PRICE & MYERS

BREEAM®

Heath Road, Twickenham

BREEAM 2014 'Shell Only' Pre-Assessment Report

Job No:	25498
Report:	v1
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STRUCTURES GEOMETRICS SUSTAINABILITY INFRASTRUC

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Executive Summary

Price & Myers has been commissioned by Eden Luxe Ltd to carry out a Preliminary BREEAM (BRE Environmental Assessment Method) 2014 New Construction assessment for the proposed development of 149-151 Heath Road, Twickenham.

This report demonstrates demonstrates that an Excellent rating can be achieved, with a score of 73.38%, based on the credits targeted by the design team.

The score provides a comfortable buffer above the 70% threshold for an Excellent rating.

It is key for the design team to remain in contact with the assessor throughout the process and to check that all specifications are in line with the pre-assessment to ensure the required level is achieved upon construction. In order to sign off the planning condition, a Design Stage and Post Construction Stage assessment will be required and the reports submitted to the BRE for certification.

1. Introduction

Price & Myers has been commissioned by Eden Luxe Ltd to carry out a Preliminary BREEAM (BRE Environmental Assessment Method) 2014 New Construction assessment for the proposed development of 149-151 Heath Road, Twickenham.

The assessment is being assessed under the 'shell only' criteria as the developer's scope of works covers new build works to the fabric, sub and superstructure of the building only, including:
- External walls, windows, doors (external), roof, core internal walls, structural floors
- Hard and soft landscaping areas (where present and within scope of works)

The development involves the construction of a block of flats with two small commercial units at ground level. The BREEAM assessment applies to the the commercial units only.

There is a planning requirement that they achieve BREEAM Excellent.

This report comprises a pre-assessment of the development against the BREEAM 2014 scheme and concludes the preliminary BREEAM score and rating that the development can achieve based on the individual credits targeted by the design team.

The results presented are indicative only of the potential performance achievable for the assessed building. The results do not represent a formal certified BREEAM assessment or rating and must not be communicated as such.

2. BREEAM 2014 New Construction 'Shell Only'

BREEAM 2014 is an environmental performance standard against which new, non-domestic buildings in the UK can be assessed, rated and certified.

The primary aim of the scheme is to improve the environmental performance of non-domestic buildings in a robust and cost effective manner. The performance of the building on the scheme is quantified by a number of individual measures and associated criteria stretching across a range of environmental issues, categorised into the following sections:

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

BREEAM Scoring

Within each of the BREEAM categories outlined above, there are a number of credit requirements that reflect the options available to designers and managers of buildings.

An environmental weighting is applied to the scores achieved under each category, illustrated in Section 3, in order to calculate the final BREEAM score. The weighting factors have been derived from consensus based research with various groups such as government, material suppliers and lobbyists. This research was carried out by BRE to establish the relative importance of each environmental issue.

The current rating benchmarks for the BREEAM 2014 scheme are detailed in the table below:

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

Table 2.1 - BREEAM 2014 rating benchmarks

Minimum Standards

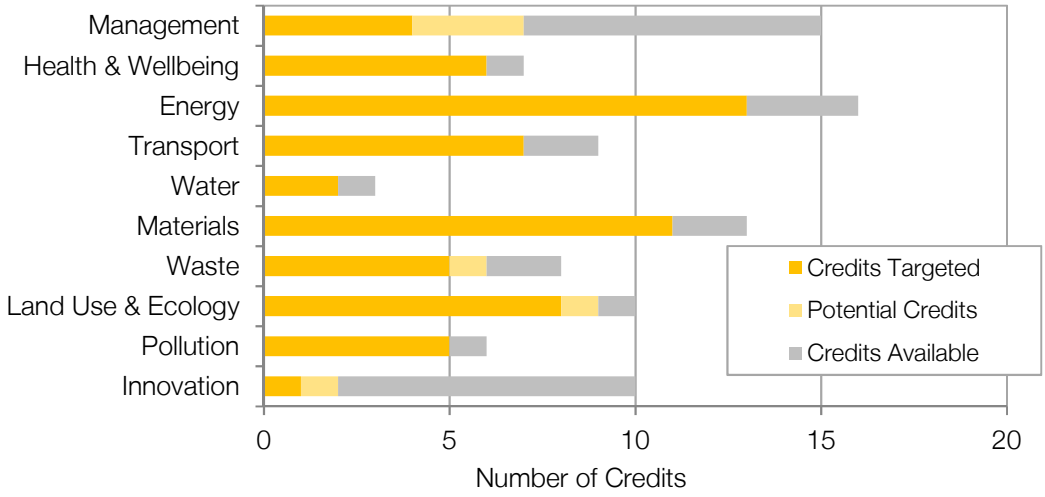
In order to achieve particular benchmark scores, there is a minimum performance requirement within the BREEAM schemes. The minimum performance requirements are detailed in the table below and a project cannot achieve a particular rating unless the minimum requirements have been met, irrespective of the overall percentage score.

BREEAM Credit	Minimum Standards by Rating Level				
	Pass	Good	Very Good	Excellent	Outstanding
Man 03: Responsible Construction Practices	Criterion 1 only	Criterion 1 only	Criterion 1 only	Criterion 1	Criterion 1
Man 03: Responsible Construction Practices	-	-	-	1 Credit (Considerate Construction)	2 Credits (Considerate Construction)
Ene 01: Reduction of Energy Use and Carbon Emissions	-	-	-	6 Credits	10 Credits
Wat 02: Water Monitoring	-	Criterion 1 only	Criterion 1 only	Criterion 1 only	Criterion 1 only
Mat 03: Responsible Sourcing	Criterion 1 only	Criterion 1 only	Criterion 1 only	Criterion 1 only	Criterion 1 only
Wst 01: Construction Waste Management	-	-	-	-	1 Credit
Wst 03: Operational Waste	-	-	-	1 Credit	1 Credit

Table 2.2 - Minimum BREEAM New Construction 2014 standards

3. Score Summary

The potential BREEAM score of the development has been determined based on discussions with the design team and is currently expected to achieve the following:



BREEAM Section	Credits Available	Credits Targeted	% of Credits Achieved	Section Weighting	Section Score
Management	15	4	26.7%	13%	3.33
Health & Wellbeing	7	6	85.7%	10%	8.57
Energy	16	13	81.3%	15%	11.78
Transport	9	7	77.8%	12%	8.94
Water	3	2	66.7%	4%	2.67
Materials	13	11	84.6%	17.5%	14.81
Waste	8	5	62.5%	11.0%	6.88
Land Use & Ecology	10	8	80.0%	13%	10.40
Pollution	6	5	83.3%	6%	5.00
Innovation	10	1	10.0%	10%	1.00
Target BREEAM Score			**73.38**		
Target BREEAM Rating			**Excellent**		
Potential BREEAM Score			79.55		
Potential BREEAM Rating			Excellent		

Minimum BREEAM Standards					
Rating Level	Pass	Good	Very Good	Excellent	Outstanding
Min Standards Achieved	Yes	Yes	Yes	Yes	Yes

This report demonstrates that the development has met all of the minimum standards and can achieve a Excellent rating on the BREEAM 2014 scheme.

4. Pre-assessment Credit Summary

The following section details the BREEAM credits assessed under the scheme and whether they will be targeted for the development.

Management				
Criteria	**Available Score**	**Status**	**Target Score**	**Pre-Assessment Stage Assumptions**
Man 01 Project Brief and Design				
Prior to completion of Concept Design: project delivery stakeholders meet to set out compliant roles and responsibilities established in accordance with details in Appendix A1	0.83	Not Achievable	0.00	The design team have met from Stage B to identify and define their roles, responsibilities and contributions for each of the key phases of project delivery, however not all relevant parties or topics were involved.
Prior to completion of Concept Design; third party consultation activities undertaken in line with requirements in Appendix A1	0.83	Not Achievable	0.00	Third party consultation has not been carried out.
BREEAM AP appointed at or before RIBA Stage 1 and a target rating contractually agreed before RIBA Stage 2. To achieve the credit at the Design Stage Assessment the agreed performance targets must be demonstrably achieved by the project design and demonstrated via the BREEAM Assessor's Design Stage report.	0.83	Not Achievable	0.00	A BREEAM AP from Price & Myers has been involved in early design team meetings but not before Stage 1.
BREEAM AP involved and reports on progress through RIBA Stages 2 to 4. The BREEAM AP will monitor against agreed targets throughout the design process and formally report the progress. The previous credit must be achieved to receive this credit.	0.83	Not Achievable	0.00	
Man 02 Life Cycle Cost and Service Life Planning				
A Concept Design stage elemental LCC analysis commissioned in line with requirements in Appendix A2	0.83	Not Achievable	0.00	These credits are not being targeted due to the cost of carrying out a compliant LCC analysis.
	0.83	Not Achievable	0.00	
A component level LCC plan has been developed including all component types to be installed by the developer by the end RIBA Stage 4 in line with requirements in Appendix A2	0.83	Not Achievable	0.00	
The capital cost of the building will be reported in £k/m2 via the BREEAM Assessment Scoring and Reporting tool	0.83	Targeted	0.83	The capital cost of the project will be reported.
Man 03 Responsible Construction Practices				
All timber and timber based products used on the project are FSC compliant		Targeted		All timber will be responsibly sourced
The Principle Contractor operates an environmental management system (EMS) covering their main operations and implement best practice pollution prevention policies (air & water pollution). The EMS must meet the criteria stated in Appendix A3	0.83	Potential	0.00	It is not currently certain whether the contractor will hve an EMS as this is a small project.
BREEAM AP monitors and reports progress through RIBA Stages 5 to 6	0.83	Potential	0.00	A BREEAM AP may be appointed for the construction stages.
CCS Score 25 - 34 (score of 5 in each section)	0.83	Targeted	0.83	The contractor will be expected to achieve at least 35 points on the new CCS scheme (with a score of at least 7 in each of the 5 sections).
CCS Score 35 - 39 (score of 7 in each section)	0.83	Targeted	0.83	
Site energy and water consumption recorded / monitored See Appendix A3 for details of the requirements.	0.83	Targeted	0.83	All site energy, water and possibly transport of materials and waste shall be /monitored and reported. The principal contractor will be expected to carry out these site activities during the construction stages of the project.
Transport of construction materials and waste metered / monitored See Appendix A3 for details of the requirements.	0.83	Potential	0.00	

Man 04 Commissioning and Handover				
Thermographic survey conducted and any defects must be rectified. See Appendix A4 for details	0.83	Not Achievable	0.00	This credit will not be targeted due to the high cost of compliance. It could be targeted later on if additional credits were required.

Health & Wellbeing				
Criteria	**Available Score**	**Status**	**Target Score**	**Pre-Assessment Stage Assumptions**
Hea 01 Visual Comfort				
Daylighting Should be met following either option A. or B. A. 2% daylight factor AND either (a) OR {(b) and (c)} (a) Uniformity ratio of 0.3 or point daylight factor of 0.3 times the relevant average daylight factor Uniformity ratio of 0.7 or point daylight factor of 0.3 times the relevant average daylight factor where the spaces with glazed roofs, atria (b) View of the sky from desk height AND room depth criterion satisfied (c) The room depth criterion d/w + d/HW < 2/(1-RB)is satisfied B. Minimum 80% of the relevant building areas meet 300 lux of Average daylight illuminance and 90 lux of Minimum daylight illuminance for 2000 hours per year or more	1.43	Targeted	1.43	These are small units and are not deep plan so this is expected to be acheivable.
View Out 95% of floor area in the relevant buildings is within 7m of a wall which has a window or permanent opening that provides an adequate view out. See Appendix B1.	1.43	Targeted	1.43	There will be a view out in occupied rooms to a landscape or buildings ≥10m away (rather than just the sky) at seated eye level (1.2 – 1.3m). The window will be ≥20% of the wall area.
All external lighting located within the construction zone is designed to provide illuminance levels that enable users to perform outdoor visual tasks efficiently and accurately, especially during the night. To demonstrate this, external lighting provided is specified in accordance with BS 5489-1:2013 Lighting of roads and public amenity areas and BS EN 12464-2:2014 Light and lighting - Lighting of work places - Part 2: Outdoor work places.	1.43	Targeted	1.43	External lighting will be compliant
Hea 02 Indoor Air Quality				
Building has potential to be naturally ventilated - 5% openable window areas and two levels of user controls. This can be achieved for mechanically ventilated buildings provided the windows could be openable in the future (i.e. not fixed panes)	1.43	Not Achievable	0.00	All occupied spaces have an openable window (openable area is at least 5% of the NIFA for the room). Alternatively compliance can be achieved if recommendations from CIBSE AM10 are met.
Hea 05 Acoustic Performance				
Indoor ambient noise levels comply with the design ranges given in BS 8233: 2014 unless otherwise stated below. Where the room types below are present, the appropriate criteria for ambient noise levels, sound insulation and acoustic privacy must also be achieved.	1.43	Targeted	1.43	An acoustician will be appointed to ensure Indoor ambient noise levels comply with the relevant criteria and All relevant rooms will be designed to meet the British Standards, as per the Acoustician's report. Pre-completion testing will be carried out to ensure that the relevant spaces (as built) achieve the required performance standards. Remedial works carried out prior to handover and occupation if standards are not met.
Hea 06 Safety and Security				
Safe access for pedestrians and cyclists in line with requirements in Appendix B5	1.43	Targeted	1.43	There will be dedicated pedestrian and cycle lanes with direct access from the site entrance(s) to building entrance and any cycle storage facilities respectively.
A Suitably Qualified Security Specialist (SQSS) conducts an evidence-based Security Needs Assessment (SNA) during or prior to Concept Design (RIBA Stage 2 or equivalent). They produce a set of recommendations and solutions to ensure the design of the development is planned, designed and specified to address the issues identified in the preceding SNA.	1.43	Targeted	1.43	The design team will consult with a SQSS and implement all recommendations made.

