BUROHAPPOLD ENGINEERING

UCL Institute of Education

Interim Sustainability Statement – Phase 1 Wing Levels 4&5

035833

18 April 2018

Revision 01

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date	**18 April 2018**

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Contents

1 Executive Summary

This report sets out the interim sustainability statement for planning for Phase 1 of the UCL Institute of Education refurbishment, covering Wing Levels 4&5. Studies contained include a summary of the baseline building performance, the energy strategy, the BREEAM pre-assessment and responses to Camden planning criteria.

The UCL Institute of Education is a Grade II* listed building, however despite this limiting factor significant efforts are being made by the design team to enhance the sustainability of the building. Key measures include:

- Improving the thermal performance of the building fabric in line with heritage constraints, through the addition of secondary glazing, where consented, and internal insulation to cladding panels.
- Upgrading all major MEP systems and lighting. To comply with Building Regulations, all performance values are better or equal to Part L2B 2010 (including 2016 amendments) and Non-Domestic Building Services Compliance Guide 2013.
- Retaining connection to the Bloomsbury Heat and Power network, which includes boiler and combined heat and power plant, enabling up to 80% of the building's electricity to come from low carbon sources.
- BREEAM 'Excellent' strategy – this includes a wide variety of sustainability measures including the integration of low flow water fittings, responsible sourcing of construction materials, measures to enhance site ecology, security studies, acoustic measures and stringent sustainability criteria for the Contractor. Currently a BREEAM pre-assessment score of 77.5% (Excellent with a 7.5% buffer) has been identified.

In terms of total CO_2 reduction for the Phase 1 Wing levels 4&5 areas, preliminary modelling following the BREEAM refurbishment and fit out calculation methodology shows up to a 46% reduction in regulated CO_2 emissions compared to the existing building, meeting the BREEAM Excellent minimum requirements (at least 6 credits in Ene01). During RIBA Stage 3-4 onwards, further coordination with the Contractor, Building Control and heritage specialist shall be conducted to develop the final design strategy, adhering to the project sustainability targets.

It is currently estimated that for Phase 1, 19.8% of the project budget will be spent on energy efficiency improvements (including fabric improvement measures, new HVAC plant, lighting, controls and metering. This is in line with the "Camden Council Planning Guidance – Sustainability CGP3" for guidelines existing buildings which requires 10% of project cost to be spent on energy efficiency.

In terms of renewable energy, there is a Camden Planning requirement to target at least a 20% reduction in carbon dioxide emissions through the installation of on-site renewable energy technologies. For UCL IOE, the only applicable on-site form of renewable energy would be solar photovoltaics (which are estimated to save 2.3% of CO_2 across Phases 1-3), however these are potentially contentious according to the heritage consultant. If PV panels are to be considered, these will be brought forward in future refurbishment phases in discussion with Camden and Historic England. It should be noted that the site is served by the Bloomsbury Combined Heat and Power (CHP) district network, which according the Display Energy Certificate allows the UCL IOE building to obtain up to 80% of its electricity from low carbon sources.

In summary, there is good potential to undertake an extensive and sustainable refurbishment for the UCL Institute of Education, which achieves BREEAM Excellent and enhances thermal comfort. The works undertaken in Phase 1 levels 2&3, and now levels 4&5 also have investigated many of the opportunities for the UCL IOE refurbishment applicable to later phases and setting a positive ethos for the project.

2 Planning requirements

2.1 Camden Planning Guidance – Sustainability CGP3

The table below outlines the Camden Council planning requirements in relation to sustainability for existing buildings. Preliminary comments in relation to the UCL IOE Phases 1 Wing levels 4&5 are given.

Table 2-1 - Camden council planning requirements on sustainability relevant for IOE.

<table>
<tr><th>Requirement</th><th>Commentary</th></tr>
<tr><td>Sustainability assessment tools (BREEAM)
Submission of a pre-assessment report at the planning application stage. The report should summarise the design strategy for achieving your chosen level of BREEAM and/or Code for Sustainable Homes and include details of the credits proposed to be achieved.
Pre-assessment report is to be carried out by a licensed assessor. The name of the assessor and their licence number should be clearly stated on the report.
You are strongly encouraged to meet the following standards in accordance with Development Policy DP22 - Promoting sustainable design and construction:
<table>
<tr><th>Time period</th><th>Minimum rating</th><th>Minimum standard for categories (% of un-weighted credits)</th></tr>
<tr><td>2010-2012</td><td>‘very good’</td><td rowspan="2">Energy 60%
Water 60%
Materials 40%</td></tr>
<tr><td>2013+</td><td>‘excellent’</td></tr>
</table></td><td>The project is targeting a BREEAM Excellent rating with a single assessment across Phases 1-3.
The project is currently targeting 75% of the energy credits.
67% of water credits are currently targeted.
61% of materials credits are currently targeted.
The licenced BREEAM assessor is Adonis Charalambous (AC61).
The licenced BREEAM AP is Mark Dowson (1000124).</td></tr>
<tr><td>Energy efficiency: existing buildings
All buildings, whether being updated or refurbished, are expected to reduce their carbon emissions by making improvements to the existing building. Work involving a change of use or an extension to an existing property is included. As a guide, at least 10% of the project cost should be spent on the improvements.
Where retro-fitting measures are not identified at application stage we will most likely secure the implementation of environmental improvements by way of condition.
Development involving a change of use or a conversion of more than 500sq m of any floorspace, will be expected to achieve 60% of the un-weighted credits in the Energy category in their BREEAM assessment.
Special consideration will be given to buildings that are protected e.g. listed buildings</td><td>Substantial works are planned to improve the energy efficiency of this Grade II* listed building.
For L2&3 and ISD L3, based on the interim cost check report, it was estimated that 19.8% of project costs are being spent on energy efficiency for Phase 1.
Levels 4&5 would be similar, given the same level of energy efficiency is being applied.</td></tr>
<tr><td>Renewable energy
All developments are to target at least a 20% reduction in carbon dioxide emissions through the installation of on-site renewable energy technologies. Special consideration will be given to heritage buildings and features to ensure that their historic and architectural features are preserved.</td><td>Solar PV provides up to 2.3% CO_2 savings, however the heritage consultant has confirmed this is potentially contentious. If PV is considered, these will be brought forward in future phases in discussion with Camden & Historic England.</td></tr>
</table>

Decentralised energy • Where feasible and viable your development will be required to connect to a decentralised energy network or include CHP.	*Levels 4&5 will be connected to the Bloomsbury Heat and Power (BHP) district heating network*
Water efficiency • The Council expects all developments to be designed to be water efficient by minimising water use and maximising the re-use of water. This includes new and existing buildings. • The Council will require developments over 1000sq m to include a grey water harvesting system, unless the applicant demonstrates to the Council's satisfaction that this is not feasible.	*Low flow fittings will be targeted as part of refurbishment works in line with BREEAM Wat 01. Grey water recycling feasibility to be confirmed by MEP engineer in Phases 2&3.*
Sustainable use of materials • All developments should aim for at least 10% of the total value of materials used to be derived from recycled and reused sources. This should relate to the WRAP Quick Wins assessments or equivalent. Special consideration will be given to heritage buildings and features to ensure that their historic and architectural features are preserved. • Major developments are anticipated to be able to achieve 15-20% of the total value of materials used to be derived from recycled and reused sources.	*A pre-refurbishment waste audit has been carried out on Wing L2&3 and ISD L3. This identified that 35% of materials can be re-used or recycled. For BREEAM, this study shall will extended to capture Wing L4&5. All materials sourcing will be in line with BREEAM responsible sourcing requirements.*
Adapting to climate change • All development is expected to consider the impact of climate change and be designed to cope with the anticipated conditions.	*A climate change risk assessment was conducted for BREEAM credit Wst05 covering all of Phase 1. BREEAM thermal comfort modelling has been carried out for L4&5.*
Brown roofs, green roofs and green walls • The Council will expect all developments to incorporate brown roofs, green roofs and green walls unless it is demonstrated this is not possible or appropriate. This includes new and existing buildings. Special consideration will be given to historic buildings to ensure historic and architectural features are preserved.	*As the building is listed, the ecologist has recommended that external terrace areas include planters with native species*
Flooding • Developments must not increase the risk of flooding, and are required to put in place mitigation measures where there is known to be a risk of flooding. Within the areas shown on Core Strategy Map 5 (Development Policies Map 2) we will expect water infrastructure to be designed to cope with a 1 in 100 year storm event in order to limit the flooding of, and damage to, property.	*The site is located in flood risk zone 1 (low risk of flooding). The proposed Phase 1-3 refurbishment works will not increase surface water run-off.*
External lighting • Lighting can have particular negative impacts on biodiversity. Unnecessary lighting should be avoided. Where lighting may harm biodiversity timers or specific coloured lighting will be required to minimise any disturbance.	*BREEAM requirements for external lighting have been embedded into the project.*
Local food growing • We encourage food to be grown wherever possible and suitable. Rooftops and shared spaces such as gardens and parks provide opportunities.	*Local food growing is not incorporated into the scheme, but shall be raised to the ecologist.*
Biodiversity • Proposals should demonstrate how biodiversity considerations have been incorporated into the development; if any mitigation measures will be included; and what positive measures for enhancing biodiversity are planned.	*An ecology study has been completed, recommending planting of native species on external terrace areas.*

3 Baseline performance

3.1 Overview

This section gives an overview of the baseline performance of the UCL Institute of Education, covering running costs, energy use, CO_2 emissions and fabric performance. The study covers the whole IOE building.

3.2 Running costs

The UCL Institute of Education building is an expensive asset to run, spending over half a million pounds on energy every year. This is not sustainable and represents a key area to be considered as part of refurbishment works.

District heating costs (Aug-14 to Jul-15)	£185,000/year
Electricity costs (Aug-14 to Jul-15)	£330,000/year
Total annual running costs	**£515,000/year**

3.3 Energy use

Based on historic energy surveys, it is estimated that approximately 45% of the buildings energy use is for heating and hot water via a district heat network. The remaining 55% of energy use can be attributed to electricity consumption, with lighting being the main source of electrical energy use. 5% of total building energy use can also be attributed to electric heating, indicating that the building is currently not meeting thermal comfort standards. Measures to improve fabric performance, where appropriate and unregulated electricity consumption should therefore be prioritised.

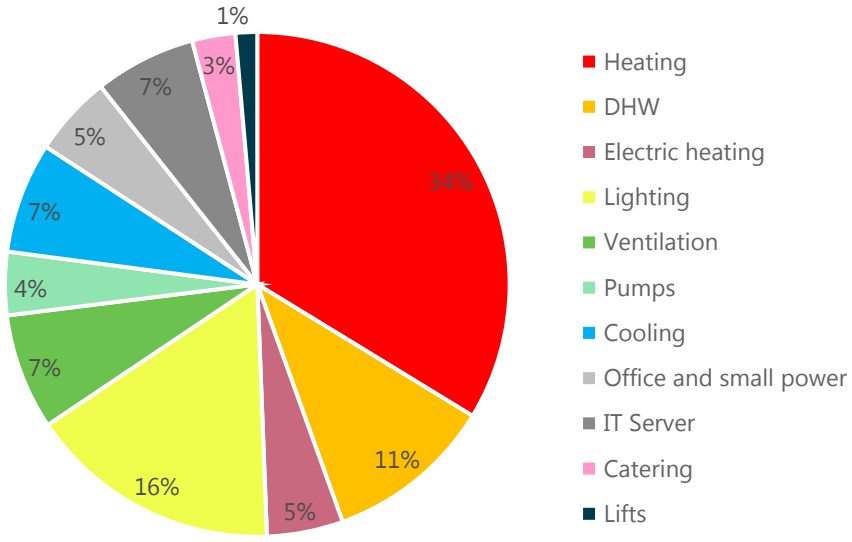


Figure 3-1 - Energy consumption by end-use for 20 Bedford Way (UCL IOE carbon management plan, 2014)

3.4 CO_2 emissions

In terms of CO_2 emissions, the UCL Institute of Education building actually performs very well. This is because the building is connected to the existing Bloomsbury Heat and Power (BHP) district heating network, which provides low-carbon heat as well as renewable electricity generated simultaneously via a CHP (combined heat and power) engine. According to the building's display energy certificate, 78.8% of the building's electricity is supplied from this renewable source. This gives the building an operational performance rating of a "B". By reducing the initial energy consumption, this can improve the operational performance further.

For Phase 1 Wing levels 4&5, both heating and domestic hot water and heating will be provided from the district heating network. The diagram below illustrates the carbon factor of this network, and the implications of this on the overall in-use carbon emissions of the existing building.

