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Report
Euston Tower, Camden
Greenhouse Gas Annexes

For British Land Property Management Limited
11 December 2024

Document Control

Project Title:	Euston Tower, Camden
Project Number:	J10-14095B-10
Client:	British Land Property Management Limited
Principal Contact:	Georgia Freeman (Trium Environmental Consulting LLP)
Document Title:	Greenhouse Gas Annexes
Document Number:	J10-14095B-10-1
Prepared By:	George Chousos (Consultant)
Reviewed By:	Denise Evans (Technical Director)

Revision History

01	11/12/2024	First Issue
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A1 Legislation, Policy and Guidance

- A1.1 In preparing the GHG assessment, consideration has been given to the requirements of national, regional and local planning policies.

National Planning Policy

National Planning Policy Framework

- A1.2 The NPPF (Department for Levelling Up, Housing and Communities, 2023) sets out planning policy for England. It states that the purpose of the planning system is to contribute to the achievement of sustainable development, and that the planning system has three overarching objectives, one of which is an environmental objective:

"to protect and enhance our natural, built and historic environment; including making effective use of land, improving biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy".

- A1.3 Part 14 of the framework is entitled "Meeting the challenge of climate change, flooding and coastal change" and sets out the strategy for minimising the climate change effects of new development. Paragraph 159 describes that "new development should be planned for in ways that [...] can help to reduce greenhouse gas emissions through its location, orientation and design". The section describes how renewable and low-carbon energy sources should be considered in planning applications for development of any scale.

- A1.4 Paragraph 160 describes further that "to help increase the use and supply of renewable and low carbon energy and heat, plans should:

a) provide a positive strategy for energy from these sources, that maximises the potential for suitable development, while ensuring that adverse impacts are addressed satisfactorily (including cumulative landscape and visual impacts);

b) consider identifying suitable areas for renewable and low carbon energy sources, and supporting infrastructure, where this would help secure their development; and

c) identify opportunities for development to draw its energy supply from decentralised, renewable or low carbon energy supply systems and for co-locating potential heat customers and suppliers".

- A1.5 In determining planning applications, the NPPF states that "local planning authorities should expect new development to:

a) comply with any development plan policies on local requirements for decentralised energy supply unless it can be demonstrated by the applicant, having regard to the type of development involved and its design, that this is not feasible or viable; and

b) take account of landform, layout, building orientation, massing and landscaping to minimise energy consumption."

Climate Change Act 2008

- A1.6 The overarching Act in relation to climate is the Climate Change Act 2008 (HMSO, 2008). The Act introduces a legally binding target to reduce the UK's GHG emissions to at least 80% below 1990 levels by 2050. It also provides for a Committee on Climate Change (CCC) with power to set out carbon budgets binding on the Government for 5-year periods.

- A1.7 In the 2009 budget, the first three carbon budgets were announced which set out a binding 34% CO₂e reduction by 2020; and the Government has since adopted the fourth and fifth carbon budgets to reduce CO₂e by 50% by 2025 and 57% by 2030.

- A1.8 The CCC also produces annual reports to monitor the progress in meeting these carbon budgets. Consequent upon the enactment of the Climate Change Act, a raft of policy at national and local level has been developed aimed at reducing carbon emissions.

Climate Change Act 2008 (2050 Target Amendment) Order 2019

- A1.9 In June 2019, the Government passed an order to amend the 2050 carbon emissions target in the Climate Change Act 2008 from 80% below 1990 levels to zero net carbon (i.e. 100% below 1990 levels) (HMSO, 2019). This new target will essentially end the UK's contribution to climate change by 2050.

Energy Act 2023

- A1.10 Enacted in October 2023, the Energy Act (HMSO, 2023) makes provision about energy production and security and the regulation of the energy market, including new frameworks to incentivise investment in clean energy technologies, such as low-carbon heat schemes. It also makes provision about energy smart appliances and load control, the energy performance of premises and energy savings opportunity schemes, amongst other measures to ensure clean and affordable energy for the UK.

Carbon Budget Order 2021

- A1.11 The Carbon Budget Order 2021 came into force in June 2021 (HMSO, 2021). It sets a legal obligation to meet the targets of the Climate Change Act 2008 and subsequent amendment to cut GHG emissions by 78% by 2035.