Energy				
Criteria	**Available Score**	**Status**	**Target Score**	**Pre-Assessment Stage Assumptions**
Ene 01 Reduction of Energy Use and Carbon Emissions				
Energy Performance Ratio for New Constructions (EPR_{NC}) (Based the EPRNC achieved):				The BRUKL shows that an EPR above 0.75 will be achieved.
0.075	0.91	Targeted	0.91	
0.150	0.91	Targeted	0.91	
0.225	0.91	Targeted	0.91	
0.30	0.91	Targeted	0.91	
0.375	0.91	Targeted	0.91	
0.45	0.91	Targeted	0.91	
0.525	0.91	Targeted	0.91	
0.600	0.91	Targeted	0.91	
0.675	0.91	Targeted	0.91	
0.750	0.91	Targeted	0.91	
0.825	0.91	Not Achievable	0.00	
0.90	0.91	Not Achievable	0.00	
Ene 03 External Lighting				
The building has been designed to operate without the need for any external lighting Or Specification of energy-efficient light fittings for external areas (in line with Appendix C2), controlled through a time switch, or daylight sensor, to prevent operation during daylight hours	0.91	Targeted	0.91	The average initial luminous efficacy of the external light fittings within the construction zone will be not less than 60 luminaire lumens per circuit Watt. All external light fittings will be automatically controlled for prevention of operation during daylight hours and presence detection in areas of intermittent pedestrian traffic.
Ene 04 Low Carbon Design				
Analysis of the proposed building design/development before RIBA Stage 2 is undertaken to identify opportunities for passive design solutions. BREEAM issue Hea 04 Thermal Comfort has to have been achieved. See Appendix C3.	0.91	Targeted	0.91	The building will use passive design measures to reduce the total heating, cooling, mechanical ventilation and lighting loads and energy consumption in line with the findings of the passive design analysis which demonstrates a meaningful reduction in the total energy demand as a result.
The building utilises a free cooling strategy and the first credit within the BREEAM issue Ene 04 Passive Design Analysis has been achieved	0.91	Not Achievable	0.00	This is not achievable.
Feasibility study carried out as part of the shell only design, based on the expected building use and loads specified in the design brief or, where these are not specified, for likely scenarios. and implemented, covering points listed in Appendix C3 before RIBA Stage 2 The feasibility study shows that a meaningful reduction in regulated CO2 in line with the requirements of Appendix C3	0.91	Targeted	0.91	An LZC will be carried out and the findings implemented.

Transport				
Criteria	**Available Score**	**Status**	**Target Score**	**Pre-Assessment Stage Assumptions**
Tra 01 Public Transport Accessibility				
Credits are awarded based on the public transport Accessibility Index (AI). The AI is determined by the information in the BREEAM Tra 01 calculator.	1.28	Targeted	1.28	The Transport for London PTAL (relating to access to public transport) shows an Accessibility Index of 15.05 for the site, which equates to 3 credits being achieved.
	1.28	Targeted	1.28	
	1.28	Targeted	1.28	
Tra 02 Proximity to Amenities				
Encourage and reward a building that is located in close proximity to local amenities, thereby reducing the need for extended travel or multiple trips	1.28	Targeted	1.28	The development is located within 500 metres of a food shop, post box and cash machine.
Tra 03 Cyclist Facilities				
Adequate provision of compliant cycle storage cyclist facilities See Appendix D2 for full requirements	1.28	Not Achievable	0.00	No cycle storage is provided for the commercial
At least two of the following cyclist facilities have been provided: - Showers - Changing facilities & lockers - Drying spaces The first credit in BREEAM Issue Tra 03 Cyclist Facilities has been achieved	1.28	Not Achievable	0.00	This credit cannot be achieved as no cycle storage is provided.

Tra 04 Maximum Car Parking Capacity				
Building's car parking capacity is compared to the maximum car parking capacity permitted according to the BREEAM benchmarks	1.28	Targeted	1.28	No parking is provided for the commercial
	1.28	Targeted	1.28	
Tra 05 Travel Plan				
Compliant travel plan developed at feasibility stage and implemented. See Appendix D2 for full details	1.28	Targeted	1.28	A BREEAM compliant travel plan will be developed.

Water				
Criteria	**Available Score**	**Status**	**Target Score**	**Pre-Assessment Stage Assumptions**
Wat 02 Water Monitoring				
The specification of a water meter on the mains water supply to each building		Targeted		A meter will be specified on the mains incoming water supply to the building and this will be fitted with a pulsed output to enable connection to a BMS.
The specification of a water meter on the mains water supply to each building. AND Each meter (main and sub) has a pulsed output to enable connection to a Building Management System (BMS) and if there is an existing BMS any new build must be connected to the existing BMS	1.33	Targeted	1.33	All meters to be labelled and pulsed to allow connection to a BMS.
Wat 03 Water Leak Detection				
A leak detection system capable of detecting major leaks on the water supply has been installed. The system must cover all mains water supply between and within the building and the site boundary. See Appendix E1 for details of requirements	1.33	Not Achievable	0.00	No leak detection will be installed.

Materials				
Criteria	**Available Score**	**Status**	**Target Score**	**Pre-Assessment Stage Assumptions**
Mat 01 Life Cycle Impact				
Credits are awarded where robust environmental performance information has been collected for newly specified materials or where materials are retained in situ. Performance of new materials is based on the Green Guide to Specification ratings of the assessed elements. The score is calculated using a BREEAM calculation methodology	1.35	Targeted	1.35	The following materials and build-ups are being considered: - External walls - Cladding - Windows - Aluminium - Roof - Concrete - Upper floor slab - Concrete
	1.35	Targeted	1.35	
	1.35	Targeted	1.35	
	1.35	Targeted	1.35	
	1.35	Not Achievable	0.00	
Mat 02 Hard Landscaping & Boundary Protection				
At least 80% of all external hard landscaping and boundary protection (by area) achieves an A or A+ rating in the Green Guide to Specification	1.35	Targeted	1.35	At least 80% of materials for external hard landscaping (including the sub-base) and boundary protection will be specified to achieve an A or A+ Green Guide rating.
Mat 03 Responsible Sourcing of Materials				
All timber and timber based products used are 'legally harvested and traded'		Targeted		All timber used on site will be responsibly and legally sourced. The appointed contractor must be responsible for establishing a sustainable procurement plan and ensuring that materials for major building elements are responsibly sourced (i.e. FSC timber, BES6001 etc) to achieve at least 3 credits.
All materials for the project are sourced in accordance with a documented sustainable procurement plan	1.35	Targeted	1.35	
Construction materials are responsibly sourced in line with requirements in Appendix F1. Responsible sourcing tier level % of available points achieved - 18%	1.35	Targeted	1.35	
Responsible sourcing tier level % of available points achieved - 36%	1.35	Targeted	1.35	
Responsible sourcing tier level % of available points achieved - 54%	1.35	Not Achievable	0.00	

Mat 04 Insulation				
The (BREEAM) Insulation Index for new insulation is ≥2.5 based on the Green Guide rating and thermal performance for insulation within: - External walls - Ground floor - Roof - Building services AND The Insulation Index for the building fabric and services insulations is the same as or greater than 2.5.	1.35	Targeted	1.35	Insulation will be specified to achieve a sufficient score based on the Green Guide rating for the products.
Mat 05 Design for Durability and Resilience				
The design incorporates suitable durability and protection measures or design features/solutions to prevent damage to the vulnerable parts of the internal and external building and landscaping elements as follows: - Protection against, or prevention from, any potential vehicular collision (within 1m of the external building façade for car parking areas and 2m for delivery areas) AND The relevant building elements incorporate design and specification measures to limit material degradation due to environmental factors. See Appendix F2 for methodology of assessment.	1.35	Targeted	1.35	Appropriate design for robustness will be included within the design and specification of materials and fittings. If relevant, bollards will be provided in car parking/drop-off areas to prevent damage to external walls.
Mat 06 Material Efficiency				
Opportunities and appropriate measures have been identified, investigated and implemented, to optimise the use of materials in building design, procurement, construction, maintenance and end of life across RIBA Stages 1-5. This could include using fewer materials, reusing existing demolition/strip-out materials, procuring materials with higher levels of recycled content. It may also include the adoption of alternative means of design/construction that result in lower materials usage and lower wastage levels including off-site manufacture and use of pre-assembled service pods.	1.35	Targeted	1.35	Opportunities will be identified and assessed at all stages in order to maximise the material efficiency of the project.

Waste				
Criteria	**Available Score**	**Status**	**Target Score**	**Pre-Assessment Stage Assumptions**
Wst 01 Construction Waste Management				
A Resource Management Plan (RMP) is developed and the amount of waste generated per 100m2 = 13.3m3 / 11.1 tonnes	1.38	Targeted	1.38	A compliant RMP will be developed and the main contractor will be expected to ensure construction waste does not exceed 13.3m3 / 11.1 tonnes per 100m2 floor space. They will also be expected to divert waste from landfill to achieve the last credit. Further review will be required once the contractor is appointed and final details of the landscaping are confirmed.
Amount of waste generated per 100m2 = 7.5m3 / 6.5 tonnes	1.38	Potential	0.00	
Amount of waste generated per 100m2 = 3.4m3 / 3.2 tonnes	1.38	Not Achievable	0.00	
Waste diverted from landfill - Non-demolition 70 / 80% or demolition 80 / 90%	1.38	Targeted	1.38	
Wst 02 Recycled Aggregates				
The total amount of recycled and/or secondary aggregate specified is >25% (by weight or volume) of the total high-grade aggregate specified for the development. See Appendix G1 for full details	1.38	Not Achievable	0.00	This is not targeted.
Wst 03 Operational Waste				
Provision of labelled dedicated storage facilities for a building's operational-related recyclable waste Appropriate capacity to the building type, size and number of units (if relevant and predicted volumes of waste. Sized either to meet known waste or 2m2 (4m2 if catering provided) for every 1000m2 of floor area Where significant food waste is produced, composting facilities are provided and where significant packaging waste, a compactor/baler is provided	1.38	Targeted	1.38	There is 110m2 of new build space. Therefore an 2m2 space will be provided for the storage of recyclable waste.
Wst 05 Adaptation to Climate Change				
A Climate Change Adaptation Strategy Appraisal for the structural and fabric resilience will be undertaken by the end of Concept Design (RIBA Stage 2 or equivalent). Carry out a systematic (structural and fabric resilience specific) risk assessment to evaluate the impact on the building over its projected life cycle from expected extreme weather conditions arising from climate change and, where feasible, mitigate against these impacts. See Appendix G2 for details.	1.38	Targeted	1.38	A climate change adaptation strategy will not be developed. A Climate Change Adaptation Strategy Appraisal for structural and fabric resilience shall be undertaken by the end of Concept Design. A systematic (structural and farbic resilience specific) risk assessment to identify and evaluate the impact on the building over its projected life cycle from expected extreme weather conditions arising from the climate change and, where feasible, mitigate against these impacts
Wst 06 Functional Adaptability				
A building-specific functional adaptation strategy study has been undertaken by Concept Design (RIBA Stage 2 or equivalent). This could include: Potential for major refurbishment including replacing facade / major plant, change in working practices, change in use and accessibility to data infrastructure. AND Functional adaptation measures have been adopted in the design by Technical Design (RIBA Stage 4). See Appendix G3 for details.	1.38	Targeted	1.38	A functional adaptation strategy will be developed by the Concept Design stage. This will include recommendations for measures to be incorporated to facilitate future adaptation. The functional adaptation measures will be adopted in the design by the Technical Design stage in accordance with the functional adaptation strategy recommendations, where practical and cost effective.