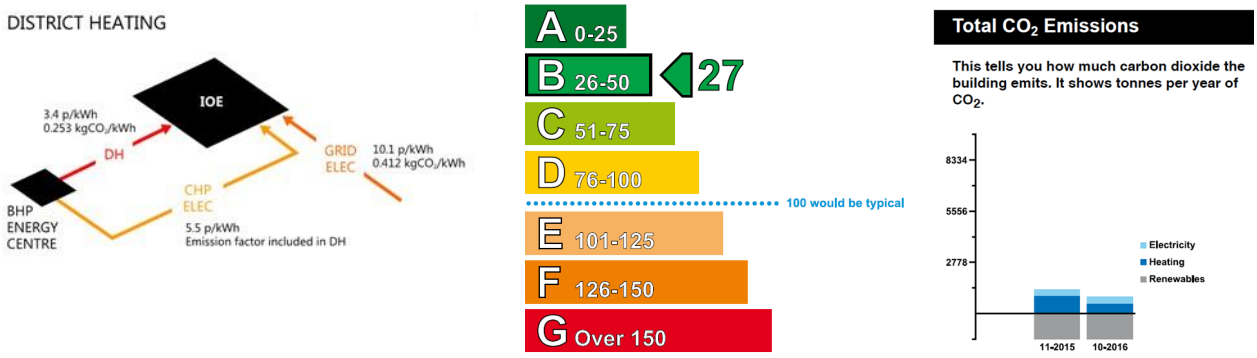


Figure 3-2 - District heating illustration (left) and operational performance rating (middle/right) (DEC number 0650-0313-7079-7509-006)

3.5 Fabric performance

Despite the good CO_2 performance, a key consideration for the UCL IOE refurbishment relates to thermal comfort for users and the building fabric performance. This is because the 1970s building has a significant amount of single glazing, large areas of original cladding panels, as well as un-insulated concrete walls. In addition, according to the facilities manager many users complain periodically about the building being too hot in summer and too cold in winter. A thermal imaging assessment has been undertaken by BuroHappold sustainability to investigate these issues.

The key findings from the study were:

- Heat loss from the IOE is much higher than that of adjacent buildings of older construction.
- Heat losses through the windows and window frames at IOE is significant; the seals on window frames could also be improved throughout the building to avoid air leakage when windows are not closed properly.
- The cladding panels perform marginally better than the glazing. Cladding joints show moderate heat loss.
- The thermal performance of glazing on the wing (by Core A) is poor
- Some windows were open during the survey. This may suggest poor heating/ventilation control.

The main recommendations (which have all now taken place) were:

- Upgrade the thermal performance of the façade, prioritising new glazing.
- Develop internal insulation strategy to treat cladding panels and thermal bridging.
- Façade engineer to be appointed to carry out investigation on improvement options / solutions to treating thermal bridging in consultation with heritage specialist.

A selection of images from the thermal imaging study, the Phase 1 wing are given below. As a result of this exercise, a façade condition survey was carried out giving 3 improvement options in correspondence with the heritage consultant. This has resulted in secondary glazing, where consented and internal insulation being applied to the Wing.

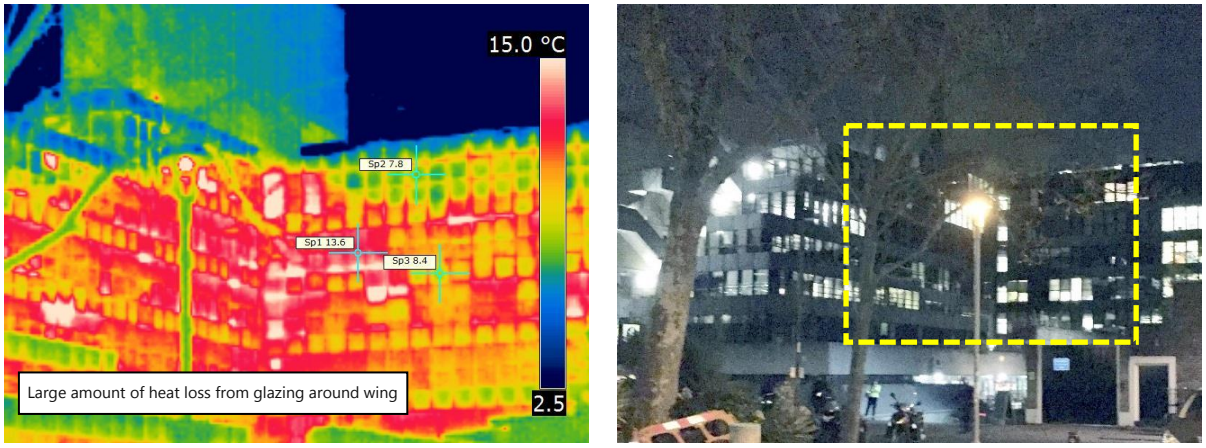


Figure 3-3 - Thermal image showing large sources of heat loss through the curtain walling

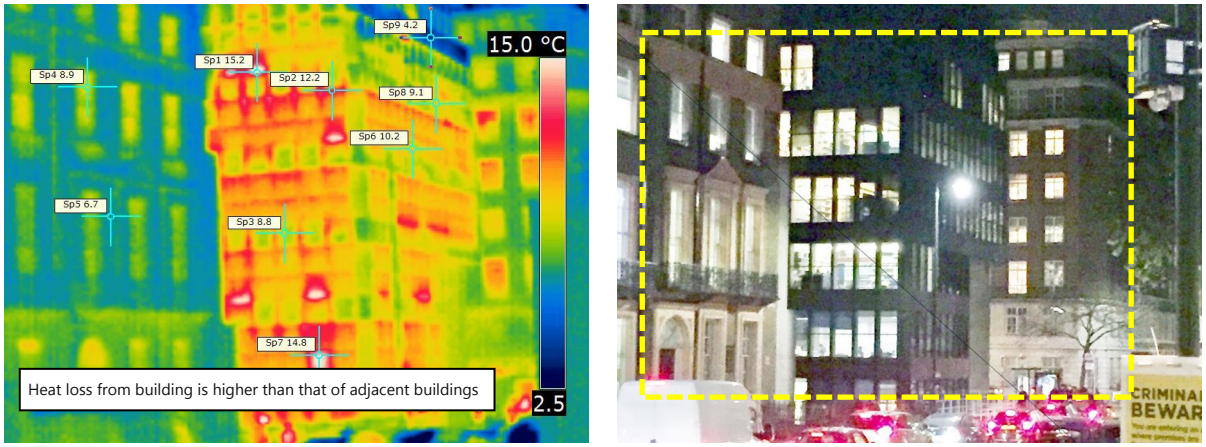


Figure 3-4 - Thermal image showing the end of the IOE building compared to adjacent buildings

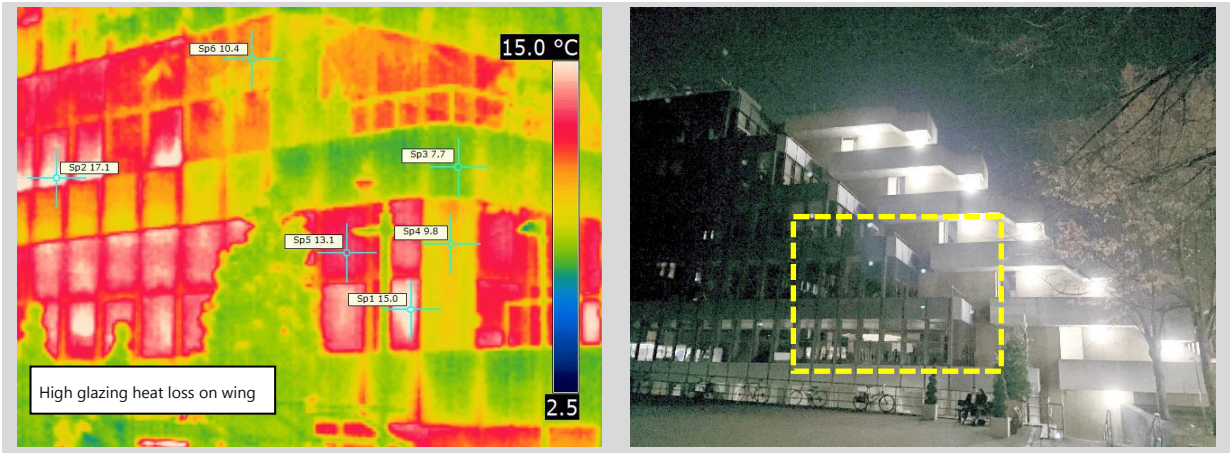


Figure 3-5 - Thermal image of the Phase 1 wing

4 Energy strategy

4.1 Overview

This section of the report describes the energy strategy for the Phase 1 level 4&5 areas of the UCL IOE refurbishment.

In order to demonstrate compliance with BREEAM, energy modelling is required comparing the existing building performance to the refurbished case. The minimum standard for the 'Excellent' rating under BREEAM credit "Ene01 – reduction of energy use and CO_2 emissions" is 6 credits (out of a possible 15). Preliminary modelling demonstrates that for Wing Levels 4&5, a total of 13 credits are feasible with the current energy strategy.

For Building Regulations Part L2B, note that an "elemental compliance" route is being followed, which does not require modelling. The relevant version of the Building Regulations are Part L2B 2010, incorporating 2016 amendments. Draft proposals and mark-ups for this Building Control submission have been prepared and issued to the Contractor as part of the RIBA stage 2 submission. This includes details of fabric performance levels (currently in development) and system efficiencies.

4.2 BREEAM energy modelling

This section contains the preliminary energy performance calculation in line with BREEAM RFO whole building modelling requirements for Phase 1 Wing levels 4&5. The study has been prepared in accordance with BREEAM credit Ene01 criteria 1 (option 1).

4.2.1 Methodology

IES VE 2017 has been used to calculate the Energy Performance Ratio for Non Domestic Refurbishment (EPRNDR) and assess the wing level 4&5 design performance against Ene 01.

The BREEAM RFO method aims to assess the existing building performance to the proposed refurbishment. At present, many spaces are redundant and largely unoccupied. As it would be unreasonable to compare future energy consumption against this low benchmark the modelling approach has been divided into the 2 following modelling steps;

- Step 1- the existing building performance is modelled (old fabric and old systems) with the proposed model geometry, space use and NCM occupancy profiles. This model is used to generate the Actual (existing) and Reference data for the EPR rating tool.
- Step 2- the proposed building is modelled (new fabric and new systems) with the proposed model geometry, space use and NCM occupancy profiles. This model is used to generate the Actual (proposed) data for the EPR rating tool.

4.2.2 Modelling inputs

The energy modelling conducted covers the Phase 1 Wing level 4&5 (layouts received from Hawkins Brown on 27-02-2018). The model is shown in Figure 4-1.

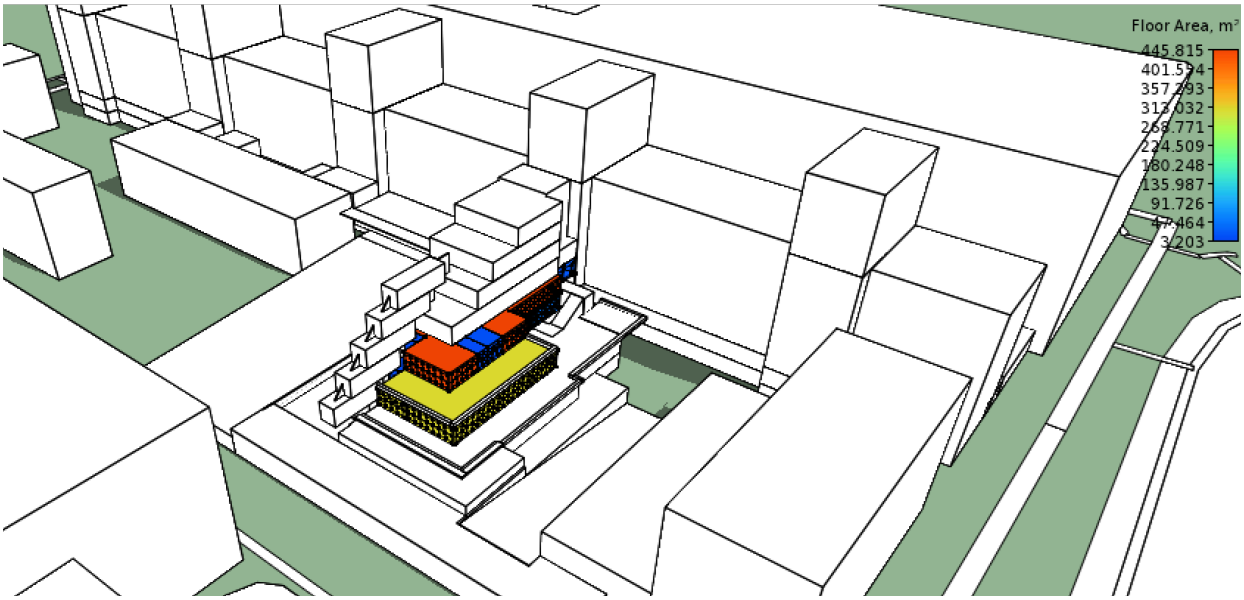


Figure 4-1 - Wing Level 4&5 IES model

Building fabric

Building fabric input parameters for the existing and proposed building models are summarised below:

