blue roof" system. This will comprise a 235mm deep Permavoid layer (see Figure 3) beneath 950m² of the roof surface which allows water to be held on the roof after a storm event before being gradually released to the surface water drainage system.

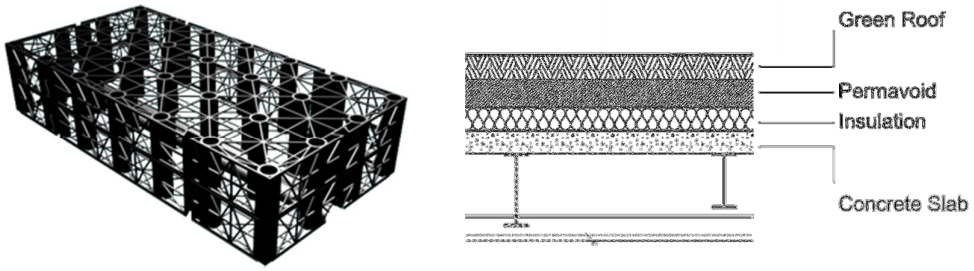

Figure 3 Permavoid System

4. Discharge rainwater direct to a watercourse

There is no watercourse local to the development to which rainwater can be discharged directly.

5. Discharge rainwater to a surface water sewer/drain

6. Discharge rainwater to the combined sewer

As noted above, rainwater will eventually run off to the surface water drain although the existing local drainage infrastructure is such that this subsequently joins the combined sewer.

3.7 Pollution and Construction Impacts

This section is primarily concerned with the impact of the development on the local environment, particularly air quality and noise.

3.7.1 Air Quality

Pollution issues are a consideration in addressing London Plan Policy 3.2 which considers health issues and promotes health equality.

In addition, London Plan Policy 7.14 aims to reduce exposure to poor air quality in London as well as to reduce emissions from development, including during the demolition and construction phases and seeks new development to be 'air quality neutral'.

Camden's Core Strategy Policy CS16 and Development Policy DP32 also support the assessment of air quality and mitigation measures where required.

An air quality assessment has been carried out and is submitted in support of the application for planning permission.

The assessments concludes that the effects on local air quality in the construction phase will be negligible providing the mitigation measures listed are included within the Construction Environmental Management Plan (CEMP) are implemented successfully.

It also found that the change in annual NO_2 concentrations would be "imperceptible". This is based on the assumption that boilers with NOx emissions of less than 40mg/kWh are installed. This will be included in the performance specification for the boilers.

Emissions from the proposed development were also assessed as 'air quality neutral' following the supplementary planning guidance from the Greater London Authority.

Finally, the air quality assessment also found that the effect of traffic from the development on local air quality will be negligible.

3.7.2 Noise

London Plan Policy 7.15 seeks to reduce overall exposure to noise within London as well as to protect new occupiers from noise within their developments.

Camden's development policy 28 outlines that the Council will seek to minimise the impact on local amenity from the demolition and construction phases of development. It also states that permission will not be granted to developments which exceed noise thresholds.

A noise impact assessment and noise mitigation assessment have been carried out and are submitted with the application.

The dwellings will be designed to achieve three credits for the CSH Sound Insulation credit. This requires impact and airborne sound insulation levels between dwellings to be 5dB better than the building regulations minimum levels.

Appendix A

Baseline Policy Review

A1 Baseline Policy Review

A1.1 National Policy

The National Planning Policy Framework (NPPF) sets out the Government's planning policies for England and how these are expected to be applied. The policy constitutes the Government's view of what sustainable development in England means in practice for the planning system.

The Government believes that sustainable development can play three critical roles in England:

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

The NPPF constitutes guidance for local planning authorities and decision-takers both in drawing up plans and as a material consideration in determining applications.

The key principle applied as part of the NPPF is a presumption in favour of sustainable development. This is to be incorporated into both plan making and decision making at the local level.

The NPPF sets out 12 core planning principles which "should underpin both planmaking and decision-taking." These stipulate that planning should:

- Be led by local plans which set out a vision for the future of the area and provide a practical framework within which decisions on planning applications can be made efficiently;
- Emphasise enhancing and improving the places in which people live their lives, not scrutiny alone;
- Drive sustainable development to deliver homes, business and industrial units, infrastructure and support local vitality, objectively identifying local need and setting out a clear strategy for allocating land;
- Seek to secure a high-quality of design and a good standard of amenity for occupants;
- Protect the diversity of different areas of England, protecting Green Belts and recognising the "intrinsic character and beauty of the countryside";
- Support the transition to a low-carbon future, take account of flood risk and coastal change and encourage the reuse of existing and renewable resources;
- Help conserve and enhance the natural environment and reduce pollution, allocating land of "lesser environmental value";
- Encourage the re-use of land that has been previously developed (brownfield land);
- Promote mixed use developments, encouraging multiple benefits from urban and rural land;

- Conserve heritage assets "in a manner appropriate to their significance";
- Manage development to make full use of public transport, walking and cycling; and
- Take account of local strategies to improve health, social, and cultural wellbeing.

A1.2 Regional Policy

A1.2.1 The London Plan, 2011

The Regional Spatial Development Strategy, in the form of The London Plan, 2011, sets out the overall strategic plan for the development of London over the next 20–25 years. It provides the London-wide policy context within which the 32 London boroughs and the Corporation of the City of London are expected to set their detailed local planning policies and is the framework for the Mayor's own decisions on the strategic planning applications referred to him.

The London Plan sets out six key objectives for London:

- A city that meets the challenges of economic and population growth in ways that ensure a sustainable, good and improving quality of life and sufficient high quality homes and neighbourhoods for all Londoners, and help tackle the huge issue of deprivation and inequality among Londoners, including inequality in health outcomes.
- An internationally competitive and successful city with a strong and diverse economy and an entrepreneurial spirit that benefit all Londoners and all parts of London; a city which is at the leading edge of innovation and research and which is comfortable with – and makes the most of – its rich heritage and cultural resources.
- A city of diverse, strong, secure and accessible neighbourhoods to which Londoners feel attached, which provide all of its residents, workers, visitors and students – whatever their origin, background, age or status – with opportunities to realise and express their potential and a high quality environment for individuals to enjoy, live together and thrive.
- A city that delights the senses and takes care over its buildings and streets, having the best of modern architecture while also making the most of London's built heritage, and which makes the most of and extends its wealth of open and green spaces, natural environments and waterways, realising their potential for improving Londoners' health, welfare and development.
- A city that becomes a world leader in improving the environment locally and globally, taking the lead in tackling climate change, reducing pollution, developing a low carbon economy, consuming fewer resources and using them more effectively.
- A city where it is easy, safe and convenient for everyone to access jobs, opportunities and facilities with an efficient and effective transport system which actively encourages more walking and cycling, makes better use of the Thames and supports delivery of all the objectives of this Plan.

The London Plan Policies which relate to sustainable design and construction are defined in appendix 1 of the Major's Supplementary Planning Guidance on Sustainable Design and Construction (see section A1.2.2) and are reproduced below:

Policy 2.18 Green Infrastructure aims to protect, promote, expand and manage the extent and quality of, and access to, London's network of open and green spaces.

Policy 3.2: Addressing health and reducing health inequalities supports the provision and improvement of health facilities and encourages the design of buildings to promote healthy lifestyles.

Policy 3.5: Quality and Design of housing development introduces a presumption against development on back gardens or other private residential gardens.

Policy 5.1: Climate change mitigation sets out the Mayor's strategic target for the reduction of carbon dioxide emissions across London of 60% (below 1990 levels) by 2025. It expects the GLA group, the boroughs and other organisations to make a contribution towards this target and that all new development fully contributes towards the London wide reduction target.

Policy 5.2: Minimising carbon dioxide emissions sets out the Mayor's energy hierarchy which developers are to follow when designing their schemes. It also sets out carbon dioxide reduction targets that developers are to aim for from their developments over the lifetime of the Plan and that where these can't be achieved an off-site or financial contribution in lieu can be sought by the local borough.

Policy 5.3 Sustainable Design and Construction requires that developments demonstrate that sustainable design standards are considered at the beginning of the design process and are integral to proposals. It also requires major development proposals to meet the minimum standards outlined in the Mayor's Supplementary Planning Guidance.

Policy 5.4: Retrofitting encourages the retro-fitting of measures to reduce carbon dioxide emissions, improving the efficiency of resource use (such as water) and minimising generation of pollution and waste from existing building stock and states that any opportunities created by new development for retro-fitting should be identified.

Policy 5.5: Decentralised energy networks sets out the Mayor's strategic target for decentralised energy, which is that 25% of the heat and power used in London is to be from local sources by 2025. The policy sets out how plans can identify and support opportunities for decentralised energy networks.

Policy 5.6: Decentralised energy in proposals sets out a hierarchy for selecting a development's heating system and states that the feasibility of combined heat and power (CHP) should be evaluated for the proposed development as well as the potential for extending the heating network beyond the site boundary.

Policy 5.7: Renewable energy seeks to increase the proportion of energy generated from renewable sources, including through their incorporation into new developments and by identifying specific opportunities within London.

Policy 5.8: Innovative energy technologies encourages the use of innovative energy technologies that will provide an alternative energy source and reduce carbon dioxide emissions.

Policy 5.9: Overheating and cooling states that developments should be designed to limit their contribution to the heat island effect and encourages spaces to be designed to avoid overheating, including by following the cooling hierarchy set out in the policy.

Policy 5.10: Urban greening encourages the greening of London's buildings and spaces and specifically those in central London by including a target for increasing the area of green space (including green roofs etc) within the Central Activities Zone.

Policy 5.11: Green roofs and development site environs specifically supports the inclusion of planting within developments and encourages boroughs to support the inclusion of green roofs.

Policy 5.12: Flood risk management outlines the requirement for boroughs and developers to carry out flood risk assessments and that developments must comply with national planning policy on flood risk assessments and management to ensure they are designed and built to be resilient to flooding.

Policy 5.13: Sustainable drainage promotes the inclusion of sustainable urban drainage systems in developments and sets out a drainage hierarchy that developers should follow when designing their schemes.

Policy 5.14: Water quality and waste water infrastructure seeks to ensure that adequate provision is made for waste water infrastructure, and that water quality is protected and improved.

Policy 5.15: Water use and supplies encourages developments to incorporate measures to minimise the use of mains water with a water consumption target for residential schemes of 105 litres or less per head per day.

Policy 5.16: Waste self-sufficiency sets out how the Mayor will support London authorities to manage as much of their waste as possible within London including through minimising waste generation and encouraging the reuse, recycling/composting and reduction in the use of materials.

Policy 5.17: Waste capacity sets out criteria for assessing waste management facilities and states that developments should include suitable waste and recycling storage facilities.

Policy 5.20: Aggregates sets targets for, and encourages the recycling or re-use of construction, demolition and excavation waste within London.

Policy 5.21: Contaminated land supports the remediation of contaminated sites and seeks to ensure that developments don't activate or spread contamination.

Policy 6.1: Strategic approach stresses the importance of integrating development with transport and encourages the reduction of car dependence.

Policy 6.3: Assessing effects of development on transport capacity sets out the necessity of assessing development impacts on transport capacity and the transport network at both corridor and local level.

Policy 6.14: Freight focuses on improving freight distribution including servicing and deliveries.

Policy 7.6 Architecture encourages the highest architectural quality, including that the development does not harm privacy, overshadowing, wind and micro-climate and so they incorporate best practice in resource management and climate change mitigation and adaptation.

Policy 7.14: Improving air quality aims to reduce exposure to poor air quality in London as well as reduce emissions from development, including during the demolition and construction phases and seeks new development to be 'air quality neutral'.

Policy 7.15: Reducing noise and enhancing Soundscapes seeks to reduce overall exposure to noise within London as well as protect new occupiers from noise within their developments.

Policy 7.19: Biodiversity and access to nature seeks a proactive approach to the protection, enhancement, creation, promotion and management of biodiversity.

Policy 7.20: Geological conservation seeks to protect, enhance and enable access to areas of national, regional and locally important geological sites.

Policy 7.21: Trees and woodlands seeks to protect, maintain and enhance trees and woodlands on a strategic scale as well as protect and promote the provision of additional trees in the public realm as well as on development sites.

Policy 7.22: Land for food seeks to protect allotments and encourages the use of land for food growing close to urban areas.

A1.2.2 Supplementary Planning Guidance

The Mayor of London's Supplementary Planning Guidance published in April 2014 contains guidance on the implementation of relevant London Plan policies and forms part of the Implementation Framework to the London Plan. The document is a material planning consideration when determining planning applications made to the Mayor.

The SPG provides guidance in three main areas as shown below and links these to this guidance to the relevant London Plan Policies:

1. Resource management
    - Land
    - Site layout and building design
    - Energy and carbon dioxide emissions
    - Renewable energy
    - Water efficiency
    - Materials and Waste
    - Nature conservation and biodiversity
2. Adapting to climate change and greening the city
    - Tackling increased temperature and drought

- Increasing green cover and trees
- Flooding

3. Pollution management - land, air, noise, light and water
   - Land contamination
   - Air pollution
   - Noise
   - Light pollution
   - Water pollution

A1.3 Local Policy

A1.3.1 Camden Core Strategy, November 2010

Section three of Camden's Core Strategy document relates to tackling climate change, protecting the environment and improving quality of life.

Policy CS13 Tackling climate change through promoting higher environmental standards, requires all developments to take measures to minimise the effects of, and adapt to, climate change and to meet the highest environmental standards that are financially viable during construction and occupation . This includes a target of 20% of energy to be generated from renewable sources on site.

Developments must also demonstrate that they incorporate efficient water and foul water infrastructure and that they avoid harm to the water environment, water quality or drainage systems and prevents or mitigates local surface water and downstream flooding.

The policy also promotes use of the energy hierarchy approach set out in the London Plan and encourages local energy generation and connection to energy networks.

Policy CS15 Protecting and improving our parks and open spaces and encouraging biodiversity, seeks to protect and enhance the borough's green and open spaces and biodiversity. Developers are expected to provide opportunities for biodiversity within the fabric and curtilage of buildings.

Policy CS18 Dealing with our waste and encouraging recycling contains a requirement for developments to provide adequate facilities for recycling and the storage and disposal of waste. The policy also seeks to secure the re-use of construction waste on development sites to reduce resource use and the need to transport materials.

A1.3.2 Camden Development Policies

Camden's Development Policies are part of the Local Development Framework and contribute towards delivering the Core Strategy by setting out detailed planning policies that the Council use when determining applications for planning permission in the borough to achieve the vision and objectives of the Core Strategy.