Land Use & Ecology				
Criteria	**Available Score**	**Status**	**Target Score**	**Pre-Assessment Stage Assumptions**
LE 01 Site Selection				
At least 75% of the proposed development's footprint is on an area of land which has previously been developed for use	1.30	Targeted	1.30	At least 75% of the proposed development's footprint is on land with was previously developed.
The site is deemed to be significantly contaminated and will be remediated	1.30	Not Achievable	0.00	The site is not contaminated.
LE 02 Ecological Value of Site and Protection of Ecological Features				
Land has low ecological value. This can be confirmed through the BREEAM checklist or if a suitably qualified ecologist confirms this.	1.30	Targeted	1.30	An ecologist will be appointed to prepare a BREEAM compliant report and is expected to confirm that the land has low ecological value. The ecologist should be appointed no later than RIBA Stage 2.
Any existing features of ecological value within and surrounding the construction zone and site boundary area are adequately protected.	1.30	Targeted	1.30	There are no existing ecological features as such this credit is awarded by default.
LE 03 Minimising Impact on Existing Site Ecology				
The change in ecological value of the site is < 0 but => -9 (i.e. a minimal negative change) This can either be confirmed through BREEAM calculation based on known vegetation information or by a suitably qualified ecologist (SQE)	1.30	Targeted	1.30	A suitably qualified ecologist will be appointed to provide recommendations to achieve a neutral or positive increase in the ecological value of the site.
Where the change in ecological value of the site is equal to or greater than zero (i.e. no negative change)	1.30	Targeted	1.30	
LE 04 Enhancing Site Ecology				
A suitably qualified ecologist (SQE) has been appointed by the Preparation and Brief Stage (RIBA Stage 1 or equivalent) to report on enhancing and protecting the ecology of the site and their recommendations are implemented by the Concept Design Stage (RIBA Stage 2 or equivalent)	1.30	Targeted	1.30	A suitably qualified ecologist will be appointed to provide recommendations to achieve a neutral or positive increase in the ecological value of the site.
The measures recommended in the SQEs report have been implemented and confirmed that it results in a change of more than 6 species	1.30	Potential	0.00	
LE 05 Long Term Impact on Biodiversity				
Minimise the long term impact of the development on the site and the surrounding area's biodiversity by adopting all mandatory criteria AND 2 of the additional criteria detailed in Appendix H1	1.30	Targeted	1.30	The ecologist will advise on how to meet all mandatory ecological requirements and on suitable additional criteria for the design team to implement. The design team will then aim to follow 4 of the additional criteria detailed in Appendix H1.
Adopt 4 of the additional criteria detailed in Appendix H1	1.30	Targeted	1.30	

Pollution				
Criteria	**Available Score**	**Status**	**Target Score**	**Pre-Assessment Stage Assumptions**
Pol 03 Surface Water Run-off				
The Flood Risk Assessment (FRA) confirms the development is situated in a flood zone that is defined as having a low annual probability of flooding	2.00	Targeted	2.00	An FRA will be carried out and the site is in a Flood Zone 1, so it is expected this credit will be achieved.
An appropriate consultant is appointed to confirm compliance with the surface water run-off credits		Targeted		A consultant will be appointed to advise on SuDS.
Drainage measures are specified to ensure that the peak rate of run-off from the site tare no greater than for the pre-developed site. This should comply at the 1 year and 100 year return period events. Calculations should include an allowance for climate change	1.00	Targeted	1.00	It is expected that the peak run-off rate for the site is less than for the pre-developed site. Calculations will be required to confirm this if the areas of hard landscaping has changed.
Where flooding of property will not occur in the event of local drainage system failure AND The post development run-off volume, over the development lifetime, is no greater than it would have been prior to the assessed site's development Any additional predicted volume of run-off for the 100 year 6 hour event must be prevented from leaving the site by using infiltration or other SUDS techniques	1.00	Targeted	1.00	Calculations and a report will be required to confirm that flooding will not occur In the event of local drainage system failure and the run-off volume is no greater than for the previous development.
Measures are implemented to minimise water course pollution in line with requirements in Appendix J2	1.00	Not Achievable	0.00	This is not achievable without infiltration
Pol 04 Reduction of Night Time Light Pollution				
Where external lighting pollution has been eliminated through effective design removing the need for external lighting OR It is designed in accordance with ILP Guidance and provided with a time switch to allow lighting to be switched off between 2300hrs and 0700hrs	1.00	Targeted	1.00	All external lighting will be designed in compliance with ILP guidance and can be automatically switched off between 23:00 hr and 07:00 hr. Safety and security lighting will be designed to meet the lower lighting levels.

Innovation				
Criteria	**Available Score**	**Status**	**Target Score**	**Pre-Assessment Stage Assumptions**
Man 01 Project Brief and Design (Simple Buildings)				
Commitment or contract for the FM or equivalent to undertake certain tasks at quarterly intervals for the first 3 years after occupation	1.00	Potential	0.00	This is not targeted at present.
Man 03 Responsible Construction Practices				
Achieve a CCS score of 40+	1.00	Targeted	1.00	TBC if a CCS score of 40+ can be achieved
Hea 01 Visual Comfort				
Exemplary level daylight factor	1.00	Not Achievable	0.00	This credit is not being targeted.
Hea 02 Indoor Air Quality				
Exemplary formaldehyde emission levels have been reached (0.006mg/m3)	1.00	Not Achievable	0.00	This credit is not being targeted.
Exemplary formaldehyde emission levels have been reached (0.001mg/m3)	1.00	Not Achievable	0.00	This credit is not being targeted.
Ene 01 Reduction of CO_2 Emissions				
Recognise and encourage buildings designed to minimise operational energy demand, consumption and CO_2 emissions	1.00	Not Achievable	0.00	This credit is not being targeted.
	1.00	Not Achievable	0.00	
	1.00	Not Achievable	0.00	
	1.00	Not Achievable	0.00	
	1.00	Not Achievable	0.00	
Mat 01 Life Cycle Impacts				
Exemplary analysis of the environmental impact of the building materials has been undertaken. See Appendix F1 for requirements.	1.00	Not Achievable	0.00	This credit is not being targeted.
	1.00	Not Achievable	0.00	
Mat 03 Responsible Sourcing of Materials				
Responsible sourcing tier level % of available points achieved = 70%	1.00	Not Achievable	0.00	This credit is not being targeted.
Wst 01 Construction Site Waste Management				
Amount of waste generated per 100m2 - 1.6m3 / 1.9 tonnes AND Waste diverted from landfill - Non-demolition 85 / 90% or demolition 85 / 95% or excavation 95 /95%	1.00	Not Achievable	0.00	This credit is not being targeted.
Wst 02 Recycled Aggregates				
Total amount of recycled and/or secondary aggregate specified is greater than 35% (by weight or volume) of the total high-grade aggregate specified for the project. AND Contributing recycled or secondary aggregate must not be transported more than 30km by road transport	1.00	Not Achievable	0.00	This credit is not being targeted.
Wst 05 Adaptation to Climate Change				
See Appendix G1 for credit requirements	1.00	Not Achievable	0.00	This credit is not being targeted.

5. Conclusion

This BREEAM 2014 pre-assessment report demonstrates that an Excellent rating can be achieved, with a score of 73.38%, based on the credits targeted by the design team.

The score provides a comfortable buffer above the 70% threshold for an Excellent rating.

Achieving the targeted BREEAM credits through the design and post construction stages will require rigorous adherence to the credit criteria, which are very prescriptive. As some details for full compliance may not be included in this summary report, it is essential for the design team to remain in contact with the assessor as the project develops to confirm that all specifications are in line with the pre-assessment.

Design Stage and Post Construction Stage assessments will be required and the reports and compliant evidence submitted to the BRE for certification.

Appendix A - Management

A1: MAN 01 – Project Brief and Design

Stakeholder Consultation (Project Delivery)

- Must be undertaken prior to the completion of Concept Stage (RIBA Stage 2 or equivalent)
- The following people must be involved:
    - Client
    - Building occupier
    - Design team
    - Contractor (does not need to be the contractor who is eventually appointed for the job but a contractor must be part of the process)
- As a minimum the process must include a meeting to identify and define their roles, responsibilities and contributions during the following phases:
    - Concept Design
    - Developed Design
    - Technical Design
    - Construction
    - Handover and Close Out
    - In-Use Occupation
- The roles and responsibilities outlined above include consideration of:
    - End user requirements
    - Aims of the design and design strategy
    - Particular instillation and construction requirements
    - Occupiers budget and technical expertise in maintaining any proposed systems
    - Manageability and adaptability of any proposals
    - Production of documentation
    - Commissioning, training and aftercare

Stakeholder Consultation (Third Party)

- Must be undertaken prior to the completion of Concept Stage (RIBA Stage 2 or equivalent)
- All relevant third party stakeholders have been consulted by the design team and as a minimum the consultation must include the following information:
    - Functionality, build quality and impact
    - Provision of appropriate internal and external facilities (for future building occupants and visitors/users)
    - Management and operational implications
    - Maintenance resources implications
    - Impacts on the local community (traffic/transport impact)
    - Opportunities for shared use of facilities and infrastructure with the community/appropriate stakeholders, if relevant/appropriate to building type
    - Compliance with statutory (national/local) consultation requirements
    - Inclusive and accessible design.

  In the case of educational building types, minimum content also includes:
    - How the building/grounds could best be designed to facilitate learning and provide a range of social spaces appropriate to the needs of pupils, students and other users

  In the case of building types containing technical areas or functions, e.g. laboratories, workshops etc., minimum content also includes:
    - The end users broad requirements for such facilities, including appropriate sizing, optimisation and integration of equipment and systems.

- The project must demonstrates how the stakeholder contributions and outcomes of the consultation exercise have influenced or changed the Initial Project Brief and Concept Design.
- All consultation feedback has been given to, and received by, all relevant parties by the Technical Design Stage (RIBA Stage 4).

A2: MAN 02 – Life Cycle Cost and Service Life Planning

Elemental Life Cycle Cost (LCC)

- An elemental life cycle cost (LCC) analysis has been carried out, at Concept Design (RIBA Stage 2 or equivalent) together with any design option appraisals in line with PD 156865:2008
- The LCC analysis should show:
    - An outline LCC plan for the project based on the building's basic structure and envelope, appraising a range of options and based on multiple cash flow scenarios e.g. 20, 30, 50+ years
    - The fabric and servicing strategy for the project outlining services component and fit-out options (if applicable) over a 15-year period, in the form of an 'elemental LCC Plan'

Component Level LCC Plan

- A component level LCC plan has been developed by the end of Technical Design (RIBA Stage 4 or equivalent) in line with PD 156865:2008 and includes the following component types (where present):
    - Envelope e.g. cladding/windows, and/or roofing
    - Services, e.g. heat source cooling source, and/or controls
    - Finishes, e.g. walls, floors and/or ceilings
    - External spaces, e.g. alternative hard landscaping, boundary protection
- Demonstrate how the component level LCC plan has been used to influence the building and systems design/specification to minimise life cycle costs and maximise critical value

Capital Cost Reporting

- Report the capital cost for the building in pounds per square metre (£k/ m^2), via the BREEAM Assessment Scoring and Reporting tool, Assessment Issue Scoring tab, Management section

A3: MAN 03 – Responsible Construction Practices

Energy Consumption

Monitoring and recording data on energy consumption (kWh) from the use of construction plant, equipment (mobile and fixed) and site accommodation necessary for completion of all construction processes.
Using the collated data, the Contractor will report the energy consumption (total kWh/£100k of project value) and carbon dioxide emissions (total $kgCO_{2eq}$ and $kgCO_{2eq}$/£100k of project value) from the construction process.

Water Consumption

Monitoring and recording data on water consumption (m^3) from the use of construction plant, equipment (mobile and fixed) and site accommodation necessary for completion of all construction processes.
Using the collated data, the Contractor will report the total net water consumption (m^3), i.e. consumption minus any recycled water use, from the construction process.

