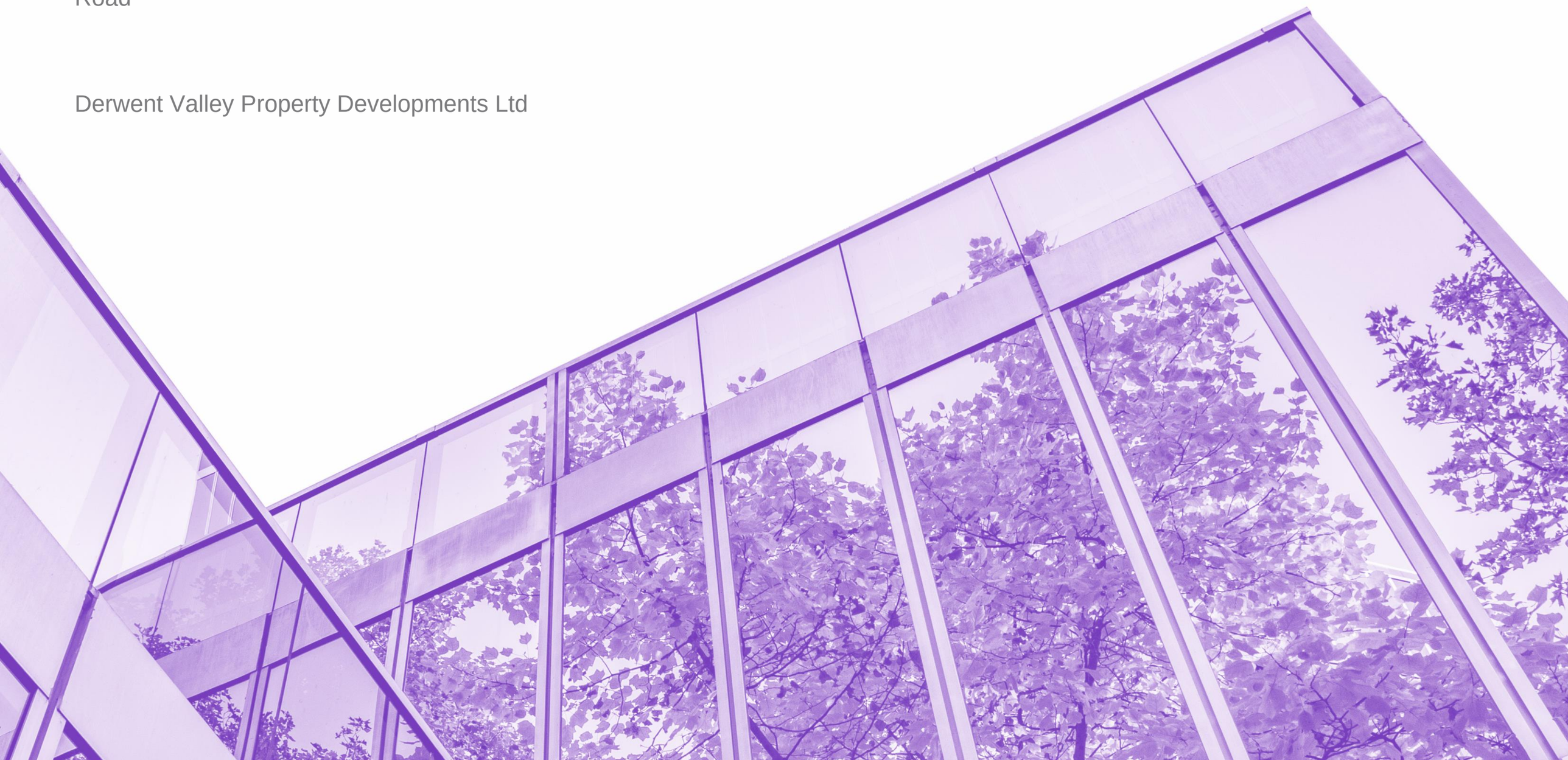
Sustainability Statement – RM2

The Network Building, 95-100 Tottenham Court Road

Derwent Valley Property Developments Ltd



Client	Derwent Valley Property Developments Ltd.	
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Figure 1-1 Network Building from Tottenham Court Road

Contents

1.0 Executive Summary

This reserved matters (RM) Sustainability Statement has been prepared on behalf of Derwent Valley Property Developments Limited by TFT in support of the class E-g(ii) life science building use with high quality retail for the sale of goods E(a) and/or food & drink E(c) facing Tottenham Court Road to the East and Howland Street to the South. This Statement appraises and reports on the environmental and social performance against local, London wide and national sustainability policies, highlighting specific considerations in relation to this Reserved Matters application.

This outline Sustainability Statement sets out:

- A description of the existing site and proposed reserved matters application;
- Specific planning considerations and demonstration against sustainability principles.

1.1 Proposed Development

Derwent Valley Property Developments Limited is submitting a reserved matters application for the demolition of the existing building and erection of a life science building with 11,374sqm (Class E-g (ii)) research and development of products or processes on floors 02-06, 4,211sqm(Class E-g(i)) office use on ground, first and seventh floors and 487sqm for two high quality (Class E- a/b) retail units on Tottenham Court Road. Associated cycle parking, servicing and all necessary enabling works are included in the proposals.

1.2 Sustainability Aspirations

This reserved matter application has been assessed against relevant sustainability criteria with a focus on; Certification; Energy and Carbon; Embodied Carbon; Climate Resilience; Circular Economy; Biodiversity; Transport; Water; Community and Wellbeing.

2.0 Introduction

2.1 The Applicant

The Applicant is Derwent Valley Property Developments Limited (hereafter referred to as 'The Applicant') which has appointed TFT to assess the sustainability performance of the proposed reserved matters application against relevant sustainability planning policy.

2.2 Purpose

This statement has been prepared on behalf of The Applicant by TFT. The Sustainability Statement appraises and reports on the environmental and social performance of the proposed reserved matters application against local, London wide and national sustainability policy.

This Sustainability Statement sets out:

- A description of the existing site and proposed reserved matters application.
- Specific planning considerations and demonstration against sustainability principles.

This Sustainability Statement forms part of a suite of documents that accompanies the planning application, and should be read in conjunction with the following documents that provide detailed evidential inputs:

- Design & Access Statement;
- Energy Statement;
- Transport Assessment and Travel Plan;
- Delivery and Servicing Strategy;
- Framework Construction Logistics Plan;
- Construction Environmental Management Plan (CEMP);
- Surface Drainage Statement;
- Security Needs Assessment;
- Air Quality Assessment;
- Noise Attenuation Report;
- Statement of Community Involvement;
- Preliminary Ecological Appraisal and;
- BREEAM Pre-assessment report

2.3 Site Description

For details and of the site's location please refer to the OPA.

2.4 Proposed Development

The Applicant is submitting a reserved matters application (RMA) for the demolition of the existing building and erection of a life science building with 11,374sqm (Class E-g (ii)) research and development of products or processes on floors 02-06, 4,211sqm(Class E-g(i)) office use on ground, first and seventh floors and 487sqm for two high quality (Class E- a/b) retail units on Tottenham Court Road. The Proposed Development will be a "car free" development with zero car parking spaces. 122 long stay cycle storage spaces alongside 24 short stay spaces are proposed alongside shower facilities and associated locker and changing facilities. Figure 2-1 shows the building class mix from basement, ground and up to seventh floors through the north south section.

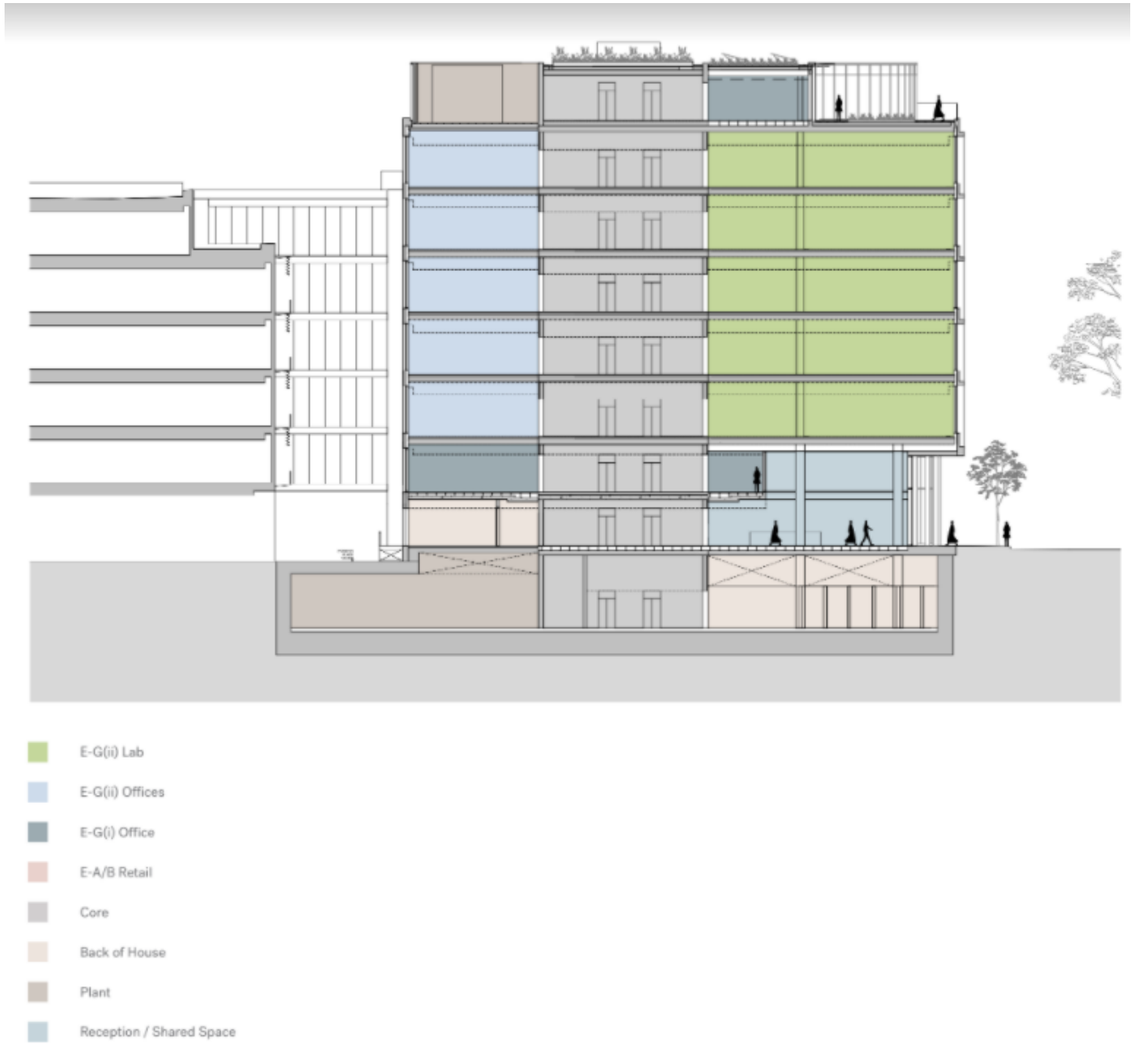

Figure 2-1 – North South section of the Proposed Development

2.5 Sustainability

This RMA has been assessed against relevant sustainability criteria, specific considerations and principles have been included within this application covering the following: Certification; Energy and Carbon; Circular Economy; Transport; Community and Wellbeing. The following sections of this Sustainability Statement outlines how the scheme demonstrates compliance against the current and draft New London Plan and local Camden Planning Policy.

3.0 Legislation and Planning Policy

The RMA proposals apply same the planning policy requirements as the OPA, please refer to the Sustainability Statement for this application for details.

4.0 Sustainability Certification

4.1 BREEAM 2018

The scope of this BREEAM scheme is to assess the environmental impacts of new, non-domestic buildings at the design and construction stages. For the purpose of the assessment the BRE defines 'New Construction' as developments that results in a new standalone structure, or new extension to an existing structure, which will come into operation or use for the first time upon completion of the works. The proposed Class E-g(ii) lab enabled scheme is a newly constructed building and therefore will be assessed under the BREEAM New Construction 2018 assessment method. As there are Category 2 Laboratory facilities present the most appropriate assessment method will BREEAM 'other buildings – research and development'.

The brief for the Network Building embeds sustainable design as a driving principle. The proposed scheme has been developed on best practice principles with a view to achieving a BREEAM Excellent (min. 70%) rating as a minimum. The team have undertaken a BREEAM pre-assessment to ascertain the potential rating and action early design criteria to ensure future flexibility and pursual of formal certification. As per the office RMA this scheme will be designed to reduce embodied and operational carbon emissions and energy use through efficient building services systems, minimise waste and optimise materials efficiency and will test principles of the circular economy. whilst building services have been proposed to contribute to improving local air quality. Water efficiency measures have been combined with an appropriate drainage strategy to minimise surface water runoff and minimise the need for irrigation of the extensive soft landscaping proposals which will improve the existing site biodiversity, and increase site greening.

The Applicant have appointed TFT as the BREEAM Assessor for the early stage of design development who have been responsible for ensuring the design team action early design considerations to achieve the BREEAM Excellent rating. During early design development, TFT have worked collaboratively with the design team and other stakeholders to address the sustainability objectives in a holistic manner and apply best practice to fulfil and exceed where possible the targets. A summary of the BREEAM pre-assessment strategy is included opposite (Table 4-1) with full details can be found in APPENDIX A: BREEAM Pre-Assessment Report.

Section	Targeted Credits for Excellent	Excellent (%)	Credit worth (%)	Section Weighting	Credits available
Management	**18**	11.00%	0.61%	11.00%	**18**
Health & Wellbeing	**8**	6.40%	0.80%	8.00%	**10**
Energy	**18**	9.69%	0.54%	14.00%	**26**
Transport	**8**	7.67%	0.96%	11.50%	**12**
Water	**6**	4.67%	0.78%	7.00%	**9**
Materials	**7**	8.75%	1.25%	17.50%	**14**
Waste	**7**	4.90%	0.70%	7.00%	**10**
Land Use & Ecology	**11**	12.69%	1.15%	15.00%	**13**
Pollution	**9**	6.75%	0.75%	9.00%	**12**
Innovation	**2**	2.00%	1.00%	N/A	**10**
TOTAL	94	**74.52%**	-	-	134.0

Table 4-1– BREEAM pre-assessment Excellent strategy rating

The scheme balances performance across the 9 credit section categories. The lab enabled scheme performs particularly well under sections relating to, Management (100%), Waste (70%), Health and Wellbeing (80%), Water (67%) and Land Use and Ecology (85%). In line with current Camden policy, the scheme prioritises reducing energy use, both regulated and operational achieving 69% of available credits, promotes material optimisation, and proposes significant ecological enhancement on site. The BREEAM proposals highlight the ethos to incorporate design and construction best practice principles and efforts to align with Camden's CC2 and Energy CPG.

4.2 Policy Alignment

The BREEAM preassessment aligns with the requirements of the following statutory policies:

Policy Document	Policies
Camden Local Plan	CC2 – Adaptation to Climate Change
Camden Supplementary Plan	CPG: Energy efficiency and adaptation
London Plan (2018)	Policy 5.3 - Sustainable design and construction
New Draft London Plan (2020)	SI 2: Minimising Green House Gas Emissions
	SI 5 Water Infrastructure

5.0 Energy and Carbon Emissions

As per the LBC's sustainable development planning requirements, this section sets out the following information for the Proposed Development:

Energy demand of the building including

- energy efficiency measures (air tightness, energy efficient plant and light installations) and demand management measures (passive ventilation and solar shading)
- low and zero carbon technologies (district heating, combined heat and power, air source heat pumps, photovoltaic cells, solar cells, ground source heat pumps) calculations of carbon emissions savings

Whole life carbon assessment of the building including:

- LCA methodology
- Embodied carbon data

5.1 Energy Demand Assessment

In support of the planning application, an Energy Statement that examines the potential for reduction of carbon emissions for the proposed Class E-g(ii) lab enabled development has been prepared.

LBC and the draft New London Plan have specific requirements with regards to improvements on operational carbon emissions in comparison to 2013 Building Regulations Part L. In line with the draft London Plan (Policy SI 2), any major development should aim to be net-zero carbon and demonstrate a minimum 35% improvement on Part L 2013 carbon emissions. Non-residential development should achieve 15 per cent through energy efficiency measures (Be Lean stage of the energy hierarchy). Where the zero-carbon target cannot be fully achieved on-site, any shortfall should be provided as a carbon offset fund.

An Energy Strategy has been prepared in accordance with guidance outlined in the 'Greater London Authority guidance on preparing assessments (October 2018)' and with the further guidance set out in the 'Mayor's Sustainable Design and Construction Supplementary Planning Guidance (April 2014)' to comply fully with London Plan Policies 5.2 to 5.9 and the draft New London Plan. The Energy Statement demonstrates how the Proposed Development will comply with LBC and GLA's policy requirement of a 35% minimum reduction of carbon emissions on 2013 Building Regulations Part L.

The GLA's hierarchical approach has been adopted which comprises four key principles for reducing regulated energy demand:

1. 'Be Lean' considers passive design measures to reduce energy demand;
2. 'Be Clean' explores how system efficiencies maximise the use of energy;
3. 'Be Green' identifies additional energy production opportunities through installation of low and zero carbon technologies; and
4. 'Be Seen' monitoring and reporting of energy performance in operation to ensure actual consumption are in line with the GLA's zero carbon target.

5.2 Lean - Use Less Energy

Planning policy encourages development to achieve Part L 2013 Building Regulations requirements through design and energy efficiency alone, as far as is practically possible. In response, the proposed lab enabled application has followed a fabric first approach and is designed with enhanced thermal envelope performance and envelope airtightness to reduce regulated energy demands of the development:

- U-values that exceed minimum Building Regulation Part L 2013 standards.
- a target air permeability rate of 5.0 $m^3/h/m^2$, surpassing Building Control requirements.
- effective use of natural daylighting to reduce the need for artificial lighting.
- highly efficient HVAC equipment with heat (73% efficiency) recovery for ventilation and heating.
- Variable speed pumps to reduce energy for heating and cooling.
- energy efficient LED lighting specified for all areas with absence control daylight dimming, PIRs and manual controls

The design also follows the cooling hierarchy through the following measures:

- Recessed windows to reduce direct solar gains.
- Energy efficiency lighting with daylight and occupancy controls alongside improved fabric insulation and airtightness to reduce heat gains in summer.
- managing the heat within the building by maximising the use of thermal mass and concrete slab, masonry walls, structural columns and exposed ceilings.
- Mechanical ventilation via central AHU with high efficiency heat recovery system. Ventilation plant has been design to avoid excessively long duct runs and increased fan power.
- High efficiency air cooled heat recovery chillers and air source heat pumps as active cooling measures.
- The carbon savings on regulated carbon emissions after the 'Lean' stage of the energy hierarchy for development are 7%, totaling 20.5tCO2e/year.

For more details of the energy efficiency measures proposed for The Network Building, refer to Arup's Energy Statement submitted as part of the planning application.

5.3 Clean - Energy Efficient Supply

In line with London Plan Policy 5.6 the Energy Statement details the considerations of decentralised energy and energy systems and explored:

- a connection to an existing district heating networks;
- connection to planned district heating networks;
- implementing a site wide private district heating network; and
- a combined heat and power (CHP) system.

The proposed design currently sits outside the reach of any existing district heating network but with a potential future network within 350m from the Proposed Development which could offer a potential connection opportunity when it becomes available. The project's mechanical engineers NDY have been in contact with the local authority to establish any heat network connection opportunities and they confirmed that currently there are no available networks to connect to. Due to the lack of existing district heating network in the vicinity, and the likelihood that any new system would take several years before it becomes available for connection, we believe it would be unreasonable to suggest the allowances for future connection to a heat network. Nevertheless, space allocations for additional plant provision allowing future integration into the district heat network have been made.

Gas fired Combined Heat & Power (CHP) Plants, also known as cogeneration, uses conventional stationary internal combustion engines or turbines to generate both electricity and heat. Assuming the CHP plant is well designed and as such will be able to utilise large proportions of waste heat on an annual basis, this leads to an overall increase in the CHP plant efficiency to figures significantly greater than those of a conventional internal combustion engine, and is the basic advantage of a CHP plant. Gas fired CHPs do, however, impact local air quality and require large amounts of space within plantrooms. There are associated problems of combusting fuels within cities in terms of NOx emissions and particulate matter (PM10). It is likely that the installation of a CHP will not align with Camden's core policies or GLA policies. For this reason, gas CHP engines have been deemed unsuitable for installation in the laboratory enabled Derwent network building.

5.4 Green - Renewable Energy

The Energy Statement contains the feasibility appraisal of Low and Zero Carbon (LZC) technologies suitable for the Proposed Development to further reduce regulated carbon emissions over the 'Be Clean' scenario. LZC technologies that have been appraised are:

- Wind Turbines;
- Ground Source Heat Pumps (GSHP);
- Air Source Heat Pumps (ASHP);
- Biomass Heating;
- Solar Photovoltaic (PV) panels; and
- Solar Water Heating Systems.