Table 4-1 Modelling inputs tested (building fabric parameters) and Part L2B

		Existing: (assumed based on review of available information)	Improved (Secondary glazing + opaque wall elements and roof upgraded.)	*Part L2B 2013*		
				Threshold of retained Element	*Value of replacement element*	*New thermal elements and controlled fittings*
Fabric U-values (W/m2K)	Solid wall	2.5 (300mm cast dense concrete, membrane)	0.3 for new thermal elements	*0.7*	*0.3*	*0.28*
	Roof	2.3 (400mm concrete deck & membrane, concrete tile 100mm)	0.18 (400mm concrete deck, insulation 100mm & membrane, concrete tile 100mm) *	*0.35*	*0.18 flat roof*	
	Internal wall	2.5 (200mm cast concrete medium)	1 (lightweight plaster)	-	-	-
	Internal floor/ceiling	2.6 (300 reinforced concrete, 20mm screed)	2.6 (300 reinforced concrete, 20mm screed)	-	-	-
External glazing	U-value	6 (single glazing metal frame	2.1	*3.3*	1.8 W/m²K Or heritage constraint does not allow to achieve a centre pane U value of 1.8 W/m2K.	
	G-value	0.73	0.4	-		
Air tightness	50 pa (m3/h.m2 @ 50 Pa)	19 (to be tested by contractor)	6.5 (target to be tested by contractor)	-		

* Conservative values taken – Contractor to confirm Part L compliant strategy

Building services

Building services input parameters for the existing and proposed building models are summarised below:

Table 4-2 System modelling inputs. Figures marked with * are assumed performance levels.

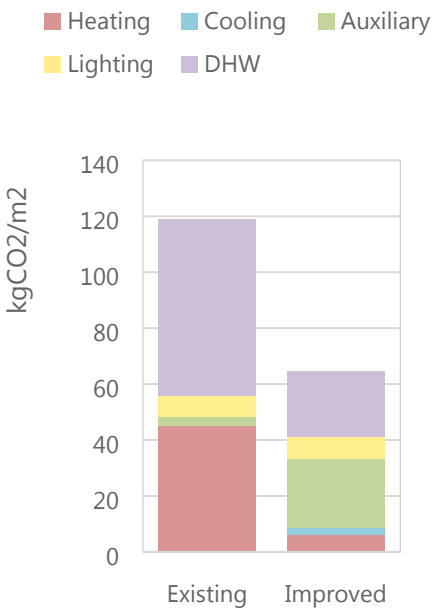
	Existing	Improved	Part L2B limiting efficiencies for new systems
Heating	Central heating using water, radiators		
Description	Existing rads		
Heat source	District heating		
Pump type	Constant speed		
SCOP	0.92	0.92	
Cooling		Water cooled fan coil systems	
SEER / EER		4.5 / 3.6	
Ventilation	Centralised balanced mech vent		
Duct air leakage standard	Not tested	Not tested	
AHU air leakage standard	Class worse than L3 or not tested	L1	
Pump type	Constant speed	Variable speed with differential sensors	Either of B&ES DW/144, BS EN1507:2066, BS EN 12237:2003, BS EN 13403:2003
Heat recovery %	0%	70%	Thermal wheel > 65%
Extract fan SFP (W/(l/s) (e.g. toilet)	0.8 @ 10ACH	0.4 @ 10ACH	AHU to comply as a minimum with Class L2
Metering			
System metering	no	yes	
Metering warn "out of range" values	no	no	
DHW			
Storage volume	600L each	600L each	
Storage losses (kWh/(l.day))	0.0063	0.0063	
Circulation losses (W/m)	30	7	
Pump power	0.2	0.2	
Heating system controls			
Central time control	no	yes	To comply with as a minimum with the Non-Domestic Building Services Compliance Guide
Optimum start and stop	no	yes	
Local temperature control	no	yes	
Local time control	no	yes	
Weather compensation	no	no	
Lighting			
Efficacy lm/W	40	60 to 80	>60 lm/W
Controls	Switch	Dimming/PIR/Time	-
Parasitic power W/m2	0.1 W/m2	0.3 W/m2	-
DH carbon factor ($kgCO_2$/kWh)	0.25	0.25	-

4.2.3 Preliminary modelling results

Energy modelling results are given below. As shown, 13 credits for BREEAM RFO Ene01 are achieved in the preliminary modelling. Total CO_2 savings are estimated at 46% for the measures tested over the baseline.

Table 4-3 Preliminary Ene01 modelling results for Phase 1 levels 4&5.

		Existing	Improved
Building emission rate ($kgCO_2/m^2$)		118	64
Carbon savings (%)		-	46%
Preliminary Ene01 score		-	13
BREEAM minimum requirements*		**Very Good**	**Excellent**
Energy kWh/m^2	Heating	176	24
	Cooling	0	6
	Auxiliary	7	57
	Lighting	17	18
	Domestic hot water	255	93
$kgCO_2/m^2$	Heating	43	6
	Cooling	0	3
	Auxiliary	3	25
	Lighting	7	7
	Domestic hot water	64	32



4.2.4 Summary and recommendations

Energy modelling for BREEAM Ene 01 shows that 13 credits may be achieved for Wing Levels 4&5. The analysis presented in this section is to be updated by the contractor as the design and underlying assumptions progress. The contractor is to ensure compliance with Part L2B, the Non-Domestic Building Services Compliance Guide recommendations and to ensure a minimum of 13 credits are achieved under BREEAM RFO Ene 01 for Phase 1.

5 Wider Sustainability (BREEAM)

5.1 Overview

BREEAM (which stands for the "Building Research Establishment Environmental Assessment Methodology") sets the standard for best practice in sustainable building design, construction and operation and has become one of the most comprehensive and widely recognised measures of a building's environmental performance.

Phases 1-3 of the UCL IOE refurbishment will be submitted together under one BREEAM 2014 (RFO) refurbishment and fit out assessment 2014. The "UCL Sustainable Building Standard" states that all refurbishment projects with building services or building fabric upgrades must achieve a **BREEAM Excellent** rating.

In order to facilitate this approach in a complex phased project will require careful project management with the Contractor providing design stage and post construction BREEAM evidence for each element of the project as if it were a single assessment in its own right.

Supporting this process, the Contractor has nominated a Sustainability Champion throughout the design and construction process to formally report progress on BREEAM items to the client and BREEAM Assessor. Providing overall leadership to the BREEAM assessment are BuroHappold, who are appointed in a client side role as BREEAM Assessor and BREEAM AP for the project.

5.2 BREEAM tracker

Appendix A sets out a detailed BREEAM tracker for the project scheduling out the BREEAM credits targeted for the Excellent rating, and current pending actions. Actions are separated out in terms of each element of the project, as well as indicating which evidence can be used at a masterplan level covering all elements in Phase 1.

5.3 BREEAM pre-assessment score – Phase 1 Wing Level 4&5

The BREEAM pre-assessment score for Wing Level 4&5 is set out in Figure 5-1. Overall, a low risk score of 77.5% is identified. Note that a 5% buffer above 70% is desired target. As shown, 15.2% of applicable design stage evidence has already been secured from a combination of the RIBA stage 1 and 2 credits being closed out, as well as evidence for a number of masterplan studies being in place.

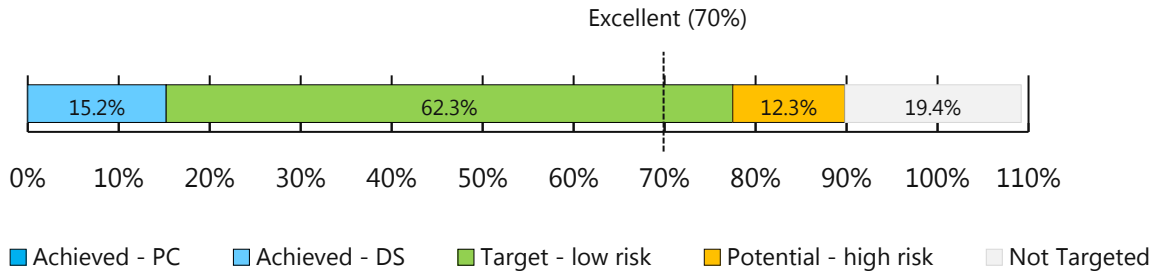


Figure 5-1 – Current BREEAM pre-assessment score for Phase 1 Wing Level 4&5

6 Summary and vision

6.1 Summary

This report has covered an analysis of the baseline performance for the UCL Institute of Education, the Phase 1 Wing Levels 4&5 energy strategy, BREEAM pre-assessment and responses to Camden planning criteria.

In summary, there is good potential to undertake an extensive and sustainable refurbishment for the UCL Institute of Education, which achieves BREEAM Excellent and provides comfortable internal environments. Works undertaken to date for Phase 1 have shown that this will require investment in passive design and fabric improvements, for which an appropriate strategy has been developed in line with the heritage consultant advice.

6.2 Investing in sustainability

The IOE currently spends approximately £515,000/year on energy, which is obviously a very significant amount. Based on energy modelling conducted to date it is estimated that if the proposed fabric renovation works were applied to the whole building, the cost saving over 25 years including expected fuel price rises would be in the order of £2.2 million. Over a 60 year period the cost saving comes to an estimated £5 million, as illustrated below.

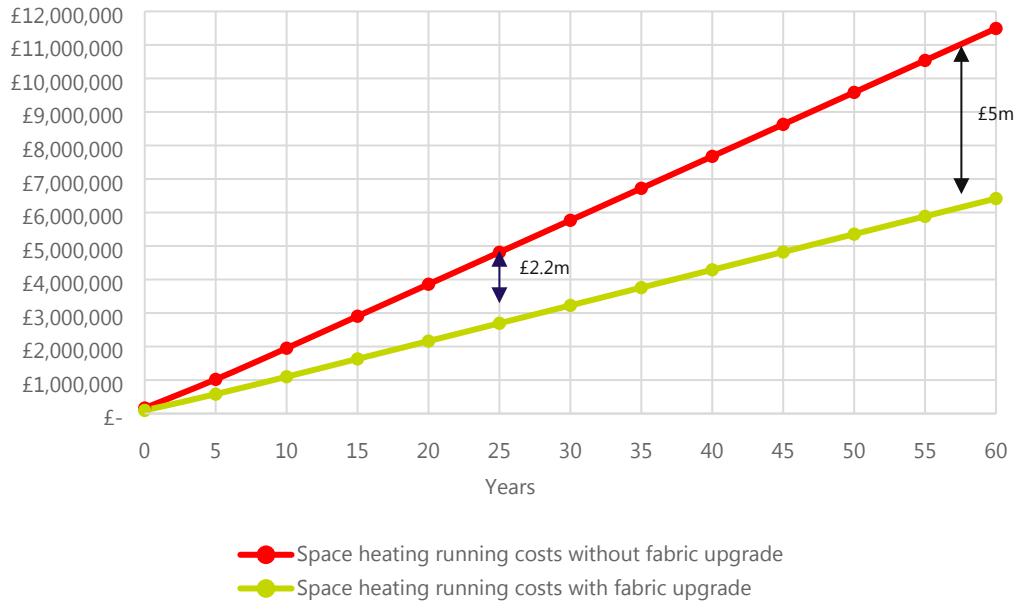


Figure 6-1 – Space heating running cost comparison with and without façade upgrade

6.3 Wider socio-economic benefits

Throughout this project, a case has been built to UCL that the investment in the façade should not be considered solely on a CapX vs. OpX model. Instead it should be appreciated that improvements to the façade will improve thermal comfort and noise, as well as light and air quality. This in turn improves health, well-being and productivity for occupants and ultimately provides wide economic savings.

In terms of quantifying this indirect productivity saving, there is a large body of research linking the internal built environment with improvements in health, well-being and productivity.