Monitoring of Transport of Construction Material and Waste

This should include the following as a minimum:

- Transport of materials from the factory gate to the building site, including any transport, intermediate storage and distribution; Scope of this monitoring must cover the following as a minimum:
    - Materials used in major building elements (i.e. those defined in BREEAM issue Mat 01), including insulation materials,
    - Ground works and landscaping materials
- Transport of construction waste from the construction gate to waste disposal processing/ recovery centre gate. Scope of this monitoring must cover the construction waste groups outlined in the project's site waste management plan (SWMP)

A4: MAN 04 – Commissioning and Handover

Commissioning and Testing Schedule Responsibilities

- A schedule of commissioning and testing that identifies and includes a suitable timescale for commissioning and re-commissioning of all complex and non-complex building services and control systems and testing and inspecting building fabric
- The schedule will identify appropriate standards that all commissioning activities will be conducted in accordance with e.g. current Building Regulations, BSRIA and CIBSE.
- An appropriate project team member(s) is appointed to monitor and programme pre-commissioning, commissioning, testing and, where necessary, re-commissioning activities on behalf of the client.
- Principal contractor accounts for the commissioning and testing programme, responsibilities and criteria within their budget and main programme works, allowing for the required time to complete all commissioning and testing activities prior to handover.

Commissioning Building Services

- The first Man 04 credit must be achieved
- For complex building services and systems, a specialist commissioning agent appointed during the design stage with responsibility for:
    - Undertaking design reviews and giving advice on suitability for ease of commissioning
    - Providing commissioning management
    - Management of commissioning, performance testing and handover/post-handover stages
- Where there are simple building services, this role can be carried out by an appropriate project team member, provided they are not involved in the general installation works for the building services system(s).

<u>Complex systems</u>

These include, but are not limited to, air-conditioning, comfort cooling, mechanical ventilation, displacement ventilation, complex passive ventilation, building management systems (BMS), renewable energy sources, microbiological safety cabinets and fume cupboards, cold storage enclosures and refrigeration plant.

Testing and Inspecting Building Fabric

- The first Man 04 credit must be achieved
- The integrity of the building fabric, including continuity of insulation, avoidance of excessive thermal bridging and air leakage paths is quality assured through completion of post construction testing and inspection (e.g. thermographic survey as well as an air tightness test and inspection).

- Any defects identified via the post construction inspections are rectified prior to building handover and close out. Any remedial work must meet the required performance characteristics for the building/element.

Handover

- The (Building User Guide) BUG is developed prior to handover for building occupiers and premises managers
- The training schedule contains the following as minimum content:
    - The building's design intent
    - The available aftercare provision and aftercare team main contact(s), including any scheduled seasonal commissioning and post occupancy evaluation
    - Introduction and demonstration of, installed systems and key features (e.g. building management systems, controls and their interfaces)
    - Introduction to the Building User Guide and other relevant building documentation, (e.g. design data, technical guides, maintenance strategy etc)
    - Maintenance requirements, including any maintenance contracts and regimes in place.

A5: MAN 05 – Aftercare

Aftercare

The aftercare support to all the building occupiers should include the following as a minimum:

- A meeting programmed to occur between the aftercare team/individual and the building occupier management (prior to initial occupation, or as soon as possible thereafter) to:
    - Introduce the aftercare team or individual to the aftercare support team available, including Building User Guide (where existing) and training schedule content.
    - Present key information about the building the design intent and how to use the building to ensure it operates as efficiently and effectively as possible
- On-site facilities management training, to include a walkabout of the building and introduction and familiarization with the building systems, their controls and how to operate them in accordance with the design intent and operational demand.
- Initial aftercare provision for at least the first month of building occupation, e.g. on site attendance on a weekly basis to support building users and management (depending on the frequency of the building.
- Longer term after care e.g. a helpline, nominated individual or other appropriate sys-tem to support building users for at least the first 12 months of occupation

There must be operational infrastructure and resources in place to co-ordinate the collection and monitoring of energy and water consumption data for a minimum of 12 months, once the building is occupied. This is done to facilitate analysis of discrepancies between actual and predicted performance, with a view to adjusting systems and/or user behaviours accordingly.

Seasonal Commissioning

Commissioning responsibilities over a minimum 12-month period, once the building becomes occupied:

- Complex Systems – Specialist commissioning manager
    - Testing of all building services under full load conditions, i.e. heating equipment in mid-winter, cooling/ventilation equipment in mid-summer, and under part load conditions (spring/ autumn);
    - Where applicable, testing should also be carried out during periods of extreme (high or low) occupancy.

    - Interviews with building occupants (where they are affected by the complex services) to identify problems or concerns regarding the effectiveness of the systems
    - Re-commissioning of systems (following any work needed to serve revised loads), and incorporating any revisions in operating procedures into the O&M manuals.
- Simple Systems (naturally ventilated) – External Consultant/Facilities Manager
    - Review thermal comfort, ventilation, and lighting, at three, six and nine month intervals after initial occupation, either by measurement or occupant feedback.
    - Take all reasonable steps to re-commission systems following the review and incorporate any relevant revisions in operating procedures into the O&M manuals.

Post Occupancy Evaluation (POE)

The POE should be carried out by an independent third party and should cover:

- A review of the design and construction process (review of design, procurement, construction and handover processes) should include:
    - Internal environmental conditions (light, noise, temperature, air quality)
    - Control, operation and maintenance
    - Facilities and amenities
    - Access and layout
    - Other relevant issues
- Sustainability performance (energy/water consumption, performance of any sustainable features or technologies e.g. materials, renewable energy, rainwater harvesting etc.)

Relevant information for dissemination; the published case study about the building and its performance should cover:

- A basic description of the project and building
- BREEAM Rating and score
- The key innovative and low-impact design features of the building
- Project cost
- Project size: Floor area, site area
- Facilities to be used by community (where relevant)
- Any steps taken during the construction process to reduce environmental impacts, i.e. innovative construction management techniques
- Predicted and actual carbon dioxide emissions and/or EPC rating
- Outcomes of the Post Occupancy Evaluation study, to share the lessons learned from the project including
    - Occupant feedback
    - Energy and water consumption including renewable energy generation, level of rainwater/grey water provision

Appendix B - Health & Wellbeing

B1: HEA 01 – Visual Comfort

Daylighting

Daylighting

Should following either option A. or B.

A.

2% daylight factor AND either (a) OR {(b) and (c)}

(a) Uniformity ratio of 0.3 or point daylight factor of 0.3 times the relevant average daylight factor
Uniformity ratio of 0.7 or point daylight factor of 0.3 times the relevant average daylight factor where the spaces with glazed roofs, atria

(b) View of the sky from desk height AND room depth criterion satisfied

(c) The room depth criterion d/w + d/HW < 2/(1-RB) is satisfied
Where:
d = room depth,
w = room width,
HW = window head height from floor level,
RB = average reflectance of surfaces in the rear half of the room,

B.
Minimum 80% of the relevant building areas meet
300 lux of Average daylight illuminance and 90 lux of Minimum daylight illuminance for 2000 hours per year or more

View out

- 95% of the floor area within relevant building areas are within 7m of a wall which has a window or permanent opening that provides an adequate view out. The window/opening must be ≥ 20% of the surrounding wall area.
- Where the room depth is greater than the 7m requirement, compliance is only possible where the percentage of window/opening is the same as or greater than the values in table 1.0 of BS 8206.

Internal & External Lighting

Internal lighting

- All fluorescent and compact fluorescent lamps are fitted with high frequency ballasts
- Illuminance (lux) levels in all internal relevant building areas of the building are specified in accordance with the SLL Code for Lighting 2012 and any other relevant industry standard.
- For areas where computer screens are regularly used, the lighting design complies with CIBSE Lighting Guide 7 (sections 3.3, 4.6, 4.7, 4.8 and 4.9). This gives recommendations highlighting:

    - Limits to the luminance of the luminaires, to avoid screen reflections. (Manufacturer' data for the luminaires should be sought to confirm this).
    - For up-lighting, the recommendations refer to the luminance of the lit ceiling rather than the luminaire; a design team calculation is usually required to demonstrate this.
    - Recommendations for direct lighting, ceiling illuminance, and average wall illuminance.

External lighting

- Illuminance levels for lighting in all external areas within the construction zone are specified in accordance with BS5489-1:2013 Lighting of roads and public amenity areas.

Zoning & Occupant Controls

The zoning of and occupant controls for internal lighting are in accordance with the criteria below for relevant areas present within the building.

- In office areas, zones of no more than four workplaces,
- Workstations adjacent to windows/atria and other building areas separately zoned and controlled,
- Seminar and lecture rooms: zoned for presentation and audience areas,
- Library spaces: separate zoning of stacks, reading and counter areas,
- Teaching space/demonstration area,
- Whiteboard/display screen
- Auditoria: zoning of seating areas, circulation space and lectern area,
- Dining, restaurant, café areas: separate zoning of servery and seating/dining areas,
- Bar areas: separate zoning of bar and seating areas,

- Wards or bedded areas: zoned for lighting control for individual bed spaces and control for staff over groups of bed spaces
- Treatment areas, dayrooms, waiting areas: zoning of seating and activity areas and circulation space with controls accessible to staff
- Areas used for teaching, seminar or lecture purposes have lighting controls provided in accordance with CIBSE Lighting Guide 5.

B2: Hea 02 – Indoor Air Quality

Indoor Air Quality Plan

The air quality plan must cover:

- Removal of contaminant sources
- Dilution and control of contaminant sources
- Procedures for pre-occupancy flush out
- 3rd party testing and analysis
- Maintaining indoor air quality in-use

VOC Emission requirements

The criteria to be met are as follows:

- All decorative paints and varnishes must meet the requirements listed in the table below
- At least five of the eight remaining product categories listed in the table below must meet the testing requirements and emission levels for Volatile Organic Compound (VOC) emissions against the relevant standards identified within this table. Where five or less products are specified within the building, all must meet the requirements in order to achieve this credit.

Reference	Product	Requirements
A	Paints and Varnishes	
	Performance requirements	VOC content limit
	Compliant performance standard	EU Directive 2004/42/CE ('Paints Directive')
	Compliant testing standard	BS EN ISO 11890-2:2013 – Paints and varnishes – Determination of VOC content, Part 2 – Gas
	Manufacturer also to confirm	Paint to be fungal and algal resistant in wet areas e.g. bathrooms, kitchens, utility rooms
B	Wood panels (including particleboard, fibreboard including medium density fibre board (MDF), oriented strand board (OSB), cement-bonded particleboard, plywood, solid wood panel and acoustic board)	
	Option 1	
	Performance requirements	Formaldehyde E1 class
	Compliant performance standard	BS EN 13986:2004 Wood-based panels for use in construction - Characteristics evaluation of conformity and marking

	Compliant testing standard	BS EN 717-1:2004 Wood-based panels – Determination of formaldehyde release - Part 1: Formaldehyde emission by the chamber method
	Manufacturer also to confirm	The absence of prohibited wood preservatives/biocides.
	Option 2	
	Performance requirements	Formaldehyde level of 0.1mg/m3
	Compliant performance standard	1. BS EN ISO 16000-9:2006 Indoor air - Part 9: Determination of the emission of volatile organic compounds from building products and furnishing - Emission test chamber method. OR 2. Standard method for the testing and evaluation of volatile organic chemical emissions from indoor sources using environmental chambers, version 1.1 - Emission testing method for California Specification 01350, Californian Department for Public Health, 2010. Note: For either method the resultant emission/surface area obtained from the chamber test method must be extrapolated to predict what the emissions would be in theoretical model room (as detailed in the standard) and this extrapolated emission rate compared with the required formaldehyde level of 0.1mg/m3.
	Manufacturer also to confirm	The absence of prohibited wood preservatives/biocides.
C	Timber Structures (e.g. glue laminated timber)	
	Option 1	
	Performance requirements	Formaldehyde E1 Class
	Compliant performance standard	BE EN 14080:2005 Timber structures - Glues laminated timber - Requirements
	Compliant testing standard	BS EN 717-1:2004 Wood-based panels – Determination of formaldehyde release - Part 1: Formaldehyde emission by the chamber method
	Option 2	
	Performance requirements	As category B Option 2.
	Compliant testing standard	As category B Option 2.
D	Wood flooring (e.g. parquet)	
	Option 1	
	Performance requirements	Formaldehyde E1 Class
	Compliant performance standard	BS EN 14342:2005+A1:2008 Wood flooring - Characteristics, evaluation of conformity and marking
	Compliant testing standard	BS EN 717-1:2004 Wood-based panels – Determination of formaldehyde release - Part 1: Formaldehyde emission by the chamber method

