LONDON

TUNNELS

The London Tunnels

32. Sustainability Assessment

PROJECT NO. 70087403
REF NO. TLT-WSP-XX-XX-RP-ES-00002

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The London Tunnels PLC

THE LONDON TUNNELS

Sustainability Statement

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WSP

WSP House
70 Chancery Lane
London
WC2A 1AF

Phone: +44 20 7314 5000

WSP.com

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Prepared by	India Golding	Silke Mason	Silke Mason	
Signature				
Checked by	Silke Mason	Shane Orme	Michela Martini	
Signature				
Authorised by	Michela Martini	Michela Martini	Dimitri Avakian/ John Parker	
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BREEAM PRE-ASSESSMENTS

EXECUTIVE SUMMARY

WSP has been commissioned by The London Tunnels Limited (the Applicant) to develop and prepare a Sustainability Statement for the Proposed Development at 38-39 and 40-41 Furnival Street, EC4A 1JQ & 31-33 High Holborn WC1V 6AX (hereafter referred to as the 'Site'), which is located within the City of London (CoL) and the London Borough of Camden (LBC).

Planning permission is being sought for:

"Change of use of existing deep level tunnels (Sui Generis) to visitor and cultural attraction, including bar (F1); demolition and reconstruction of existing building at 38-39 Furnival Street; redevelopment of 40-41 Furnival Street, for the principle visitor attraction pedestrian entrance at ground floor, with retail at first and second floor levels and ancillary offices at third and fourth levels and excavation of additional basement levels; creation of new, pedestrian entrance at 31-33 High Holborn, to provide secondary visitor attraction entrance (including principle bar entrance); provision of ancillary cycle parking, substation, servicing and plant, and other associated works."

This Sustainability Statement has been produced to demonstrate how the design of the Proposed Development responds to challenges that contribute to achieving a sustainable development and is submitted in support of the planning application.

A review of current national, regional and local planning policies has been undertaken, with particular emphasis on the National Planning Policy Framework (NPPF), the London Plan 2021, the Mayor of London Sustainable Design and Construction Supplementary Planning Guidance, the London Borough of Camden's Local Plan (2017) and the City of London Local Plan (2021).

This report summarises the sustainability vision for the Proposed Development, considering the proposed design at RIBA Stage 2 across a number of sustainability themes and describes the initiatives planned to take place during the detailed design and construction stages, see high level summary in Figure 1.

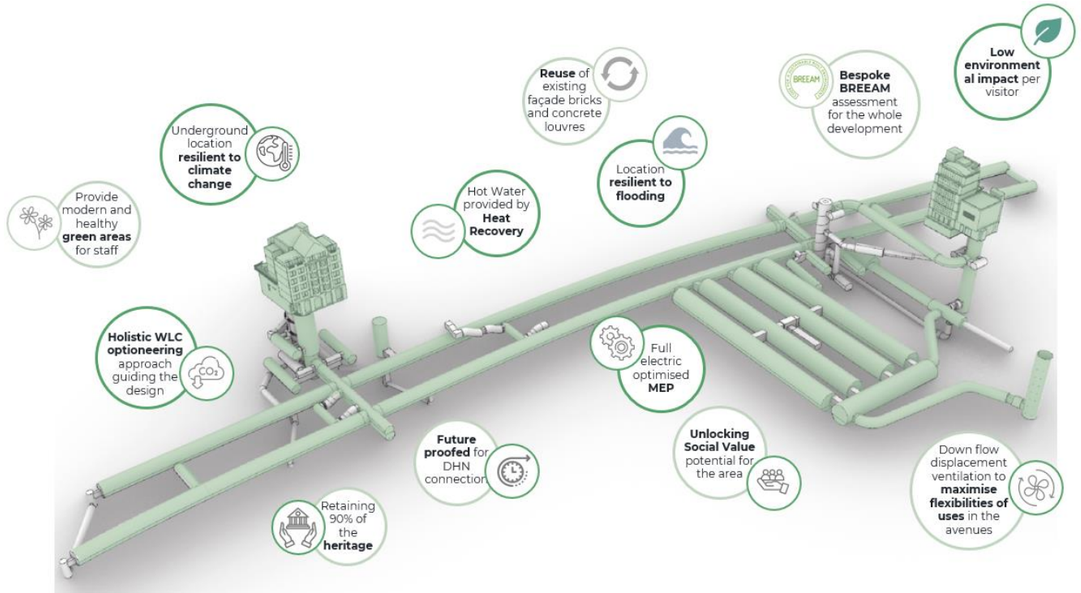


Figure 1 - Sustainability Vision

The design process has been developed exploring several innovative solutions to minimise the use of resources. The Proposed Development is a retention led development, which incorporates the following sustainability measures, including:

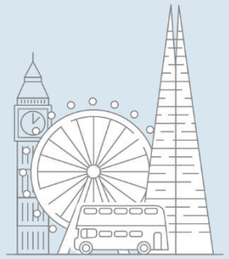
- An energy strategy that follows the GLA energy hierarchy and achieves an overall 41% carbon reduction over Part L 2021 minimum regulated carbon emissions through innovative building services design and low zero carbon technology.
- Targets the BREEAM rating level of "Very Good" for the development.
- A high level of heat recovery is present in the development to ensure a highly efficiency all electric servicing strategy.

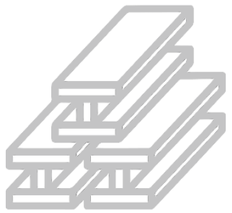
The Proposed Development also provide positive contributions to the local community and environment, including:

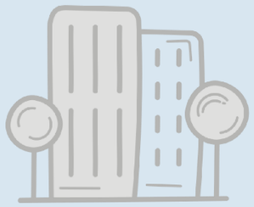
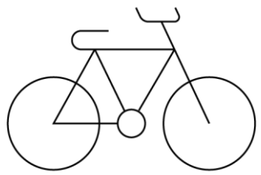
- A visitor attraction to bring social value to the area.
- Preserving a historic asset and allowing the community to experience the space first hand.
- Collaboration with universities or similar institutions to creative innovative initiatives.

The Proposed Development responds to the issues identified in the policy documents as shown in Table 1-1.

Table 1-1 – Summary of Proposed Measures for The London Tunnels

Key Sustainability Area	Proposed Measures	Response to Policy
Optimising the Use of Land 	The Proposed Development is a retention led Scheme, which will bring a new cultural attraction to the city. 100% of the development footprint is on previously developed land in line with City of London's Local Plan. The Proposed Development will provide a, innovative destination and asset. Refer to Section 3 for full details.	Local Plan Policy CS10 'Design' LP Sustainable Design and Construction SPG LBC Policy D1 Design LBC Policy D2 Heritage
Energy & CO_2 Emissions 	The development has maximised energy efficient measures to exceed current Part L notional building performance and follow the GLA Energy Hierarchy, Be Lean, Be Clean, Be Green, Be Seen. **Be Lean** The new build elements of the development at 38-39 and 40-41 Furnival Street in combination with the existing development at Kingsway Tunnels and the small space at 31-33 High Holborn achieve a 0.3% carbon emission reduction over Part L 2021 through fabric efficiency and passive design (Be Lean) Highly efficient building services are specified throughout the Proposed Development, including: ▪ All spaces will include 100% low energy lighting. Lighting controls will be specified as appropriate across the development including daylight and motion controls. ▪ Smart efficient control systems and building management system will be provided to allow for efficient control and monitoring of MEP services to minimise energy waste. **Be Clean** Connection to future local DHN will be enabled through the provision of plate heat exchangers within the plant areas. **Be Green** The Site wide reduction of the development achieves a 41% carbon emission reduction over the GLA Baseline through: ▪ Highly efficient heat recovery heat pumps and water cooled chillers will be incorporated in the design. **Be Seen** Prediction of operational energy has been carried out following the Be Seen methodology and the CIBSE TM54:2022. Refer to Section 4 for full details.	Building Regulations Part L LP Policy SI2 'Minimising Greenhouse Gas Emissions' LP Policy SI3 'Energy Infrastructure' Local Plan Policy DM 15.2 'Energy and CO_2 Emissions Assessments' LBC Policy A1 Managing the impact of development LBC Policy CC1 Climate change mitigation
Water Efficiency 	The development incorporates best practice technologies to limit its water consumption to a minimum. This will include conservation, efficiency, and recycling techniques. Water leak detection and automatic shut off control valves will be implemented throughout the development. Refer to Section 5 for full details.	LP Policy SI5 'Water Infrastructure' Local Plan Policy DM 2.1 'Infrastructure Provision and Connection' Local Plan Policy CS2 'Utilities Infrastructure' LBC Policy CC3 Water and flooding

Key Sustainability Area	Proposed Measures	Response to Policy
Materials & Whole Lifecycle Carbon 	The development has been designed of high quality, robust materials with a long service life. This minimises the need for maintenance and replacement. The development has been designed to minimise whole life embodied carbon. Structural design efficiency and prefabrication will allow to reduce demand for new materials. The use of recycled materials will be maximised, according to procurement strategy. The final target will be confirmed during the next stage of design once more certainty on supply chain is available. A WLC Optioneering was carried out according to the CoL draft WLC Optioneering Planning Advisory Note (PAN) and a WLCA assessment has been carried out for the Proposed Development. Refer to Section 6 for full details.	LP Policy SI7 ‘Reducing Waste and Supporting the Circular Economy’ Local Plan Policy DM 10.1 ‘New Development’ CoL WLC PAN LBC Policy A1 Managing the impact of development LBC Policy D1 Design LBC Policy D2 Heritage
Waste & Circular Economy 	The Proposed Development complies with the SPG and City of London Local Plan by ensuring that both the construction and the operational waste is managed in accordance with the waste hierarchy. Every effort will be taken to ensure most excavation and demolition waste is reused or recycled, and 95% per volume non-hazardous waste will be diverted from landfill. By implementing a clear Circular Economy Strategy there is the potential for the Proposed Development to become an exemplar project for the minimisation of construction waste environmental impacts. The design allows for provision of sufficient space for the collection, segregation, compaction and storage of recyclables, compostable material and other waste in the development. The circular economy strategy commits to conserve resources, eliminate waste and manage waste sustainably. The proposed design has a strong focus on retention and retrofit. Separate Waste Management Plan and Circular Economy Statement have been produced by WSP (November 2023) in line with the GLA London Plan guidance, which promote the adaption and recycling of building materials over a building’s lifetime. This is to ensure a sustainable built environment, where the lifetime of building elements is prolonged, and waste is minimised. Refer to Section 7 for full details.	LP Policy SI7 ‘Reducing Waste and Supporting the Circular Economy’ Local Plan Policy DM 17.1 ‘Provision for Waste in Development Schemes’ Local Plan Policy DM 17.2 ‘Designing out Construction Waste’ LBC Policy CC5 Waste
Climate Change Adaptation 	A climate change adaptation review has been undertaken to ensure the building will remain fit for purpose over its intended lifespan without a requirement for undue modification or expenditure. The development has been designed to achieve resilience in a climate change scenario. Overheating analysis have been carried out using historic and future climate based on CIBSE TM52 methodology, as required by the GLA Energy Planning Guide and informed the design. A flood risk assessment has been carried out and the SuDS feasibility study has been undertaken to sustainably surface water runoff rates and volumes from the existing condition. MEP, structural and façade designs have been developed to be durable and resilient in extreme weather conditions. Refer to Section 8 for full details.	LP policy SI4 ‘Managing heat risk’ LP policy SI12 ‘Flood risk management’ LP policy SI13 ‘Sustainable drainage’ LP policy GG6 ‘Increasing efficiency and resilience’ Local Plan Policy DM 15.5 ‘Climate change resilience and adaptation LBC Policy CC1 Climate change mitigation LBC Policy CC2 Adapting to climate change
Pollution Management 	Potential sources of pollution have been minimised. Of particular note is the energy strategy, focussing on electrification and thus reduction of both NOx and Particulate Matter emitted to air. Best practice construction pollution management measures will be followed during construction. An acoustic report has been developed to assess the impact on neighbouring properties where it was concluded that this would be negligible. Refer to Section 9 for full details.	LP Policy SI1 ‘Improving air quality’ LP Policy D13 ‘Agent of change’ LP Policy D14 ‘Noise’ Local Plan Policy DM 15.6 ‘Air Quality’ Local Plan Policy DM 15.7 ‘Noise and Light Pollution’ LBC Policy A4 Noise and vibration LBC Policy CC4 Air quality

Key Sustainability Area	Proposed Measures	Response to Policy
Health & Wellbeing 	The design ensures a comfortable and safe environment will be provided for all building users. Thermal and visual comfort will be achieved in all parts of the development. Refer to Section 10 for full details.	LP Sustainable Design and Construction SPG LP Policy D11 Safety, security and resilience to emergency Local Plan Policy CS15 ‘Sustainable Development and Climate change’ Local Plan Policy CS19 ‘Open Spaces and Recreation’ LBC Policy C1 Health and wellbeing
Ecology & Biodiversity 	The Proposed Development aligns with ecological and biodiversity policies. The project achieves a UGF of 0.135, improving public realm quality and providing green spaces at the roof terraces and the south façade of 40-41 Furnival Street building for enjoyment. Although below the recommended UGF value of 0.3, the strategy maximizes available space to enhance biodiversity. Refer to Section 11 for full details.	LP Policy G1 ‘Green infrastructure’ LP Policy G5 ‘Urban greening’ LP Policy G6 ‘Biodiversity and access to nature’ LP Policy G7 ‘Trees and woodland’ Local Plan Policy DM 19.2 ‘Biodiversity and Urban Greening’ LBC Policy A3 Biodiversity
Transportation & Accessibility 	The transport assessment for the development confirms that long and short stay cycle space will be provided in line with the London Plan. In terms of public transport, the Site benefits from a PTAL score of 6b, which is currently the best score available. Refer to Section 12 for full details.	LP Policy T5 ‘Cycling’ LP Policy T6 ‘Car parking’ The Mayors Transport Strategy Local Plan Policy DM 16.1 ‘Transport impacts of Development’ Local Plan Policy DM 16.2 ‘Pedestrian Movement’ Local Plan Policy DM 16.4 ‘Facilities to encourage active travel’ LBC Policy T1 Prioritising walking, cycle and public transport LBC Policy T2 Parking and car-free development

Key Sustainability Area	Proposed Measures	Response to Policy
Environmental Method Ratings	BREEAM pre-assessments have been carried out for the Proposed Development. The design has been shown to achieve a BREEAM ‘Very Good’ rating. All feasible BREEAM features have been maximised in the proposed pre-assessment strategy. Refer to Section 13 for full details.	Local Plan Policy CS15: ‘Sustainable Development and Climate Change’

1 APPROACH TO SUSTAINABILITY

1.1 SUSTAINABILITY STRATEGY

This Sustainability Statement appraises the design of the Proposed Development to summarise how it meets the current and relevant regulatory requirements and policy targets. The appraisal identifies key legislative drivers, local planning policy and Applicant targets with regards to sustainable development and establishes how these objectives are met by the design.

Sustainable development can be defined as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs…” (Brundtland). A sustainable approach to the design of the Proposed Development would therefore be to provide a healthy and comfortable environment for the incoming occupants whilst avoiding negative impacts at a local, national and global level both for today and in the future. The most recent agreement which sets global aims on sustainability is the Paris Agreement 2015, which established a target of limiting global warming to 1.5°C. Every development in the world has the opportunity to contribute to the global effort to meet this target. The design of the Proposed Development has endeavoured to ensure that social, economic and environmental issues are responded to in an integrated and equal manner. The sustainability of the design, construction and operation of the Proposed Development has been assessed, as well as consideration of its contribution to the surrounding area.

1.1.1 THE VISION

“*The London Tunnels are positioned between the London Borough of Camden and the City of London Corporation, a conduit connecting prominent cultural landmarks and central attractions. Their conversion to a cultural venue offers London a new cultural destination to join other City of London and London Borough of Camden cultural landmarks, including the Barbican, Guildhall School of Music Museum of London, British Museum, British Library, Camden Arts Centre, and the Roundhouse.*

Cultural Vision – London’s Cultural Connector

This new cultural offer will help the City of London achieve its goal of a vibrant seven-days-a-week destination and help to increase footfall (for both boroughs) back to pre-pandemic levels. The London Tunnels will act as a catalyst for building an ecosystem of culture-led businesses and public organisations across both boroughs, expanding beyond cultural anchor organisations to bring together historic locations and smaller galleries, theatres, and experiences, all within a walkable area.

The London Tunnels main attraction is the experience of walking and exploring the tunnels originally built by the British in the 1940s and 50s and designed to protect Londoners from the war and other threats and play a strategic role in early telecommunications. There is now a unique opportunity to restore the vast spaces, allowing visitors to move fluidly between digital and analogue worlds to experience something truly unique, and to explore broader topics across the arts, nature, and sciences.”

Please refer to the Cultural Plan prepared by Futurecity, (November 2023). A high-level summary of sustainability initiatives is given in Figure 1-1

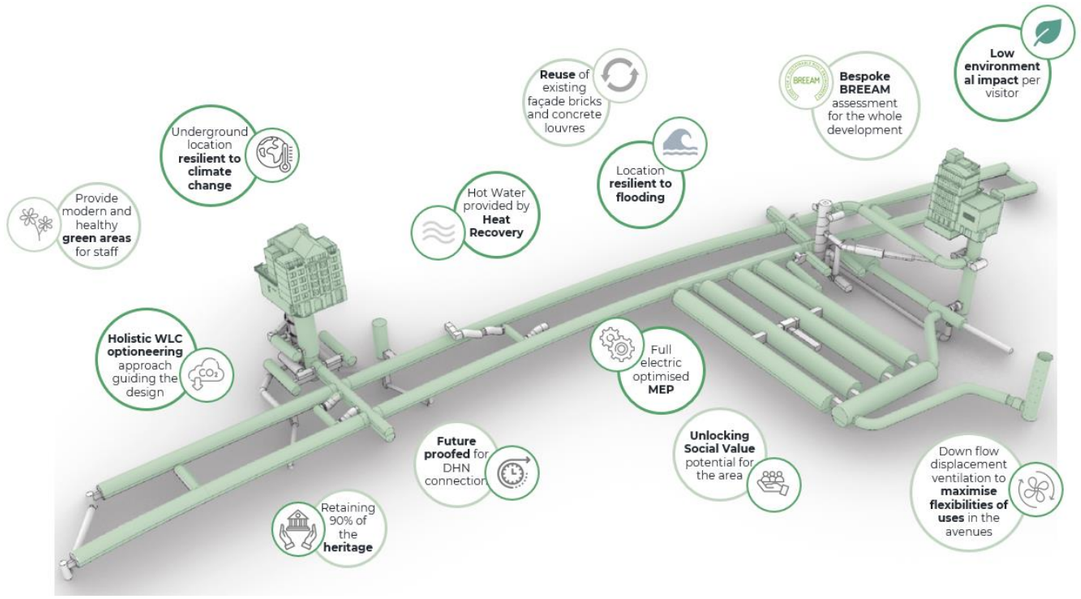


Figure 1-1 - Sustainability Vision

2 POLICY CONTEXT

2.1 OVERVIEW

The Proposed Development is designed in line with current national, regional and local development plan policy.

The City of London's approach to sustainable development is underpinned by policies set within the National Planning Policy Framework (NPPF) and the London Plan.

Whilst this section looks to review planning policy, a full assessment of the Proposed Development against planning policy is provided in the Planning Statement (DP9, April 2023).

2.2 NATIONAL POLICY

2.2.1 NATIONAL PLANNING POLICY FRAMEWORK

The National Planning Policy Framework (NPPF) was updated in July 2021 and replaces the previous versions. Plans and decisions should apply a presumption in favour of sustainable development.

The National Planning Policy Framework (NPPF) sets the planning context for sustainable design and construction. It is this that Local Planning Policies are based on and adapted to account for regionally specific requirements.

The NPPF identifies three dimensions to sustainable development – economic, social and environmental – which should be applied jointly and simultaneously:

- Economic objective – to help build a strong, responsive and competitive economy, by ensuring that sufficient land of the right types is available in the right places and at the right time to support growth, innovation and improved productivity; and by identifying and coordinating the provision of infrastructure;
- Social objective – to support strong, vibrant and healthy communities, by ensuring that a sufficient number and range of homes can be provided to meet the needs of present and future generations; and by fostering a well-designed and safe built environment, with accessible services and open spaces that reflect current and future needs and support communities' health, social and cultural well-being; and
- Environmental objective – to contribute to protecting and enhancing our natural, built and historic environment; including making effective use of land, helping to improve biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy.

The NPPF promotes the pursuit of sustainable development by seeking positive improvements to the built and natural environment, and to people's quality of life. This will include:

- Delivering a sufficient supply of homes;
- Building a strong, competitive economy;
- Ensuring the vitality of town centres;
- Promoting healthy and safe communities;
- Promoting sustainable transport;
- Supporting high quality communications;
- Making effective use of land;
- Achieving well-designed places;
- Protecting green belt land;
- Meeting the challenge of climate change, flooding and coastal change;
- Conserving and enhancing the natural environment;
- Conserving and enhancing the historic environment; and
- Facilitating the sustainable use of materials.

2.3 REGIONAL PLANNING POLICY

2.3.1 THE LONDON PLAN MARCH 2021 GREATER LONDON AUTHORITY

The London Plan 2021 sets out a framework for how London will develop over the next 20-25 years in line with the Mayor's vision for Good Growth. It is part of the statutory development plan for London, meaning that the policies in the Plan should inform decisions on planning applications across London. The main policies of relevance to this report are listed below:

- Policy D3 Optimising site capacity through the design-led approach
- Policy D9 Tall buildings
- Policy D13 Agent of Change
- Policy D14 Noise
- Policy SI1 Improving Air Quality
- Policy SI2 Minimising Greenhouse Gas Emissions
- Policy SI3 Energy Infrastructure
- Policy SI4 Managing Heat Risk
- Policy SI5 Water Infrastructure
- Policy SI7 Reducing waste and supporting the circular economy
- SI12 Flood Risk Management
- SI13 Sustainable Drainage
- T5 Cycling
- T6 Car Parking

2.4 REGIONAL POLICY – SUPPLEMENTARY PLANNING GUIDANCE

The following documents remain the current guidance in relation to the current London Plan 2021.

2.4.1 LONDON ENVIRONMENT STRATEGY (MAY 2018)

The Mayor's London Environment Strategy sets out an ambitious vision for improving London's environment for the benefit of all Londoners. The state of London's environment affects everyone who lives in and visits the city – it helps Londoners to stay healthy, allows businesses to thrive and keeps London functioning from day to day. This is the first strategy to bring together approaches to every aspect of London's environment, integrating the following areas:

- Air Quality;
- Green infrastructure;

- Climate Change mitigation and energy;
- Waste;
- Adapting to Climate Change;
- Ambient Noise; and
- Low carbon circular economy.

2.4.2 MAYOR'S CLIMATE CHANGE MITIGATION AND ENERGY STRATEGY (2011)

The Mayor's climate change mitigation and energy strategy sets out the strategic approach for London to limit further climate change and secure a low carbon energy supply for London. The document sets out a strategy to reduce London's CO_2 emissions by 60% from 1990 levels.

To facilitate delivering London's energy strategy the programmes and activities promoted across London to help achieve the targets set by this document include:

- Reconnect low carbon zones in London aiming to reduce CO_2 emissions by 20% by 2012 across the community;
- Decentralised energy programme – aiming to supply 23% of London's energy from secure, low carbon local sources; and
- Zero carbon target.

2.4.3 MAYOR'S WATER STRATEGY (2011)

The Mayor's water strategy is the first water strategy for London and provides a complete picture of London's water needs. The strategy calls for organisations involved in the city's management to:

- Invest in a water management and sewerage infrastructure system that's fit for a world class city and will create jobs;
- Support and encourage Londoners to take practical actions to save water, save energy and save money off their utility bills;
- Realise the potential of London's sewerage as an energy resource to help reduce greenhouse gas emissions; and
- Work in partnership with the Mayor, boroughs and communities to see and develop opportunities to manage flood risk through enhancing London's green spaces.

2.4.4 SUSTAINABLE DESIGN AND CONSTRUCTION: SUPPLEMENTARY PLANNING GUIDANCE (SPG) (2014)

The Sustainable Design and Construction SPG was published in May 2006 to provide additional information to support the implementation of the London Plan policies. A revised version of the Sustainable Design and Construction SPG was issued in April 2014.

The SPG explains the principles of sustainable design and construction and how they should be implemented in London. It provides guidance on how to achieve the objectives of the local plan effectively and supports developers and local planning authorities in achieving sustainable development.

2.4.5 AIR QUALITY POSITIVE GUIDANCE (DRAFT NOVEMBER 2021)

This guidance aims to promote to benefits of improving local air quality by minimising exposure to existing sources of poor air quality. This aligns with Policy SI 1 – Part C of the London Plan. Air Quality Positive assessments should be incorporated for masterplans at plan making stage where developments are likely to be subject to Environment Impact Assessments.

2.4.6 AIR QUALITY NEUTRAL GUIDANCE (DRAFT NOVEMBER 2021)

This guidance aims to promote to benefits of local air quality, by ensuring that developments do not contribute to air pollution beyond allowable benchmarks. This aligns with Policy SI 1 of the London Plan, which requires new developments to be air quality neutral.

2.4.7 CIRCULAR ECONOMY STATEMENTS GUIDANCE (MARCH 2022)

The circular economy guidance promotes the adaption and recycling of building materials over a building's lifetime. This is to ensure a sustainable built environment, where the lifetime of building elements is prolonged and waste is minimised. This is in line with Policy SI 7 of the London Plan.

2.4.8 WHOLE LIFE-CYCLE CARBON ASSESSMENTS GUIDANCE (MARCH 2022)

Whole life carbon emissions from embodied and operational energy should form part of the whole life carbon assessment for a new development. This is done by establishing the carbon emissions from materials, construction, operation, demolition and disposal. The calculation method for whole life carbon is set out in line with Policy SI 2 of the London Plan.

2.4.9 ENERGY ASSESSMENT GUIDANCE (JUNE 2022)

This guidance aligns with Part L of the Building Regulations. In June 2022, national building regulations were updated to enhance energy performance standards for new buildings through Part L 2021.

The GLA sets out the guidance on the energy hierarchy, where a minimum 35% improvement over Part L is required. This is part of the mayor's net zero targets for London.

The GLA have issued the 'Part L 2021 and the Energy Assessment Guidance 2022 – cover note' where they recognise that non-residential developments may find it challenging to achieve significant on-site carbon reductions beyond Part L 2021 to meet both the energy efficiency target and the minimum 35% improvement. This is because the new Part L baseline now includes low carbon heating for non-residential developments but not for residential developments. Planning applicants will be expected to demonstrate that at each stage of the energy hierarchy they have maximised opportunities for carbon reduction to achieve as close to zero as possible. However, planning applicants will still be expected to follow the energy hierarchy to maximise carbon savings before offsetting is considered.

2.4.10 'BE SEEN' ENERGY MONITORING GUIDANCE (SEPTEMBER 2021)

This guidance focuses on the operational energy performance of buildings. The guidance seeks to minimise the 'performance gap' so that it is possible to predict or forecast the operational energy based on energy modelling at design stage. This guidance aligns with Policy SI 2 of the London Plan and is the last stage of the GLA energy hierarchy. At planning and as-built stage, a webform should be filled out to verify the results.

2.5 LOCAL POLICY – CITY OF LONDON

At the time of the submission, the City of London Local Plan (2015) is relevant to the Proposed Development.

The Draft Local Plan titled 'City Plan 2040', but formerly called 'City Plan 2036 Shaping the Future City' (Proposed submission draft March 2021), is the version referred to as the 'Draft Local Plan'.

The City of London are currently preparing this Plan, which will replace the current version. The latest version at the time of writing is the Proposed submission draft, which was published in March 2021. Adoption is currently anticipated to be in early 2025.

2.5.1 THE CITY OF LONDON LOCAL PLAN (2015)

The City of London Local Plan was adopted in January 2015 and sets out the City's vision, strategy, objectives and policies for planning the City of London. It provides the strategy and policies for shaping the City until 2026 and beyond. It also forms part of the statutory development plan.