Policy DP22 Promoting sustainable design and construction requires the inclusion of sustainable development principles, BREEAM assessment, green/brown roofs and resilience to climate change.

Policy DP23 Water requires the inclusion of water efficient fixtures, limits to run-off, assessment of flood risk, reducing pressure of the water and sewer network and encouraging water features.

A1.3.3 Camden Planning Guidance CPG3 Sustainability

CPG3 supports the policies in the Core Strategy and is an additional "material consideration" in planning decisions. The key areas and messages and council expectations set out in CPG3 are summarised below:

Section	Key Message	What does the council expect?
The Energy Hierarchy	All developments are to be design to reduce carbon dioxide emissions Energy strategies are to be designed following the steps set out by the energy hierarchy	All new developments are to be designed to minimise carbon dioxide emissions by being as energy efficient as is feasible and viable.
Energy Efficiency	All new developments are to be designed to minimise carbon dioxide emissions The most cost-effective ways to minimise energy demand are through good design and high levels of insulation and air tightness.	A full model of the building should be carried out to ensure the building design optimises solar gain and daylight without resulting in overheating for developments comprising 5 dwellings or more or 500sq m or more of any floorspace Consider maximising the use of natural systems within buildings before any mechanical services are considered. Any development proposing electric heating (including heat pumps) will need to demonstrate the carbon efficiency of the proposed heating system. Specifications of the electric heating system and calculations will need to be provided to demonstrate that the proposed electric heating system would result in lower carbon dioxide emissions than an efficiency gas fuelled heating system. Where traditional mechanical cooling e.g. air conditioning units are proposed applicants must demonstrate that energy efficient ventilation and cooling methods have been considered first, and that they have been assessed for their carbon efficiency. Air source heat pumps will be considered to provide air conditioning in the summer unless it can be demonstrated that the model chosen is not capable of providing cooling.

Section	Key Message	What does the council expect?
Energy Efficiency – Existing Buildings	As a guide, at least 10% of the project cost should be spent on environmental improvements. Potential measures are bespoke to each property Sensitive improvements can be made to historic buildings to reduce carbon dioxide emissions	All buildings, whether being updated or refurbished, are expected to reduce their carbon emissions by making improvements to the existing building. Work involving a change of use or an extension to an existing property is included. As a guide, at least 10% of the project cost should be spent on the improvements. Where retro-fitting measures are not identified at application stage we will most likely secure the implementation of environmental improvements by way of condition. Appendix 1 sets out a checklist of retro fit improvements for applicants. Development involving a change of use or a conversion of 5 or more dwellings or 500sq m of any floorspace, will be expected to achieve 60% of the un-weighted credits in the Energy category in their EcoHomes or BREEAM assessment, whichever is applicable. (See the section on Sustainability assessment tools for more details). Special consideration will be given to buildings that are protected e.g. listed buildings to ensure that their historic and architectural features are preserved.
Decentralised energy networks and combined heat and power	Decentralised energy could provide 20% of Camden's heating demand by 2020. Combined heat and power plants can reduce carbon dioxide emissions by 30-40% compared to a conventional gas boiler. Where feasible and viable your development will be required to connect to a decentralised energy network or include CHP.	Where there is more than one occupier, use or building a community heating network will be expected. When demonstrating the feasibility and viability of not connecting to a decentralised energy network or including a combined heat and power plant developers will be required to address the relevant considerations in section 5.22. Where a development is not connecting immediately to a network the following measures need to be included in your scheme: • space in the plant room for a heat exchanger, any other plant and pipe and electricity connections; and • pipes from the plant room to the property boundary where the decentralised energy pipe is most likely to be located.

Section	Key Message	What does the council expect?
Renewable energy	There are a variety of renewable energy technologies that can be installed to supplement a development's energy needs. Developments are to target a 20% reduction in carbon dioxide emissions from on-site renewable energy technologies.	All developments are to target at least a 20% reduction in carbon dioxide emissions through the installation of on-site renewable energy technologies. Special consideration will be given to heritage buildings and features to ensure that their historic and architectural features are preserved. When assessing the feasibility and viability of renewable energy technology, the Council will consider the overall cost of all the measures proposed and resulting carbon savings to ensure that the most cost-effective carbon reduction technologies are implemented in line with the energy hierarchy. Individual technology references not listed here.
Water	At least 50% of water consumed in homes and workplaces does not need to be of drinkable quality re-using water All developments are to be water efficient Developments over 10 units or 1000sq m should include grey water recycling.	The Council expects all developments to be designed to be water efficient by minimising water use and maximising the re-use of water. This includes new and existing buildings. The Council will require buildings with gardens or landscaped areas that require regular maintenance to be fitted with water butts. The Council will require developments over 10 units or 1000sq m and/or intense water use developments, such as hotels, hostels, student housing etc to include a grey water harvesting system, unless the applicant demonstrates to the Council's satisfaction that this is not feasible.
Sustainable Use of Materials	Reduce waste by firstly re-using your building, where this is not possible you should implement the waste hierarchy. The waste hierarchy prioritises the reduction, re-use and recycling of Materials. Source your materials responsibly and ensure they are safe to health.	All developments should aim for at least 10% of the total value of materials used to be derived from recycled and reused sources. This should relate to the WRAP Quick Wins assessments or equivalent as (highlighted in the waste hierarchy information section). Special consideration will be given to heritage buildings and features to ensure that their historic and architectural features are preserved. Major developments are anticipated to be able to achieve 15-20% of the total value of materials used to be derived from recycled and reused sources.

Section	Key Message	What does the council expect?
Sustainability assessment tools	A new build dwelling will have to be designed in line with the Code for Sustainable Homes The creation of 5 or more dwellings from an existing building will need to be designed in line with EcoHomes 500sq m or more of non-residential floorspace will need to be designed in line with BREEAM	You are strongly encouraged to meet the standards in Development Policy DP22 - Promoting sustainable design and construction. A pre-assessment report should be submitted at the planning application stage. The report should summarise the design strategy for achieving your chosen level of BREEAM and/or Code for Sustainable Homes and include details of the credits proposed to be achieved.
Brown roofs, green roofs and green walls	All developments should incorporate green and brown roofs The appropriate roof or wall will depend on the development, the location and other specific factors Specific information needs to be submitted with applications for green/brown roofs and walls	The Council will expect all developments to incorporate brown roofs, green roofs and green walls unless it is demonstrated this is not possible or appropriate. This includes new and existing buildings. Special consideration will be given to historic buildings to ensure historic and architectural features are preserved. What information will the council expect? • a statement of the design objectives for the green or brown roof or green wall • details of its construction and the materials used, including a section at a scale of 1:20 • planting details, including details of the planting technique, plant varieties and planting sizes and densities. • a management plan detailed how the structure and planting will be maintained.

Section	Key Message	What does the council expect?
Flooding	All developments are required to prevent or mitigate against flooding. All developments are expected to manage drainage and surface water. There is a hierarchy you should follow when designing a sustainable drainage system	Developments must not increase the risk of flooding, and are required to put in place mitigation measures where there is known to be a risk of flooding. Within the areas shown on Core Strategy Map 5 (Development Policies Map 2) we will expect water infrastructure to be designed to cope with a 1 in 100 year storm event in order to limit the flooding of, and damage to, property. All sites in Camden over one hectare or 10,000sq m require a Flood Risk Assessment in line with Planning Policy Statement 25. The assessment should be site specific and concentrate on the management of surface water run-off, and / or ground water where applicable, and should address the amount of impermeable surfaces resulting from the development and the potential for increased flood risk both on site and elsewhere within the catchment. These must be prepared by a suitably qualified professional and should be submitted with a planning application. All developments are expected to manage drainage and surface water on-site or as close to the site as possible, using Sustainable Drainage Systems (SUDS) and the hierarchy set out below. The Council will expect plans and application documents to describe how water will be managed within the development, including an explanation of the proposed SUDS, the reasons why certain SUDS have been ruled out and detailed information on materials and landscaping. The Council will expect developments to achieve a greenfield surface water run-off rate once SUDS have been installed. As a minimum, surface water run-off rates should be reduced by 50% across the development.
Adapting to climate change	All development should consider how it can be occupied in the future when the weather will be different. The early design stage is the most effective time to incorporate relevant design and technological measures.	All development is expected to consider the impact of climate change and be designed to cope with the anticipated conditions.

Section	Key Message	What does the council expect?
Biodiversity	Proposals should demonstrate: • how biodiversity considerations have been incorporated into the development; • if any mitigation measures will be included; and • what positive measures for enhancing biodiversity are planned.	Lighting can have particular negative impacts on biodiversity. Unnecessary lighting should be avoided. Where lighting may harm biodiversity timers or specific coloured lighting will be required to minimise any disturbance.
Local food growing	We encourage food to be grown wherever possible and suitable Rooftops and shared spaces such as gardens and parks provide opportunities for food growing.	

A1.3.4 Tottenham Court Road Station and St Giles Planning Area Framework and 21 – 31 New Oxford Street Planning Brief

These documents were produced in 2004 and are referenced in Camden's Development Policies.

The design principles listed in the Area Framework environmental sustainability, particularly in respect of ventilation, energy and water use, materials, and flexibility of layout. The Planning brief contains a number of sustainability requirements, including a requirement for BREEAM certification, but these have largely been superseded by more recent policy. Appendix 2 of the document contains a list of features of a sustainable development which is reproduced below.

Accessibility
Accessible by public transport
Accessible to cyclists
Improves environment for walkers
Accessible to people with disabilities
Contains mixed use
Access to shops and services within walking distance
Higher density
Minimal parking
Links to Locality

Creates jobs
Designs out crime
Contributes to sense of place
Is a good neighbour
Creates public realm
Respects built heritage
Low CO_2 Emissions
Low emissions of CO_2
Use of renewable energy
Uses of natural daylight
Uses natural ventilation
Uses passive solar gain
Compact buildings
Conserves energy
Use of low emission vehicles
Prudent Use of Resources
Reuses site
Reuses building
Considers future uses of building
Conserves water and minimises run of
Considers long term maintenance costs of the building
Timber from sustainable sources
Materials sourced locally
Assess environmental impact of materials
Non polluting materials to create healthy environment
Minimise construction wastage
Contains facilities for minimising and recycling waste
Enhancing biodiversity
Enhances ecological value of the site
Protects trees

Appendix B

BREEAM Offices Pre-Assessment

BREEAM Offices 2011 Pre-Assessment

Margaret Hamilton, BREEAM assessor, BREEAM AP

ID	Issue	Credits	Available	Target	Summarised requirements	Responsibility	Comments
				73.83			
Management							
Man 01	Sustainable Procurement	Project Brief and Design	4	4	1) Meeting to define roles, responsibilities and contributions of team members across Stages B-L. Training for FM/users at handover. 2) BREEAM AP appointed and BREEAM performance targets by early Stage C at the latest. BREEAM targets met at interim design stage and contractually agreed to by team. 3) Credit 2 achieved, plus: BREEAM AP monitors and reports progress at regular team meetings over Stages B-E. 4) BREEAM AP monitors and reports progress at regular team meetings over Stages F-L. BREEAM targets met at post construction stage.	Client Design Team Contractor Assessor	Project brief and design requirements have been completed by the developer and design team. BREEAM AP has been appointed and will have ongoing input throughout the project.
		Construction and Handover	2	2	1) Post-construction thermographic survey of building fabric and rectification of any defects 2) Basic commissioning: named Commissioning Monitor reporting to client, responsible for monitoring and programming pre-commissioning, commissioning and re-commissioning as required. Specialist Commissioning Manager required for complex systems, and must input to design with commissionability design reviews.	Client Contractor	A post-construction thermographic survey and commissioning will be procured through the main contractor.
		Aftercare	2	2	1) Seasonal commissioning (12 months post occupancy) for simple and complex systems. 2) Credit 1 achieved, plus: > energy and water consumption data will be collected and analysed against expectations for min 12 months post occupancy > Aftercare support - dedicated aftercare team/individual, FM site training and building walkabout, weekly on site presence for first month, then longer term support e.g.. helpline for min 12 months post handover.	Client Contractor	Seasonal commissioning and aftercare for the offices will be procured through the main contractor. Energy and water data will be monitored by the building management in operation.
Man 02	Responsible Construction Practices	Responsible Construction Practices	2	2	Compliance or exemplary performance in Considerate Constructors Scheme, or equivalent. 1) CCS score of 24-31.5 2) 32-35.5 = 2 credits 35 or more = exemplary (Innovation point).	Client Contractor	The contractor will be required through their contract to achieve a CCS score of at least 35 this will achieve 2 credits.
Man 03	Construction Site Impacts	Energy	1	1	Monitoring, recording and reporting of consumption data resulting from construction in following areas: > Energy (kWh) for plant, equipment and site accommodation.	Client Contractor	The contractor will be required through their contract to monitor and report energy use from site activities in line with this credit.
		Water	1	1	> Water consumption and recycled water use (m^3) for plant, equipment and site accommodation.	Client Contractor	The contractor will be required through their contract to monitor and report water use from site activities in line with this credit.
		Transport	1	1	> Transport (fuel, litres and distance travelled, km) for the majority of construction materials delivery to site, and disposal of construction waste. Target setting encouraged, but not required.	Contractor	The contractor will be required through their contract to monitor and report transport emissions from site activities in line with this credit.
		Timber Procurement	1	1	All site timber sourced in line with UK Government's Timber Procurement Policy.	Contractor	All site timber will be FSC or PEFC certified.
		Construction Site Management	1	1	> Main Contractor operates an Environmental Management System, ISO 14001 or equivalent. > Best practice pollution prevention measures implemented on site - Env. Agency's Environmental Checklist §2.2.5 of *Preventing Pollution in England and Wales*	Contractor	Only contractors with ISO14001 certification will be considered for the main contractor role. The contractor will be required to observe all best practice pollution prevention procedures.
Man 04	Stakeholder Participation	Consultation	1	1	Extensive stakeholder/consultation above and beyond statutory requirements. Should include bodies with experience of comparable existing buildings, existing community groups, FM staff (if known), and historic/heritage groups. Formalisation of process in Consultation Plan and evidence of feedback influencing project design/operations strategy.	Planning Consultants Architects Client	A consultation plan has been produced and consultation with stakeholders is ongoing.
		Inclusive and Accessible Design	1	1	CABE Design and Access Statement to document inclusive design features. Consideration of facilitating wider community usage, where appropriate.	Architect	The architect has produced a design and access statement outlining accessibility features of the building.
		Building User Information	1	1	Production of non-technical Building User Guide - functions, uses and access details.	Client Mechanical Engineer Contractor	A non-technical building user guide will be procured through the main contractor. Tenants will be required to complete this for their fit-out.
		Post Occupancy Evaluation	1	1	Post Occupancy Evaluation (POE) one year after occupation by independent third party. POE scope: design and construction process, feedback from range of users, and appraisal of sustainability performance.	Client	POE evaluation will be provided by the devloper as part of the management service for office tenants.
Man 05	Life Cycle Cost and Service Life Planning	Life Cycle Cost and Service Life Planning	3	3	1) LCC analysis per PD156865:2008 and service life planning per ISO 15686 Part 1. 2) Credit 1 achieved, plus: > Scope of analysis includes at least 2 of: envelope, services, finishes and external spaces. > Findings are shown to have influenced the design and variant selection in areas of "critical value" in the project 3) Credits 1 and 2 achieved, plus: > LCC model updated at Stages D/E. Results implemented in final spec, design and construction. > Maintenance strategy and landscaping management plan developed, as appropriate.	Client Consulting Engineers	Life cycle costing will be carried out based on the Stage C and the Stage D design to compare design options for the building.
Management Totals:			**22**	**22**			
Management score totals:			**12**	**12.00**			