The National Adaptation Programme and the Third Strategy for Climate Adaptation Reporting

- A1.12 The National Adaptation Programme (Defra, 2018) sets out government's response to the second Climate Change Risk Assessment, showing the actions government is, and will be, taking to address the risks and opportunities posed by a changing climate. It forms part of the five-yearly cycle of requirements laid down in the Climate Change Act 2008 to drive a dynamic and adaptive approach to building our resilience to climate change.

Net Zero Strategy

- A1.13 The UK Government's Net Zero Strategy (HM Government, 2021) sets out the strategy for achieving the UK's binding commitment to net zero carbon emissions by 2050.

- A1.14 The strategy sets out a number of key aims and objectives to decarbonise the UK economy across all sectors. In relation to residential development the strategy includes commitments for heat and buildings which include phasing out natural gas heating (and other fossil fuels) and maximising energy efficiency of buildings.

- A1.15 The strategy also covers transport, setting a mandate to decarbonise road transport through the use of zero emission (electric) vehicles.

The Clean Growth Strategy

- A1.16 The Clean Growth Strategy (HM Government, 2017) sets out a comprehensive set of policies and proposals that aim to accelerate the pace of "clean growth", i.e. deliver increased economic growth

and decreased emissions. In the context of the UK's legal requirements under the Climate Change Act, the UK's approach to reducing emissions has two guiding objectives:

- To meet our domestic commitments at the lowest possible net cost to UK taxpayers, consumers and businesses; and
- To maximise the social and economic benefits for the UK from this transition.

A1.17 The Strategy contains policies relating to the delivery of clean, smart and flexible power, including reducing power costs for homes and businesses and more transparent carbon pricing. It effectively replaces the "The Carbon Plan: delivering our Low Carbon Future" published in 2011.

Approved Document L

A1.18 The Ministry of Housing, Communities and Local Government has published a series of 'Approved Documents' which provide guidance on ways to meet building regulations (HM Government, 2023). The latest version of the Approved Documents L1A and L2A on the Conservation of Fuel and Power define the energy efficiency requirements for new buildings (domestic and non-domestic).

A1.19 The baseline Part L compliant CO₂ emissions calculated for the Amended Proposed Development are presented within the Energy Statement (Arup, 2024) and were determined in accordance with the methodology detailed within these Approved Documents.

Decarbonising Transport: A Better, Greener Britain

A1.20 Published in 2021, the plan sets out the Government's commitments and actions needed to decarbonise the UK's transport system (DfT, 2021). It details the pathway to and the wider benefits of net zero transport and the principles that underpin the Government's approach to delivering net zero transport, aligning with the timescales set out in the Government's Net Zero Strategy published later in 2021.

Regional Planning Policy

The London Plan

A1.21 The London Plan (GLA, 2021) establishes a strategic planning policy for London over the next 20-25 years and promotes the fundamental objective of accommodating London's population and economic growth through sustainable development. It sets out the Spatial Development Strategy for Greater London and the Development Plans of all London Boroughs that must eventually comply with the general requirements of the London Plan.

A1.22 The London Plan includes planning policies both for reducing energy consumption within buildings and, significantly, promoting the use of decentralised electricity generation and renewable energy.

A1.23 Of particular relevance to GHG emissions, the Plan states that "the Mayor is committed to London becoming a zero-carbon city". It also explains that "'Carbon' is used in the London Plan as a shorthand term for all greenhouse gases".

A1.24 Policy SI 2 in the London Plan relates specifically to GHG emissions and states:

"Policy SI 2 – Minimising Greenhouse Gas Emissions

A. Major development should be net zero-carbon. This means reducing carbon dioxide emissions from construction an operation, and minimising both annual and peak energy demand in accordance with the following energy hierarchy:

1) be lean: use less energy and manage demand during operation

2) be clean: exploit local energy resources (such as secondary heat) and supply energy efficiently and cleanly

3) be green: maximise opportunities for renewable energy by producing, storing and using renewable energy on-site

4) be seen: monitor, verify and report on energy performance

B. Major development proposals should include a detailed energy strategy to demonstrate how the zero-carbon target will be met within the framework of the energy hierarchy.