The City of London's sustainability drivers and policies are provided in section 3.15 of the Local Plan. It identifies the following key issues:

- Energy consumption;
- Air quality; and
- Urban heat island and climate change.

Core Strategic Policy CS15 'Sustainable Development and Climate Change' states the following requirements for design and construction:

- All redevelopment proposals to demonstrate the highest feasible and viable sustainability standards and major developments should aim to achieve a BREEAM rating of "excellent" or "outstanding";
- Minimise carbon emissions and contribute to a City wide reduction in emissions by:
  - Adopting energy-efficiency measures;
  - Enabling the use of decentralised energy, including the safeguarded Citigen Combined Cooling Heating and Power (CCHP) network, CCHP-ready designs in areas where CCHP networks are not yet available, and localised renewable energy technologies; and
  - Adopting offsetting measures to achieve the Government's zero carbon targets for buildings.
- Avoiding demolition through the reuse of existing buildings or their main structures, and minimising the disruption to nearby businesses and residents, using sustainably sourced materials and conserving water resources;
- Requiring developments to positively address local air quality, noise pollution, light pollution, water quality, land contamination and biodiversity;
- Incorporating climate change adaptation measures into development; and
- Having regard to the need to protect heritage assets.

Development Management Policy DM15.1 'Sustainability Requirements' further requires that Sustainability Statements must be submitted with all planning applications in order to ensure that sustainability is integrated into designs for all development. They should include:

- A BREEAM pre-assessment;
- An Energy Statement in line with the London Plan requirements; and
- Demonstration of climate change resilience measures.

Other policies of relevance to this report are listed below:

- Policy DM 2.1 Infrastructure provision and connection
- Policy CS 2 Utilities Infrastructure
- Policy CS 10 Design
- Policy DM 15.2 Energy and CO2 emissions assessments
- Policy DM 10.1 New Development
- Policy DM 17.1 Provision for Waste in Development Schemes
- Policy DM 17.2 Designing out construction waste
- Policy DM 15.6 Air Quality
- Policy DM 15.7 Noise and Light Pollution
- Policy CS 19 Open Spaces and Recreation
- Policy DM 19.2 Biodiversity and Urban Greening
- Policy DM 16.1 Transport impacts of Development
- Policy DM 16.2 Pedestrian Movement
- Policy DM 16.4 Facilities to encourage active travel

2.5.2 COL WHOLE LIFE CARBON OPTIONEERING PLANNING ADVICE NOTE (MARCH 2023)

The City Corporation draft Whole Life Carbon Optioneering Planning Advice Note (WLC PAN) was consulted on from June to September 2022. The City of London Whole Life Carbon Planning Advice Note requires;

- WLC assessments, in line with the GLA's proposed methodology, to be undertaken at pre-application and planning stages, bringing carbon accounting to early stages of design planning;
- Developers to calculate and report the WLC of realistic and feasible options at pre-application where there are existing buildings on site;
- The emissions associated with a minor refurbishment, major refurbishment, significant refurbishment & extension, and new-build options should be compared – compelling clients and design teams to look for opportunities to minimise demolition;
- A WLC reporting dashboard to increase consistency of supporting carbon documents across pre-app and planning application submissions;
- Scope and assumptions across all options to be consistent and presented in a transparent way, without bias; and
- An independent third-party verification to be carried out on all optioneering assessments as a quality assurance mechanism.

2.6 LOCAL POLICY – THE LONDON BOROUGH OF CAMDEN (LBC)

At the time of the submission, the London Borough of Camden Local Plan (2017) is relevant to the Proposed Development.

The Camden Local Plan sets out the Council's planning policies and replaces the Core Strategy and Development Policies planning documents (adopted in 2010). The Local Plan will cover the period between 2016-2031.

2.6.1 LBC LOCAL PLAN (2017)

The Camden Local Plan was adopted in January 2017 and ensures that Camden continues to have robust, effective, and up-to-date planning policies. These policies should respond to changing circumstances, the borough's unique characteristics and contribute to the delivery of the Camden Plan and other local priorities. The plan prioritises the following issues:

- Creating conditions for economic growth;
- Securing sustainable neighbourhoods for the community; and
- Reducing inequality and improve health & wellbeing.

The LBC strategic objectives highlight the following objectives which are relevant to the current development:

- To promote high quality, safe and sustainably designed buildings, places and streets and preserve and enhance the unique character of Camden and the distinctiveness of our conservation areas and our other historic and valued buildings, spaces and places;
- To make sure that development in Camden minimises its energy use by encouraging local efficient energy generation, achieving the highest possible environmental standards, and is designated to adapt to, and reduce the effects of climate change;
- To improve and protect Camden's Metropolitan Open Land, parks and open spaces, and protect and enhance biodiversity, in addition to providing for new habitats an open space;
- To improve health and wellbeing of Camden's population and reduce health inequalities through good spatial planning, supporting healthier lifestyles and environmental improvements, as well as ensuring appropriate access to health facilities; and
- To reduce, plan for and manage Camden's waste, including by working with our partner boroughs in the North London Waste Authority area, to work towards self- sufficiency within London.

Other policies of relevance to this report are listed below:

- Policy A1 Managing the impact of development
- Policy A3 Biodiversity
- Policy A4 Noise and vibration
- Policy C1 Health and wellbeing
- Policy C6 Access for all
- Policy D1 Design
- Policy D2 Heritage
- Policy E1 Economic development
- Policy E3 Tourism
- Policy T1 Prioritising walking, cycle and public transport
- Policy T2 Parking and car-free development
- Policy CC1 Climate change mitigation
- Policy CC2 Adapting to climate change
- Policy CC3 Water and flooding
- Policy CC4 Air quality
- Policy CC5 Waste
- Policy DM1 Delivery and monitoring

3 OPTIMISING THE USE OF LAND

London has a large and increasing population. Land is therefore a precious, finite resource. Green spaces providing habitat to flora and fauna are limited in number. The efficient use of land requires that: developments optimise the carrying capacity of land; previously developed land is re-used; green spaces are protected and opportunities for the provision of new open space are maximised.

The City of London, also known as the Square Mile, is at the heart of the UK's financial and professional services with the dominant use of space being commercial and retail. The City generated over £85bn in economic output in 2021.The number of residents is estimated at 8,000, with the workday population estimated at 587,000[1]. The City has the highest density of built environment in Greater London and one of the highest levels of high-rise construction. Camden is a very well-visited tourist destination and offers a rich culture with nightlife, shopping and markets.

Existing open space is a scarce and already over stretched resource. Any opportunity to increase the provision of green and/or open space is desirable.

3.1 REQUIREMENTS AND TARGETS

3.1.1 LONDON PLAN & SUSTAINABLE DESIGN AND CONSTRUCTION SPG

The London Plan SPG includes the following requirements:

Optimising the Use of Land[2]

- 100% of development to be delivered on previously developed land;
- Development density should be maximised based on local context, design principles, open space provision and public transport capacity; and
- Existing buildings should be reused where practicable, and the density of development and amenity are optimised.

City of London Policy

Core Strategic Policy CS10 ‘Design’ of the City of London Local Plan promotes a high standard of design and sustainable approach to building by:

- Ensuring that the bulk, height, scale, massing, quality of materials and detailed design of buildings are appropriate to the character of the City and the setting and amenities of surrounding buildings and spaces;
- Encouraging design solutions that make effective use of limited land resources;
- Ensuring that development has an appropriate street level presence and roof-scape, and has a positive relationship to neighbouring buildings and spaces; and
- Ensuring that new development respects and maintains the City’s characteristic network of streets and alleyways.

LONDON BOROUGH OF CAMDEN POLICY (2017)

Policy D1 ‘Design’ of the London Borough of Camden ensures that the Council will seek to secure high quality design in development. The Council will require that development:

a) respects local context and character;
b) preserves or enhances the historic environment and heritage assets in accordance with Policy D2 Heritage;
c) is sustainable in design and construction, incorporating best practice in resource management and climate change mitigation and adaptation; (…)

3.2 DESIGN APPRAISAL

3.2.1 LAND USE AND DENSITY

The entire project will occupy predeveloped land across the two boroughs. At 38-39 and 40-41 Furnival Street, where the existing building will be redeveloped, this will be carried out to support the usage and access to the tunnels.

3.2.2 SOCIAL AND ECONOMIC VALUE

The tunnels are an existing asset, which have valuable history and this project will provide them with new life while at the same allow the users to be educated on the history and significance of the tunnels. The project will become a visitor attraction which will positively contribute to the local economy in the two boroughs by bringing visitors to the area.

Construction Stage

Indirect employment opportunities will also be generated, including additional spending in the local area due to the increase in people present as a result of the Proposed Development.

Operational Stage

The attraction will provide jobs for the attraction staff. Furthermore, it is proposed that artists could use the space to exhibit, hereby creating additional job opportunities in the creative sector.

The Cultural Plan prepared by Futurecity (November 2023) describe the operational stage of the tunnels in the following way,

“Beyond the heritage offer The London Tunnels should be seen as a ‘subterranean connector’ joining up the communities of the City of London and Camden and providing a range of benefits and opportunities. The cultural section of the Tunnels is described as the ‘Avenues’ consisting of 4 large scale parallel and interconnected Tunnels In the southern part of the Tunnels, accessed off Furnival Street. This will be the stage for a programme of exciting cultural activations, exhibitions, and events. A ‘black box’ space will be able to shift and adapt to the different cultural programmes. High-resolution large-scale curved digital screens and projection systems, interactive structures, scent-emitting technology, and hundreds of individual acoustic pinpoint speakers will provide an adaptable canvass for a wide range of cultural events and uses.”

[1] City of London website “City Statistic briefing” February 2023

[2] Table 1.1, Summary of the Mayor’s Priorities and Best Practice, Sustainable Design and Construction SPG, 2014

Furthermore, it is proposed that “T_LAB” will be created to foster strategic partnerships with universities and institutions to support innovation, unlock socio-economic benefits and develop a sustainable financial model.

3.3 SUMMARY

The Proposed Development focuses on retaining the existing heritage asset and opening it up in such a way that visitors will be able to experience a previously inaccessible space, where exhibition space will be installed to inspire visitors. Furthermore, through technological projects and collaborative initiatives such as “T_Labs”, the Proposed Development will become a destination for innovation. Based on the Proposal for the project and the new lease of life given to this existing historic assets, it is believed that the development is aligned with the CoL policy CS10 and the LBC policy D1.

4 ENERGY AND CARBON EMISSIONS

The City of London and London Borough of Camden are both very densely occupied areas. CoL in particular has a very high workday population, it therefore requires a substantial energy input to maintain operations.

There are a number of factors relating to the energy strategy that must be considered when designing new buildings to be situated in the City. One key factor is the carbon emissions caused by the production of the energy used within the building, and another is the quantity of NOx and Particulate Matter (PM) emissions on Site – levels of these are becoming increasingly critical in cities across the UK and especially in London.

The following upside down pyramid diagram sets out the hierarchy of considerations to be taken into account when designing buildings to be energy and carbon efficient. This starts out with simplest (and often cheapest) considerations at the widest part at the top of the pyramid, with the most expensive items towards its tapering lower portion.

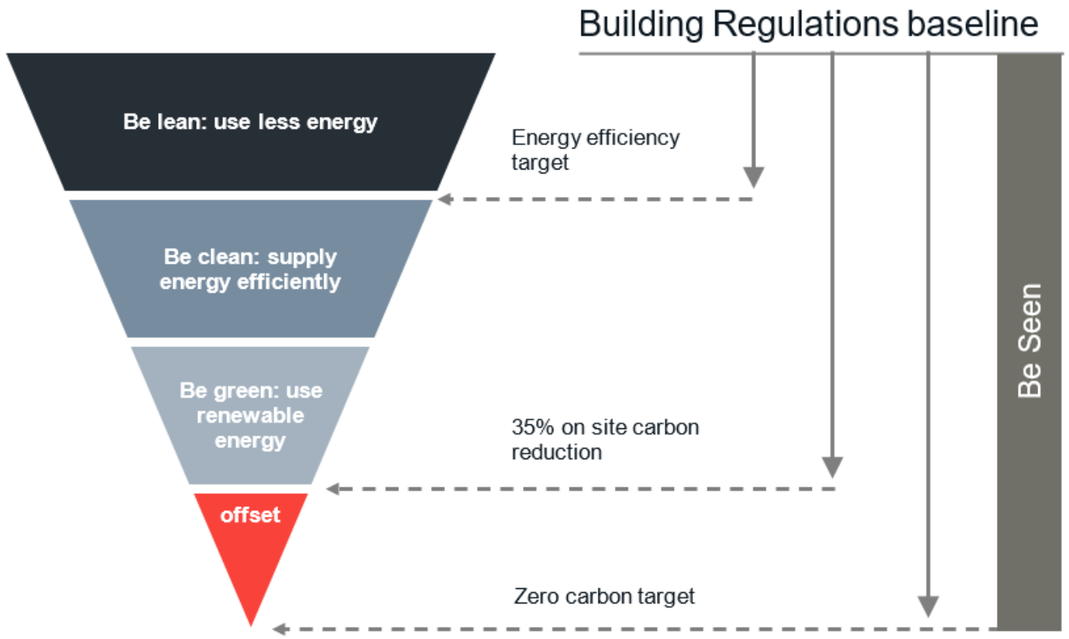


Figure 4-1 – GLA Energy Hierarchy

4.1 REQUIREMENTS AND TARGETS

BUILDING REGULATIONS (PART L)

All new buildings constructed in the UK must meet the minimum requirements of the UK Building Regulations. With regards to energy and carbon compliance, all buildings must meet the building regulations Part L 'Target Emission Rate' (TER) requirements for the Part L revision which is current at the time of initial construction works for each developmental phase. Part L 2021 has been used as the basis of the Energy Statement.

4.1.1 THE LONDON PLAN (MARCH 2021)

Policy SI2 – Minimising Greenhouse Gas Emissions

- Major development should be net zero-carbon. Reducing greenhouse gas emissions in operation and minimising both annual and peak energy demand in accordance with the energy hierarchy, see Figure 4-1:
  - Be Lean;
  - Be Clean;
  - Be Green; and
  - Be Seen.
- Major development proposal should include a detailed energy strategy to demonstrate how the zero-carbon target has been maximised on site beyond Building Regulations Part L 2021;
- Non-residential should maximise carbon reduction through energy efficiency measures;
- Major development should calculate and minimise carbon emissions from any other part of the development, including plant or equipment (unregulated emissions); and
- Major development must carry out a Be Seen analysis, the energy modelling must aim to minimise the 'performance gap' so that it is possible to predict or forecast the operational energy based on energy modelling at design stage.

Policy SI3 Energy Infrastructure

- Boroughs and developers should engage at an early stage with relevant energy companies and bodies to establish the future energy and infrastructure requirements arising from large-scale development proposals such as Opportunity Areas, Town Centres, other growth areas or clusters of significant new development.

4.1.2 ENERGY ASSESSMENT GUIDANCE (JUNE 2022)

This guidance aligns with Part L of the building regulations. In June 2022, national building regulations were updated to enhance energy performance standards for new buildings through Part L 2021.

The GLA sets out the guidance on the energy hierarchy, where a minimum 35% improvement over Part L is required. This is part of the mayor's net zero targets for London.

The GLA have issued the 'Part L 2021 and the Energy Assessment Guidance 2022 – cover note' where they recognise that non-residential developments may find it challenging to achieve significant on-site carbon reductions beyond Part L 2021 to meet both the energy efficiency target and the minimum 35% improvement. This is because the new Part L baseline now includes low carbon heating for non-residential developments but not for residential developments. Planning applicants will be expected to demonstrate that at each stage of the energy hierarchy they have maximised opportunities for carbon reduction to achieve as close to zero as possible. However, planning applicants will still be expected to follow the energy hierarchy to maximise carbon savings before offsetting is considered.

4.1.3 'BE SEEN' ENERGY MONITORING GUIDANCE (SEPTEMBER 2021)

This guidance focuses on the operational energy performance of buildings. The guidance seeks to minimising the 'performance gap' so that it is possible to predict or forecast the operational energy based on energy modelling at design stage. This guidance aligns with Policy SI 2 of the London Plan and is the last stage of the GLA energy hierarchy. At planning and as-built stage, a webform should be filled out to verify the results.

4.1.4 CITY OF LONDON POLICY (2015)

Policy DM 15.2 'Energy and CO_2 emissions assessments' of the City of London Local Plan requires that designs must take account of location, building orientation, internal layouts and landscaping to reduce energy consumption and demonstrate the following:

- Optimisation of energy efficiency;
- Use of on-site low and zero carbon technology to reduce carbon emissions;
- Maximise energy efficient measures and aim for a 35% reduction in carbon emissions compared to the minimum requirements of Part L2 2021; and
- Residual CO_2 emissions to be offset through "allowable solutions" for the lifetime of the building to achieve national targets for non-domestic buildings.

Under Policy SI2, where carbon targets cannot be met on-site, carbon abatement elsewhere or a carbon offset payment, negotiated through a S106 planning obligation will be required.

4.1.5 LONDON BOROUGH OF CAMDEN POLICY (2017)

Policy CC1 'Climate change mitigation' ensures that the Council will require all development to minimise the effects of climate change and encourage all developments to meet the highest feasible environmental standards that are financially viable during construction and occupation.

4.1.6 DESIGN APPRAISAL

The energy strategy has been structured in accordance with GLA's energy hierarchy: Be Lean, Be Clean, Be Green and Be Seen.

The Proposed Development will be designed to achieve optimum energy performance, and will incorporate the following design features throughout each stage of the GLA's Energy Hierarchy:

4.1.7 BE LEAN

Above Ground

38-39 and 40-41 Furnival Street will partially demolished and rebuilt to ensure the best use of space for lobby, retail, plant space, and office. The façade will feature a glass brick curtain wall to the retail floors and a glass brick double skin façade to the plant and office floor. Between the glass brick façade and the thermal line wall of the upper floors, there will be a void which is open to the external environment, which will bring air into the plant room, see Figure 4-2 and Figure 4-3. Where possible, existing brick will be reused to minimise carbon and support the circular economy strategy of the building.

Figure 4-2 – 38-39 and 40-41 Furnival Street Facade

Figure 4-3 – 38-39 and 40-41 Furnival Street Render

There will be minimal change at the 31-33 High Holborn, however work to ensure the building is in good condition and can properly serve the attraction will be carried out. This will include replacement of the glazing and draught proofing of the building.

Below Ground

The Tunnels network was constructed in the 1940s. It is approximately 30m below ground level and the and is predominantly built from cast iron and concrete. The thermal model has been developed by applying the ground contact to all surfaces of the tunnels, as well as setting the adjacent temperature condition to the default ground temperature. The build-up of all surfaces has included a layer of London clay to ensure the heat sink and thermal mass provided by the clay is considered, see Figure 4-4.

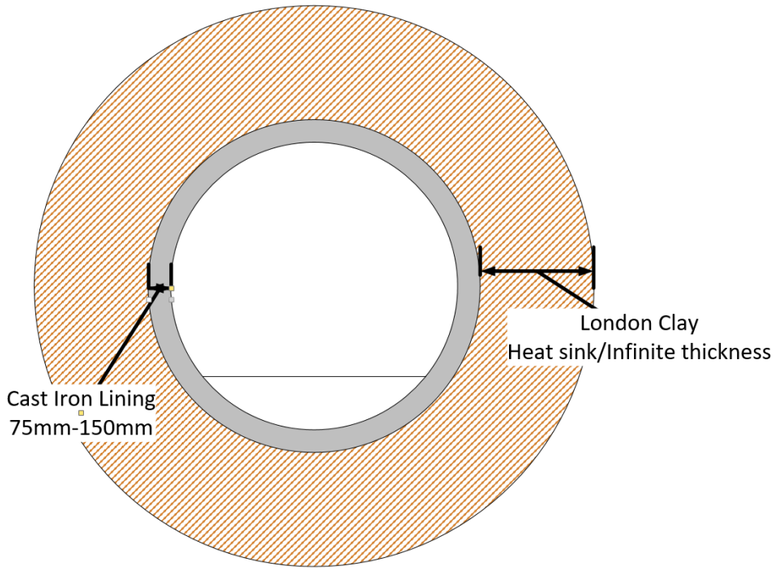


Figure 4-4 – Tunnels Build-up

The fabric performance of the project can be seen in Table 4-1.

Table 4-1 – Fabric Performance Targets

Element	31-33 High Holborn	Furnival St	Tunnels	Part L 2021 New Elements in new buildings	Part L 2021 New elements in existing buildings	Part L 2021 Existing elements in existing buildings
Exposed Floor U-value	0.25 W/m²K	0.13 W/m²K	0.14 W/m²K	0.18 W/m²K	0.25 W/m²K	0.18 W/m²K
Roof U-value	-	0.13 W/m²K	0.15 W/m²K	0.16 W/m²K	0.16 W/m²K	0.15W/m²K
External Wall U-value	0.30 W/m²K	0.13 W/m²K	0.12 W/m²K	0.26 W/m²K	0.30 W/m²K	0.18 W/m²K
Glazing U-value (double)	1.2 W/m²K	1.2 W/m²K	-	1.6 W/m²K	-	1.2 W/m²K
Curtain Wall U-value	-	1.6 W/m²K	-	1.6 W/m²K	-	-
Glazing g-value	0.35	0.30	-	-	-	-
Thermal Bridging	25% of associated U-value	25% of associated U-value	-	-	-	-
Air Permeability	3 m³/(h.m²) @50Pa	3 m³/(h.m²) @50Pa	-	8 m³/(h.m²) @50Pa	10 m³/(h.m²) @50Pa	10 m³/(h.m²) @50Pa

The results from the Be Lean stage, is stated in Table 4-2 below.

Table 4-2 – Be Lean carbon reduction

	Furnival Street (New Build)	31-33 High Holborn (Existing Build)	Kingsway Tunnels (Existing Build)	Site Wide		
Total	**Regulated Emissions (Tonnes)**	**Regulated Emissions (Tonnes)**	**Regulated Emissions (Tonnes)**	**Regulated Emissions (Tonnes)**	**Unregulated Emissions (Tonnes)**	**% Reduction in Regulated Carbon Emissions**
Baseline emissions (Tonnes CO_2)	1.1	3.8	69.4	74.2	22.8	-
Be Lean: Emissions after energy demand reduction (Tonnes CO_2)*	1.0	3.9	69.1	74.0	22.8	0.30%

Be Clean

It is not yet possible to connect to a DHN. Therefore, the results are the same as for the Be Lean stage. The DHN provider, Citigen has been contacted and the discussion is ongoing.

Be Green

The project will make use of highly efficient air source heat pumps and chillers which actively minimise the carbon emissions of the building. This results in a fully electric strategy, see results Table 4-3

Be Seen

A TM54 analysis has been completed for each building type to estimate the operational energy.

The following three TM54 scenarios have been tested:

- Low Scenario: the low scenario represents the base building CAT A design where building operates with anticipated occupancy and opening hours but there is no energy intensive audio visual equipment installed.
- Medium Scenario: the medium scenario is based on anticipated occupancy and opening hours, also taking into account the proposed HVAC efficiencies for the project. The AV system in this case is assumed to be mostly projectors with some screens, equivalent to roughly 50% AV coverage of the high scenario.
- High Scenario: the high scenario consumption is based on anticipated occupancy and opening hours, also taking into account the proposed HVAC efficiencies for the project. The AV system in this case is assumed to be mostly LED screens with some projectors.

4.1.8 RESULTS

Detailed energy modelling was undertaken based on the methodology from Part L of the Building Regulations (2021) in order to establish the baseline carbon emissions for the Proposed Development.

WSP utilised a dynamic simulation software package, the Virtual Environment (VE) suite from Integrated Environmental Solutions (IES). The carbon emissions for the residential elements of the Proposed Development were calculated utilising Accredited Design Standard Assessment Procedure (SAP) 10 software, Elmhurst Design.

The SAP 10.2 carbon factors have been used for all further calculations using the GLA Carbon Emission Reporting Spreadsheet v2.0.

The following table provides, see Table 4-3 a summary of the performance of the Proposed Development for each stage of the energy hierarchy.

Table 4-3 – Regulated Carbon Dioxide Savings from Each Stage of The Energy Hierarchy (SAP10.2 Carbon Factors)

	Furnival Street (New Build)	31-33 High Holborn (Existing Build)	Kingsway Tunnels (Existing Build)	Site Wide		
Total	**Regulated Emissions (Tonnes)**	**Regulated Emissions (Tonnes)**	**Regulated Emissions (Tonnes)**	**Regulated Emissions (Tonnes)**	**Unregulated Emissions (Tonnes)**	**% Reduction in Regulated Carbon Emissions**
Baseline emissions (Tonnes CO_2)	1.1	3.8	69.4	74.2	22.8	-
Be Lean: Emissions after energy demand reduction (Tonnes CO_2)*	1.0	3.9	69.1	74.0	22.8	0.30%
Be Clean: Emissions after energy efficient supply (Tonnes CO_2)*	1.0	3.9	69.1	74.0	22.8	0.3%
Be Green: Emissions after renewable energy (Tonnes CO_2)	0.5	3.6	39.4	43.5	22.8	41.4%

Refer to the Energy Statement produced by WSP (November 2023) for full details.

4.2 SUMMARY

The Proposed Development will achieve a reduction of 41% over Part L 2021 minimum regulated carbon emissions in regulated carbon emissions over the regulatory baseline, through fabric efficiency, energy efficient building services and incorporation of renewable energy sources.

By following the Energy Hierarchy, it is clear that the Proposed Building has been designed in line with the London Plan Policy SI1 Minimising Greenhouse Gas Emissions. Furthermore, as shown in the Energy Statement, the relevant energy companies have been contacted, hereby complying with Policy SI3 Energy infrastructure.

Policy DM 15.2 ‘Energy and CO_2 emissions assessments’ of the City of London Local Plan has also been followed and improvements over current Building Regulations have been maximised. For further details, please refer to the Energy Statement.

5 WATER EFFICIENCY

Water consumption is an important issue to address in all developments. Not only does it carry a financial cost and large carbon footprint but climate change predictions also forecast irregular rainfall patterns, leading to either too much water in winter along with increasing flood risk, or water shortages in summer. In terms of the environmental impact of water consumption, DEFRA's UK Climate Risk Assessment 3 indicates that the production of potable water requires chemicals and energy in large amounts and creates a carbon footprint for water of almost 300kgCO_2/1000 m^3.

London's growing population and ageing pipes, combined with a changing and increasingly extreme climate, means that our water resources are under growing pressure. A 2014 research project[4] ranked London as the 15th most water-stressed city in the world. Thames Water is predicting that London is imminently facing a drinking water deficit that might escalate to a 40% deficit by 2040 if no action is taken.

A responsible and prudent use of water is therefore a prime consideration of the Proposed Development.

5.1 REQUIREMENTS AND TARGETS

5.1.1 THE LONDON PLAN (MARCH 2021)

Policy SI5 Water Infrastructure

Commercial development should achieve at least the BREEAM Excellent standard for the Wat 01 or equivalent (12.5% improvement over defined baseline performance standard).

Development should seek to improve the water environment and ensure that adequate wastewater infrastructure capacity is provided.

5.1.2 THE CITY OF LONDON POLICY (2015)

Core Strategic Policy CS2: Utilities Infrastructure

Minimising the demand for power, water and utility services, requiring sustainable building design and the incorporation of demand management measures within all development.

Policy DM 2.1 Infrastructure Provision and Connection

Utility infrastructure and connections must be designed into and integrated with the development wherever possible. As a minimum, developers should identify and plan for:

- Reasonable gas and water supply considering the need to conserve natural resources;

5.1.3 LONDON BOROUGH OF CAMDEN POLICY (2017)

Policy 'CC3 Water and flooding' ensures that the Council will seek to ensure that development does not increase flood risk and reduces the risk of flooding where possible. We will require development to:

a. incorporate water efficiency measures;
b. avoid harm to the water environment and improve water quality;
c. consider the impact of development in areas at risk of flooding (including drainage);
d. incorporate flood resilient measures in areas prone to flooding;
e. utilise Sustainable Drainage Systems (SuDS) in line with the drainage hierarchy to achieve a greenfield run-off rate where feasible; and
f. not locate vulnerable development in flood-prone areas. Where an assessment of flood risk is required, developments should consider surface water flooding in detail and groundwater flooding where applicable. The Council will protect the borough's existing drinking water and foul water infrastructure, including the reservoirs at Barrow Hill, Hampstead Heath, Highgate and Kidderpore.