Wind turbines: Wind turbines are generally less suitable in dense urban environments such as the proposed development as the wind speed will be lower and more disrupted than on a similar site in a more rural location. In order to get any power from wind turbines they need to be mounted significantly above all obstacles, which means they have a visual impact not considered appropriate in this. It is for these reasons wind turbines have not been deemed appropriate for this scheme.

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Ground Sourced Heat Pumps: The Proposed Development has a limited building footprint to house the number of boreholes required for a successful GSHP installation suitable for a development this size. GSHPs require a large amount of capital investment and are significantly more complicated in operation when compared to air and water source heat pumps, Water source heat pumps require access to a large body of water which is not possible at this site. Furthermore, an ASHP with simultaneous heating and cooling will prove to be more cost effective than a GSHP. A GSHP system is therefore not considered as a viable solution.

Air Sourced Heat Pumps: Air sourced heating could provide a large proportion of the development's annual energy demand without a large space requirement for mounting equipment. Through the design of a highly efficient façade system, the space heating requirement for the building has been minimised, however a heat pump system could provide the heating required for the domestic hot water systems serving all the basement showers and 'end of journey' facilities. The heat pumps can be situated on the roof-top plant room and also benefit from the Renewable Heat Incentive. An ASHP system will produce approximately 73% less CO2 emissions per kWh of heat generated than a conventional gas boiler system. Heat pumps systems have been considered a feasible technology for the Proposed Development to provide space heating and cooling to all occupied areas.

Biomass Heating: Biomass boilers work on the principle that the combustion of wood chip or pellets can create heat for space heating and hot water loads. While biomass is of increasing interest owing to the assumed low carbon nature of the fuel, there are increasing concerns being voiced publicly. These include noise and emissions associated with delivery of the fuel and also the impact of combusting an organic fuel in cities in terms of NOx emissions and particulate matter (PM10). The adverse impact on air quality does not lend itself to being sited within the Camden region according to the Policy CC4 "Air Quality".

Energy from Waste: Methane gas from sewage or waste can be captured and used for firing boilers. The Proposed Development will not generate sufficient waste to make this option worthwhile. Moreover, plant space requirements and emissions (air quality and odour) would be an issue. This option is therefore not considered feasible.

Solar Photovoltaics (PVs): Due to the high-rise nature of the development, the available roof space is limited and is taken up by external plant. However PV has been determined as feasible to generate electricity, A total of 131 panels can potentially be installed on the green roof area, a total array area of 232.4m2, equivalent to a total solar PV electrical output capacity of 52.4 kWp. Figure 5-1 details the proposed roof layout with an indicative location for a PV array in contribution to reducing regulated carbon emissions.

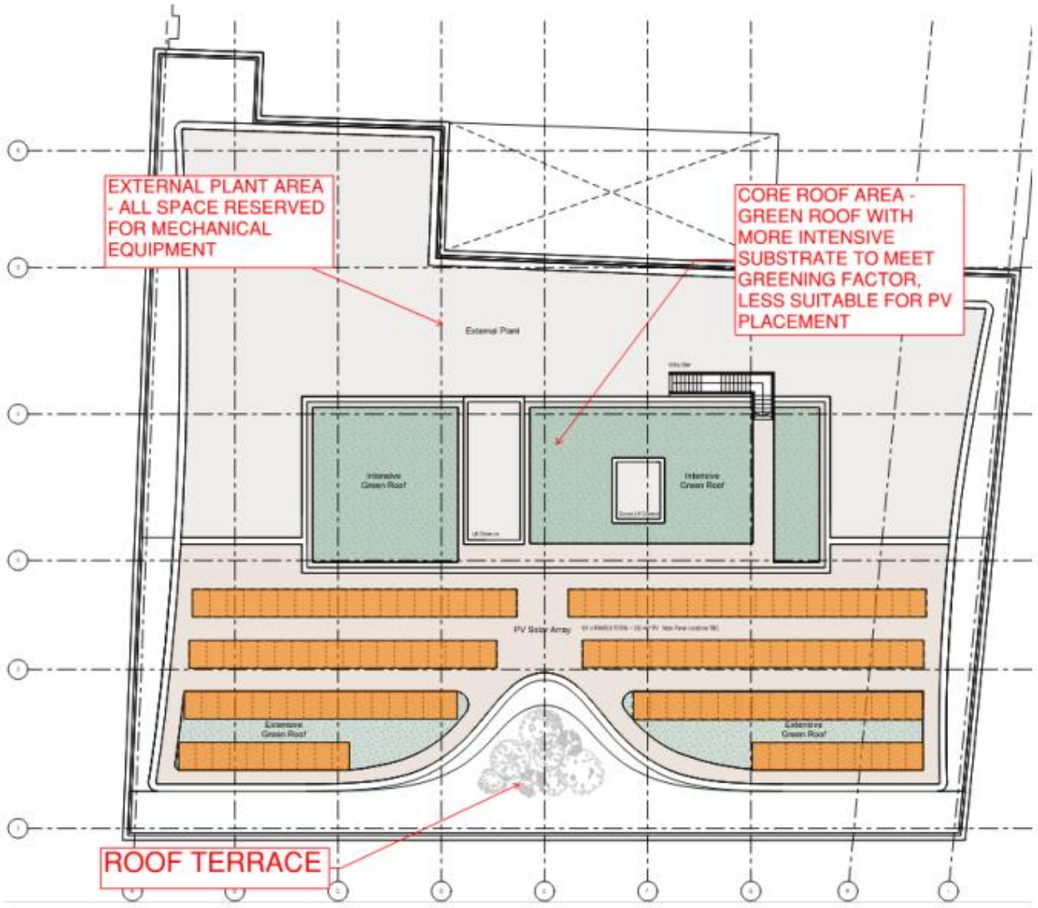


Figure 5-1: Proposed PV layout

Solar water heating: Solar hot water systems are more cost efficient on buildings with a high demand for domestic hot water. Constraints and considerations for use include overshadowing from adjacent buildings and other rooftop structures, as well as compatibility with other roof space uses (including roof plant and green roofs). Solar thermal will be competing for roof space with Solar PV. As heat pumps will be installed to provide space heating, these can also provide the primary energy which the solar thermal technologies would provide. As a technology is therefore already being installed which can provide this primary energy for domestic hot water (DHW), it was deemed more suitable to utilise the roof space for solar photovoltaic installation.

In summary, the Proposed Development has the potential of benefiting from a heat pump system for space heating and cooling requirements of the building and photovoltaic panels for generating additional electricity.

The carbon savings for the “Green” stage of the energy hierarchy, are 78.9 tCO2e/year constituting an additional 26% saving.

Table 5-1 below details the scheme’s regulated (and unregulated) carbon emissions and detailed the savings across each stage of the energy hierarchy.

Stage of the GLA Energy Hierarchy	CO2 Emissions	
	Regulated emissions (tCO_2/yr)	Unregulated emissions (tCO_2/yr)
Baseline	304	190.1
Be Lean	283.6	190.1
Be Clean	283.6	190.1
Be Green	204.7	190.1

Regulated CO_2 emissions savings	Tonnes of CO2 per annum	%
Be lean: Savings from energy demand reduction	20.5	7%
Be clean: Savings from heat network	-	-
Be green: Savings from renewable energy	78.9	26%
Total cumulative savings	99.3	33%
Annual savings from off-set payment	204.7	-
Shortfall in Regulated CO2 savings	**Tonnes of CO_2**	
Cumulative savings from offset payment	**6,140**	-
Cash-in-lieu contribution (based on £95/tonne)	**£583,332**	-

Table 5-1 Summary of regulated CO2 savings from each stage of the energy hierarchy for non-domestic buildings

5.5 Cash in Lieu Contribution

In accordance with the London Plan Policy 5.2, developments should make the fullest contribution to minimising carbon dioxide emissions and should meet the 35% reduction targets on site unless clearly demonstrated that this cannot be met. Where 35% targets are not achievable on site, a cash in lieu contribution is required to the local authority to secure the delivery of carbon dioxide savings elsewhere.

The scheme targets a 33% improvement via ‘be lean’, ‘be clean’ and ‘be green’ design measures and will therefore be required to pay a cash in lieu payment to achieve the minimum 35% requirement which is included in the offset total outlined in Table 5-1.

5.6 Seen – Energy Monitoring and Verification

The Mayor’s Environment Strategy and the draft New London Plan also place an increasing emphasis on new non-domestic buildings to reduce regulated carbon emissions to deliver zero carbon developments. The Proposed Development acknowledges that the New London Plan is expected to extend the zero-carbon standard to non-domestic buildings in the near future. In line with the emerging London Plan, the Energy Statement prepared by Arup confirms the following will be reported for a minimum of 5 years to ensure the actual operational performance will be in line with the GLA’s zero carbon target:

- Building energy use (gas, electricity)
- Renewable energy generation
- Report on details of the building’s energy storage equipment
- Performance of heating and cooling generation plant
- Carbon emissions and any carbon offsetting contributions.

5.7 Lifecycle Assessment (LCA) and Whole Lifecycle Carbon

The current London Plan does not require developments to undertake a WLC assessment or LCA however the emerging New London Plan, Policy SI2 (F), requires referable schemes to undertake WLC assessments and LCAs. The Proposed Development is referable and has undertaken an assessment in line with the methodology outlined below with opportunities to optimise embodied carbon performance identified.

Buildings emit GHG emissions at all stages of their lifecycle and are responsible for a significant amount of total global carbon equivalent (CO_2e) emissions. Estimates vary between a third and half of global emissions, depending on geographic location and the boundaries assumed.

Carbon emissions associated with buildings are derived from direct (operational emissions) and indirect (embodied emissions) sources, as shown in Figure 5-2.

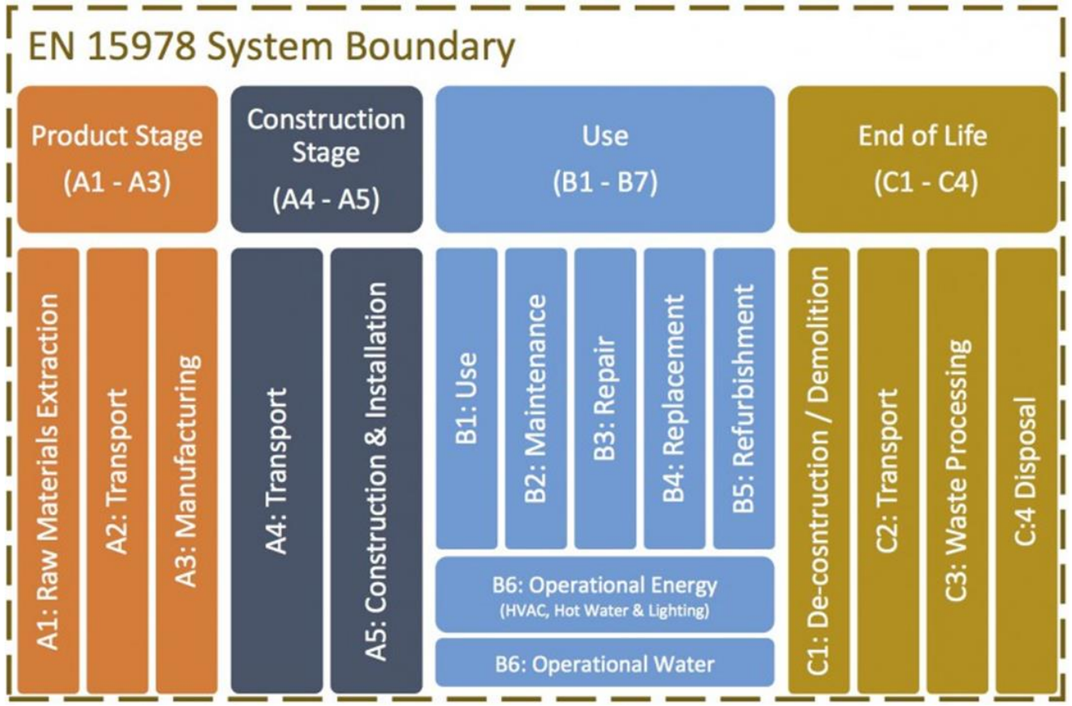


Figure 5-2 Sources of building's emissions in a building's lifecycle or system boundary, European Standard EN 15978[1]

One of the main tools available to the construction and built environment sector to understand carbon emissions is to undertake Life Cycle Assessments (LCAs) to calculate Whole Life Carbon (WLC).

WLC is the total carbon emissions of a building over its entire life cycle, as defined by the EN 15978 standard[1], from materials (A1-3), transport (A4) and construction (A5), use (B1-7), end of life (C1-C4) and an optional "beyond lifecycle" stage (Module D). Whole lifecycle carbon can be split into embodied carbon emissions and operational carbon emissions. Embodied carbon emissions are all EN 15978 modules except modules B6 and B7 which are the emissions from the operational energy demand of the building.

[1] BS EN 15978:2011 Sustainability of construction works. Assessment of environmental performance of buildings. Calculation method. https://shop.bsigroup.com/ProductDetail?pid=000000000030256638

5.8 Embodied vs Operational Emissions

There are two key lifecycle stages where carbon is emitted:

- in the manufacture of building materials (A1-A3), and
- in the operation of the completed building (B6-7)

Therefore, construction industry professionals can dramatically reduce the carbon emitted by the construction and built environment sector by:

- using materials and systems with a lower embodied carbon: This can be reduced by increasing awareness of the embodied carbon emissions associated with different materials and systems through undertaking a Life Cycle Assessment (LCA), and making conscious decisions about specifying low-carbon options. LCAs should be undertaken from the earliest stages, revisited and refined throughout the design process.
- designing buildings to use less energy in-use and sourcing the remaining energy from low/zero carbon (LZC) sources. This is achieved by undertaking detailed ongoing and iterative advanced energy analysis of future building energy demands from the earliest stages in the design process, and embracing passive design measures, energy efficiency and LZC technologies.

TFT has undertaken an LCA of the proposed Lab enabled RM to understand the full extent of the carbon impacts across the whole lifecycle and where these could be mitigated.

The following process was undertaken as part of calculating reflective WLC emissions to include and inform the team for post-planning deisgn development:

- TFT based the LCA on the Stage 2 capital cost plan issued by Turner and Townsend.
- Material quantities for substructure, vertical and horizontal superstructure elements, roof, façade, assumptions for internal partitions and stairs, windows, doors and finishes & coverings and MEP services were included in the WLC model.
- The LCA software applies commercial in-use repair and replacement rates to each of the materials input, as well as end-of-life assumptions.
- Construction activities have been assumed based on climate data and areas of the building to calculate electricity, fuel, waste and transportation impacts aligned with RICS methodology for preparing whole life carbon assessments.
- In-use energy consumption information was incorporated based on the energy consumption figures included within TFT's Energy Statement.

Limitations: The study was completed using the best information available at the time of analysis, namely the RIBA Stage 2 design information prepared for planning and before the developed design stage (Stage 3). There was not a full Stage 2 cost plan available at the time of the assessment and therefore assumptions

have been made where quantify information was not known. There were limitations with the data sources used, as exact products or specifications are not known and have not been specified at this stage. Therefore, where unknown generic materials were specified within the software, and default transport distances and service life of products were used in accordance with RICS guidance. Generic information will be reviewed and optimised following further design development and specification once product information is confirmed.

The WLC assessment is an ongoing and iterative process that is refined and enhanced as project information becomes available through the design process. The data input into the LCA's WLC model will be added to, reviewed and refined throughout the design process as designs become formalised and materials/ systems/ component information becomes available. TFT will progress the LCA assessment in line with design development throughout the RIBA stages. LCA data will be provided to the project team to help inform and guide further design development as the design process continues through RIBA Stages 3 and 4.

5.8.1 WLC Results

The following results summarise the baseline WLC emissions for the lab enabled scheme, i.e. those calculated at the initial design stage before any embodied carbon reduction strategies have been implemented. The results in Table 5-2 demonstrate emissions across two scenarios: including decarbonisation of grid electricity over time, and without the decarbonisation of grid electricity:

LCA Outputs	Network Building –Class E-g (ii) Lab Enabled			
	GIFA (m^2)	16,072		
Life Cycle Stage	**Total emissions**	**Total/m^2**	**% contribution: Without decarbonis'n**	**% contribution: With decarbonis'n**
A1-A3	6,139,875	382	15.02%	26.76%
A4	244,581	15	0.56%	1.00%
A5	894,114	56	2.04%	3.64%
B1	4,488,020	279	10.98%	19.56%
B4-B5	2,502,388	156	6.12%	10.91%
B6 (no decarbonisation)	26,471,874	1644	64.74%	NA
B6 (with decarbonisation)	8,526,000	529	NA	37.17%
B7	115,938	7	0.28%	0.51%
C1-C4	104,103	6	NA	NA
D (not incl. in total)	-1,053,556	-65	NA	NA
Carbon Sequestration	52,200	3	NA	NA
Total (no decarbonisation)	40,886,399	2,539	NA	NA
Total (with decarbonisation)	22,888,325	1,425	NA	NA

Table 5-2 - WLC results of Proposed Development

5.8.2 Analysis

With reference to the GLA's benchmark and aspirations for embodied carbon (see Table 5-3 below) the Proposed Development performs exceeds the aspirational benchmarks for modules A1-A5 (453kg/CO2e/m2) and within the benchmarks for modules B-C (479kg/CO2e/m2).

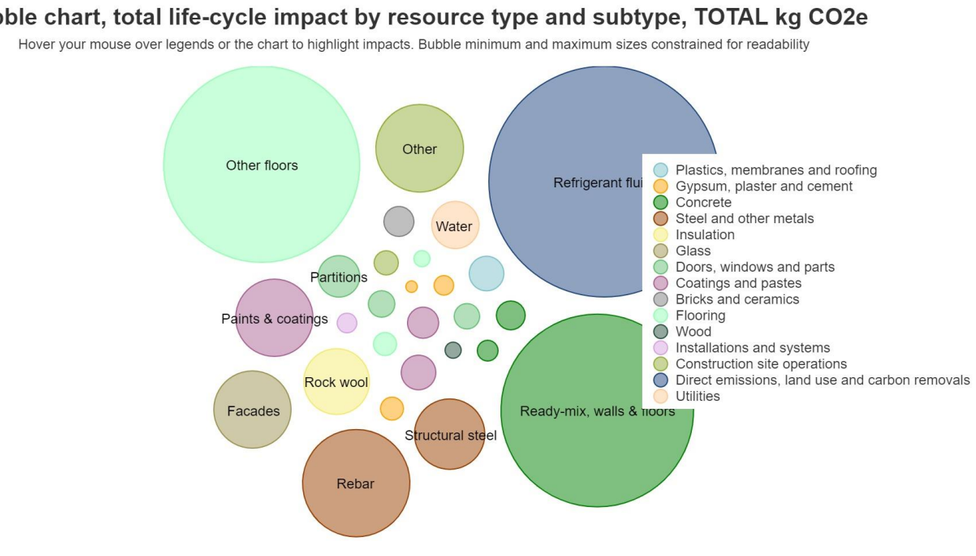
Sector	Modules	WLC benchmark kg CO_2e/m^2 GIA	Aspirational WLC benchmark kg CO_2e/m^2 GIA	Network Building Office RMA
Offices	A1-A5	900 to 1000	550 to 600	453
	B-C (excluding B6 & B7)	400 to 500	250 to 300	448

Table 5-3– GLA embodied carbon benchmarks

Operational energy consumption, typically a major contributor, accounts for over 64% of WLC decreasing to 37.1% if decarbonisation of the grid is taken into account. Refer to the Energy Statement accompanying the planning submission authored by Arup for full details of the operational energy reduction strategies.

Excluding operational energy results show that greatest contributor to WLC is the materials, with either 15% or 26.8% contribution, depending on whether decarbonisation of the grid has been taken into account.

Embodied carbon emissions are illustrated in Figure 5-5 which demonstrate the contributing elements by resource type and by RICS classifications.



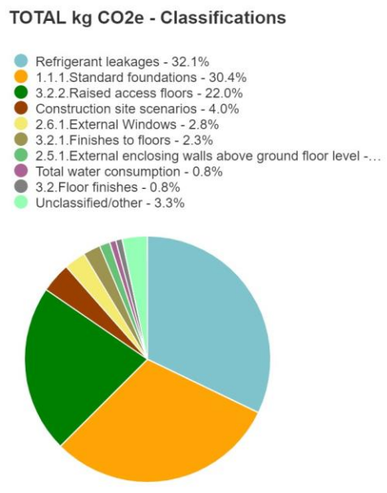


Figure 5-5 Embodied carbon emissions by resource type and by RICS classifications for the Proposed Development

The proposals are for Reinforced Concrete (RC) framed building. Figure 5-5 indicates that a large proportion of embodied carbon is attributed to concrete within the frame, core walls and floor slabs. Given the heavy duty nature of the proposed raised access flooring required for the Research and Development areas, raised access flooring with associated fixings also contribute significantly to the scheme's embodied carbon totals. Emissions from refrigerant leakages should also be highlighted. The refrigerant assumed is R410a as this is currently the most commonly used. R410a has a global warming potential of 2125.01 kgCO2e/kg. The total refrigerant charge of all systems has been assumed to be 640kg, with an annual leakage rate of 5% per annum and 10% at end of life. Industry is slowly phasing out R410A and presents an opportunity for this development to specify a low carbon alternative refrigerant during technical design. Initial discussions with the team have been held to highlight the embodied carbon benefits of specifying a low embodied carbon refrigerant alternative, balanced with energy efficiency performance.