ID	Issue	Credits	Available	Target	Summarised requirements	Responsibility	Comments
Health & Wellbeing							
Hea 01	Visual Comfort	High Frequency Ballasts	*0*	*0*	*Specification of high frequency ballasts for all fluorescent and compact fluorescent lamps.*	*Electrical Engineer* *Lighting Designer*	
		Daylighting	2	0	Meet good practice daylighting criteria: > 2% daylight factor in 80% of "relevant building areas" AND EITHER: > Uniformity ratio ≥0.4 or minimum point daylight factor of ≥0.8 (≥0.7 and ≥1.7 respectively for toplit areas) OR: > View of the sky from desk height (0.7m) > Satisfy room depth criterion (considers room geometry, function of depth of floor plate, room width, average surface reflectance, and window head height).	Architect Electrical Engineer Lighting Designer	These credits will not be achieved due to the geometry of the existing building.
		Glare Control and View Out	1	0	> Disabling glare designed out of all relevant building areas - geometry (low eaves) or design (brise soleil, blinds... etc). Design glare control in tandem with lighting control strategy to avoid conflicts. > All relevant building areas are within 7m of a window or wall with permanent opening providing a view out. Ratio of window/opening to be 20% surrounding wall area or ≥values in Table 1.0 BS 8206.	Architect Electrical Engineer Lighting Designer	These credits will not be achieved due to the geometry of the existing building.
		Internal and External Lighting Levels	1	1	> Internal lux levels in relevant building areas per CIBSE Code for Lighting 2009 / other relevant industry standard. > Areas where computer screens are regularly used, additional requirements on avoiding reflections, uplighting, direct/indirect lighting, and ceiling/wall illuminance (CIBSE Guide 7). > External lighting lux levels per BS5489-1:2003+A2:2008 > Lighting controls and zoning: e.g.. office areas, zones of ≤ 4 desks, peripheral zones adjacent glazing separately controlled... etc. Shell projects require lighting controls system with *capacity* for zoning as required once fit out layout is known.	Architect Landscape Architect Electrical Engineer Lighting Designer	Internal and external lighting levels will be designed in line with the relevant requirements.
Hea 02	Indoor Air Quality	Minimising sources of pollution	3	3	1) Develop indoor air quality plan covering: a) removal of / b) dilution and control of contaminants; c) pre occupancy flush out procedure; d) 3rd party testing and analysis. > Air intakes over 10 m from sources of ext. pollution (mech systems: exhaust, nat. vent: openings) > Fresh air provision per industry best practice: e.g.. offices: 12 l/s/person per British Council for Offices Best Practice. > CO_2 sensors for zones with large, unpredictable/variable occupancy: for DCV in mech vent., or user alerts/automated openings in nat vent spaces. 2) IAQ Plan established, and: > VOC limits set in specifications for all decorative paints and varnishes, plus at least 5 of the following 8 product categories: wood panels, timber structures, wood flooring, resilient/textile/laminate floorings, suspended ceiling tiles, flooring adhesives, wall-coverings, flexible wall covering adhesives. 3) IAQ Plan established, and: > Post completion, pre-occupancy testing confirms: Formaldehyde concentration ≤ 100μg/m^3 averaged over 30 minutes / TVOC concentration ≤ 300μg/m3 over 8 hours. Testing and measurement per defined standards. > Remedial measures implemented where these limits are not met.	Client Mechanical Engineer Architect Contractor	Low VOC materials will be specified for the office areas and VOC testing will be required prior to handover. Ventilation rates will be monitored and will be in line with the requirements of this credit.
		Potential for Natural Ventilation	1	0	Occupied spaces served by natural ventilation, which is either: a) 5% openable window area vs. gross internal floor area, evening distributed facing fenestration for zones/floor plates 7-15m deep to encourage cross ventilation; OR b) CIBSE AM10 compliance through modelling. > Nat vent strategy can provide min. 2 levels of user-control on fresh air rates. Easily accessible controls.	Mechanical Engineer	This credit can not be achieved due to the layout of the existing building.
Hea 03	Thermal Comfort	Thermal Modelling	1	1	> Thermal modelling per CIBSE AM11 shows thermal comfort levels in line with CIBSE Guide A, or a more stringent industry standard. > Time out of range ("TOR") metric deemed appropriate to project/building type.	Mechanical Engineer Client	Thermal modelling will be carried out to ensure that CIBSE guidelines can be met.
		Thermal Zoning	1	0	First credit achieved, plus: > Comfort modelling informs temperature controls strategy. > Servicing strategy addresses a) zoning; b) required occupant control (determined by considering user knowledge, occupancy type/room usage, likelihood of user interaction, user expectations and anticipated degrees of control); c) system interactions; d) accessible manual overrides for user control.	Mechanical Engineer Client	The thermal zoning will be determined by the tenant's fit out.
Hea 04	Water Quality	Legionella	*0*	*0*	*> Water system design per HSE Approved Code of Practice and Guidance "Legionnaire's Disease", 2000, and any other relevant industry standard.*	*Public Health Engineer* *Client*	*All water systems will comply with this requirement.*
		Drinking Water	1	1	> Accessible supply of clean fresh drinking water: for offices: chilled (mains-fed) point of use supply or point of use water coolers provided on each floor (e.g.. staff kitchenette) and in staff canteen, if provided.	Public Health Engineer Client	The tenant will be required to fit out water coolers in appropriate areas as part of their lease agreement.

ID	Issue	Credits	Available	Target	Summarised requirements	Responsibility	Comments
Hea 05	Acoustic Performance	Acoustic Performance	2	2	1) Suitably qualified acoustician appointed at pre-bid/briefing stage to advise on: external sources of noise impacting site, site layout and zoning of the building for good acoustics, acoustic requirements for users with special hearing or communication needs, acoustic treatment of different zones and facades. 2) Meet acoustic performance standards and testing requirements for relevant building type and function areas: e.g.. offices: (i) indoor ambient noise levels compliant with "good practice" levels of BS8233:1999 Tables 5 & 6. Pre-completion acoustic testing, performed by a Compliant Test Body, ensures rooms are built to achieve required standards. Remedial works planned where non-compliance found. (ii) rooms used for speech (e.g.. meeting/presentation spaces): reverberation times per Table 8 of BS8233:1999.	Client Acoustician Contractor	The project's acoustician has provided advice on achieving the required noise levels within the office spaces. Pre-completion testing will be carried out to demonstrate that the requirements are met.
Hea 06	Safety and Security	Safe Access	1	1	> Safe cyclist and pedestrian access > External lighting per BS5489-1:2008 > Separation of delivery areas from general parking, appropriate waiting, turning and storage space.	Architect Infrastructure Team Electrical Engineer / Lighting Designer	Cyclist and pedestrian routes have been designed to comply with these requirements.
		Security of Site	1	1	Security consultant consultation prior to or during Stage C. Final design to embody recommendations and be SbD/Safer Parking Scheme conformant, or meet the site specific guidance of consultant.	Architect	The ALO has been consulted by the base build design team and the ALO's recommendations will be incorporated during the detailed design stage.
Health & Wellbeing Totals:			**15**	**10**			
Health & Wellbeing score totals:			**15**	**10.00**			
Energy							
Ene 01	Reduction of CO_2 Emissions		15	5	Energy modelling to assess building's operational impact. Credits awarded using the BREEAM metric of Energy Performance Ratio (EPR_{NC}), determined using BRUKL Output Document.	Mechanical Engineer Energy Assessor	Current energy modelling shows that 5 credits will be achievable. The mandatory requirement for an excellent rating is not met.
Ene 02	Energy Monitoring	Metering	1	1	> Major energy consuming systems are monitored using Building Energy Management System (BEMS) or separate meters with pulsed output, to enable future BEMS-connection: a) space heating; b) domestic hot water; c) humidification; d) cooling; e) major fans; f) lighting; g) small power; h) other major energy consuming items (e.g.. lifts, kitchen plant, studios with large lighting rigs). Note lighting and small power can be combined providing each floor plate is separately metered. > End energy consumer is identifiable to the building user through labelling or data outputs.	Mechanical Engineer	All major energy uses will be metered and monitored using the building management system.
		Submetering	1	1	Provide accessible BEMS or sub-meters for energy supply to relevant functional/tenanted areas.	Mechanical Engineer	All major energy uses will also be submetered and monitored through the BMS.
Ene 03	External Lighting	External Lighting	1	1	> External light fittings (incl. decorative fixtures) to meet Luminous Efficacy requirements linked to colour rendering index (Ra), as follows: a) Building, access and pathways: ≥50 lamp lumens/circuit Watt for Ra ≥60 (60 lumens/Watt for Ra <60). b) Parking, associated roads, and floodlighting: ≥70 lumens/circuit Watt for Ra ≥60 (80 lumens/Watt for Ra <60). c) Signage illumination and uplighters: ≥60 lumens/Watt for lamps > 25W (50 lumens/Watt for lamps < 25). > External lighting controls through time switch or daylight sensor to prevent operation during daylight hours.	Electrical Engineer	External lighting provided by the developer will be compliant.
Ene 04	Low and Zero Carbon Technologies	Feasibility Study	1	1	> Stage C Feasibility Study to establish most appropriate local (on site or near site) LZC energy source for the project. Min. scope of study defined in BREEAM Manual. > A local LZC technology has been specified for the building/development in line with feasibility study recommendations. OR > The organisation occupying the building commits to a min 3 year contract with a supplier providing 100% accredited renewable energy.	Client Energy Specialist Mechanical Engineer	A renewables feasibility study has been carried out and is detailed in the Energy Statement.
		LZC Specification/ Installation	3	0	First credit is achieved, plus: > Specified local LZC reduces regulated CO2 emissions by 10% (2 credits); 20% (3 credits); or 30% (exemplary). OR: > Feasibility study includes LCA of the carbon impact of the selected LZC per ISO 14044:2006, assuming a 60 year building life span and any maintenance requirements. The resulting reduction in life cycle CO2 emissions is found to be 10% (3 credits) 20% (4 credits) or 30% (exemplary).	Client Energy Specialist Mechanical Engineer	The renewables feasibility study found that the CO_2 emissions reduction which could be achieved is insufficient to achieve further credits.
		Free Cooling	1	0	Where Hea 03 Credit 1 is achieved, plus: > The building utilises any of the following free cooling strategies: a) night time cooling in conjunction with high thermal mass; b) ground coupled air cooling; c) displacement ventilation; d) ground water cooling; e) surface water cooling; f) evaporative cooling, direct or indirect; g) desiccant dehumidification and evaporative cooling, using waste heat; h) absorption cooling, using waste heat; i) building requires no cooling (i.e. naturally ventilated).	Mechanical Engineer	No suitable free cooling strategies were identified for the retail units.
Ene 06	Energy Efficient Transportation Systems	Transport Analysis	1	1	Where lifts, escalators or moving walks are required, a transportation survey covering demand and usage patterns is used to determine the optimum number and size. The system/strategy specified is the lowest energy consuming option available.	Electrical Engineer	All lifts and escalators provided by the developer will comply with these requirements.
		Energy Efficient Features	1	1	Credit 1 is achieved, plus: > Lifts: 3 of the following energy-efficient measures are provided: standby mode during off peak periods; efficient lighting and controls; variable speed/voltage/frequency control of drive motor; regenerative drive unit. > Escalators/moving walks: one of the following: load sensing device that synchronises motor output to passenger demand; passenger sensing device to initiate standby mode from zero passenger demand.	Electrical Engineer	All lifts and escalators provided by the developer will comply with these requirements.