5.2 DESIGN APPRAISAL

The Proposed Development will be designed to minimise water use and impact on the existing urban drainage system. Water supplied to the Proposed Development will not give rise to significant adverse effects to the environment as control and leak detection will be installed where appropriate.

The Proposed Development is currently exceeding the minimum BREEAM Excellent standard for the Wat 01. Proposed measures designed to minimise water use are described in the following paragraphs.

5.2.1 WATER CONSERVATION

The development employs best practice design in regard to water conservation and will have reduced mains water demand compared to typical building performance. Proposed water saving features include:

- Water efficient sanitary fittings such as low flush WCs, low flow taps and low flow showers with flow regulators will be installed in the commercial areas;
- Fittings will be specified such that a reduction over a notional building consumption is at least 40%;
- Water consumption will be limited through specification of restricted flow fittings for all WCs, urinals, hand basins, showers and kitchens. Greywater from rainwater to be collected and used for WC flushing, therefore reducing demand for potable water further.

5.2.2 MANAGING WATER USE

To ensure ongoing sustainability performance during building operation, water use must be appropriately and effectively managed.

In all commercial and retail areas, water meters will be linked to a central Building Management System which will enable monitoring and evaluation of water usage by the building management team.

[3] UK Climate Change Risk Assessment: Government Report, DEFRA, 2012

[4] The Nature Conservancy, Global Environmental Change Journal, 2014

5.2.3 LEAK DETECTION AND PREVENTION

Systems will be specified to detect a major water leak on the mains supply both within the building and between the building and the utilities water meter, to avoid the risk of accidental water consumption.

Proximity controls will be installed in the toilet blocks to ensure that water supply is turned off when toilets are not in use.

5.2.4 WATER USE DURING CONSTRUCTION

Water consumption targets will be set for the construction Site and usage will be monitored.

5.2.5 WATER RECYCLING

A rainwater harvesting system is under consideration in the design. This will collect water falling on the building and reuse for irrigation.

5.3 SUMMARY

The Proposed Development complies with the London Plan Policy SI5 and City of London Local Plan Strategic Policy CS2 and DM 2.1 by ensuring it will minimise its water footprint and achieve the BREEAM Water credits required. Hereby also being designed in line with the Mayor's Water Strategy (2011). Particular attention has been given to water conservation, monitoring, leak detection and water recycling.

6 MATERIALS & WHOLE LIFE CARBON

On a global level, and particularly in developed countries such as the United Kingdom, the rate of resource use is currently unsustainable. Material extraction, processing and manufacturing contributes a large proportion to total human-made carbon emissions and other environmental and social impacts.

To address these issues, there is now an increased focus on 'embodied impacts' due to material use, a drive to use materials in a more efficient way and to select materials based on their environmental, health and ethical credentials. The careful choice and application of building materials does not only have a positive impact on the environment and the building occupants, it can also reduce costs over the lifetime of the building.

6.1 REQUIREMENTS AND TARGETS

6.1.1 THE LONDON PLAN (MARCH 2021)

Policy SI7 Reducing Waste and Supporting the Circular Economy

Resource conservation, waste reduction, increases in material re-use and recycling, and reductions in waste going for disposal will be achieved by the Mayor, waste planning authorities and industry working in collaboration to:

"Promote a more circular economy that improves resource efficiency and innovation to keep products and materials at their highest use for as long as possible"

The whole life carbon London planning guidance provides management on whole life carbon emissions from embodied and operational energy should form part of the whole life carbon assessment for a new development. This is done by establishing the carbon emissions from materials, construction, operation, demolition and disposal. The calculation method for whole life carbon is set out in line with Policy SI 2 of the London Plan.

6.1.2 CITY OF LONDON POLICY

Policy DM 10.1 'New Development' of the City of London Local Plan requires all developments, including alterations and extensions to existing buildings, to be of a high standard of design and to avoid harm to the townscape and public realm, by ensuring that:

- Appropriate, high quality and durable materials are used; and
- The design and materials avoid unacceptable wind impacts at street level.

6.1.3 COL WHOLE LIFE CARBON OPTIONEERING PLANNING ADVICE NOTE (MARCH 2023)

The City of London Whole Life Carbon Planning Advice Note requires:

- WLC assessments, in line with the GLA's proposed methodology, to be undertaken at pre-application and planning stages, bringing carbon accounting to early stages of design planning;
- Developers to calculate and report the WLC of realistic and feasible options at pre-application where there are existing buildings on Site;
- The emissions associated with a minor refurbishment, major refurbishment, significant refurbishment & extension, and new-build options should be compared – compelling clients and design teams to look for opportunities to minimise demolition;
- A WLC reporting dashboard to increase consistency of supporting carbon documents across pre-app and planning application submissions;
- Scope and assumptions across all options to be consistent and presented in a transparent way, without bias; and
- An independent third-party verification to be carried out on all optioneering assessments as a quality assurance mechanism.

6.1.4 LONDON BOROUGH OF CAMDEN POLICY (2017)

Policy 'D2 Heritage' ensures that the Council will preserve and, where appropriate, enhance Camden's rich and diverse heritage assets and their settings, including conservation areas, listed buildings, archaeological remains, scheduled ancient monuments and historic parks and gardens and locally listed heritage assets. Designated heritage assets Designed heritage assets include conservation areas and listed buildings.

Policy A1 'Managing the impact of development' ensures that the Council will seek to protect the quality of life of occupiers and neighbours. We will grant permission for development unless this causes unacceptable harm to amenity. We will:

a. seek to ensure that the amenity of communities, occupiers and neighbours is protected;
b. seek to ensure development contributes towards strong and successful communities by balancing the needs of development with the needs and characteristics of local areas and communities;
c. resist development that fails to adequately assess and address transport impacts affecting communities, occupiers, neighbours and the existing transport network; and
d. require mitigation measures where necessary. The factors we will consider include:
e. visual privacy, outlook;
f. sunlight, daylight and overshadowing;
g. artificial lighting levels;
h. transport impacts, including the use of Transport Assessments, Travel Plans and Delivery and Servicing Management Plans;
i. impacts of the construction phase, including the use of Construction Management Plans;
j. noise and vibration levels;
k. odour, fumes and dust;
l. microclimate;
m. contaminated land; and
n. impact upon water and wastewater infrastructure.

6.2 DESIGN APPRAISAL

The following paragraphs summarise the aspects have been addressed by the Proposed Development.

6.2.1 ENVIRONMENTAL IMPACT OF MATERIALS

The design and specification will ensure that the use of toxic substances is avoided throughout. Internal materials in particular will contain low levels of Volatile Organic Compounds (VOCs). The

selection criteria for external materials will include the specification of low toxicity to humans and the wider environment, especially those that deplete stratospheric ozone.

Material efficiency is a priority for the Design Team and one of the key considerations during detailed design. Potential measures for reducing the material demand and for designing out waste has been and will be further explored by all key design team disciplines at each design stage. Material efficiency seeks to optimise the use of materials within building design, procurement, construction, maintenance, and end of life; with the aim being to reduce the quantities of new materials used in the development.

6.2.2 REUSE & RECYCLED CONTENT

Using recycled materials contributes to the reduction of the need for using raw materials and therefore saves natural resources. It is anticipated that at least 20% of the new material used by value of the whole building will contain reused or/and recycled content by value. It is important to mention that procurement routes will be looked post planning to ensure that the Proposed Development aligns with the target.

The proposed development aims to maximise material reuse. Through rigorous condition surveys, 100% of the existing façade bricks and precast concrete vertical louvres will be reused. Additionally, the cast iron shaft rings will be repurposed as lift shaft cladding, while the existing shaft linings will be reused as architectural elements lining the new stair and lift shaft.

6.2.3 RESPONSIBLE SOURCING

The responsible sourcing of materials will be a key consideration in the selection of suppliers, and a sustainable procurement strategy will be produced for the Proposed Development prior to construction. Materials from suppliers who participate in responsible sourcing schemes such as the BRE BES 6001:2008 Responsible Sourcing Standard will be prioritised.

All timber specified will be sourced from schemes supported by the Central Point of Expertise for Timber Procurement such as Forest Stewardship Council (FSC) accreditation–which ensures that the harvest of timber and non-timber products maintains the forest's ecology and its long-term viability. Precast elements will be designed to be easily transported and assembled on site.

Where viable the Design Team will specify materials that are grown or made locally. Likewise, the appointed contractor will be asked to prioritise local sourcing of materials. Additionally, a WLC assessment has been undertaken and used to guide the material selection of products.

Natural resource depletion will be minimised throughout the development, and materials such as peat and natural weathered limestone will not be used in the buildings or landscape features.

6.2.4 FUNCTIONAL ADAPTABILITY

The Proposed Development has ensured that the third and fourth principles of Circular Economy Assessment are embedded in the design layers of the project by ensuring the design is flexible and adaptable therefore increasing the building's lifecycle and providing a building lifespan of at least 50 years as per British standards and Eurocodes. See the Circular Economy Assessment for further details.

6.2.5 WHOLE LIFE CARBON ASSESSMENT

In line with the City of London's Whole Life Carbon Draft Planning Advice Note, a WLC preliminary optioneering study was carried out at early concept stages to quantify the relative carbon impact of different proposals. This included Structural, Architectural and MEP input. Details of the WLC Optioneering study can be seen in the Whole Life Carbon Report (WSP, November 2023).

A Whole Life Carbon Assessment has been carried out for the Proposed Development in accordance with the GLA's Whole Life Carbon Assessment Methodology updated in March 2022 to comply with The London Plan (2021) Policy SI2 Minimising greenhouse gas emissions.

The estimated carbon emissions associated with the development were compared against the GLA benchmarks for office developments. The WLC Assessment shows a breakdown of the estimated WLC performance of the development in comparison with GLA benchmarks.

6.3 SUMMARY

The Proposed Development is a retention led Scheme that addresses and will continually ensure compliance with the London Plan Policy SI7 and City of London Local Plan Policy 10.1 by giving careful consideration to the environmental impacts of the materials used. These considerations include embodied energy, the source of the materials and the health impacts when the materials are in use.

The materials chosen will be of high quality and high durability, in keeping with the location and prestige of the building. The environmental impact of replacing materials and components will be minimised, as their robustness leads to longer service life. The principles set out in the Sustainable Procurement plan will be followed at each stage of the design to ensure the Scheme is aligned with the aspirations set at the early stages of design.

A Whole Life Carbon Optioneering study and a Whole Life Carbon Assessment have been carried out for the Proposed Development. Carbon optimization has been and will be further explored by the Design Team as observed in the WLC Assessment at current and later design stages.

For further details on the materials used with the Proposed Development, please see the Circular Economy Statement (WSP, November 2023) and the Whole Life Carbon Report (WSP, November 2023).

At the RIBA Stage 5/6 (3 months post completion), it is intended that a WLC assessment will be carried out to understand the final impact of the Proposed Development on the environment.

7 WASTE & CIRCULAR ECONOMY

The UK construction industry is responsible for the consumption of 400 million tonnes of resources every year and produces 120 million tonnes of waste[5]. This is a large amount of finite natural resources being consumed and of which, a third is thrown away. This is not financially or environmentally responsible, and organisations like WRAP are promoting a more sustainable approach to using natural resources.

The waste hierarchy, which is represented in Figure 7-1, identifies a methodical approach to dealing with waste to minimise the environmental impact and has been used to guide the early design. The waste hierarchy ranks the different ways in which waste can be treated so that it limits the amount of resources used and waste generated.

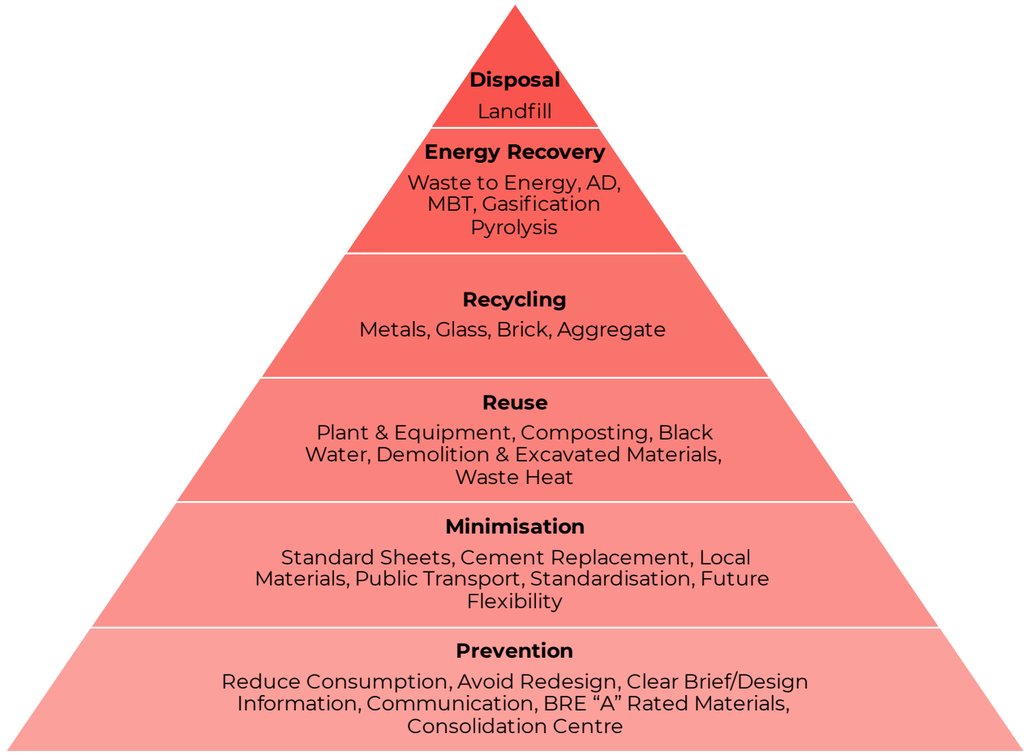


Figure 7-1 – Hierarchy to Design Out Waste

7.1 REQUIREMENTS AND TARGETS

7.1.1 THE LONDON PLAN (MARCH 2021)

Policy SI7 Reducing Waste and Supporting the Circular Economy

Resource conservation, waste reduction, increases in material re-use and recycling, and reductions in waste going for disposal will be achieved by the Mayor, waste planning authorities and industry working in collaboration to:

- Promote a more circular economy that improves resource efficiency and innovation to keep products and materials at their highest use for as long as possible;
- Encourage waste minimisation and waste prevention through the reuse of materials and using fewer resources in the production and distribution of products;
- Ensure that there is zero biodegradable or recyclable waste to landfill by 2026;
- Meet or exceed the targets for each of the following waste and material streams:
  - Construction and demolition – 95 per cent reuse/recycling/recovery; and
  - Excavation – 95 per cent beneficial use.

Design developments with adequate, flexible, and easily accessible storage space and collection systems that support, as a minimum, the separate collection of dry recyclables (at least card, paper, mixed plastics, metals, glass) and food.

7.1.2 CITY OF LONDON POLICY

Policy DM 17.1 'Provision for Waste in Development Schemes' and DM 17.2 'Designing out construction waste' of the City of London Local Plan contain the following requirements:

- Waste facilities must be integrated into the design of buildings, wherever feasible, and allow for the separate storage and collection of recyclable materials, including compostable material;
- On-site waste management, through techniques such as recycle sorting or energy recovery, which minimises the need for waste transfer, should be incorporated wherever possible;
- Reuse of existing structures where feasible;
- Building design which minimises wastage and makes use of recycled materials;
- Recycling of deconstruction waste for reuse on site where feasible;
- Transport of waste and construction materials by rail or river wherever practicable; and
- Application of current best practice with regard to air quality, dust, hazardous waste, waste handling and waste management.

7.1.3 LONDON BOROUGH OF CAMDEN POLICY (2017)

Policy 'CC5 Waste' ensures that the Council will seek to make Camden a low waste borough. We will:

- Aim to reduce the amount of waste produced in the borough and increase recycling and the reuse of materials to meet the London Plan targets of 50% of household waste recycled/composted by 2020 and aspiring to achieve 60% by 2031.

[5] WRAP

7.2 DESIGN APPRAISAL

Construction Waste

Best practice waste reduction measures will be pursued during the detailed design and construction stages in line with the waste hierarchy to reduce, reuse, and recycle. These include:

- Exploring prefabricated and modular design options as the development progresses through the detailed design phase. Specifically, precast reinforced concrete (RC) elements, including walls, infill panels, and the Tunnels lining structure, are being considered for off-site prefabrication.
- Outlining procedures and commitments to minimize non-hazardous waste to meet the established benchmark.
- Implementing procedures to minimize hazardous waste.
- Establishing procedures for monitoring, measuring, and reporting both hazardous and non-hazardous site waste.
- Defining procedures for sorting, reusing, and recycling construction waste into specific waste groups.
- Aiming to divert 95% of construction waste generated by the development from landfill and instead reuse or recycle it, aligning with BREEAM Wst 01.

7.2.1 MANAGEMENT OF OPERATIONAL WASTE

The waste management strategy has been carried out by WSP (November 2023). The strategy is summarised as follows:

Furnival Street

The Furnival Street entrance will be used to manage the wastes generated within the tunnels, and the administration areas including the reception, shop and offices.

Two main waste storage areas will be provided to service the waste managed by the Furnival Street entrance. The tunnels will be service via a below ground main waste storage area, and the administration areas will be service via an above ground main waste storage area.

The waste generated within each area within the development will be temporarily stored in segregated waste bins before being transported to the main waste storage areas by the on-site FM team where it will be placed into labelled segregated bins.

On a daily basis, and outside of the opening hours for the Proposed Development the on-site FM team will transfer the bins from the main waste storage areas to a waste presentation area on Furnival Street.

The commercial waste management contractor appointed by the on-site FM team will collect the bins from the waste presentation area.

Once the bins have been emptied the on-site FM team will return them to the main waste storage areas.

31-33 High Holborn

The 31-33 High Holborn entrance will be used to manage the wastes generated within by the Cocktail Bar which will be located within the tunnels.

A main waste storage area will be provided within the tunnels to store the segregated wastes prior to collection.

On a daily basis, and outside of the opening hours for the Proposed Development the on-site FM team will transfer the bins from the main waste storage areas to a ground floor waste presentation area.

Due to the Cocktail Bar being located on a pedestrian only route with no direct access for a refuse collection vehicle, the bins will have to be collected from existing business located in High Holborn. The waste presentation area will therefore either be adjacent to the entrance to the Cocktail Bar (in bins) or on the kerb line on High Holborn (in bags).

The commercial waste management contractor appointed by the on-site FM team will collect the bins from the waste presentation area.

Once the bins have been emptied the on-site FM team will return them to the main waste storage areas.

The estimated waste requirement are shown below in Table 7-1.

Table 7-1 – Bin Requirements – Main Waste Storage Areas

Activity	Refuse 1,100 Litre Eurobin	Recycling 1,100 Litre Eurobin	Food Waste 240 Litre Wheeled Bin
Below Ground Facilities			
Tunnels	1	2	n/a
TOTAL	**1**	**2**	**1**
Above Ground Facilities			
Retail	0.18	0.34	n/a
Office	0.05	0.10	n/a
Staff Changing	0.01	0.01	n/a
Reception	0.64	1.1	n/a
TOTAL	**1**	**2**	**1**
GRAND TOTAL	**2**	**4**	**2**

Refer to the 'Waste Management Strategy' produced by WSP (November 2023) for full details.

7.2.2 CIRCULAR ECONOMY STRATEGY

The Circular Economy Statement was carried out by WSP (November 2023) and outlines the circular economy commitments.

- 20% of new materials used should contain reused/recycled content by value
- 95% of construction & demolition waste should be reused/recycled/diverted from landfill
- 95% of excavation waste should have beneficial use
- 65% of municipal waste should be recycled by 2030 (applicable to retail, café, residential spaces)
- 75% Business waste should be recycled by 2030 (applicable to office space)

Various measures are deployed to meet the commitments mentioned in Table 2. These include the design for disassembly, adaptability, and longevity and in general to design out waste.

The Proposed Development demonstrates a strong commitment to circular economy. Various elements of the building, including lifts, structures, glass balustrades, facades, and steel frames, have been designed for disassembly and recycling. Additionally, it is aimed to extend the lifespan of the structure, to at least 50 years. The project also emphasizes the use of recyclable materials in Mechanical, electrical, and plumbing (MEP) systems. The use of steel frames and easily modifiable internal partitions further emphasizes the building's adaptability. MEP are also designed for easy de-commissioning and recycling.

The project implemented a range of strategies designed to enhance its longevity. Various building elements, including lifts, structures, MEP systems, and architectural components, are designed for disassembly and recycling. In addition, the project focuses on prolonging the building's lifespan to at least 50 years through a combination of long-spanning slabs, flexible floorplates, and adaptable tunnel refurbishments.

To design out waste, the focus has been on optimizing material efficiency, retaining existing buildings and elements as much as possible, and reducing the consumption of raw materials by incorporating recycled content throughout the development.

Full details can be seen within the Circular Economy Statement produced by WSP (November 2023).

7.3 SUMMARY

The proposed design has a strong focus on retention and retrofit whilst enhancing the experience of visitors.

7.3.1 CONSTRUCTION STAGE

The construction management plan will include measures to reduce waste, implement waste segregation, and offer recycling services. The contractor will be advised of the targets to be achieved & construction waste monitored. The Construction Environmental Management Plan prepared by WSP will assist the Contractor in managing construction waste sustainably. This is also anticipated to be updated as design progresses.

7.3.2 OPERATIONAL STAGE

The plan divides waste management into two entrances, Furnival Street and 31-33 High Holborn, and estimates waste generation based on different metrics. To meet the GLA's recycling target of 65%, the waste will be divided into 35% refuse and 65% recycling, with no food waste. Separate waste storage areas will be provided for underground and above-ground facilities, ensuring proper separation and disposal. 31-33 High Holborn will handle waste from a Cocktail Bar. The strategy aligns with environmental guidelines and involves transporting waste to communal storage areas in line with building standards.

7.3.3 CIRCULAR ECONOMY

The Proposed Development aligns with the GLA's Circular Economy Targets by emphasizing resource conservation, waste elimination, and sustainable waste management. It aims to use at least 20% recycled materials in the construction process and minimize waste generation, ensuring that 95% of construction and excavation waste is reused, recycled, or diverted from landfills. Additionally, the development will submit a Waste Management Plan, encouraging waste segregation and recycling. The GLA's Circular Economy Targets include using recycled materials, reducing waste, and achieving high recycling rates for municipal and business waste by 2030. The development's design principles focus on efficient material use, longevity, adaptability, and sustainable waste management to meet these goals and minimise environmental impact.

Full details of the strategies for the Development can be seen within the abovementioned documents.

8 CLIMATE CHANGE ADAPTATION AND FLOOD RISK

Climate change will affect the quality of life of all Londoners. The effects of climate change can already be seen in UK weather patterns, and it is prudent to consider the likely impact of changes for the design and operation of new developments, to ensure that they can remain fit for purpose during their lifetime.

Climate change adaptation measures will improve resilience to the changing climate. Their benefits include reduced carbon dioxide emissions, improved water and energy security. Furthermore, they can assist with tackling social inequality and boost the green economy.

Taking action to mitigate the effects of climate change will help future-proof buildings and infrastructure, providing longevity and flexibility to the Proposed Development and making it an attractive place to work regardless of the climate. It is important that the buildings and spaces built today are suitable for occupation and use for their anticipated lifetime.

Particularly relevant for London is the urban heat island effect. This is the term given to the observed higher temperatures in cities and towns in comparison to rural areas. One predicted impact of climate change on London is an increase in temperatures, particularly summertime peaks, which will exacerbate the urban heat island effect.

Steps to tackle climate change are being set mainly by the Mayor through policies and programmes seeking to reduce London's carbon dioxide emissions. The early design stages of development proposals are the most cost effective time to incorporate relevant design and technological measures, enabling proposals to realise their full potential to reduce carbon dioxide emissions and adapt to climate change.

8.1 REQUIREMENTS AND TARGETS

8.1.1 THE LONDON PLAN (MARCH 2021)

Policy SI4 Managing Heat Risk

- Development should minimise adverse impacts on the urban heat island through design, layout, orientation, materials and the incorporation of green infrastructure; and
- Through an energy strategy, development should demonstrate how they will reduce internal overheating and reliance on air conditioning systems in accordance with the cooling hierarchy.

SI12 Flood Risk Management

- Development should ensure that flood risk is minimised and mitigated, and that residual risk is addressed;
- Development proposal adjacent to flood defences will be required to protect the integrity of flood defences and allow access for future maintenance and upgrading; and
- Natural flood management methods should be employed in development proposals due to their multiple benefits including increasing flood storage and creating recreational areas and habitat.

Policy SI13 Sustainable Drainage

- Development proposals should aim to achieve greenfield run-off rates and ensure that surface water run-off is managed as close to its source as possible in line with the following drainage hierarchy:
  - Store rainwater for later use;
  - Use infiltration techniques, such as porous surfaces in non-clay areas;
  - Attenuate rainwater in ponds or open water features for gradual release;
  - Attenuate rainwater by storing in tanks or sealed water features for gradual release;
  - Discharge rainwater direct to a watercourse;
  - Discharge rainwater to a surface water sewer/drain; and
  - Discharge rainwater to the combined sewer.
- Drainage should be designed and implemented in ways that promote multiple benefits including increased water use efficiency, improve water quality, and enhance biodiversity, urban greening, amenity and recreation; and
- Development proposals should aim to get as close to greenfield run-off rates as possible depending on site conditions. The well-established drainage hierarchy set out in this policy helps to reduce the rate and volume of surface water run-off. Rainwater should be managed as close to the top of the hierarchy as possible. There should be a preference for green over grey features, and drainage by gravity over pumped systems. A blue roof is an attenuation tank at roof or podium level; the combination of a blue and green roof is particularly beneficial as the attenuated water is used to irrigate the green roof.

Policy GG6 Increasing Efficiency and Resilience

- Ensure buildings and infrastructure are designed to adapt to a changing climate, making efficient use of water, reducing impacts from natural hazards like flooding and heatwaves, while mitigating against and avoiding contributing to the urban heat island effect.

8.1.2 CITY OF LONDON POLICY

The City can experience temperatures up to 10°C higher than the countryside around London. This temperature difference will increase with climate change, and adaptation is imperative if the City is to remain a comfortable place to live, work and visit. The London Plan is complemented locally by the City of London's Climate Change Mitigation and Adaptation Strategies and Code of Practice in the following policies:

- Policy DM 15.5 - Developers will be required to demonstrate through Sustainability Statements that all major development are resilient to the predicted climate conditions during the building's lifetime; and
- Policy DM 15.5 – Building designs should minimise any contribution to the urban heat island effect caused by heat retention and waste heat expulsion in the built environment.

And to ensure that the City remains at low risk from all types of flooding new development must:

- Reduce the risks of flooding from surface water throughout the City, ensuring that development proposals minimise water use and reduce demands on the combined surface water and sewerage network by applying the London Plan drainage hierarchy; and
- Reduce rainwater run-off through SuDS.

8.1.3 LONDON BOROUGH OF CAMDEN POLICY (2017)

Policy CC1 'Climate change mitigation' ensures that the Council will require all development to minimise the effects of climate change and encourage all developments to meet the highest feasible environmental standards that are financially viable during construction and occupation. (…)

Policy CC2 'Adapting to climate change' ensures that the Council will require development to be resilient to climate change. All development should adopt appropriate climate change adaptation measures such as:

a. the protection of existing green spaces and promoting new appropriate green infrastructure;
b. not increasing, and wherever possible reducing, surface water runoff through increasing permeable surfaces and use of Sustainable Drainage Systems;
c. incorporating bio-diverse roofs, combination green and blue roofs and green walls where appropriate;
d. ensuring development schemes demonstrate how adaptation measures and sustainable development principles have been incorporated into the design and proposed implementation; and
e. expecting non-domestic developments of 500 sqm of floorspace or above to achieve "excellent" in BREEAM assessments and encouraging zero carbon in new development from 2019.