Other significant WLC contributors are shown below:

Rank	Material	tons CO_2e	% Contribution
1	Ready-mix concrete, normal strength, generic	2,633 tons CO_2e	46%
2	Raised access flooring system	909 tons CO_2e	16%
3	Reinforcement steel (rebar), generic	791 tons CO_2e	14%
4	Curtain wall with steel frame	394 tons CO_2e	7%
5	Structural steel profiles, generic	302 tons CO_2e	5%

Table 5-4 -Proposed Development's ten major contributing materials to WLC emissions

5.8.3 Opportunities to decarbonise

Significant attention has been given to reducing operational energy consumption, as per Arup's Energy Statement. To ensure optimal carbon emissions, it is essential that these aspirations are carried through the design stages and are realised in the final construction of the building.

Regarding embodied carbon, given the results of the LCA presented in the previous section, the following opportunity areas have been identified which will be investigated and quantified throughout the subsequent design stages by the project team.

1. The assumed recycled content of structural steel is 20%, in line with RICS guidance. If alternatives to steel are not pursued, steel with a higher recycled content could be sought for the scheme, although this is likely to need to be sourced from the European continent where steel can typically be sourced with recycled content of up to 60%. The additional carbon resulting from increased transport distances is comparatively insignificant compared to the benefit of a higher recycled content, so the overall carbon benefit is high.
2. The baseline cement replacement of ready-mix concrete is 20%, which follows the RICS guidance for this material. It is suggested that a higher percentage of cement replacement is possible and should be explored at the detailed design. Options could be investigated to source ready-mix concrete from suppliers that can guarantee a higher recycled content, both in terms of cement replacement (Ground Granulated Blast-furnace Slag (GGBS) or Pulverised Fly Ash (PFA)), and aggregate substitution. Suppliers can typically provide cement replacement in the region of at least 40%, and higher. The extent of cement replacement and aggregate substitution would need to be confirmed by the structural engineer and cost consultants, and reviewed by the appointed contractor to determine any associated programme impact.
3. Cemfree is another alternative to traditional concrete mixes which can significantly reduce embodied carbon emissions. Given uncertain curing times of Cemfree careful consideration around its application will be needed.
4. The assumed refrigerant used in the scheme is R410a, which is typical of the industry but has a high global warming potential (GWP) – circa 2125.01 kgCO2e/kg. Other refrigerants are available with lower GWP, such as R32 (circa 700 kgCO2e/kg) or R513A (573kgCO2e/kg, although these can have an effect on the overall system efficiency. Systems that can use alternative refrigerant to R410a should be considered, although it is accepted that the effect on overall system efficiency should be clearly understood and the optimum trade-off sought.
5. The assumed baseline raised access flooring system consists of a high-density particle chipboard core encased in galvanised steel (approximately 40.25 - 121 kgCO_2eq/m^2 within office and R&D areas respectively). Metal raised access floor systems are inherently high in embodied energy, and consequently carbon. This is largely due to the galvanised steel component, and the extent to

which they are installed in buildings, essentially covering the entire net internal area (NIA). The most robust alternatives are:

- Reclaimed metal raised access floors
- High density chipboard system (un-cased)
- Calcium sulphate system.

The reclaimed option would provide the closest visual equivalent to the specified system, as it will be a metal encased raised access floor. The other two alternatives remove the metal casing, and are constructed from a single durable material (either chipboard or calcium sulphate), and would therefore not provide the same visual finish. It is unlikely an alternative to the heavy duty raised access flooring is possible given the more specific performance requirements however reclaimed access flooring could be possible for the office areas of the scheme.

6. Whilst the glass façade system is a significant embodied carbon contributor, its installation is critical to the overall energy performance of the building and operational carbon reductions. It is therefore a difficult trade-off to optimise embodied carbon performance and operational energy performance. This will need further investigation, including coordination with suppliers to assess the feasibility of incorporating recycled materials into the façade units, such as recycled aluminium, glass and rubber.

Based on this, an analysis was done on the embodied carbon to study the impacts of the above considerations (Table 5-5):

Rank	Area of Improvement	% Improvement	Description
1	Improved Refrigerant	22.2%	Changing the refrigerant
2	GGBS Concrete	5.9%	Sourcing concrete with 50% GGBS content
3	Reused Raised Access Floors	0.7%	Building the Raised Access Floor from reused materials on the construction site
4	40% Recycled Steel	0.2%	Sourcing 40% recycled steel for structural steel rather than 20%

Table 5-5 – Embodied carbon saving opportunities

5.9 Whole Life Carbon Conclusions

The LCA model presented in this report adopts the RICS Professional Statement methodology and guidance. The specifications of high recycled content structural steel alongside low embodied alternative concrete mixes, particularly, can be enhanced in order to reduce embodied carbon and wider environmental impacts.

In light of the current heightened awareness of climate change and carbon emissions, particularly embodied carbon, establishing the WLC emissions for this RM application, and the identification of 'hot-spots', provides an excellent opportunity to deliver a low embodied carbon development in line with the UK's Net Zero carbon commitments.

The next steps include continuing engagement across the design team, including the architect, cost consultant and engineers on the issue of embodied carbon and to discuss the feasibility of implementing embodied carbon reduction measures. Collaboration with the main contractor once engaged will also be essential to ensure that the carbon reduction strategies identified are implemented successfully on-site during construction.

5.10 Policy Alignment

The Energy Statement and approach to whole life carbon, including embodied carbon and operational efficiency demonstrate the following planning policies have been addressed:

Policy Document	Policies
London Plan	Policy 5.2 Minimising carbon dioxide emissions
	Policy 5.3 Sustainable design and construction
	Policy 8.2 Planning obligations
Draft New London Plan (2019)	SI 2: Minimising Green House Gas Emissions
	SI 5 Water Infrastructure
London Borough of Camden	CC1 – Climate Change Mitigation
	CC2 – Adaptation to Climate Change
	CC4 - Air Quality
	CPG: Design
	CPG: Energy efficiency and adaptation

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6.0 Climate Change Resilience

This section sets out design information regarding the Proposed Development's contribution to and mitigation of the impacts of climate change. The main issues are:

- overheating and solar gain in the building and how these have been mitigated;
- the quality and quantity of urban greening and how this contributes to mitigating the urban heat islands effect;
- how the Proposed Development may be impacted by a flood event and the measures implemented to avoid damage and also contributions to mitigate worsening of flood events and surface water run off.

6.1 Overheating and Reducing Solar Gain

A full dynamic thermal overheating analysis in line with the GLA's Energy Assessment Guidance 2018 has been prepared to demonstrate that summer operative temperature ranges in occupied zones are in accordance with the criteria set out in CIBSE Guide A Environmental Design and follow the methodology outlined in CIBSE TM52For details of measures included within the design to reduce overheating refer to section 5.2).

The results suggest that indoor temperatures are predicted to remain within the range recommended for office zones, laboratories and foyers for 100% of occupied hours. All assessed zone within the proposed development Pass the three DSY weather scenarios tested. This includes projected climate change assumptions scenarios for 2020, 2050 and 2080. Based on these results it is concluded that the proposed design has a low risk of overheating during non-heating seasons.

6.2 Flooding and Drainage

The Proposed Development aligns with the principles highlighted in the OPA.

6.3 Urban Greening and Urban Heat Island (UHI) Effect

The Proposed Development aligns with the principles highlighted in the OPA.

6.4 Policy Alignment

The overheating analysis, and the Drainage Strategy demonstrate the following planning policies have been addressed:

Policy Document	Policies
London Plan	Policy 2.18 Green Infrastructure
	Policy 5.3 Sustainable design and construction
Draft New London Plan	Policy 5.10 Urban Greening
	Policy 5.13 Sustainable drainage
	Policy 7.19 Biodiversity and access to nature
	GG6 Increasing efficiency and resilience
	Policy G1 Green infrastructure
	Policy G5 Urban greening
	Policy G6 Biodiversity and access to nature
	Policy D11 Safety, security and resilience to emergency
	Policy SI 4 Managing heat risk
	Policy SI 5 Water infrastructure
	Policy SI 12 Flood risk management
	Policy SI 13 Sustainable drainage
London Borough of Camden	Policy A1 Managing the impact of development
	Policy D1 Design
	Policy CC1 Climate change mitigation
	Policy CC2 Adapting to climate change
	Policy CC5 Waste
	CPG: Design
	CPG: Energy efficiency and adaptation

7.0 Circular Economy Statement

7.1 Background

Materials and Circular Economy issues are quickly becoming a key material consideration for all major planning applications in an attempt to reduce the amount of virgin resources, and the corresponding energy and waste generated for each unit of manufactured material, that are required for new buildings.

To reduce the environmental impacts of the proposals, the design team has considered the principles of materials optimisation and opportunities to contribute to a circular economy in construction for the Proposed Development.

7.2 Policy Requirement

This Circular Economy (CE) Statement has been prepared for The Applicant, in support of its reserved matters Class E-g (ii) lab enabled planning application. The draft London Plan Policy SI7 Reducing waste and supporting the circular economy requires referable projects to prepare a Circular Economy Statement with the purpose of demonstrating the following three core principles:

Principle 1 - Conserve resources and source ethically

- Minimise the quantities of materials used.
- Design out construction, demolition, excavation and municipal waste arisings.
- Specifying and sourcing materials and other resources responsibly and sustainably.

Principle 2 – Design to eliminate waste (and for ease of maintenance)

- Designing for longevity, adaptability or flexibility and reusability or recoverability
- Design out construction, demolition, excavation and municipal waste arising

Principle 3 – Manage waste sustainably and at the highest value

- Managing demolition waste
- Managing excavation waste
- Managing construction waste
- Managing municipal waste

This Detailed CE Statement is provided in demonstration against GLA emerging policy ambitions as expressed in the draft New London Plan. In light of the above, The GLA's Circular Economy Guidance (pre consultation draft) 2020[2] has been followed in preparing the Circular Economy Statement and responds to the required sections of a Detailed CE Statement where achievable.

7.3 Method statement

Stage 1: TFT were appointed to generate the Circular Economy Statement in Stage 2 and assess the proposed design for circularity and embed circularity principles into the Proposed Development.

Stage 2: A BREEAM compliant pre-demolition audit has been undertaken on the site to understand the extent and quantity of the in-situ materials and to assess their viability for re-use either on or offsite.

Stage 3: A circular economy workshop was held with the architect, mechanical engineer and structural engineer.. The workshop outlined background information and requirements for the Circular Economy in

[2] GLA (2020), Circular Economy Statement Guidance (pre consultation draft).
https://www.london.gov.uk/sites/default/files/ggbd_circular_economy_statement_guidance_2020_web.pdf

both theory and practice to upskill the full team and achieve the workshops main objectives summarised as follows:

1. Ensure a shared and common understanding of circularity principles;
2. Understand the circularity assessment process; and
3. Set ambition and goals for the Proposed Development.

Stage 4: The design team, comprising the architect (HOK), the structural engineer (AKTII) and the MEP engineer (Arup) were issued with templates based on the GLA's circularity guidance which were designed to trigger circular design responses that could be integrated into the Proposed Development's design. The design team also referred to the innovative Regenerate v1 circularity tool developed by the Urban Flows Observatory, part of the University of Sheffield. Regenerate is a freely available engagement tool designed to instil circular economic principles within the building design process and provoke meaningful discussion across the construction sector. Through its use, consultants, contractors, architects and clients are able to explore how their decisions may assist in increasing the circularity of material flows in the construction industry. This is possible at various project stages, through the consideration of a large number of criteria across four key circular economic principles. The degree to which these are implemented is represented in a summary output, offering an overviewed assessment of the circularity of a given development. The tool is designed to be compatible with the requirements of a Circular Economy Statement as set out in the London Plan Policy SI7; using responses to specific criteria and the provided templates as a means of generating the tables required to be submitted as part of this statement.

7.4 Circular Economy Aspirations

The design team have an aspiration to ensure that the Proposed Development comprises elements of circularity. The team has considered the GLA's Design for a Circular Economy Primer (2019)[3] as well as the Circular Economy Guidance for Construction Clients (2019)[4] published by UK Green Building Council, paying attention to new guides on reuse and servitisation[5] and in reference to the GLA's Circular Economy Statement Guidance (Pre Consultation Draft)[6] issued in May 2020. Applied circularity of the Proposed Development will mainly be a function of:

1. Adaptability and flexibility of the structural design to allow tenants to explore multiple spatial configurations;
2. Mindful materials selection and specification during Stages 3 and 4 to ensure high recycled content wherever possible;
3. Careful management of the existing materials on the site during demolition and deconstruction; and
4. Minimisation of waste from new materials brought on to site for the construction stage and minimisation through designing out waste.

7.5 Circular Economy Goals and Strategic Approach

Through early discussions with the design team and interrogation of the pre-demolition audit an initial circularity strategy based on the following circularity principles has been developed:

- Minimising new material use
- Deconstruct and reuse
- Responsible material sourcing
- Longevity and flexibility

These principles have been applied to deliver a building with a basic level of circularity, in keeping with the original design intent and vision and still fit for purpose according to the use functions (tenanted, research and development, offices& retail).

With reference to policy requirements, the team are targeting a BREEAM Excellent rating which comprises the following issues:

- Mat 01: Environmental Impacts of Construction Materials
- Material 06: Material Efficiency
- Waste 01 Construction Waste Management
- Waste 03 Operational Waste
- Waste 04 Speculative finishes
- Waste 06 Design for disassembly and adaptability

[3] GLA (2019), Design for a Circular Economy Primer https://www.london.gov.uk/sites/default/files/design_for_a_circular_economy_web.pdf

[4] UKGBC (2019), Circular Economy Guidance for Construction Cilents, https://www.ukgbc.org/wp-content/uploads/2019/04/Circular-Economy-Report.pdf

[5] UKGBC, (2020) Circular Economy Implementation Packs for reuse and servitisation https://www.ukgbc.org/ukgbc-work/circular-economy-implementation-packs/

[6] GLA (2020), Circular Economy Statement Guidance (pre consultation draft). https://www.london.gov.uk/sites/default/files/ggbd_circular_economy_statement_guidance_2020_web.pdf

The Proposed Development will aim for the minimisation of waste as far as is practicable, with an aspiration to be close to zero waste in construction. To minimise waste as much as possible, the following can be undertaken in later stages:

- A designing out waste exercise during RIBA Stage 3 and 4 to ensure that the design is as lean and efficient as possible;
- Collaborative meetings with the main contractor and sub-contractors to ensure that waste on site is minimised and recycling rates are maximised which will be documented in the Resource Management Plan; and
- Engagement with the waste contractor to understand if recycling rates can be improved and landfill is avoided entirely.

7.6 Circular Economy Commitments

With reference to policy requirements and targets, the Proposed Development aims to:

1. Achieve the BREEAM Waste 01 target of undertaking a pre-demolition to determine whether refurbishment or reuse is feasible and, in the case of demolition, to maximise the recovery of material for subsequent high grade or value applications.
2. Achieve the BREEAM Waste 01 target of 11.1 tonnes or less of construction waste generated per 100m^2 and has an aspirational target to achieve 6.5 tonnes which would deliver two BREEAM credits. A compliant Resource Management Plan will be generated in RIBA Stages 3-5 in collaboration with the appointed contractor.
3. Exceed BREEAM Waste 01 target of 80% of demolition waste and 70% of non-demolition waste to be diverted from landfill aspiring for a minimum of 95%. In addition, waste materials will be sorted into separate key waste groups for higher recycling rates.

To inform the Recycling and Waste Reporting the following quantities of waste and construction materials have been estimated based on the pre-demolition audit and detailed stage 2 cost plan:

Demolition/Excavation Material	Demolition/Excavation Quantities
Concrete / brick / rubble	c. 15,728 tonnes
Metal rebar	c. 850 tonnes
Excavation mixed waste	c. 14,500 m3

Table 7-1 Estimated Demolition & Excavation Quantities

Activity	Estimate of Bulk Quantities
Concrete to substructures (up to podium)	c. 11,544
Rebar	c. 1,566t
Steel Frame (Superstructure)	c.120 t
Glazing /Curtain walling	c. 2,720 m^2
Raised access floor	C 15,585 m^2
Internal partitions	c.3,479 m^2
Floor finishes	c. 16,072 m^2

Table 7-2- Estimates of bulk material quantities for key construction components

7.7 Circular Economy - Opportunities

This section of the Statement provides a more detailed description of how the building design can look to incorporate circularity principles and actions and is structured according to the nine circularity principles specified in the GLA Circular Economy Guidance. Each item set out below is an opportunity, to be considered within the project team throughout the delivery of the Proposed Development.

A. Conserve resources, increase efficiency and source sustainably

1. Minimise the quantities of materials used:

- The site is constrained by surrounding buildings and roads and the footprint is being maximised by increasing the height and the massing.
- Lab-enabled floors will also be left with exposed soffits as part of CAT A. tenant(s) will determine whether they wish to include a suspended ceiling system or not.
- The proposal is for a raft foundation to be used for the new building. This saves approximately 160 No. piles being constructed. The raft has been designed to a high utilisation to give an efficient use of materials.
- The existing basement is to be backfilled in order to pile from ground floor level. This backfilling will be done partially from the demolition rubble meaning that less imported materials will be required.
- The internal columns reduce in size as they go up the building and the perimeter columns will reduce in reinforcement quantity as they go up the building. The slabs have been sized for their specific purpose and therefore have been thinned down where office space is used as opposed to lab. The slab thicknesses have also be reduced in the core area A modular approach to the design of spaces will be implemented throughout the building which inherently conserves resources and reduces unnecessary material usage.
- A lightweight steel and timber roof has been used for level 08 which has reduced the load acting on the level 07 slab and therefore meant that the thickness can be reduced

Key consideration will be given in specification of products with a high recycled content and ‘cradle-to-cradle’ C2C certification.

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- The overall building size, including the floor to floor heights, and functional relationships of spaces within the building have been optimised to make efficient use of space and conserve materials Self-finishing surfaces/inherent finishes will be used wherever possible, such as exposed concrete soffits, exposed concrete and blockwork walls in back-of-house spaces.
- Internal finishes will be specified to meet Building Regulations in relation to fire resistance, thermal and acoustic properties using as little material as possible.
- Potential for re-use of 10% existing doors from the site and potential for up to 50% of existing wooden flooring to be reclaimed.

2. Minimise the quantities of other resources used

- A cofferdam will be formed from the secant wall which will reduce the amount of dewater that will be required, reducing the energy required and reducing the strain on the sewer systems Appropriate admixtures will be used for the concrete which will mean that the water required can be significantly reduced.
- low-embodied materials will be specified wherever possible to reduce overall embodied emissions, and lower embodied energy consumption. Consideration will be given to the following examples; Linoleum as an alternative to vinyl. Water-based eco paints as an alternative to oil-based. Use of cork and bamboo can also be considered.
- Consideration will be made for embodied water consumption in the manufacture and supply of materials, when specifying. Water efficient sanitary fixtures will be specified such as non-concussive/self-closing taps, sensor-flushing toilets and smart-flush urinals Loading allowance has been made for a blue roof system which reduces to requirement to store water in the basement and pump subsequently, therefore saving energy.
- The same opportunities exist for the superstructure with regard to water reducing admixtures.
- Concrete specified will have ground granulated blast furnace slag (GGBS) substitute of up to 50% in the superstructure and up to 80% in the substructure.
- The Proposed Development’s Energy Strategy details the measures taken to optimise the shell and skin elements of the circular economy building layers.
- Consideration for materials with high recycled content will be made such as Plasterboard, kitchen tops and floor panels which can achieve almost 100% recycled content.

3. Specify and source materials and other resources responsibly and sustainably:

- BREEAM Excellent Responsible Sourcing credits and Environmental impacts of materials (EPDs) credits are being targeted.
- Low-VOC, and non-toxic finishes + materials will be specified typically Cement replacement (likely to be GGBS) will be specified for the substructure (likely to be approximately 50%). The reinforcement will be 80-90% recycled (as per industry standard). There is the possibility to use recycled aggregate for the concrete.
- The use of exposed concrete soffits means that the building can benefit from the following:

  1. Utilisation of concrete structure’s thermal mass, enabling it to form a key element in the cooling strategy by using its passive performance to help reduce or avoid the need for air-conditioning.

  2. direct saving of materials by omitting suspended ceilings.

  3. Improved effectiveness of natural ventilation from increased slab-to slab height.
- -Greater building adaptability from increased slab-to-slab height.
- Prioritise suppliers who report raw material extraction and manufacturing processes.
- Transport miles and transport mode, prioritizing materials that come from within the UK and Europe, and that are transported through low carbon modes;
- Consideration will be given to specifying timber strapping and framing in lieu of steel section framing.
- Local sourcing will be a key consideration in procurement, reducing the embodied carbon related to transportation.
- Packaging credentials in terms of recyclability through manufacturer takeback schemes or have low carbon credentials; and
- Wherever possible, internal fitout elements will be designed to be reclaimed and re-used at their highest value.
- Avoidance of known toxins such as formaldehyde, urea formaldehyde, volatile organic compounds (VOCs), heavy metals, carcinogens, phthalates, vinyl chloride monomer (VCM), halogenated flame retardants. Products with a Health Product Declaration can also be explored.