C. A minimum on-site reduction of at least 35 per cent beyond Building Regulations is required for major development. Residential development should aim to achieve 10 per cent, and non-residential development should aim to achieve 15 per cent through energy efficiency measures. Where it is clearly demonstrated that the zero-carbon target cannot be fully achieved on-site, any shortfall should be provided, in agreement with the borough, either:

1) through a cash in lieu contribution to the relevant borough's carbon offset fund, or

2) off-site provided that an alternative proposal is identified and delivery is certain.

D. Boroughs must establish and administer a carbon offset fund. Offset fund payments must be ring-fenced to implement projects that deliver carbon reductions. The operation of offset funds should be monitored and reported on annually.

E. Major development proposals should calculate and minimise carbon emissions from any other part of the development, including plant or equipment, that are not covered by Building Regulations, i.e. unregulated emissions.

F. Development proposals referable to the Mayor should calculate whole life-cycle carbon emissions through a nationally recognized Whole Life-Cycle Carbon Assessment and demonstrate actions taken to reduce life-cycle carbon emissions."

A1.25 The London Plan recognises that energy efficiency should come before energy supply considerations and has suggested a simple strategy known as the Mayor's Energy Hierarchy, which is described in Policy SI 2. The process follows good practice in the design of low carbon buildings and comprises four stages and order of application:

- 1. Use Less Energy (Be Lean);
- 2. Supply Energy Efficiently (Be Clean);
- 3. Use Renewable Energy (Be Green); and
- 4. Offset.

A1.26 This strategy puts energy efficiency/conservation measures first in order to reduce the demand for energy, 'Be Lean'. Following this, consideration must be given to supplying the resultant reduced energy demand as efficiently as possible, 'Be Clean'. Then, sources of renewable energy should be examined, 'Be Green'. Finally, emissions should be offset.

A1.27 Policy GG6 'Increasing efficiency and resilience' states:

"To help London become a more efficient and resilient city, those involved in planning and development must:

A. Seek to improve energy efficiency and support the move towards a low carbon circular economy, contributing towards London becoming a zero-carbon city by 2050

B. 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 and avoiding contributing to the urban heat island effect..."

GLA Energy Assessment Guidance

- A1.28

This guidance issued in 2022, is an update to the 2018 Energy Assessment Guidance, and sets out what is expected for compliance with the London Plan (GLA, 2022a). The guidance details the 'be seen' policy, which requires all major developments to monitor and report on their energy performance post-construction, as well as a new requirement for all referable planning applications to calculate and reduce whole life-cycle carbon emissions.
- A1.29

Specifically, the guidance states that:

"Each application is considered on its merits, taking into account the individual characteristics of the development. For all strategic planning applications case-specific energy comments for each development are provided at Stage 1 and 2 of the GLA planning process by GLA energy officers to ensure applications comply with London Plan policy. However, for the avoidance of doubt, energy assessments must:

 - be submitted at the planning application stage, not submitted post planning in response to a condition;*
 - report estimated site-wide regulated CO₂ emissions and reductions (broken down for the domestic and non-domestic elements of the development), expressed in tonnes per annum, after each stage of the energy hierarchy, using the GLA's carbon emissions reporting spreadsheet;*
 - demonstrate how the zero carbon target for major residential and non-residential development will be met, with at least a 35% on-site carbon reduction beyond Part L 2021 and provide the value of the offset payment which will be paid in the relevant borough's carbon offset fund to make up any shortfall to achieve net-zero carbon, where required;*
 - commit that energy efficiency measures along will reduce regulated CO₂ emissions for residential uses by 10 per cent below those of a development compliant with Part L 2021 of the Building Regulations, and by 15 per cent for non-residential uses;*
 - align with related documents and assessments that are submitted as part of the planning application, e.g. Whole Life-Cycle Carbon Assessments, Air Quality Assessments, Sustainability Statements."*
- A1.30

Therefore, for the Proposed Development being a "major" application, the target reduction on CO₂ emissions, according to the GLA's requirements is 35% reduction below the Part L 2021 Baseline, with 10% reduction from energy efficiency measures alone for the regulated domestic emissions and a 15% reduction for the regulated non-domestic emissions, and proposals for making up the shortfall (e.g. offsetting) to net zero carbon.
- A1.31

The guidance also clarifies the requirements for different types of planning application, alongside explanations relating to carbon emission factors, restructuring of the 'be clean' section to align with the heating hierarchy, further information on the role of Combined Heat and Power (CHP) plant

generally and in heat networks and transferal of heat pump and PV requirements into the core of the guidance due to the popularity of these technologies.