Policy CC3 'Water and flooding' ensures that the Council will seek to ensure that development does not increase flood risk and reduces the risk of flooding where possible. We will require development to:

a. incorporate water efficiency measures;
b. avoid harm to the water environment and improve water quality;
c. consider the impact of development in areas at risk of flooding (including drainage);
d. incorporate flood resilient measures in areas prone to flooding;
e. utilise Sustainable Drainage Systems (SuDS) in line with the drainage hierarchy to achieve a greenfield run-off rate where feasible.

8.2 DESIGN APPRAISAL

The Climate Change adaptation strategy of the building has been developed to mitigate the effects of climate change through efficient design. Where relevant, adaptation strategies have been considered to ensure the success and longevity of the building.

8.2.1 TEMPERATURE

Temperatures will generally heighten across the seasons and summer maximum temperatures will raise even further. The most prescient risks to the building of these changes are overheating, and increased cooling demands & costs.

Thermal modelling has been carried out as part of the design process to ensure the impacts of these heightened temperatures can be managed and minimised. If additional cooling is required, the approach within the energy strategy with its focus on provision of electrically powered plant will provide the lowest future carbon energy source.

Due to the uniqueness of the tunnels, the soil temperature will have an impact on the performance and operation of these. This will be further investigated in the future stages of the project to better understand the properties of the soil and how this may affect the conditions in the tunnels.

8.2.2 WATER

Precipitation patterns are expected to change, with an increase in winter months and a reduction in summer months. Peak precipitation is also expected to rise by 20% in winter. The potential impact of this is increased flood risk is through additional rainfall and/or exceedance of drainage system capabilities.

The drainage system design will take account of the expected increase in precipitation over the course of the life of the building, providing enough spare capacity to cope with the peak rain events.

8.2.3 SOIL MOISTURE DEFICIT

The aforementioned variations in precipitation levels could result in shrinkage or swelling of clay soils which in turn can cause subsidence and heave. The potential impacts of this are movement in foundations and below ground drainage resulting in damage and failures.

These risks are most likely to have effects on shallow foundations. As this building will be designed with deep foundations, it will be resistant to any movement occurring in the subsoils.

8.2.4 SNOW

Snowfall is expected to decrease by 85% over the coming 60 years. No adverse effects upon the building are expected.

8.2.5 WIND

Given the minor increase in building massing which is proposed only at 38-39 and 40-41 Furnival Street and therefore it is not expected there will be any effect as a result of this.

8.2.6 SUN

UV radiation is expected to increase, putting strain on synthetic materials and affecting colour-fastness. Materials with high coefficients of thermal expansion will be given increased tolerances during the detailed design stage. The vast majority of the Scheme however, is below ground and therefore will be affected by the sun.

8.2.7 URBAN HEAT ISLAND

The following proposed measures will help reduce external overheating and provide benefits in terms of balancing the microclimate:

- All air handling systems will be equipped with heat recovery systems to reduce the amount of heat expelled to the external environment; and
- Increasing the quantity of green infrastructure on the Furnival terrace will help to reduce the impact of urban heat island, as plants will mitigate heat build-up of heat.

8.2.8 OVERHEATING

In line with policy SI4 of the London Plan, offices will be designed to reduce potential overheating and reliance on air conditioning systems. Please refer to the Energy Statement for full details and overheating results. A summary of the strategy for reducing overheating is as follows:

- The building will be provided with solar control glazing to reduce the amount of solar heat entering the building and will comply with Part L Criterion 3;

- Mechanical ventilation will be provided by centralised air handling units with fresh air distribution throughout the office areas;
- All spaces will be specified with low energy lighting. Additionally, photoelectric sensors and motion sensors will be applied throughout relevant areas to help reduce lighting demand and turn off lighting when spaces are unoccupied or adequately day-lit reducing internal heat gains from luminaires; and
- All areas have been assessed in line with PMV/PPD, following the overheating assessment guidance in TM52 to guarantee comfortable conditions are maintained throughout the year.

8.2.9 URBAN GREENING & TREES

The proposed planting cover, which will provide the site with a 0.135 Urban Greening Factor (UGF), will contribute to protect from both heat and UV radiation by evapotranspiration.

8.2.10 RESILIENT FOUNDATIONS

The foundations will be designed as per the Eurocode which covers extreme weather events.

8.2.11 SURFACE WATER FLOODING

The Site is classified as ‘Less Vulnerable’ and is located in Flood Zone 1, therefore does not require an Exception Test, as per the requirements of the NPPF, hence the Site is deemed suitable for its intended usage in terms of flood risk.

The GOV.UK’s flood maps for planning indicates that the Site is located entirely within Flood Zone 1 which is classified as an area of low flood risk an annual probability of flooding of less than 0.1%.

The CoL SFRA data shows the tidal breach height for the 2100-year event has no flooding within the development area. Any uses at ground floor are classed as less vulnerable.

The risk from sewer flooding, surface water flooding and groundwater flooding are all low.

The Outline Drainage Statement prepared by WSP (November 2023) demonstrates that the drainage network for the Site is designed to accommodate all run-off during all events up to and including the 100-year storm rainfall event plus 40% climate change allowance. As such, the Proposed Development will not have a negative impact on surface water flooding offsite.

Refer to the Flood risk assessment and outline drainage strategy (WSP, November 2023) for full details.

8.2.12 SUSTAINABLE DRAINAGE

A SuDS feasibility study has been carried out to determine which options are applicable to the Site (WSP, November 2023) in line with the SuDS hierarchy. It was found that blue roofs, rainwater harvesting and green roofs are feasibly options for the development.

8.2.13 DAYLIGHT AND SUNLIGHT FOR NEIGHBOURS

As the Proposed Development occupies pre-developed space and is mainly below ground, the impact on neighbours is minimal. At 38-39 and 40-41 Furnival Street, the development has been designed such that the height and massing does not infringe on the surrounding occupiers’ Right to Light.

8.3 SUMMARY

The projected impacts of climate change which may affect the Proposed Development are the need to deal with higher ambient and peak temperatures, higher peak rainfall events and more intense UV radiation. The drainage system design is designed to accommodate with the expected increased peak rainfall events.

The Proposed Development complies with the climate change policies from both City of London and London Borough of Camden.

9 POLLUTION MANAGEMENT

Urban areas tend to have high levels of pollution – this includes air pollution, light pollution and noise pollution.

Treating wastewater, filtering air emissions, and creating landfills for solid waste are all methods of controlling pollution after it has been created. Pollution prevention means avoiding pollution at the source rather than trying to control it afterwards. An approach of pollution avoidance will benefit the health and comfort of London's inhabitants, the local and wider ecosystems, whilst concurrently reducing ongoing risks and costs.

During the construction and the operation of the building, there are many sources of pollution that should be addressed and minimised, such as:

- Air pollution: CO_2 emissions, NOx emissions, particulate matter emissions including dust and incomplete combustion of fossil fuels, volatile organic compounds (VOCs);
- Land pollution: contaminating land through accidental spills and improper waste disposal;
- Water pollution: contaminating water through accidental spills into groundwater, local water ways and the aquifer;
- Light pollution; and
- Noise pollution.

9.1 REQUIREMENTS AND TARGETS

9.1.1 THE LONDON PLAN (MARCH 2021)

Policy SI1: Improving Air Quality

- Development should not lead to further deterioration of existing poor air quality, create any new areas that exceed air quality limits and create unacceptable risk of high levels of exposure to poor air quality;
- Major development must be at least air quality neutral and should use design solutions to prevent or minimise increased exposure to existing air pollution and make provision to address local problems of air quality in preference to post-design or retro-fitted mitigation measures. Major development must be submitted with an Air Quality Assessment; and
- To reduce the impact on air quality during the construction and demolition phase development proposals must demonstrate how they plan to comply with the Non-Road Mobile Machinery Low Emission Zone and reduce emissions from the demolition and construction of buildings following best practice guidance.

Policy D13 Agent of Change

- The Agent of Change principle places the responsibility for mitigating impacts fro$_m$ existing noise and other nuisance-generating activities or uses on the proposed new noise-sensitive development;
- Development should be designed to ensure that established noise and other nuisance-generating uses remain viable and can continue or grow without unreasonable restrictions being placed on them;
- New noise and other nuisance-generating development proposed close to residential and other noise-sensitive uses should put in place measures to mitigate and manage any noise impacts for neighbouring residents and businesses; and
- Development proposals should manage noise and other potential nuisances by:
  - Ensuring good design mitigates and minimises existing and potential nuisances generated by existing uses and activities located in the area;
  - Exploring mitigation measures early in the design stage, with necessary and appropriate provisions including ongoing and future management of mitigation measures secured through planning obligations; and
  - Separating new noise-sensitive development where possible from existing noise generating businesses and uses through distance, screening, internal layout, soundproofing, insulation and other acoustic design measures.

Policy D14 Noise

- In order to reduce, manage and mitigate noise to improve health and quality of life, residential and other non-aviation development proposals should manage noise by:
  - Avoiding significant adverse noise impacts on health and quality of life;
  - Mitigating and minimising the existing and potential adverse impacts of noise on, from, within, as a result of, or in the vicinity of new development without placing unreasonable restrictions on existing noise-generating uses;
  - Improving and enhancing the acoustic environment and promoting appropriate soundscapes;
  - Separating new noise-sensitive development from major noise sources; and
  - Where it is not possible to achieve separation of noise-sensitive development and noise sources without undue impact on other sustainable development objectives, then any potential adverse effects should be controlled and mitigated through applying good acoustic design principles.

9.2 WATER POLLUTION

9.2.1 SURFACE WATER RUNOFF

- In their aim to achieve a greenfield runoff rate developers should incorporate SuDS into their schemes which also provide benefits for water quality;
- Encourage good environment practice to help reduce the risk from business activities on the London water environment; and
- Encourage those working on demolition and construction sites to prevent pollution by incorporating prevention measures and following best practice.

9.2.2 WASTEWATER TREATMENT

- Commercial developments discharging trade effluent should connect to the public foul sewer or combined sewer network where it is reasonable to do so subject to a trade effluent consent from the relevant sewerage undertaker; and
- Developments should be properly connected and post-construction check should be made by developers to ensure that misconnections do not occur.

9.2.3 CITY OF LONDON POLICY

Policy DM 15.6 ‘Air Quality’ and DM 15.7 ‘Noise and Light Pollution’ of the City of London Local Plan includes the following requirements:

- Developers will be required to consider the impact of their proposals on air quality;
- Major developments will be required to maximise credits for the pollution section of the BREEAM assessment relating to on-site emissions of oxides of nitrogen (NOx);
- Developers will be encouraged to install non-combustion low and zero carbon energy technology. A detailed air quality impact assessment will be required for combustion based low and zero carbon technologies, such as CHP plant and biomass or biofuel boilers, and necessary mitigation must be approved by the City Corporation;
- Construction and deconstruction and the transport of construction materials and waste must be carried out in such a way as to minimise air quality impacts;
- Air intake points should be located away from existing and potential pollution sources;
- Developers will be required to consider the impact of their developments on the noise environment and where appropriate provide a noise assessment;
- Any potential noise conflict between existing activities and new development should be minimised and there will be no increase in background noise levels associated with new plant and equipment;
- Noise and vibration from deconstruction and construction activities must be minimised;
- Internal and external lighting should be designed to reduce energy consumption, avoid spillage of light beyond where it is needed and protect the amenity of light-sensitive uses; and
- Where development involves ground works or the creation of open spaces, developers will be expected to carry out a detailed site investigation to establish whether the site is contaminated and to determine the potential for pollution of the water environment or harm to human health and non-human receptors.

9.2.4 LONDON BOROUGH OF CAMDEN POLICY (2017)

Policy A4 ‘Noise and vibration’ ensures that the Council will seek to ensure that noise and vibration is controlled and managed. Development should have regard to Camden’s Noise and Vibration Thresholds (Appendix 3). We will not grant planning permission for:

a. development likely to generate unacceptable noise and vibration impacts; or

b. development sensitive to noise in locations which experience high levels of noise, unless appropriate attenuation measures can be provided and will not harm the continued operation of existing uses. We will only grant permission for noise generating development, including any plant and machinery, if it can be operated without causing harm to amenity. We will also seek to minimise the impact on local amenity from deliveries and from the demolition and construction phases of development.

Policy CC4 ‘Air quality’ ensures that the Council will ensure that the impact of development on air quality is mitigated and ensure that exposure to poor air quality is reduced in the borough. The Council will take into account the impact of air quality when assessing development proposals, through the consideration of both the exposure of occupants to air pollution and the effect of the development on air quality. Consideration must be taken to the actions identified in the Council’s Air Quality Action Plan. Air Quality Assessments (AQAs) are required where development is likely to expose residents to high levels of air pollution. Where the AQA shows that a development would cause harm to air quality, the Council will not grant planning permission unless measures are adopted to mitigate the impact. Similarly, developments that introduce sensitive receptors (i.e., housing, schools) in locations of poor air quality will not be acceptable unless designed to mitigate the impact. Development that involves significant demolition, construction or earthworks will also be required to assess the risk of dust and emissions impacts in 270 Camden Local Plan | Sustainability and climate change an AQA and include appropriate mitigation measures to be secured in a Construction Management Plan.

Policy ‘CC5 Waste’ ensures that the Council will seek to make Camden a low waste borough. We will:

a. aim to reduce the amount of waste produced in the borough and increase recycling and the reuse of materials to meet the London Plan targets of 50% of household waste recycled/composted by 2020 and aspiring to achieve 60% by 2031; and

b. make sure that developments include facilities for the storage and collection of waste and recycling.

9.3 DESIGN APPRAISAL

9.3.1 CONTAMINATION

Plant system designs will incorporate leak detection and containment to avoid pollution to land and water.

9.3.2 AIR QUALITY

It is proposed that the energy strategy for the Proposed Development will rely on a fully electrical plant. This avoids air pollution completely at point of use. An Air Quality Assessment has been carried out by WSP (November 2023), please refer to this for full details.

9.3.3 NOISE

The acoustic performance of the Proposed Development has been assessed by WSP (November 2023). The report states that the operational noise from the tunnels would be negligible at the nearest neighbouring properties.

9.3.4 LIGHT POLLUTION

Consideration has been given to the impact of light pollution. A detailed light pollution study is being carried out by GIA to ensure the light levels are in line with policy requirements.

9.3.5 WATER POLLUTION

Surface Water Runoff

The surface water drainage design Proposal is for the Proposed Development to connect into the existing Thames Water sewer which passes through the Site, however an external drainage survey will

be carried out to confirm the best strategy. The impacts of this will be minimised by incorporating capacity for water attenuation and control of outflow rates from the Proposed Development.

Wastewater Treatment

The proposed drainage network will be sized to cater for the 1 in 100-year event + 40% climate change rainfall event, limited to Greenfield rates in accordance with current policy. Water saving fittings and technologies will be incorporated into the Proposed Development.

Refer to the Flood Risk Assessment and Outline Drainage Strategy (WSP, November 2023) for further details.

9.4 SUMMARY

In developing this Proposal, the design team have strived to minimise pollution caused by the redevelopment of this Site. Consideration has been given to preventing any pollutants reaching land, water and air, as well as minimising any disruptive pollution such as light and noise. The Proposed Development will thus satisfy the requirements set by both the London Plan, City of London, London Borough of Camden policies and hereby satisfies the requirements.

10 HEALTH AND WELLBEING

Humans in developed countries spend as much as 90% of their time inside buildings. It is therefore vital that new developments are designed with human health in mind. Internal spaces should have adequate levels of space and natural light whilst external areas provide pleasant areas of public realm, which are safe and easily accessible. The main areas for consideration are:

- Internal Environmental Quality - limiting volatile organic compounds (VOCs) emitted from materials, flexible ventilation and heating strategies to adjust to each occupant's requirements and adequate external views and natural daylight; and
- Externally, consider the access to buildings - designing to ensure it is safe for people to use at all times of opening, by having adequate lighting and incorporating passive surveillance.

10.1 REQUIREMENTS AND TARGETS

10.1.1 LONDON PLAN & SUSTAINABLE DESIGN AND CONSTRUCTION SPG

The Mayor's SPG on Sustainable Design and Construction includes the following design requirements:

- Ensure developments are comfortable and secure for users, including avoiding the creation of adverse local climatic conditions;
- Inert or low emission finishes, construction materials, carpets and furnishings should be used wherever practical;
- Developments should incorporate principles of "Secured by Design";
- All developments should meet the principles of inclusive design, adopting the principles of SPG Accessible London: Achieving an Inclusive Environment; and
- Policy D11 Safety, security and resilience to emergency:
  - Development should include measures to design out crime that – in proportion to the risk – deter terrorism, assist in the detection of terrorist activity and help mitigate its effects. These measures should be considered at the start of the design process to ensure they are inclusive and aesthetically integrated into the development and the wider area.

10.1.2 CITY OF LONDON POLICY

- CS15 Sustainable Development and Climate change includes the following requirements:
  - To enable City businesses and residents to make sustainable choices in their daily activities creating a more sustainable City, adapted to the changing climate; and
  - Air quality: Nitrogen Dioxide & PM10 - To meet European Air Quality Objectives for PM10 and Nitrogen Dioxide.
- CS19 Open Spaces and Recreation includes the following requirements:
  - To encourage healthy lifestyles for all the City's communities through improved access to open space and facilities, increasing the amount and quality of open spaces and green infrastructure, while enhancing biodiversity;
  - To maintain the ratio of 0.06 hectares of open space per 1000 population; and
  - To ensure that all public realm schemes achieve the highest quality.

10.1.3 LONDON BOROUGH OF CAMDEN POLICY (2017)

Policy C1 'Health and wellbeing' ensures that the Council will improve and promote strong, vibrant and healthy communities through ensuring a high-quality environment with local services to support health, social and cultural wellbeing and reduce inequalities. Measures that will help contribute to healthier communities and reduce health inequalities must be incorporated in a development where appropriate

Policy C6 'Access for all' ensures that the Council will seek to promote fair access and remove the barriers that prevent everyone from accessing facilities and opportunities. We will:

a. expect all buildings and places to meet the highest practicable standards of accessible and inclusive design so they can be used safely, easily and with dignity by all;
b. expect facilities to be located in the most accessible parts of the borough;
c. expect spaces, routes and facilities between buildings to be designed to be fully accessible;
d. encourage accessible public transport; and e. secure car parking for disabled people. The Council will seek to ensure that development meets the principles of lifetime neighbourhoods.

10.2 DESIGN APPRAISAL

10.2.1 SAFETY AND SECURITY

A Security Report has been completed by WSP (November, 2023). This report details the security measures which should be incorporated into the visitor attraction, such as the size of allowable items and the training for the staff members. Furthermore, electronic security systems are suggested to ensure video surveillance, access control and possible lockdowns are managed in a suitable manner.

For full details, please refer to the Security report.

10.2.2 OVERHEATING

The overheating study is detailed in the Energy Strategy (WSP, November 2023). Due to the uniqueness of the tunnels it is also proposed that a specialist below ground model is carried out to accurately capture the heat transfer from the tunnels and to the surrounding soil in the next stage of the project.

10.3 SUMMARY

The Proposed Development complies with the SPG, the London Plan and City of London Local Plan Policy CS19 and LBC Policy C1 by ensuring the Proposed Development provides a comfortable environment for its occupants with the use of appropriate building fabric, building systems and controls. The Proposed Development has also incorporated principles of 'Secured by Design' to design out crime.

11 ECOLOGY AND BIODIVERSITY

Man-made climate change and the removal of natural habitat from the built environment places a strain on biodiversity on a global and local level. Furthermore, the southeast of England has a large population and a comparatively small land area. The efficient use of land means optimising the carrying capacity of land used for new developments, re-using land that has been previously developed whilst also protecting green spaces and maximising opportunities for the provision of new open space.

Following the Earth Summit in Rio in 1992, the UK government launched a national Biodiversity Action Plan (BAP) in 1994 and in 2007 a new List of Priority Species and Habitats was published. This list consists of 1120 species and 65 habitats covering terrestrial, freshwater and marine biodiversity.

Local Biodiversity Action Plans (LBAPs) are produced by local partnerships made up of key nature conservation organisations. The partnerships identify local priorities and determine the contribution they can make to the delivery of the national Species and Habitat Action Plan targets. Local BAPs are a very good starting point for identifying the most vulnerable and important habitats and species in an area. Often, but not always, LBAPs conform to local authority boundaries[6].

11.1 REQUIREMENTS AND TARGETS

THE LONDON PLAN (MARCH 2021)

POLICY G1 – GREEN INFRASTRUCTURE

- Development proposals should incorporate appropriate elements of green infrastructure that are integrated into London's wider green infrastructure network

POLICY G5 – URBAN GREENING

- Major development proposals should contribute to the greening of London by including urban greening as a fundamental element of site and building design, and by incorporating measures such as high-quality landscaping (including trees), green roofs, green walls and nature-based sustainable drainage;
- Boroughs should develop an Urban Greening Factor (UGF) to identify the appropriate amount of urban greening required in new developments; and
- In the interim, the Mayor recommends a target score of 0.4 for developments that are predominately residential, and a target score of 0.3 for predominately commercial development.

POLICY G6 - BIODIVERSITY AND ACCESS TO NATURE

Development proposals should manage impacts on biodiversity and aim to secure net biodiversity gain. This should be informed by the best available ecological information and addressed from the start of the development process.

POLICY G7 - TREES AND WOODLAND

- London's urban forest and woodlands should be protected and maintained, and new trees and woodlands should be planted in appropriate locations in order to increase the extent of London's urban forest – the area of London under the canopy of trees; and
- Development proposals should ensure that, wherever possible, existing trees of value are retained:
  - The planting of additional trees should generally be included in new developments – particularly large-canopied species which provide a wider range of benefits because of the larger surface area of their canopy.

CITY OF LONDON POLICY

Policy DM 19.2 'Biodiversity and Urban Greening' of the City of London Local Plan requires developments should promote biodiversity and contribute to urban greening by incorporating:

- Green roofs and walls, soft landscaping and trees;
- Features for wildlife, such as nesting boxes and beehives;
- Planting mix which encourages biodiversity;
- Planting which will be resilient to a range of climate conditions; and
- Maintenance of habitats within Sites of Importance for Nature Conservation.

LONDON BOROUGH OF CAMDEN POLICY (2017)

Policy 'A3 Biodiversity' ensures that the Council will protect and enhance sites of nature conservation and biodiversity. We will:

a. designate and protect nature conservation sites and safeguard protected and priority habitats and species;

b. grant permission for development unless it would directly or indirectly result in the loss or harm to a designated nature conservation site or adversely affect the status or population of priority habitats and species;

b. resist the loss of trees and vegetation of significant amenity, historic, cultural or ecological value including proposals which may threaten the continued wellbeing of such trees and vegetation;

c. require trees and vegetation which are to be retained to be satisfactorily protected during the demolition and construction phase of development in line with BS5837:2012 'Trees in relation to Design, Demolition and Construction' and positively integrated as part of the site layout;

d. expect replacement trees or vegetation to be provided where the loss of significant trees or vegetation or harm to the wellbeing of these trees and vegetation has been justified in the context of the Proposed Development;

e. expect developments to incorporate additional trees and vegetation wherever possible.

[6] http://www.biodiversityplanningtoolkit.com/stylesheet.asp?file=217_local_biodiversity_action_plans

11.2 DESIGN APPRAISAL

SITE SELECTION

The proposed footprint of the building is located fully on previously developed land with negligible ecological value.

LANDSCAPING AND URBAN GREENING OPPORTUNITIES

The Proposed Development aims to increase the connectivity between “Sites of Importance for Nature” identified by City of London Biodiversity Action Plan which are within the 1.5 km of the Site. This will be achieved by providing a planting selection suitable for pollinator species at each identified opportunity for greening the building.

“*At level 4, a planting palette of flower rich perennial planting, including small trees/shrubs and climbers that will cover the south façade of the building, will provide amenities and year-round interest for the users of the terrace, and at level 5, an intensive roof sown with a wildflower seed mix with plug planting will increase the opportunities provided to wildlife.*”

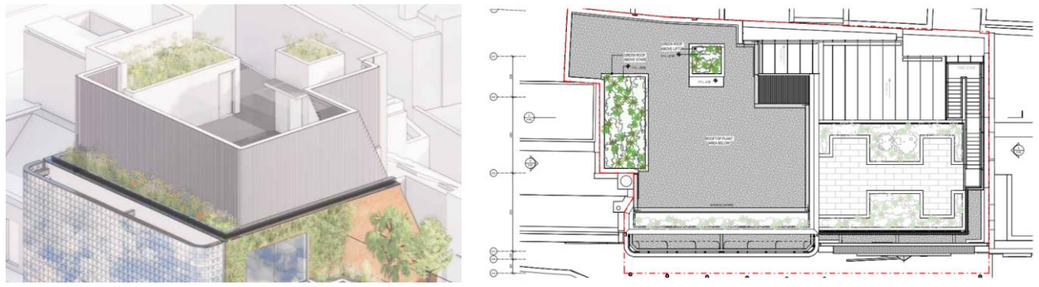


Figure 11-1 – Urban greening at roof terrace and the south façade of 38-39 and 40-41 Furnival Street.

URBAN GREENING FACTOR (UGF)

While the UGF falls below the policy target of 0.3, there are significant project constraints which result in the target being near impossible to meet:

- The Proposed Development is predominantly underground which imposes limitation on increasing the green areas within the Scheme;
- Additionally, the building form has been designed to fit within the rights of light envelope. Despite the maximum above-ground volume provided by the building envelope, it remains insufficient to provide more greenery, without taking away from the only outdoor space available for the staff.

UGF for the proposed development is 0.135 which is below 0.3. Despite efforts to maximise available space and explore opportunities for green elements, the project's inherent constraints restrict the feasibility of achieving the desired UGF target of 0.3.

Table 11-1 – UGF calculation

Surface Cover Type	Factor	Area (m^2)	Contribution
Semi-natural vegetation (e.g., trees, woodland, species-rich grassland) maintained or established on site.	1		0
Wetland or open water (semi-natural; not chlorinated) maintained or established on site.	1		0
Intensive green roof or vegetation over structure. Substrate minimum settled depth of 150mm.	0.8	24	19.2
Standard trees planted in connected tree pits with a minimum soil volume equivalent to at least two thirds of the projected canopy area of the mature tree.	0.8		0
Extensive green roof with substrate of minimum settled depth of 80mm (or 60mm beneath vegetation blanket) – meets the requirements of GRO Code 2014.	0.7	31.2	21.84
Flower-rich perennial planting.	0.7		0
Rain gardens and other vegetated sustainable drainage elements.	0.7		0
Hedges (line of mature shrubs one or two shrubs wide).	0.6		0
Standard trees planted in pits with soil volumes less than two thirds of the projected canopy area of the mature tree.	0.6		0
Green wall –modular system or climbers rooted in soil.	0.6	13.5	8.1
Groundcover planting.	0.5		0
Amenity grassland (species-poor, regularly mown lawn).	0.4		0
Extensive green roof of sedum mat or other lightweight systems that do not meet GRO Code 2014.	0.3		0
Water features (chlorinated) or unplanted detention basins.	0.2		0
Permeable paving.	0.1		0
Sealed surfaces (e.g. concrete, asphalt, waterproofing, stone).	0		0
Total contribution			**49.14**
Urban Greening Factor			**0.135**

11.3 SUMMARY

The Proposed Development has responded to all the London Plan, Sustainable Design and Construction: Supplementary Planning Guidance (SPG) and City of London Local Plan policies in relation to ecological and biodiversity matters. The Proposed Development achieve an urban greening factor of 0.135 and improves the quality of public realm and opportunities for enjoyment and relaxation for staff using the area. While the UGF falls below the London Plan Policy G5 recommended value of 0.3 for commercial scheme, the urban greening has been maximised where possible. The Proposed Development seeks to make use of all the available space to implement solutions that will enhance biodiversity and provide green spaces wherever possible.

12 TRANSPORTATION AND ACCESSIBILITY

Pollution from transport includes Nitrogen Oxides (NOx), Particulate Matter (PM), carbon monoxide and hydrocarbons. All have a damaging impact on the health of people, animals and vegetation locally. Air quality in the UK is slowly improving, but many areas still fail to meet the health based national air quality objectives and European limit values – especially for particulates and nitrogen dioxide. The result is that vehicles are responsible for most local pollution.