Example research papers include:

- 3% gain in productivity achieved by improved personal control over workspace temperature (Loftness et al, 2013).
- Better air quality can result in an 8-11% improvement in overall productivity (Loftness et al, 2013).
- Noise reduction in the workplace can increase productivity by up to 28% (Oseland and Burton, 2012)

In terms of quantifying this indirect cost benefit, according to published records on the 'Research Excellence Framework (REF)' portal, from 2008 and 2013 the average research income at the UCL Institute of Education was £15.5 million/year. If it was considered that the fabric refurbishment could improve overall productivity by 2% then over a 25 year period the total economic benefit could be up to £10 million. Over a 60 year period the total economic benefit could be up to £25 million.

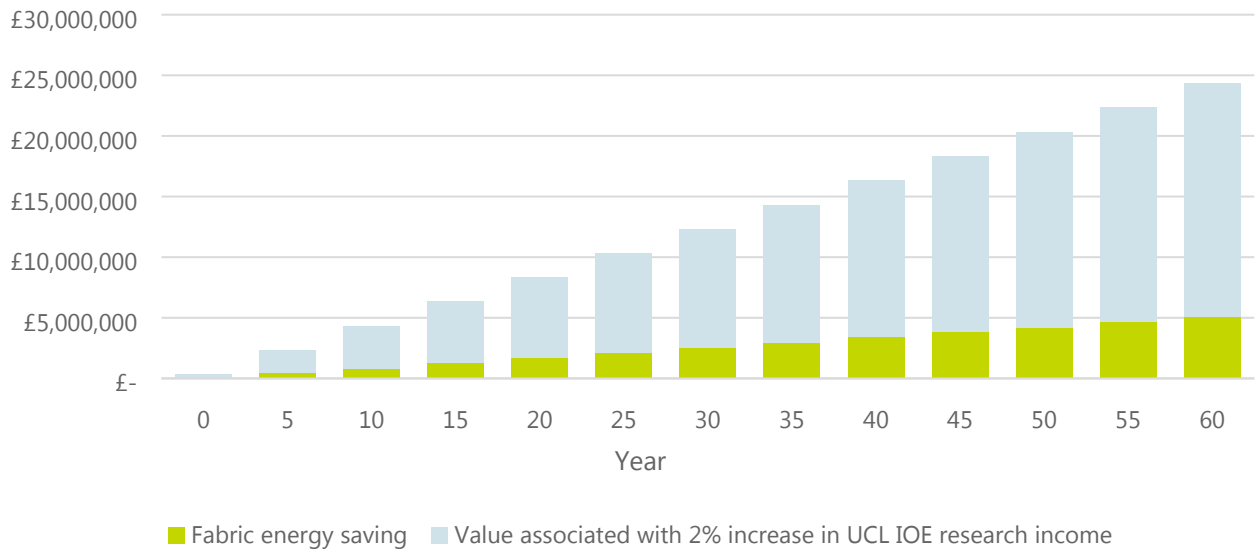


Figure 6-2 – Potential cost benefit from fabric upgrade including additional 2% productivity gain on research income

6.4 Next steps

Moving forward into the detailed design and construction stages for the Phase 1 refurbishment, further work will be undertaken to establish a set of baseline data for the IOE on metric such as thermal comfort, health, well-being and perceived productivity in the building. A user survey to support this process is currently being organised through the IOE, using the industry recognised 'Building Use Studies' (BUS) survey. This will inform the concept design stages for Phases 2 and 3 (and beyond), then also be available for benchmarking during a post occupancy evaluation as part of the client's commitment to long term sustainability.

Despite the constraints of this existing listed building, significant efforts have been made to date to improve the energy performance of the asset. As the design progresses, further work shall be carried out to develop detailed strategies for all IOE phases in line with the BREEAM Excellent requirements, the UCL Sustainable Building Standard, Building Regulations Part L2B and the Camden Planning requirements for existing buildings.

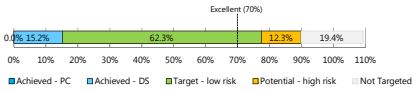
Appendix A – BREEAM tracker

BREEAM Refurbishment and Fit Out 2014 Tracker

BUROHAPPOLD ENGINEERING

Scheme: BREEAM RFO 2014
Project: UCL Institute of Education Phase 1
BRE Ref: BREEAM-0067-3285
Stages: Phase 1 Wing L2&3 and ISD L3 (RIBA Stage 4), and Phase 1 Wing L4&5 (RIBA Stage 2)
Date: 13-Apr-18
Rev: 17

Select >>	Phase 1 - L4&5
TARGET RATING	EXCELLENT
TARGETED LOW RISK SCORE	77.5%
MINIMUM STANDARDS ON TRACK?	YES
ACHIEVED CREDITS (DS)	15.2%
ACHIEVED CREDITS (PC)	0.0%



					IOE Masterplan					Phase 1 - L2&3 & ISD L3					Phase 1 - L4&5									
				%	75.8	90.9	19.0	22.2	0.0	74.3	87.8	22.1	25.7	0.0	77.5	89.8	19.4	15.2	0.0					
Credit Ref:	**Credit Issue (Mandatory Credits for Excellent shown red)**	**RIBA Stage**	**Available**	**% Score Value**	**Targeted - Low Risk**	**High risk - TBC**	**Not Targeted**	**Achieved - DS**	**Achieved - PC**	**Targeted - Low Risk**	**High risk - TBC**	**Not Targeted**	**Achieved - DS**	**Achieved - PC**	**Targeted - Low Risk**	**High risk - TBC**	**Not Targeted**	**Achieved - DS**	**Achieved - PC**	**Owner (lead support)**	**Design stage actions (and risks) IOE Masterplan - Phase 1** Green = Design stage evidence closed	**Owner (lead support)**	**Design stage actions (and risks) Phase 1 - L2&3 & ISD L3** Green = Design stage evidence closed	**Owner (lead support)**	**Design stage actions (and risks) Phase 1 - L4&5** Green = Design stage evidence closed
MANAGEMENT																								
Man 01	**Project Brief and Design**																							
Man 01	Stakeholder Consultation - Project Delivery (Defining roles and responsibilities)	Stage 2	1	0.65%	1			1		1			1		1					Arcadis, HB	Crit 1a-e, 2, 3a-k - All early stage masterplan evidence covering Phases 1-3 received covering all Crit. Crit 4 - See specific phases	Arcadis, HB	Crit 1a-e, 2, 3a-k - See masterplan evidence. Crit 4 - Meeting minutes and updated project execution plan for Phase 1 levels 2&3 and ISD Level 3 provided.	Arcadis, HB	Crit 1a-e, 2, 3a-k - See masterplan evidence. Crit 4 - Meeting minutes and updated project execution plan for Phase 1 levels 4&5 to be provided.
Man 01	Stakeholder Consultation -Third Parties (End users, local community, statutory consultees, etc.)	Stage 2	1	0.65%	1			1		1			1		1					HB, Arcadis	Crit 5 - Consultation evidence from masterplan stages provided. Crit 6 - Masterplan phasing strategy evidence provided. Crit 7 - See specific phases. Crit 8 - Architect leading consultation independently.	HB, Arcadis	Crit 5 - Consultation evidence provided (UCL, MLM, heritage) Crit 6 - Design / phasing strategy presentations provided for phase 1 levels 2&3 and ISD Level 3 provided. Crit 7 - Phase 1, stage 3 design team presentation provided. Crit 8 - Architect leading consultation independently.	HB, Arcadis	Crit 5 - Consultation evidence needed (UCL, MLM, heritage) Crit 6 - Design / phasing strategy presentations needed Crit 7 - Feedback presentations to stakeholders needed Crit 8 - Architect leading consultation independently.
Man 01	Sustainability Champion (Design Stage) - Appointment of a BREEAM AP to set BREEAM performance targets	Stage 1	1	0.65%	1					1					1					BH sust, Arcadis	Crit 9 - Mark Dowson (BuroHappold) appointed as BREEAM AP Crit 10 - BREEAM Excellent target included in UCL Sust Standard Crit 11 - BREEAM Excellent must be achieved to secure credit. Assumed this is low risk currently.	n/a	n/a	n/a	n/a
Man 01	Sustainability Champion (Design Stage) - Involvement of a BREEAM AP to monitor and advise on BREEAM progress	Stage 2 - 4	1	0.65%	1			1		1			1		1					BH sust	Crit 12 - Dependent on securing previous credit Crit 13 - See specific phases	BH sust	Crit 12 - See masterplan evidence. Crit 13 - BREEAM AP evidence at RIBA stages 2-4 gathered. BH to write up Stage 4 evidence to close credit.	BH sust	Crit 12 - See masterplan evidence. Crit 13 - BREEAM AP evidence at RIBA stages 2-4 to be gathered and written up.
Man 02	**Life Cycle Cost and Service Life Planning**																							
Man 02	Elemental Life Cycle Cost (LCC) analysis to PD156865:2008	Stage 2	2	1.30%	2			2		2			2		2					n/a	n/a	AECOM	Crit 1-2 - AECOM have provided an LCC study specific to the phase, including a fabric options study.	AECOM	Crit 1-2 - AECOM will need to update previous report to reflect addition of the new floors. Action from PM (Ajet) to Su Chia. Note this is a RIBA Stage 2 study.
	Component Level LCC Plan to PD156865:2008 (Envelope, Services, Finishes and external spaces)	Stage 4	1	0.65%	1					1					1					n/a	n/a	AECOM	Crit 3 - RIBA Stage 4 LCC report received from AECOM specific to the phase. BH to write up evidence to close credit.	AECOM	Crit 3 - As above, AECOM will need to update the RIBA Stage 4 LCC study to reflect the addition of the new floors.
	Capital Cost Reporting (£/m2) to the BRE		1	0.65%	1					1					1					n/a	n/a	AECOM	Crit 4. RIBA Stage 4 capital cost confirmation needed (Stage 3 confirmation is already in place).	AECOM	Crit 4. RIBA Stage 4 capital cost confirmation needed
Man 03	**Responsible Construction Practices**																							
	Pre-Requisite: Responsibly sourced timber		Pre-requisite	-	Y			1		Y			1		Y				1	n/a	n/a	Mace	Crit 1-2 - Mace have provided a letter of intent for "Phase 1" confirming that all timber will be legally harvested and traded.	Mace	Crit 1-2 - Mace have provided a letter of intent for "Phase 1" confirming that all timber will be legally harvested and traded.
	Environmental Management System operated by the Principal Contractor (E.g. ISO14001, BS8555)		1	0.65%	1					1					1					Mace	Crit 2-3 - Mace have provided a letter of intent confirming they have an EMS in place and that PPG61 will be followed. EMS certificate needed to close, together with PPG61 examples.	n/a	n/a	n/a	n/a
	Sustainability Champion (Construction Stage) - BREEAM AP appointed to monitor and advise on progress	Stage 5 Stage 6	1	0.65%	1			1		1			1		1				1	Mace	Crit 4-5 - Mace have confirmed that Conor Storkey is the Contractor's BREEAM AP. The Sustainability Employers requirements also confirm that this is required. Crit 6 - BREEAM Excellent must be achieved to secure credit. Assumed this is low risk currently.	n/a	n/a	n/a	n/a
	Considerate Construction (CCS or equivalent) **(ONE CREDIT NEEDED FOR BREEAM EXCELLENT)**		2	1.30%	2			1		2			2		2				1	n/a	n/a	Mace	Crit 7-8 - Mace have provided a letter of intent confirming that "Phase 1" will be registered for the Considerate Construction Scheme, targeting a score of 40 with 7 in all sections. Currently 39 achieved 180116) CCS registration details to be confirmed.	Mace	Crit 7-8 - Mace have provided a letter of intent confirming that "Phase 1" will be registered for the Considerate Construction Scheme, targeting a score of 40 with 7 in all sections. CCS registration details to be confirmed.
	Monitoring of Construction-site impacts (Energy and water consumption; transport movements for delivery of materials and waste transfer)		2	1.30%	2					2					2					n/a	n/a	Mace	Crit 9 - Mace to confirm who is responsible for site monitoring Crit 10-15 - Mace have confirmed in a letter for "Phase 1" that energy and water shall be monitored. Crit 16-19 - Mace to confirm transport monitoring shall be in line with BREEAM RFO requirements (current wording in letter is slightly different to manual, e.g. MEP not mentioned).	Mace	Crit 9 - Mace to confirm who is responsible for site monitoring Crit 10-15 - Mace have confirmed in a letter for "Phase 1" that energy and water shall be monitored. Crit 16-19 - Mace to confirm transport monitoring shall be in line with BREEAM RFO requirements (current wording in letter is slightly different to manual, e.g. MEP not mentioned).
Man 04	**Commissioning and Handover**																							
	Commissioning and Testing Schedule, including assignment of responsibilities, in line with Building Regulations, CIBSE and BSRIA.		1	0.65%	1					1					1					n/a	n/a	Mace, BH Mech	Crit 1-4 - The BH MEP employers requirements for L2&3 and ISD L3 for Mace made reference to all BREEAM requirements. Mace to provide commissioning schedule, the testing programme and confirm who is responsible to monitor and programme pre-commissioning, commissioning, testing and, where necessary, re-commissioning activities on behalf of the client.	Mace, BH Mech	Crit 1-4 - Mace to confirm that all BREEAM commissioning requirements are included in the RIBA Stage 3-4 design, and provide all supplementary evidence as per previous levels. Same evidence can apply if same appointments are extended to L4&5.
	Commissioning Building Services - Appointment of a specialist commissioning manager	Stage 4	1	0.65%	1					1					1					n/a	n/a	Mace, BH Mech	Crit 5 - Criteria 1-4 to be achieved. Crit 6 - The BH MEP employers requirements for L2&3 and ISD L3 for Mace made reference to all BREEAM requirements. Mace to confirm who is appointed as specialist commissioning manager, as well as their responsibilities.	Mace	Crit 1-4 - Mace to confirm that all BREEAM commissioning requirements are included in the RIBA Stage 3-4 design, and provide all supplementary evidence as per previous levels. Same evidence can apply if same appointments are extended to L4&5.