ID	Issue	Credits	Available	Target	Summarised requirements	Responsibility	Comments
Ene 08	Energy Efficient Equipment		2	0	Identify functions/equipment present in the project, and meet efficiency criteria for those considered responsible for the "significant majority" of unregulated energy consumption. Areas common to office buildings include: a) small power plug in equipment, including office equipment and white goods; d) data centre (includes small server rooms in office buildings); e) IT intensive operating areas, defined as >1 PC per 5m2; h) kitchen and catering facilities. Please see Manual for full criteria.	Client	This credit is not targeted as it would require the developer to specify limits on the small power equipment which could be fitted out by tenants.
	Energy Totals:		**27**	**11**			
	Energy score totals:		**19**	**7.74**			
Transport							
Tra 01	Public Transport Accessibility		3	3	Public transport Accessibility Index (AI) calculated: for offices: AI of 2 (1 credit); 4 (2 credits); 8 (3 credits). AI is determined from the distance (m) from the main building entrance to the transport node (max 650m for a bus stop, 1000m for a rail station), transport type serving the node; and average number of services stopping each hour during the building's standard operating hours. Projects in Greater London can streamline documentation using an online public transport accessibility map (Map 2A.3 - PTAL from www.london.gov.uk).	Architect	The development has a very high PTAL rating and will achieve all of the available credits.
Tra 02	Proximity to Amenities		1	1	Location of project building within close proximity (measured along safe pedestrian routes) to amenities: office - 500m to selected amenities	Architect	All necessary amenities are located within a 500m walking distance.
Tra 03	Cyclist Facilities	Cycle Storage	1	1	Requirements for offices: 1 cycle store per 10 building occupants (staff) up to 500 users, then 1 space per 15 staff for 501-1000 users, then 1 space per 20 staff for 1001+ users. To be compliant, storage must: > be protected overhead from the weather > be set into/fixed to a permanent structure / contained within a locked structure with CCTV > allow appropriate distance between racks and from obstructions > located in a prominent location visible from an occupied building/a main building access > lit in compliance with the external or internal criteria of Hea 01 and controlled to avoid out-of-hours/daytime use. > in an easily accessible location, ideally within 50-100m of a building entrance.	Architect Electrical Engineer	Cycle storage provision has been included as part of the current design.
		Cyclist Facilities	1	1	Requirements for offices: 2 cycle facilities from choice of: showers / changing facilities & lockers / drying space. > one shower for every 10 cycle storage spaces, unisex or even male: female split. > changing facilities to include adequate space to hang /store clothing and equipment whilst showering/changing - e.g.. bench seats, hooks. > lockers must be ≥ cycle stores > WC/shower facilities do not count as changing facilities. > Drying space must be designed as such, and have adequate heating and ventilation. Use of a plant room is not compliant.	Architect	Changing and showering facilities for staff have been provided within the basement area.
Tra 04	Maximum Car Parking Capacity		2	2	The building's car parking capacity is compared to the maximum car parking capacity permitted according to the BREEAM benchmarks, and the relevant number of BREEAM credits awarded.	Architect	Only disabled parking spaces are provided therefore two credits will be awarded.
Tra 05	Travel Plan		1	1	> A site-specific travel plan is developed at feasibility/design stage to consider all means of transport relevant to building users. Scope per requirements in Manual. > Travel plan includes package of measures used to steer the design to meet objectives and minimise car-based patterns. > Where appropriate, measures are included to reduce impacts of operational-related transport (deliveries, support services...etc) > Travel plan is to be implemented post construction by building management by final occupier / (in case of speculative development) supported by developer.	Client	A travel plan framework has been developed for planning and will be implemented for the development in operation.
	Transport Totals:		**9**	**9**			
	Transport score totals:		**8**	**8.00**			
Water							
Wat 01	Water Consumption		5	3	Efficiency of building's domestic water consuming components assessed in Wat 01 calculator. Credits assigned to savings over notional baseline: 12.5 / 25 / 40 / 50 / 55% improvement awarded 1-5 credits, 60% saving achieves exemplary level. Scope of typical office fixtures, together with baseline performance, are: WCs (6L per flush), urinals (10 L/bowl/hour for one fixture, 7.5 L/bowl/hour for two+), taps (washbasin 12 L/min, kitchen 12 L/min), and waste disposal unit 17L/min), showers (14 L/min), dishwashers (17 L/cycle domestic scale, 8L/rack commercial). See Manual for full details. > Greywater and/or rainwater systems can offset potable water use - yield (L/person/day) required for calculation. > Greywater systems must comply with BS8525-1:2010, rainwater systems with BS8515:2009.	Client Architect Public Health Engineer	Three credits will be achieved using low flow fittings and greywater harvesting.
Wat 02	Water Monitoring		1	1	> Water meters to be specified on each potable water supply to building (mains, borehole, private source). > Submeters / integral water monitoring equipment for plant or building areas attributable to >10% of the total water demand. > All water meters to have pulsed output to enable connection to a BMS for monitoring. > Connection to existing BMS, if applicable.	Public Health Engineer (Client)	Water meters and submeters will be provided as necessary. These will beconnected to the BMS.
Wat 03	Leak Detection	Leak Detection	1	1	> Leak detection system provided on mains water supply between building and mains water meter. > System must be audible when activated, triggered when the flow rate is above a setpoint for a pre-set time period, able to identify different flow/leakage rates, programmable to suit owner/occupiers water consumption criteria, designed to avoid false alarms by normal operation of large water-consuming plant.	Public Health Engineer	Leak detection will be provided throughout the building through the BMS system.
		Sanitary Supply Shut-off	1	1	Flow control device fitted to each WC area/facility (albeit male/female facilities can be combined where these share block location) to prevent minor water leaks. Options are: a) time controller to auto shut-off after predetermined interval; b) programmed time controller; c) volume controller; d) presence detector and controller; e) central control unit.	Public Health Engineer	Solenoid valves linked to PIR controls will be provided in all toilet and shower areas to provide absence shut-off.

ID	Issue	Credits	Available	Target	Summarised requirements	Responsibility	Comments
Wat 04	Water Efficient Equipment	Water Efficient Equipment	1	1	> Irrigation for internal and external planting/landscaping complies with one of the following: a) zoned, drip-feed subsurface irrigation, incorporating soil moisture sensors and rainstat to prevent operation during periods of rainfall; b) reclaimed water from rainwater/greywater system; c) external planting to suit local precipitation for all seasons; d) planting restricted to species that thrive in hot/dry climates; e) no dedicated mains-supplied irrigation - sole reliance on manual watering. > Where vehicle wash system is specified, use full or partial reclaim unit with at least one of the following: hydro-cyclone, sand/activated carbon filter, sump tank(s), three chamber interceptors, cartridge or bag filter.	Architect Public Health Engineer	External planting will not require irrigation with potable water.
Water Totals:			**9**	**7**			
Water score totals:			**6**	**4.67**			
Materials							
Mat 01	Life Cycle Impacts		5	3	Appraisal of building's life cycle impact through assessment of main building elements. For offices, these are: external walls, windows, roof, upper floor slab, floor finishes/coverings. Internal walls, structural frame, ground floor slabs, hard landscaping and foundations/substructure are explicitly excluded from the scope of Mat 01 assessment. Specifications can be appraised using a number of methods: a) generic data from the Green Guide Online b) product-specific Environmental Profiles Certification, found on Green Book Live c) provided through your Assessor, either using the Online Green Guide Calculator or through submission of a bespoke Green Guide Ratings from the BRE. Where a third party verified Environmental Product Declaration (EPD) exists for a specified product, a points uplift can be applied which improves that element's performance in the calculation. The Assessor inputs the project data to the Mat 01 Calculator to determine project performance.	Architect Structural Engineer (Contractor) Client	The materials selections will be developed further during detailed design. The current scoring is based on the base build materials. Office tenants will be required to use A or A+ rated floor finishes as part of their lease agreement.
Mat 02	Hard Landscaping and Boundary Protection		1	1	80% of all external hard landscaping and boundary protection to achieve A or A+ Green Guide rating. Retained existing hardscaping/boundary protection can be awarded A+ rating where <20% of the total area of these elements is subject to minor alteration/repair. Note: where no hardscaping or boundary protection exist, credit is awarded by default.	Landscape architect / Civil Engineer (hardscaping) Contractor	A or A+ rated materials will be targeted for the external hard landscaping.
Mat 03	Responsible Sourcing of Materials		3	2	Appraisal of the construction materials supply chain, through assessment of applicable building elements and materials. Scope includes: structural frame, ground floor, upper floors, roof, external walls, internal walls, foundation/substructure, fittings (e.g. staircase, windows, doors, floor finishes), hard landscaping. Within these elements, applicable materials focus on solid components - insulation, fixings, adhesives and additives are excluded. The Mat 03 calculator allows input of up to 4 key specifications under each element type, and awards credits depending on the Tier level of responsible sourcing achieved. At least 80% of materials under a building element must be responsibly sourced for that element to contribute to credit achievement. In addition, all timber must be sourced in accordance with the UK Government's Timber procurement policy (also Man 03 credit 4): see CPET www.cpet.org.uk.	Architect Landscape architect / Civil Engineer (hardscaping) Structural Engineer Contractor	The offices will target the following responsible sourcing measures for new materials: BES6001 certification for concrete CARES SRS certification for reinforcing steel FSC or PEFC certification for all timber BES6001 certification for drylining systems ISO14001 certification for other proprietary systems.
Mat 04	Insulation	Green Guide Rating	1	1	Same process as Mat 01, but purely for insulation materials. Examines both building fabric and building services insulation.	Architect Mechanical Engineer Contractor Client	Insulation materials will generally be A or A+ rated.
		Responsible Sourcing	1	1	Same process as Mat 03, but purely for insulation materials. Examines both building fabric and building services insulation.	Architect Mechanical Engineer Contractor Client	Insulation materials will be responsibley sourced with BES6001 certification or ISO 14001 certification for the product and key raw material.
Mat 05	Designing for Robustness		1	1	> Vulnerability analysis of design to identify internal and external areas of vehicular, trolley and concentrated pedestrian movement. > Incorporation of durability and protection measures to prevent damage to vulnerable parts of the building (e.g.. walls/doors from impact, high volume floor finishes from wear). Scope must include at minimum protection from: a) high pedestrian traffic in main entrances, public areas and circulation areas; b) internal vehicular/trolley movement within 1m of internal finishes in storage, delivery, corridor and kitchen areas; c) potential vehicular collision where parking occurs within 1m of the building facade or manoeuvring within 2m of delivery areas. Selected measures should balance the need for additional materials with the objective to protect elements to minimise replacement - the goal is material optimisation.	Architect	The architect has identified vulnerable areas of the building and will specify appropriate protection measures both internally and externally.
Materials Totals:			**12**	**9**			
Materials score totals:			**12.5**	**9.38**			

ID	Issue	Credits	Available	Target	Summarised requirements	Responsibility	Comments
Waste							
Wst 01	Construction Waste Management	Construction Resource Efficiency	3	2	> Achievement of the following resource efficiency benchmarks for non hazardous construction waste (excluding demolition and excavation waste): 1) 13.3 m³ per 100m² gross internal floor area 2) 7.5 m³ per 100m² 3) 3.4 m³ per 100m² Exemplary) 1.6 m³ per 100m² > Where existing buildings will be demolished, a pre-demolition audit of existing buildings, structures or hard surfaces is completed to maximise reuse, refurbishment, and material recovery. The audit must identify a) key refurbishment/demolition materials; and b) potential applications and issues in reuse /recycling of these materials. > Development and implementation of a compliant Site Waste Management Plan (SWMP), defining targets, procedures, roles and responsibilities. Referencing the pre-demolition audit, if applicable.	Contractor	This requirement will be set out in the main construction contract.
		Diversion from Landfill	1	1	> Diversion of the following percentages of non hazardous construction, excavation and demolition waste: by volume: 70% construction waste, 80% demolition (1 credit); 85% for both construction and demolition waste (exemplary). by tonnage: 80% construction waste, 90% demolition (1 credit); 90/95% construction/demolition waste (exemplary). > On or off-site sorting of key waste groups - full list in Manual, page 278.	Contractor	This requirement will be set out in the main construction contract.
Wst 02	Recycled Aggregates		1	0	> Total amount of recycled/secondary aggregate is >25% of the total high-grade aggregate specified (by weight or volume). > Applications must meet minimum percentages of recycled content for the application to contribute to credit achievement: e.g., ≥25% for structural frame, floor slabs, concrete road surfaces and foundations, and ≥100% for gravel landscaping. For full list of applications, and minimum percentages for exemplary performance, see BREEAM Manual. > Aggregates are sourced on site, locally (within 30km radius of site) or from a non-construction pre- or post-consumer by-product source.	Structural Engineer	Secondary aggregate may be used but subject to further investigation at the detailed design stage.
Wst 03	Operational Waste		1	1	> Provision of dedicated space for the segregation and storage of operational recyclable waste volumes. The space must be clearly labelled, accessible (ideally within 20m of building entrance) and appropriately sized for the projected waste volumes. > Where sustained, high-volume streams of particular waste materials are anticipated, provision of static waste compactor/baler, organic waste vessel(s) alongside water outlet for clearing (can be on site composter or dedicated food waste bin for collection).	Architect	Appropriate waste storage space has been provided at basement level.
Wst 04	Speculative Floor and Ceiling Finishes		1	1	For tenanted areas (where the future occupant is not known), prior to full fit-out works, carpets, other floor finishes and ceiling finishes have been installed in a show area only.	Developer	The tenant will fit out their own floor and ceiling finishes.
Waste Totals:			**7**	**5**			
Waste score totals:			**7.5**	**5.36**			
Land Use & Ecology							
LE 01	Site Selection	Previously Developed Land	1	1	At least 75% of the proposed development's footprint is on land previously developed for industrial/commercial/domestic use in the last 50 years	Architect	The current building was completed in the 1960s and there is a long history of the land being used prior to this. The credit will be achieved.
		Contaminated Land	1	0	> A Contaminated land specialist deems the site to be "significantly contaminated" in site investigation, risk assessment and appraisal, which details the degree, sources/types and remediation options. > Client and principle contractor confirms suggested remediation will be carried out.	Contaminated land specialist Client Contractor	The land is not contaminated therefore this credit can not be achieved.
LE 02	Ecological Value of Site and Protection of Ecological Features	Ecological Value of Site and Protection of Ecological Features	1	1	> Site designated as "land of low ecological value" using BREEAM checklist, or assessment report based on a site visit from a suitably qualified ecologist (SEQ). > All existing features of ecological value are protected from damage during activities on site. > Principle contractor is required to construct ecological protection prior to preliminary/preparatory site works.	Ecologist	An Ecologist has completed a Phase 1 habitat survey and has confirmed that the site has low ecological value. Surrounding trees which are to be retained will be protected during construction based on guidance from the Ecologist.
LE 03	Mitigating Ecological Impact	Mitigating Ecological Impact	2	2	A BREEAM Calculator is used to assess and quantify the ecological of the site pre- and post development, and credits awarded as follows: 1) change in ecological value is minimised, indicated by a score between -9 and 0. 2) site ecology is maintained or improved as a result of development, indicated by a score ≥0.	Client Architect Landscape Architect	The planting at ground level and on the terraces at levels 5 and 9 will increase species numbers on the site.
LE 04	Enhancing Site Ecology	Site Visit by SQE	1	1	> Suitably qualified ecologist (SEQ) appointed to report on enhancing and protecting site ecology, providing a report with appropriate recommendations that is based on a site visit/survey at the design brief stage. > General recommendations of the Ecology Report are implemented.	Ecologist	An SQE has carried out a phase 1 habitat survey and has made recommendations which will be incorporated into the landscape architect's design.
		Increase in Plant Species	2	2	First credit is achieved; plus: Through implementation of the ecologist's recommendations, credits are awarded for an increase of plant species on site as follows: 1) increase of <6 plant species 2) 6+ plant species introduced on site.	Ecologist	The number of plant species will increase by more than 6 as a result of the proposed planting.