Road traffic also creates noise pollution and vehicle use can affect local quality of life as busy roads can be dangerous and intimidating, dividing communities and making street life unpleasant. Sustainable transport means addressing these problems by facilitating alternatives for travelling to and from the Proposed Development. The main alternatives are:

- Car sharing - reducing the number of single occupant journeys can have a huge impact on pollution and congestion;
- Green travel plans - When businesses create a travel plan, they can make a real difference to the transport choice their employees and visitors make; and
- Cycling – Traffic free cycle routes can promote cycle use which not only reduces transport missions but promotes a healthy lifestyle.

12.1 REQUIREMENTS AND TARGETS

12.1.1 THE LONDON PLAN (MARCH 2021)

Policy T5 Cycling

- All new development in the city must provide convenient and accessible cycle parking in line with minimum standards.

Policy T6 Car Parking

- Parking should be restricted in line with existing and future public transport accessibility and connectivity;
- Car-free development should be targeted in places that are well-connected; and
- Appropriate provision should also be made for Blue Badge holders.

The Mayor's Transport Strategy (March 2018)

The Mayors Transport Strategy (MTS) notes that transport has a role to play in delivering good growth that satisfies the following principles:

- Good access to public transport;
- High-density, mixed use developments;
- People choose to walk and cycle;
- Car-free and car-lite places;
- Inclusive, accessible design;
- Carbon-free travel; and
- Efficient freight.

The policies of the MTS seek to tackle the challenges through:

- "Making London a city where people choose to walk and cycle more often by improving street environments and promoting the benefits of active travel;
- Aiming for no one to be killed in or by a London bus by 2030, and for all deaths and serious injuries from road collisions to be eliminated from London's streets by 2041;
- Prioritising space efficient modes of transport to tackle congestion and improve the efficiency of streets for the movement of people and goods, with the aim of reducing overall traffic levels by 10-15% by 2041;
- Seeking to make London's transport network zero emission by 2050; and
- Using the Healthy Streets Approach to deliver coordinated improvements to public transport and streets to provide an attractive whole journey experience that will facilitate mode shift away from the car."

12.1.2 CITY OF LONDON POLICY

The Local Plan requires that:

- Development proposals that are likely to have effects on transport must be accompanied by an assessment of the transport implications during both construction and operation (Policy DM 16.1 'Transport impacts of Development');
- Pedestrian movement must be facilitated by provision of suitable pedestrian routes through and around new developments (Policy DM 16.2 'Pedestrian Movement'); and
- Cyclist movement must be facilitated by provision of adequate cycle routes, cycle storage, showers and changing room as well as locker storage (Policy DM 16.4 'Facilities to encourage active travel').

12.1.3 LONDON BOROUGH OF CAMDEN POLICY (2017)

Policy C6 'Access for all' ensures that the Council will seek to promote fair access and remove the barriers that prevent everyone from accessing facilities and opportunities. We will:

a. expect all buildings and places to meet the highest practicable standards of accessible and inclusive design so they can be used safely, easily and with dignity by all;
b. expect facilities to be located in the most accessible parts of the borough;
c. expect spaces, routes and facilities between buildings to be designed to be fully accessible;
d. encourage accessible public transport; and e. secure car parking for disabled people. The Council will seek to ensure that development meets the principles of lifetime neighbourhoods.

Policy T2 'Parking and car-free development' ensures that the Council will limit the availability of parking and require all new developments in the borough to be car-free.

Policy T1 'Prioritising walking, cycling and public transport ensures that the Council will promote sustainable transport by prioritising walking, cycling and public transport in the borough.

Walking

In order to promote walking in the borough and improve the pedestrian environment, we will seek to ensure that developments:

1. Improve the pedestrian environment by supporting high quality public realm improvement works.
2. Make improvements to the pedestrian environment including the provision of high-quality safe road crossing where needed, seating, signage and landscaping

Cycling

In order to promote the cycling in the borough and ensure a safe and accessible environment for cyclists, the Council will seek to ensure that development provides for and makes contributions towards connected, high quality, convenient and safe cycle routes, in line or exceeding London Cycle Design Standards

- Public Transport
- In order to safeguard and promote the provision of public transport in the borough we will seek to ensure that development contributes towards the improvements to bus network infrastructure including the access to bus stops, shelters, passenger seating, waiting areas, signage and timetable information.

12.2 DESIGN APPRAISAL

WSP (November 2023) have produced a Transport Assessment, which present the transport strategy for the Proposed development. A summary of the proposed measures is summarised below.

A trip generation, mode share and distribution exercise has been completed to predict how many visitors the Site will generated during the 'busy' design day, what mode of transport visitors will use and where they will come from / go to. The trip generation shows that the development may create up to 1,500 two-way total person trips in the busy design day scenario. On this basis a PCL analysis and Chancery Lane station Legion model was produced.

The PCL sensitivity results which include testing the local footways with an additional 100% of development trips, indicate no significant impact on the level of footway crowding in both the 2023 and 2041 scenarios. The results from the Chancery Lane station modelling results, which has been tested with 1,350pp/hr which is double the predicted trips generated by the development, demonstrates an increase in pedestrian movements, while the station walkways and stairwells and the ticket hall as a whole remain within a Level of Service of C in the 2022 and in the 2022+35% scenarios.

A robust assessment has been conducted using the most recent Numbat data and uplifting the development trips by 100% within a sensitivity test. The 2022+35% scenario may result in higher figures compared to the missing 2041 forecast data. The growth rate accounts for a significant increase in forecasted demand, compensating for the absence of TfL data.

It is demonstrated that in the peak capacity scenario, which is only likely to occur on the 20 busiest days of the years (weekends and bank holidays) the development will not generate a severe impact on the local transport network.

12.2.1 PTAL & PUBLIC TRANSPORT ACCESS

The Site benefits from a PTAL score of 6b, which is currently the best score available.

12.2.2 CYCLE PARKING

At 38-39 and 40-41 Furnival Street, 12 long stay cycle parking spaces will be provided in 6 two-tier racks. In terms of short stay space, 17 spaces are required. These will be provided in the public realm as Sheffield stands.

12.2.3 MOTORISED VEHICLE PARKING PROVISION

The Proposed Development is car free in line with planning policy.

12.3 SUMMARY

The Proposed Development satisfies the key sustainability requirements of the London Plan Policies T5 and T6, City of London policies DM 16.1, 16.2 and 16.4 and London Borough of Camden policies C6, T1 and T2.

13 ENVIRONMENTAL RATING METHODS

13.1 BREEAM

BREEAM is a market-focused tool aimed at encouraging significant improvements in the performance of buildings through the recognition and demonstration of improvements made to those buildings. The assessment applicable to this development is:

- BREEAM Non-Domestic Refurbishment and Fit Out 2014 Bespoke

The BREEAM rating is divided into five levels, with Pass, Good, Very good, Excellent and Outstanding being the achievable ratings. The percentage score achieved within the assessment is categorised accordingly, based on calculations in the BREEAM software. To achieve a BREEAM rating, the minimum percentage score must be achieved and the mandatory standards applicable to that rating level must also be complied with.

Table 13-1 – BREEAM Rating Levels

Rating	Percentage required
Pass	30%
Good	45%
Very Good	55%
Excellent	70%
Outstanding	85%

13.2 REQUIREMENTS AND TARGETS

13.2.1 CITY OF LONDON POLICY (2015)

Core Strategic Policy CS15: 'Sustainable Development and Climate Change'

The Core Strategic Policy CS15 of the City of London Local Plan requires the Proposed Development to target the standard of BREEAM 'Excellent' at a minimum.

The Draft Local Plan: City Plan 2040

More recently the draft City of London Planning Policy DE1: Sustainability Standards requires development to aim for 'Outstanding'.

13.2.2 LONDON BOROUGH OF CAMDEN POLICY (2017)

Policy CC2 'Adapting to climate change' ensures that the Council will require development to be resilient to climate change. All development should adopt appropriate climate change adaptation measures such as:

a. the protection of existing green spaces and promoting new appropriate green infrastructure;
b. not increasing, and wherever possible reducing, surface water runoff through increasing permeable surfaces and use of Sustainable Drainage Systems;
c. incorporating bio-diverse roofs, combination green and blue roofs and green walls where appropriate; and
e. ensuring development schemes demonstrate how adaptation measures and sustainable development principles have been incorporated into the design and proposed implementation;
h. expecting non-domestic developments of 500 sqm of floorspace or above to achieve "excellent" in BREEAM assessments and encouraging zero carbon in new development from 2019.

13.3 DESIGN APPRAISAL

13.3.1 PRELIMINARY BREEAM ASSESSMENT

The aspiration for the Scheme is to achieve a rating of 'high-score Very Good'.

After introducing the bespoke criteria to the strategy discussed before the targeted score is 67.06% (Very good) with a potential to achieve an Excellent rating (>80%).

The additional credits to achieve additional credits has discussed with design team to incorporate into the project cost plan to assess the project costs required to achieve an Excellent rating.

At RIBA Stage 2, BREEAM assessment scoring should allow sufficient margin in targeted credits as the Scheme progresses.

13.4 SUMMARY

The BREEAM pre-assessment has been carried out for the Proposed Development. The Proposed Development is targeting a 'Very Good' rating.

This will further support the health and wellbeing of the building users to ensure the success of the Proposed Development.

Appendix A

BREEAM PRE-ASSESSMENTS

LONDON

TUNNELS

The London Tunnels

2. BREEAM Pre-Assessment Report

PROJECT NO. 70106185
REF NO. TLT-WSP-XX-XX-RP-BE-000001

30 November 2023

The London Tunnels Ltd.

TLT - THE LONDON TUNNELS

BREEAM Pre-assessment Report

TYPE OF DOCUMENT (VERSION) PUBLIC

PROJECT NO. 70106185

OUR REF. NO. WSP-XX-XX-RP-BE-000001

DATE: NOVEMBER 2023

WSP

WSP House
70 Chancery Lane
London
WC2A 1AF

Phone: +44 20 7314 5000

WSP.com

QUALITY CONTROL

Issue/revision	First issue
Remarks	BREEAM Pre-assessment Report (Planning)
Date	November 2013
Prepared by	Rita, Tsz Kwan Chung
Signature	
Checked by	Ronald Chan
Signature	
Authorised by	John Parker / Dimitri Avakian
Signature	
Project number	70106185
Report number	P01
File reference	TLT-WSP-XX-XX-RP-BE-000001

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EXECUTIVE SUMMARY

WSP has been appointed in its capacity as Licensed BREEAM Assessors and Advisory Professionals (AP) to undertake an initial BREEAM evaluation for The London Tunnels (TLT) project. This report provides an overview to BREEAM Refurbishment and Fit Out 2014 Bespoke, highlights opportunities to embed sustainability principals from the outset of the project and the current BREEAM strategy and scoring.

The project under assessment comprises:

Project Name	The London Tunnels
Location	39-40 Furnival Street, EC4A 1JQ & 31-33 High Holborn WC1V 6AX
BREEAM Assessment Scheme	BREEAM Non-Domestic Refurbishment and Fit Out 2014 Bespoke
Assessment Type	NDRFO Bespoke, Parts 1-4
Target Rating	BREEAM 'high-score Very Good'
Stage of Assessment	Pre-Assessment (RIBA Stage 2)

The purpose of this report is to demonstrate:

- The agreed route for the achievement of a formal BREEAM 'Very Good' certification at the pre-assessment stage (Strategy).
- The credits/performance requirements which the team have agreed to target and implement.
- The actions required by the project team to satisfy the BREEAM evidential requirements, including those with early RIBA stage requirements.

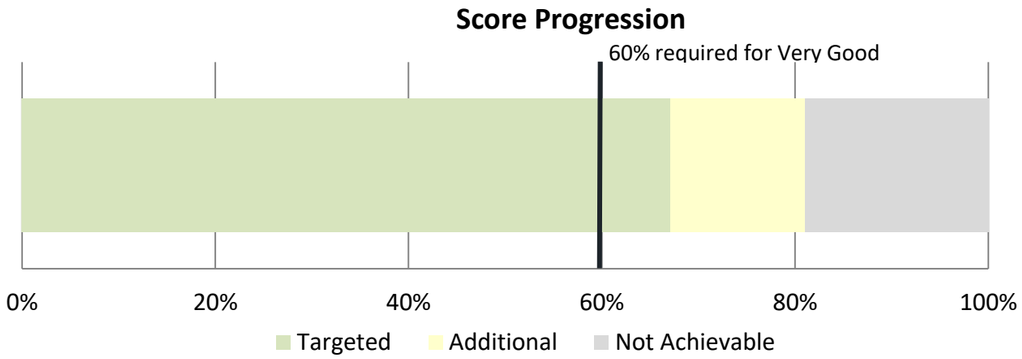
SCORING

Based on discussions and agreements with the Design Team and client, the following scoring scenarios are predicted:

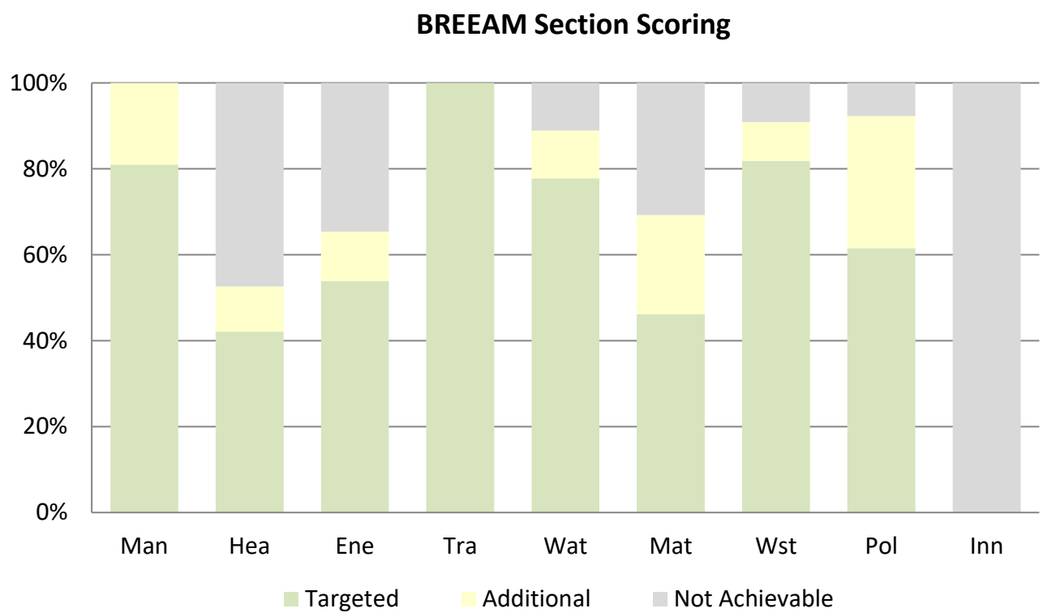
BESPOKE – FULLY FITTED

Scoring Scenario		BREEAM Score (Cumulative)*	Indicative BREEAM Rating
BREEAM NON-DOMESTIC REFURBISHMENT AND FIT OUT 2014 Parts 1-4	**Targeted**	67.06%	Very Good
	Potential	81.00%	Excellent
*Score as produced by BRE's BREEAM scoring and reporting tool			

For full details please refer to the main assessment trackers in Appendix A.



Graphical representation of progress to a required score of 60% (i.e. recommended score with 5% buffer for BREEAM 'Very Good') for the Proposed Development.



Graphical representation of the credits associated with each environmental section.

Targeted Scoring Scenario

This is based on the items agreed as being targeted by the design team.

We recommend that at least 5% is targeted above the required rating, i.e. 60% for 'Very Good', or 75% for 'Excellent'. This is to safeguard for missed credits during completion of the design and construction of the asset.

Additional Scoring Scenario

Further to those items noted as targeted, additional credits were identified, which upon further investigation from the design team or updates to the design could result in an additional (higher) score and rating.

Contact name WSP

Contact details +44 (0) 20 7314 5111 | ronald.chan@wsp.com

PROJECT BACKGROUND

TLT involves change of use of 3 aboveground properties and existing deep level Tunnels to visitor and cultural attraction. Existing 39 Furnival Street will be demolished and reconstructed, while 40 Furnival Street will be redeveloped for the principal visitor attraction pedestrian entrance at ground floor, with retail at first and second floor levels and ancillary offices at third and fourth levels and excavation of additional basement levels. Fulwood Place will be designed as new, pedestrian entrance to provide secondary visitor attraction entrance with retail at ground floor.

As confirmed by BRE, this Proposed Development will be assessed under BREEAM Refurbishment and Fit Out 2014 Bespoke Scheme due to its special nature, which a bespoke assessment criteria and scoring spreadsheet for this project will be developed.

This project is designed to achieve a rating of BREEAM 'high-score Very Good'.

PRE-ASSESSMENT REPORT PURPOSE

The report constitutes the BREEAM pre-assessment report for the Proposed TLT Development.

The content is based on information provided by the Design Team during various workshops and DTMs held in September and October 2023, subsequent conference calls and information collated from the individual project team members.

The purpose of this report is to:

- Demonstrate the strategy (targeted BREEAM credits and overall score) agreed with the project team to achieve the desired BREEAM high-score Very Good;
- Represent status of early-stage credits following the design team providing necessary evidence;
- Outline the actions required by the project team to satisfy BREEAM evidence requirements.

To summarise these outcomes, this report includes the following:

- An appraisal of the current Development Proposals against the BREEAM criteria;
- Identification of the mandatory credits which are essential to be included within the Development to achieve the desired rating;
- Consideration of potential credits that could be targeted subject to additional consideration, investigation and possibly additional costs.

This report has been prepared by qualified BREEAM Assessors at WSP who are licensed by the BRE to undertake assessments using the NDRFO 2014 Schemes.

To demonstrate compliance with the targeted credits as part of the formal design stage and construction stage BREEAM assessments, documentary evidence demonstrating performance is required to be presented to the BREEAM Assessor by the project team. It is therefore important for all project team members to ensure that commitments made at this early stage are carried through the design process and are implemented at

construction. Cost implications of the assumptions made in this report have not been evaluated as part of this study.

The criteria for achieving a BREEAM certificate can be challenging if overlooked during the design evolution process. The team can access the full Scheme documents (technical manual), which are freely available, at:

https://www.breeam.com/ndrefurb2014manual/.

ASSESSMENT STRATEGY

The stages of a BREEAM assessment require as a minimum a Construction Stage assessment in order to receive a final BREEAM certificate. It is strongly recommended that a three-stage assessment process is undertaken to maximise the efficiency of achieving the required rating.

- Pre-Assessment
- Design Stage Assessment
- Construction Stage Assessment

The BREEAM: Project Lifecycle diagram shows the full process for a BREEAM assessment.

This report represents the initial stages of the BREEAM Assessment (a Pre-Assessment review) whereby the team have identified and agreed a set of BREEAM performance measures to ensure the overall achievement of the required BREEAM rating is met.

PROPOSED BREEAM PROGRAMME

The provisional BREEAM Programme needs to be agreed with the Project Team. The Project Team should confirm the estimated dates against which the following actions can be programmed to the BREEAM Assessor/AP:

Item	Ideal RIBA Stage	Status	Ownership
BREEAM Pre-Assessment Strategy Workshop	1 / 2	Carried out on 29th Sep and 5th Oct 2023	Assessor with input from the Design Team and BREEAM AP
Bespoke Assessment Development Meeting	2	Carried out on 7th Nov 2023	BRE, Assessor and Design Team
Design Stage Assessment Kick-Off Meeting	3	TBC	Assessor/ Design Team
Design Stage Action and Guidance Report	3	TBC	Assessor
Design Team – Production of Information	3 / 4	TBC	Design Team
Design Stage Assessment – Recommendation for Certification	4	TBC	Design Team / Assessor
Design Stage (Interim Certification) 7-9 Weeks for QA Response	4	TBC	BRE

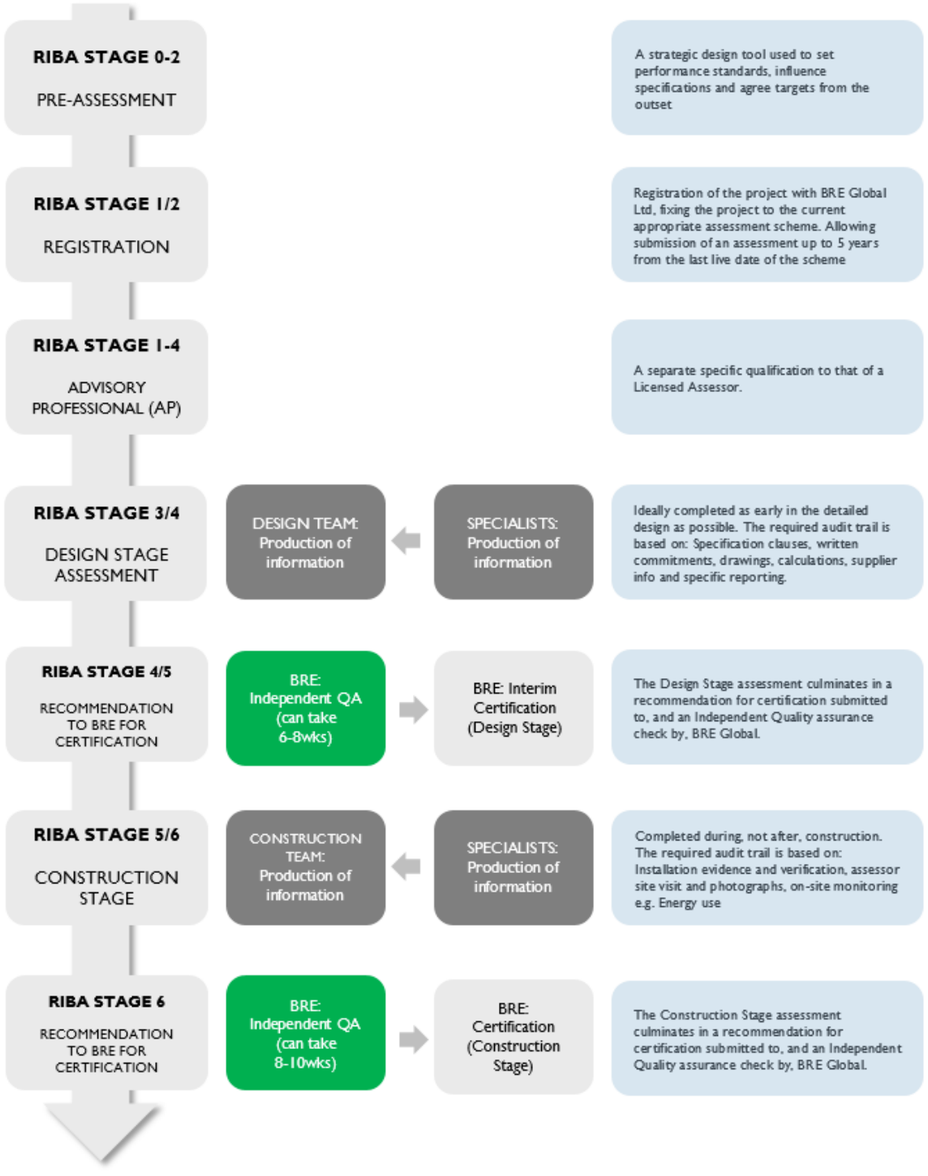


Figure 1 - REEAM Project Lifecycle

ROLES AND RESPONSIBILITIES

The BREEAM Assessor and BREEAM Accredited Professional (AP) must act in accordance with their "BREEAM License Agreement" with BRE Global Ltd; the owner, managing body and certification authority for all BREEAM Schemes.

The design/ construction team will be required to demonstrate "achievement" of the various BREEAM performance requirements through the presentation of documentary evidence as listed by BRE and conveyed by the Licensed Assessor. This audit material often requires specific responses/ reporting to demonstrate compliance.

During the early stages of assessment, ownership for the various actions and dates for submission will be agreed, which if not met may require a variation to our agreed scope of works.

In accordance with the BREEAM License the Assessor/BREEAM AP must maintain a position of non-conflict of interest. This means that whilst they can provide guidance to the various design/ construction team members, they cannot be responsible for the delivery of any part of the required audit trail.

Note: It is acceptable that the Assessor/ AP is part of the same organisation as a member or members of the design team who are responsible for information production).

BACKGROUND TO BREEAM

BREEAM is a market-focused tool aimed at encouraging significant improvements in the performance of buildings through quantification of a building's full life environmental impacts.

The BREEAM score provides a means of recognising a projects sustainability benefits and so benchmarking it against other buildings. Key benefits of using the methodology include:

- Maximising opportunities to enhance the building's performance during the planning, design and construction phases of new build, refurbishment and fit out projects.
- Specifying environmental requirements during procurement and management of all types of developments.
- Use of an independently verifiable measurement tool for forming part of Environmental Management Systems.
- Providing an independently verifiable sustainability label for marketing and promotional purposes.

BREEAM SCORING AND RATING

BREEAM ratings are divided into six levels as shown in Table 1. The associated percentage score is achieved based on meeting the requirements of a number of credits that correspond to meet or exceed the rating benchmarks.

Table 1 - BREEAM Rating Benchmarks

BREEAM Rating	Percentage Required
UNCLASSIFIED	<30%
PASS	≥30%
GOOD	≥45%
VERY GOOD	≥55%
EXCELLENT	≥70%
OUTSTANDING	≥85%

BREEAM CATEGORY WEIGHTINGS

The categories within BREEAM are weighted according to relative importance within the country of assessment through a weighting system derived by BRE Global as shown in Table 2. Within each category there are a different number of credits, therefore, individual credits carry specific percentage weightings, as a percentage of the overall total.

The number of credits available is based on the scoping of appropriate assessment criteria for the project type, location and functions. WSP's assessment tracker (found in Appendix A) shows the percentage contribution of each targeted credit to highlight that a credit in one section may not carry the same contribution to the score as a credit in another, due to the category weightings.

BREEAM incorporates a mechanism whereby Schemes achieving exemplar performance in a particular area or demonstrating innovation can achieve an additional 1% for each credit up to a maximum of 10. The innovation section is shown at the end of the main assessment table.

Table 2 - Section Weightings

Category	Section Weighting NDRFO 2014
Management	13.24%
Health & Wellbeing	14.29%
Energy	16.52%
Transport	8.09%
Water	6.62%
Materials	13.79%
Waste	7.59%
Land Use and Ecology	8.83%
Pollution	11.03%
Innovation	10.0%

MANDATORY REQUIREMENTS

To achieve a BREEAM rating, the minimum percentage score (associated with credits achieved) must be met plus mandatory standards for specific requirements applicable to that rating level must be complied with. These are shown in Table 3.

Table 3 - Mandatory Credits (NDRFO 2014)

Credit Ref.	Credit	BREEAM Rating/ Minimum Number of Credits				
		Pass	Good	Very Good	Excellent	Outstanding
Man 03	Responsible Construction Practices	-	-	-	One Credit (CCS)	Two Credits (CCS)
Man 04	Commissioning and Handover	-	-	-	Criterion 10 (Building User Guide)	Criterion 10 (Building User Guide)
Man 05	Aftercare	-	-	-	One credit (Seasonal commissioning)	One credit (Seasonal commissioning)
Ene 01	Reduction of Energy Use and Carbon Emissions	-	-	-	Six Credits	Ten Credits
Ene 02	Energy Monitoring	-	-	One Credit (first credit)	One Credit (first credit)	One Credit (first credit)
Wat 01	Water Consumption	-	One Credit	One Credit	One Credit	Two Credits
Wat 02	Water Monitoring	-	Criterion 1 Only (mains water meter)	Criterion 1 Only (mains water meter)	Criterion 1 Only (mains water meter)	Criterion 1 Only (mains water meter)
Mat 03	Responsible Sourcing of Materials	Criterion 1 Only (Legal Timber)	Criterion 1 Only (Legal Timber)	Criterion 1 Only (Legal Timber)	Criterion 1 Only (Legal Timber)	Criterion 1 Only (Legal Timber)
Wst 01	Construction Waste Management	-	-	-	-	One Credit
Wst 03	Operational Waste	-	-	-	One Credit	One Credit

REQUIREMENTS WITH SPECIFIC ACTION TIMINGS

When targeting some credits, the requirements can include delivery of work ahead of completion of a specific project stage (RIBA Stage) to ensure opportunities for positive sustainability outcomes are not missed by the project team. These are shown in Table 4.