Credit Ref:	Credit Issue (Mandatory Credits for Excellent shown red)	RIBA Stage	Available	% Score Value	IOE Masterplan % 75.8 20.3 19.0 22.2 0.0: Targeted - Low Risk	High risk - TBC	Not Targeted	Achieved - DS	Achieved - PC	Phase 1 - L2&3 & ISD L3 74.3 87.8 22.1 25.7 0.0: Targeted - Low Risk	High risk - TBC	Not Targeted	Achieved - DS	Achieved - PC	Phase 1 - L4&5 27.5 89.2 19.4 15.2 0.0: Targeted - Low Risk	High risk - TBC	Not Targeted	Achieved - DS	Achieved - PC	Owner (lead, support)	Design stage actions (and risks) IOE Masterplan - Phase 1 — Green = Design stage evidence closed	Owner (lead, support)	Design stage actions (and risks) Phase 1 - L2&3 & ISD L3 — Green = Design stage evidence closed	Owner (lead, support)	Design stage actions (and risks) Phase 1 - L4&5 — Green = Design stage evidence closed
	Testing and Inspecting Building Fabric (E.g. Thermographic survey, air tightness)		1	0.65%	1					1			1		1					n/a	n/a	Mace, BH Mech	Crit 7-8 - The BH sustainability employers requirements confirmed that air tightness testing and thermal imaging is required and that any defects must be remedied. Design stage evidence can be closed.	Mace	Crit 7-8 - Mace to confirm that levels 4&5 will also be air tightness tested and undergo thermal imaging, with any defects rectified.
	Handover - Building User Guide and Training Schedule (Crit 10 NEEDED FOR BREEAM EXCELLENT)		1	0.65%	1					1			1		1					n/a	n/a	Mace, BH Mech	Crit 9 - Requirements for the BUG were included in the BH MEP preliminaires for L2&3 and ISD L3. Crit 10 - Requirements for the training schedule were also included in the BH MEP preliminaries.	Mace	Crit 9-10 - Mace to provide design stage evidence for L4&5 confirming that the BUS and training schedule will be completed in line with BREEAM requirements.
Man 05	Aftercare																								
	Aftercare Support for building occupants (Aftercare team for 12 months; Energy/water monitoring for 12 months)		1	0.65%	1					1			1		1					n/a	n/a	Mace, BH Mech	Crit 1-2 - The BH sustainability employers requirements included the requirements for aftercare support. Mace has provided letter confirming that all aftercare requirements will be met.	Mace	Crit 1-2 - Mace to provide letter confirming that all aftercare requirements will be met.
	Seasonal Commissioning over a 12 month period post-occupation (ONE CREDIT NEEDED FOR EXCELLENT RATING)		1	0.65%	1					1			1		1					n/a	n/a	Mace, BH Mech	Crit 3 - The BH MEP preliminaries for L2&3 and ISD L3 contain seasonal commissioning requirements. Mace has provided letter confirming that all aftercare requirements will be met.	Mace	Crit 3 - Mace to confirm that all seasonal commissioning requirements in BREEAM RFO will also be allowed for in L4&5.
	Post Occupancy Evaluation (Independent third party POE one year after occupation)		1	0.65%	1					1					1					UCL	Crit 4-5 - Letter of intent has been issued to UCL. Signed copy to be sent back to close design stage action.	n/a	n/a	n/a	n/a
HEALTH & WELLBEING																									
Hea 01	Visual comfort																								
	Glare Control Strategy (E.g. Building integrated measures, brise soleil, blinds)		1	0.77%	1					1			1		1					n/a	n/a	HB, Mace	Crit 1-2 - The architectural specifications (p27) confirm that blinds are required for all windows.	HB, Mace	Crit 1-2 - Architectural specs / drawings required to confirm that all windows on L4&5 will also have blinds installed.
	Daylighting		3	2.32%	1	2						3					2	1		n/a	n/a	Mace, RES, BH sust	Crit 3-5 - RIBA Stage 2 pre-assessment for Phase 1 achieved 19% compliance (i.e. no credits). 30% needed for 1 credit. RES (Appointed by Mace) to provided RIBA Stage 4 daylight results.	Mace, RES, BH sust	Crit 3-5 - RES (appointed by Mace) has provided RIBA Stage 4 daylight results, 1 credit awarded under method 2.
	View Out		2	1.55%	1	1					1	1			1	1				n/a	n/a	Mace	Crit 6-9 - Credit is challenging for these areas, however Phase 1 areas still need to be assessed at Stage 4 for inclusion in wider masterplan assessment. Mace/ Phoenix to provide analysis for Phase 1 areas. 80% of occupied spaces are within 7m of wall. window must be 20%> of wall area or more depending on room depth check BS 8206	Mace	Crit 6-9 - L4&5 areas to be assessed at Stage 4 for inclusion in wider masterplan assessment. Mace/Phoenix to provide analysis for Phase 1 areas. 80% of occupied spaces are within 7m of wall. window must be 20%> of wall area or more depending on room depth check BS 8206
	Internal and External Lighting Levels to CIBSE codes; Adequate zoning and local occupant control		1	0.77%	1					1					1					n/a	n/a	Mace, BH Elec	Crit 10-16 - The BH MEP specifications included the BREEAM requirements. Mace to ensure strategy complies and provide necessary evidence. Mace to provide nessecary evidence (specs, marked up drawings, lighting calcs) with letter signed.	Mace	Crit 10-16 - Mace to provide design stage evidence for L4&5 covering internal lighting, external lighting and zoning/occupant control (e.g. specs, marked up drawings, lighting calcs with letter signed).
Hea 02	Indoor air quality																								
	Indoor Air Quality Plan		1	0.77%	1			1		1			1		1				1	BH IAQ team, Mace	Crit 1 - The BH environment team have prepared in the indoor air quality plan for the project in line with BREEAM RFO requirements. Mace to note requirements.	n/a	n/a	n/a	n/a
	Minimising sources of external air pollution - Ventilation Strategy		1	0.77%		1					1					1				n/a	n/a	Mace, BH Mech	Crit 2.4 - Ventilation standards included in BH MEP specs (p31) Crit 3 - Mace to provide marked up drawings showing distances between intakes and exhausts and sources of external pollution. Crit 5 - Ventilation schematics provided by BH MEP showing location of CO2 sensors in mechanically ventilated areas.	Mace	Crit 2-5 - Provide design stage evidence to demonstrate compliance in Levels 4&5, allowing for different standards in nat vent vs mechanically ventilated areas.
	Minimising sources of internal air pollution - Specification of Low VOC finishes and fittings		1	0.77%	1					1			1		1					n/a	n/a	HB, Mace	Crit 6-7 - HB included a table in the architectural specifications listing out all applicable products and VOC standards. Mace to ensure it is implemented and provide evidence.	Mace	Crit 6-7 - Mace to provide details of VOC standards to be applied for levels 4&5. HB to provide evidence if they are providing specifications.
	Minimising sources of internal air pollution - Pre-completion indoor air quality testing		1	0.77%	1					1			1		1					n/a	n/a	Mace	Crit 8-12 - Mace have provided a signed letter of intent confirming that testing shall take place. Note that Mace have flagged it has challenging to achieve and will need to be carefully planned with construction phasing.	Mace	Crit 8-12 - Mace to provide letter confirming that the VOC testing shall also take place 'post construction, but pre-occupancy' on L4&5.
	Potential for Natural Ventilation		1	0.77%			1					1						1		n/a	Credit not achievable. Early modelling showed the need for mechanical cooling. BREEAM credit requires full nat vent everywhere.	n/a	n/a	n/a	n/a
Hea 03	Safe Containment in Laboratories																								
	Laboratory containment devices and containment areas	Stage 3	0	0.00%																n/a (Phase 1)	Confirmed 19 Jan 2017, that labs are likely to be included in Phase 2 & 3 scope of works, n/a to Phase 1.	n/a	n/a for this phase	n/a	n/a for this phase
	Buildings with containment level 2 and 3 laboratory facilities		0	0.00%																n/a (Phase 1)	Scope for labs on project TBC. If labs are Cat 2 or 3, then these credits would be required also.	n/a	n/a for this phase	n/a	n/a for this phase
Hea 04	Thermal Comfort																								
	Thermal Modelling		1	0.77%	1			1		1			1		1				1	n/a	n/a	Mace, RES, BH sust	Crit 1-5 - BH sustainability undertook preliminary modelling at RIBA Stage 3. RES (appointed by Mace) provided RIBA Stage 4 modelling results showing compliance with CIBSE Guide A winter and summer temperature ranges, as well as report on PMV and PPD indices under curent and future climate scenarios.	Mace, RES, BH sust	Crit 1-5 - RES carried out thermal comfort modelling for L4&5 at RIBA Stage 4.
	Adaptability - For a Projected Climate Change Scenario		1	0.77%	1			1		1			1		1				1	n/a	n/a	Mace, RES, BH sust	Crit 6 - Dependent on criteria 1-5 being achieved. Crit 7.9 - Future climate modelling carried out by RES/Mace at RIBA Stage 4, including PMV/PPD reporting Crit 8 - No failing spaces	Mace, RES, BH sust	Crit 6-9 - RES caried out future climate modelling for levels 4&5 in line with BREEAM requirements.