	Option 2	
	Performance requirements	As category B Option 2.
	Compliant testing standard	As category B Option 2.
E	**Resilient textile and laminated floor coverings (e.g. vinyl, linoleum, cork, rubber, carpet, laminated wood flooring)**	
	Performance requirements	Option 1 - Formaldehyde E1 Class
	Compliant performance standard	BS EN 14041:2006 Resilient, textile and laminate floor coverings - Essential characteristics
	Compliant testing standard	BS EN 717-1:2004 Wood-based panels – Determination of formaldehyde release - Part 1: Formaldehyde emission by the chamber method
	Option 2	
	Performance requirements	As category B Option 2.
	Compliant testing standard	As category B Option 2.
F	**Suspended ceiling tiles**	
	Performance requirements	Formaldehyde E1 Class
	Compliant performance standard	BS EN 13964:2004+A1:2006 Suspended ceilings - Requirements and test methods
	Compliant testing standard	BS EN 717-1:2004 Wood-based panels – Determination of formaldehyde release - Part 1: Formaldehyde emission by the chamber method
	Option 2	
	Performance requirements	As category B Option 2.
	Compliant testing standard	As category B Option 2.
G	**Flooring adhesives**	
	Performance requirements	Carcinogenic or sensitising volatile substances are substantially absent
	Compliant performance standard	BS EN 13999-1:2013 Adhesives - Short term method for measuring the emission properties of low-solvent or solvent-free adhesives after application - Part 1: General procedure
	Compliant testing standard	1. BS EN 13999-1:2013 Adhesives - Short term method for measuring the emission properties of low-solvent or solvent-free adhesives after application - Part 1: General procedure 2. BS EN 13999-2:2013 Adhesives - Short term method for measuring the emission properties of low-solvent or solvent-free adhesives after application - Part 2: Determination of volatile organic compounds 3. BS EN 13999-3:2007+A1:2009 Adhesives - Short term method for measuring the emission properties of

		low-solvent or solvent-free adhesives after application - Part 3: Determination of volatile aldehydes 4. BS EN 13999-4:2007+A1:2009 Adhesives - Short term method for measuring the emission properties of low-solvent or solvent-free adhesives after application - Part 4: Determination of volatile diisocyanates
H	Wall Coverings	
	Performance requirements	- Vinyl chloride monomer (VCM) content - Formaldehyde level - Migration of heavy metals
	Compliant performance standard	1. BS EN 233:1999 Wall coverings in roll form - Specification for finished wallpapers, wall vinyls and plastic wall coverings 2. BS EN 234:1997 Wall coverings in roll form - Specification for wall coverings for subsequent decoration 3. BS EN 259-1:2001 Wall coverings in roll form - Heavy duty wall coverings - Part 1: Specifications
	Compliant testing standard	BS EN 12149:1998 – Wall coverings in roll form. Determination of migration of heavy metals and certain other elements, of vinyl chloride monomer and of formaldehyde release

Table – 8: VOC criteria by product type

VOC and Formaldehyde testing requirements

- The formaldehyde concentration level is measured post construction (but pre-occupancy) and is found to be less than or equal to 100µg/averaged over 30 minutes (WHO guidelines for indoor air quality: Selected pollutants, 2010).
- The total volatile organic compound (TVOC) concentration level is measured post construction (but pre-occupancy) and found to be less than 300µg/over 8 hours, in line with the building regulation requirements.
- Where VOC and formaldehyde levels are found to exceed the limits defined in criteria 8 and 9, the project team confirms the measures that have, or will be taken, in accordance with the IAQ plan, to reduce the levels to within these limits.
    - The testing and measurement of the above pollutants are in accordance with the following standards where relevant:
    - BS ISO 16000-4: 2011 Diffusive sampling of formaldehyde in air
    - BS ISO 16000-6: 2011 VOCs in air by active sampling
    - BS EN ISO 16017-2: 2003 VOCs - Indoor, ambient and workplace air by passive sampling
    - BS ISO 16000-3: 2011 formaldehyde and other carbonyls in air by pumped sampling.
- The measured concentration levels of formaldehyde (µg/m3) and TVOC (µg/m3) are reported, via the BREEAM Assessment Scoring and Reporting Tool.

B3: Hea 03 – Safe Containment in Laboratories

Laboratory fume cupboards & containment areas (where applicable)

To meet the requirements; where fume cupboards are specified, they are manufactured and installed in accordance with all of the following:

- General purpose fume cupboards: BS EN 14175 Parts 1-7
- Recirculatory filtration fume cupboards: BS 7989:2001
- Microbiological safety cabinets: BS EN 12469:2000 (manufacturer) and BS 5726:2005 (installation)

- Clean air hoods, glove boxes, isolators and mini-environments: BS EN ISO 14644-7:2004
- Articulated extension arms: PD CEN/TR 16589
- Or, for Schools, Sixth Form Colleges and Further Education with labs and fume cupboards for subjects up to and including A-level (or equivalent): Building Bulletin 88, Fume cupboards in schools.

Where laboratory containment devices that are ducted to discharge externally are specified, the guidance in the National Annex of BS EN 14175-2 must be followed to ensure an appropriate discharge velocity is achieved.

Buildings with Containment Level 2 and 3 laboratory facilities (where applicable)

The first credit has been achieved.

To meet the requirements, the following is required:

- Ventilation systems are designed in compliance with the best practice guidance set out in ' DRAFT HSE Biological Agents and Genetically Modified Organisms (Contained Use) Regulations 2010
- Filters for all areas designated as Containment Level 2 and 3 are located outside the main laboratory space for ease of cleaning/replacement and the filters are easily accessible for maintenance staff/technicians.
- The design team demonstrated that the individual fume cupboard location and stack heights have been considered in accordance with the HMIP Technical Guidance Note (Dispersion) D1.

B4: Hea 04 Thermal Comfort

Thermal modelling

- Thermal modelling has been carried out using software in accordance with CIBSE AM11 Building Energy and Environmental Modelling.
- The software used to carry out the simulation at the detailed design stage provides full dynamic thermal analysis. For smaller and more basic building designs with less complex heating or cooling systems, an alternative less complex means of analysis may be appropriate (such methodologies must still be in accordance with CIBSE AM11).
- The modelling demonstrates that:
    - For air conditioned buildings, summer and winter operative temperature ranges in occupied spaces are in accordance with the criteria set out in CIBSE Guide A Environmental design, Table 1.5; or other appropriate industry standard (where this sets a higher or more appropriate requirement/level for the building type).
    - For naturally ventilated/free running buildings:
        - Winter operative temperature ranges in occupied spaces are in accordance with the criteria set out in CIBSE Guide A Environmental design, Table 1.5; or other appropriate industry standard (where this sets a higher or more appropriate requirement/level for the building type).
        - The building is designed to limit the risk of overheating, in accordance with the adaptive comfort methodology outlined in CIBSE TM52: The limits of thermal comfort: avoiding overheating in European buildings.
- For air conditioned buildings, the PMV (predicted mean vote) and PPD (predicted percentage of dissatisfied) indices based on the above modelling are reported via the BREEAM assessment scoring and reporting tool.

Adaptability - for a projected climate change scenario

- The thermal modelling demonstrates that the relevant requirements set out in criteria 3 are achieved for a projected climate change environment.
- Where thermal comfort criteria are not met for the projected climate change environment, the project team demonstrates how the building has been adapted, or designed to be

easily adapted in future using passive design solutions in order to subsequently meet the requirements above
- For air conditioned buildings, the PMV and PPD indices based on the above modelling are reported via the BREEAM assessment scoring and reporting tool.

Thermal zoning and controls

- The thermal modelling analysis (undertaken for compliance with criteria above) has informed the temperature control strategy for the building and its users.
- The strategy for proposed heating/cooling system(s) demonstrates that it has addressed the following:
    - Zones within the building and how the building services could efficiently and appropriately heat or cool these areas. For example consider the different requirements for the central core of a building compared with the external perimeter adjacent to the windows.
    - The degree of occupant control required for these zones, based on discussions with the end user (or alternatively building type or use specific design guidance, case studies, feedback) considers:
        - User knowledge of building services
        - Occupancy type, patterns and room functions (and therefore appropriate level of control required)
        - How the user is likely to operate or interact with the system(s), e.g. are they likely to open windows, access thermostatic radiator valves (TRV) on radiators, change air-conditioning settings etc.,
        - The user expectations (this may differ in the summer and winter) and degree of individual control (i.e. obtaining the balance between occupant preferences, for example some occupants like fresh air and others dislike drafts).
- How the proposed systems will interact with each other (where there is more than one system) and how this may affect the thermal comfort of the building occupants.
- The need or otherwise for an accessible building user actuated manual override for any automatic systems.

B5: Hea 06 Safety and Security

Safe Access

The requirements for access are as follows:

- Dedicated cycle lanes are provided and have been designed and constructed in accordance with either:
    - Local Transport Note 2/08 Cycle Infrastructure Design, Department of Transport, 2008.
    - The National Cycle Network Guidelines and Practical Details – issue 2, Sustrans and the relevant parts of Appendix VI NCN Design and Construction Checklist
- The cycle lanes provide direct access from the site entrance(s) to any cycle storage facilities provided, without the need to deviate from the cycle path and, if relevant, connects to off-site cycle paths where these run adjacent to the development's site boundary.
- Footpaths on site provide direct access from the site entrance(s) to the building entrance(s) and connect to public footpaths off site (where existing), providing access to local transport nodes and other offsite amenities (where existing).
- Where provided, drop-off areas are designed off/adjoining to the access road and provide direct access to pedestrian footpaths, therefore avoiding the need for the pedestrian to cross vehicle access routes.

- Where a dedicated pedestrian crossing of a vehicle access route is provided, the road is raised to the pavement level (i.e. the pavement is not lowered to road level); unless pavement is at road level (this may be the case in some car parks).
- For large developments with a high number of public users/visitors, pedestrian pathways must be signposted to other local amenities off site, including public transport nodes (where existing).
- The lighting for access roads, pedestrian areas, footpaths and cycle lanes is compliant with the external lighting criteria defined in BREEAM issue Hea 01, i.e. in accordance with BS5489-1:2011 Lighting of roads and public amenity areas.

Where dedicated delivery access and drop-off areas form part of the assessed development the following apply:

- Delivery areas are not directly accessed through general parking areas and do not cross or share pedestrian and cyclist routes and other outside amenity areas accessible to building users and general public.
- There is a separate parking/waiting area for goods vehicles away from / adjacent to the manoeuvring area and staff/visitor car parking.
- Parking and turning areas are designed for simple manoeuvring according to the type of delivery vehicle likely to access the site, thus avoiding the need for repeated shunting.
- There is a dedicated space for the storage of refuse skips and pallets away from the delivery vehicle manoeuvring area and staff/visitor car parking (if appropriate given the building type / function).

Security of Site and building

Suitably Qualified Security Specialist (SQSS)

The following are, at present, deemed to meet this definition:
1. Crime Prevention Design Advisors (CPDA) or Architectural Liaison Officers (ALO), Counter Terrorism Security Advisor (CTSA); or
2. A specialist registered with a BREEAM-recognised third party accreditation scheme for security specialists.
3. A practising security consultant that meets the following requirements:
a. Minimum of three years relevant experience within the last five years. This experience must clearly demonstrate a practical understanding of factors affecting security in relation to construction and the built environment, relevant to the type and scale of the project being undertaken.
b. Hold a suitable qualification relevant to security.
c. Maintains (full) membership to a relevant professional body or accreditation scheme that meets the following:

i. Has a professional code of conduct, to which members must adhere; and
ii. Ongoing membership is subject to peer review.

When appointing the suitably qualified security specialist, consideration should be given to the appropriateness of the individual to carry out the security needs assessment, based on the size, scope and security needs of the development. Organisations, associations or scheme operators who wish to have their membership recognised as a 'third party accreditation scheme for security specialist', should review their current status (and therefore their members) against the requirements above and, where they feel they are compliant, contact BRE Global with the relevant information/evidence.