Table 4 - Timing of Assessment (key credits)

Credit Ref.	Credit	RIBA Plan of Work				
		Preparation and Brief (1)	Concept Design (2)	Developed Design (3)	Technical Design (4)	Construction and Handover (5/6)
Man 01	Stakeholder Consultation			Identify and Define Project Delivery Stakeholders		
Man 01	Stakeholder Consultation (Interested Parties)		Consultation		Feedback Provided	
Man 01	Sustainability Champion (Design)		Appointment (BREEAM AP) to Maximise Project Performance			
Man 02	Life Cycle Cost and Service Life Planning		Elemental Life Cycle Cost (LCC)		Component Level LCC Appraisal	
Hea 06	Security of Site & Building		Security Needs Assessment			
Ene 04	Passive Design Analysis		Passive Design Analysis and Thermal Model			
Ene 04	Low or Zero Carbon Technologies		LZC Appraisal			
Ene 05	Energy Efficient Cold Storage		Cold Storage Strategy			
Tra 05	Travel Plan	Travel Plan				
Mat 01 (Opt 2)	Environmental impact of materials				Elemental LCA assessment	
Mat 06	Materials Efficiency	Whole Team Engagement	Whole Team Engagement	Whole Team Engagement	Whole Team Engagement	Whole Team Engagement

Credit Ref.	Credit	RIBA Plan of Work				
		Preparation and Brief (1)	Concept Design (2)	Developed Design (3)	Technical Design (4)	Construction and Handover (5/6)
Wst 01	Construction Waste Management		Pre-Refurbishment Audit			
Wst 05	Structural and Fabric Resilience		Climate Change Adaptation Strategy		Update on Climate Change Adaptation Strategy	
Wst 06	Functional Adaptability		Adaptability Study		Adaptation Measures Adopted	

ADDITIONAL CREDITS

Further to those items noted as targeted, the additional credits in the following section were identified as potential additional.

Table 5 – Identified Additional Credits

Item	BREEAM Issue	Potential Credits	Contribution to Total Score	Brief Action / Summary	Production Team Owner
1	**Man 02** Life cycle cost and service life planning	Three Credits	1.89%	Cost consultant has submitted a quotation for conducting the LCC works at stage 2. Client to confirm the appointment.	Cost Consultant Client
2	**Man 05** Post occupancy evaluation	One Credit	0.63%	Additional appointment of 3rd party is required to carry out the POE. To be reviewed in next stage.	Client
3	**Hea 02** Indoor Air Quality: *Ventilation*	One Credit	0.75%	Design team have confirmed that ventilation strategy will be reviewed against requirements in next stage as the design develops due to extract and intake locations.	MEP Engineer
4	**Hea 02** Indoor Air Quality: *Emissions from Construction Products*	One Credit	0.75%	Design team have confirmed that requirements will be reviewed and implemented into the design, where applicable. One credit has been advised to be targeted until product information is available in RIBA Stage 4.	Architect Client PM
5	**Ene 01** Reduction of energy use and carbon emissions	Two Credits	1.28%	Initial studies estimates that 4 credits can be achieved. To be reviewed in next stage when more MEP design details are available.	MEP Engineer
6	**Ene 04** Free cooling	One Credit	0.64%	Free cooling study is carried out, however the credit is subjected to reduction percentage of the cooling energy demand.	MEP Engineer
7	**Wat 01** Water consumption	One Credit	0.74%	Design team have confirmed that there will be a baseline improvement of around 40%. This achieves 3 credits. To achieve a further additional credit, a baseline improvement of at least 50% is required.	MEP Engineer Architect
8	**Mat 01** LCA (Option 2)	One Credit	1.06%	Depends on percentage of retained in situ and percentage of materials specified with robust environmental performance information. To be reviewed at stage 4.	MEP Engineer Structural Engineer Architect
9	**Mat 03** Responsible Sourcing of Materials: *Measuring Responsible Sourcing*	One Credit	1.07%	First credit (targeted) where >18% RSM points are achieved. Second credit (potential) where >36% RSM points are achieved. Design team and contractor to ensure as much materials as possible is procured from responsible resourcing. This is to be implemented into the design, where applicable. Design team have confirmed that this is to be included as part of the employer's requirements for the contractor to deliver.	Client PM Contractor

Item	BREEAM Issue	Potential Credits	Contribution to Total Score	Brief Action / Summary	Production Team Owner
				This credit is directly linked to the CES. The WLCA process through specifying low carbon and more sustainable materials.	
10	**Mat 04** Insulation	One Credit	1.06%	Design team have confirmed that it is likely that proposed insulation is suitable and BREEAM compliant - to be confirmed and reviewed.	Structural Engineer Architect
11	**Wst 01** Construction Waste Management: *Construction Resource Efficiency*	One Credit	0.69%	Two credits are currently targeted. An additional credit can be achieved when < 4.5m³ per 100m² non-hazardous construction. Design team have confirmed that this is to be included as part of the employer's requirements for the contractor to deliver. This credit is directly linked to the CES. GLA CES Targets: 95% of excavation waste should have a beneficial use. 95% of demolition waste and construction waste should be diverted from landfill.	Client PM Contractor
12	**Pol 01** Impact of refrigerants	One Credit	0.85%	First credit (targeted) where the systems using refrigerants have DELC CO2e of ≤ 1000 kgCO2e/kW cooling/heating capacity Second credit (potential) where DELC CO2e of ≤ 100 kgCO2e/kW or GWP ≤ 10 Second credit to be confirmed in next stage.	MEP Engineer
13	**Pol 03** Flood and Surface Water Management: *Minimising Water Course Pollution*	Three Credits	2.55%	Subject to Drainage Consultant's calculation in stage 3 when more details are available.	Drainage Consultant

REPORT FORMAT

The tables in appendix A shows the BREEAM criteria against which the buildings are being assessed (bespoke RFO). The credits available for each issue are shown along with a calculated overall percentage score and rating. The scoring has also been undertaken on the BREEAM Non-Domestic RFO 2014 assessment Scheme tools.

This allows for simple analysis of the effect of achieving more or removing any given credit. A summary of the actions has been shown, however the full requirements for the BREEAM assessment can be viewed within the assessment manual or can be provided upon request.

The tables provide high level discussion of performance requirements and agreements. During the next stage of formal assessment, explicit ownership, actions and timing for production will be shown based on agreement with the team.

DISCLAIMER

WSP has undertaken the following BREEAM report, with input and agreement from the Design Team. All information provided has been accepted in good faith as being accurate and representative of the proposed Scheme at the time of review.

The credits and credit requirements are based on the BREEAM NDRFO 2014 methodology with 'best estimate' for the bespoke criteria.

The assessor (for him/herself and as an agent for his/her staff) shall not be held liable whether in Contract or in Tort or otherwise for any loss or damage sustained as a result of using or relying on the information contained in this report or the final certificate from BRE that it is based on.

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Appendix A

BREEAM CREDIT TRACKER

The London Tunnels Pre-Assessment

This BREEAM credit tracker has been developed following an initial meeting with the project team on the 29 Sep & 02 Oct 2023. The BREEAM UK Non Domestic Refurbishment and Fit-Out 2014 scheme document must be referred to for the criteria details.
During the design evolution, the project team has responsibility to understand the details of the criteria requirements and consider them in the context of the proposed design.

Outstanding	≥ 85%
Excellent	≥ 70%
Very good	≥ 55%
Good	≥ 45%
Pass	≥ 30%
Unclassified	< 30%

												70.87%	84.81%				
BREEAM Issue ID	BREEAM Issue Title	BREEAM Credit Title	BREEAM Criteria	Part Applicability				Credits Available	% Worth (in total for each BREEAM issue)	Mandatory Requirements		Design Stage Scoring		Commentary	Actions	Indicative Timeframe	Indicative Responsibility
				Part 1	Part 2	Part 3	Part 4			Very Good	Excellent	Targeted	Additional				
Management																	
Man 01	**Project brief and design**	Stakeholder consultation (project delivery)	The design team develop a sustainability brief prior to during RIBA Stage 1 to set out the following: (a) Client requirements (b) Sustainability objectives and targets including target BREEAM rating (c) Timescales and budget; (d) List of consultees and professional appointments required (e) Project constraints Prior to completion of the RIBA Stage 2, the project delivery stakeholders meet to identify and define their roles, responsibilities and contributions for each of the key phases of project; considering the following: (a) End user requirements (b) Aims of the design and design strategy (c) Particular installation and construction requirements/limitations (d) Design and construction risk assessments e.g. CDM, legionella risk assessment (e) Legislative requirements e.g. building control notification, heritage requirements (f) Procurement and supply chain (g) Identifying and measuring project success in line with project brief objectives (h) Occupiers' budget and technical expertise in maintaining any proposed systems (i) Maintainability and adaptability of the proposals (j) Requirements for the production of project and end user documentation (k) Requirements for commissioning, training and aftercare support. The project team demonstrate how the project delivery stakeholder contributions and the outcomes of the consultation process influenced the project at each stage.	✓	✓	✓	✓	1	0.63%			1		Action in stage 2: Planning Consultant / PM to provide design brief, meeting minutes and consultation plan / project execution plan. Assessor to provide template matrix completion by PM. **1 credit targeted.**	1) Consultation plan setting out the process and scope of the consultation. 2) Meeting minutes to demonstrate when collaborations began, what was discussed, the defining of roles and responsibilities for each stage, aims, requirements and the outcomes of this process.	RIBA Stage 2	PM / WSP Design Manager
		Stakeholder consultation (third party)	The design team have covered the minimum consultation content to relevant third party stakeholders prior the completion of RIBA Stage 2. Consultation feedback is given to, and received by all relevant parties by the end of RIBA Stage 4. 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. The consultation exercise used a method carried out by an independent party.	✓	✓	✓	✓	1	0.63%			1		The design team confirmed that the third party stakeholder consultation has a touch for the minimum content listed out in BREEAM. Public consultation will be carried out, BREEAM AP to check with WSP Design Manager and Planning Consultant for any records available. Action in stage 2: Client to provide consultation report(s) setting out the process, scope and outcomes of the consultation; documentation demonstrating how consultation influenced design brief; and evidence of third party stakeholders. **1 credit targeted.**	1) Consultation plan and reports setting out the process, scope and outcomes of the consultation, as well as the timings of this process. 2) Documentation demonstrating the parties consulted, the topics covered, a summary of the views expressed, how these influenced the design brief, and the feedback given to consultees.	RIBA Stage 2	PM / Planning Consultant / WSP Design Manager
		Sustainability champion (design)	A Sustainability Champion has been appointed at RIBA Stage 1 to facilitate the setting and achievement of BREEAM performance targets. The defined BREEAM performance targets between the client and design/project team no later than RIBA Stage 2. The agreed BREEAM performance targets must be demonstrably achieved via the BREEAM assessor's design stage assessment report.	✓	✓	✓	✓	1	0.63%			1		WSP BREEAM AP have been appointed from RIBA Stages 1-2. BREEAM AP to be appointed from RIBA Stages 3-6. BREEAM AP Note are available in stage 1 & 2. **2 credits targeted.**	1) Appointment letter for the Sustainability Champion defining the scope of their role and responsibilities 2) Meeting minutes confirming the Sustainability Champion attended key design team meetings throughout the design process and the BREEAM requirements and targets discussed. 3) Status/monitoring reports from the Sustainability Champion at key stages.	RIBA Stage 1/2	BREEAM AP
		Sustainability champion (monitoring progress)	Sustainability Champion (design) criteria has been achieved. A Sustainability Champion is appointed to monitor progress against the agreed BREEAM performance targets throughout the design process and formally report progress to the client and design team. The Sustainability Champion must attend key project/design team meetings and report throughout each RIBA stage.	✓	✓	✓	✓	1	0.63%			1			1) Appointment letter for the Sustainability Champion defining the scope of their role and responsibilities 2) Meeting minutes confirming the Sustainability Champion attended key design team meetings throughout the design process and the BREEAM requirements and targets discussed. 3) Status/monitoring reports from the Sustainability Champion at key stages.	RIBA Stage 4	BREEAM AP

											70.87%	84.81%				
				Part Applicability						Mandatory Requirements		Design Stage Scoring				
BREEAM Issue ID	BREEAM Issue Title	BREEAM Credit Title	BREEAM Criteria	Part 1	Part 2	Part 3	Part 4	Credits Available	% Worth (in total for each BREEAM issue)	Very Good	Excellent	Targeted	Additional	Commentary	Actions	Indicative Timeframe	Indicative Responsibility
Man 02	Life cycle cost and service life planning	Elemental life cycle cost (LCC)	An outline, entire asset elemental life cycle cost (LCC) plan has been carried out at RIBA Stage 2 in line with 'Standardised method of life cycle costing for construction procurement' PD 156865:20081. The elemental LCC plan: a) An outline LCC plan has been undertaken for the project based on the building's basic structure and envelope, appraising a range of options and based on the life expectancy of the refurbished building, e.g. 20, 30, 50+ years. b) The servicing strategy for the project outlining services component over a 15 -year period, in the form of an 'elemental LCC Plan'. c) A fit-out strategy is developed outlining fit-out options over a 10-year period.	✓	✓	✓	✓	2	1.26%				2	Not within the scope of a Cost Consultant's works. AECOM to provide a quote. BREEAM compliant Elemental LCC report to be completed and provided for RIBA Stage 2. Action in stage 2: BREEAM compliant Elemental LCC report to be completed and provided for RIBA Stage 2. **2 credits considered additional potential.**	1) A copy of a compliant Elemental LCC report with supporting documentation of analysis of alternative options and the benefits of the chosen option; 2) The fabric and servicing strategy	RIBA Stage 2	Cost Consultant Client
		Component level LCC Plan	A Component level LCC plan has been developed by the end of RIBA Stage 4 in line with PD 156865:2008 and includes the following component types: **Part 1** assessments, including components within scope of works: Envelope, e.g. cladding, windows, and/or roofing **Part 2 & 3** assessments including newly specified local and core services: Newly specified local and/or core service equipment, e.g. boiler, air-conditioning, air handling unit, and/or controls etc. **Parts 1 – 4**, where finishes are within scope of works: Finishes, e.g. walls, partitions, floors and/or ceilings etc. Where **external spaces** are within scope of works: External spaces, e.g. alternative hard landscaping, boundary protection.	✓	✓	✓	✓	1	0.63%				1	BREEAM compliant Component LCC report to be completed and provided for RIBA Stage 4. Not commonly within the scope of a Cost Consultant's works. **1 credit considered additional potential.**	1) A copy of the compliant Component level LCC plan with supporting documentation of analysis. 2) Design drawings / specification of the inclusion of the recommended options identified by the LCC reports. 3) A copy of the maintenance strategy or a formal commitment to produce one in compliance with the requirements and be informed by the LCC.	RIBA Stage 4	Cost Consultant Client
		Capital cost reporting	Report the capital cost for the refurbishment/fit-out works in pounds per square metre (£k/m2)	✓	✓	✓	✓	1	0.63%			1		It is anticipated that this requirement will be met. Details of capital cost are to be provided in RIBA Stage 4. **1 credit targeted.**	1) Report with the capital cost for the building in pounds per square metre	RIBA Stage 4	Cost Consultant Client
Man 03	Responsible construction practices	Pre-requisite	All timber and timber-based products used on the project is 'Legally harvested and traded timber'	✓	✓	✓	✓		0.00%			Yes		It is anticipated that this requirement will be met. This is to be included as part of the employer's requirements for the contractor to deliver. **Pre-requisite targeted. 6 credits targeted.**	1) A formal letter of commitment or contractual requirements document confirming the actions that will be undertaken as part of site works.	RIBA Stage 4	Contractor
		Environmental management	The principal contractor operates an environmental management system (EMS) covering their main operations. i.e. ISO 14001/EMAS or Compliance with BS8555:2003. 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	0.63%			1				RIBA Stage 4	Contractor
		Sustainability Champion (construction)	A Sustainability Champion is appointed to monitor the project to ensure ongoing compliance with the relevant sustainability performance/process criteria, and therefore BREEAM targets, during RIBA Stages 5 and 6. The principal contractors contract includes BREEAM performance targets The BREEAM assessor's final post construction stage assessment report must demonstrate compliance with BREEAM-related performance targets	✓	✓	✓	✓	1	0.63%			1				RIBA Stage 4	Contractor
		Considerate construction	Using the Considerate Constructors Scheme (CCS) the principal contractor must achieve scheme certification and a CCS score as follows: 1. One credit: 9 points per section and 27 overall 2. Two credits: 11 points per section and 35 overall 3. Exemplary credit: 13 points per section and 39 overall	✓	✓	✓	✓	2	1.26%		1	2				RIBA Stage 4	Contractor
		Utility consumption	Responsibility has been assigned to an individuals for monitoring, recording and reporting energy use and water consumption resulting from all on-site refurbishment or fit-out processes. <u>Energy consumption</u> - Monitor and record data of the site energy consumption in kWh (and where relevant, litres of fuel used) as a result of the use of construction plant, equipment (mobile and fixed) and site accommodation (as relevant to the project type). - Report the total carbon dioxide emissions (total kgCO2/project value) from the construction process <u>Water consumption</u> - Monitor and record data on principal constructor's and subcontractors' potable water consumption (m3) arising from the use of construction plant, equipment (mobile and fixed) and site accommodation - Using the collated data report the total net water consumption (m3), i.e. consumption minus any recycled water use from the construction process	✓	✓	✓	✓	1	0.63%			1				RIBA Stage 4	Contractor
		Transport of construction materials and waste	Monitor and record data on transport movements and impacts resulting from delivery of the majority of materials to site and demolition or strip-out waste from site. As a minimum this must cover: a. Transport of materials from the factory gate to the building site, including any transport, intermediate storage and distribution. b. Scope of this monitoring must cover the following as a minimum: - Materials used for core services - Where within scope, ground works and landscaping materials c. Transport of construction waste from the gate to waste disposal processing or recovery centre. Scope 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/or total carbon dioxide emissions (kgCO2 eq), plus total distance travelled (km)	✓	✓	✓	✓	1	0.63%			1				RIBA Stage 4	Contractor

											70.87%	84.81%				
				Part Applicability						Mandatory Requirements		Design Stage Scoring				
BREEAM Issue ID	BREEAM Issue Title	BREEAM Credit Title	BREEAM Criteria	Part 1	Part 2	Part 3	Part 4	Credits Available	% Worth (in total for each BREEAM issue)	Very Good	Excellent	Targeted	Additional	Commentary	Actions	Indicative Timeframe	Indicative Responsibility
Man 04	Commissioning and handover	Commissioning and testing schedule and responsibilities	There is a schedule of commissioning and testing that identifies appropriate commissioning required for the scope of works that includes a suitable timescale for commissioning and re-commissioning of all relevant works carried out. Commissioning should be carried out where changes are being made to buildings services, building services control systems and changes to the building fabric which will affect building performance. All commissioning activities are carried out in accordance with current Building Regulations, BSRIA and CIBSE guidelines and/or other appropriate standards, where applicable. An appropriate project team member(s) is appointed to monitor and programme pre-commissioning, commissioning, testing and, where necessary, re-commissioning activities on behalf of the client. The principal contractor accounts for the commissioning and testing programme, responsibilities and criteria within the main programme of works.	✓	✓	✓	✓	1	0.63%			1		It is anticipated that this requirement will be met and to be part of MEP specification. Commissioning manager / specialist will be appointed. **1 credit targeted.**	1) Specification or written confirmation confirming commissioning standards, responsibilities and schedule.	RIBA Stage 4	MEP Engineer
		Commissioning building services	Commissioning and testing schedule and responsibilities credit is achieved. For projects where work is being undertaken to upgrade, renovate or install new building services and systems. (a) For complex building services and systems, a specialist commissioning manager is appointed during the design stage with responsibility for: (i) Undertaking design reviews and giving advice on suitability for ease of commissioning; (ii) Providing commissioning management input to construction programming and during installation stages; (iii) Management of commissioning, performance testing and handover/post handover stages;		✓	✓	✓	1	0.63%			1		It is anticipated that this requirement will be met and to be part of MEP specification. Commissioning manager / specialist will be appointed. **1 credit targeted.**	1) Specification or written confirmation confirming commissioning standards, responsibilities and schedule.	RIBA Stage 4	MEP Engineer
		Testing and inspecting building fabric	If the fabric of the building has be upgraded the integrity of the building fabric, including continuity of insulation, avoidance of thermal bridging and air leakage paths is quality assured through completion of a thermographic survey as well as airtightness testing and visual inspection. This will be undertaken by a Suitably Qualified Professional with any defects rectified prior to building handover and close out.	✓				1	0.63%			1		Credit requires a thermographer to be appointed during post construction to undertaken thermal imaging. Any defects would need to be remidiated. **1 credit targeted.**	1) A formal letter of commitment or specification document confirming the actions that will be undertaken in the performance testing of the building fabric. 2) Project programme confirming inclusion of thermographic survey and air leakage testing.	RIBA Stage 4	Contractor
		Handover	A Building User Guide (BUG) is developed prior to handover for distribution to the building occupiers and premises managers. A training schedule is prepared for building occupiers/premises managers, timed appropriately around handover and proposed occupation plans, which includes the following content as a minimum: - The design intent of refurbishment/fit-out works - 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 features, particularly BMS controls and their interfaces, - Introduction to the Building User Guide and other relevant building documentation. - Maintenance requirements, including any maintenance contracts and regimes in place.	✓	✓	✓	✓	1	0.63%		BUG	1		This is to be included as part of the employer's requirements for the contractor to deliver. **1 credit targeted.**	1) Specification or written confirmation confirming that a BREEAM compliant building user guide will be produced and handed over.	RIBA Stage 4	Client Contractor
Man 05	Aftercare	Aftercare support	There will be operational infrastructure and resources in place to provide aftercare support to the building occupiers, which meets the following as a minimum: a) A meeting programmed to occur between the aftercare team/individual and the building occupier/management to: i. Introduce the aftercare team or individual to the aftercare support available ii. Present key information about features of the refurbished building b) On-site facilities management training c) Initial aftercare support provision for at least the first month of building occupation d) Longer term aftercare support provision for occupants for at least the first 12 months from occupation There will be operational infrastructure and resources in place to co-ordinate the collection and monitoring of energy and water consumption data for a minimum of 12 months. If discrepancies between actual and predicted performance are identified, commitments are required to address the discrepancies.	✓	✓	✓	✓	1	0.63%			1		It is anticipated that aftercare support will be provided. **1 credit targeted.**	1) Specification or written confirmation confirming that a the provision of BREEAM compliant Aftercare will be provided.	RIBA Stage 4	Client Contractor
		Seasonal commissioning	Seasonal commissioning activities must be completed over a minimum 12-month period, once the building becomes substantially occupied. Complex systems - Specialist Commissioning Manager: i. Testing of all building services under full load conditions ii. Where applicable, testing should also be carried out during periods of extreme (high or low) occupancy. iii. Interviews with building occupants to identify problems or concerns regarding the effectiveness of the systems. iv. Re-commissioning of systems, and incorporating any revisions in operating procedures into the operations and maintenance (O&M) manuals.		✓	✓		1	0.63%		1	1		It is anticipated that seasonal commissioning support will be provided. **1 credit targeted.**	1) Specification or written confirmation confirming that a the provision of BREEAM compliant Seasonal commissioning will be provided.	RIBA Stage 4	Contractor
		Post occupancy evaluation	The client or building occupier makes a commitment to carry out a post occupancy evaluation (POE) exercise one year after initial building occupation. This is done to gain in-use performance feedback from building users to inform operational processes, including re-commissioning activities, and maintain or improve productivity, health, safety and comfort. The POE is carried out by an independent party and needs to cover: a) A review of the design intent and construction process b) Feedback from a wide range of building users including facilities management on the design and environmental conditions of the building covering c) Sustainability performance The client or building occupier makes a commitment to carry out the appropriate dissemination of information on the building's post-occupancy performance.	✓	✓	✓	✓	1	0.63%				1	Additional appointment required to carry out the POE. To be reviewed in next stage. BREEAM AP to provide more inforamtion on this issue. **1 credit considered additional potential.**	1) Specification or written confirmation confirming that a the provision of BREEAM compliant post-occupancy evaluation will be provided.	RIBA Stage 4	Client Contractor

													70.87%	84.81%			
BREEAM Issue ID	BREEAM Issue Title	BREEAM Credit Title	BREEAM Criteria	Part Applicability				Credits Available	% Worth (in total for each BREEAM issue)	Mandatory Requirements		Design Stage Scoring		Commentary	Actions	Indicative Timeframe	Indicative Responsibility
				Part 1	Part 2	Part 3	Part 4			Very Good	Excellent	Targeted	Additional				
Health and Wellbeing																	
Hea 01	**Visual comfort**	Glare control	1. The potential for disabling glare has been designed out of all relevant building areas using a glare control strategy, either through building form and layout and/or building design measures (see compliance note CN7). 2.The glare control strategy avoids increasing lighting energy consumption, by ensuring that: (a) The glare control system is designed to maximise daylight levels under all conditions while avoiding disabling glare in the workplace or other sensitive areas. The system should not inhibit daylight from entering the space under cloudy conditions, or when sunlight is not on the façade: AND (b) The use or location of shading does not conflict with the operation of lighting control systems.	✓			✓	1	0.75%					Not achievable due to tunnel protion. **Credit not targeted.**	1) Specialist report / modelling results demonstrating that glare has been designed out. 2) Specification or manufacturer literature for the blinds 3) Drawings with marked up locations of blinds	RIBA Stage 3	Client Architect
		Daylighting	3. Up to three credits are awarded on a sliding scale depending on the percentage of relevant building areas that comply with one of the following daylighting criteria: **Higher education - occupied spaces 2% ADF for 30% / 45% / 60% area** 4. Two credits where daylighting, averaged over all relevant spaces, has improved by 30% or more and there is a minimum glazing to floor area ratio of either: a.5% glass to floor area ratio for side windows; OR b.2.5% glass to floor area ratio for roof lights; 5. One credit where daylighting, averaged over all relevant spaces, has improved by 15% or more and there is a minimum glazing to floor area ratio of either: a.5% glass to floor area ratio for side windows; OR b.2.5% glass to floor area ratio for roof lights. Note: The improvement in daylighting provision is calculated using the BREEAM Hea 01 Calculator tool based upon either the increase in glazing area, transmittance, illuminance or percentage daylight factor.	✓			✓	3	2.26%					Not achievable due to tunnel protion. **Credit not targeted.**	1) Specialist daylight report / calculation / modelling results demonstrating that the daylight values can be achieved in all relevant areas. 2) GA drawings demonstrating the designs, arrangement and location of windows modelled for daylighting.	RIBA Stage 3	Client Architect
		View out	6. Two credits where 95% of the floor area in relevant building areas is within 7m of a wall which has a window or permanent opening that provides an adequate view out. 7.One credit where 80% of the floor area space in relevant building areas is within 7m of a wall which has a window or permanent opening that provides an adequate view out and criterion 8 is met. 8.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 7m, compliance is only possible where the percentage of window/opening is the same as, or greater than, the values in Table 1.0 of BS 8206 . 9. In addition, the building type criteria in Table 15 are applicable to view out criteria.	✓			✓	2	1.50%					Not achievable due to tunnel protion. **Credit not targeted.**	1) Drawings (and, if required, supporting calculations) demonstrating that the relevant floor areas are within the required distances. 2) Drawings demonstrating that the windows/openings account for 20% of the surrounding wall area.	RIBA Stage 3	Client Architect
		Internal and external lighting levels, zoning and control	**Internal Lighting** - All fluorescent and compact fluorescent lamps are fitted with high frequency ballasts. - Internal lighting in all relevant areas of the building is designed provide illuminance levels in accordance with the SLL Code for Lighting 2012 and any other relevant industry standard. - For areas where computer screens are regularly used, the lighting design complies with CIBSE Lighting Guide 7 sections 3.3, 4.6, 4.7, 4.8 and 4.9. **External lighting** All external lighting located within the refurbishment or fit-out zone is designed to provide illuminance levels that enable users to perform outdoor visual tasks efficiently and accurately, especially during the night. To demonstrate this, external lighting provided is specified in accordance with BS 5489-1:2013 Lighting of roads and public amenity areas and BS EN 12464-2:2014 Light and lighting - Lighting of work places - Part 2: Outdoor work places. **Zoning and occupant control** Internal lighting is zoned to allow for occupant control in accordance with the specific criteria for relevant areas present within the building:			✓		1	0.75%			1		It is anticipated that this requirement will be met. MEP Engineer to confirm that this will be included in design. Internal lighting will be zoned and occupant controlled. **1 credit targeted.**	1) Specification confirming compliance with the relevant CIBSE, BS and zoning requirements. 2) Drawings confirming the zoning and control of internal and external lighting.	RIBA Stage 4	MEP Engineer