ID	Issue	Credits	Available	Target	Summarised requirements	Responsibility	Comments
LE 05	Long Term Impact on Biodiversity	Long Term Impact on Biodiversity	2	2	> Suitably qualified ecologist (SQE) appointed prior to start of works on site confirms compliance with all relevant UK and EU legislation during the design and construction process. > Site-specific landscape and habitat management plan is produced covering at least five years of the building in operation. Minimum scope of plan defined in Manual. PLUS; compliance with some* additional criteria - *SEQ to advise on how many apply and could potentially be targeted. a) Contractor biodiversity champion b) Contractor site training for workforce c) Records made of steps to protect or enhance site ecology, publically available where requested. d) Creation of new ecologically valuable habitat e) Scheduling of construction activities to minimise impact on existing habitats and species.	Ecologist Contractor	An SQE has been appointed and will provide guidance for the contractor to meet all of the relevant requirements.
Land Use & Ecology Totals:			**10**	**9**			
Land Use & Ecology score totals:			**10**	**9**			
Pollution							
Pol 01	Impact of Refrigerants	Direct Effect of Refrigerants	3	1	3) No use of refrigerants in the following plant/systems: a) comfort cooling systems; b) cold storage, including chilled dispensers/display cabinets but excluding domestic white goods; and c) process-based cooling loads (e.g.. servers/IT equipment). OR ----- Up to three credits through a combination of the following: > Analysis of refrigerant life cycle impact in terms of CO_2 equivalent emissions. Credits are awarded using a BREEAM calculator that finds Direct Effect Life Cycle CO_2 equivalent emissions (DELC CO_{2e}): 1) 1000 kgCO_2/kW 2) 100 kgCO_2/kW OR 2) All installed air conditioning / refrigeration systems use refrigerants with a Global Warming Potential (GWP) of 10. PLUS (OPTIONAL) 1) Provision of a robust and tested refrigerant leak detection system that triggers shutoff and pump down. Systems detecting concentrations in air can only be used where the relevant equipment is housed in a moderately air tight enclosure / mechanically vented plant room, and the alarm threshold must be set at ≤ 2000 ppm. Alternatively, a leak detection system can be supplied that is not based on that principle of detecting concentrations in air.	Mechanical Engineer	refrigeration equipment that has DEL CO_{2e} equivalent emissions of 100kgCO_2/kW or less will be selected.
Pol 02	NOx Emissions		3	3	Normal operation of heating and cooling plant results in a dry NO_x emission level (measured at 0% excess O_2) of: offices: 1) 100 mg/kWh 2) 70 mg/kWh 3) 40 mg/kWh Note: Water heating remains outside scope of analysis for office projects.	Mechanical Engineer	The retail units are likely to require heat pumps for heating. These use grid electricity which has very high NOx therefore these credits will not be achieved.
Pol 03	Surface Water Run Off	Flood Risk	2	2	Two credits where: > Site located in a flood zone defined by planning/policy guidance (PPS25 for England) as having a low annual probability of flooding. > A site specific Flood Risk Assessment (FRA) confirms low risk of flooding from all sources: fluvial; tidal; surface water; groundwater; sewers; reservoirs. OR One credit where: > Site located in a flood zone defined by planning/policy guidance as having a medium/high probability of flooding but is outside the functional floodplain. > A site specific FRA confirms the development is sufficiently flood resilient > Building ground level and access to building and site are designed to be at least 600mm above design flood level.	Infrastructure / Civils	A flood risk statement has been prepared for the BREEAM assessment and confirms that the risk of flooding is low.
		Surface Water Run-off	2	2	Appropriate Consultant confirms the following: 1) Drainage measures of the new development reduce peak rate of run off to natural or municipal watercourses. Compliance must be demonstrated at 1 year and 100 year events, and include an allowance for climate change. 2) Property flooding will not occur in the event of local drainage system failure (see CIRIA C635:2006 Designing for exceedance in urban drainage); AND > post development run off volume over the development's lifetime is no greater than pre-development conditions > any additional run-off for the 100-year 6 hour event is contained on site using infiltration or other SUDs techniques. Where this cannot be met: > Justification from the appropriate consultant that the above criteria cannot be met. > Post development peak run-off rate reduced to a limiting discharge, defined as the highest of a) pre development 1-year peak flow rate; b) mean annual flow rate Qbar; c) 2 l/s/ha. > All calculations must include allowance for climate change in line with best practice guidance.	Infrastructure / Civils	Run-off rate will be reduced by 50% by use of a blue roof system.
		Minimising Watercourse Pollution	1	0	Appropriate Consultant confirms: > No discharge from the site for up to 5mm rainfall. > SuDS or source control systems where pollution risks are low. > Provision of oil/petrol separators in areas with high risk of contamination or spillage > Water pollution prevention measures designed per Pollution Prevention Guideline 3 / SuDS manual. Project team also confirms: > Provision of comprehensive site drainage plan for building/site occupants > Shut off valves for chemical/gas storage areas > Design and detailing of any external storage and delivery areas per Environmental Agency's recommendations in Pollution Prevention Pays guidance.	Infrastructure / Civils	It is not possible to infiltrate all rainfall up to 5mm on a site of this nature. All surface water runoff eventually is discharged to the sewer therefore this credit can not be achieved.

ID	Issue	Credits	Available	Target	Summarised requirements	Responsibility	Comments
Pol 04	Reduction of Night Time Light Pollution		1	1	> External lighting strategy complies with Table 1 of ILE/ILP Guidance notes for the Reduction of Obtrusive Light, 2005 > External lighting can be automatically switched off 23:00-07:00. Security/safety lighting is exempt from automatic switching requirements, but must comply with the lower levels of ILE/ILP Table 1 values during these hours - e.g. automatic control to reduce input power by 23:00. > Where illuminated advertisements are specified, these must be designed in compliance with ILE Technical Report 5.	Architect Landscape Architect Electrical Engineer	External lighting provided by the developer will be compliant with the ILE guidance as required.
Pol 05	Noise Attenuation		1	1	> No noise sensitive areas or buildings are present within an 800m radius of the project. OR > A noise impact assessment in compliance with BS 7445:1991 / BS 4142:1997 is carried out by a suitably qualified acoustician to: a) measure existing background noise levels at the nearest or most exposed noise-sensitive development to the project; b) determine the rating noise level resulting from the new noise source. > The noise level from the proposed site/building is a difference no greater than +5dB 07:00-23:00hrs, and +3dB 23:00-07:00hrs compared to background noise levels. Where the proposed building introduces noise sources above these limits, measures are incorporated to attenuate noise at its source to a compliant level.	Acoustician (Client)	A noise impact assessment has been carried out and all plant provided by the developer or tenant will be required to comply with the noise limits.
	Pollution Totals:		**13**	**10**			
	Pollution score totals:		**10**	**7.69**			
Innovation							
Man 01	Sustainable Procurement		1	0	Commitment from FM to conduct min. 3 year post occupancy evaluation / ongoing calibration. > Collate occupant satisfaction, energy and water consumption quarterly, and report to BRE Global. > Set targets to reduce energy and water usage and monitor achievement. > Feedback "lessons learned" to project team.		Not targeted
Man 02	Responsible Construction Practices		1	0	CCS score of 36 or more.		Not targeted
Hea 01	Visual Comfort		1	0			Not targeted
Ene 01	Reduction of CO2 Emissions		5	0	First credit of Ene 04 is achieved, plus: > Specified local LZC reduces regulated CO2 emissions by 10% (2 credits); 20% (3 credits); or 30% (exemplary). OR: > Feasibility study includes LCA of the carbon impact of the selected LZC per ISO 14044:2006, assuming a 60 year building life span and any maintenance requirements. The resulting reduction in life cycle CO2 emissions is found to be 10% (3 credits) 20% (4 credits) or 30% (exemplary).		Not targeted
Ene 04	Low or Zero Carbon Technologies		1	0	Inclusion of LZC technology resulting in a 60 year life cycle CO_2 emission reduction of 30%.		Not targeted
Wat 01	Water Consumption		1	0	Innovation point for high savings in potable water over baseline, plus >95% of WC/urinal flushing met using recycled non-potable water.		Not targeted
Mat 01	Life Cycle Impacts		1	0			Not targeted
Mat 03	Responsible Sourcing of Materials		1	0			Not targeted
Wst 01	Construction Waste Management		1	0	> Exemplary resource efficiency benchmark for non hazardous construction waste (excluding demolition and excavation waste) met: 1.6 m^3 per 100m^2 > Exemplary benchmark for waste diversion met: by volume: 85% for both construction and demolition waste by volume / 90/95% construction/demolition waste (exemplary). > All key waste groups identified for diversion from landfill in pre-construction stage SWMP.		Not targeted
Wst 02	Recycled Aggregates		1	0	> Recycled/secondary aggregate comprising at least 35% of total high-grade aggregate specified (by weight or volume). > Applications must meet exemplary level minimum percentages of recycled content for the application to contribute to credit achievement: e.g., ≥50% for structural frame, floor slabs, concrete road surfaces and foundations, and ≥100% for pipe bedding and high-grade granular fill. For full list of applications, and minimum percentages for exemplary performance, see BREEAM Manual.		Not targeted
	Innovation Totals:		**14**	**0**			
	Innovation score totals:		**14**	**0**			
	OVERALL SCORE TOTALS:		**114**	**73.83**			
	Total potential score:						

Appendix C

BREEAM Retail Pre-Assessment

BREEAM Retail 2011 Pre-Assessment

Margaret Hamilton, BREEAM assessor, BREEAM AP

ID	Issue	Credits	Available	Target	Summarised requirements	Responsibility	Comments
				59.45			
Management							
Man 01	Sustainable Procurement	Project Brief and Design	4	4	1) Meeting to define roles, responsibilities and contributions of team members across Stages B-L. Training for FM/users at handover. 2) BREEAM AP appointed and BREEAM performance targets by early Stage C at the latest. BREEAM targets met at interim design stage and contractually agreed to by team. 3) Credit 2 achieved, plus: BREEAM AP monitors and reports progress at regular team meetings over Stages B-E. 4) BREEAM AP monitors and reports progress at regular team meetings over Stages F-L. BREEAM targets met at post construction stage.	Client Design Team Contractor Assessor	Project brief and design requirements have been completed by the developer and design team. BREEAM AP has been appointed and will have ongoing input throughout the project.
		Construction and Handover	2	2	1) Post-construction thermographic survey of building fabric and rectification of any defects 2) Basic commissioning: named Commissioning Monitor reporting to client, responsible for monitoring and programming pre-commissioning, commissioning and re-commissioning as required. Specialist Commissioning Manager required for complex systems, and must input to design with commissionability design reviews.	Client Contractor	A post-construction thermographic survey and commissioning will be procured through the main contractor.
		Aftercare	2	1	1) Seasonal commissioning (12 months post occupancy) for simple and complex systems. 2) Credit 1 achieved, plus: > energy and water consumption data will be collected and analysed against expectations for min 12 months post occupancy > Aftercare support - dedicated aftercare team/individual, FM site training and building walkabout, weekly on site presence for first month, then longer term support e.g.. helpline for min 12 months post handover.	Client Contractor	Seasonal commissioning and collection of energy and water consumption data will be recommended to tenants but will not be required through the lease. Half of credit value is targeted for providing guidance.
Man 02	Responsible Construction Practices	Responsible Construction Practices	2	2	Compliance or exemplary performance in Considerate Constructors Scheme, or equivalent. 1) CCS score of 24-31.5 2) 32-35.5 = 2 credits 35 or more = exemplary (Innovation point).	Client Contractor	The contractor will be required through their contract to achieve a CCS score of at least 35 this will achieve 2 credits.
Man 03	Construction Site Impacts	Energy	1	1	Monitoring, recording and reporting of consumption data resulting from construction in following areas: > Energy (kWh) for plant, equipment and site accommodation.	Client Contractor	The contractor will be required through their contract to monitor and report energy use from site activities in line with this credit.
		Water	1	1	> Water consumption and recycled water use (m^3) for plant, equipment and site accommodation.	Client Contractor	The contractor will be required through their contract to monitor and report water use from site activities in line with this credit.
		Transport	1	1	> Transport (fuel, litres and distance travelled, km) for the majority of construction materials delivery to site, and disposal of construction waste. Target setting encouraged, but not required.	Contractor	The contractor will be required through their contract to monitor and report transport emissions from site activities in line with this credit.
		Timber Procurement	1	1	All site timber sourced in line with UK Government's Timber Procurement Policy.	Contractor	All site timber will be FSC or PEFC certified.
		Construction Site Management	1	1	> Main Contractor operates an Environmental Management System, ISO 14001 or equivalent. > Best practice pollution prevention measures implemented on site - Env. Agency's Environmental Checklist §2.2.5 of *Preventing Pollution in England and Wales*	Contractor	Only contractors with ISO14001 certification will be considered for the main contractor role. The contractor will be required to observe all best practice pollution prevention procedures.
Man 04	Stakeholder Participation	Consultation	1	0	Extensive stakeholder/consultation above and beyond statutory requirements. Should include bodies with experience of comparable existing buildings, existing community groups, FM staff (if known), and historic/heritage groups. Formalisation of process in Consultation Plan and evidence of feedback influencing project design/operations strategy.	Planning Consultants Architects Client	A consultation plan has been produced and consultation with stakeholders is ongoing.
		Inclusive and Accessible Design	1	1	CABE Design and Access Statement to document inclusive design features. Consideration of facilitating wider community usage, where appropriate.	Architect	The architect has produced a design and access statement outlining accessibility features of the building.
		Building User Information	1	1	Production of non-technical Building User Guide - functions, uses and access details.	Client Mechanical Engineer Contractor	A non-technical building user guide will be procured through the main contractor. Tenants will be required to complete this for their fit-out.
		Post Occupancy Evaluation	1	0	Post Occupancy Evaluation (POE) one year after occupation by independent third party. POE scope: design and construction process, feedback from range of users, and appraisal of sustainability performance.	Client	POE will not be carried out by the developer for the retail tenants.
Man 05	Life Cycle Cost and Service Life Planning	Life Cycle Cost and Service Life Planning	3	0	1) LCC analysis per PD156865:2008 and service life planning per ISO 15686 Part 1. 2) Credit 1 achieved, plus: > Scope of analysis includes at least 2 of: envelope, services, finishes and external spaces. > Findings are shown to have influenced the design and variant selection in areas of "critical value" in the project 3) Credits 1 and 2 achieved, plus: > LCC model updated at Stages D/E. Results implemented in final spec, design and construction. > Maintenance strategy and landscaping management plan developed, as appropriate.	Client Consulting Engineers	Life cycle costing will be carried out based on the Stage C and the Stage D design to compare design options for the building.
Management Totals:			**22**	**16**			
Management score totals:			**12**	**8.73**			