- Potential for specifying recycled raised access floor panels and pedestals, partitions made from almost 100% recycled content e.g Fermacell, carpet tiles with high recycled yarn content.
- For the timber roof, C16 grade timber was used for the design as higher grades than this are often required to be important. This will allow locally sourced timber to be used.

B. Design to eliminate waste (and for ease of maintenance)

4. Design for longevity, adaptability or flexibility and reusability or recoverability

- The raft as a foundation system is an adaptable solution because it means that columns can easily be repositioned during the design stage and even during retrofitting of the building columns can be added and others taken away, making it easier to change the building's use. The relatively high loading requirements for lab space will also mean that the foundations are likely to be able to be used as they are if the building changed use in the future.
- Regularly positioned drainage stacks have been included to allow for greater flexibility of use Consideration will be given to mechanical fixings over adhesives, allowing for ease of disassembly and re-use of materials and finishes.
- Soffit mounted Fan Coil Units will ensure that each room or zone will be able to adjust the temperature independently, offering more flexibility, particularly useful in a multi-let scenario.
- It is intended that Internal partitions will be designed with the ability to be disassembled and moved as use changes over time.
- The design of the superstructure, as open plan with a 10m x 6m grid at upper floor levels, allows for adaptability and flexibility of the building over its use. All partitions are to be flexible non-loadbearing partitions with a 1.0kN/m2 partition load allowance across the whole footprint of each floor level.
- Some materials will be able to be re-used at the end of the building life (though the full potential of this will be explored during RIBA Stage 3). This could include some of the Cycle Facilities equipment (bike racks / lockers) and the Raised Access Floor system.
- Space has been designed with generous floor to soffit heights (4m for typical floors) allowing for greater flexibility for use A generous clear zone (0.8m) has been allocated for high-level services, allowing for a minimum 2.7m clear height for ceilings, which increases the flexibility for future use The high floor to ceiling heights required for the lab space mean that the building will be very flexible in the future.
- Concrete as a material inherently has good longevity. The inherent fire protection means that intumescent paint is not required. Concrete is has also got good adaptability as small penetration are able to be drilled through large areas of the floors which allow for easy change of use.
- The location of the central building core has been studied in-depth to ensure future flexibility and division of spaces. It allows for a wide range of uses and a range in number of tenants per floor plate. A larger building grid (typically 9.6m) has been employed to provide clear spans and reduce the number of columns within the space, hence increasing the flexibility for use Standard steel beam and column sections have been specified for the roof with bolted connections to be specified, meaning that these elements can easily be disassembled and reused in the future Structures are typically built with a design life of 50 years, however by specifying a thicker concrete cover, the design life can be significantly increased.
- Mechanical anchors in lieu of chemical anchors to fix the curtain walling on the precast panels and to the structure can be specified, in order to enable easier disassembly.
- Regular window modules along the facade increases future adaptability and positioning of internal partitions to provide for both cellular and open plan spaces with ease The cavity behind the insulation is wide enough to accommodate more insulation if it is required in the future. This can be installed, only by removing the internal lining.
- The spaces have been carefully designed to be able to switch easily from Lab / R+D use to Commercial office depending on the market Central MEP systems will be designed to get maximum life for plant etc.
- Flat concrete floor soffits have been used typically to increase flexibility by reducing the need for mechanical duct and service cross-overs under down-stand beams. This also reduces cutting on-site to internal partitions and increases adaptability for future positioning /re-use of partitions. Flat floors have been used typically with no stepped transitions to a typical floorplate allowing for greater flexibility when renovating or changing uses and contributes to universal design.
- Interior non-load bearing partitions are intended for use throughout to ensure programs can be adapted without threatening the structural integrity of the building.

5. Design out construction, demolition, excavation and municipal waste arising

- Design will consider the use of full dimensions of off-the-shelf materials and products avoiding cut-offs.

- The RC stairs in the core have been specified as precast concrete, resulting in less construction waste.
- There is the opportunity to use precast concrete walls for some of the walls within the core (for those not required for the lateral stability).
- End-of-life waste will be reduced by specifying products that reuse or contain recycled material or are recyclable A designing out waste exercise will be pursued in RIBA Stage 3 and 4 to minimise material quantities. This exercise will be run in parallel with a whole life cost exercise to reduce carbon emissions.
- Durability and longevity of materials will be carefully considered to balance embodied carbon with the need for future reuse or replacement Construction systems will be prioritised that do not require temporary supports or construction aids wherever possible, to avoid additional waste materials DfMA (Designing for Manufacture and assembly) could be considered for certain modular components of the building, such as unisex WC pods, avoiding on-site offcuts, or wastage from incorrect quantity orders. These DfMA components, such as WCs, can be designed with disassembly in mind, and incorporate wherever possible mechanical fixings.

C. Manage waste sustainably and at the highest value

6. Manage demolition waste

- A reclamation-led approach to refurbishment / demolition will enable the client to realise the economic value of these materials; recover valuable materials whose on-site reuse supports the retention of desirable architectural features, beneficial to the planning application; and increase the overall sustainability of the demolition and new development project as a whole.
- Support through the segregation of demolition arising. Such segregation is an integral part of the Site Waste Management Plan.
- The demolition will aim to deconstruct as much as possible and salvage items including timbe doors and flooring, decking, internal glazed partitions and cycle racks.
- The MEP plant and appliances of the existing site have been assessed for reuse viability with a large proportion both viable and reasonable likelihood for off-site reuse/recycling wherever possible.
- Exceed BREEAM waste targets to aspire to a 95% demolition waste diversion from landfill rate.
- Concrete from the demolition of the existing building could potentially be used as recycled aggregates. Recycled concrete is generally used as aggregates in subbases, soil-cement fill, and can be used in new concrete. One area on the project that could use recycled aggregates from the existing building concrete is the piling mat
- The demolition waste from the existing building will also be used for as large a percentage of the basement infill as possible.
- As the steel is concrete encased this will require the concrete encasement to be removed to allow for the steel to be recycled. It is likely to be very labour intensive to clean and check steel in order for it to be re-used elsewhere and it is assumed that this process could result in some of the steel work being damaged. In addition the steelwork sizes are unlikely to be appropriate for the proposed scheme. Therefore, recycling the steel may be more appropriate for the site. In the UK, the overall average end-of-life recovery rate for steel from buildings has been estimated to be 96%.

7. Manage excavation waste

- Concrete pads to be crushed and reused on site.
- Inert waste to be reused as fill for landscaping wherever possible.
- Exceed BREEAM waste targets to aspire to a 95% excavation waste diversion from landfill rate.

8. Manage construction waste

- Best practice at construction stage is for high levels of segregation of waste materials which can increase the reuse and recycling quantities. Higher than standard reuse and recycle targets will be set in RIBA Stage 5 for the main works contractor, with a 95% diversion from landfill rate targeted.
- Engage early and work with suppliers to reduce the amount of packaging on the delivery of materials to site.

9. .Manage municipal waste

- The operational waste strategy for commercial waste will align with the Applicant's managed portfolio's waste strategy.
- The waste strategy will follow the waste hierarchy as practicable as is possible: prevention, preparing for reuse, recycling, other recovery, and disposing only as a last resort.

The quantity of waste arising for the Proposed Development over a two day period has been calculated based on British Standards (BS:5906 2005), which generate the following requirements for the land use proposed Table 7-3.

Waste Stream	Class E g (ii) R&D	Class E – g (i) Office	Class E a/b Retail
Residual	4.47m3		0.12m3
Paper	14.53m3		0.27m3
Cardboard	1.56m3		0.40m3
Plastic	1.34m3		0.13m3
Aluminum	0.45m3		0.00
Glass	0.00		0.03m3
Food Waste	0.00		0.05m3
Total	22.61m3		1.00m3

Table 7-3 Waste Generation for the Proposed Development

A dedicated space for the segregation and storage of operational waste, recyclables and organic compostable waste has been designed into the back of house areas on the ground floor. The dedicated segregation and storage spaces comply with BREEAM NC 2018 Wst03 requirements. The capacity and design of the waste storage facilities have also been prepared with reference to LBC.

Based on Table 7-3 which sets out the likely weekly waste generation (in litres) for each use class, a corresponding number of eurobins required for a daily collection schedule is summaarised as follows:

- Recycling – 17 No. 1,100l Eurobins
- Residual waste – 5 No. 1,100l Eurobins
- Baled waste – 6 no. 1,000mm x 1,200mm pallets (2 no. 100kg bales per pallet)
- Aluminium – 1 No. 1,100 Eurobin
- Glass - 1 No. 240 litre wheelie bin
- Food recycling – 1 No. 240l wheelie bin

To progress circularity principles, and in addition to the waste hierarchy, the Proposed Development will work with specialised waste contractors which can ensure that the recyclate is maintained at its highest value and avoid energy recovery from incineration as much as possible.

As a minimum the operational waste strategy will ensure a minimum of 65% of available storage space is allocated for recycling.

Laboratory and clinical waste will be stored in a separate waste store, which will have the BS5906 waste room standards such as Drainage and hose-down facilities. The waste stream will be collected in situ by a specialist contractor and disposed of off-site.

In accordance with the GLA's municipal waste recycling requirements the Proposed Development commits to ensuring a minimum of 65% of operational waste will be reused/recycled as part of the operational waste management strategy. To deliver this the Applicant will look to incorporate the following:

- work with a progressive commercial waste contractor with high reuse and recycle rates and innovative end of life routes for all waste streams;
- implement behaviour change programmes with tenants to reduce office waste;
- create a network of office managers within the building which can liaise with the FM team to reduce paper, furniture, electricals waste and create economies of scale for waste collections;
- produce a purchasing guide on new products such as office furniture which contains recycled content and uses reclaimed and refurbished items;
- distribute any food surplus to food entrepreneurs who build services on using this resource for a new product;
- Group orders together and collaborate with other tenants to consolidate loads;
- Optimise reverse logistics to collect used products and packaging from customers for recycling, returning, packaging and products that can be reused and recycled.

7.8 Circularity in Later Stages

This CE Statement outlines the design intentions of the Proposed Development that incorporate circular principles and points to some of the actions that could be taken in detailed design stages, construction and in operation that could amplify the circular outcomes. The design team will be considering what targets could be set for recycled content of materials to be specified at RIBA Stages 3 and 4, and whether the design can be nominally changed to accommodate greater circularity. Implementation of short and medium term targets will be discussed with responsibilities, intervention points, methods and specific actions assigned. Monitoring and reporting methods of the outcomes with key milestones will also be decided. End of life routes that maintain the material at a high value will also be discussed. Where materials could have a residual value, this can be indicated in a basic materials passport section in O&M manuals with instruction on how these materials can be easily disassembled and removed. An option to include this information in the Building Information Model (BIM) can also be explored. If there is no residual value, then the best option for downgrading or disposal should be indicated.

In next design stages, opportunities to conserve resources by applying lean design principles and sourcing materials sustainably will be explored thoroughly. To facilitate this, an estimation of the quantity of materials used in each ‘layer’ of the building, determine the material intensity (kg/m2 GIA) and set a target for the minimum amount of recycled content to be used (% by value).Prior to construction, the total amount of waste / material generated during excavation, demolition, and management methods construction and their recycling potential will also be estimated and reported. Post construction, these figures can be updated with actual monitored figures.

Finally, innovative practices in design can also be explored such as identification of building elements that could be standardised or modularized and the use of leased products with take back schemes.

7.9 Policy Alignment

This Circular Economy Statement aligns with the below planning requirements

Policy Document	Policies
London Plan	Policy 5.16 Waste Net Self Sufficiency
	Policy 5.17 Waste Capacity
	Policy 5.18 Construction, excavation and demolition waste
	Policy 5.3 Sustainable design and construction
Draft New London Plan	Policy SI 7 Reducing waste and supporting the circular economy (Partial)
	Policy SI 8 Waste capacity and net waste self- sufficiency
London Borough of Camden	Policy A1 Managing the impact of development
	Policy D1 Design
	Policy CC2 Adapting to climate change
	Policy CC5 Waste
	CPG: Design

In conclusion, the Class E-g (ii) lab enabled RMA has begun to explore circularity in design and already demonstrates early signs of circular principles. This issue will be further explored in later design stages and during the construction phase to build upon the commitments outlined above and further develop circular outcomes in order reduce the amounts of virgin materials required for the build.

8.0 Land Use, Biodiversity and Urban Greening

The RMA landscaping and biodiversity proposals align with the OPA, please refer to the Sustainability Statement for this application for details.

9.0 Transport

9.1 Accessibility and Public Transport

For details of site accessibility and public transport please refer to the OPA.

9.2 Walkability

For details of site walkability please refer to the OPA.

9.3 Cycling

OPA transport assessment outlines the ,minimum cycle parking requirements for the proposed development, which under a worst case scenario for the retail use would required 122 long stay and 50 short stay cycle parking spaces. Long stay cycling parking will be provided at basement level and will accessed via a dedicated cycle access from Cypress Place. Access to the basement will be via a dedicated cycle lift with dimensions in accordance with London Cycle Design Standards (LCDS) requirements. A stair with a cycle channel will also be provided. The mix of cycle spaces is summarised as follows:

Type of cycle stand	Number of spaces
Two Tier Rack	116
Folding Bicycle	12
Larger adapted spaces	6
Total	122

The proposal will also include provision of showers at a minimum ratio of 1:10 cycle parking spaces (12c showers), lockers at a ratio of 1 locker per cycle parking space (122 lockers), and associated changing facilities. A cycle repair hub will also be located within the basement cycle storage.

There is also 12 Sheffield Stands (equating to 24 short stay cycle spaces) adjacent to the Tottenham Court Road, Howland Street and Whitfield Street frontages being provided. It has been acknowledged that the surrounding footways comprise adopted highway, therefore a discussion with LBC will be required to confirm suitable locations for short stay cycle parking provision.

Long stay cycle parking in excess of policy minimum requirements and allowances for short stay cycle parking in accordance with policy minimum requirements are proposed. In addition end of trip shower facilities with changing space and lockers in accordance with the parameters of the OPA will be provided alongside bike maintenance and repair facilities.

9.4 Parking

The Proposed Development aligns with the principles highlighted in the OPA.

9.5 Servicing and Logistics

9.5.1 Delivery and servicing

The Lab enabled Network Building is estimated to generate 32 delivery and servicing trips a day. To effectively manage servicing and delivery vehicles the service area should have a minimum headroom of 3.65m in order to match the height restriction at the entry point to the yard. Servicing and delivery vehicles will be able to access the internal service yard at Network Building 19 hours a day (between 5am and 6pm), seven days a week and will be managed.

Consideration will also need to be given to any future tenant's requirements for frequent motorcycle couriers, which are likely to be directly linked to the scientific functions carried out by the tenant(s) e.g. Computational or Robotics will have less courier demand than Tissue Culture which relies heavily on samples.

A delivery vehicle booking-in system will be provided by the site Facilities Management (FM) team to control the movement of servicing traffic entering and leaving each building and to manage the number of vehicles using the loading bays. When scheduling deliveries outside of normal busines hours, suppliers and their delivery agents will be expected to conform to TfL's Code of Practice for Quieter Deliveries. The FM team will work with occupiers, service partners and suppliers to minimise the impact from delivery and service activity no residents. Waste strategy.

Commercial waste will be taken by each of the tenants to the commercial waste store periodically throughout the day. Two options have been explored to establish a viable working solution.

Option 1- Waste is collected directly from the service area by the nominated waste contractor. This would require the contractor to utilise specialist, small refuse collection vehicles which can pass safely under the 3.65m tall Maple Street entrance. This option would require no infrastructural improvements to be made however it would limit the number of contractors who could bid for the specialist waste contract which may result in higher commercial waste rates due to the specialist nature of the collection.

Option 2 – Waste is transferred from the storage area to a temporary presentation point at the interchange of Maple Street and the Cypress Place access road by on-site FM. The RVC would be able to reverse partially off Maple Street adjacent to the presentation point and waste is collected by the nominated waste carrier in a standard RCV. The advantage of this option would be more flexibility with potential contractors however it would require the loading dock schedule to keep the service yard free during collection times, the removal of barrier along Cypress Place, agreement from Qube building to temporality store bins awaiting collection and would clash with cycle access. For details of the waste storage facilities please refer to Arup's Waste and Logistics report.

Given the challenges of keeping the service yard free and conflicts with neighbouring buildings and the proposed cycle strategy option 1 is preferred.

The SMT will oversee the day-to-day management of incoming goods and consignments. Ongoing review and investigation will be made to reduce the number of daily deliveries which could include:

- Encouraging tenants to advise staff to make use of facilities such as Amazon lockers to reduce the number of staff personal deliveries to the site;
- Investigating the potential use of last mile delivery solutions by eco-friendly or non-vehicular modes, such as cycle couriers;
- Reviewing the number of deliveries for each tenant and suggesting further measures that could be adopted by tenants with high-frequencies of deliveries to reduce overall numbers; and;
- Exploring the possibility of smart/joint procurement with adjacent properties in conjunction with seeking suppliers who use consolidation centres.

This delivery and servicing strategy ensures appropriate storage and collection arrangements for all types of waste and assist with those designing and managing of buildings and demonstrates alignment with LBC Local Plan policy CC5.

9.6 Travel Plan

A workplace Travel Plan has been prepared and included in the OPA.

9.7 Policy Alignment

The Proposed Development's consideration to sustainable delivery and servicing strategy, walkability and cycle provision and travel plan arrangements address the following LBC and London Plan Policy:

Policy Document	Policies
London Plan	Policy 6.10 Walking
	Policy 6.13 Parking
	Policy 6.14 Freight
	Policy 7.1 Lifetime neighbourhoods
Draft New London Plan	Policy T1 Strategic approach to transport
	Policy T2 Healthy Streets
	Policy T3 Transport capacity, connectivity and safeguarding
	Policy T4 Assessing and mitigating transport impacts
	Policy T5 Cycling
	Policy T6 Car parking
	Policy T6.5 Non-residential disabled persons parking
	Policy T7 Deliveries, servicing and construction
London Borough of Camden	Policy C1: Health and wellbeing
	Policy C6: Access for all
	Policy D1: Design
	Policy CC4: Air Quality
	Policy CC5: Waste
	Policy T1: Prioritising walking, cycling and public transport
	Policy T2 Parking and car-free development
	Policy T3 Transport infrastructure
	Policy T4 Sustainable movement of goods and materials

10.0 Pollution Management

The RMA proposals fundamentally align with the principles addressed in the OPA, please refer to the Sustainability Statement for this application for details. Specific considerations to air quality is highlighted below.

10.1 Air Quality

Arup have been commissioned to prepare an air quality assessment for the proposed laboratory The building class (E -g (ii) laboratory enabled development will emit emissions into the atmosphere as a result of the research and development nature of the proposals. Strobic fans will be specified to minimise the visual impacts from the stacks whilst maximising the dispersion of pollutants. The report outlines the relevant air quality standards and policies, confirms the existing air quality conditions in the vicinity of the proposed development and determines emission rates to minimise the short-term and long-term effect of benzene emissions.

Two monitoring sites in the vicinity of the proposed development confirms that the annual mean benzene concentrations (0.6-1ug/m3) are below the relevant air quality standard (5ug/m3) for the pollutant and have remained consistent over the past three years.

The analysis anticipates a continuous emission of benzene from the laboratory in the proposed development and confirms that a 0.07g/s emission rate, equivalent to 2.2t of benzene per year will result in compliance with the European, national and local air quality standards, odour detection thresholds and Environmental Assessment Levels (EALs) will not be exceeded. The reports concludes that should future tenants intend to use the laboratory with emissions of other pollutants with more stringent limits the assessment should be revisited.

10.2 Policy Alignment

The considerations to air quality for the RMA align with the following policies:

Policy Document	Policies
London Plan	Policy 5.3 Sustainable design and construction
	Policy 7.14 Improving air quality
	Policy 5.21 Contaminated land
Draft New London Plan	Policy SI 1 Improving air quality
London Borough of Camden	Policy C1 Health and wellbeing
	Policy A1 Managing the impact of development
	CPG: Air quality

11.0 Community & Wellbeing

The RMA proposals align with the principles addressed in the OPA, please refer to the Sustainability Statement for this application for details.

12.0 Conclusion

This RMA demonstrates the design team's proactive approach to ensure this lab enabled scheme meets and where possible exceeds global, national and local sustainability objectives and planning policy requirements.

The proposals accord with the current London Plan and demonstrate alignment against the draft New London Plan policy which is due for adoption in the near future. Camden Core Policy has been cross referenced by the design team to ensure alignment with current policy whilst the supplementary planning guidance has been reviewed and with policies addressed where relevant.