GLA Whole Life-Cycle Carbon Assessments Guidance

- A1.32

This guidance document explains how to prepare a WLCA in line with Policy SI 2 of the London Plan (GLA, 2022b).
- A1.33

It defines WLCA emissions as the carbon emissions resulting from the construction and the use of a building over its entire life, including its demolition and disposal. As such they capture a building's operational carbon emissions from both regulated and unregulated energy use, as well as its embodied carbon emissions, i.e. those associated with raw material extraction, manufacture and transport of building materials, construction and the emissions associated with maintenance, repair and replacement as well as dismantling, demolition and eventual material disposal.
- A1.34

The guidance confirms that the Mayor's net zero-carbon target continues to apply to the operational emissions of a building. The WLCA requirement is therefore not subject to this target but, as set out in London Plan Policy SI 2, planning applicants are required to calculate the embodied emissions of the development, as well as the operational emissions, and demonstrate how these can be reduced as part of the WLCA.
- A1.35

The guidance confirms that planning applicants should continue to follow the GLA's Energy Assessment Guidance to assess and reduce operational emissions and insert the relevant information into the WLCA assessment.

London Environment Strategy

- A1.36

The London Environment Strategy (GLA, 2018), published in May 2018, sets out an action plan for environmental improvement in London up to 2050 and covers a range of core environmental aspects including energy and climate change, air quality, green infrastructure, waste and noise.
- A1.37

The strategy sets a series of targets, including the aim to make London a zero-carbon city by 2050; reiterating the same commitment as is included in the London Plan. The strategy sets out a series of measures designed to achieve this aim, which are focussed upon delivering zero-carbon energy, zero-carbon transport and zero-carbon development. The strategy also sets out plans for retrofitting existing buildings to enable them to be considered to be zero-carbon.

Local Planning Policy, Strategy and Guidance

Local Plan

- A1.38

The London Borough of Camden (LBC) Local Plan (London Borough of Camden, 2017) was adopted in 2017, and within this there are two policies that are relevant to climate change.

- Policy CC1: Climate change mitigation**, which states:

"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.

We will:

 - a. promote zero carbon development and require all development to reduce carbon dioxide emissions through following the steps in the energy hierarchy;*

- b. require all major development to demonstrate how London Plan targets for carbon dioxide emissions have been met;
- c. ensure that the location of development and mix of land uses minimise the need to travel by car and help to support decentralised energy networks;
- d. support and encourage sensitive energy efficiency improvements to existing buildings;
- e. require all proposals that involve substantial demolition to demonstrate that it is not possible to retain and improve the existing building; and
- f. expect all developments to optimise resource efficiency.

For decentralised energy networks, we will promote decentralised energy by:

- g. working with local organisations and developers to implement decentralised energy networks in the parts of Camden most likely to support them;
- h. protecting existing decentralised energy networks (e.g., at Gower Street, Bloomsbury, King's Cross, Gospel Oak and Somers Town) and safeguarding potential network routes; and
- i. requiring all major developments to assess the feasibility of connecting to an existing decentralised energy network, or where this is not possible establishing a new network.

To ensure that the Council can monitor the effectiveness of renewable and low carbon technologies, major developments will be required to install appropriate monitoring equipment."

• **Policy CC2: Adapting to climate change** states:

"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
- d. measures to reduce the impact of urban and dwelling overheating, including application of the cooling hierarchy.

Any development involving 5 or more residential units or 500 sqm or more of any additional floorspace is required to demonstrate the above in Sustainability Statement.