ID	Issue	Credits	Available	Target	Summarised requirements	Responsibility	Comments
Health & Wellbeing							
Hea 01	Visual Comfort	High Frequency Ballasts	*0*	*0*	*Specification of high frequency ballasts for all fluorescent and compact fluorescent lamps.*	*Electrical Engineer* *Lighting Designer*	
		Daylighting	2	0	Meet good practice daylighting criteria: > 2% daylight factor in 80% of "relevant building areas" AND EITHER: > Uniformity ratio ≥0.4 or minimum point daylight factor of ≥0.8 (≥0.7 and ≥1.7 respectively for toplit areas) OR: > View of the sky from desk height (0.7m) > Satisfy room depth criterion (considers room geometry, function of depth of floor plate, room width, average surface reflectance, and window head height).	Architect Electrical Engineer Lighting Designer	These credits will not be achieved due to the geometry of the existing building.
		Glare Control and View Out	1	0	> Disabling glare designed out of all relevant building areas - geometry (low eaves) or design (brise soleil, blinds... etc). Design glare control in tandem with lighting control strategy to avoid conflicts. > All relevant building areas are within 7m of a window or wall with permanent opening providing a view out. Ratio of window/opening to be 20% surrounding wall area or ≥values in Table 1.0 BS 8206.	Architect Electrical Engineer Lighting Designer	These credits will not be achieved due to the geometry of the existing building.
		Internal and External Lighting Levels	1	0.5	> Internal lux levels in relevant building areas per CIBSE Code for Lighting 2009 / other relevant industry standard. > Areas where computer screens are regularly used, additional requirements on avoiding reflections, uplighting, direct/indirect lighting, and ceiling/wall illuminance (CIBSE Guide 7). > External lighting lux levels per BS5489-1:2003+A2:2008 > Lighting controls and zoning: e.g.. office areas, zones of ≤ 4 desks, peripheral zones adjacent glazing separately controlled... etc. Shell projects require lighting controls system with *capacity* for zoning as required once fit out layout is known.	Architect Landscape Architect Electrical Engineer Lighting Designer	The requirements for this credit will be outlined to tenants in a tenant guide but, given the possible range of retail tenants, limits on lighting levels will not be imposed through the lease.
Hea 02	Indoor Air Quality	Minimising sources of pollution	3	1	1) Develop indoor air quality plan covering: a) removal of / b) dilution and control of contaminants; c) pre occupancy flush out procedure; d) 3rd party testing and analysis. > Air intakes over 10 m from sources of ext. pollution (mech systems: exhaust, nat. vent: openings) > Fresh air provision per industry best practice: e.g.. offices: 12 l/s/person per British Council for Offices Best Practice. > CO_2 sensors for zones with large, unpredictable/variable occupancy: for DCV in mech vent., or user alerts/automated openings in nat vent spaces. 2) IAQ Plan established, and: > VOC limits set in specifications for all decorative paints and varnishes, plus at least 5 of the following 8 product categories: wood panels, timber structures, wood flooring, resilient/textile/laminate floorings, suspended ceiling tiles, flooring adhesives, wall-coverings, flexible wall covering adhesives. 3) IAQ Plan established, and: > Post completion, pre-occupancy testing confirms: Formaldehyde concentration ≤ 100µg/m^3 averaged over 30 minutes / TVOC concentration ≤ 300µg/m3 over 8 hours. Testing and measurement per defined standards. > Remedial measures implemented where these limits are not met.	Client Mechanical Engineer Architect Contractor	Recommendations will be made for the tenant to use low VOC materials and to carry out air quality testing.
		Potential for Natural Ventilation	1	0	Occupied spaces served by natural ventilation, which is either: a) 5% openable window area vs. gross internal floor area, evening distributed facing fenestration for zones/floor plates 7-15m deep to encourage cross ventilation; OR b) CIBSE AM10 compliance through modelling. > Nat vent strategy can provide min. 2 levels of user-control on fresh air rates. Easily accessible controls.	Mechanical Engineer	This credit can not be achieved due to the proximity of the retail units to the road.
Hea 03	Thermal Comfort	Thermal Modelling	1	0.5	> Thermal modelling per CIBSE AM11 shows thermal comfort levels in line with CIBSE Guide A, or a more stringent industry standard. > Time out of range ("TOR") metric deemed appropriate to project/building type.	Mechanical Engineer Client	Thermal modelling will be recommended to the tenant in a green building guide.
		Thermal Zoning	1	0.5	First credit achieved, plus: > Comfort modelling informs temperature controls strategy. > Servicing strategy addresses a) zoning; b) required occupant control (determined by considering user knowledge, occupancy type/room usage, likelihood of user interaction, user expectations and anticipated degrees of control); c) system interactions; d) accessible manual overrides for user control.	Mechanical Engineer Client	Thermal zoning will be recommended to the tenant in a green building guide.
Hea 04	Water Quality	Legionella	*0*	*0*	*> Water system design per HSE Approved Code of Practice and Guidance "Legionnaire's Disease", 2000, and any other relevant industry standard.*	*Public Health Engineer* *Client*	*All water systems will comply with this requirement.*
		Drinking Water	1	1	> Accessible supply of clean fresh drinking water: for offices: chilled (mains-fed) point of use supply or point of use water coolers provided on each floor (e.g.. staff kitchenette) and in staff canteen, if provided.	Public Health Engineer Client	The tenant will be required to fit out water coolers in appropriate areas as part of their lease agreement.

ID	Issue	Credits	Available	Target	Summarised requirements	Responsibility	Comments
Hea 05	Acoustic Performance	Acoustic Performance	2	1	1) Suitably qualified acoustician appointed at pre-bid/briefing stage to advise on: external sources of noise impacting site, site layout and zoning of the building for good acoustics, acoustic requirements for users with special hearing or communication needs, acoustic treatment of different zones and facades. 2) Meet acoustic performance standards and testing requirements for relevant building type and function areas: e.g.. offices: (i) indoor ambient noise levels compliant with "good practice" levels of BS8233:1999 Tables 5 & 6. Pre-completion acoustic testing, performed by a Compliant Test Body, ensures rooms are built to achieve required standards. Remedial works planned where non-compliance found. (ii) rooms used for speech (e.g.. meeting/presentation spaces): reverberation times per Table 8 of BS8233:1999.	Client Acoustician Contractor	Tenant guidance will provide recommendations for designing the fit-out in line with these requirements.
Hea 06	Safety and Security	Safe Access	1	1	> Safe cyclist and pedestrian access > External lighting per BS5489-1:2008 > Separation of delivery areas from general parking, appropriate waiting, turning and storage space.	Architect Infrastructure Team Electrical Engineer / Lighting Designer	Cyclist and pedestrian routes have been designed to comply with these requirements.
		Security of Site	1	1	Security consultant consultation prior to or during Stage C. Final design to embody recommendations and be SbD/Safer Parking Scheme conformant, or meet the site specific guidance of consultant.	Architect	The ALO has been consulted by the base build design team and the ALO's recommendations will be incorporated during the detailed design stage.
Health & Wellbeing Totals:			**15**	**6.5**			
Health & Wellbeing score totals:			**15**	**6.50**			
Energy							
Ene 01	Reduction of CO_2 Emissions		15	5	Energy modelling to assess building's operational impact. Credits awarded using the BREEAM metric of Energy Performance Ratio (EPR_{NC}), determined using BRUKL Output Document.	Mechanical Engineer Energy Assessor	Current energy modelling shows that 5 credits will be achievable. Assumptions regarding the performance of tenant systems which have been included in the energy model will be transferred to the tenant lease agreement.
Ene 02	Energy Monitoring	Metering	1	1	> Major energy consuming systems are monitored using Building Energy Management System (BEMS) or separate meters with pulsed output, to enable future BEMS-connection: a) space heating; b) domestic hot water; c) humidification; d) cooling; e) major fans; f) lighting; g) small power; h) other major energy consuming items (e.g.. lifts, kitchen plant, studios with large lighting rigs). Note lighting and small power can be combined providing each floor plate is separately metered. > End energy consumer is identifiable to the building user through labelling or data outputs.	Mechanical Engineer	The utilities supplies to the retail units will be fitted with meters that are capable of connection to a building management system.
		Submetering	1	1	Provide accessible BEMS or sub-meters for energy supply to relevant functional/tenanted areas.	Mechanical Engineer	The tenant will be required through their lease agreement to sub meter the relevant energy uses.
Ene 03	External Lighting	External Lighting	1	1	> External light fittings (incl. decorative fixtures) to meet Luminous Efficacy requirements linked to colour rendering index (Ra), as follows: a) Building, access and pathways: ≥50 lamp lumens/circuit Watt for Ra ≥60 (60 lumens/Watt for Ra <60). b) Parking, associated roads, and floodlighting: ≥70 lumens/circuit Watt for Ra ≥60 (80 lumens/Watt for Ra <60). c) Signage illumination and uplighters: ≥60 lumens/Watt for lamps > 25W (50 lumens/Watt for lamps < 25). > External lighting controls through time switch or daylight sensor to prevent operation during daylight hours.	Electrical Engineer	External lighting provided by the developer will be compliant. Any external lighting or signage provided by tenants will need to comply with these requirements through the lease agreement.
Ene 04	Low and Zero Carbon Technologies	Feasibility Study	1	1	> Stage C Feasibility Study to establish most appropriate local (on site or near site) LZC energy source for the project. Min. scope of study defined in BREEAM Manual. > A local LZC technology has been specified for the building/development in line with feasibility study recommendations. OR > The organisation occupying the building commits to a min 3 year contract with a supplier providing 100% accredited renewable energy.	Client Energy Specialist Mechanical Engineer	A renewables feasibility study has been carried out and is detailed in the Energy Statement.
		LZC Specification/ Installation	3	0	First credit is achieved, plus: > Specified local LZC reduces regulated CO2 emissions by 10% (2 credits); 20% (3 credits); or 30% (exemplary). OR: > Feasibility study includes LCA of the carbon impact of the selected LZC per ISO 14044:2006, assuming a 60 year building life span and any maintenance requirements. The resulting reduction in life cycle CO2 emissions is found to be 10% (3 credits) 20% (4 credits) or 30% (exemplary).	Client Energy Specialist Mechanical Engineer	The renewables feasibility study found that the CO_2 emissions reduction which could be achieved is insufficient to achieve further credits.
		Free Cooling	1	0	Where Hea 03 Credit 1 is achieved, plus: > The building utilises any of the following free cooling strategies: a) night time cooling in conjunction with high thermal mass; b) ground coupled air cooling; c) displacement ventilation; d) ground water cooling; e) surface water cooling; f) evaporative cooling, direct or indirect; g) desiccant dehumidification and evaporative cooling, using waste heat; h) absorption cooling, using waste heat; i) building requires no cooling (i.e. naturally ventilated).	Mechanical Engineer	No suitable free cooling strategies were identified for the retail units.
Ene 06	Energy Efficient Transportation Systems	Transport Analysis	1	1	Where lifts, escalators or moving walks are required, a transportation survey covering demand and usage patterns is used to determine the optimum number and size. The system/strategy specified is the lowest energy consuming option available.	Electrical Engineer	All lifts and escalators provided by the developer will comply with these requirements.
		Energy Efficient Features	1	1	Credit 1 is achieved, plus: > Lifts: 3 of the following energy-efficient measures are provided: standby mode during off peak periods; efficient lighting and controls; variable speed/voltage/frequency control of drive motor; regenerative drive unit. > Escalators/moving walks: one of the following: load sensing device that synchronises motor output to passenger demand; passenger sensing device to initiate standby mode from zero passenger demand.	Electrical Engineer	All lifts and escalators provided by the developer will comply with these requirements.

ID	Issue	Credits	Available	Target	Summarised requirements	Responsibility	Comments
Ene 08	Energy Efficient Equipment		2	0	Identify functions/equipment present in the project, and meet efficiency criteria for those considered responsible for the "significant majority" of unregulated energy consumption. Areas common to office buildings include: a) small power plug in equipment, including office equipment and white goods; d) data centre (includes small server rooms in office buildings); e) IT intensive operating areas, defined as >1 PC per 5m2; h) kitchen and catering facilities. Please see Manual for full criteria.	Client	This credit is not targeted as it would require the developer to specify limits on the small power equipment which could be fitted out by tenants.
	Energy Totals:		**27**	**11**			
	Energy score totals:		**19**	**7.74**			
Transport							
Tra 01	Public Transport Accessibility		5	5	Public transport Accessibility Index (AI) calculated: for offices: AI of 2 (1 credit); 4 (2 credits); 8 (3 credits). AI is determined from the distance (m) from the main building entrance to the transport node (max 650m for a bus stop, 1000m for a rail station), transport type serving the node; and average number of services stopping each hour during the building's standard operating hours. Projects in Greater London can streamline documentation using an online public transport accessibility map (Map 2A.3 - PTAL from www.london.gov.uk).	Architect	The development has a very high PTAL rating and will achieve all of the available credits.
Tra 02	Proximity to Amenities		1	1	Location of project building within close proximity (measured along safe pedestrian routes) to amenities: office - 500m to selected amenities	Architect	All necessary amenities are located within a 500m walking distance.
Tra 03	Cyclist Facilities	Cycle Storage	1	1	Requirements for offices: 1 cycle store per 10 building occupants (staff) up to 500 users, then 1 space per 15 staff for 501-1000 users, then 1 space per 20 staff for 1001+ users. To be compliant, storage must: > be protected overhead from the weather > be set into/fixed to a permanent structure / contained within a locked structure with CCTV > allow appropriate distance between racks and from obstructions > located in a prominent location visible from an occupied building/a main building access > lit in compliance with the external or internal criteria of Hea 01 and controlled to avoid out-of-hours/daytime use. > in an easily accessible location, ideally within 50-100m of a building entrance.	Architect Electrical Engineer	Cycle storage provision has been included as part of the current design.
		Cyclist Facilities	1	1	Requirements for offices: 2 cycle facilities from choice of: showers / changing facilities & lockers / drying space. > one shower for every 10 cycle storage spaces, unisex or even male: female split. > changing facilities to include adequate space to hang /store clothing and equipment whilst showering/changing - e.g.. bench seats, hooks. > lockers must be ≥ cycle stores > WC/shower facilities do not count as changing facilities. > Drying space must be designed as such, and have adequate heating and ventilation. Use of a plant room is not compliant.	Architect	Changing and showering facilities for retail staff have been provided within the basement area.
Tra 05	Travel Plan		1	1	> A site-specific travel plan is developed at feasibility/design stage to consider all means of transport relevant to building users. Scope per requirements in Manual. > Travel plan includes package of measures used to steer the design to meet objectives and minimise car-based patterns. > Where appropriate, measures are included to reduce impacts of operational-related transport (deliveries, support services...etc) > Travel plan is to be implemented post construction by building management by final occupier / (in case of speculative development) supported by developer.	Client	A travel plan framework has been developed for planning and will be implemented for the development in operation.
	Transport Totals:		**9**	**9**			
	Transport score totals:		**8**	**8.00**			
Water							
Wat 01	Water Consumption		5	2	Efficiency of building's domestic water consuming components assessed in Wat 01 calculator. Credits assigned to savings over notional baseline: 12.5 / 25 / 40 / 50 / 55% improvement awarded 1-5 credits, 60% saving achieves exemplary level. Scope of typical office fixtures, together with baseline performance, are: WCs (6L per flush), urinals (10 L/bowl/hour for one fixture, 7.5 L/bowl/hour for two+), taps (washbasin 12 L/min, kitchen 12 L/min), and waste disposal unit 17L/min), showers (14 L/min), dishwashers (17 L/cycle domestic scale, 8L/rack commercial). See Manual for full details. > Greywater and/or rainwater systems can offset potable water use - yield (L/person/day) required for calculation. > Greywater systems must comply with BS8525-1:2010, rainwater systems with BS8515:2009.	Client Architect Public Health Engineer	The tenant will be required as part of their lease agreement to use low flow fixtures and fittings to achieve two credits.
Wat 02	Water Monitoring		1	1	> Water meters to be specified on each potable water supply to building (mains, borehole, private source). > Submeters / integral water monitoring equipment for plant or building areas attributable to >10% of the total water demand. > All water meters to have pulsed output to enable connection to a BMS for monitoring. > Connection to existing BMS, if applicable.	Public Health Engineer (Client)	Water meters will be provided for all retail units. The tenant will be required through their lease agreement to sub-meter should they have any major water consuming equipment.
Wat 03	Leak Detection	Leak Detection	1	1	> Leak detection system provided on mains water supply between building and mains water meter. > System must be audible when activated, triggered when the flow rate is above a setpoint for a pre-set time period, able to identify different flow/leakage rates, programmable to suit owner/occupiers water consumption criteria, designed to avoid false alarms by normal operation of large water-consuming plant.	Public Health Engineer	The tenant will be required to provide leak detection as part of their lease agreement.
		Sanitary Supply Shut-off	1	1	Flow control device fitted to each WC area/facility (albeit male/female facilities can be combined where these share block location) to prevent minor water leaks. Options are: a) time controller to auto shut-off after predetermined interval; b) programmed time controller; c) volume controller; d) presence detector and controller; e) central control unit.	Public Health Engineer	The tenant will be required to provide sanitary supply shut-off as part of their lease agreement.