Appendix C - Energy

C1: Ene 02 – Energy Monitoring

- Energy metering systems are installed that enable at least 90% of the estimated annual energy consumption of each fuel to be assigned to the various end-use categories of energy consuming systems.
- Energy consuming systems in buildings with a total useful floor area greater than 1,000m^2 are metered using an appropriate energy monitoring and management system.
- The following major energy consuming systems (where present) are monitored using either a Building Energy Management System (BEMS) or separate accessible energy sub-meters with a pulsed or other open protocol communication outputs to enable future connection to a BEMS:
    - Space Heating
    - Domestic Hot Water Heating
    - Humidification
    - Cooling
    - Fans (major)
    - Pumps
    - Lighting
    - Small Power (lighting and small power can be on the same sub-meter where supplies are taken at each floor/department)
    - Renewable or Low Carbon Systems (separately)
    - Controls
    - Other major energy-consuming items where appropriate

C2: Ene 03 – External Lighting

The average initial luminous efficacy of external light fittings within the construction zone is not less than 60 luminaire lumens per circuit Watt
All external light fittings must be controlled through a time switch, daylight sensor or daylight sensor override on a manually switched lighting circuit and must meet the following efficiency requirements:

C3: Ene 04 – Low Carbon Design

Passive Design

The passive design measures reduce the total heating, cooling, mechanical ventilation, lighting loads and energy consumptions in line with the passive design analysis. The analysis demonstrates a meaningful reduction in total energy demand. As a guide, the installation should contribute at least 5% of overall building energy demand and/or CO_2 emissions. The analysis should cover the following:

- Site location
- Site weather
- Microclimate
- Building layout
- Building orientation
- Building form
- Building fabric
- Thermal mass or other fabric thermal storage
- Building occupancy type
- Daylighting strategy
- Ventilation strategy
- Adaptation to climate change

Free cooling

The free cooling credit can be achieved if one of the following is used to meet the entire cooling requirement.

- Night-time cooling (requires fabric to have a high thermal mass)
- Ground coupled air cooling
- Displacement ventilation
- Ground water cooling
- Surface water cooling
- Evaporative cooling, direct or indirect
- Desiccant dehumidification and evaporative cooling, using waste heat
- Absorption cooling, using waste heat.
- The building does not require any form of cooling (i.e. naturally ventilated)

Feasibility Study

The feasibility study has been carried out by the completion of the Concept Design Stage (RIBA Stage 2 or equivalent) and must cover the following as a minimum:

- Energy generated from LZC energy source per year
- Life cycle cost of the potential specification, accounting for payback
- Local planning criteria, including land use and noise
- Feasibility of exporting heat/electricity from the system
- Any available grants
- All technologies appropriate to the site and energy demand of the development.
- Reasons for excluding other technologies.
- Where appropriate to the building type, connecting the proposed building to an existing local community CHP system or source of waste heat or power OR specifying a building/site CHP system or source of waste heat or power with the potential to export excess heat or power via a local community energy scheme.

As a guide, the installation should contribute at least 5% of overall building energy demand and/or CO_2 emissions.

C4: Ene 06 – Energy Efficient Transportation Systems

Transport Demand

Where new lifts, escalators and/or moving walks (transportation types) are specifieD:

- An analysis of the transportation demand and usage patterns for the building has been carried out to determine the optimum number and size of lifts, escalators and/or moving walks.
- The energy consumption has been estimated in accordance with BS EN ISO 25745 Energy performance of lifts, escalators and moving walks, Part 2: Energy calculation and classification for lifts (elevators) and/or Part 3 - Energy calculation and classification for escalators and moving walks, for one of the following:
    - At least two types of system (for each transportation type required); OR
    - An arrangement of systems (e.g. for lifts, hydraulic, traction, machine room-less lift (MRL)); OR
    - A system strategy which is 'fit for purpose'.
- The use of regenerative drives should be considered, subject to the requirements in CN6
- The transportation system with the lowest energy consumption is specified.

Energy Efficient Specification

For lifts, the following three energy-efficient features are specified:

- The lifts operate in a stand-by condition during off-peak periods. For example the power side of the lift controller and other operating equipment such as lift car lighting, user

displays and ventilation fans switch off when the lift has been idle for a pre-scribed length of time.
- The lift car uses energy-efficient lighting and display lighting i.e. an average lamp efficacy, across all fittings in the car, of >55 lamp lumens/ circuit watt and lighting switches off after the lift has been idle for a prescribed length of time.
- The lift uses a drive controller capable of variable-speed, variable-voltage, variable-frequency (VVVF) control of the drive motor.

Where the use of regenerative drives is demonstrated to save energy, they are specified

For escalators and/or moving walks, each escalator and/or moving walk complies with EITHER of the following:
- It is fitted with a load sensing device that synchronises motor output to passenger demand through a variable speed drive. OR
- It is fitted with a passenger sensing device for automated operation (auto walk), so the escalator operates in stand-by mode when there is no passenger demand.

NB: The criteria relating to lifts within this issue do not apply to lifting platforms, wheelchair stairlift/platforms or other similar facilities to aid persons with impaired mobility. However, any lift with a rated speed greater than 0.15m/s must be assessed inclusive of goods, vehicle and passenger lifts.

C5: Ene 07 – Energy Efficient Laboratory Systems

Client engagement is sought through consultation during the preparation of the initial project brief (RIBA Stage 1 or equivalent) to determine occupant requirements and define laboratory performance criteria.

Design Specification should include, but not be limited to the following aspects:
- Description of purpose
- Occupant/process activities
- Containment requirements and standards
- Air change rate requirements
- Ventilation system performance and efficiencies
- Heating and cooling requirements
- Interaction between systems
- Flexibility/adaptability of laboratory facilities

The design team also demonstrates that the energy demand of the laboratory facilities has been minimized as a result of achieving the defined performance criteria.

Laboratory containment devices and containment areas:

Specification of fume cupboards and other containment devices has been carried out in compliance with criteria 2 and 3 of BREEAM Issue Hea 03 Safe containment in laboratories, as appropriate to the containment device specification
Where duct fume cupboards are specified:
- Average design air flow rate in the fume cupboards specified no greater than 0.16m^3/per linear metre (internal width) of fume cupboard workspace.
- Measurement of volume flow rate should be taken in the exhaust duct (at the boundary of the laboratory) to take account of reductions in (inward) volume flow rate from fume cupboard leakage
- A reduction in air flow does not compromise the defined performance criteria and therefore does not increase the health and safety risk to future building occupants.

Best practice energy efficient measures:

The following criteria are applicable where the laboratory area accounts for at least 10% of the total building floor area

- The pre-requisite and first credit have been achieved
- Laboratory plant and systems are designed, specified and installed to promote energy efficiency demonstrated through compliance with B to L in the table below
    - Up to 2 credits where the laboratory areas accounts for at least 10% (but less than 25% of the building floor area; OR
    - Up to 4 credits where the laboratory area accounts for 25% or more of the total building floor area
- To achieve credits for energy efficient measures, the chosen measure(s) must have a reasonably significant effect on the total energy consumption of the laboratory, i.e. 2% reduction or greater. This must be demonstrated by calculations or modelling.
- The energy efficient measures specified do no compromise the defined performance criteria, and therefore do not increase the health and safety risk to future building occupants.

Item	Category	Description
B	Fan power	Specification and achievement of best practice fan power figures (as shown below) for all air handling units, laboratory extract systems, local extract ventilation, containment area extracts (where applicable) and fume cupboard extracts (where applicable).
Lab. System		**Best Practice SFP (W/(l/s))**
General laboratory supply air handling unit (AHU) with heating and cooling		1.5
General laboratory extract systems		1.2
Laboratory local extract ventilation – ducted		1.0
Containment area extract, without high efficiency particulate absorption (HEPA) filtration		1.5
Containment area extract, with HEPA filtration		2.5
Fume cupboard extract		1.5
C	Fume cupboard volume flow rates (further reduction)	An average design air flow rate of < 0.12m3/s per linear metre (internal width) of fume cupboard workspace
D	Grouping and/or isolation of high filtration/ventilation activities	Minimisation of room air change rates and overall facility ventilation flows by grouping together or isolating activities and equipment with high filtration or ventilation requirements.
E	Energy recovery - heat	Heat recovery from exhaust air (where there is no risk of cross-contamination) or via refrigerant or water cooling systems.
F	Energy recovery – cooling	Cooling recovery via exhaust air heat exchangers (where there is no risk of cross-contamination) or via refrigerant or water cooling systems.
G	Grouping of cooling loads	Grouping of cooling loads to enable supply efficiencies and thermal transfer.
H	Free cooling	Specification of free cooling coils in chillers or dry air coolers related to laboratory-specific activities.

I	Load responsiveness	Effective matching of supply with demand through modularity, variable speed drives and pumps, and other mechanisms.
J	Clean rooms	Specification of particle monitoring systems, linked to airflow controls.
K	Diversity	Achievement of high levels of diversity in central plant sizing and laboratory duct sizing, where compatible with safety.
L	Room air changes rates	Reducing air change rates by matching ventilation airflows to environmental needs and demands of containment devices.

C6: Ene 08 – Energy Efficient Equipment

Identify from the list in the table below the functions/equipment that are or will be present within the assessed building. Of those functions identify which will be responsible for the significant majority of unregulated energy consumption in the building. Two credits are then awarded for compliance with the corresponding criteria demonstrating a meaningful reduction in the total annual unregulated energy consumption of the building.

Function/ equipment	Criteria
Small power, plug in equipment	The following equipment EITHER has been awarded an Energy Star rating OR has been procured in accordance with the Government Buying Standards: 1. Office equipment 2. Domestic scale white goods and other small powered equipment 3. Supplementary electric heating.
Swimming pool	1. Where automatic or semi-automatic pool covers or 'liquid' pool covers with an automatic dosing system is fitted to ALL pools, including spa pools and Jacuzzi (if relevant). 2. The covers envelop the entire pool surface when fully extended. 3. Where the air temperature in the pool hall can be controlled so that it is 1˚C above the water temperature.
Communal laundry	At least one of the following can be demonstrated for commercial sized appliances: 1. Specification of heat recovery from waste water 2. Use of greywater for part of the washing process i.e. either water from the final rinse used for the next pre-wash or water sourced from a rain water collection tank(s)
Data Centre	1. Design is in accordance with the 'Best practices for the EU Code of Conduct on Data Centres' principles with the data centre achieving at least the 'Expected minimum practice' level. 2. Temperature set points are not less than 24ºC, as measured at the inlet of the equipment in the rack.
IT-intensive operating areas	1. Uses a natural ventilation and cooling strategy as standard, with forced ventilation only to be used when the internal temperature exceeds 20ºC and active cooling only when the internal temperature exceeds 22ºC. 2. There is a mechanism to achieve automatic power-down of equipment when not in use, including overnight.
Residential areas	1. Fridges, fridge freezers: A+ rating 2. Washing machines A++ rating 3. Dishwashers: A+ rating 4. Washer-dryers and Tumble dryers: A rating (or better) OR 5. If appliances will be purchased during occupation by the tenant/owner,

	information on the EU Energy Efficiency Labelling Scheme of efficient white goods must be provided to the residential aspect of the building. Note: 1. Any white goods available to purchase from the developer must be compliant with criteria F1 and F2 above. 2. If criteria F3 is chosen to demonstrate compliance, only one of the two available credits can be awarded.
Healthcare	1. The procurement of large scale equipment and sets of electrical equipment (where numbering more than 50) has been informed and selected by life cycle costing analysis in accordance with EnCO_2de, Chapter 3.0
Kitchen and catering facilities	Where the project team can demonstrate that the project has incorporated at least one energy efficiency measure outlined in each of the following sections of CIBSE Guide TM50: 1. Section 8 (Drainage and kitchen waste removal) 2. Section 9 (Energy controls - specifically controls relevant to equipment), 3. Section 11 (Appliance specification, fabrication specification - not utensil specification), 4. Section 12 (Refrigeration), 5. Section 13 (Warewashing: dishwashers and glass washers), 6. Section 14 (Cooking appliance selection), 7. Section 15 (Water temperatures, taps, faucets and water saving controls) Refrigeration for kitchen and catering facilities should be assessed here, not in Ene 05 Energy efficient cold storage

Data centre

For the purpose of this BREEAM issue, the term 'data centres' includes all buildings, facilities and rooms which contain enterprise servers, server communication equipment, cooling equipment and power equipment, and may provide some form of data service (e.g. large scale mission critical facilities all the way down to small server rooms located in office buildings).