					IOE Masterplan					Phase 1 - L2&3 & ISD L3					Phase 1 - L4&5									
				%	75.8	20.9	19.0	22.2	0.0	74.3	87.8	22.1	25.7	0.0	77.5	85.2	19.4	15.2	0.0					
Credit Ref:	**Credit Issue** **(Mandatory Credits for Excellent shown red)**	**RIBA Stage**	**Available**	**% Score Value**	**Targeted - Low Risk**	**High risk - TBC**	**Not Targeted**	**Achieved - DS**	**Achieved - PC**	**Targeted - Low Risk**	**High risk - TBC**	**Not Targeted**	**Achieved - DS**	**Achieved - PC**	**Targeted - Low Risk**	**High risk - TBC**	**Not Targeted**	**Achieved - DS**	**Achieved - PC**	**Owner** (lead, support)	**Design stage actions (and risks)** IOE Masterplan - Phase 1 Green = Design stage evidence closed	**Owner** (lead, support)	**Design stage actions (and risks)** Phase 1 - L2&3 & ISD L3 Green = Design stage evidence closed	**Owner** (lead, support)	**Design stage actions (and risks)** Phase 1 - L4&5 Green = Design stage evidence closed
	Thermal Zoning and Controls		1	0.77%	1					1					1					n/a	n/a	Mace, BH Mech	**Crit 10** - Dependent on criteria 1-5 being achieved. **Crit 11** - BH MEP specifications conform to design stage modelling **Crit 12a** - BH MEP HVAC zoning drawings provided as prelimary evidence. Mace to provide final zoning drawings. **Crit 12b-e** - BH MEP meeting minutes provided confirming that users were consulted on controls/zoning for L2&3 and ISD L3.	Mace, BH Mech	**Crit 10-12a** - Mace to provide zoning strategy drawings and confirm how modelling has informed the approach. **Crit 12b-e** - BH MEP / Mace to confirm that UCL have been consulted on decisions relating to heating/cooling controls and zoning.
Hea 05	**Acoustic performance**																							
	Acoustic performance standards and testing (Sound insulation, indoor ambient noise level and reverberation times)		3	2.32%	3					3			3		3					n/a	n/a	BH acoustics, Mace, HB	**Crit 1-3** - The BH RIBA Stage 3 acoustics report has been provided confirming that 3 of 3 credits are achievable. Mark-ups are provided for levels 2&3 and ISD L3. CV to be provided. Mace have also provide a letter confirming post construction acoustic testing shall be carried out.	BH acoustics Mace, HB	**Crit 1-3** - Acoustics report and mark-up to be provided for L4&5.
Hea 06	**Safety and security**																							
Hea 06	Security of Site and Building (Security Needs Assessment)	Stage 2	1	0.77%	1					1					1					BH security	**Crit 1-2** - BH security team has been appointed as the SQSS. A CV has been provided. BH security provided an SNA for Phase 1 during RIBA stage 2, and also consulted with the DOCO. The report included reference to measures applicable to level 4.	BH security, Mace, Reach Active	**Crit 3 - At RIBA Stage 4 the** Reach Active security mark up was provided to Peter Smith, the BH security consultant who did not identify any problems. Peter requested that CCTV and access control drawings for L2&3 and ISD L3 be provided to enable full 'sign off'.	BH security, Reach Active	**Crit 3** - Security drawings for L4&5 to be prepared (e.g. by Reach Active again). BH security to provide similar sign off at RIBA stage 4.
ENERGY																								
Ene 01	**Reduction of CO2 emissions**																							
	Energy Performance **(SIX CREDITS NEEDED FOR BREEAM EXCELLENT UNDER THE RFO ASSESSMENT)**		15	9.11%	9	2	4	2		9	2	4	2		13	2	2			Heritage consultant	Crit 3-7 - Energy efficiency study compliant with BREEAM undertaken by heritage consultant securing 2 credits (applicable to historic buildings only).	Mace, RES, BH sust	**Crit 1-2** - RIBA Stage 4 BREEAM RFO energy modelling results to be proivded by RES (appointed by Mace). BH sustainability undertook pre-assessment identying 7 credits available, however note that this model did not include insulation to roofs or internal concrete walls so a higher score is expected. Provide model, description of inputs, assumptions and results.	Mace, RES, BH sust	**Crit 1-2** - RIBA Stage 3-4 BREEAM RFO energy modelling results will be required by the Contractor.
Ene 02	**Energy monitoring**																							
	Sub-Metering of Major Energy Consuming Systems **(ONE CREDIT NEEDED FOR BREEAM VERY GOOD OR EXCELLENT RATING)**		1	0.61%	1					1					1					n/a	n/a	Mace, BH Mech, BH Elec	**Crit 1-4** - BH MEP specs include requirements (e.g. sub meter by major end use and floor for both electrical and heat/DHW). Mace to provide final RIBA Stage 4 evidence.	Mace, BH Mech, BH Elec	**Crit 1-4** - Mace to provide metering pack and specifications in line with BREEAM.
	Sub-Metering of High Energy Load and Tenancy Areas		1	0.61%	1					1					1					n/a	n/a	Mace, BH Mech, BH Elec	**Crit 5** - BH MEP specs include requirements (e.g. sub meter by major end use and floor for both electrical and heat/DHW). Mace to provide final RIBA Stage 4 evidence.	Mace, BH Mech, BH Elec	**Crit 5** - Mace to provide metering pack and specifications in line with BREEAM requirements for education buildings. The bar will need to be separately metered (in addition to lecture halls, computer suites, etc).
Ene 03	**External lighting**																							
	External Lighting - Energy efficient specification		1	0.61%	1					1					1					n/a	n/a	Mace, BH Elec	**Crit 1-3** - BH MEP specifications made refence to BREEAM requirements. Mace to confirm the scope and external lighting and provide drawings, calculations and tech-subs.	Mace, BH Elec	**Crit 1-3** - Scope for external lighting on levels 4&5 to be confirmed. Mace to ensure any external lighting meets the BREEAM requirements and provide design stage evidence.
Ene 04	**Low Carbon Design**																							
Ene 04	Passive Design Analysis	Stage 2	1	0.61%	1			1		1			1		1			1		BH sust	**Crit 1** - Hea04 to be achieved to fully close credit. **Crit 2-3** - RIBA Stage 2 passive design analysis was completed covering the IOE masterplan. Can be used for all stages.	n/a	n/a	n/a	n/a
Ene 04	Free Cooling	Stage 2	1	0.61%			1					1					1			n/a	Credit not achievable. Early modelling showed the need for mechanical cooling. BREEAM credit requires all passive cooling.	n/a	n/a	n/a	n/a
Ene 04	Low and Zero Carbon Feasibility Study	Stage 2	1	0.61%	1			1		1			1		1			1		BH sust	**Crit 7-8** - BH sustainability carried out a masterplan LZC study at RIBA Stage 2. The study identified the Bloomsbury Heat & Power network as a key strategy, which the building is connecting to. Solar PV was also identified as a potential option.	n/a	n/a	n/a	n/a
Ene 05	**Energy efficient cold storage**																							
	Refrigeration Energy Consumption		1	0.61%	1					1					1					n/a	n/a	Mace	**Crit 1-2** - Mace to ensure that controls and components associated with cold storage areas (e.g. serving bar) have been designed, installed and commissioned in line with Code of Conduct for carbon reduction and BS EN 378-2. Products to be in line with Enhanced Capital Allowance (ECA) Energy Technology Product List (ETPL), or approved equivalent.	Mace	**Crit 1-2** - Mace to ensure that controls and components associated with cold storage areas (e.g. serving bar) have been designed, installed and commissioned in line with Code of Conduct for carbon reduction and BS EN 378-2. Products to be in line with Enhanced Capital Allowance (ECA) Energy Technology Product List (ETPL), or approved equivalent.
	Indirect Greenhouse Gas Emissions (Carbon Trust Refrigeration Road Map)		1	0.61%	1					1					1					n/a	n/a	Mace	**Crit 3-** Criteria 1-2 to be achieved **Crit 4 -** Mace to provide manufacturers evidence confirming the installed refrigeration system demonstrates a saving in indirect greenhouse gas emissions (CO2 eq.) over the course of its operational life.	Mace	**Crit 3-** Criteria 1-2 to be achieved **Crit 4 -** Mace to provide manufacturers evidence confirming the installed refrigeration system demonstrates a saving in indirect greenhouse gas emissions (CO2 eq.) over the course of its operational life.
Ene 06	**Energy efficient transportation systems**																							
	Energy Consumption (Lift analysis, energy options appraisal)		1	0.61%	1					1					1					n/a	n/a	Mace, lift supplier, BH Elec	**Crit 1** - BH MEP specs required Mace to provide a llift energy consumption study. Mace to provide study and/or request compliant study from lift supplier. Regenerative drives to be considered.	Mace, lift supplier	**Crit 1** - As per levels 2&3, Mace to provide lift energy use study compliant with BS EN ISO 25745 and/or request compliant study from lift supplier. Regenerative drives to be considered.
	Energy Efficient Features - Three of the following that offer most energy savings: Standby, energy efficient lighting, VVVF, Regenerative drive.		2	1.22%	2					2					2					n/a	n/a	Mace, lift supplier, BH Elec	**Crit 2-4** - BH MEP specs made reference to BREEAM energy efficiency requirements for lifts Mace to provide technical submittal confirming that all features will be included.	Mace, lift supplier	**Crit 2-4** - As per levels 2&3, Mace to provide technical submittal confirming that all energy efficiency features in lifts will be included.
Ene 07	**Energy efficient laboratory systems**																							
	Pre-requisite - Hea 03 criterion 1 (objective risk assessment)		Pre-requisite	-																n/a (Phase 1)	Confirmed 19 Jan 2017, that labs are likely to be included in Phase 2 & 3 scope of works, n/a to Phase 1.	n/a	n/a for this phase	n/a	n/a for this phase

Credit Ref:	Credit Issue (Mandatory Credits for Excellent shown red)	RIBA Stage	Available	% Score Value	IOE Masterplan % 75.8 20.3 19.0 22.2 0.0					Phase 1 - L2&3 & ISD L3 74.3 87.8 22.1 25.7 0.0					Phase 1 - L4&5 77.5 89.2 19.4 15.2 0.0					Owner (lead, support)	Design stage actions (and risks) IOE Masterplan - Phase 1 — Green = Design stage evidence closed	Owner (lead, support)	Design stage actions (and risks) Phase 1 - L2&3 & ISD L3 — Green = Design stage evidence closed	Owner (lead, support)	Design stage actions (and risks) Phase 1 - L4&5 — Green = Design stage evidence closed
					Targeted - Low Risk	High risk - TBC	Not Targeted	Achieved - DS	Achieved - PC	Targeted - Low Risk	High risk - TBC	Not Targeted	Achieved - DS	Achieved - PC	Targeted - Low Risk	High risk - TBC	Not Targeted	Achieved - DS	Achieved - PC							
	Design specification		0	0.00%																n/a (Phase 1)	Confirmed 19 Jan 2017, that labs are likely to be included in Phase 2 & 3 scope of works, n/a to Phase 1.	n/a	n/a for this phase	n/a	n/a for this phase
	Best practice energy efficient measures		0	0.00%																n/a (Phase 1)	Confirmed 19 Jan 2017, that labs are likely to be included in Phase 2 & 3 scope of works, n/a to Phase 1.	n/a	n/a for this phase	n/a	n/a for this phase
Ene 08	**Energy efficient equipment**																								
	Energy Efficient Equipment		2	1.22%	2					2					2					n/a	n/a	BH sust, Mace, RES, UCL	**Crit 1-2** - BH sustainability undertook a TM54 at RIBA stage 3 (in line with the UCL SBS) identifying small power as the main source of unregulated energy. **Crit 3** - UCL to provide letter confirming EnergyStar compliance.	Mace, RES, BH sust, UCL	**Crit 1-2** - Consultant leading modelling at RIBA Stage 3 to undertake the TM54 for the new levels. **Crit 3** - If unregulatd load for catering is highest, then the UCL letter will need updating.
TRANSPORT																									
Tra 01	**Public Transport Accessibility**																								
	Public Transport Accessibility Index (AI)		5	2.94%	5			5		5			5		5			5		BH sust	**Crit 1-2** - The transport index has been calculated for the masterplan and achieves maximum score. No further action needed.	n/a	n/a	n/a	n/a
Tra 02	**Proximity to Amenities**																								
	Proximity to Amenities		1	0.59%	1			1		1			1		1			1		BH sust, UCL	**Crit 1** - Maps have been produced indicating the safe pedestrian routes to amenities. Ben Stubbs has confirmed these are valid.	n/a	n/a	n/a	n/a
Tra 03	**Cyclist Facilities**																								
	Cycle Storage		1	0.59%			1					1					1			UCL, HB, Arcadis	**Crit 1** - Number of cycle racks to be confirmed based on proposed occupancy of building. Should be ample space for external cycle racks. This has not been included part of Phase 1, but could easily be targeted.	n/a	n/a	n/a	n/a
	Cyclist Facilities		1	0.59%			1					1					1			UCL, HB, Arcadis	**Crit 2-3** - Credit is contingent on achieving criteria 1 above. Then in addition, compliant showers/lockers/drying space etc would be needed in line with the required occupancy.	n/a	n/a	n/a	n/a
Tra 05	**Travel plan**																								
	Travel plan based on site specific travel survey/assessment	Stage 3	1	0.59%	1					1					1					Iceni, BH sust, UCL	**Crit 1, 2b-f, 3** - Iceni has prepared a travel plan for IOE. **Crit 2a** - Transport survey data for IOE is required for the travel plan. It was agreed this would captured in the BUS user survey. **Crit 4** - A letter of confirmation will be needed from UCL	n/a	n/a	n/a	n/a
WATER																									
Wat 01	**Water Consumption**																								
	Minimising water consumption **(ONE CREDIT NEEDED FOR BREEAM VERY GOOD AND EXCELLENT RATING, WHERE APPLICABLE)**		5	3.79%	3		2			3		2			3		2			n/a	n/a	Mace, BH Mech, HB	**Crit 1-3** - Flow rates included in BH MEP spec with requirement to achieve 3 credits. Mace to confirm final flow rates (inc. dishwashers) and provide product datasheets. **Crit 4-5** - Greywater not specified for Phase 1.	Mace, HB	**Crit 1-3** - Mace to confirm final flow rates as per L2&3, including bar area and dishwashers etc, and provide product datasheets. **Crit 4-5** - Greywater not specified for Phase 1.
Wat 02	**Water Monitoring**																								
	Water Monitoring **(Crit 1 NEEDED FOR BREEAM VERY GOOD OR EXCELLENT RATING)**		1	0.76%	1					1					1					Arcadis, Mace, BH PH	**Crit 1** - Mains water meter for IOE to meet minimum standards for BREEAM. Arcadis/UCL to confirm. **Crit 2** - Separate water meter for Phase 1 wing. **Crit 3-5** - Each main and sub have pulsed output connected to BMS. Relevant contractor to provide meter schematics and relevant evidence.	n/a	n/a	Mace, BH PH	**Crit 2** - Bar area to be fitted with separate accesible water meter. Mace to include in specification and schematic in line with BREEAM requirements.
Wat 03	**Water Leak Detection**																								
	Leak Detection System - mains water supply		1	0.76%		1					1					1				Arcadis, Mace, BH PH	**Crit 1** - Leak detection system will need to be installed on the mains water supply in line with BREEAM requirements. This would de-risk credit for all phases. Arcadis/UCL to confirm. Alternatively, Mace to provide leak detection to Phase 1.	n/a	n/a	n/a	n/a
	Flow control devices to WC areas		1	0.76%	1					1					1					n/a	n/a	Mace, BH PH	**Crit 2** - BH MEP specs and PH drawings contain solenoid shut of valves for WC areas. Mace to provide RIBA Stage 4 evidence to close design stage action.	Mace, BH PH	**Crit 2** - Mace to provide solenoid shut of valves for WC areas for levels 4&5. Evidence to be provided.
Wat 04	**Water Efficient Equipment**																								
	Water Efficient Equipment		1	0.76%	1					1					1					Mace, UCL, HB, Arcadis	**Crit 1-2** - Scope of irrigation for Phase 1 TBC. Where there are soft landscaped areas however no irrigation systems are specified, and therefore there are no unregulated water demands for the building, the credit available under this assessment issue can be awarded by default. Where there are no soft landscaped areas and no other unregulated water demands for the building, this credit is filtered out of the assessment.	n/a	n/a	n/a	n/a
MATERIALS																									
Mat 01	**Life Cycle Impacts**																								