ID	Issue	Credits	Available	Target	Summarised requirements	Responsibility	Comments
Wat 04	Water Efficient Equipment	Water Efficient Equipment	1	1	> Irrigation for internal and external planting/landscaping complies with one of the following: a) zoned, drip-feed subsurface irrigation, incorporating soil moisture sensors and rainstat to prevent operation during periods of rainfall; b) reclaimed water from rainwater/greywater system; c) external planting to suit local precipitation for all seasons; d) planting restricted to species that thrive in hot/dry climates; e) no dedicated mains-supplied irrigation - sole reliance on manual watering. > Where vehicle wash system is specified, use full or partial reclaim unit with at least one of the following: hydro-cyclone, sand/activated carbon filter, sump tank(s), three chamber interceptors, cartridge or bag filter.	Architect Public Health Engineer	External planting will not require irrigation with potable water.
Water Totals:			**9**	**6**			
Water score totals:			**6**	**4.00**			
Materials							
Mat 01	Life Cycle Impacts		6	2	Appraisal of building's life cycle impact through assessment of main building elements. For offices, these are: external walls, windows, roof, upper floor slab, floor finishes/coverings. Internal walls, structural frame, ground floor slabs, hard landscaping and foundations/substructure are explicitly excluded from the scope of Mat 01 assessment. Specifications can be appraised using a number of methods: a) generic data from the Green Guide Online b) product-specific Environmental Profiles Certification, found on Green Book Live c) provided through your Assessor, either using the Online Green Guide Calculator or through submission of a bespoke Green Guide Ratings from the BRE. Where a third party verified Environmental Product Declaration (EPD) exists for a specified product, a points uplift can be applied which improves that element's performance in the calculation. The Assessor inputs the project data to the Mat 01 Calculator to determine project performance.	Architect Structural Engineer (Contractor) Client	The materials selections will be developed further during detailed design. The current scoring is based on the base build materials but does not include a score for floor finishes which will be fitted out by the tenant.
Mat 02	Hard Landscaping and Boundary Protection		1	1	80% of all external hard landscaping and boundary protection to achieve A or A+ Green Guide rating. Retained existing hardscaping/boundary protection can be awarded A+ rating where <20% of the total area of these elements is subject to minor alteration/repair. Note: where no hardscaping or boundary protection exist, credit is awarded by default.	Landscape architect / Civil Engineer (hardscaping) Contractor	A or A+ rated materials will be targeted for the external hard landscaping.
Mat 03	Responsible Sourcing of Materials		3	1	Appraisal of the construction materials supply chain, through assessment of applicable building elements and materials. Scope includes: structural frame, ground floor, upper floors, roof, external walls, internal walls, foundation/substructure, fittings (e.g. staircase, windows, doors, floor finishes), hard landscaping. Within these elements, applicable materials focus on solid components - insulation, fixings, adhesives and additives are excluded. The Mat 03 calculator allows input of up to 4 key specifications under each element type, and awards credits depending on the Tier level of responsible sourcing achieved. At least 80% of materials under a building element must be responsibly sourced for that element to contribute to credit achievement. In addition, all timber must be sourced in accordance with the UK Government's Timber procurement policy (also Man 03 credit 4): see CPET www.cpet.org.uk.	Architect Landscape architect / Civil Engineer (hardscaping) Structural Engineer Contractor	The base build will target the following responsible sourcing measures for new materials: BES6001 certification for concrete CARES SRS certification for reinforcing steel FSC or PEFC certification for all timber
Mat 04	Insulation	Green Guide Rating	1	1	Same process as Mat 01, but purely for insulation materials. Examines both building fabric and building services insulation.	Architect Mechanical Engineer Contractor Client	All insulation materials within the base build will be A or A+ rated. The tenant will be required to follow this requirement in their fit-out.
		Responsible Sourcing	1	1	Same process as Mat 03, but purely for insulation materials. Examines both building fabric and building services insulation.	Architect Mechanical Engineer Contractor Client	Insulation materials in the base build will be responsibly sourced. The tenant will be required to follow this requirement in their fit-out.
Mat 05	Designing for Robustness		1	1	> Vulnerability analysis of design to identify internal and external areas of vehicular, trolley and concentrated pedestrian movement. > Incorporation of durability and protection measures to prevent damage to vulnerable parts of the building (e.g.. walls/doors from impact, high volume floor finishes from wear). Scope must include at minimum protection from: a) high pedestrian traffic in main entrances, public areas and circulation areas; b) internal vehicular/trolley movement within 1m of internal finishes in storage, delivery, corridor and kitchen areas; c) potential vehicular collision where parking occurs within 1m of the building facade or manoeuvring within 2m of delivery areas. Selected measures should balance the need for additional materials with the objective to protect elements to minimise replacement - the goal is material optimisation.	Architect	The base build architect has identified vulnerable areas of the building and will specify appropriate protection measures. The tenant will be required through the green lease to follow the same requirement for their fit-out.
Materials Totals:			**13**	**7**			
Materials score totals:			**12.5**	**6.73**			

ID	Issue	Credits	Available	Target	Summarised requirements	Responsibility	Comments
Waste							
Wst 01	Construction Waste Management	Construction Resource Efficiency	3	1	> Achievement of the following resource efficiency benchmarks for non hazardous construction waste (excluding demolition and excavation waste): 1) 13.3 m³ per 100m² gross internal floor area 2) 7.5 m³ per 100m² 3) 3.4 m³ per 100m² Exemplary) 1.6 m³ per 100m² > Where existing buildings will be demolished, a pre-demolition audit of existing buildings, structures or hard surfaces is completed to maximise reuse, refurbishment, and material recovery. The audit must identify a) key refurbishment/demolition materials; and b) potential applications and issues in reuse /recycling of these materials. > Development and implementation of a compliant Site Waste Management Plan (SWMP), defining targets, procedures, roles and responsibilities. Referencing the pre-demolition audit, if applicable.	Contractor	This requirement will be set out in the main construction contract.
		Diversion from Landfill	1	1	> Diversion of the following percentages of non hazardous construction, excavation and demolition waste: by volume: 70% construction waste, 80% demolition (1 credit); 85% for both construction and demolition waste (exemplary). by tonnage: 80% construction waste, 90% demolition (1 credit); 90/95% construction/demolition waste (exemplary). > On or off-site sorting of key waste groups - full list in Manual, page 278.	Contractor	This requirement will be set out in the main construction contract.
Wst 02	Recycled Aggregates		1	0	> Total amount of recycled/secondary aggregate is >25% of the total high-grade aggregate specified (by weight or volume). > Applications must meet minimum percentages of recycled content for the application to contribute to credit achievement: e.g., ≥25% for structural frame, floor slabs, concrete road surfaces and foundations, and ≥100% for gravel landscaping. For full list of applications, and minimum percentages for exemplary performance, see BREEAM Manual. > Aggregates are sourced on site, locally (within 30km radius of site) or from a non-construction pre- or post-consumer by-product source.	Structural Engineer	Secondary aggregate may be used but subject to further investigation at the detailed design stage.
Wst 03	Operational Waste		1	1	> Provision of dedicated space for the segregation and storage of operational recyclable waste volumes. The space must be clearly labelled, accessible (ideally within 20m of building entrance) and appropriately sized for the projected waste volumes. > Where sustained, high-volume streams of particular waste materials are anticipated, provision of static waste compactor/baler, organic waste vessel(s) alongside water outlet for clearing (can be on site composter or dedicated food waste bin for collection).	Architect	Appropriate waste storage space has been provided at basement level.
Waste Totals:			**6**	**3**			
Waste score totals:			**7.5**	**3.75**			
Land Use & Ecology							
LE 01	Site Selection	Previously Developed Land	1	1	At least 75% of the proposed development's footprint is on land previously developed for industrial/commercial/domestic use in the last 50 years	Architect	The current building was completed in the 1960s and there is a long history of the land being used prior to this. The credit will be achieved.
		Contaminated Land	1	0	> A Contaminated land specialist deems the site to be "significantly contaminated" in site investigation, risk assessment and appraisal, which details the degree, sources/types and remediation options. > Client and principle contractor confirms suggested remediation will be carried out.	Contaminated land specialist Client Contractor	The land is not contaminated therefore this credit can not be achieved.
LE 02	Ecological Value of Site and Protection of Ecological Features	Ecological Value of Site and Protection of Ecological Features	1	1	> Site designated as "land of low ecological value" using BREEAM checklist, or assessment report based on a site visit from a suitably qualified ecologist (SEQ). > All existing features of ecological value are protected from damage during activities on site. > Principle contractor is required to construct ecological protection prior to preliminary/preparatory site works.	Ecologist	An Ecologist has completed a Phase 1 habitat survey and has confirmed that the site has low ecological value. Surrounding trees which are to be retained will be protected during construction based on guidance from the Ecologist.
LE 03	Mitigating Ecological Impact	Mitigating Ecological Impact	2	2	A BREEAM Calculator is used to assess and quantify the ecological of the site pre- and post development, and credits awarded as follows: 1) change in ecological value is minimised, indicated by a score between -9 and 0. 2) site ecology is maintained or improved as a result of development, indicated by a score ≥0.	Client Architect Landscape Architect	The planting at ground level and on the terraces at levels 5 and 9 will increase species numbers on the site.
LE 04	Enhancing Site Ecology	Site Visit by SQE	1	1	> Suitably qualified ecologist (SEQ) appointed to report on enhancing and protecting site ecology, providing a report with appropriate recommendations that is based on a site visit/survey at the design brief stage. > General recommendations of the Ecology Report are implemented.	Ecologist	An SQE has carried out a phase 1 habitat survey and has made recommendations which will be incorporated into the landscape architect's design.
		Increase in Plant Species	2	2	First credit is achieved; plus: Through implementation of the ecologist's recommendations, credits are awarded for an increase of plant species on site as follows: 1) increase of <6 plant species 2) 6+ plant species introduced on site.	Ecologist	The number of plant species will increase by more than 6 as a result of the proposed planting.
LE 05	Long Term Impact on Biodiversity	Long Term Impact on Biodiversity	2	2	> Suitably qualified ecologist (SQE) appointed prior to start of works on site confirms compliance with all relevant UK and EU legislation during the design and construction process. > Site-specific landscape and habitat management plan is produced covering at least five years of the building in operation. Minimum scope of plan defined in Manual. PLUS; compliance with some* additional criteria - *SEQ to advise on how many apply and could potentially be targeted. a) Contractor biodiversity champion b) Contractor site training for workforce c) Records made of steps to protect or enhance site ecology, publically available where requested. d) Creation of new ecologically valuable habitat e) Scheduling of construction activities to minimise impact on existing habitats and species.	Ecologist Contractor	An SQE has been appointed and will provide guidance for the contractor to meet all of the relevant requirements.
Land Use & Ecology Totals:			**10**	**9**			