The Applicant's environmental and social sustainability aspirations has ensured the development has embedded best practice design and construction principles within the proposals from the outset which in combination with the sustainability principles applied to the OPA can be summarised as follows:

- Carbon efficient development that considers whole life cycle carbon emissions with the aspiration to minimise energy demands and exceed minimum policy requirements.
- Application of the energy hierarchy, best practice industry standards for fabric performance alongside the incorporation of zero carbon technologies.
- Designed for climate resilience and UHI mitigation, embedding mitigation measures to ensure a future proofed development.
- Significantly enhances the proposals green infrastructure through intensive and extensive green roof design and soft landscaping.
- Application of principles of circularity to optimise material efficiency, future flexibility and adaptation and minimisign waste on site.
- Use of low toxicity, healthy, and sustainably sourced material to ensure user wellbeing and contribute to improving internal air quality.
- Use of low flow sanitaryware fittings and a design strategy to minimise external water use.
- Healthy and comfortable internal environments for occupant wellbeing and satisfaction, placing the user front and center to enhance experiences of the development.
- Consideration to air quality impacts of providing research and development spaces within the city.
- Inclusive design that is accessible to all and a design that promotes and contributes to a healthy city.

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APPENDIX A: BREEAM Pre-Assessment Report

Project Details		Responsibility Key (BREEAM Core Specialisms)		
		Specialism	**Organisation**	**Consultant**
Project Name	The Network Building	**Client**	**Derwent London**	Simon Silver / Richard Baldwin / Tom French / Caroline Haines / Tim Hyman / Emily Prideaux
Project Address	95-100 Tottenham Court Rd, London	**PM**	**Blackburn & Co.**	Chris Blackburn / Tim Alexander
City	London	**M&E**	**Arup**	Aleksandar Topalovi
Assessment Scheme	New Construction 2018 (3.0)	**Architect, PD & BIM**	**HOK**	Michael Whiteacre
Assessment Building Type	Other (Research and Development)	**Quantity Surveyor**	**Turner and**	Adam Nur
Assessment Type	Shell & Core (speculative)	**Structural and civil**	**AKTII**	Joe Chappell, William Cole
Project Stage	Pre-assessment	**BREEAM**	**TFT**	Oliver Morris/ Giulia Mori
Author	Giulia Mori / Oliver Morris	**Transport**	**Caneparo**	Sam McCartney
Date issued	151120	**Ecologist**	**The Ecology Consult**	Andrew Lewis
Version	1	**Planning**	**DP9**	Jim Pool / Hannah Willcock
Minimum Rating	Excellent (min 70%)			
Target Rating	Excellent (min 70%)			
Current RIBA Stage	2			

Section	Targeted Credits for Excellent	Excellent (%)	Credit worth (%)	Section Weighting	Credits available
Management	**18**	11.00%	0.61%	11.00%	**18**
Health & Wellbeing	**8**	6.40%	0.80%	8.00%	**10**
Energy	**18**	9.69%	0.54%	14.00%	**26**
Transport	**8**	7.67%	0.96%	11.50%	**12**
Water	**6**	4.67%	0.78%	7.00%	**9**
Materials	**7**	8.75%	1.25%	17.50%	**14**
Waste	**7**	4.90%	0.70%	7.00%	**10**
Land Use & Ecology	**11**	12.69%	1.15%	15.00%	**13**
Pollution	**9**	6.75%	0.75%	9.00%	**12**
Innovation	**2**	2.00%	1.00%	N/A	**10**
TOTAL	94	**74.52%**	-	-	134.0

Status Key
Not actioned
In progress
Completed
Not targeted

Credit ID - Name	Credit Issue	Credit Summary	Available	Excellent	Excellent Status	Responsibility	RIBA Stage	Deadline For Next Action	Comments
Man 01 - Project brief and design	**Man 01.1** Stakeholder consultation (project delivery planning)	Prior to completion of the Concept Design (RIBA Stage 2 or equivalent), the project delivery stakeholders have met to identify and define their roles, responsibilities and contributions for each of the key phases of project delivery. In defining the roles and responsibilities for each key phase of the project, the following must be considered: -End user requirements, -Aims of the design and design strategy, -Particular installation and construction requirements/limitations, -Occupiers' budget and technical expertise in maintaining any proposed systems, -Maintainability and adaptability of the proposals, -Requirements for the production of project and end user documentation, -Requirements for commissioning, training and aftercare support, operational energy The project team demonstrate how the project delivery stakeholder contributions and the outcomes of the consultation process have influenced or changed the Initial Project Brief, including if appropriate, the Project Execution Plan, Communication Strategy, and the Concept Design.	1	1		Blackburn/ HOK/TFT	2	-	TFT received project directory. BREEAM kick off meeting to be carried out the 8th June 2020 - **during RIBA Stage 2** Meetings to be minuted and issued: BREEAM and sustainability always to be an item on the agenda. Issue project brief, meeting minutes appointment contracts and consultant responsibilities matrix (if available) before the end of RIBA stage 2
	Man 01.2 Stakeholder consultation (third party)	Prior to completion of the Concept Design stage, all relevant third party stakeholders have been consulted by the design team and this covers the minimum consultation content. The project must demonstrate how the stakeholder contributions and outcomes of the consultation exercise have influenced or changed the Initial Project Brief and Concept Design. Prior to completion of the detailed design (RIBA Stage 4, Technical Design or equivalent), consultation feedback has been given to, and received by, all relevant parties.	1	1		DP9	**2**	Stakeholder engagements to be organised	Third party stakeholders to be identified and consulted as part of the stakeholder engagement exercise Blackburn and DP9 to confirm the stakeholder engagement dates. This shall be completed **by the end of RIBA 2.**
	Man 01.3 Pre-requisite	The project team, including the client, formally agree strategic performance targets early in the design process	Yes	Yes		Derwent Design team	**1**	-	Project brief and Derwent include sustainability targets. The BREEAM workshop on the 8th of June will provide an opportunity to agree on BREEAM specific strategies.
	Man 01.3 Sustainability champion (concept design)	A Sustainability Champion is appointed to monitor progress against the agreed BREEAM performance target(s) throughout the design process and formally report progress to the client and design team - team to include 'Sustainability' as an agenda item on all meeting minutes. The BREEAM AP roles is to: -maximise the project's overall performance against BREEAM -Monitor progress against the performance targets -Proactively identify risks and opportunities related to the achievement of the targets agreed -Provide feedback to the project team -Monitor and coordinate the generation of appropriate evidence by the project team	1	1		TFT	**2**	-	Part of TFT 's scope of works.
	Man 01.4 Sustainability champion (developed design)	A Sustainability Champion is appointed to monitor progress against the agreed BREEAM performance target(s) throughout the design process and formally report progress to the client and design team. To do this the Sustainability Champion must attend key project/design team meetings during the Concept Design, Developed Design and Technical Design stages, as defined by the RIBA Plan of Work 2013, reporting during, and prior to, completion of each stage, as a minimum.	1	1		TFT	3,4,5,6	-	Part of TFT 's scope of works.

Credit ID - Name	Credit Issue	Credit Summary	Available	Excellent	Excellent Status	Responsibility	RIBA Stage	Deadline For Next Action	Comments
Man 02 - Life cycle cost and service life planning	**Man 02.1** Elemental lifecycle cost	An outline, entire asset elemental life cycle cost (LCC) plan has been carried out at Process Stage 2 in line with 'Standardised method of life cycle costing for construction procurement'.	2	2		Turner and Townsend / TFT	**2**	Turner & Townsend to issue cost plan	Elemental cost plan must be undertaken **by the end of RIBA stage 2** based on Stage 2 cost plan. Component cost plan must be undertaken by the end of RIBA stage 4 The following are needed: -cost plan in excel format for all RIBA Stages -BRUKL report
	Man 02.2 Component level LCC plan	A component level LCC option appraisal has been developed by the end of Process Stage 4 (equivalent to Technical Design – RIBA Stage 4) in line with PD 156865:2008 and includes the following component types (where present): 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, using appropriate examples provided by the design team, how the component level LCC cycle appraisal has been used to influence building and systems design/specification to minimise life cycle costs and maximise critical value.	1	1		Turner & Townsend / TFT	4	-	
	Man 02.3 Capital cost reporting	Report the capital cost for the building in pounds per square metre (£k/m²), via the BREEAM Assessment Scoring and Reporting tool, Assessment Issue Scoring tab, Management section.	1	1		Turner & Townsend / contractor / TFT	1,2,3,4,5,6	Turner & Townsend to issue cost plan	Turner & Townsend to issue capital cost for building at the end of each RIBA stage To include construction, preparatory works, materials, equipment, labour, site management, construction financing, insurance and taxes during construction, inspection and testing
Man 03 - Responsible construction practices	**Man 03.0** legally harvested and traded timber	Pre-requisite: Is all timber used in the project 'legally harvested and traded timber'?	Yes	Yes		Contractor	4	-	Specification to be included within the tender documents. TFT to issue tender documents at RIBA Stage 4
	Man 03.1 Environmental management	The principal contractor operates an environmental management system (EMS) covering their main operations. The EMS must be either: Third party certified, to ISO 14001/EMAS or equivalent standard; or Have a structure that is in compliance with BS 8555**:2016** and has reached phase four of the implementation stage, 'implementation and operation of the environmental management system', and has completed phase audits one to four, as defined in BS 8555:**2016.** The principal contractor implements best practice pollution prevention policies and procedures on-site in accordance with Pollution Prevention Guidelines, Working at construction and demolition-sites: PPG6	1	1		Contractor	4,5,6	-	Specification to be included within the tender documents. TFT to issue tender documents at RIBA Stage 4
	Man 03.2 BREEAM AP (site)	Involve a BREEAM AP in the project at an appropriate time and level to: - Work with the project team, including the client, to consider the links between BREEAM issues and assist them in achieving and if possible going beyond the design intent, to maximise the project's performance against the agreed performance targets throughout the Construction, Handover and Close Out stages. - Monitor construction progress against the performance targets agreed throughout all stages where decisions critically impact BREEAM performance - Proactively identify risks and opportunities related to the procurement and construction process and the achievement of the targets agreed. - Provide feedback to the constructors and the project team as appropriate, to support them in taking corrective actions and achieving their agreed performance targets. -Monitor and, where relevant, coordinate the generation of appropriate evidence by the project team and the provision to the assessor.	1	1		TFT/ Contractor	4,5,6	-	Part of TFT 's scope of works.

Credit ID - Name	Credit Issue	Credit Summary	Available	Excellent	Excellent Status	Responsibility	RIBA Stage	Deadline For Next Action	Comments
Man 03 - Responsible construction practices	**Man 03.3** Responsible Construction Management	**One credit is a Mandatory requirement for an Excellent rating to be achieved** One Credit : A dedicated person is responsible for monitoring and reporting on activities for: 1. Vehicle movement (on and near site) 2. Pollution management 3. Tidiness 4. Health and wellbeing Two Credits : In addition the following is include in the monitoring and reporting responsibilities: 1. Training awareness and feedback OR 2. Monitoring and reporting of road traffic accidents, incidents and near misses	2	2		Contractor	4,5,6	-	Contractor must register the site before preparation works. TFT to include within tender documents One credit is a Mandatory requirement for an Excellent or outstanding rating. An innovation credit is available where all the responsible construction management items are achieved on site. This exemplary credit is targeted.
	Man 03.4 Monitoring of construction-site impacts - First monitoring credit - Utility consumption	Responsibility has been assigned to an individual(s) for monitoring, recording and reporting energy use, water consumption and transport data (where measured) resulting from all on-site construction processes (and dedicated off-site monitoring) throughout the build programme. To ensure the robust collection of information, this individual(s) must have the appropriate authority and responsibility to request and access the data required. Where appointed, the Sustainability Champion could perform this role. Energy consumption - monitor and record data of the site energy consumption in kWh and report the total kgCO2/project value from the construction process via the BREEAM Assessment Scoring and Reporting tool Water consumption - monitor and record data on water consumption. Using the collated data report the total net water consumption via the BREEAM Assessment Scoring and Reporting tool.	1	1		Contractor	4,5,6	TFT to issue tender documents at RIBA Stage 4	Specification to be included within the tender documents
	Man 03.5 Monitoring of construction-site impacts - Second monitoring credit - Transport of construction materials and waste	Responsibility has been assigned to an individual(s) for monitoring, recording and reporting energy use, water consumption and transport data (where measured) resulting from all on-site construction processes (and dedicated off-site monitoring) throughout the build programme. To ensure the robust collection of information, this individual(s) must have the appropriate authority and responsibility to request and access the data required. Where appointed, the Sustainability Champion could perform this role. Monitor and record data on transport movements and impacts resulting from delivery of the majority of construction materials to site and construction waste from site. As a minimum this must cover: Transport of materials from the factory gate to the building site, including any transport, intermediate storage and distribution, (see Relevant definitions). 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 Life cycle impacts), 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 waste management plan. Using the collated data, report separately for materials and waste, the total fuel consumption (litres) and total carbon dioxide emissions (kgCO2 eq), plus total distance travelled (km) via the BREEAM Assessment Scoring and Reporting tool.	1	1		Contractor	4,5,6	-	Specification to be included within the tender documents. TFT to issue tender documents at RIBA Stage 4

Credit ID - Name	Credit Issue	Credit Summary	Available	Excellent	Excellent Status	Responsibility	RIBA Stage	Deadline For Next Action	Comments
Man 04 - Commissioning and handover	**Man 04.1** Commissioning and testing schedule and responsibilities	**This is a minimum requirement for an Excellent rating to be achieved -** Commissioning should be carried out, in accordance with Building Regulations where changes are being made to: a) Building services b) Building services control systems c) Changes to the building fabric that will affect thermal performance	1	1		Contractor	4,5,6	-	Specification to be included within the tender documents. TFT to issue tender documents at RIBA Stage 4 This credit is a minimum standard to achieve Excellent or outstanding.
	Man 04.2 Commissioning - design and preparation	For complex building services and systems, a specialist commissioning manager is appointed during the design stage with responsibility for: a) undertaking design reviews b) providing commissioning management input to construction programming c) management of commissioning, performance testing and handover stage This role can be carried out by an appropriate project team manager provided they are not involved in general installation works.	1	1		Contractor	4,5,6	-	Specification to be included within the tender documents. TFT to issue tender documents at RIBA Stage 4
	Man 04.3 Testing and inspecting building fabric	The commissioning and testing schedule and responsibilities credit is achieved. The integrity of the building fabric, including continuity of insulation, avoidance of thermal bridging and air leakage paths is quality assured through completion of post construction testing and inspection (see compliance notes CN3.3, CN3.4 and Man 04 Commissioning and handover). The survey and testing is undertaken by a Suitably Qualified Professional (see Relevant definitions) in accordance with the appropriate standard. Any defects identified in the thermographic survey or the airtightness testing reports are rectified prior to building handover and close out. Any remedial work must meet the required performance characteristics for the building/element.	1	1		Contractor	4,5,6	Discuss costs with Turner & Townsend by end of Stage 2	TFT to discuss costs with Turner & Townsend by end of Stage 2. This might impact on the main contractor liability risks. May increase contractor liability risk
	Man 04.4 Handover	**Producing a Building User Guide in line with the BREEAM criteria is a minimum requirement for achieving an Excellent rating** Building User Guide (BUG) is developed prior to handover, for distribution to the building occupiers and premises managers. A training schedule is prepared for building occupiers/premises managers, timed appropriately around handover and proposed occupation plans, which includes the following content as a minimum: - 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 to, and demonstration of, installed systems and key features, particularly 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, operations and maintenance (O&M) manual, commissioning records, log book etc. - Maintenance requirements, including any maintenance contracts and regimes in place.	1	1		Contractor	4,5,6	-	Specification to be included within the tender documents. TFT to issue tender documents at RIBA Stage 4 Criterion 11 is a minimum standard to achieve Excellent or outstanding.
Man 05 - Aftercare	**Man 05.1** Aftercare support	Operational infrastructure and resources in place to provide aftercare support to the building occupier(s). Operational infrastructure and resources in place to coordinate collection of energy and water consumption data for a minimum of 12 months.	0	0		n/a	-	Speculative development	n/a for shell and core assessment
	Man 05.2 Commissioning - implementation	Specialist Commissioning Manager - Testing of all building services under full load conditions within complex systems over a minimum 12 month period. Review of thermal comfort, ventilation and lighting at three, six and nine month intervals after initial occupation completed over a minimum 12-month period. **Produce monthly reports comparing sub-metered energy performance to the predicted one**	0	0		n/a	-	Speculative development	n/a for shell and core assessment

Credit ID - Name	Credit Issue	Credit Summary	Available	Excellent	Excellent Status	Responsibility	RIBA Stage	Deadline For Next Action	Comments
	Man 05.3 Post occupancy evaluation	Client or building occupier to make a commitment to carry out a post occupancy evaluation (POE) exercise one year after initial building occupation carried out by an independent party which covers: a) internal environmental conditions (light, noise, temperature, air quality) b) control, operation and maintenance c) Facilities and amenities d) Access and layout e) Energy and water consumption f) Other relevant issues The independent party provides a report with lessons learned to the client and building occupiers The client or building occupier commits funds to pay for the POE in advance.	0	0		n/a	-	Speculative development	n/a for shell and core assessment

Credit ID - Name	Credit Issue	Credit Summary	Available	Excellent	Excellent Status	Responsibility	RIBA Stage	Deadline For Next Action	Comments
Hea 01 - Visual Comfort	**Hea 01.1** Glare control from sunlight	Identify areas at risk of glare using a glare control assessment. The glare control assessment also justifies any areas deemed not at risk of glare. A glare control strategy designs out potential glare in all relevant building areas where risk has been identified. This strategy must not increase consumption used for lighting. This is achieved by: 1. Maximising daylighting levels in all weather, cloudy or sunny AND 2. Ensuring the use or location of shading does not conflict with the operation of lighting control systems	0	0		HOK	1, 2	-	n/a for shell and core. However HOK and to consider a glare control strategy to reduce energy demand and enhance occupants wellbeing
	Hea 01.2 Daylighting	<u>Option 1:</u> Daylighting criteria have been met using either of the following options: The relevant building areas meet good practice daylight factor(s) and other criterion as outlined in Table 10 and Table 11 of the BREEAM manual: 2% ADF, 80% of floor area complies and uniformity ratio of 0.3 is achieved OR <u>Option 2:</u> The relevant building areas meet good practice average and minimum point daylight illuminance criteria (At least 300 lux for 2000 hours per year or more for average, 90 lux for 2000 hours per year or more minimum at worst lit point).	1	1		HOK / Arup/	2	to confirm if modelling can be undertaken	HOK and to confirm on whether daylighting criteria is likely to be achieved in meeting rooms, office areas and general communal areas (i.e. reception) Option 2 is recommended to align with WELL and LEED. Exemplary credit is targeted if outstanding is pursued.
	Hea 01.3 View out	95% of the floor area in each relevant building areas is within 8m 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 (refer to Hea 01 Visual comfort in the Additional information section). Where the room depth is greater than 8m, 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 82061. The view out must be a view of a landscape or buildings (rather than just the sky) at seated eye level (1.2–1.3m) within the relevant building areas and should ideally be through an external window. A view into an internal courtyard or atrium will comply provided the distance from the opening to the back wall of the courtyard or atrium is at least 10m.	1	0		HOK	3,4	-	HOK to review the layout with to advise if this can be achieved. If floor plate's depth is greater than 8m, 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 82061.
	Hea 01.4 Internal and external lighting, zoning and control	**Internal lighting** - Not applicable for shell and core assessments **External lighting** - In accordance with BS 5489-1:2013 Code for the practice for the design of road lighting. and BS EN 12464-:2014. Where no external light fittings are specified (either separate from or mounted on the external building façade or roof), the criteria relating to external lighting do not apply and the credit can be awarded on the basis of compliance with criteria 7–8.c above. If no internal lighting is specified, the credit cannot be awarded. **Zoning and occupant control of internal lighting** - Not applicable for shell and core assessments	1	1		Arup	3,4	-	Arup to issue lighting specifications/controls in Stage 3 specification report Need to clarify assessment boundary for external lighting
	Hea 02.1 Indoor air quality plan	Pre-requisite- Minimising indoor air pollution during design, construction and occupation of building. Production of an Air Quality Plan.	Yes	Yes		Arup / IAQ plan specialist	2	Appoint IAQ plan specialist	Indoor Air Quality consultant to advise on minimising pollutants during design construction and occupation to promote healthier buildings and occupants. Confirm additional costs with Turner & Townsend.

Credit ID - Name	Credit Issue	Credit Summary	Available	Excellent	Excellent Status	Responsibility	RIBA Stage	Deadline For Next Action	Comments
	Hea 02.2 Ventilation	The building has been designed to minimise the concentration and recirculation of pollutants in the building as follows: a. Provide fresh air into the building in accordance with the criteria of the relevant standard for ventilation. NOTE: If ventilation systems are not within the remit of the shell and core developer, compliance can be demonstrated through the building servicing strategy where this is predetermined by the built form or core services provision.	1	1		Arup	3	-	Arup to confirm availability of credit. Site layout drawings showing intake/extract locations will be required at RIBA Stage 3 if targeted. May be possible to target depending on distance of extracts from intakes. To be discussed with Arup.