					IOE Masterplan					Phase 1 - L2&3 & ISD L3					Phase 1 - L4&5								
				%	75.8	20.9	3.3	22.2	0.0	74.3	87.8	22.1	25.7	0.0	77.5	89.2	19.4	15.2	0.0				
Credit Ref:	Credit Issue (Mandatory Credits for Excellent shown red)	RIBA Stage	Available	% Score Value	Targeted - Low Risk	High risk - TBC	Not Targeted	Achieved - DS	Achieved - PC	Targeted - Low Risk	High risk - TBC	Not Targeted	Achieved - DS	Achieved - PC	Targeted - Low Risk	High risk - TBC	Not Targeted	Achieved - DS	Achieved - PC	Owner (lead, support)	Design stage actions (and risks) IOE Masterplan - Phase 1 Green = Design stage evidence closed	Owner (lead, support)	Design stage actions (and risks) Phase 1 - L2&3 & ISD L3 Green = Design stage evidence closed	Owner (lead, support)	Design stage actions (and risks) Phase 1 - L4&5 Green = Design stage evidence closed
	Green Guide rating of main building elements		6	6.56%	3	1	2			3	1	2			3	1	2			n/a	n/a	HB, Mace, BH MEP	Crit 1-7 - Option 1 compliance route (full LCA) not taken **Crit 8-10** - Option 2 compliance route taken. In this approach, the green guide rating of all newly specified materials is needed (as per a normal BREEAM assessment) with detailed area calculations not needed. For all elements, the overall % of elements retained in situ should be estimated (from 0%, <25%, >25%, >50%, >75%, 95%). In addition the overall % of newly specified materials or products with robust environmental information should be estimated (again from 0%, <25%, >25%, >50%, >75%, 95%). Note that the calculation also requires building services and Fit Out items must also be included in the schedule with 'robust environmental product information' provided - e.g. ISO 14000 compliant suppliers. The output of these results gives the Mat01 score with a maximum of 4 credits available. Mace/HB to provide relevant information.	HB, Mace	Crit 1-7 - Option 1 compliance route (full LCA) not taken **Crit 8-10** - Option 2 compliance route taken. Evidence as per Levels 2&3 to be provided. HB to provide information on materials and fit out. Mace to provide information on MEP.
Mat 03	**Responsible sourcing of materials**																							
	Pre-Requisite: Responsible sourced timber (Crit 1 NEEDED FOR BREEAM VERY GOOD OR EXCELLENT RATING)		Pre-requisite	-	Y			Y		Y			Y		Y			Y		n/a	n/a	Mace	Crit 1-2 - Mace have provided a letter of intent for "Phase 1" confirming that all timber will be legally harvested and traded.	Mace	Crit 1-2 - Mace have provided a letter of intent for "Phase 1" confirming that all timber will be legally harvested and traded.
	Sustainable Procurement Plan		1	1.09%	1					1					1					Mace	Crit 3 - Mace to provide a copy of the Sustainable Procurement Plan for the project. Note that this can either be an 'organisational document' or 'project specific'. It should cover aims, objectives and targets, material tracking procedures, risks & opportunities.	n/a	n/a	n/a	n/a
	Responsible Sourcing of Materials		3	3.28%	1	2				1	2				1	2				n/a	n/a	Mace, HB	Crit 3-4 - HB made reference to FSC/PEFC, BES 6001 standards, with ISO 14001 (supply chain and process) as a minimum requirement in the specs. Mace to provide required schedule of materials for design stage evidence. Note that BREEAM RFO awards one credit where at least three of the material types listed in Table 53 'Material categories' has been responsibly sourced from one of the responsible sourcing schemes recognised by BREEAM as detailed in Guidance Note 18.	Mace	Crit 3-4 - As per Levels 2&3, Mace to ensure materials are procured following FSC/PEFC, BES 6001 standards, with ISO 14001 (supply chain and process) as a minimum requirement. Mace to provide required schedule of materials for design stage evidence.
Mat 04	**Insulation**																							
	Embodied impact of insulation (fabric and building services)		1	1.09%	1					1					1					n/a	n/a	Mace, HB	Crit 1-2 - BH MEP and HB included requirements for insulations in specifications. Mace to provide schedule of insulation volumes for each element (external walls, GF, Roof, Building services), conductivity and green guide rating (A or A+) with manufacturer EPD where available.	Mace	Crit 1-2 - As per Levels 2&3, Mace to provide schedule of insulation volumes for each element (external walls, GF, Roof, Building services), conductivity and green guide rating (A or A+) with manufacturer EPD where available.
Mat 05	**Designing for Durability and Resilience**																							
	Protecting Vulnerable Parts of the Building From Damage (criteria below also needed for credit)		1	1.09%	1					1					1					n/a	n/a	Mace, HB	Crit 1 - Mace / HB to provide L2&3 and ISD L3 drawings marking up durability measures e.g. protection to entrance areas, corridoors, lifts, stairs, protection in kitchen areas, trolley movement, protection against vehicle collision where vehicle movement and parkin occurs within 1m of building.	Mace, HB	Crit 1 - Mace / HB to provide L4&5 drawings marking up durability measures e.g. protection to entrance areas, corridoors, lifts, stairs, protection in kitchen areas, trolley movement, protection against vehicle collision where vehicle movement and parkin occurs within 1m of building.
	Protecting Parts of the Building from Material Degradation (criteria above also needed for credit)																			HB, AECOM, Arcadis	Crit 2.3.5 - HB/AECOM to complete the materials degredation schedule for Phase 1 areas (BH sust have template), listing all applicable new and existing elements and protection standards. **Crit 4** - AECOM/Arcadis to provide structural survey reports assessing the severity of any degredation effects.	n/a	n/a	n/a	n/a
Mat 06	**Material Efficiency**																							
Mat 06	Material Efficiency	Stage 1-5	1	1.09%	1					1					1					n/a	n/a	BH sust, BH MEP, HB, AECOM, Mace	**Crit 1-2 -** At every RIBA Stage, opportunities have been identified, and appropriate measures investigated and implemented within the scope of refurbishment or fit-out works, to optimise the use of materials through building design, procurement, refurbishment, maintenance and end of life. RIBA Stage 1 - Phase 1 template completed at masterplan stage RIBA Stage 2 - Template updated RIBA Stage 3 - Template updated RIBA Stage 4 - Template updated . Mace MEP info needed. RIBA Stage 5 - TBC	BH sust, BH MEP, HB, AECOM, Mace	**Crit 1-2 -** Team to review Mat06 template at each RIBA Stage (produced initially for Wing levels 2&3 and ISD L3). Any new comments for L4&5 to be added where relevant. RIBA Stage 1 - Phase 1 template completed at masterplan stage RIBA Stage 2 - Template updated and/or confirmed no changes RIBA Stage 3 - TBC RIBA Stage 4 - TBC RIBA Stage 5 - TBC
WASTE																								
Wst 01	**Construction Waste Management**																							
Wst 01	Pre refurbishment audit	Stage 2	1	0.71%	1					1			1		1					n/a	n/a	Mace	**Crit 1** - Mace have issued a draft of the pre-refurbishment audit for L2&3 and ISD L3. Finalised audit report to be issued to allow this element of the credit to be closed.	Mace	Crit 1 - Pre-refurbishment audit for L4&5 to be conducted prior to strip out works.
	Reuse and direct recycling of materials		2	1.42%		2					2					2				n/a	n/a	Mace	**Crit 2-4** - Mace to confirm approach against Wst01 schedule (table 61) at stage 4 to assess potential for recycling and reusing in line with audit. Provide written confirmation of routes & tracking procedures for each material ytpe.	Mace	**Crit 2-4** - As per L2&3, Mace to confirm approach against Wst01 schedule (table 61) for L4&5. Provide written confirmation of routes & tracking procedures for each material ytpe.
	Construction Resource Efficiency		3	2.13%	2	1				2	1				2	1				n/a	n/a	Mace	**Crit 5-6** - Requirements included in tender process were to acihevе less than 4.5m3/100m2 GIA (less than 1.2 tonnes/100m2 GIA). Mace has provided SWMP. Unclear what level/part of the building this plan extends to.	Mace	**Crit 5-6** - Mace to extend SWMP to cover levels 4&5.
	Diversion of Resources from Landfill		1	0.71%	1					1					1					n/a	n/a	Mace	**Crit 7** - Requirements included in tender process were: - Non-demolition, 85% volume and 90% tonnage - Demolition, 90% volume and 95% tonnage. Mace has provided SWMP. Unclear what levels/part of the building this plan extends to.	Mace	**Crit 5-6** - Mace to extend SWMP to cover levels 4&5.
Wst 02	**Recycled Aggregates**																							