										70.87%	84.81%						
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				Part 1	Part 2	Part 3	Part 4			Very Good	Excellent	Targeted	Additional				
Hea 02	Indoor air quality	Indoor air quality (IAQ) plan	An indoor air quality (IAQ) plan has been produced and implemented, with the objective of facilitating a process that leads to design, specification and installation decisions and actions that minimise indoor air pollution during the design, construction and occupation of the building.	✓	✓	✓	✓	1	0.75%			1		An IAQP to be developed by WSP IAQ Team. Action in stage 2: BREEAM compliant IAQP to be provided. **1 credit targeted.**	1) Copy of a BREEAM compliant Indoor Air Quality plan.	RIBA Stage 2/3	Client MEP Engineer / Air Quality Consultant
		Ventilation	Provide fresh air into the building in accordance with the criteria of the relevant standard for ventilation. Design ventilation pathways to minimise the build-up of air pollutants in the building, as follows: a)In air conditioned and mixed mode buildings/spaces: i. The building's air intakes and exhausts are over 10m apart and intakes are over 20m from sources of external pollution; OR ii. The location of the building's air intakes and exhausts, in relation to each other and external sources of pollution, is designed in accordance with BS EN 13779:20071 Annex A2. b)In naturally ventilated buildings/spaces: openable windows/ventilators are over 10m from sources of external pollution. Where present, HVAC systems must incorporate suitable filtration to minimise external air pollution, as defined in BS EN 13779:2007 Annex A3. Areas of the building subject to large and unpredictable or variable occupancy patterns have carbon dioxide (CO2) or air quality sensors specified.	✓	✓	✓		1	0.75%				1	The project will have adequate ventilation and it will be well filtered, however the 10m apart or 20m from sources of pollution rule could be difficult to achieve. To be further investigated in next stage. **1 credit considered additional potential.**	1) Design drawings demonstrating the ventilation pathway distances are to be achieved, or specification confirming these are designed in accordance with BS EN 13779:2007 Annex A2 2) Where applicable, specification confirming that building areas subject to large and unpredictable or variable occupancy patterns have carbon dioxide or air quality sensors	RIBA Stage 4	MEP Engineer
		Volatile organic compound (VOC) emission levels (products)	All decorative paints and varnishes specified meet the criteria in Table 20 At least five of the seven remaining product categories listed in Table 20 meet the testing requirements and emission levels criteria for volatile organic compound (VOC) emissions (listed in the table).				✓	1	0.75%			1		Targeted based on other projects. BREEAM AP to forward the Table 20 to Architect for consideration. **1 credit targeted.**	1) Copy of a BREEAM compliant indoor air quality plan (as above) 2) Specification confirming products are specified to meet the BREEAM VOC levels and testing requirements	RIBA Stage 4	Air Quality Specialist Architect
		Volatile organic compound (VOC) emission levels (post construction)	The formaldehyde concentration level is measured post construction (but pre-occupancy) and is found to be less than or equal to 100µg/m3 averaged over 30 minutes The total volatile organic compound (TVOC) concentration level is measured post construction (but pre-occupancy) and found to be less than 300µg/m3 over 8 hours Where VOC and formaldehyde levels are found to exceed the limits 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, including re-measurement. The testing and measurement of the above pollutants are in accordance with the following standards where relevant: a) BS ISO 16000-4: 2011, b) BS ISO 16000-6: 2011, c) BS EN ISO 16017-2: 2003, d) BS ISO 16000-3: 20116 The measured concentration levels of formaldehyde (µg/m³) and TVOC (µg/m³) are reported, via the BREEAM Assessment Scoring and Reporting Tool.				✓	1	0.75%				1	TBC, air flushing could be challenging. **1 credit considered additional potential.**	1) Copy of a BREEAM compliant indoor air quality plan (as above) 2) Written confirmation confirming the commitment to undertake pre-completion testing in line with the BREEAM requirements.	RIBA Stage 4	Contractor
		Adaptability - Potential for natural ventilation	The building ventilation strategy is designed to be flexible and adaptable to potential building occupant needs and climatic scenarios. Occupied spaces are designed to be capable of providing fresh air entirely via a natural ventilation strategy. The following are methods deemed to satisfy this criterion: - Room depths are designed in accordance with CIBSE AM10 (section 2.4). The openable window area in each occupied space is equivalent to 5% of the gross internal floor area of that room/floor plate; OR - The design demonstrates that the natural ventilation strategy provides adequate cross flow of air to maintain the required thermal comfort conditions and ventilation rates. This is demonstrated using the requirements of CIBSE AM10. For fit-out projects (Part 3 assessments), local services are designed to provide fresh air via a natural ventilation strategy and are appropriately designed according to the room depth in accordance with CIBSE AM10. For Part 3 assessments , local services are designed to provide fresh air via a natural ventilation strategy and are appropriately designed according to the room depth in accordance with CIBSE AM10. The natural ventilation strategy is capable of providing at least two levels of user-control on the supply of fresh air to the occupied space	✓	✓	✓		1	0.75%					Not achievable due to tunnel protion. **Credit not targeted.**	1) Specification / report to confirm the building are designed to be capable of providing fresh air entirely via a natural ventilation strategy in accordance with the accepted methods and standards.	RIBA Stage 4	MEP Engineer Architect

											70.87%	84.81%				
				Part Applicability						Mandatory Requirements		Design Stage Scoring				
BREEAM Issue ID	BREEAM Issue Title	BREEAM Credit Title	BREEAM Criteria	Part 1	Part 2	Part 3	Part 4	Credits Available	% Worth (in total for each BREEAM issue)	Very Good	Excellent	Targeted	Additional	Commentary	Actions	Indicative Timeframe	Indicative Responsibility
Hea 04	**Thermal comfort**	Thermal modelling	Thermal modelling has been carried out using software in accordance with CIBSE AM11. The software used to carry out the simulation at the detailed design stage provides full dynamic thermal analysis. The modelling demonstrates that 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 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. Where undertaking a Part 4 assessment must assess the suitability of existing building services and controls to identify any changes that may be required as a result of fit-out works 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	0.75%			1		WSP Sustainability are appointed to provide the thermal modling. **1 credit targeted.**	1) CIBSE AM 11 full dynamic thermal comfort study results confirming that the building complies with the above credit but also can accommodate the expected effects of climate change.	RIBA Stage 3	Client MEP Engineer
		Adaptability - for a projected climate change scenario	All thermal modelling criteria has been achieved The thermal modelling demonstrates that the relevant requirements set out above are achieved for a projected climate change environment. Where thermal comfort criteria are not met for the projected climate change environment, the project team demonstrates how the building has been adapted, or designed to be easily adapted in future using passive design solutions. For air conditioned buildings, the PMV and PPD indices based on the above modelling are reported.	✓	✓			1	0.75%			1		Ditto. HVAC provided, assumed achievable. **1 credit targeted.**	1) CIBSE AM 11 full dynamic thermal comfort study results confirming that the building complies with the above credit but also can accommodate the expected effects of climate change.	RIBA Stage 3	Client MEP Engineer
		Thermal zoning and controls	The thermal modelling analysis has informed the temperature control strategy for the building and its users. The strategy for proposed heating/cooling system(s) demonstrates that it has addressed the following: a. Zones within the building and how the building services could efficiently and appropriately heat or cool these areas. b. Any new local cooling or heating services (or changes to existing services) are designed to ensure they do not conflict with core services c. The degree of occupant control required for these zones, based on discussions with the end user d. How the proposed systems will interact with each other and how this may affect the thermal comfort of the building occupants. e. The need or otherwise for an accessible building user actuated manual override for any automatic systems.		✓	✓		1	0.75%			1		To be advised by MEP. **1 credit targeted.**	1) Specification confirming the thermal controls and their location/accessibility to building users. 2) Written confirmation that the amount of control provided is as a result of discussions with the end user. 3) Drawings showing the thermal zones and associated controls	RIBA Stage 4	MEP Engineer
Hea 05	**Acoustic performance**	Acoustic performance	The building meets the appropriate acoustic performance standards and testing requirements defined in the checklists and tables section which defines criteria for the acoustic principles of: (a) Sound insulation (b) Indoor ambient noise level (c) Reverberation times. Where undertaking a partial refurbishment or fit-out, the performance standards and testing requirements defined in the checklist and tables section for the following principles are applicable to each assessment part: b. Part 2: criteria for indoor ambient noise levels only c. Part 3: criteria for sound insulation and indoor ambient noise levels	✓	✓	✓	✓	2	1.50%					As advised by Acoustician, the acoustic condition within the tunnel is challenging due to the high level of noise transmission from the underground train pass-by, and in order to achieve suitable indoor ambient noise level criteria for the intended use, extensive mitigation measures would be required to the tunnels. Such mitigation measures are considered very difficult due to cost, space and other logistics including the amount of additional materials required to achieve any meaningful improvement. BREEAM AP to speak to BRE if area weighting can be applied. **Credit not targeted.**	1) Acoustician's report confirming early design advice to meet the required performance standards, and the design is capable achieving the relevant acoustic performance criteria. 2) Written confirmation or specification from the design team confirming the recommendations made by the Acoustician will be implemented to achieved the performance standards. 3) A copy of the Acoustician's CV to confirm they meet the BRE's definition of a Suitably Qualified Acoustician	RIBA Stage 4	Acoustician
		Reverberation times	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.	✓			✓	1	0.75%			1		Controlling RT will be be of the design strategies. **1 credit targeted.**			
Hea 06	**Safety and security**	Security of site and building	1. A Suitably Qualified Security Specialist (SQSS) conducts an evidence based Security Needs Assessment (SNA) during or prior to Concept Design (RIBA Stage 2 or equivalent), see compliance note where the refurbishment or fit-out zone comprises part of a larger building. 2.The SQSS develops a set of recommendations or solutions during or prior to Concept Design (RIBA Stage 2 or equivalent). 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. 3.The recommendations or solutions proposed by the SQSS are implemented (see CN5.2. Any deviation from those recommendations or solutions will need to be justified, documented and agreed in advance with a suitably qualified security specialist.	✓			✓	1	0.75%			1		WSP SQSS appointed during Stage 2. BREEAM compliant Security Needs Assessment will be covered. Action in stage 2: SQSS report and CV to be provided. **1 credit targeted.**	1) SQSS Report and Recommendations 2) Drawings demonstrating implementation of ALO recommendations.	RIBA Stage 2	Client SQSS

											70.87%	84.81%				
				Part Applicability						Mandatory Requirements		Design Stage Scoring				
BREEAM Issue ID	BREEAM Issue Title	BREEAM Credit Title	BREEAM Criteria	Part 1	Part 2	Part 3	Part 4	Credits Available	% Worth (in total for each BREEAM issue)	Very Good	Excellent	Targeted	Additional	Commentary	Actions	Indicative Timeframe	Indicative Responsibility
Energy																	
Ene 01	**Reduction of energy use and carbon emissions**	Whole building energy model	Project can demonstrate compliance with a whole building energy model (Max fifteen credits) OR elemental level energy model (Max twelve credits) Two additional credits are available for historic buildings dependant on scores achieved in the whole building energy model/elemental level energy model and if a set list of requirements is met	✓	✓	✓	✓	15	9.53%		6 credits (for part 1,2,3 and 4 ass'mnts)	10	2	GIA 39 Furnival Street - 942 m2; 40 Furnival Street -1,462 m2 (21.6%) Fulwood Place - 874 m2 (7.8%) Tunnel - 7,869 m2 (70.6%) NC 2014: Furnival Street (2 credits according to BRUKL outputs) RFO 2014 Option 1: Fulwood Place and Tunnel (15 credits according to BRUKL outputs) The credits will be area weighted. **10 credits targeted. 2 credits considered additional potential.**	1) As-designed BRUKL Input (.inp) and Output (pdf) report for both the existing and proposed building. 2) Details of the Energy Assessor's Accreditations	RIBA Stage 4	MEP Engineer Accredited Energy Assessor
Ene 02	**Energy monitoring**	Sub-metering of major energy consuming systems	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 (e.g. BMS) The end energy consuming uses are identifiable to the building users, for example through labelling or data outputs.		✓	✓	✓	1	0.64%	1 (pts 2, 3, 4)	1 (pts 2, 3, 4)	1		BMS system and sub-metering present. **2 credits targeted.**	1) Specification / metering schematic / drawings confirming metering of relevant systems. 2) Written confirmation of the systems that have been metered using a pulsed output meter.	RIBA Stage 4	MEP Engineer
		Sub-metering of high energy load and tenancy areas	An accessible energy monitoring and management system is 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.		✓	✓		1	0.64%			1					
Ene 03	**External lighting**	External lighting	The building has been designed to operate without the need for external lighting (including building, signs and at entrances). OR Where the building does have external lighting: - The average initial luminous efficacy of the external light fittings within the construction zone is not less than 60 luminaire lumens per circuit Watt. - All external light fittings are automatically controlled for prevention of operation during daylight hours and presence detection in areas of intermittent pedestrian traffic.		✓	✓		1	0.64%			1		It is anticipated that this requirement will be met. **1 credit targeted.**	1) Specification confirming compliance with the relevant energy efficient lighting and lighting control criteria. 2) Drawings showing the extent of the external lighting and the type of fittings. 3) Manufacturers literature/datasheets for the specified external light fittings (if known at this stage).	RIBA Stage 4	MEP Engineer
Ene 04	**Low carbon design**	Passive design analysis	The first credit within issue Hea 04 Thermal comfort has been achieved. The project team carries out an passive design analysis of the proposed building design to influence decisions made during RIBA Stage 2 and identify opportunities for the implementation of passive design solutions. The building implements passive design measures in line with the passive design analysis and provides a meaningful reduction in total energy demand.	✓	✓	✓		1	0.64%			1		WSP Sustainability are appointed to provide passive design analysis. Action in stage 2: BREEAM complaint Passive Design Report to be provided. **1 credit targeted.**	1) A copy of the passive design analysis report 2) Drawings / specifications demonstrating the inclusion of any passive design measures resulting from the findings of the passive design analysis. 3) Calculations confirming the meaningful reduction of the total heating, cooling, mechanical ventilation and lighting loads and energy consumption in line with the findings of the passive design analysis as a result of implementing passive design measures.	RIBA Stage 2	MEP Engineer WSP Sustainability
		Free cooling	The passive design analysis credit 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 listed in the BREEAM manual to reduce the cooling energy demand, i.e. it does not use active cooling.	✓	✓			1	0.64%				1	WSP Sustainability are appointed to provide free cooling analysis. Action in stage 2: Free cooling analysis to be included in Passive Design Report. **1 credit considered additional potential.**	1) A copy of the specialist report confirming the outcomes of the dynamic simulation model to demonstrate the feasibility of a free cooling strategy meeting the requirements. 2) Drawings / specification confirming the inclusion of the free cooling strategy measures.	RIBA Stage 2	MEP Engineer WSP Sustainability
		Low zero carbon feasibility study	A feasibility study has been carried out by the completion of the RIBA Stage 2 by an energy specialist to establish the most appropriate recognised local low or zero carbon (LZC) energy source for the building. A local LZC technology has been specified for the development in line with the recommendations of this feasibility study and provides a meaningful reduction in regulated carbon dioxide (CO2) emissions.		✓			1	0.64%			1		WSP Sustainability are appointed to provide LZC study. Action in stage 2: LZC report along with Energy Specialist CV to be provided. **1 credit targeted.**	1) BREEAM compliant LZC feasibility study. 2) BRUKL Output report for designed and standard case building and associated calculations to demonstrate the reduction in CO2 emissions. 3) Drawings / specifications demonstrating the inclusion of the recommended LZC technology.	RIBA Stage 2	MEP Engineer WSP Sustainability

													70.87%	84.81%			
				Part Applicability						Mandatory Requirements		Design Stage Scoring					
BREEAM Issue ID	BREEAM Issue Title	BREEAM Credit Title	BREEAM Criteria	Part 1	Part 2	Part 3	Part 4	Credits Available	% Worth (in total for each BREEAM issue)	Very Good	Excellent	Targeted	Additional	Commentary	Actions	Indicative Timeframe	Indicative Responsibility
Ene 06	**Energy efficient transportation systems**	Energy consumption	1.Where new lifts are specified within refurbishment works: a. 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. b. The energy consumption has been estimated in accordance with BS EN ISO 25745 Energy performance of lifts, escalators and moving walks, Part 2: Energy calculation and classification for lifts (elevators) and/or Part 3 - Energy calculation and classification for escalators and moving walks, for one of the following: i. At least two types of system (for each transportation type required); OR ii. An arrangement of systems (e.g. for lifts, hydraulic, traction, machine room-less lift (MRL)); OR iii. A system strategy which is 'fit for purpose'. c. The use of regenerative drives should be considered, subject to the requirements in CN6 d. The transportation system with the lowest energy consumption is specified.		✓	✓		1	0.64%			1		It is anticipated that this requirement will be met. **1 credit targeted.**	1) The professional study of transportation analysis and energy consumption comparison of systems/ strategies. 2) Specification confirming implementation of lowest energy consuming lift system/strategy.	RIBA stage 3	VT Engineer
		Energy Efficient features	For each **newly specified** lift, the following three energy efficient features are specified and for **existing lifts**, at least two of the following energy efficient features are specified: a. The lifts operate in a standby condition during off-peak periods. b. The lift car lighting and display lighting provides an average lamp efficacy, (across all fittings in the car) of > 55 lamp lumens/circuit Watt. c. 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.		✓	✓		2	1.27%			2		It is anticipated that this requirement will be met. **2 credits targeted.**	1) Specification confirming at least three energy efficient features of the specified lift. 2) Manufacturer datasheet for the specified lift demonstrating the energy efficient features.	RIBA stage 3	VT Engineer
Ene 08	Energy efficient equipment		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 unregulated energy consumption of the building. **A:** Small power, plug-in equipment The following equipment has been awarded an Energy Star rating OR has been procured in accordance with the Government Buying Standards: - Office equipment - Other small powered equipment - Supplementary electric heating. **D**: Data centres 1. Design is in accordance with the 'Best practices for the EU Code of Conduct on Data Centres' principles with the data centre achieving at least the 'Expected minimum practice' level (as defined in the Code of Conduct). 2. Temperature set points are not less than 24°C, as measured at the inlet of the equipment in the rack. **I**: Internal display lighting Display lighting shall have a minimum luminaire efficacy of ≥ 60 luminaire lumens per circuit Watt in accordance with the Enhanced Capital Allowance Scheme. Display lighting shall also be controlled by a time switch to prevent operation after midnight except where the area is open to the public. **J**: Overhead warm air heaters (e.g air curtains) In all cases where overhead warm air heaters are used, they are to be controlled using automatic temperature control. Where the units supply multiple areas then these shall be controlled by zone temperature sensors.			✓	✓	2	1.27%			2		It is anticipated that this requirement will be met. D: Comms rooms will be available. I: Exhibition area might be excluded, permenent eqippment will be within scope. BREEAM AP to send out the detail requirements. **2 credits targeted.**	1) Specification confirming the white goods to be procured or written confirmation that any white goods will comply with the performance requirements. 2) Manufacturer datasheet for the specified white goods, if known.	RIBA Stage 2	Client Project Team

													70.87%	84.81%				
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				Part 1	Part 2	Part 3	Part 4			Very Good	Excellent	Targeted	Additional				
Transport																	
(for a part 2/3 only without a change of use																	
Tra 01	**Public transport solutions**	Accessibility Index	1.The public transport Accessibility Index (AI) for the assessed building is calculated and BREEAM credits awarded according to the building type. For Accessibility Index benchmarks see Table - 34 in the Checklists and tables section. 2.The Accessibility Index is determined by entering the following information into the BREEAM Tra 01 calculator: a. The distance (m) from the main building entrance to each compliant public transport node b. The public transport type(s) serving the compliant node, e.g. bus or rail c. The average number of services stopping per hour at each compliant node during the operating hours of the building for a typical day (see compliance notes and Table - 36 in the Additional information section). Up to three credits - Alternative transport measures 3.Where alternative transport measures are provided, credits can be awarded based upon the number of measures implemented	✓			✓	5	3.68%			5		Based on project location, it is anticipated that this requirement will be met. **5 credits targeted.**	1) Location map marked-up to confirm: a. public transport nodes b. safe pedestrian walking routes 2) Transport timetables for all relevant bus and train services at the identified nodes.	RIBA Stage 3	Architect Client
Tra 02	Proximity to amenities		Recognition of projects where proximity of, and accessibility to, local amenities which are likely to be frequently required and used by building occupants has been reviewed.	✓			✓	1	0.74%			1		Based on project location, it is anticipated that this requirement will be met. **1 credit targeted.**	1) Location map marked-up to confirm location and safe pedestrian routes and distances (500m) to at least TWO of the THREE following amenities: a. food outlet b. cash machine c. Access to a recreation/leisure facility for fitness/sports	RIBA Stage 3	Architect Client
Tra 03	**Cyclist facilities**	Cycle storage	1. Compliant cycle storage spaces that meet the minimum levels set out in Table - 38 are installed.	✓			✓	1	0.74%			1		It is anticipated that this requirement will be met. Numbers of cycle storage TBC. The project proposing to use cycle parking inside the building secure long stay cycle parking for staff within Furnival St - 10 spaces was the amount. Short savers to be provided in the public realm. **1 credit targeted.**	1) Design plan confirming location and number of cycle spaces. 2) Manufacturer datasheet for cycle racks. 3) Written confirmation of actual or nominal building occupancy - Nominal numbers can be calculated based on calculation ratios provided in the BREEAM technical manual. 4) Specification / drawings to confirm the security and lighting standards comply with requirements.	RIBA Stage 3	Architect Client
		Cyclist facilities	2. Criterion 1 has been achieved. 3. At least two of the following types of compliant cyclist facilities have been provided for all building users (including pupils where appropriate to the building type) - see Relevant definitions for the scope of each compliant cyclist facility: a) Showers b) Changing facilities c) Lockers d) Drying spaces .	✓			✓	1	0.74%			1		It is anticipated that this requirement will be met. At least two are proposed. **1 credit targeted.**		RIBA Stage 3	Architect Client
Tra 04	Maximum car parking capacity		The building's car parking capacity is compared to the maximum car parking capacity benchmarks in Table 39 and the relevant number of BREEAM credits awarded.	✓	✓	✓	✓	2	1.47%			2		No parking space will be provided. There is an existing blue badge space on Furnival St which is going to be retained. **2 credits targeted.**		None	None
Tra 05	Travel plan		1.A travel plan has been developed as part of the feasibility and design stages. 2. 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 requirements in the BREEAM manual 3. 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. 4.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 refurbishment or fit-out and be supported by the building's management in operation.	✓			✓	1	0.74%			1		WSP Transport is appointed to provide the Travel Plan. Action in stage 2: BREEAM compliant Travel Plan to be provided. **1 credit targeted.**	1) A copy of the Travel Plan for the building. 2) Written confirmation and/or drawings demonstrating the measures outlined in the plan will be implemented.	RIBA stage 1/2	Client Transport Consultant

													70.87%	84.81%			
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				Part 1	Part 2	Part 3	Part 4			Very Good	Excellent	Targeted	Additional				
Water																	
Wat 01	**Water consumption**		Up to five credits where evidence provided demonstrates that the specification includes taps, urinals, WCs and showers that consume less potable water in use than standard specifications for the same type of fittings. Credits are awarded based on the following improvement over the notional baseline: - One credit - 12.5% improvement - Two credits - 25% improvement - Three credits - 40% improvement - Four credits - 50% improvement - Five credits - 55% improvement The calculations is based upon the following sanitary fittings: a) WCs; b) Urinals; c) Taps; d) Showers; e) Baths; f) Dishwashers; g) Washing machine; h) Kitchen pre-rinse nozzles		✓	✓	✓	5	3.68%	1	1	3	1	Design Team confirm improvement over notional baseline by water-saving fittings. It is also advised that rainwater harvesting will be designed. **3 credits targeted. 1 credit considered potential.**	1) Specification / sanitary schedule confirming number of fittings and water efficiency figures for the following: a) WCs b) Urinals c) Taps d) Showers e) Baths f) Dishwashers g) Washing machines 2) Manufacturer datasheet confirming the water efficiency figures in the specification can be delivered.	RIBA Stage 4	Architect MEP Engineer
Wat 02	**Water Monitoring**		One credit where evidence provided demonstrates that a water meter with a pulsed output will be installed on the mains supply to each building/unit. The water consuming plant or areas consuming 10% or more of the building's water use need to be fitted with a pulsed sub meter or have water monitoring equipment integral to the plant or area. If the refurbishment zone is within a site that has an existing BMS, managed by the same occupier/owner, the pulsed/digital water meters must be connected to the existing BMS		✓	✓	✓	1	0.74%	Criterion 1 (part 2)	Criterion 1 (part 2)	1		It is anticipated that this requirement will be met. **1 credit targeted.**	1) Specification confirming the provision of a water meter and its connection to BMS. 2) Design plan confirming location of water meter and BMS display. 3) Written confirmation whether water consuming plant or areas consume 10% or more of the building's water use.	RIBA Stage 4	MEP Engineer
Wat 03	**Water Leak detection**	Leak Detection	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) 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. b) 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. c) Able to identify different flow and therefore leakage rates, e.g. continuous, high and/or low level, over set time periods. d) Programmable to suit the owner/occupiers' water consumption criteria. e) Where applicable, designed to avoid false alarms caused by normal operation of large water-consuming plant such as chillers.		✓			1	0.74%			1		It is anticipated that this requirement will be met. **1 credit targeted.**	1) Specification confirming the inclusion of the leak detection system and its capabilities as listed in the BREEAM Criteria column.	RIBA Stage 4	MEP Engineer
		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	0.74%			1		It is anticipated that this requirement will be met. **1 credit targeted.**	1) Specification confirming the inclusion of flow control devices. 2) Design plan / schematic confirming location of solenoid valves and PIRs to WC areas.	RIBA Stage 4	MEP Engineer
Wat 04	**Water efficient equipment**	Water efficient equipment	One credit where the design team has identified all unregulated water demands that could be realistically mitigated or reduced. The systems or processes have been identified to reduce the unregulated water demand, and demonstrate, through either good practice design or specification, a meaningful reduction in the total water demand of the building. **Where no irrigation systems are specified, and therefore there are no unregulated water demands for the building, this issue can be awarded by default.**	✓	✓	✓	✓	1	0.74%			1		Rainwater harevesing is available but need to check if the collected rainwater will be used for irrigation. To further check with Ecologist and landscape consultant. **1 credit targeted.**	1) Written confirmation of the irrigation strategy. 2) Datasheets and drawings from any irrigation system to be installed to confirm compliance with the requirements. (if applicable / known)	RIBA stage 3	MEP Engineer Landscape Architect