Credit ID - Name	Credit Issue	Credit Summary	Available	Excellent	Excellent Status	Responsibility	RIBA Stage	Deadline For Next Action	Comments
Hea 02 - Indoor Air Quality	**Hea 02.3** Emissions from construction products	<u>One credit</u> three out of the five product types meet the emission limits, testing requirements and any additional requirements. Where wood-based products are not one of three selected product types, all wood-based products used for internal fixtures and fittings must be tested and classified as formaldehyde E1 class as a minimum. <u>Two credits</u> All of the product types listed meet the emission limits, testing requirements and any additional requirements listed in the BREEAM guidance	0	0		HOK / Arup / AKTII / Hann Tucker / Contractor	3, 4, 5	-	n/a for shell and core However similar requirements will have to be included in HOK, AKTII, Hann Tucker, and Arup specifications for the contractor. The Main contractor must procure materials accordingly.
	Hea 02.4 Post-construction indoor air quality measurement	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 500µg/ 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 diffusive sampling BS ISO 16000-3: 20116 Formaldehyde and other carbonyls in air by active sampling. The measured concentration levels of formaldehyde (µg/m³) and TVOC (µg/m³) are reported, via the BREEAM Assessment Scoring and Reporting Tool.	0	0		Testing Specialist	6	-	n/a for shell and core However specialist to perform indoor air quality testing for WELL
Hea 04 - Thermal comfort	**Hea 04.1** Thermal modelling	1. Thermal modelling has been carried out using software in accordance with CIBSE AM11 Building Energy and Environmental Modelling. 2. 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). 3. The modelling demonstrates that: 3.a 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); or the thermal environment in occupied spaces meet the Category B requirements for PPD, PMV and local discomfort set out in Table A.1 of Annex A of ISO 7730:2005. 3.b.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.	1	1		Arup/ TFT	3	-	TFT have undertaken initial modelling to align with Hea 04 Post Planning

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	Hea 04.2 Design for future thermal comfort	Criteria 1-4 achieved, thermal modelling demonstrates that the relevant requirements set out in in criterion 3 are achieved for a projected climate change environment.	1	1		Arup/ TFT	3	-	TFT have undertaken initial modelling to align with Hea 04 Post Planning
	Hea 04.3 Thermal zoning and controls	Thermal modelling analysis has informed the temperature control strategy for the building and its users.	0	0		-	-	-	n/a for shell and core

Credit ID - Name	Credit Issue	Credit Summary	Available	Excellent	Excellent Status	Responsibility	RIBA Stage	Deadline For Next Action	Comments
Hea 05 - Acoustic Performance	**Hea 05.1** Sound insulation	Criteria The sound insulation between rooms and other occupied areas complies with the performance criteria given in Section 7 of BS 8233:20144. This should be based on the layout and function of the different spaces within the building. Testing requirement A programme of pre-completion acoustic testing is carried out by a compliant test body in accordance with the acoustic testing and measurement procedures outlined in Methodology section of this BREEAM issue. Notes If testing is to be carried out where the office is not yet furnished, then section 7.5 of BS 8233:2014 should be referred to when determining the performance criteria. Where the office is to be furnished at the time testing is carried out, then refer to section 7.7.6 of BS 8233:2014 for the relevant performance criteria.	0	0		-	-	-	n/a for shell and core assessment
	Hea 05.2 Indoor ambient noise level	Criteria Achieve indoor ambient noise levels that comply with the design ranges given in Section 7 of BS 8233:2014. Testing requirement A programme of pre-completion acoustic testing is carried out by a compliant test body in accordance with the acoustic testing and measurement procedures outlined in Methodology. OR A suitably qualified acoustician (SQA) is appointed to define a bespoke set of performance requirements for all function areas in the building. The bespoke performance requirements use the acoustic principles defined above, setting out the performance requirements for each and the testing regime required.	1	1		Hann Tucker	2, 3,4,5,6	-	Hann Tucker to provide initial thoughts on design considerations to achieve compliance with Section 7 of BS 8233:2014
	Hea 05.3 Room acoustics	Criteria Acoustic environment (control of reverberation, sound absorption and speech transmission index): Achieve the requirements relating to sound absorption and reverberation times, where applicable, set out in Section 7 of BS 8233:2014. Testing Requirement A programme of acoustic measurements is carried out by a compliant test body in accordance with the acoustic testing and measurement procedures outlined in the Additional information section of this BREEAM issue	0	0		-	-	-	n/a for shell and core
Hea 06-Security	**Hea 06.1** Security of site and building	A Suitably Qualified Security Specialist (SQSS) conducts an evidence based Security Needs Assessment (SNA) during or prior to Concept Design. The SQSS develops a set of recommendations or solutions during or prior to Concept Design. These recommendations or solutions aim to ensure that the design of buildings, public and private car parks and public or amenity space are planned, designed and specified to address the issues identified in the preceding SNA. The recommendations or solutions proposed by the SQSS are implemented. Any deviation from those recommendations or solutions will need to be justified, documented and agreed in advance with a suitably qualified security specialist.	1	1		Specialist	**2**	Security consultant to be appointed	Security Needs Assessment needs to be issued **by end of RIBA Stage 2**. This can be provided at a later stage than RIBA Stage 2 if it is demonstrated that the late engagement did not compromise the site's security assessment. SNA has been undertaken and included in the strategy

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Hea 07 Safe and Healthy Surrounding	**Hea 07.1** Safe access	Dedicated cycle paths provide direct access from the site entrance(s) to any cycle storage provided, without the need to deviate from the cycle path and, if relevant, connect to off-site cycle paths (or other appropriate safe route) 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 practical and convenient access to local transport nodes and other off-site 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. Dedicated pedestrian crossings are provided where pedestrian routes cross vehicle access routes, and appropriate traffic calming measures are in place to slow traffic down at these crossing points. For large developments with a high number of public users or visitors, pedestrian footpaths must be signposted to other local amenities and public transport nodes off-site (where existing). The lighting for access roads, pedestrian routes and cycle lanes is compliant with the external lighting criteria defined in Hea 01 Visual comfort, i.e. in accordance with BS 5489-1:20131 Lighting of roads and public amenity areas. Where vehicle 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 dedicated parking/waiting area for goods vehicles with appropriate separation from the manoeuvring area and staff and 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).	1	0		All	-	-	Design team to confirm if there is an external areas with the following: -Dedicated and safe cycle paths -Dedicated and safe footpaths -Pedestrian drop-off areas -Vehicle delivery areas -Dedicated parking or waiting area for goods vehicles -Parking and turning areas Currently not targeted
	Hea 07.02 Safe and healthy surroundings	There is an outside space providing building users with an external amenity area. The space needs to be an appropriate size to provide enough amenity for the predicted number of building users during coffee or lunch breaks to gather, socialise, relax and connect with the natural environment. The outside space must: - be an outdoor landscaped area, for example a garden, balcony or terrace. The majority of the space must be open to the sky. - have appropriate seating areas and be non-smoking - be located to ensure it is accessible to all building users and avoids areas that will have disturbances from noise.	1	1		All	-	-	Design team to confirm if there is an external amenity area

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Ene 01 - Reduction of energy use and carbon emissions	**Ene 01.1** Energy Performance	**A minimum of four credits are required for an Excellent rating to be achieved** Calculate an Energy Performance Ratio for New Constructions (EPR NC). Compare the EPR NC achieved with the benchmarks and award the corresponding number of BREEAM credits.	9	4		Arup/ HOK/ / TFT	2,3	BRUKL and inp. to be prepared	Whole building approach (EPC input file required for the new built). A minimum of 4 credits must be achieved to target an excellent rating OR 4 credits for Prediction of operational energy consumption (where operational energy performance has been substantially improved). A minimum of 6 credits are required for outstanding to be achieved and 4 credits for prediction of operational energy consumption. **Net Zero opportunities to be discussed.** **Initial modelling confirms minimum performance for an excellent can be achieved**
	Ene 01.3 Prediction of operational energy consumption	Undertake additional energy modelling during the design and post construction stage to generate predicted operational energy consumption figures Report predicted energy consumption targets by end use, design assumptions and input data (with justifications) Carry out a risk assessment to highlight any significant design, technical, and process risks that should be monitored and managed throughout the construction and commissioning process.	4	4		Arup/ HOK/ / TFT	2,3	Scope to be agreed	TM54 has been commissioned. GN 39 and GN32 outline the recommended methodology for undertaking operational energy modelling demands. http://www.breeam.com/filelibrary/Guidance%20Notes/DRAFT_GN32_UKNC2018_Energy_Prediction-Verification_FINAL.pdf Post planning action but will need to discuss operational energy demands

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Ene 02 - Energy Monitoring	**Ene 02.1** Sub-metering of major energy consuming systems	**This is a minimum requirement for an Excellent rating to be achieved** - 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. The energy consuming systems in buildings with a total useful floor area greater than 1,000m² are metered using an appropriate energy monitoring and management system. The systems in smaller buildings are metered either with an energy monitoring and management system or with separate accessible energy sub-meters with pulsed or other open protocol communication outputs, to enable future connection to an energy monitoring and management system. The energy consuming end uses are identifiable to the building users, for example through labelling or data outputs.	1	1		Arup	3,4	-	Arup to provide schematic layouts at RIBA Stage 3. TFT to issue compliance statement for Arup to confirm Applicable areas include: - all main incoming feeds (electricity/water/gas) - any landlord lighting - All major energy using equipment e.g. heating and cooling plant; and Renewable & low carbon energy generation sources e.g. PV, CHP plant A minimum of 1 credits must be achieved under Ene02.1 to target a Good, very Good or excellent rating
	Ene 02.2 Sub-metering of high energy load and tenancy areas	An accessible energy monitoring and management system or separate accessible energy sub-meters with pulsed or other open protocol communication outputs to enable future connection to an energy monitoring and management system are provided, covering a significant majority of the energy supply to tenanted areas or, in the case of single occupancy buildings, relevant function areas or departments within the building/unit. **In addition to sub-metering of relevant function areas in single occupancy buildings, sub-metering must also be carried out per floor plate in single large occupancy or single tenancy-buildings with homogenous function.**	1	1		Arup	3,4	-	
Ene 03 - External Lighting	**Ene 03.1** External lighting	The average initial luminous efficacy of the external light fittings within the construction zone is not less than **70** luminaire lumens per circuit Watt. All external light fittings are automatically controlled for prevention of operation during daylight hours and presence detection in areas of intermittent pedestrian traffic.	1	1		HOK / Arup	3,4	-	Arup to provide lighting specifications for building at RIBA Stage 3.
Ene 04 - Low carbon design	**Ene 04.1** Passive design analysis	Hea 04.1 Thermal comfort has been achieved to demonstrate the building design can deliver appropriate thermal comfort levels in occupied spaces. The project team carries out an analysis of the proposed building design/development to influence decisions made during Concept Design stage (RIBA Stage 2 or equivalent) and identify opportunities for the implementation of passive design solutions that reduce demands for energy consuming building services. The building uses 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 and the analysis demonstrates a meaningful reduction in the total energy demand as a result. **Reduced total energy demand and carbon dioxide (CO2) emissions resulting from passive design measures need to be quantified.**	1	1		TFT	**2**	Confirm how this should form part of the strategy	Passive design analysis to cover : - Site location - Site weather - Microclimate - Building layout - Building orientation - Building form - Building fabric - Thermal mass or other thermal storage - Building occupancy type - Daylighting strategy - Ventilation strategy - Adaptation to climate change **This has to be completed by the end of RIBA Stage 2**
	Ene 04.2 Free cooling	The passive design analysis has been undertaken and the relevant credit (Ene 04.1) is achieved. The passive design analysis carried out includes an analysis of free cooling and identifies opportunities for the implementation of free cooling solutions. The building uses ANY of the free cooling strategies to reduce the cooling energy demand.	1	0		Arup / Turner & Townsend	2	Confirm whether this should form part of the strategy	Active cooling assumed in offices so not available

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	Ene 04.3 Low and zero carbon technologies	A feasibility study has been carried out by the completion of the Concept Design stage (RIBA Stage 2 or equivalent) by an energy specialist to establish the most appropriate recognised local (on-site or near-site) low or zero carbon (LZC) energy source(s) for the building/development. A local LZC technology/technologies has/have been specified for the building/development in line with the recommendations of this feasibility study and this method of supply results in a meaningful reduction in regulated carbon dioxide (CO2) emissions. **Reduced total energy demand and carbon dioxide (CO2) emissions resulting from passive design measures need to be quantified.**	1	1		TFT	**2**	Confirm how this should form part of the strategy	Low and zero carbon technologies opportunities to be considered for the building **This has to be completed by the end of RIBA Stage 2**

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Ene 06 - Energy Efficient Transportation Systems	**Ene 06.1** Energy consumption	Where 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 calculated 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, where it produces an energy saving greater than the additional standby energy used to support the drives. The transportation system with the lowest energy consumption is specified.	1	1		Arup	3	-	Transportation analysis required by installer/supplier
	Ene 06.2 Energy efficient features	<u>Lifts</u> For each lift, the following three energy efficient features are specified: The lifts operate in a standby 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 prescribed length of time. The lift car lighting and display lighting provides an average lamp efficacy, (across all fittings in the car) of > **70** lamp lumens/circuit Watt. The lift uses a drive controller capable of variable speed, variable-voltage, and variable-frequency (VVVF) control of the drive motor. Where the use of regenerative drives is demonstrated to save energy, they are specified.	1	1		Arup	3	-	Lift supplier to provide transport analysis to confirm appropriateness of proposed lift - RIBA Stage 3 Should be included as part of the lift analysis (Ene06.1)
Ene 07 - Energy Efficient Labs	**Ene 07.1** - Design Specification	Engage with the client during the preparation of the initial project brief to determine occupant requirements and define laboratory performance criteria. Performance criteria will include, but not be limited to: 1.a: Description of purpose 1.b: Occupant or process activities 1.c: Containment requirements and standards 1.d: Interaction between systems 1.e: Flexibility and adaptability of laboratory facilities. 1.f: Any other specific requirements (for example, requirements relevant to ventilation, heating or cooling). 2 Size the services system equipment (including ventilation supply and extract) correctly (see Definitions). 3 Demonstrate the minimised energy demand of the laboratory facilities resulting from the achievement of the defined design performance criteria.	1	1		Arup / HOK / TFT	3	-	4 For ducted fume cupboards specified: 4.a: Demonstrate that the average design air flow rate is no greater than 0.16m³/s per linear metre (internal width) of fume cupboard workspace 4.b: Measure the volume flow rate in the exhaust duct (at the boundary of the laboratory) to take account of reductions in (inward) volume flow rate from fume cupboard leakage 4.c: Demonstrate that a reduction in air flow does not compromise the defined performance criteria and does not increase the health and safety risk to future building occupants.

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Efficient Labs	**Ene 07.2** - Best practice energy efficient measures	If the laboratory area accounts for at least 10% of the total building floor area (see Definitions): 5 Achieve criteria 1 to 4 (or criteria 1 to 3 where there are no ducted fume cupboards). 6 Design, specify and install laboratory plant and systems to promote energy efficiency. Demonstrate compliance with items in Table 6.4 (see 6.a and 6.b for credits available). 6.a: Up to 2 credits: laboratory areas (see Definitions) account for at least 10% (but less than 25%) of the total building floor area OR 6.b: Up to 4 credits: laboratory areas account for 25% or more of the total building floor area. 7 Demonstrate by calculations or modelling that the chosen measures have a reasonably significant effect on the total energy consumption of the laboratory, i.e. 2% reduction or greater. 8 Demonstrate that the energy efficient measures specified do not compromise the defined performance criteria, and do not increase the health and safety risk to future building occupants.	4	2		Arup / HOK / TFT	3	-	Laboratory system Best practice specific fan power (W/(L/s)) General laboratory supply air handling unit (AHU) with heating and cooling1.5 General laboratory extract systems1.2 Laboratory local extract ventilation – ducted1.0 Containment area extract, without high efficiency particulate absorption (HEPA) filtration1.5 Containment area extract, with HEPA filtration2.5 Fume cupboard extract1.5
Ene 08 - Energy Efficient equipment	**Ene 08.1** Energy Efficient Equipment	Two credits Identify the building's unregulated energy consuming loads and estimate their contribution to the total annual unregulated energy consumption of the building, assuming a typical/standard specification. Identify the systems and/or processes that use a significant proportion of the total annual unregulated energy consumption of the development and its operation. Demonstrate a meaningful reduction in the total annual unregulated energy consumption of the building. See Table 28 Table 28 contains solutions deemed to satisfy compliance for common examples of significant contributors to unregulated energy consumption, for a number of different building types/functions.	0	0		n/a	-	-	Out of scope
Tra 01 - Transport assessment and travel plan	**Tra 01.1** Travel Plan	A travel plan has been developed as part of the feasibility and design stages. A site specific travel assessment/statement has been undertaken to ensure the travel plan is structured to meet the needs of the particular site and 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). - Reporting of the number and type of existing accessible amenities - Disabled access (accounting for varying levels of disability and visual impairment). - Public transport links serving the site. - Calculation of the existing public transport Accessibility Index (AI) - 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 building's operation and use. If the occupier is known, they must be involved in the development of the travel plan and they must confirm that the travel plan will be implemented post construction and be supported by the building's management in operation.	2	2		Caneparo Associates	2	Proposed drawings and transport assessment required	A transport assessment/travel plan will be required as part of the planning application. These documents will identify the scheme's accessibility index confirming Tra 01 credit availability AI is 57.92 (6b PTAL)

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Tra 02 - Sustainable transport measures	**Tra 02.1** Alternative modes of Transport	Consider the following when providing alternative means of transport to the development 1. The existing AI calculated in Tra 01 achieves ≥8 2. Demonstrate an increase over the existing Accessibility index through negotiation with local bus, train or tram companies to increase the frequency of the local service provision for the development OR demonstrate an increase of the existing Accessibility Index. This could be through the provision of a diverted bus route, a new or enhanced bus stop, or other similar solutions OR provide a dedicated service, such as a bus route or service 3. Provide a public transport information system in a publicly accessible areas, to allow building users access to up-to-date information on the available public transport and transport infrastructure. The may include signposting to public transport cycling walking infrastructure or local amenities. 4. Provide electric recharging stations of a minimum of 3kW for at least 10% of the total car parking capacity for the development. 5.Set up a car sharing group or facility to facilitate and encourage building users to car share; 6. During the preparation of the brief, the design team consults with the local authority (LA) on the state of the local cycling network and public accessible pedestrian routes, to focus on whichever the LA deems most relevant to the project and how to improve it. Ensure new amenities are provided for the users of the building (this could include; access to cash, access to an outdoor space, access to a recreation or leisure facility, publicly available postal or sports, community facility, over the counter services associated with a pharmacy, Child care facility or school). 7. Install compliant cycle storage spaces to meet the minimum levels 8. Provide at least two compliant facilities for the building users (i.e. showers, changing facilities, lockers, drying spaces) 9. At least three existing accessible amenities are present, where relevant for a building group 10. Ensure a minimum of one new accessible amenity, relevant to the relevant building group is provided 11. Implement one site-specific improvement measure, not covered by the options already listed in this issue, in line with the recommendations of the travel plan.	10	6		Caneparo Associates / HOK	2	This credit issue can help to uplift the score.	Travel consultant to provide confirmation of what needs to be included in the travel plan. AI is 57.92 (6a PTAL) It is recommended that the following options are included: -option 1 - 1 point: AI 57 -option 3 - 1 point: provide a public transport information system in a publicly accessible area -option 7 - 1 point: compliant cycle storage -option 8 - 1 point: Provide at least two compliant cyclists' facilities (showers, changing rooms, lockers, drying room) -option 9 - 1 point: access to three existing amenities
Wat 01 - Water Consumption	**Wat 01.1** Water efficiency	**A minimum of one credit must be awarded for an Excellent rating to be achieved -** An assessment of the efficiency of newly specified domestic-water consuming components and measures specified to retrofit existing devices is undertaken using the BREEAM Wat01 calculator. Water consumption (litres/person/day) is compared against a baseline performance. BREEAM credits available on % improvement over baseline building water consumption. The efficiency of the following 'domestic scale' water-consuming components must be included in the assessment (where specified): - WCs - Urinals - Taps (wash hand basins and where specified kitchen taps and waste disposal unit) - Showers - Dishwashers (domestic and commercial sized) - Washing machines (domestic and commercial or industrial sized).	5	3		Arup / HOK / TFT	2, 3, 4	HOK to provide proposed sanitary ware specifications at RIBA stage 3 for TFT to confirm water consumption	50% reduction. For four credits an example specification (at 3 bar pressure) is shown below: W/C : 4.5/3 flush 5 litre hand basins 4.5 litre cistern per 3 urinal bowels with 6 flush frequency per hour 6 litre showers 6 litre kitchenette taps Commercial dishwasher (will need to be included within a tenancy lease agreement) - 12 litres per cycle used as benchmark. If catering facilities are present : Kitchen taps - 6 litres per min Dishwasher - 1.25 litre per place setting For full credits greywater recycling will be likely A minimum of 1 credit must be achieved to target excellent or outstanding rating