Credit Ref:	Credit Issue (Mandatory Credits for Excellent shown red)	RIBA Stage	Available	% Score Value	IOE Masterplan: Targeted - Low Risk (75.8%)	IOE Masterplan: High risk - TBC (20.5%)	IOE Masterplan: Not Targeted (19.7%)	IOE Masterplan: Achieved - DS (22.2%)	IOE Masterplan: Achieved - PC (8.0%)	Phase 1 - L2&3 & ISD L3: Targeted - Low Risk (74.1%)	Phase 1 - L2&3 & ISD L3: High risk - TBC (87.8%)	Phase 1 - L2&3 & ISD L3: Not Targeted (22.1%)	Phase 1 - L2&3 & ISD L3: Achieved - DS (25.7%)	Phase 1 - L2&3 & ISD L3: Achieved - PC (8.0%)	Phase 1 - L4&5: Targeted - Low Risk (77.5%)	Phase 1 - L4&5: High risk - TBC (89.2%)	Phase 1 - L4&5: Not Targeted (19.4%)	Phase 1 - L4&5: Achieved - DS (15.2%)	Phase 1 - L4&5: Achieved - PC (0.0%)	Owner (lead, support)	Design stage actions (and risks) IOE Masterplan - Phase 1 (Green = Design stage evidence closed)	Owner (lead, support)	Design stage actions (and risks) Phase 1 - L2&3 & ISD L3 (Green = Design stage evidence closed)	Owner (lead, support)	Design stage actions (and risks) Phase 1 - L4&5 (Green = Design stage evidence closed)
	Recycled Aggregates for high grade use		1	0.71%			1					1					1			AECOM	Credit not targeted. Structural engineer to review requirements and confirm if feasible to target for the project.	AECOM	Credit not targeted. Structural engineer to review requirements and confirm if feasible to target for the project.	AECOM	Credit not targeted. Structural engineer to review requirements and confirm if feasible to target for the project.
Wst 03	**Operational waste**																								
	Operational Waste (ONE CREDIT NEEDED FOR BREEAM EXCELLENT)		1	0.71%	1					1					1					UCL	**Crit 1-2** - UCL to confirm waste streams and sizing figures for the project. Requirements for waste store to be reviewed in line with BREEAM requirements and operational FM strategy.	n/a	n/a	n/a	n/a
Wst 05	**Adaptation to Climate Change**																								
Wst 05	Adaptation to Climate Change - Structural and Fabric Resilience	Stage 2	1	0.71%	1			1		1			1		1			1		BH sust, BH MEP, AECOM, HB	**Crit 1** - Climate change risk assessment was conducted for the IOE masterplan at RIBA Stage 2. Credit closed.	n/a	n/a	n/a	n/a
Wst 06	**Functional Adaptability**																								
Wst 06	Functional adaptability strategy	Stage 2 Stage 4	1	0.71%	1					1			1		1					n/a	n/a	HB, BH MEP, Mace	**Crit 1** - HB provided the RIBA stage 2 functional adaptability study for levels 2&3 and ISD L3. BH MEP evidence also included. **Crit 2** - Mace have provided RIBA stage 4 evidence, including details of furniture layouts, accessibility routes and confirmation of the MEP strategy and details of secondary glazing.	HB, BH MEP, Mace	**Crit 1** - HB have provided the RIBA Stage 2 functional adaptability mark-ups for wing levels 4&5 together with narrative. The Stage 2 MEP report has also been provided as supplementary evidence. **Crit 2** - Mace will need to provide RIBA Stage 4 evidence.
LAND USE & ECOLOGY																									
Le 02	**Ecological Value of Site and Protection of Ecological Features**																								
	Protection of existing ecological features		1	2.27%	1			1		1					1					Ecologist	**Crit 1-2** - An ecology report has been prepared. Requirements include protection of trees with trunks over 100mm diameter in accordance with BS5837:2012. Checks on any works that may disturb nests and eggs in areas such as trees, roof, gutters, soffit boxes, external beams. An ecologist is required on site should the Contractor's biodiversity champion deem necessary to check for any black redstart birds that may be nesting in roof areas and on gravel areas of the roof.	Mace	**Crit 1-2** - Mace sustainability champion to ensure measures are implemented in line with ecologist's report. Mace to provide evidence before work starts on site- that sustainability champion undertook survey- survey report and pictures of protection measures in place required as evidence. Mace to provide program and justification how activities have been timed to to avoid negative impact on biodiversity- check ecologist report	Mace	**Crit 1-2** - Mace sustainability champion to ensure measures are implemented in line with ecologist's report. Mace to provide evidence before work starts on site- that sustainability champion undertook survey- survey report and pictures of protection measures in place required as evidence. Mace to provide program and justification how activities have been timed to to avoid negative impact on biodiversity- check ecologist report
Le 04	**Enhancing Site Ecology**																								
LE 04	Ecologist's Report and Reccomendations	Stage 1 Stage 2	1	2.27%	1			1		1					1					Ecologist	Crit 1-3 - An ecology report was prepared. The report identifed that external terraces should include planters.	Mace, HB	**Crit 3** - Mace has provided letter confirming planters will be provided on external terraces with native species.	Mace, HB	**Crit 3** - Mace has provided letter confirming planters will be provided on external terraces with native species.
Le 05	**Long Term Impact on Biodiversity**																								
	Long Term Impact on Biodiversity (Landscape and habitat management plan; Site management for minimal impact on biodiversity)		2	4.55%	2					2					2					Ecologist	Crit 1-3 - An ecology report was prepared. The SQE confirmed that a landscape and habitat management plan is not necessary. Although the contractor will be required to appoint a biodiversity champion and monitor on-site activities.	Mace	**Crit 3** - Mace to provide finalised letter confirming the scope of the biodiversity champion, and provide evidence of checks undertaken to date.	Mace	**Crit 3** - Mace to provide finalised letter confirming the scope of the biodiversity champion, and provide evidence of checks undertaken to date.
POLLUTION																									
Pol 01	**Impact of Refrigerants**																								
	No Refrigerant Use		0	0.00%																n/a	n/a building has refrigerants	n/a	n/a building has refrigerants	n/a	n/a building has refrigerants
	Pre-Requisite for buildings that use refrigerants (compliance with industry standards and best practice)		Pre-requisite	-	Y					Y					Y					n/a	n/a	Mace, BH Mech	**Crit 2** - Requirements included in BH MEP specs. Mace to provide evidence that all systems will comply with the requirements of BS EN 378:20081 (parts 2 and 3) and where refrigeration systems containing ammonia are installed, the Institute of Refrigeration Ammonia Refrigeration Systems Code of Practice.	Mace	**Crit 2** - Mace to provide evidence that all systems will comply with the requirements of BS EN 378:20081 (parts 2 and 3) and where refrigeration systems containing ammonia are installed, the Institute of Refrigeration Ammonia Refrigeration Systems Code of Practice.
	Impact of Refrigerant (Low DELC C02 refrigerants)		2	1.75%	1		1			1		1			1		1			n/a	n/a	Mace, BH Mech	Crit 3-4 - Not targeted **Crit 5** - Requirements included in BH MEP specs. Mace to provide evidence for DELC CO2 calculation (refrigerant type, volume of refrigerant charge, cooling capacity etc for each system) plus supporting tech-subs / datasheets.	Mace	Crit 3-4 - Not targeted **Crit 5** - Mace to provide evidence for DELC CO2 calculation (refrigerant type, volume of refrigerant charge, cooling capacity etc for each system) plus supporting tech-subs / datasheets.
	Leak detection and containment		1	0.87%	1					1					1					n/a	n/a	Mace, BH Mech	**Crit 6-7** - Requirements included in BH MEP specs. Mace to provide schematics and manufacturer specs for leak detection on systems with refrigerant charge above 6kg.	Mace	**Crit 6-7** - Mace to provide schematics and manufacturer specs for leak detection on systems with refrigerant charge above 6kg.
Pol 02	**NOx Emissions**																								
	Low N0x Emissions plant for space heating and hot water		3	2.62%		3					3					3				BH sust, UCL	**Crit 1** - BH sustainability requested information about the NOx emissions for the BHP energy centre, but did not receive a reply regarding NOx. Re-request information.	Mace, BH Mech	**Crit 1** - Mace to confirm the heating and hot water loads for Phase 1 L2&3 and ISD L3 served by each item on plant (e.g. DH, heat pumps, any new boilers etc). Calculation is then rated to heat output from each system as per BREEAM method.	Mace	**Crit 1** - Mace to confirm the heating and hot water loads for Phase 1 L4&5 served by each item on plant (e.g. DH, heat pumps, any new boilers etc). Calculation is then rated to heat output from each system as per BREEAM method.
Pol 03	**Surface Water Run Off**																								
	Flood Risk Management		2	1.75%	2			2		2			2		2			2		AECOM	**Crit 1-6** - FRA report confirms that the site is located in flood risk zone 1 (low risk of flooding).	n/a	n/a	n/a	n/a
	Surface Water Run Off - neutral impact		1	0.87%	1			1		1			1		1			1		AECOM	**Crit 7-8** - The FRA report confirms the proposed Phase 1-3 refurbishment works will not increase surface water run off.	n/a	n/a	n/a	n/a
	Surface Water Run Off - 50% reduction		1	0.87%			1					1					1			n/a	Credit not targeted as these works are not included in the scope of the refurbishment strategy.	n/a	n/a	n/a	n/a
	Minimising Watercourse Pollution		1	0.87%			1					1					1			n/a	Credit not targeted as these works are not included in the scope of the refurbishment strategy.	n/a	n/a	n/a	n/a
Pol 04	**Reduction of Night Time Light Pollution**																								

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					Targeted - Low Risk	High risk - TBC	Not Targeted	Achieved - DS	Achieved - PC	Targeted - Low Risk	High risk - TBC	Not Targeted	Achieved - DS	Achieved - PC	Targeted - Low Risk	High risk - TBC	Not Targeted	Achieved - DS	Achieved - PC							
	Reduction of Night Time Light Pollution		1	0.87%	1					1					1					n/a	n/a	Mace, BH Elec	Crit 1-3 - BH MEP specifications made refence to BREEAM requirements. Mace to confirm the scope and external lighting and provide drawings, calculations and tech-subs confirming controls and ILP guidance has been followed.	Mace, BH Elec	Crit 1-3 - BH MEP specifications made refence to BREEAM requirements. Mace to confirm the scope and external lighting and provide drawings, calculations and tech-subs confirming controls and ILP guidance has been followed.
Pol 05	**Reduction of Noise Pollution**																								
	Reduction of Noise Pollution		1	0.87%	1			1		1			1		1			1		BH acoustics	Crit 2-5 - Acoustics study was carried out for Phase 1. To comply with the planning requirements of Camden Council, noise emissions from new plant should be a minimum of 5dB below the lowest measured background noise level. Since the requirements of the LA are more stringent, BREEAM criteria can automatically be met when the local planning requirements are satisfied.	Mace	Crit 2-5 - Mace has provided letter of intent confirming that acoustic recommendations will be implemented and that post construction testing shall be carried out to the required standard.	Mace	Crit 2-5 - Mace has provided letter of intent confirming that acoustic recommendations will be implemented and that post construction testing shall be carried out to the required standard.
INNOVATION																									
Man 03	Exemplary Level Credit: CCS score of 40 or above		1	1.00%	1					1					1					n/a	n/a	Mace	Crit 19 - Mace have provided a letter of intent confirming that "Phase 1" will be registered for the Considerate Construction Scheme, targeting a score of 40 with 7 in all sections.	Mace	Crit 19 - Mace have provided a letter of intent confirming that "Phase 1" will be registered for the Considerate Construction Scheme, targeting a score of 40 with 7 in all sections.
Man 05	Exemplary Level Crit: Building performance review at quarterly intervals over first 3 years of occupation		1	1.00%		1					1					1				UCL	Crit 4-5 - Letter of intent to be signed by UCL.	n/a	n/a	n/a	n/a
Hea 02	Exemplary Level Crit: - Minimising sources of internal air pollution through specification of exemplary low VOC products		1	1.00%		1					1					1				n/a	n/a	HB, Mace	Crit 6-7 - HB included a table in the architectural specifications listing out all applicable products and VOC standards. Mace to ensure it is implemented and provide evidence. Innovation levels likely to be challenging to gather all evidence for.	Mace	Crit 6-7 - Mace to provide details of VOC standards to be applied for levels 4&5. HB to provide evidence if they are providing specifications.
Wat 01	Exemplary Level Crit: Exemplary water efficiency and rain/water recycling for WC/urinal flushing		1	1.00%			1					1					1			BH MEP, Mace	Credit to be reviewed at masterplan level. Phase 1 areas are not currently targeting this level of performance.	n/a	n/a	n/a	n/a
Mat 01	Exemplary Level Crit Green Guide to Specification (Elemental Approach)		1	1.00%			1					1					1			Mace, HB	Very high scoring would be required on the BREEAM RFO Mat01 (option 2) tool to achieve this. The main limitation is providing 'robust environmental information' for MEP items.	n/a	n/a	n/a	n/a
Mat 01	Exemplary Level Crit Compliant Life Cycle Assessment Software Tools (Whole Building Approach)		2	2.00%			2					2					2			BH sust, Mace	IES IMPACT software would need to be used to carry out a whole building LCA. This is currently not included in the scope.	n/a	n/a	n/a	n/a
Mat 03	Exemplary Level Crit - At least 70% of the available RSM points are achieved		1	1.00%			1					1					1			Mace	Very stringent responsible sourcing would be required to achieve this innovation credit.	n/a	n/a	n/a	n/a
Wst 01	Exemplary Level Crit - ≤ 1.4m3 per 100m2 waste, and 95% diversion from landfill.		1	1.00%			1					1					1			Mace	Waste generation targets are likely to be too challenging for the project to achieve. (Mace have already flagged that the target of 4.5m3/100m2 is already challenging).	n/a	n/a	n/a	n/a
Wst 05	Exemplary Credit - Responding to Adaptation to Climate Change		1	1.00%			1					1					1			AECOM, Mace, BH sust	A number of requirements have been met. In order to achieve this credit, the key limitation is that 2 credits are needed on "Pol 03 - 50% reduction in surface water run-off" which is currently outside of the scope of the project. 8 credits would also be needed on Ene01.	n/a	n/a	n/a	n/a
	BESPOKE BRE Approved Innovations		Varies																	UCL, BH Sust, Mace	Identify any possible opportunities for masterplan level bespoke innovation credits UCL sustainablity may be able to fund (e.g. wellness facilities, air quality enhancers, innovative PV solutions, window traffic light systems, living lab sensors, phase change materials, productivity surveys, flow batteries, outdoor gym etc).	n/a	n/a	n/a	n/a

[1] Note: a maximum of 10 credits can be awarded from the available innovation credits

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