ID	Issue	Credits	Available	Target	Summarised requirements	Responsibility	Comments
Land Use & Ecology score totals:			10	9			
Pollution							
Pol 01	Impact of Refrigerants	Direct Effect of Refrigerants	3	0.5	3) No use of refrigerants in the following plant/systems: a) comfort cooling systems; b) cold storage, including chilled dispensers/display cabinets but excluding domestic white goods; and c) process-based cooling loads (e.g.. servers/IT equipment). OR ----- Up to three credits through a combination of the following: > Analysis of refrigerant life cycle impact in terms of CO_2 equivalent emissions. Credits are awarded using a BREEAM calculator that finds Direct Effect Life Cycle CO_2 equivalent emissions (DELC CO_{2e}): 1) 1000 kgCO_2/kW 2) 100 kgCO_2/kW OR 2) All installed air conditioning / refrigeration systems use refrigerants with a Global Warming Potential (GWP) of 10. PLUS (OPTIONAL) 1) Provision of a robust and tested refrigerant leak detection system that triggers shutoff and pump down. Systems detecting concentrations in air can only be used where the relevant equipment is housed in a moderately air tight enclosure / mechanically vented plant room, and the alarm threshold must be set at ≤ 2000 ppm. Alternatively, a leak detection system can be supplied that is not based on that principle of detecting concentrations in air.	Mechanical Engineer	The retail tenant guide will provide guidance on selecting refrigeration equipment that has DEL CO_{2e} equivalent emissions of 100kgCO_2/kW or less.
Pol 02	NOx Emissions		3	0	Normal operation of heating and cooling plant results in a dry NO_x emission level (measured at 0% excess O_2) of: offices: 1) 100 mg/kWh 2) 70 mg/kWh 3) 40 mg/kWh Note: Water heating remains outside scope of analysis for office projects.	Mechanical Engineer	The retail units are likely to require heat pumps for heating. These use grid electricity which has very high NOx therefore these credits will not be achieved.
Pol 03	Surface Water Run Off	Flood Risk	2	2	Two credits where: > Site located in a flood zone defined by planning/policy guidance (PPS25 for England) as having a low annual probability of flooding. > A site specific Flood Risk Assessment (FRA) confirms low risk of flooding from all sources: fluvial; tidal; surface water; groundwater; sewers; reservoirs. OR One credit where: > Site located in a flood zone defined by planning/policy guidance as having a medium/high probability of flooding but is outside the functional floodplain. > A site specific FRA confirms the development is sufficiently flood resilient > Building ground level and access to building and site are designed to be at least 600mm above design flood level.	Infrastructure / Civils	A flood risk statement has been prepared for the BREEAM assessment and confirms that the risk of flooding is low.
		Surface Water Run-off	2	2	Appropriate Consultant confirms the following: 1) Drainage measures of the new development reduce peak rate of run off to natural or municipal watercourses. Compliance must be demonstrated at 1 year and 100 year events, and include an allowance for climate change. 2) Property flooding will not occur in the event of local drainage system failure (see CIRIA C635:2006 Designing for exceedance in urban drainage); AND > post development run off volume over the development's lifetime is no greater than pre-development conditions > any additional run-off for the 100-year 6 hour event is contained on site using infiltration or other SUDs techniques. Where this cannot be met: > Justification from the appropriate consultant that the above criteria cannot be met. > Post development peak run-off rate reduced to a limiting discharge, defined as the highest of a) pre development 1-year peak flow rate; b) mean annual flow rate Qbar; c) 2 l/s/ha. > All calculations must include allowance for climate change in line with best practice guidance.	Infrastructure / Civils	Run-off rate will be reduced by 50% by use of a blue roof system.
		Minimising Watercourse Pollution	1	0	Appropriate Consultant confirms: > No discharge from the site for up to 5mm rainfall. > SuDS or source control systems where pollution risks are low. > Provision of oil/petrol separators in areas with high risk of contamination or spillage > Water pollution prevention measures designed per Pollution Prevention Guideline 3 / SuDS manual. Project team also confirms: > Provision of comprehensive site drainage plan for building/site occupants > Shut off valves for chemical/gas storage areas > Design and detailing of any external storage and delivery areas per Environmental Agency's recommendations in Pollution Prevention Pays guidance.	Infrastructure / Civils	It is not possible to infiltrate all rainfall up to 5mm on a site of this nature. All surface water runoff eventually is discharged to the sewer therefore this credit can not be achieved.
Pol 04	Reduction of Night Time Light Pollution		1	1	> External lighting strategy complies with Table 1 of ILE/ILP Guidance notes for the Reduction of Obtrusive Light, 2005 > External lighting can be automatically switched off 23:00-07:00. Security/safety lighting is exempt from automatic switching requirements, but must comply with the lower levels of ILE/ILP Table 1 values during these hours - e.g. automatic control to reduce input power by 23:00. > Where illuminated advertisements are specified, these must be designed in compliance with ILE Technical Report 5.	Architect Landscape Architect Electrical Engineer	External lighting provided by the developer will be compliant. Any external lighting or signage provided by tenants will need to comply with these requirements through the lease agreement.

ID	Issue	Credits	Available	Target	Summarised requirements	Responsibility	Comments
Pol 05	Noise Attenuation		1	1	> No noise sensitive areas or buildings are present within an 800m radius of the project. OR > A noise impact assessment in compliance with BS 7445:1991 / BS 4142:1997 is carried out by a suitably qualified acoustician to: a) measure existing background noise levels at the nearest or most exposed noise-sensitive development to the project; b) determine the rating noise level resulting from the new noise source. > The noise level from the proposed site/building is a difference no greater than +5dB 07:00-23:00hrs, and +3dB 23:00-07:00hrs compared to background noise levels. Where the proposed building introduces noise sources above these limits, measures are incorporated to attenuate noise at its source to a compliant level.	Acoustician (Client)	A noise impact assessment has been carried out and all plant provided by the developer or tenant will be required to comply with the noise limits.
Pollution Totals:			**13**	**6.5**			
Pollution score totals:			**10**	**5.00**			
Innovation							
Man 01	Sustainable Procurement		1	0	Commitment from FM to conduct min. 3 year post occupancy evaluation / ongoing calibration. > Collate occupant satisfaction, energy and water consumption quarterly, and report to BRE Global. > Set targets to reduce energy and water usage and monitor achievement. > Feedback "lessons learned" to project team.		Not targeted
Man 02	Responsible Construction Practices		1	0	CCS score of 36 or more.		Not targeted
Hea 01	Visual Comfort		1	0			Not targeted
Ene 01	Reduction of CO2 Emissions		5	0	First credit of Ene 04 is achieved, plus: > Specified local LZC reduces regulated CO2 emissions by 10% (2 credits); 20% (3 credits); or 30% (exemplary). OR: > Feasibility study includes LCA of the carbon impact of the selected LZC per ISO 14044:2006, assuming a 60 year building life span and any maintenance requirements. The resulting reduction in life cycle CO2 emissions is found to be 10% (3 credits) 20% (4 credits) or 30% (exemplary).		Not targeted
Ene 04	Low or Zero Carbon Technologies		1	0	Inclusion of LZC technology resulting in a 60 year life cycle CO_2 emission reduction of 30%.		Not targeted
Wat 01	Water Consumption		1	0	Innovation point for high savings in potable water over baseline, plus >95% of WC/urinal flushing met using recycled non-potable water.		Not targeted
Mat 01	Life Cycle Impacts		1	0			Not targeted
Mat 03	Responsible Sourcing of Materials		1	0			Not targeted
Wst 01	Construction Waste Management		1	0	> Exemplary resource efficiency benchmark for non hazardous construction waste (excluding demolition and excavation waste) met: 1.6 m^3 per $100m^2$ > Exemplary benchmark for waste diversion met: by volume: 85% for both construction and demolition waste by volume / 90/95% construction/demolition waste (exemplary). > All key waste groups identified for diversion from landfill in pre-construction stage SWMP.		Not targeted
Wst 02	Recycled Aggregates		1	0	> Recycled/secondary aggregate comprising at least 35% of total high-grade aggregate specified (by weight or volume). > Applications must meet exemplary level minimum percentages of recycled content for the application to contribute to credit achievement: e.g.. ≥50% for structural frame, floor slabs, concrete road surfaces and foundations, and ≥100% for pipe bedding and high-grade granular fill. For full list of applications, and minimum percentages for exemplary performance, see BREEAM Manual.		Not targeted
Innovation Totals:			**14**	**0**			
Innovation score totals:			**14**	**0**			
OVERALL SCORE TOTALS:			**114**	**59.45**			
Total potential score:							

Appendix D

Code for Sustainable Homes Pre-Assessment

Code for Sustainable Homes 2010 Pre-Assessment

Margaret Hamilton, CSH Assessor

Issue ID	Description	Available Credits	Mandatory Element	Targeted	Responsibility	Comments
Energy and Carbon Dioxide Emissions				**Weighted credit value (%)**		
Ene 1	Dwelling Emissions Rate	10	✓	3	Mechanical Engineer	In order to achieve Code Level 4, carbon dioxide emissions must be 25% below Part L 2010. The Energy Strategy shows that emissions will be 27.4% better than Part L 2010 which meets this requirement and achieves three credits.
Ene 2	Building Fabric	9	✓	9	Mechanical Engineer	The current energy modelling shows that the average FEE for the dwellings is 30.4kWh/m^2/yr which achieves 9 credits.
Ene 3	Energy Display Devices	2	×	2	Mechanical Engineer	It is currently proposed to provide smart meters for heating and electricity in each flat. The device will display the following features: • Local Time • Current mains energy consumption (kilowatts and kilowatt hours) • Current emissions (g/kg CO2) • Current tariff • Current cost (in pounds and pence). For pre-payment customers this should be 'real time' data and for 'credit' paying customers cost should be displayed on a monthly basis • Display accurate account balance information (amount in credit or debit) • Visual presentation of data (i.e. non-numeric) to allow consumers to easily identify high and low level of usage • Historical consumption data so that consumers can compare their current and previous usage in a meaningful way. This should include cumulative consumption data in any of the following forms day/week/month/billing period.
Ene 4	Drying Space	1	×	1	Architect	It is currently proposed that this credit will be achieved by providing a drying line of an appropriate length above the bath in each dwelling. The MVHR system will deliver appropriate extract ventilation in the relevant bathroom (minimum 13l/s.)
Ene 5	Energy Labelled White Goods	2	×	2	Client	A+ rated fridges, freezers, washing machines and dishwashers will be provided within the dwellings.
Ene 6	External Lighting	2	×	2	Electrical Engineer	External lighting will meet the wattage, efficacy and controls requirements set out under this issue.
Ene 7	Low or Zero Carbon Technologies	2	×	0	Mechanical Engineer	A renewables feasibility study has been prepared. The saving from renewable energy technologies that can be achieved is 9.1% for the residential element of the scheme. This is less than the 10% required to achieve credits.
Ene 8	Cycle Storage	2	×	2	Architect	Secure cycle storage space has been provided for residents at basement level. Numbers have been calculated to achieve two credits.
Ene 9	Home Office	1	×	1	Architect	Appropriate space has been allowed within the apartments for a home office. During detailed design, the daylight factor in each home office room will be checked for compliance with the Code requirement for this issue.
Score		**31**		22		
Weighted score				25.83		
Water				**Weighted credit value (%)**		
Wat 1	Indoor Water Use	5	✓	3	Architect/ (for fittings)/PH Engineer (calculations and RWH)	There is a mandatory requirement for Code Level 4 dwellings to have water use of 105 litres per person per day or less (3 credits). Currently this can be achieved using efficient fittings.
Wat 2	External Water Use	1	×	0	PH Engineer	It is currently not proposed to collect rainwater for residential irrigation purposes.
Score		**6**		3		
Weighted score				4.50		

Materials				**Weighted credit value (%)**		
Mat 1	Environmental Impact of Materials	15	✓	9	Architect	Materials selection will be developed during detailed design. The current target score is based on previous experience of similar buildings.
Mat 2	Responsible Sourcing of Materials: Basic Building Elements	6	×	2	Architect/Structural Engineer	Materials selection will be developed during detailed design. The current target score is based on previous experience of similar buildings.
Mat 3	Responsible Sourcing of Materials: Finishing Elements	3	×	1	Architect	Materials selection will be developed during detailed design. The current target score is based on previous experience of similar buildings.
Score		**24**		12		
Weighted score				3.60		
Surface Water Run-off				**Weighted credit value (%)**		
Sur 1	Management of surface water run-off from developments	2	✓	1	Civil Engineer	The impermeable area of the site will decrease as a result of the development. Surface water run-off will be reduced by half. It will not, however, be possible to infiltrate the first 5mm of rainfall on the site as required for the second credit.
Sur 2	Flood Risk	2	×	2	Civil Engineer	A flood risk statement has been prepared which confirms that the risk of flooding is low and that 2 credits can be achieved.
Score		**4**		3		
Weighted score				1.65		
Waste				**Weighted credit value (%)**		
Was 1	Storage of non-recyclable waste and recyclable household waste	4	✓	4	Architect	Appropriate external bin storage has been provided for residents. Fitted internal storage bins will also be provided within the kitchen in line with the requirements for the local authority's collection scheme.
Was 2	Construction Site Waste Management	3	✓	2	Client	The contractor will be required to divert at least 85% of waste from landfill.
Was 3	Composting	1	×	1	Architect	Camden have a food waste collection scheme for estates. Appropriate space has been allowed within the development.
Score		**8**		7		
Weighted score				5.60		
Pollution				**Weighted credit value (%)**		
Pol 1	Global Warming Potential (GWP) of insulants	1	×	1	Architect	All insulation and blowing agents used in insulation manufacture will have a global warming potential less than five and an ozone depletion potential of zero.
Pol 2	NOx Emissions	3	×	3	Mechanical Engineer	Gas boilers with NOx emissions of less than 40mg/kWh will be selected for the communal heating system.
Score		**4**		4		
Weighted score				2.80		
Health and Wellbeing				**Weighted credit value (%)**		
Hea 1	Daylighting	3	×	0	Architect	The number of credits achieved for this issue will vary between apartments. Full daylight analysis will be carried out during detailed design to confirm the score achieved. Currently no score is assumed as a worst case scenario.
Hea 2	Sound Insulation	4	×	3	Acoustician	'Mayor's Preferred Standard' from the Mayor of London's Sustainable Development guidance is for 3 credits. This will be targeted and pre-completion testing will be carried out to confirm this is achieved.
Hea 3	Private Space	1	×	1	Architect	All flats are provided with private space as part of the development.
Hea 4	Lifetime Homes	4	✓(6*)	4	Architect	Lifetime homes will be achieved in all dwellings.
Score		**12**		8		
Weighted score				9.33		

Management				Weighted credit value (%)		
Man 1	Home User Guide	3	×	3	Client	Home User Guide will be provided to all dwellings.
Man 2	Considerate Constructors Scheme	2	×	2	Client	Requirements will be included in project preliminaries.
Man 3	Construction Site Impacts	2	×	2	Client	Requirements will be included in project preliminaries.
Man 4	Security	2	×	2	Architect	The architectural liaison officer has been consulted and their recommendations will be incorporated during the detailed design phase.
Score		**9**		9		
Weighted score				10.00		
Ecology				**Weighted credit value (%)**		
Eco 1	Ecological Value of Site	1	×	1	Ecologist	A phase 1 habitat survey has been carried out and has confirmed that the site is currently of low ecological value.
Eco 2	Ecological Enhancement	1	×	1	Ecologist/Landscape Architect	The Ecologist has made recommedations for the enhancement of the site which are being incorporated into the landscape architect's strategy.
Eco 3	Protection of Ecological Features	1	×	1	Client	The contractor will be required to construct appropriate protection of surrounding trees. The Ecologist has confirmed that there are no other features requiring protection beyond statutory requirements.
Eco 4	Change in Ecological Value of Site	4	×	2	Ecologist/Landscape Architect	The Ecologist has made recommedations for the enhancement of the site which are being incorporated into the landscape architect's strategy.
Eco 5	Building Footprint	2	×	2	Architect	Based on net internal floor area to net internal ground floor area, two credits will be achieved.
Score		**9**		7		
Weighted score				9.33		
Total						
				72.65		

Total % Score	Code Level
36	Level 1 (*)
48	Level 2 (**)
57	Level 3 (***)
68	Level 4 (****)
84	Level 5 (*****)
90	Level 6 (******)