I.T-intensive areas

These include computer areas where more than 1 PC per 5 m2 is provided, e.g. training suites, design studios, libraries' I.T areas and other areas with a high density of computing devices.

Appendix D - Transport

D1: Tra 03 – Cyclist Facilities

Compliant cycle storage space:

- The space is covered overhead and protected from the weather
- Cycles are secured within spaces in rack(s) and consists of fixings for 1 or more spaces.
- The covered area and the cycle racks are set in or fixed to a permanent structure (building or hardstanding). Alternatively the cycle storage may be located in a locked structure fixed to or part of a permanent structure with CCTV surveillance. For proprietary systems see also compliance note below.
- The distance between each cycle rack, and cycle racks and other obstructions e.g. a wall, allows for appropriate access to the cycle storage space, to enable bikes to be easily stored and accessed.
- The facilities are in a prominent site location that is viewable/overlooked from either an occupied building or a main access to a building.
- Lighting of the cycle storage facility must be compliant with the external (or internal where relevant) lighting criteria defined in BREEAM issue Hea 01. The lighting must be controlled to avoid 'out-of-hours' use and operation during daylight hours, where there is sufficient daylight in/around the facility.

Compliant showers:

- Provision of one shower for every 10 cycle storage spaces, subject to a minimum provision of one shower.
- Any building providing eight showers or more will comply regardless of the number of cycle storage spaces provided.
- Both male and female users must be catered for i.e. either separate showers within shared gender-specific facilities (required provision split 50-50) or single shower cubicles and changing space for mixed use.
- The showers do not need to be dedicated to cyclists and can be those shared with other users/uses.

Compliant changing facilities:

- Appropriately sized for the likely/required number of users. The assessor should use their judgement to determine whether the changing area is appropriately sized given the number of cycle storage spaces or showers provided.
- Changing areas must include adequate space and facilities to hang or store clothing and equipment while changing or showering, e.g. bench seat and/or hooks.
- Toilet/shower cubicles cannot be counted as changing facilities.

Complaint lockers:

- The number of lockers is at least equal to the number of cycle spaces provided.
- Lockers are either in or adjacent to compliant changing rooms.
- The lockers are sized appropriately for the storage of a cyclist's equipment.

Compliant drying space:

The drying space (for wet clothes) must be a specially designed and designated space with adequate heating/ventilation. A plant room is not a compliant drying space.

D2: Tra 05 – Travel Plan

The travel plan must cover all the criteria listed below:

- The travel plan is structured to meet the needs of the particular site and takes into consideration the findings of a site-specific transport survey and assessment that covers the following (as a minimum):
    - Where relevant, existing travel patterns and opinions of existing building or site users towards cycling and walking so that constraints and opportunities can be identified
    - Travel patterns and transport impact of future building users
    - Current local environment for walkers and cyclists (accounting for visitors who may be accompanied by young children)
    - Disabled access (accounting for varying levels of disability and visual impairment)
    - Public transport links serving the site
    - Current facilities for cyclists
- The travel plan includes a package of measures to encourage the use of sustainable modes of transport and movement of people and goods during the operations and user.
- If the occupier is known, they must be involved in the development of the travel plan and they must confirm that the travel plan will be implemented post construction and supported by the building management in operation.
- The following measures could be considered as part of the travel plan for the development:
    - Providing parking priority spaces for car sharers
    - Providing dedicated and convenient cycle storage and changing facilities
    - Lighting, landscaping and shelter to make pedestrian and public transport waiting areas pleasant
    - Negotiating improved bus services, i.e. altering bus routes or offering discounts
    - Restricting and/or charging for car parking
    - Requirements for lobby areas where information about public transport or car sharing can be made available
    - Pedestrian and cycle friendly (for all types of user regardless of the level of mobility or visual impairment) via the provision of cycle lanes, safe crossing points, direct routes, appropriate tactile surfaces, well lit and signposted to other amenities, public transport nodes and adjoining offsite pedestrian and cycle routes.
    - Providing suitable taxi drop-off/waiting areas.
    - Ensuring that rural buildings are located with appropriate transport access to ensure that they adequately serve the local community (where procured to do so e.g. community centre).

Appendix E – Water

E1: Wat 03 – Water Leak Detection and Prevention

Leak detection system

A leak detection system which is capable of detecting a major water leak on the mains water supply within the building and between the building and the utilities water meter is installed. The leak detection system must be:

- A permanent automated water leak detection system that alerts the building occupants to the leak OR an in-built automated diagnostic procedure for detecting leaks is installed.
- Activated when the flow of water passes through the water meter/data logger at a flow rate above a pre-set maximum for a pre-set period of time.
- Able to identify different flow and therefore leakage rates, e.g. continuous, high and/or low level, over set time periods.
- Programmable to suit the owner/occupiers' water consumption requirements
- Where applicable, designed to avoid false alarms caused by normal operation of large water-consuming plant such as chillers.

Flow control

Flow control devices that regulate the supply of water to each WC area/facility according to demand are installed. The following devices are acceptable:

- A time controller i.e. an automatic time switch device to switch off the water supply after a predetermined interval
- A programmed time controller i.e. an automatic time switch device to switch water on and/or off at predetermined times.
- A volume controller i.e. an automatic control device to turn off the water supply once the maximum pre-set volume is reached.
- A presence detector and controller i.e. an automatic device detecting occupancy or movement in an area to switch water on and turn it off when the presence is removed.
- A central control unit i.e. a dedicated computer-based control unit for an overall managed water control system, utilising some or all of the types of control elements listed above.

E2: Wat 04 - Water Efficient Equipment

Water efficient irrigation systems

Any of the following would comply

- Drip feed subsurface irrigation that incorporates soil moisture sensors. The irrigation control should be zoned to permit variable irrigation to different planting assemblages.
- Reclaimed water from a rainwater or greywater system. The storage system must be appropriately sized i.e. storage capacity is relative to the size of the soft landscaped area.
- External landscaping and planting that relies solely on precipitation, during all seasons of the year.
- All planting specified is restricted to species that thrive in hot and dry conditions.

Appendix F - Materials

F1: Mat 03 - Responsible Sourcing of Materials

Sustainable Procurement Plan

A plan that sets out a clear framework for the responsible sourcing of materials to guide procurement by all involved in the specification and procurement of construction materials. The plan may be prepared and adopted at an organisational level or be site/project specific and for the purposes of BREEAM compliance, cover the following as a minimum:

- Risks and opportunities are identified against a broad range of social, environmental and economic issues. BS 8902:2009 Responsible sourcing sector certification schemes for construction products- Specification can be used as a guide to identify these issues.
- Aims, objectives and targets to guide sustainable procurement activities.
- The strategic assessment of sustainably sourced materials available locally and nationally. There should be a policy to procure materials locally where possible.
- Procedures are in place to check and verify that the sustainable procurement plan is being implemented/adhered to on the project, e.g. setting out measurement criteria, methodology and performance indicators to assess progress and demonstrate success.

Responsible Sourcing

Location/use categories to be included in assessment:

- External wall (e.g. bricks, blocks)
- External wall finishes (plastering, cladding, render, internal dry lining, wall coverings etc.)
- Insulation
- Roof (structure)
- Roof finishes (e.g. tiles, cladding systems, etc.)
- Upper floors (mezzanines)
- Floor (structure)
- Flooring finishes (including coatings)
- Internal partitions / internal walls (structure)
- Internal partitions / internal walls (finishes, wall coverings)
- Ceiling (structure)
- Ceiling finishes (including coatings)
- External / internal doors/ windows
- Staircases / ramps
- Fittings (shop fittings, railings, screens, gutters, vents , air grilles)
- Furniture (desks, chairs, display cabinets, shelving)
- Building services (equipment, distribution systems)
- Hard landscaping
- Other

Applicable materials within above elements:

- Timber/timber-based products
- Concrete/cementitious
- Metal
- Stone/aggregate
- Clay based (pavers, blocks, bricks, roof tiles, etc.)
- Gypsum
- Glass
- Plastic, polymer, resin, paint, chemicals and bituminous
- Animal fibre/skin
- Other

Compliant responsible sourcing schemes

The following table details all compliant schemes. The higher the tier achieved by the materials in the building, the higher the score in this section is likely to be, with 10 being the best and 1 the worst.

Responsible Sourcing & Tiers		
Scheme	Certification level/scope	Tier level
BRE Global, BES6001 Product /Standard certification	All ratings	5
Timber FSC / PEFC / SFI	Chain of custody certification	5
Environmental Management System (EMS) (certified)	Key process and supply chain extraction process4	2
Environmental Management System (EMS) (certified)	Key process	1
Re-used materials	-	10

F2: Mat 05 – Design for Durability and Resilience

Protecting vulnerable parts of the building from damage

The building incorporates suitable durability and protection measures or designed features/solutions to prevent damage to vulnerable parts of the internal and external building and landscaping elements. This must include, but is not necessarily limited to:

- Protection from the effects of high pedestrian traffic in main entrances, public areas and thoroughfares (corridors, lifts, stairs, doors etc).
- Protection against any internal vehicular/trolley movement within 1m of the internal building fabric in storage, delivery, corridor and kitchen areas.
- Protection against, or prevention from, any potential vehicular collision where vehicular parking and manoeuvring occurs within 1m of the external building façade for all car parking areas and within 2m for all delivery areas

Protecting exposed parts of the building from material degradation

The relevant building elements incorporate appropriate design and specification measures to limit material degradation due to environmental factors listed below. The design team must provide a survey of applicable building elements to demonstrate that the building has been designed and materials and/or measures specified which will be effective in preventing unnecessary deterioration, through reducing frequent replacements, repairs and maintenance through the life cycle of the building.

Applicable building elements to be identified from the below and included in assessment:

- Foundations/substructure/lowest floor/retaining walls
- External walls
- Roof/balconies
- Glazing
- Externals doors
- Railings/balusters
- Cladding
- Staircase/ramps
- Hard Landscaping

Establish from the environmental factors list below those factors that are likely to cause material degradation effects in the identified applicable building elements:

- Environmental agents
  - Solar radiation
  - Temperature variation
  - Water/moisture
  - Wind
  - Precipitation
  - Extreme weather conditions (e.g. high wind speeds, flooding etc)
- Biological agents
  - Vegetation
  - Pests and insects
- Pollutants
  - Air contaminants
  - Ground contaminants
- Material degradation effects
  - Corrosion
  - Dimensional change (e.g. swelling or shrinkage)
  - Fading/discolouration
  - Rotting
  - Leaching
  - Blistering
  - Melting
  - Salt crystallization
  - Abrasion

F3: Mat 06 – Material efficiency

The process of undertaking a building project to enable the most efficient use of materials over the life cycle of the building and its components. This includes using fewer materials, reusing existing demolition/strip-out materials and, where appropriate, procuring materials with higher levels of recycled content. It may also include the adoption of alternative means of design/construction that result in lower materials usage and lower wastage levels including off-site manufacture and use of pre-assembled service pods.
The following is required to show compliance for:

- Opportunities have been identified, and appropriate measures investigated and implemented, to optimise the use of materials in building design, procurement, construction, maintenance and end of life ,
- The above is carried out by the design/construction team in consultation with the relevant parties (see CN3) at each of the following RIBA stages:
  a. Preparation and Brief
  b. Concept Design
  c. Developed Design
  d. Technical Design
  e. Construction.

Reference	Terms	Description
General		
CN3	Relevant parties	All parties (as relevant to the project stage) involved in the design, specification and/or construction of the building should be consulted. This includes but is not limited to the following: 1. Client/developer 2. Cost consultant 3. Architect 4. Structural/civil engineers 5. Building services engineers - mechanical, electrical 6. Principal contractor 7. Demolition/strip-out contractor 8. Environmental consultant 9. Project management consultant 10. Materials/component manufacturers/suppliers

The evidence required to demonstrate compliance will vary according to RIBA stage. A few examples have been provided below:

- Reports (at Preparation and Brief stage) outlining the activity relating to material efficiency (ideas discussed, analysis and decisions taken)
- Drawings or building integrated model (BIM), calculations showing reduction of material use through design (Concept Design/Developed Design stages)
- Meeting notes, construction program, responsibilities schedule (indicating parties consulted).