Credit ID - Name	Credit Issue	Credit Summary	Available	Excellent	Excellent Status	Responsibility	RIBA Stage	Deadline For Next Action	Comments
Wat 02 - Water Monitoring	**Wat 02.0** Pre-requisite	The specification of a water meter on the mains water supply to each building; this includes instances where water is supplied via a borehole or other private source.	Yes	Yes		Arup	3		Installed meters must be pulsed to enable connection to an appropriate utility monitoring and management system Arup to issue schematic showing location of pulsed water meter on mains supply at RIBA stage 3
	Wat 02.1 Water monitoring	**Specifying a water meter on the mains water supply to each building is a minimum requirement for an Excellent rating to be achieved -** Water-consuming plant or building areas, consuming 10% or more of the building's total water demand, are either fitted with easily accessible sub-meters or have water monitoring equipment integral to the plant or area. As a minimum, this includes the following (where present): - Buildings with a swimming pool and its associated changing facilities (toilets, showers etc.). - On sites with multiple units or buildings, e.g. shopping centres, industrial units, retail parks etc. separate sub meters are fitted on the water supply to the following areas (where present): - Each individual unit supplied with water - Common areas (covering the supply to toilet blocks) - Service areas (covering the supply to outlets within storage, delivery, waste disposal areas etc.) - Ancillary/separate buildings to the main development with water supply. Each meter (main and sub) has a pulsed or other open protocol communication output to enable connection to an appropriate utility monitoring and management system, e.g. a building management system (BMS), for the monitoring of water consumption (see Relevant definitions). If the site on which the building is located has an existing BMS, managed by the same occupier/owner (as the new building), the pulsed/digital water meter(s) for the new building must be connected to the existing BMS.	1	1		Arup	3	-	Arup to confirm if any likely areas consuming more than 10% of total water demand and provide drawings as necessary to confirm metering strategy Criterion 1 must be achieved to target an or excellent or outstanding rating
Wat 03 - Leak Detection	**Wat 03.1** 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 inbuilt automated diagnostic procedure for detecting leaks is installed. - Activated when the flow of water passing through the water meter/data logger is 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 criteria. - Where applicable, designed to avoid false alarms caused by normal operation of large water-consuming plant such as chillers.	1	1		Arup / Turner & Townsend	4	-	Detection system must be capable of detecting a major water leak on the mains water supply within the building and between the building and the utilities water meter Arup to provide details of leak detection system at RIBA Stage 4
	Wat 03.2 Flow control devices	Flow control devices that regulate the supply of water to each WC area/facility according to demand are installed (and therefore minimise water leaks and wastage from sanitary fittings).	1	1		Arup / Turner & Townsend	4	-	Confirm cost implications and confirm will be part of the strategy Arup to provide details of flow control devices at RIBA Stage 4

Credit ID - Name	Credit Issue	Credit Summary	Available	Excellent	Excellent Status	Responsibility	RIBA Stage	Deadline For Next Action	Comments
Wat 04 - Water efficient equipment	**Wat 04.1** Water efficient equipment	Identify all water demands from uses other than those listed under Wat 01 Water consumption: Calculation of water efficiency performance that could be realistically mitigated or reduced. Where there is no water demand from uses other than domestic-scale, sanitary use components in the building, this issue is not applicable. 2 Identify systems or processes to reduce the relevant water demand (criterion 1), and establish, through either good practice design or specification, a demonstrable reduction in the total water demand of the building. **KBCN0553:** Where the design team can justify that manual watering provides a reduction in unregulated water consumption, this can be considered as an acceptable method for reducing unregulated water use. **KBCN0147:** Temporary watering arrangements set up purely to allow plant species or a green roof to establish are acceptable for plants relying on natural precipitation during all seasons of the year. Where this is the case, the ecologist's report must confirm the plant species and the expected time for recommended plant species to establish themselves i.e. time period for temporary watering arrangements.	1	0		Arup, Exterior HOK	-	-	This is applicable is any of the following is present: -cooling towers and humidification systems -Water filtration and treatment processes -Equipment used for irrigation -Swimming pools -Recreational hot tubs and hydrotherapy pools **Where the design team can justify that manual watering or temporary irrigations can be provided the credit is awarded.**

Credit ID - Name	Credit Issue	Credit Summary	Available	Excellent	Excellent Status	Responsibility	RIBA Stage	Deadline For Next Action	Comments
Mat 01 - Life Cycle Impacts	**Mat 01.1** Environmental impact from construction	Up to seven credits: BREEAM awards credits on the basis of the building's quantified environmental life cycle impact through assessment of the main building elements. Using LCA IMPACT compliant software, the scheme's substructure, superstructure and hard landscaping are considered at RIBA stages 2 and 4. This exercise will need to be verified by a third party verification body	7	3		TFT	**2,3,4**	TFT engagement to be discussed	Exemplary credits can be achieved where core services are considered within the LCA and where the LCA aligns with the LCC **During the RIBA Stage 2**, demonstrate the environmental performance of the superstructure, substructure and hard landscaping and core building services **During RIBA Stage** 4 identify opportunities for reducing environmental impacts of superstructure An inital LCA has been undertaken
Mat 02 - Environmental Impacts of Construction Products	**Mat 02.1** Environmental impacts from construction products	Specify construction products with EPD that achieve a total EPD points score of at least 20. Details should be inputted into the Mat 01 result submission tool, including the material category classification.	1	0		HOK /Cost consultant / TFT	3	Material procurement to be discussed	EPDs are applicable for: - Timber or timber -based - Concrete or cementitious - Metal - Stone or aggregate - Clay- based - Gypsum - Glass - Plastic, polymer, resin, paint, chemicals and bituminous - Animal fibre or skin, cellulose fibre
Mat 03 - Responsible Sourcing of Materials	**Mat 03.0** Pre-requisite	**This is a minimum requirement for an Excellent rating to be achieved -** All timber and timber-based products used on the project is Legally harvested and traded timber Note: It is a minimum requirement for achieving a BREEAM rating (for any rating level) that compliance with criterion 1 is confirmed. For other materials there are no pre-requisite requirements at this stage.	Yes	Yes		Derwent / HOK / Contractor/ Turner & Townsend	3	-	To be included in enabling works and main contractor tender document. TFT to issue tender documents at RIBA Stage 4
	Mat 03.1 Sustainable procurement plan	The principal contractor sources materials for the project in accordance with a documented sustainable procurement plan. A plan that sets out a clear framework for the responsible sourcing of materials to guide procurement throughout a project and 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, will cover the following as a minimum: - Risks and opportunities are identified against a broad range of social, environmental and economic issues. BS ISO 20400:2017, 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 individual projects. These could include setting out measurement criteria, methodology and performance indicators to assess progress and demonstrate success. **A sustainable procurement plan must be in place before the end of RIBA Stage 2**	1	1		Derwent / HOK / Contractor/ Turner & Townsend / TFT	**2**	Prepare a sustainable procurement plan	A sustainable procurement plan must be in place **before the end of RIBA Stage 2** TFT to issue tender documents at RIBA Stage 4

Credit ID - Name	Credit Issue	Credit Summary	Available	Excellent	Excellent Status	Responsibility	RIBA Stage	Deadline For Next Action	Comments
	Mat 03.2 Responsible Sourcing of Materials	The available RSM credits can be awarded where the applicable building materials are responsibly sourced in accordance with the BREEAM methodology.	3	1		Derwent/ HOK / Contractor/ Turner & Townsend/ Arup/ AKTII	4	-	HOK, Derwent , Cost consultant and TFT to work in collaboration throughout Stage 3 to complete the BREEAM calculator. The results will be incorporated into the contractor's tender documentation. It will be important to liaise directly with the contractor procurement team at the earliest opportunity once the contractor is appointed to confirm the performance requirements that are expected. TFT to issue tender documents at RIBA Stage 4 Criterion 1 must be achieved to target any level of BREEAM certification.

Credit ID - Name	Credit Issue	Credit Summary	Available	Excellent	Excellent Status	Responsibility	RIBA Stage	Deadline For Next Action	Comments
Mat 05 - Designing for durability and resilience	**Mat 05.1** Designing 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. The following outlines the process: 1. Identify from the list of 'applicable building elements' under Table 50 the elements that are appropriate to the building being assessed. 2. Establish from the 'environmental factors' list those factors that are likely to cause material degradation effects in the identified applicable building elements. 3. Confirm the design and specification measures in place to limit these degradation effects. 4. The assessor should use their professional judgement in determining whether the design team have adequately demonstrated that they have designed and specified materials and/or measures which will be effective in preventing unnecessary deterioration, so reducing frequent replacements, repairs and maintenance through the life cycle of the building. 5. At post construction stage, where the design and specification measures installed differ from those proposed at design stage, the assessor must ensure that these measures still meet the aims of the criterion as detailed in point 4 above.	1	1		Arup / AKTII / Cost consultant / HOK	3	-	TFT to issue table of elements to HOK for review and to confirm design/specification measures in place to limit degradation at RIBA Stage 3
Mat 06 - Material efficiency	**Mat 06.1** Minimise environmental impact of material - Materials Optimisation	Opportunities have been identified, and appropriate measures investigated and implemented, to optimise the use of materials in building design, procurement, construction, maintenance and end of life. The above is carried out by the design/construction team in consultation with the relevant parties at each of the following RIBA stages: Preparation and Brief Concept Design Developed Design Technical Design Construction. Record the implementation of material efficiency during the developed design, technical design and construction Report the targets and actual material efficiencies achieved. 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: Client/developer, Cost consultant, HOK, Structural/civil engineers, Building services engineers - mechanical, electrical, Principal contractor, Demolition/strip-out contractor, Environmental consultant, Project management consultant, Materials/component manufacturers/suppliers.	1	1		All	**1,2,3,4**	To be discussed with the project team	Design team to issue Stage 1 reports which include material efficiency considerations. **Get Stage 1 information from design team.** **This credit has to be complete for RIBA Stages 1 to 5**

Credit ID - Name	Credit Issue	Credit Summary	Available	Excellent	Excellent Status	Responsibility	RIBA Stage	Deadline For Next Action	Comments
Wst 01 - Construction Waste Management	**Wst 01.0** Pre-demolition audit	Carry out a pre-demolition audit by the end of Concept Design stage by a competent person prior to strip-out or demolition works. This informs the design of materials to consider for reuse and set targets for waste management. All contractors should be engaged in the process of maximising high grade reuse and recycling opportunities Actual waste arisings and waste management routes used with those forecast should be compared and investigate significant deviations from planned targets	1	1		Specialist	**2**	Commission pre-demolition audit	Demolition is happening therefore this is applicable. Recommendations from the report must be used to inform Wst02 performance. This has to be completed **by the end of RIBA Stage 2**
	Wst 01.1 Construction resource efficiency	Where a Resource Management Plan (RMP) has been developed covering the non-hazardous waste related to on-site construction and dedicated off-site manufacture or fabrication (including demolition and excavation waste) generated by the building's design and construction (see CN3). Where construction waste related to on-site construction and dedicated off-site manufacture/fabrication (excluding demolition and excavation waste) meets or is lower than the following BREEAM credits Amount of waste generated per 100m² (gross internal floor area) m³ tonnes One credit ≤ 13.3 ≤ 11.1 Two credits ≤ 7.5 ≤ 6.5 Three credits ≤ 3.4 ≤ 3.2 Exemplary level ≤ 1.6 ≤ 1.9 Note - Volume (m³) is actual volume of waste (not bulk volume). Where existing buildings on the site will be demolished a pre-demolition audit of any existing buildings, structures or hard surfaces is completed to determine if, in the case of demolition, refurbishment/reuse is feasible and, if not, to maximise the recovery of material from demolition for subsequent high grade/value applications. The audit must be referenced in the RMP and cover: Identification of the key refurbishment/demolition materials. Potential applications and any related issues for the reuse and recycling of the key refurbishment and demolition materials in accordance with the waste hierarchy.	3	1		Contractor	4,5,6	-	Target full credits to be included within the employer's requirements. This will help uplift the score and reduce the site's waste impact. TFT to issue tender documents at RIBA Stage 4
	Wst 01.2 Diversion of resources from landfill	The following percentages of non-hazardous construction (on-site and off-site manufacture/fabrication in a dedicated facility), demolition and excavation waste (where applicable) generated by the project have been diverted from landfill: BREEAM credits Type of waste Volume Tonnage One credit Non demolition 70% 80% Demolition 80% 90% Excavation N/A Exemplary level Non demolition 85% 90% Demolition 85% 95% Excavation 95% 95%	1	1		Contractor	5,6	-	Requirements to be written into the tender documents. TFT to issue tender documents at RIBA Stage 4. This will also be informed by the pre-demolition audit.

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Wst 02 - Recycled Aggregates	**Wst 02.1** Use of recycled and sustainably sourced aggregates	Identify all aggregate uses and type on the project, determine the quantity in tonnes for each identified use and aggregate type, identify the region in which the aggregate source is located and identify the distance in kilometres travelled by all aggregates by transport type. This information is then entered into BREEAM Wst 02 calculator to calculate the Project Sustainable Aggregate points. The corresponding number of BREEAM credits will be awarded.	1	0		AKTII/ Cost consultant	3	Commission pre-demolition audit	Should be targeted to demonstrate exceptional performance TFT to liaise with AKTII (structures)
Wst 03 - Operational Waste	**Wst 03.1** Operational Waste	**This is a minimum requirement for an Excellent rating to be achieved -** Dedicated space(s) is provided for the segregation and storage of operational recyclable waste volumes generated by the assessed building/unit, its occupant(s) and activities. This space must be: -Clearly labelled, to assist with segregation, storage and collection of the recyclable waste streams -Accessible to building occupants or facilities operators for the deposit of materials and collections by waste management contractors -Of a capacity appropriate to the building type, size, number of units (if relevant) and predicted volumes of waste that will arise from daily/weekly operational activities and occupancy rates. Where the consistent generation in volume of the appropriate operational waste streams is likely to exist, e.g. large amounts of packaging or compostable waste generated by the building's use and operation, the following facilities are provided: -Static waste compactor(s) or baler(s); situated in a service area or dedicated waste management space. -Vessel(s) for composting suitable organic waste resulting from the building's daily operation and use; OR adequate space(s) for storing segregated food waste and compostable organic material prior to collection and delivery to an alternative composting facility. -Where organic waste is to be stored/composted on-site, a water outlet is provided adjacent to or within the facility for cleaning and hygiene purposes.	1	1		HOK / AKTII	2, 3	HOK to confirm refuse storage location and size	Waste strategy to be submitted as part of the planning application. BREEAM waste storage size requirements : 2sqm per 1000m of net floor area for buildings <5000sqm A minimum of 10sqm for buildings >5000sqm An additional 2sqm per 1000sqm where catering is provided A minimum of 1 credit must be achieved to target an excellent or outstanding rating
Wst 05 - Adaptation to climate change	**Wst 05.1** 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 or equivalent), in accordance with the following approach: Carry out a systematic (structural and fabric resilience specific) risk assessment to identify and evaluate the impact on the building over its projected life cycle from expected extreme weather conditions arising from climate change and, where feasible, mitigate against these impacts. The assessment should cover the following stages: - Hazard identification - Hazard assessment - Risk estimation - Risk evaluation - Risk management. Provide an update during Technical Design demonstrating how the recommendations or solutions proposed at Concept Design have been implemented where practical and cost effective. Omissions have been justified in writing by the assessor.	1	1		All	2, 4	Review to confirm measures will/have been incorporated into the design	Climate change appraisal will be issued for the team's completion before TFT collate responses and validate as part of the evidence to the BRE **Wst05 appraisal to include building services and renewable systems. This has to be completed by the end of RIBA Stage 2.** Exemplary credit is targeted if outstanding is pursued.
Wst 06 - Design for disassembly and adaptability	**Wst 06.1** Design for disassembly and functional adaptability - recommendations	Conduct a study to explore the ease of disassembly and the functional adaptation potential of different design scenarios by the end of Concept Design Develop recommendations or solutions based on the study, during or prior to Concept Design, that aim to enable and facilitate disassembly and functional adaptation.	1	1		All	2, 3	Review to confirm measures will/have been incorporated into the design	Each design discipline to include a section in their Stage 2 report entitled "Functional Adaptability" with a narrative on the adaptability of their proposals in support of future adaptability, taking into account the BREEAM consideration requirements and any site constraints. The disassembly and the functional adaptation exercise shall be completed **by the end of RIBA Stage 2** To be reviewed at Stage 3 and 4
	Wst 06.2 Design for disassembly and functional adaptability - implementation	Conduct a study to explore the ease of disassembly and the functional adaptation potential of different design scenarios by the end of Concept Design Develop recommendations or solutions based on the study, during or prior to Concept Design, that aim to enable and facilitate disassembly and functional adaptation.	1	1		All	4		

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LE 01 - Site selection	**LE 01.1** Previously occupied land	At least 75% of the proposed development is on previously occupied land	1	1		HOK	1	-	Existing and proposed site plans to be issued
	LE 01.2 Contaminated land	A contaminated land professional's site investigation, risk assessment and appraisal has deemed land within the site to be affected by contamination. The report identified: -The degree of contamination -The contaminant sources/types -The options for remediating sources of contamination which present an unacceptable risk. The client or principal contractor confirms that a remediation strategy will be implemented, in line with the report	1	0		Specialist	2	-	This could be undertaken after demolition. To be discussed with the team. Currently not targeted
LE 02 - Ecological risk and opportunities	**LE 02.0** Pre-requisite; Assessment route selection	The client or contractor confirms compliance is monitored against all relevant UK and EU or international legislation relating to the ecology of the site.	Yes	yes		The Ecology Consultancy / Derwent / Blackburn & Co.	2	Appoint ecologist	Ecology report to confirm
	LE 02.1 Survey and evaluation	Foundation route (Route 1) The site is evaluated using the BREEAM Ecological Risk Evaluation Checklist (Guidance Note 34) confirming that the Foundation route can be used Comprehensive route (Route 2) A The Ecology Consultancy (SQE) carries out a survey and evaluation for the site early enough to influence site preparation works, layout and, where necessary, strategic planning decisions (typically Preparation and brief stage). The SQE's survey and evaluation determines the site's ecological baseline, including: a: Current and potential ecological value and condition of the site and related areas within the Zone of Influence. b: Direct and indirect risks to current ecological value from the project. c: Capacity and feasibility for enhancement of the site's ecological value and, where relevant, areas within the Zone of Influence. Recommendations and data collected from the survey and evaluation are shared with appropriate project team members to influence decisions made for activities during site preparation, design and construction works, which can support ecological features	1	1		The Ecology Consultancy	**1, 2**	Appoint ecologist	The Ecology Consultancy to undertake site survey and report by using the comprehensive route (Route 2). A The Ecology Consultancy (SQE) carries out a survey and evaluation (typically Preparation and brief stage) by the end of RIBA Stage 2
	LE 02.2 Determining the ecological outcomes	Survey and evaluation criteria relevant to the chosen route (criterion 2 if following the Foundation route or Criteria 3–5 for the Comprehensive route). The project team liaise and collaborate with representative stakeholders (see Methodology) early enough to influence key planning decisions to: a. Identify the optimal ecological outcomes for the site. b: Identify, appraise and select measures to meet the optimal ecological outcomes for the site, in line with the mitigation hierarchy of action, according to the route being used: - Avoidance - Protection - Reduction or limitation of negative impacts - On site compensation and, - Enhancement, considering the capacity and feasibility within the site, or where viable, off-site.	1	1		The Ecology Consultancy	**2**	Appoint ecologist	The Ecology Consultancy report to confirm if the requirements of this credit and GN40 by the end of RIBA Stage 2

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LE 03 - Managing impacts on ecology	**LE 03.0** Pre-requisite; Ecological risks and opportunities	LE 02 has been achieved	Yes	Yes		The Ecology Consultancy	2	Appoint ecologist	Needs to be confirmed by a The Ecology Consultancy and client
	LE 03.1 Planning and measures on-site	Further planning to avoid and manage negative ecological impacts on-site is carried out early enough to influence the concept design and design brief as well as site preparation planning (typically Concept Design stage). On-site measures for managing negative ecological impacts during site preparation and construction are implemented in-practice (e.g. mitigation measures to protect existing ecological features) The project team liaising and collaborating with representative stakeholders, taking into consideration data collated as part of the 'Determining ecological outcomes' in LE 02 Ecological risks and opportunities	1	1		The Ecology Consultancy	**2**	Appoint ecologist	Further planning to avoid and manage negative ecological impacts on-site is carried out by using the comprehensive route (Route 2) **by the end of RIBA Stage 2**
	LE 03.2 Managing negative impacts of the project	<u>Route 1 (one credit)</u> Negative impacts from site preparation and construction works are managed according to the mitigation hierarchy and no overall loss of ecological value has occurred. <u>Route 2 (up to two credits)</u> Negative impacts from site preparation and construction works have been managed accordingly to the mitigation hierarchy, in line with the SQE's recommendations and either: - No loss of ecological value has occurred (2 credits) OR - The loss of ecological value has been limited as far as possible (1 credit)	2	2		The Ecology Consultancy	2	Appoint ecologist	The Ecology Consultancy to undertake site survey and report by using the comprehensive route (Route 2).
LE 04 - Ecological	**LE 04.0** Pre-requisite: Managing negative impacts on ecology	LE 03 has been achieved. Including the following, specific to the aims of this issue: 1.Negative impacts from site preparation and construction works have been managed according to the mitigation hierarchy, in line with the SQE's recommendations (see Methodology) and o overall loss of ecological value has occurred OR the loss of ecological value has been minimised. 2 The client or contractor confirms compliance is monitored against all relevant UK, EU or international legislation relating to the ecology of the site.	Yes	Yes		The Ecology Consultancy	2	Appoint ecologist	The Ecology Consultancy report to confirm if the requirements of this credit and GN40 at the planning stage
	LE 04.1 Change and enhancement of ecology	<u>Route 1 only</u> Locally relevant ecological measures have been implemented that enhance the site's ecological value. The measures adopted are based on: 3.a: Recommendations from recognised 'local' ecological expertise and specialist input and guidance. 3.b: Input from the project team in collaboration with representative stakeholders and data collated as part of 'Determining ecological outcomes' in LE 02.	0	0		The Ecology Consultancy	-	-	Route 1 not recommended.