												70.87%	84.81%				
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				Part 1	Part 2	Part 3	Part 4			Very Good	Excellent	Targeted	Additional				
Materials																	
Mat 01	**Life cycle impacts**	Project lifecycle assessment study	**OPTION 2** Robust environmental performance information has been collected for newly specified materials or where materials are retained in situ for the following elements: a) Heat source, space heating, air-conditioning and ventilation b) Communication, security and control systems c) Electrical installations d) Fire and lightning protection e) Lift and conveyor installations/systems f) Water and waste installations g) Sanitary installations Credits are awarded based upon the percentage of available points achieved. The total number of points achieved is based on the percentage of each element that has been: - reused in situ - reused in situ with minor repairs - specified with robust environmental performance information.	✓	✓	✓	✓	6	6.36%			2	1	NC 2014: Furnival Street RFO 2014: Fulwood Place and Tunnel (Option 2) Most of shed envelope will be reused. Products selected must have EPD. To be put in specification. **2 credits targeted. 1 credit considered potential.**	1) Report/Minutes confirming the proportion of materials which will be reused. 2) Completed Mat 01 Calculator tool.	RIBA Stage 4	Architect MEP Engineer Structual WSP Sustainability
Mat 03	**Responsible sourcing of materials**	Pre-requisite	All timber and timber based products used on the project is 'Legally harvested and traded timber'	✓	✓	✓	✓	yes		Criterion 1	Criterion 1	Yes		**Pre-requisite targeted.**	1) Drawings/specification confirming material build up of elements. 2) Completed Mat 3 template table confirming the following: - Breakdown of element - Supplier details and certification type (e.g. ISO14001) - Volume of material 3) Specification confirming that all timber will be sourced in accordance with the UK Government's Timber Procurement Policy. 4) A copy of a BREEAM compliant Sustainability Procurement Plan	RIBA Stage 4	Client Contractor
		Sustainable procurement plan	The principal contractor sources materials for the project in accordance with a documented sustainable procurement plan	✓	✓	✓	✓	1	1.06%			1		To include requirement for the principal contractor to have in place a sustainable procurement plan. WSP to provide a sample plan. **1 credit targeted.**		RIBA Stage 3	Client WSP BREEAM
		Responsible sourcing of materials (RSM)	Up to three credits of the available RSM credits can be awarded where the applicable building materials are responsibly sourced in accordance with the BREEAM methodology. Credits are awarded based on the following % points achieved: - Three credits - 54% of available points achieved - Two credits - 36% - One credit - 18%	✓	✓	✓	✓	3	3.18%			1	1	Design Team to ensure as much materials as possible is procured from responsible resourcing. This is to be implemented into the design, where applicable. **1 credit targeted. 1 credit considered potential.**		RIBA Stage 4	Architect Contractor Client
Mat 04	**Insulation**	Embodied impact	Any new insulation specified for use within the following building elements must be assessed: (a.) External walls; (b.) Ground floor; (c.) Roof; (d.) Building services. The Insulation Index for the building fabric and services insulation is the same as or greater than 2.5. Therefore at least 50% of the insulation must be A+ rated, with the remaining 50% to be at least A rated.	✓	✓	✓	✓	1	1.06%				1	It is anticipated that this requirement will be met. It is likely that proposed insulation is suitable and BREEAM compliant - to be confirmed and reviewed. **1 credit considered potential.**	1) Drawings/specification confirming material build up of insulation elements. 2) Completed Mat 4 template table confirming the following for each material specification: a. area (m²) b. thickness (mm) c. thermal conductivity (W/m.k) d. green guide rating	RIBA Stage 4	Architect MEP Engineer

												70.87%	84.81%				
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				Part 1	Part 2	Part 3	Part 4			Very Good	Excellent	Targeted	Additional				
Mat 05	**Designing for durability and resilience**	Protecting vulnerable parts of the building from damage and material degradation	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; such as: - Bollards/barriers/raised kerbs to delivery and vehicle drop-off areas - Corridor walls specified to Severe Duty (SD) as per BS 5234-21 - Protection rails to walls of corridors - Kick plates/impact protection (from trolleys etc.) on doors - Hard-wearing and easily washable floor finishes in heavily used circulation areas (i.e. main entrance, corridors, public areas etc.) 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 Existing building elements, have been assessed to identify impacts of material degradation effects including an assessment to grade the severity of any degradation effects. Design measures have been developed to repair and protect existing elements according to the severity of any degradation affects, to limit degradation. Newly specified materials or newly constructed elements (e.g. a new external wall) within the scope of refurbishment or fit-out works incorporate appropriate design and specification measures to limit material degradation due to environmental factors	✓			✓	1	1.06%			1		It is anticipated that this requirement will be met. Architect, MEP and structural to input the CE Matrix. **1 credit targeted.**	1) Design plan marked-up to confirm internally and externally: a. areas of vulnerability b. protection from the effects of high pedestrian traffic c. protection against any internal vehicular/ trolley movement d. protection against or prevention from any potential vehicular collision where vehicular parking and manoeuvring occurs. 2) Completed Mat 05 proforma detailing design measures to protect the building from environmental degradation	RIBA Stage 2/4	Architect Structural Engineer MEP Engineer
Mat 06	**Material efficiency**	Material efficiency	Opportunities have been identified, and appropriate measures investigated and implemented, to optimise the use of materials in building design, procurement, construction, maintenance and end of life. The above is carried out by the design/construction team in consultation with the relevant parties at each of the following RIBA stages: a. Preparation and Brief b. Concept Design c. Developed Design d. Technical Design e. Construction.	✓	✓	✓	✓	1	1.06%			1		Materials efficiency reporting to be provided in RIBA Stages 2, 3, 4 and 5. Action in stage 2: Materials Efficiency report to be produced. Architect, MEP and structural to input the CE Matrix. **1 credit targeted.**	1) Material efficiency design notes / report revisions for each key RIBA stage reached to date, identifying opportunities for and appropriate measures taken to optimise the use of materials in building design, procurement, construction, maintenance and end of life. 2) Supporting documentary evidence of implementing measures for optimising the use of materials (e.g. specifications, drawings, etc...)	RIBA Stage 1/2	Architect Structural Engineer MEP Engineer

											70.87%	84.81%				
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				Part 1	Part 2	Part 3	Part 4			Very Good	Excellent	Targeted	Additional				
Waste																	
Wst 01	**Project waste management**	Pre-refurbishment audit	The client shall ensure that a pre-refurbishment audit of all existing buildings, structures or hard surfaces within the scope of the refurbishment or fit-out zone is completed. The audit should be carried out prior to strip-out or demolition works, be referenced in the resource management plan and cover: d. Identification and quantification of the key materials where present on the project e. Potential applications and any related issues for the reuse and recycling of the key materials in accordance with the waste hierarchy. f. Identification of local reprocessors or recyclers for recycling of materials g. Identification of overall recycling rate for all key materials h. Identification of reuse targets where appropriate. i. Identification of overall landfill diversion rate for all key materials.	✓	✓	✓	✓	1	0.69%			1		Pre-Demolition Audit to undertaken during prior to any strip out or demolition. According to CE workshop, demolition auidt will be carried out. **1 credit targeted.**	1) A copy of a compliant pre-refurbishment audit. 2) Completed Wst01 Proforma identifying all material types present prior to strip out and confirmation as to whether they will be re-used or recycled 3) Confirmation of all materials which are unable to be reused due to contamination (asbestos) 4) Written confirmation that the contractor will meet the resource efficiency and diversion from landfill targets 5) Written commitment to produce a BREEAM compliant Resource Management Plan / Site Waste Management Plan	RIBA Stage 3	Client Contractor
		Reuse and direct recycling of materials	Where waste material types detailed in the BREEAM manual are either directly re-used on-site or off-site or are sent back to the manufacturer for closed loop recycling Credits are awarded based on the % of available points achieved for the waste material types detailed in Table - 64, that are present on the project: - Two credits - 75% - One credit - 50%	✓	✓	✓	✓	2	1.38%			2		This is to be included as part of the employer's requirements for the contractor to deliver. **2 credits targeted,.**		RIBA Stage 4	Client Contractor
		Resource efficiency	Develop and implement a compliant resource management plan covering the waste arising's project One credit for <11.3 m³ per 100m² (gross internal floor area) Two credits for <4.5m³ per 100m² Three credits for < 2.1m³ per 100m²	✓	✓	✓	✓	3	2.07%			2	1	According to CE workshop, assumed 2 credits at this stage. **2 credits targeted. 1 credit considered potential.**		RIBA Stage 4	Client Contractor
		Diversion of resources from landfill	One credit where evidence provided demonstrates that: - 85% by volume or 90% by tonnage non-hazardous construction AND - 90% by volume or 95% by tonnage demolition waste generated by the development will be diverted from landfill and reused or recycled.	✓	✓	✓	✓	1	0.69%			1		It is anticipated that this requirement will be met. CE & WLC has more onerous requirements. **1 credit targeted.**		RIBA Stage 4	Client Contractor
Wst 02	**Recycled aggregates**	Recycled aggregates	1. The percentage of high grade aggregate that is recycled or secondary aggregate, specified in each application (present) must meet the following minimum % levels (by weight or volume) to contribute to the total amount of recycled or secondary aggregate, as specified in Table 67 . 2. The total amount of recycled or secondary aggregate specified, and meeting criterion 1, is greater than 25% (by weight or volume) of the total high grade aggregate specified for the project. Where the minimum level in criterion 1 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. 3. The recycled or secondary aggregates are EITHER: a) Construction, demolition and excavation waste obtained on-site or off-site; OR b) Secondary aggregates obtained from a non-construction post-consumer industrial by product source.	✓				1	0.69%					This credit may be difficult to achieve from other project exp. **Unlikely to achieve.**		None	None

												70.87%	84.81%				
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Wst 03	**Operational waste**	Operational waste	1. 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: a. Clearly labelled, to assist with segregation, storage and collection of the recyclable waste streams b. Accessible to building occupants or facilities operators c. Of a capacity appropriate to the building type, size, number of units (if relevant) and predicted volumes of waste 2. Where the consistent generation in volume of the appropriate operational waste streams is likely to exist, the following facilities are provided: a. Static waste compactor(s) or baler(s); situated in a service area or dedicated waste management space. b. Vessel(s) for composting suitable organic waste; OR adequate space(s) for storing segregated food waste and compostable organic material prior to collection. c. Where organic waste is on-site, a water outlet is provided adjacent to or within the facility for cleaning and hygiene purposes.	✓			✓	1	0.69%			1		Dedicated space is provided for the storage of the building's recyclable waste streams. **1 credit targeted.**	1) Design plan confirming location and area (m²) of storage area. 2) Written confirmation that the space is adequately sized for the anticipated volume of waste and the waste collection arrangement, is clearly labelled for recycling, within easy reach of the building (<20m away from an entrance) and in a location with good vehicular access.	RIBA Stage 4	Architect Client
Wst 05	**Adaptation to climate change**	structural and fabric resilience	1. 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: a) 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: i. Hazard identification ii. Hazard assessment iii. Risk estimation iv. Risk evaluation v. Risk management.	✓				1	0.69%			1		Action in stage 2: Architect, MEP and structural to input the CE Matrix. **1 credit targeted.**	1) A copy of the Climate change adaptation strategy appraisal report 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. 2) Evidence to demonstrate how the findings of the Climate Change Adaptation Strategy Appraisal has influenced the design and measures that have been taken to mitigate the impact of the expected effects (e.g. specification documents)	RIBA Stage 2	Architect Structural Engineer MEP Engineer
Wst 06	**Functional adaptability**	Functional adaptability	A building-specific functional adaptation strategy study has been undertaken by the client and design team by RIBA Stage 2, which includes recommendations for measures to be incorporated to facilitate future adaptation. Functional adaptation measures have been implemented by RIBA Stage 4 in accordance with the functional adaptation strategy recommendations, where practical and cost effective.	✓	✓	✓	✓	1	0.69%			1		Action in stage 2: According to CE workshop, the development will be designed for disassembly and adaptability. Architect, MEP and structural to input the CE Matrix. **1 credit targeted.**	1) A copy of the Functional adaptation strategy appraisal report to identify and make recommendations for measures to be incorporated to facilitate future adaptation. 2) Evidence to demonstrate how the findings of the Functional adaptation strategy appraisal report have influenced the design and particular measures have been implemented (e.g. implementation report, drawings or specification documents)	RIBA Stage 2	Architect Structural Engineer MEP Engineer

														70.87%	84.81%			
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				Part 1	Part 2	Part 3	Part 4			Very Good	Excellent	Targeted	Additional				
Land Use and Ecology																		
or existing landscaping areas within the refurbishment or fit-out zone																		
Le 02	**Protection of ecological features**		1. All existing features of ecological value within and surrounding the refurbishment or fit-out zone and site boundary area are adequately protected from damage during clearance, site preparation and refurbishment or fit-out activities in line with BS42020: 20131. 2. In all cases, the principal contractor is required to construct ecological protection recommended by the Suitably Qualified Ecologist (SQE), prior to any preliminary site refurbishment or fit-out or preparation works (e.g. erection of temporary site facilities).	✓	✓	✓	✓	1	2.21%			1		WSP Ecology Team has been appointed to carry out the studies. Subject to Ecologist advice. **1 credit targeted.**	1)A copy of the ecologist's CV to confirm they meet the BRE's definition of a Suitably Qualified Ecologist. 2) Suitably Qualified Ecologist's report highlighting ecological features that need protection. 3) Written commitment the protection recommendations will be implemented by the contractor.	RIBA Stage 2	Ecologist
Le 04	**Enhancing site ecology**		1. A suitably qualified ecologist (SQE) has been appointed by the client or their project representative by the end of the RIBA Stage 1 to advise on enhancing the ecology of the site at an early stage. 2. The SQE has provided an Ecology Report with appropriate recommendations for the enhancement of the site's ecology at RIBA Stage 2. The report is based on a site visit/survey by the SQE (see also CN4.1). 3. The early stage advice and recommendations of the Ecology Report for the enhancement of site ecology have been, or will be, implemented in the refurbishment or fit-out.	✓				1	2.21%			1		WSP Ecology Team has been appointed to carry out the studies. Subject to Ecologist advice. **1 credit targeted.**	1) Appointment letter for the Suitably Qualified Ecologist. 2)A copy of the ecologist's CV to confirm they meet the BRE's definition of a Suitably Qualified Ecologist. 3) Suitably Qualified Ecologist's report highlighting information required in accordance with the BREEAM manual. 4) Written commitment the enhancement recommendations will be implemented by the contractor.	RIBA Stage 2	Ecologist
Le 05	**Long term impact on biodiversity**		1. Where a Suitably Qualified Ecologist (SQE) is appointed prior to commencement of activities on-site and they confirm that all relevant UK and EU legislation relating to the protection and enhancement of ecology has been complied with during the refurbishment or fit-out process. 2. Where a landscape and habitat management plan, appropriate to the site, is produced covering at least the first five years after project completion in accordance with BS 42020:20131 Section 11.1. This is to be handed over to the building owner/occupants for use by the grounds maintenance staff. 3. Where additional measures to improve the assessed site's long term biodiversity are adopted: 1 credit where 2 additional measures are adopted 2 credits where 4 additional measures are adopted	✓	✓	✓	✓	2	4.42%			2		Subject to Ecologist advice. **2 credits targeted.**	1) Appointment letter for the Suitably Qualified Ecologist. 2)A copy of the ecologist's CV to confirm they meet the BRE's definition of a Suitably Qualified Ecologist. 2) Copy of or confimation a habitat and lanscape management plan will be produced. 4) Written confirmation the contractor will implement additional biodiversty measures.	RIBA Stage 4	Ecologist

													70.87%	84.81%				
BREEAM Issue ID	BREEAM Issue Title	BREEAM Credit Title	BREEAM Criteria	Part Applicability				Credits Available	% Worth (in total for each BREEAM issue)	Mandatory Requirements		Design Stage Scoring		Commentary	Actions	Indicative Timeframe	Indicative Responsibility
				Part 1	Part 2	Part 3	Part 4			Very Good	Excellent	Targeted	Additional				
Pollution																	
Pol 01	**Impact of refrigerants**	Pre-requisite	All systems (with electric compressors) must comply with the requirements of BS EN 378:20081 and where refrigeration systems containing ammonia are installed, the Institute of Refrigeration Ammonia Refrigeration Systems Code of Practice.		✓	✓	✓	-				Yes		**Pre-requisite targeted.**	1) Written confirmation and manufacturer datasheet of the relevant refrigeration type confirming refrigerant charge (kg) and system information, if applicable: a. Refrigerant Recovery Efficiency factor (%) b. Annual Leakage Rate (units: % refrigerant charge) c. Annual Purge Release factor (% Refrigerant charge) d. Annual Service Release (% Refrigerant charge) e. Probability factor for catastrophic failure (% refrigerant charge loss/year) f. Global Warming Potential of refrigerant g. Cooling capacity (kW)	RIBA Stage 4	MEP Engineer
		Impact of Refrigerant	**3 credits:** Where the building does not require the use of refrigerants within its installed plant/systems. **2 credits:** 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. **1 credit:** Where the systems using refrigerants have Direct Effect Life Cycle CO2 equivalent emissions (DELC CO2e) of ≤ 1000 kgCO2e/kW cooling/heating capacity.		✓	✓	✓	2	1.70%			1	1	It is anticipated that this requirement will be met. **1 credit targeted. 1 credit considered potential.**		RIBA Stage 4	MEP Engineer
		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	0.85%			1		It is anticipated that this requirement will be met. **1 credit targeted.**	1) Specification confirming inclusion of refrigerant leak detection and containment system as per the BREEAM Criteria column.	RIBA Stage 4	MEP Engineer
Pol 02	**NO_x emissions**	NO_x emissions	Credits achieved are based on the following scores where the dry NOx emissions (at 0% excess O2): - One credits- ≤100 mg/kWh (space heating) - Two credits - ≤70 mg/kWh (space heating) - Three credits - ≤40 mg/kWh (space heating)		✓	✓		3	2.55%			2		All heating and hot water provided by electric equipment. As per discussion with BRE, NC 2018 requirements can be adopted (TBC by assessment criteria issued by BRE). **2 credits targeted.**	1) Specification confirming heating, cooling and hot water systems. 2) Manufacturer's datasheet confirming: a. dry NOx emission rate (at 0% excess O2) b. heat and electrical outputs of all systems 3) Calculations from the project team confirming average NOx emission rate.	RIBA Stage 4	MEP Engineer
		Flood risk management	**Low flood risk** Where flood maps from the appropriate statutory body confirm the refurbishment or fit-out is situated in a flood zone that is defined as having a low annual probability of flooding; OR The project meets the requirements for avoidance of flooding in accordance with Checklist 1, where the refurbishment or fit-out zone is of a floor level that is 0.3m higher than the obtained/estimated flood level and safe access/escape routes are available/present **Medium/high flood risk** Where flood maps confirm the site has a medium/high flood risk a site specific FRA his undertaken AND 5.The refurbishment zone achieves avoidance from flooding through either: a. The refurbishment zone is located entirely on the first floor or above and a flood emergency plan has been developed in accordance with 'Would your business stay afloat? A Guide to preparing your business for flooding', Environment Agency, 2011 b. As a result of the building's floor level or measures to keep water away, the building is defined as achieving avoidance from flooding by following Checklist A-1. OR 6. Where avoidance is not possible, two credits are achieved where a full flood resilience/resistance strategy is implemented for the building's scope of works in accordance with recommendations made by a Suitably Qualified Building Professional.	✓	✓	✓	✓	2	1.70%			2		Specific FRA will be commissioned, **2 credits targeted.**	1) Drainage consultant's report/ calculations/ specification confirming: a.Type and storage volume (l) of the drainage measures b. Total area of hard surfaces (m2) c. Peak/Volume flow rates (l/s) pre and post development for the return period events and discharge rates d. Additional allowance for climate change designed in to the system e. Impact on the building of flooding from local drainage system failure f. specification of SuDS and pollution measures for high risk areas as applicable.	RIBA Stage 3	Client Architect Drainage Consultant

													70.87%	84.81%				
BREEAM Issue ID	BREEAM Issue Title	BREEAM Credit Title	BREEAM Criteria	Part Applicability				Credits Available	% Worth (in total for each BREEAM issue)	Mandatory Requirements		Design Stage Scoring		Commentary	Actions	Indicative Timeframe	Indicative Responsibility
				Part 1	Part 2	Part 3	Part 4			Very Good	Excellent	Targeted	Additional				
Pol 03	Flood risk management and reducing surface water run-off	Surface water run-off	One credit 7. There is no increase in the impermeable surfaces as a result of the refurbishment works; OR 8. If there is an increase in the impermeable surface as a result of the refurbishment works then the following must be met: a) Hard standing areas - where there is an extension or increase in the hardstanding areas and hence an increase in the total impermeable area as a result of the refurbishment works, the hardstanding area must be permeable or be provided with on-site SuDS to allow full infiltration of the additional volume, to achieve the same end result. The permeable hardstanding must include all pavements and public rights of way, car parks, driveways and non-adoptable roads, but exclude footpaths that cross soft landscaped areas which will drain onto a naturally permeable surface. b) Building extension - where there is an increase in building footprint, extending onto any previously permeable surfaces, the additional run-off caused by the area of the new extension must be managed on-site using an appropriate SuDS technique for rainfall depths up to 5mm. Two credits - reducing run-off 9. An Appropriate Consultant has been used to design an appropriate drainage strategy for the site. 10. Either of the following criteria are met: a) There is a decrease in the impermeable area by 50% or more, from the pre-existing impermeable hard surfaces; OR b) Where run-off as a result of the refurbishment is managed on-site using source control achieving the following requirements: i. The peak rate of run-off as a result of the refurbishment for the 1 in 100 year event has been reduced by 50% from the existing site. ii. The total volume of run-off discharged into the watercourses and sewers as a result of the refurbishment, for a 1 in 100 year event of 6 hour duration has been reduced by 50%. iii. An allowance for climate change must be included for all of the above calculations; this should be made in accordance with current best practice planning guidance.	✓				2	1.70%				2	Subject to Drainage Consultant advice. **2 credits considered as additional potential.**	1) Drainage consultant's report/calculations confirming: a. Type and storage volume (l) of the drainage measures b. Total area of hard surfaces (m2) c. Peak/Volume flow rates (l/s) pre and post development for the return period events d. Additional allowance for climate change designed in to the system e. Impact on the building of flooding from local drainage system failure 2) Copy of a completed GN15 issued to design team at Pre-Assessment stage.	RIBA Stage 3	Drainage Consultant
		Minimising water course pollution	11. There is no discharge from the developed site for rainfall up to 5mm. 12. Where suitable pollution prevention measures are put in place (or already exist) for the different sources of pollution present on the assessed site 13. A comprehensive and up to date drainage plan of the site will be made available for the building/site occupiers. 14. Relevant maintenance agreements for the ownership, long term operation and maintenance of all specified SuDS must be in place.	✓				1	0.85%				1	Subject to Drainage Consultant advice. **1 credit considered as additional potential.**	1) Design drawings or relevant section or clauses of the building specification or contract indicating: a. High and low risk areas of the site b. Specification of SuDS, source control systems, oil or petrol separators and shut-off valves as appropriate.	RIBA Stage 3	Drainage Consultant
Pol 04	Reduction of night time light pollution		One credit where evidence provided demonstrates that the external lighting design is in compliance with the guidance in the ILP Guidance notes for the reduction of obtrusive light, 2011. All external lighting (except safety and security) should be automatically switched off between 23:00 and 7:00 hours. Safety and security lighting levels should be lowered between these hours to meet the criteria in table 2 of the ILP notes. illuminated advertisements, where specified, must be designed in compliance with ILE Technical Report 5 – The Brightness of Illuminated Advertisements		✓	✓		1	0.85%			1		To adopt the requirements as part of the lighting strategies. **1 credit targeted.**	1) Specification confirming compliance with the ILP Guidance notes for the reduction of obtrusive light, 2011 and inclusion of controls to automatically switch off lighting between 23:00 and 07:00 hours.	RIBA Stage 4	MEP Engineer
Pol 05	Reduction of noise pollution		Where there are no noise-sensitive areas or buildings within 800m radius of the assessed site. OR Where the building does have noise-sensitive areas or buildings within 800m radius of the site: - A noise impact assessment in compliance with BS 7445 is carried out - The noise impact assessment must be carried out by a suitably qualified acoustic consultant - The noise level 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 is greater than the levels described measures have been installed to attenuate the noise at its source to a level where it will comply.	✓	✓	✓	✓	1	0.85%			1		City of London planning requirements more onerous than BREEAM. Therefore noise limit set out will comply with BREEAM requirements. Action in stage 2: Acoustic's report and CV to be provided. **1 credit targeted.**	1) Acoustician's report confirming: a. Distance to noise sensitive buildings from the proposed sources of noise in the new development. b. Baseline noise investigations (compliant with BS 7445:1991) and plant noise values that the background noise levels will not be exceeded and the proximity of any noise sensitive receptors in the vicinity. c. Recommendations for noise attenuation measures. 2) Written confirmation that any recommendations made by the Acoustician will be implemented into the design to ensure the final building is compliant with the relevant standards	RIBA Stage 2	Acoustician

													70.87%	84.81%				
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				Part 1	Part 2	Part 3	Part 4			Very Good	Excellent	Targeted	Additional				
Innovation																	
Man 03	Responsible construction		See Man 03 above					1	1.00%							RIBA Stage 4	Contractor
Man 05	Aftercare support		Operational infrastructure and resources will be put in place to co-ordinate the following activities at quarterly intervals for the first three years of building occupation: a.Collection of occupant satisfaction, energy consumption and water consumption data. b.Analysis of the data to check the building is performing as expected and make any necessary adjustments to systems controls or to inform building user behaviours. c.Setting targets for reducing water and energy consumption and monitor progress towards these. d.Feedback any 'lessons learned' to the design team and developer for use in future projects. e.Provision of the actual annual energy, water consumption and occupant satisfaction data to BRE.					1	1.00%							RIBA Stage 4	Contractor
Hea 01	Daylighting		- Occupied areas have an average daylight factor of 3% in 80% of the space - A minimum point daylight factor of 1.2% OR 2.1% for spaces with glazed roofs, such as atria					1	1.00%							None	
Hea 02	VOC		**One credit** - All seven remaining categories meet the testing requirements and emission levels criteria - For products b) – f) listed in the table, the formaldehyde emission levels are measured and found to be less than or equal to 0.06mg/m3 air in accordance with the approved testing standards **Two credits** - All seven remaining categories meet the testing requirements and emission levels criteria - For products B to F listed in the table, the formaldehyde emission levels are measured and found to be less than or equal to 0.01mg/m3 air, in accordance with the approved testing standards					2	2.00%							None	
Wat 01	Water consumption		As per Wat 1, one exemplary credit can be achieved where there is a 65% reduction in water consumption over the notional building.					1	1.00%							None	
Mat 01	Environmental impact of materials		Achieve at least 85% of points within the Option 2 proforma					2	2.00%							None	
Mat 03	Responsible sourcing of materials		Where, in addition to the standard BREEAM requirements, 70% of the available responsible sourcing points have been achieved.					1	1.00%							None	
Was 01	Construction waste management		- Non-hazardous construction waste is no greater than 1.4m3 or 0.4 tonnes per 100m2 - The percentage of non-hazardous construction and demolition waste diverted from landfill meets is at least 95% by volume or 97 by tonnage - Waste materials are sorted into separate key waste groups either on-site or off-site through a licensed contractor for recovery. - 75% of difficult to manage wastes have been reused on or off-site rather than recycled					2	2.00%							None	
Was 02	Recycled aggregates		Where 35% (by weight or volume) of the total high-grade aggregates specified in the development are recycled and/or secondary. The percentage of high-grade aggregate that is recycled and/or secondary, must meet the following levels: - Structural frame - 30% - Bitumen or hydraulically bound base, binder and surface courses for paved areas and roads - 75% - Concrete road surfaces - 45% - Pipe bedding - 100% - Building foundations - 35% - Granular fill and capping - 100%					1	1.00%							None	
Was 05	Adaptation to climate change		Achievement of the Structural and fabric resilience criterion in this issue and the following criteria points or credits: Hea 04 Thermal comfort Criterion 6 in the second credit of the Hea 04 issue has been achieved. Ene 01 Reduction of energy use and carbon emissions At least eight credits in this issue have been achieved. Ene 04 Low carbon design The Passive design analysis credit in this issue has been achieved. Wat 01 Water consumption A minimum of three credits in this issue have been achieved. Mat 05 Designing for durability and resilience Criterion 2 relating to material degradation in this issue has been achieved. Pol 03 Surface water run-off Flood risk – a minimum of one credit has been achieved.					1	1.00%							None	
Pol 03	Flood risk and reducing surface water run-off		- The peak rate of run-off as a result of the refurbishment for the 1 in 1 year event is reduced to zero. - The peak rate of run-off as a result of the refurbishment for the 1 in 100 year event is reduced to zero. - There is no volume of run-off discharged into the watercourses and sewers as a result of the refurbishment, for a 1 in 100 year event of 6 hour duration. (An allowance for climate change must be included for all of the above calculations)					1	1.00%							None	

WSP House
70 Chancery Lane
London
WC2A 1AF
Phone: +44 20 7314 5000

WSP.com