Appendix G - Waste

G1: Wst 02 – Recycled Aggregates

To contribute to the total amount, the percentage of high-grade aggregate specified per application (where present) that is recycled and/or secondary aggregate, must meet the following minimum levels (by weight or volume):

Application	Min. % One credit	Min. % Exemplary performance
Bound		
Structural frame	15%	30%
Bitumen or hydraulically bound base, binder, and surface courses for paved areas and roads	30%	75%
Building foundations	20%	35%
Concrete road surfaces	15%	45%
Unbound		
Pipe bedding	100%	N/A
Granular fill and capping (see Compliance notes)	100%	N/A

The recycled or secondary aggregates are EITHER:

- Construction, demolition and excavation waste obtained on-site or off-site OR
- Secondary aggregates obtained from a non-construction post-consumer industrial by-product source.

Secondary aggregates
Recognised non-construction post-consumer or post-industrial by-products include:

- China clay waste
- Slate overburden
- Pulverised Fuel Ash (PFA)
- Ground Granulated Blast Furnace Slag (GGBFS)
- Air-cooled blast furnace slag
- Steel slag
- Furnace bottom ash (FBA)
- Incinerator bottom ash
- Foundry sands
- Recycled glass
- Recycled plastic
- Tyres
- Spent oil shale
- Colliery spoil
- Municipal Solid Waste Treatment Residues

G2: Wst 05 – Adaptation to Climate Change

Adaptation to climate change – structural and fabric resilience

Conduct a climate change adaptation strategy appraisal for structural and fabric resilience by the end of Concept Design (RIBA Stage 2), in accordance with the assessment structure laid out below.

Carry out a systematic (structural and fabric resilience* specific) risk assessment** to identify and evaluate the impact on the building overs its projected life cycle from expected extreme weather conditions arising from climate change and, where feasible, mitigate against these impacts. The assessment should cover the following stages:

- Hazard identification
    - Review the evidence/information from the relevant bodies to identify and understand the expected impacts of increased extreme weather events climate change for on the building
    - Identify likely hazards
- Hazard assessment
    - Identify the scale of hazards identified
- Risk estimation. This should identify the risk presented by these hazards to the building and the likely impact of the hazards taking into account the following aspects as a minimum:
    - Structural stability
    - Structural robustness
    - Weather proofing and detailing
    - Material durability
    - Health and safety of building occupants and other
    - Impact on building contents and business continuity
- Risk evaluation
    - Evaluate the potential impact of these risks on the building
    - Determine the tolerable risk threshold
    - Check the sensitivity of the risk assessment
    - Identify areas where the risks are unacceptable in health and safety, life cycle assessment and financial terms

- Risk management
    - Identify risk reduction measures
    - Mitigate the hazards as far as is practically feasible
    - Adapt the design/specification to incorporate the measures identified by the risk assessment in the final design

*Structural and fabric resilience

BREEAM defines this as the ability of a structure to withstand an increased burden of weather/increase pressure/hazards associated with climate change. Examples of increased pressures/hazards include:

- Solar radiation
- Temperature variation
- Water/moisture
- Wind
- Precipitation e.g. rain and snow
- Extreme weather conditions: high wind speeds, flooding, driving rain, snow, rainwater ponding
- Subsidence/ground movement.

**Systematic risk assessment

A structured approach to help professionals identify, evaluate and manage risk, where the reduction of the risks identified is integral to the process.

It includes:

1. Identifying the hazards
2. Eliminating the hazards, as far as reasonably practicable
3. Reducing the risks from each hazard, as far as reasonably practicable
4. Developing the building design to be robust.

Innovation Credit

For this credit it to be achieved the following credits must also have also been achieved:

- Wst 05 - Adaptation to climate change
- Hea 04 – Thermal comfort – criterion 6 of the second credit
- Ene 01 – Reduction of energy use and carbon emissions – at least eight credits must have been achieved
- Ene 04 – low carbon design – passive design analysis credit
- Wat 01 – Water Consumption – minimum of three credits must have been achieved
- Mat 05 – Design for durability and resilience – criterion 2 to material degradation must have been achieved
- Pol 3 – Surface water run-off – Flood risk a minimum of one credit and surface water run-off two credits have been achieved

G3: Wst 06 - Functional Adaptability

- A building-specific functional adaptation strategy study has been undertaken by the client and design team by Concept Design (RIBA Stage 2), which includes recommendations for measures to be incorporated to facilitate future adaptation.
- Functional adaptation measures (see table below for examples) have been adopted in the design by the Technical Design Stage (RIBA Stage 4) in accordance with the functional adaptation strategy recommendations, where practical and cost effective. Omissions have been justified in writing to the assessor.
- The functional adaptation strategy study should consider the following:
    - The potential for major refurbishment, including façade replacement
    - Design aspects that facilitate the replacement of all major plant within the life of the building (e.g. panels, in floors/walls that can be removed without affecting the structure)
    - The degree of adaptability of the internal physical space and external shell to accommodate change in-use
    - The extent accessibility to local services, such as local power, data infrastructure etc
- The functional adaptation implementation will be specific to the building and scope of project, but information should be made available to the assessor covering:
    - The feasibility for multiple/alternative building users and area functions (e.g. related to structural design of the building)
    - Options for multiple building users and area functions based on design details (e.g. modularity)
    - Routes and methods for major plant replacement (e.g. networks and connections have flexibility and capacity for expansion)
    - Accessibility for local plant and service distribution routes (e.g. detailed information on building conduits and connections infrastructure)
    - The potential for the building to be extended, horizontally and/or vertically

Assessment Type	Accessibility	Spatial adaptability	Expandability
Part 1: Fabric and structure - External walls - Cladding - Ground and first floor - Roof	Use of products or systems which allow easy replacements	Location of structural components within the floor space	Provision to add extensions or alterations to increase building capacity
Parts 2 and 3: Core and local services - Mechanical and electrical - Plumbing - Stairs and lifts - Fire	Inclusion of facilities management requirements and CDM feedback for future operational needs		Provision of capacity in infrastructure to enable future expansion and adaptation
Part 4: Interior design - Finishes - Floors - Interior walls - Connections	Use of products or systems which allow easy replacements	Layout in standardised grids Use of inherent finishes to allow replacement Use of standardised material sizes	Identifying or recognising potential future functional requirements Efficient use of space to allow for any increase in occupancy

Appendix H – Land Use & Ecology

H1: LE05 – Long term impact on biodiversity

Criteria

- A suitably qualified ecologist (SQE) has been appointed prior to commencement of activities on site.
- The suitably qualified ecologist confirms that all relevant UK and EU legislation relating to protection and enhancement of ecology has been complied with during the design and construction process.
- A landscape and habitat management plan, appropriate to the site, is produced covering at least the first five years after project completion. This is to be handed over to the building occupants.

Additional measures for the improvement of long term biodiversity

- The principal contractor nominates a 'Biodiversity Champion' with the authority to influence site activities and ensure that detrimental impacts on site biodiversity are minimised in line with the recommendations of a suitably qualified ecologist.
- The principal contractor trains the site workforce on how to protect site ecology during the project. Specific training must be carried out for the entire site workforce to ensure they are aware of how to avoid damaging site ecology during operations on site. Training should be based on the findings and recommendations for protection of ecological features highlighted within a report prepared by a suitably qualified ecologist.
- The principal contractor records actions taken to protect biodiversity and monitor their effectiveness throughout key stages of the construction process. The requirement commits the principal contractor to make such records available where publicly requested.
- A new ecologically valuable habitat appropriate to the local area is created. This includes habitat that supports nationally, regionally or locally important biodiversity, and/or which is nationally, regionally or locally important itself; including any habitat listed in the UK Biodiversity Action Plan (UK BAP) , Local Biodiversity Action Plan (LBAP), those protected within statutory sites (e.g. SSSIs), or within non-statutory sites identified in local plans.
- Where flora and/or fauna habitats exist on site, the contractor programmes site works to minimise disturbance to wildlife. For example, site preparation, ground works, and landscaping have been, or will be, scheduled at an appropriate time of year to minimise disturbance to wildlife. Timing of works may have a significant impact on, for example, breeding birds, flowering plants, seed germination, amphibians etc. Actions such as phased clearance of vegetation may help to mitigate ecological impacts. This additional requirement will be achieved where a clear plan has been produced detailing how activities will be timed to avoid any impact on site biodiversity in line with the recommendations of a suitably qualified ecologist.
- Education buildings only: A partnership has been set up by the design team with a local group that has wildlife expertise (e.g. local wildlife trust or similar) and the group has:
    - Provided advice early in the design process regarding protecting and/or providing habitat for species of local importance on the site.
    - Provided advice to ensure the design is in keeping with the local environment. In particular this should draw on their local knowledge of any features or species of eco-logical interest on or near the site.
    - Provided, or will continue to provide, on-going support and advice to the educational establishment to help them manage, maintain and develop the outdoor space in the longer term.
    - A suitable starting point for discussion with the local wildlife group would be to ask for advice on how to take account of the Local Biodiversity Action Plan (LBAP) in the school/college landscape design.

Appendix J - Pollution

J1: Pol 01 – Impact of Refrigerants

Refrigerant leak detection

- Where systems using refrigerants have a permanent automated refrigerant leak detection system installed; OR where an in-built automated diagnostic procedure for detecting leakage is installed. In all instances a robust and tested refrigerant leak detection system must be installed and must be capable of continuously monitoring for leaks
- The system must be capable of automatically isolating and containing the remaining refrigerant(s) charge in response to a leak detection incident.

J2: Pol 03 – Surface Water Runoff

Minimising watercourse pollution

- There is no discharge from the developed site for rainfall up to 5mm as confirmed by the Appropriate Consultant.
- In areas with a low risk source of watercourse pollution, an appropriate level of pollution prevention treatment is provided, using appropriate SuDS techniques.
- Where there is a high risk of contamination or spillage of substances such as petrol and oil (see Compliance notes for a list of areas), separators (or an equivalent system) are installed in surface water drainage systems.
- Where the building has chemical/liquid gas storage areas, a means of containment is fitted to the site drainage system (i.e. shut-off valves) to prevent the escape of chemicals to natural watercourses (in the event of a spillage or bunding failure).
- All water pollution prevention systems have been designed and installed in accordance with the recommendations of documents such as Pollution Prevention Guideline 3 (PPG 3) and/or where applicable the SUDS manual. For areas where vehicle washing will be taking place, pollution prevention systems must be in accordance with Pollution Prevention Guidelines 13
- A comprehensive and up-to date drainage plan of the site will be made available for the building/site occupiers.
- Relevant maintenance agreements for the ownership, long term operation and maintenance of all specified SuDS must be in place.
- Where present, all external storage and delivery areas designed and detailed in accordance with the current best practice planning guidance.

J3: Pol 05 - Reduction of Noise Pollution

Where the building has noise-sensitive areas or buildings within 800m radius of the site:

- A noise impact assessment in compliance with BS 7445 has been carried out and the following noise levels measured/determined:
    - Existing background noise levels at the nearest or most exposed noise-sensitive development to the proposed development or at a location where background conditions can be argued to be similar.
    - The rating noise level resulting from the new noise source through the use of calculations or scale model predictions.
- The noise impact assessment must be carried out by a suitably qualified acoustic consultant holding a recognised acoustic qualification and membership of an appropriate professional body.
- The noise level from the proposed site/building, as measured in the locality of the nearest or most exposed noise-sensitive development, is a difference no greater than +5dB during

the day (07:00 to 23:00) and +3dB at night (23:00 to 07:00) compared to the background noise level.
- Where the noise source(s) from the proposed site/building is greater than the levels described in item 4, measures have been installed to attenuate the noise at its source to a level where it will comply with item 4.

*Suitably qualified acoustician (SQA)

An individual achieving all the following items can be considered to be 'suitably qualified' for the purposes of a BREEAM assessment:

- Holds a degree, PhD or equivalent qualification in acoustics/sound testing.
- Has a minimum of three years relevant experience (within the last five years). Such experience must clearly demonstrate a practical understanding of factors affecting acoustics in relation to construction and the built environment; including, acting in an advisory capacity to provide recommendations for suitable acoustic performance levels and mitigation measures.
- An individual who holds a recognised acoustic qualification and membership of an appropriate professional body. The primary professional body for acoustics in the UK is the Institute of Acoustics.

Where a suitably qualified acoustician is verifying the acoustic measurements/calculations carried out by another acoustician who does not meet the SQA requirements, they must, as a minimum, have read and reviewed the report and confirm in writing that they have found it to:

- Represent sound industry practice
- Be appropriate given the building being assessed and scope of works proposed
- Avoid invalid, biased and exaggerated recommendations.

Additionally, written confirmation from the third party verifier that they comply with the definition of a Suitably Qualified Acoustician is required.