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change and enhancement	**LE 04.2** Ecological enhancement	<u>Route 2 only</u> Measures have been implemented that enhance ecological value, which are based on input from the project team and SQE in collaboration with representative stakeholders and data collated as part of the 'Determining ecological outcomes' in LE 02. Measures are implemented in the following order: a: On site, and where this is not feasible, b: Off site within the Zone of Influence. Data collated are analysed and where potentially valuable, provided to the local environmental records centres nearest to, or relevant for, the site.	1	1		The Ecology Consultancy	3	Appoint ecologist	The Ecology Consultancy to undertake site survey and report by using the comprehensive route (Route 2).
	LE 04.3 Change and enhancement of ecology	<u>Route 2 only</u> Up to three credits are awarded based on the change in ecological value occurring as a result of the project. This must be calculated in accordance with the process set out in GN36 - BREEAM, CEEQUAL and HQM Ecology Calculation Methodology – Route 2. Credits are awarded in line with the Reward Scale table in GN36 where there are no residual impacts on protected sites or irreplaceable habitats.	3	2		The Ecology Consultancy	3		GN 36 needs to be used to calculate the change in ecological value

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LE 05 - Long Term ecology management and maintenance	**LE 05.0** Pre-requisite: Statutory obligations, planning and site implementation	1 The client or contractor has confirmed that compliance is being monitored against all relevant UK, EU and international standards relating to the ecology of the site. The following must be achieved, according to the route being assessed: 2.a: Foundation route (Route 1) - Criterion 6 in LE 03 has been achieved. 2.b: Comprehensive route (Route 2) - Criterion 8 in LE 03 has been achieved, and at least one credit under LE 04 for 'Change and Enhancement of Ecology' has been awarded.	Yes	Yes		The Ecology Consultancy	4	Appoint ecologist	Ecologist to confirm
	LE 05.1 Management and maintenance throughout the project	Measures have been implemented to manage and maintain ecology throughout the project. These measures are based on input from the project team in collaboration with representative stakeholders and data collated as part of the 'Determining ecological outcomes' in LE 02. To ensure the optimal ecological outcomes agreed in LE 02 are met in-practice, these measures must monitor and review the effectiveness of the mitigation and enhancement measures in place for LE 03 & LE 04 to ensure they are implemented. A section on Ecology and Biodiversity has been included as part of the tenant or building owner information supplied, to inform the owner or occupant of local ecological features, value and biodiversity on or near the site. This should include detailed management and maintenance plans as required by landscape and asset managers as well as relevant parts of the handover information for occupiers written in a format that encourages understanding and supportive behaviours.	1	1		The Ecology Consultancy	3,4	Appoint ecologist	Ecologist to confirm
	LE 05.2 Landscape and ecology management plan	Landscape and ecology management plan, or similar, is developed in accordance with BS 42020:2013 covering as a minimum the first five years after project completion and includes: 6.a: Actions and responsibilities, prior to handover, to give to relevant individuals 6.b: The ecological value and condition of the site at handover and how this is expected to develop and change over time 6.c: Identification of opportunities for ongoing alignment with activities beyond the development project and which supports the aims of BREEAM's Strategic Ecology Framework 6.d: Identification and guidance s to trigger appropriate remedial actions to address previously unforeseen impacts 6.e: Clearly defined and allocated roles and responsibilities for delivering the plan 7 The landscape and management plan or similar will be updated to support maintenance of the ecological value of the site.	1	1		The Ecology Consultancy	3,4	Appoint ecologist	Ecologist to confirm
	Pol 01.0 Pre-requisite	All systems (with electric compressors) must comply with the requirements of **BS EN 378:2016** (parts 2 and 3) and where refrigeration systems containing ammonia are installed, the Institute of Refrigeration Ammonia Refrigeration Systems Code of Practice	Yes	Yes		Arup	4	-	TFT to issue compliance statement to Arup to sign - RIBA Stage 4

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Pol 01 - Impact of Refrigerants	**Pol 01.1** Impact of refrigerants	Three credits - No refrigerant use Where the building does not require the use of refrigerants within its installed plant/systems. OR alternatively, where the building does require the use of refrigerants, the three credits can be awarded as follows: Two credits - Impact of refrigerant Where the systems using refrigerants have Direct Effect Life Cycle CO2 equivalent emissions (DELC CO2e) of ≤ 100 kgCO2e/kW cooling/heating capacity. To calculate the DELC CO2e please refer to the Relevant definitions in the Additional information section and the Methodology section. OR Where air-conditioning or refrigeration systems are installed the refrigerants used have a Global Warming Potential (GWP) ≤ 10. OR One credit - Impact of refrigerant Where the systems using refrigerants have Direct Effect Life Cycle CO2 equivalent emissions (DELC CO2e) of ≤ 1000 kgCO2e/kW cooling/heating capacity.	2	1		Arup /TFT	3	-	Arup to provide refrigerant details to be inputted into BREEAM calculator tool at RIBA stage 3 TFT to complete the calculator Indicative refrigerants confirmed
	Pol 01.2 Leak detection	Where systems using refrigerants have a permanent automated refrigerant leak detection system installed; OR where an inbuilt 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	1	1		Arup	4	-	Credit can be awarded where systems use natural or environmentally benign refrigerants, such as air and water (lithium bromide/water absorption chillers) and installations of small multiple hermetic systems

Credit ID - Name	Credit Issue	Credit Summary	Available	Excellent	Excellent Status	Responsibility	RIBA Stage	Deadline For Next Action	Comments
Pol 02 - NOx emissions	**Pol 02.1** Local Air Quality	All installed combustion plant that provide space heating and domestic hot water and for which minimum emission levels have been set under European Directive 2009/125(215) must meet the following emission levels. If electrically sourced then the associated local NOx emissions are considered to be zero. If gas boilers are utilised then the following standards must be met : 1 credit : 27mg/kWh (outside AQMA), 27 mg/kWh (inside AQMA) 2 credits : 24mg/kWh (outside AQMA), 24 mg/kWh (inside AQMA)	2	2		Arup	3	-	Arup to confirm heating strategy and compliance with requirements if gas is utilised If all electric two credits achieved within this credit section
Pol 03 - Flood Risk Management & Reducing Surface Water Run-off	**Pol 03.1** Flood resilience	2 credits - Low flood risk - Where a site-specific flood risk assessment (FRA) confirms the development is situated in a flood zone that is defined as having a low annual probability of flooding (in accordance with current best practice national planning guidance. The FRA must take all current and future sources of flooding into consideration. The Flood Risk Assessment (FRA) must detail the risk of flooding from the following sources: Fluvial (rivers) Tidal Surface water: sheet run-off from adjacent land (urban or rural) Groundwater: most common in low-lying areas underlain by permeable rock (aquifers) Sewers: combined, foul or surface water sewers Reservoirs, canals and other artificial sources. The content of the FRA should be based on historic trends, but should also account for predicted changes to the climate which may impact on the flood risk to the site in future. 1 credit - Medium/high flood risk - Where a site-specific FRA confirms the development is situated in a flood zone that is defined as having a medium or high annual probability of flooding and is not in a functional floodplain (in accordance with current best practice national planning guidance . The FRA must take all current and future sources of flooding into consideration. To increase the resilience and resistance of the development to flooding, one of the following must be achieved: The ground level of the building and access to both the building and the site, are designed (or zoned) so they are at least 600mm above the design flood level of the flood zone in which the assessed development is located OR The final design of the building and the wider site reflects the recommendations made by an appropriate consultant in accordance with the hierarchy approach outlined in section 5 of BS 8533:2011	2	2		AKTII	3	AKTII to confirm if this is in their scope/ can be undertaken	New build developments require a FRA to comply with this criteria. Low flood risk (from all sources) confirm 2 credits whilst medium/high risk areas confirm 1 credit (if all criteria is met) A site specific Flood Risk Assessment is required to meet BREEAM 2018 criteria EA flood map suggests development is in zone 1
		An Appropriate Consultant is appointed to carry out, demonstrate and/or confirm the development's compliance with the following criteria: One credit Where drainage measures are specified to ensure that the peak rate of run-off from the site to the watercourses (natural or municipal) is no greater for the developed site than it was for the pre-development site. This should comply at the 1-year and 100-year return period events. Relevant maintenance agreements for the ownership, long term operation and maintenance of all specified SuDS are in place. Calculations include an allowance for climate change; this should be made in accordance with current best practice planning guidance (see definitions). Where flooding of property will not occur in the event of local drainage system failure (caused either by extreme rainfall or a lack of maintenance); AND EITHER Drainage design measures are specified to ensure that the post development run-off volume, over the development lifetime, is no greater than it would have been prior to the							

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Pol 03 - Flood Risk Management & Reducing Surface Water Run-off	**Pol 03.2** Surface water run-off	volume, over the development lifetime, is no greater than it would have been prior to the assessed site's development for the 100-year 6-hour event, including an allowance for climate change (see criterion 14). Any additional predicted volume of run-off for this event is prevented from leaving the site by using infiltration or other Sustainable Drainage System (SuDS) techniques. OR (only where criteria 9 and 10 for this credit cannot be achieved): Justification from the Appropriate Consultant indicating why the above criteria cannot be achieved, i.e. where infiltration or other SuDS techniques are not technically viable options. Drainage design measures are specified to ensure that the post development peak rate of run-off is reduced to the limiting discharge. The limiting discharge is defined as the highest flow rate from the following options: The pre-development 1-year peak flow rate; OR The mean annual flow rate Qbar; OR 2L/s/ha. Note that for the 1-year peak flow rate the 1-year return period event criterion applies (as described in the peak run-off criteria above). Relevant maintenance agreements for the ownership, long term operation and maintenance of all specified SuDS are in place. For either option, above calculations must include an allowance for climate change; this should be made in accordance with current best practice planning guidance.	2	1		AKTII	3	AKTII to provide initial thoughts	Based on the design proposals it is not likely that surface water run off will increase post-development from the pre-developed site. The second credit will need to be confirmed with AKTII

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	Pol 03.3 Minimising watercourse pollution	There is no discharge from the developed site for rainfall up to 5mm (confirmed by the Appropriate Consultant). In areas with a low risk source of watercourse pollution, an appropriate level of pollution prevention treatment is provided, using appropriate SuDS techniques. 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) 2 and/or where applicable the SuDS manual 3. For areas where vehicle washing will be taking place, pollution prevention systems must be in accordance with Pollution Prevention Guidelines 13 4. 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 (see Pol 03 Surface water run-off for further information).	1	0		AKTII		AKTII to provide initial thoughts	To be informed by the FRA assessment. Currently not targeted
Pol 04 - Reduction of Night Time Light Pollution	**Pol 04.1** Reduction of night time light pollution	Where external lighting pollution has been eliminated through effective design that removes the need for external lighting without adversely affecting the safety and security of the site and its users. OR alternatively, where the building does have external lighting, one credit can be awarded as follows: The external lighting strategy has been designed in compliance with Table 2 (and its accompanying notes) of the ILP Guidance notes for the reduction of obtrusive light, 2011. Buildings located in Scotland must comply with the light pollution criteria in the guidance note 'Controlling Light Pollution and Reducing Lighting Energy Consumption'. This can be demonstrated via completion of the checklists in Annexes B and C of the guidance note by a relevant member of the design team. All external lighting (except for safety and security lighting) can be automatically switched off between 23:00 and 07:00. If safety or security lighting is provided and will be used between 23:00 and 07:00, this part of the lighting system complies with the lower levels of lighting recommended during these hours in Table 2 of the ILP's Guidance notes. Illuminated advertisements, where specified, must be designed in compliance with ILP PLG 05 The Brightness of Illuminated Advertisements.	1	1		Arup/ HOK	4	-	Where light fittings are specified to comply with specific security standards and these conflict with the BREEAM requirements these can be excluded. Justification will need to be provided in this instance. Arup to provide lighting specifications and controls to confirm compliance - RIBA Stage 4 To discuss at BREEAM workshop

Credit ID - Name	Credit Issue	Credit Summary	Available	Excellent	Excellent Status	Responsibility	RIBA Stage	Deadline For Next Action	Comments
Pol 05 - Noise Attenuation	**Pol 05.1** Noise Attenuation	Where there are, or will be, no noise-sensitive areas or buildings within 800m radius of the assessed site. OR Alternatively, where the building does have noise-sensitive areas or buildings within 800m radius of the site, one credit can be awarded as follows: Where 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. 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 criterion above, measures have been installed to attenuate the noise at its source to a level where it will comply with criterion above.	1	1		Hann Tucker	2,3,4	-	Noise attenuation report for planning will likely be more onerous than that for BREEAM
Man 03 - Responsible construction practices	**Inn Man 03.5** Exemplary level criteria	Both risk evaluation and implementation and training awareness, monitoring and reporting have been undertaken.	1	1		Turner & Townsend / Contractor	4	-	Needs to be confirmed and incorporated into Contractor's requirements. TFT to include in tender documents at RIBA Stage 4
Hea 01 - Visual Comfort	**Inn Hea 01.5** Exemplary level criteria	Daylighting criteria have been met using either of the following: Multi-storey buildings: 80% Occupied spaces meet both requirements: -At least 300 lux for 2650 hours per year or more -At least 90 lux for 2650 hours per year or more	1	0		Point 2	2, 3	-	Need to be confirmed by daylight modelling. Standard requirements are: -At least 300 lux for 2000 hours per year or more -At least 90 lux for 2000 hours per year or more

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Hea 02 - Indoor Air Quality	**Inn Hea 02.6** Exemplary level criteria	Three of the product types listed meet the emission limits, testing requirements and any additional requirements listed in the BREEAM manual. Where wood-based products are not one of the three selected product types, all wood-based products used for internal fixture and fittings must be tested and classified as formaldehyde E1 class as a minimum	0	0		-	-	-	Specialist to [prepare an IAQ plan. Design team to specify materials accordingly and contractor to install them as specified.
Hea 06-Security	**Inn Hea 06.2** Exemplary level criteria	Undertake a compliant risk based security rating scheme. The performance against the scheme has been confirmed by independent assessment and verification. At the time of issue the only recognised risk based security rating scheme is SABRE	1	0		SQSS	2	-	Not recommended as this exercise can be quite onerous
Ene 01 - Reduction of energy use and carbon emissions	**Inn Ene 01.2** Exemplary level criteria	Up to three credits - Zero regulated carbon The building achieves an EPR NC≥ 0.9 and zero net regulated CO2 emissions (see Relevant definitions). An equivalent percentage of the building's modelled 'regulated' operational energy consumption, as stipulated in Table 26 , is generated by carbon neutral on-site or near-site sources and used to meet energy demand from 'unregulated' building systems or processes. **Up to two credits - Verification stage** **Achieve two credits in Ene 02 energy monitoring (sub metering)** **The client commits to the verification stage and to report on the actual energy consumption compared with the targets set in criterion 4. The energy modelling is submitted to the BRE and retained by the building owner**	5	0		Derwent/ Arup	3, 4	TFT to discuss with Derwent	In use energy modelling post completion and comparison between predicted energy use models undertaken at the design and construction stage awards two credits under the exemplary criteria. A commitment to carry out post completion verification will be required
Wat 01 - Water Consumption	**Inn Wat 01.2** Exemplary level criteria	65% improvement over baseline building water consumption	1	0		Arup/ HOK / TFT	3, 4	-	This can be discussed at the BREEAM workshop
Mat 01 - Life Cycle Impacts	**Inn Mat 01.2** Exemplary level criteria	When undertaking an Life Cycle Assessment 2 exemplary credits are awarded where the following has been confirmed: 1. During RIBA Stage 2 the LCA options appraisal considers at least 3 significantly different core building services design options to identify reductions in environmental impacts. (Not applicable as shell only) 2. Achieve Elemental LCC plan and Component Level LCC options appraisal credits and incorporate the design options for the LCC plans into the LCA appraisal. 3. A suitably qualified 3rd party shall verify the results of the LCA appraisal as accurately representing the designs under consideration at RIBA stages 2 and 4. For each LCA option, the report shall itemise the findings of the verification checks made by the suitably qualified 3rd party.	3	1		IMPACT compliant LCA /TFT	3	-	Exemplary criteria is achieved where the LCA considers Core services, aligns with the LCC plan and is verified by a 3rd party verification body.
Mat 03 - Responsible Sourcing of Materials	**Inn Mat 03.3** Exemplary level criteria	As per the benchmarks for Mat 03 plus core building services and ≥50% of available points achieved	1	0		Arup/ HOK / TFT / Contractor	3, 4, 5	-	This can be discussed at the BREEAM workshop. Not recommended
Wst 01 - Construction Waste Management	**Inn Wst 01.5** Exemplary level criteria	Non-hazardous construction waste generated by the building's design and on-site construction and off-site manufacture or fabrication (excluding demolition and excavation waste) is no greater than the exemplary level resource efficiency benchmark (outlined in Table 51). The percentage of non-hazardous construction (on-site and dedicated off-site manufacture/fabrication), demolition and excavation waste (if relevant) diverted from landfill meets or exceeds the exemplary level percentage benchmark (outlined in Table 52). All key waste groups are identified for diversion from landfill in the RMP.	1	0		Contractor	5	-	This can be discussed at the BREEAM workshop

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Wst 02 - Recycled Aggregates	**Inn Wst 02.2** Exemplary level criteria	The percentage of high grade aggregate that is recycled or secondary aggregate, specified in each application (present) must meet the exemplary minimum levels (by weight or volume), as defined in Table 54 . Where this minimum level is not met, all the aggregate in that application must be considered as primary aggregate when calculating the total high grade aggregate specified. Where the total amount of recycled or secondary aggregate specified is greater than 35% (by weight or volume) of the total high grade aggregate specified for the project. Where the minimum level in criterion 4 is not met for an application, all the aggregate in that application must be considered as primary aggregate when calculating the total high grade aggregate specified. The contributing recycled or secondary aggregate must not be transported more than 30 km by road transport.	1	0		Arup/ HOK / TFT / Contractor	3, 4, 5	-	This can be discussed at the BREEAM workshop. Not recommended
Wst 05 - Adaptation to climate change	**Inn Wst 05.2** Exemplary level criteria	Responding to climate change A holistic approach to the design and construction of the current building's life cycle, to mitigate against the impacts of climate change, is represented by the achievement of these criteria. The following outlines the exemplary level criteria to achieve an innovation credit for this BREEAM issue: Achievement of criterion 1, the structural and fabric resilience criterion in this issue, and the following criteria points or credits: Hea 04 Thermal comfort (Link to Wst 05 issue: to prevent increasing risks of overheating) Criterion 6 in the second credit of the Hea 04 issue has been achieved. Ene 01 Reduction of energy use and carbon emissions (Link to Wst 05 issue: to maximise energy efficiency contributing to low carbon emissions resulting from increasing energy demands) At least eight credits in this issue have been achieved. Ene 04 Low carbon design (Link to Wst 05 issue: to maximise opportunities to avoid unnecessary carbon emissions) The Passive design analysis credit in this issue has been achieved. Wat 01 Water consumption (Link to Wst 05: to minimise water demands in periods of drought) A minimum of three credits in this issue have been achieved. Mat 05 Designing for durability and resilience (Link to Wst 05 issue: to avoid increased risks of deterioration and higher maintenance demands) Criterion 2 relating to material degradation in this issue has been achieved. Pol 03 Surface water run-off (Link to Pol 03: to minimise the risks of increased flood risk and surface water run-off affecting the site or others) Flood risk – a minimum of one credit has been achieved. Surface water run-off – two credits have been achieved.	1	0		All		Team to consider Hea 04, Ene 01, Ene 04, Wat 01, Mat 05, Pol 03 requirement	All criteria for exemplary credit are already targeted. Following needs to be met : Hea 4 - thermal comfort Criterion 6 Ene 1 - 6 credits Ene 4 - Passive design analysis Mat 5 - Criteria 2-4 Wat 1 - Minimum of 3 credits Pol 3 - 1 credit for flood risk and 2 credits for surface water run off
LE 02 - Ecological Value of Site and Protection of Ecological Features	**Inn - Le 02** Determine the ecological outcomes for the site (sustainability-related activities)	When determining the optimal ecological outcome for the site consider, in addition to those outlined in criteria 8-10, the wider site sustainability-related activities and the potential for ecosystem service related benefits. The following credits must also be achieved : - Hea 07: Safe and healthy surroundings (both credits) - Pol 03: Flood and surface water management (achieve credits for surface water run off and minimising watercourse pollution - Pol 05: Reduction of noise pollution	1	0		Ecologist	2,3	-	Considered not feasible as Hea07 might not be available for this assessment

End