Sustainable design and construction measures

The Council will promote and measure sustainable design and construction by:

- e. ensuring development schemes demonstrate how adaptation measures and sustainable development principles have been incorporated into the design and proposed implementation;
- f. encourage new build residential development to use the Home Quality Mark and Passivhaus design standards;

- g. encouraging conversions and extensions of 500 sqm of residential floorspace or above or five or more dwellings to achieve "excellent" in BREEAM domestic refurbishment; and
- 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."

New Draft Local Plan

A1.39 LBC commenced, in early 2024, consultation on a new Draft Local Plan (Regulation 18) (London Borough of Camden, 2024). Once adopted, the new Plan will replace the Local Plan 2017. The following policies are applicable to the GHG assessment:

• **Policy DS1: Delivering Healthy and Sustainable Development** states:

"The Council will require development to support the creation of healthy and sustainable places in Camden by:

...

- ii. Delivering buildings that achieve net zero carbon emissions, optimise resource efficiency and are designed to be resilient to climate change..."

• **Policy CC1: Responding to the climate emergency** states:

"The Council will prioritise the provision of measures to mitigate and adapt to climate change and require all development in Camden to respond to the climate change emergency by:

- i. Supporting the retrofitting of existing buildings to make them more energy efficient and reduce the energy needed to occupy the building;
- ii. Prioritising and enabling the repurposing and re-use of existing buildings over demolition;
- iii. Following circular economy principles, minimising waste and increasing re-use;
- iv. Reducing whole life carbon emissions, by taking a whole life carbon approach, considering both embodied carbon and operational carbon;
- v. Being designed and constructed to be net zero carbon in operation;
- vi. Utilising low carbon technologies and maximising opportunities for renewable energy generation, and heat networks;
- vii. Being designed to be resilient to climate change and meet the highest standards of sustainable design and construction;
- viii. Minimising the risk of overheating through design and avoiding reliance on air conditioning;
- ix. Improving water efficiency;
- x. Minimising and avoiding the risk of flooding from all sources and incorporating multifunctional Sustainable Urban Drainage Systems (SuDS) to reduce surface water run-off;
- xi. Protecting and enhancing existing green spaces and water sources, enhancing biodiversity, strengthening nature recovery and providing multi-functional green infrastructure; and
- xii. Prioritising sustainable transport."

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A2 Extract from Whole Life-Cycle Carbon Assessment

GWP POTENTIAL FOR ALL LIFE-CYCLE MODULES (kgCO ₂ e) (See Note 1 below if you entered a reference study period in cell C12)	Sequestered (or biogenic) carbon (negative value) (kgCO ₂ e)	Product stage (kgCO ₂ e)	Construction process stage (kgCO ₂ e)			Use stage (kgCO ₂ e)				
		Module A			Module B					
		[A1] to [A3]	[A4]	[A5]	[B1]	[B2]	[B3]	[B4]	[B5]	
Building element category										
Other site construction impacts or overall construction stage [A5] carbon emissions not specific to an individual building element category				2,075,449 kg CO ₂ e						
TOTAL kg CO ₂ e	-1,185,705 kg CO ₂ e	47,262,876 kg CO ₂ e	4,260,518 kg CO ₂ e	4,608,125 kg CO ₂ e	3,852,000 kg CO ₂ e	798,250 kg CO ₂ e	199,562 kg CO ₂ e	32,972,626 kg CO ₂ e	0 kg CO ₂ e	
TOTAL - kg CO ₂ e/m ² GIA	-15 kg CO ₂ e/m ² GIA	592 kg CO ₂ e/m ² GIA	53 kg CO ₂ e/m ² GIA	58 kg CO ₂ e/m ² GIA	48 kg CO ₂ e/m ² GIA	10 kg CO ₂ e/m ² GIA	3 kg CO ₂ e/m ² GIA	413 kg CO ₂ e/m ² GIA	0 kg CO ₂ e/m ² GIA	

[B6]	[B7]	[C1]	[C2]	[C3]	[C4]		Module U
						2,075,449 kg CO ₂ e	
92,745,671 kg CO ₂ e	776,345 kg CO ₂ e	2,027,554 kg CO ₂ e	1,085,905 kg CO ₂ e	1,832,386 kg CO ₂ e	65,842 kg CO ₂ e	191,301,955 kg CO ₂ e	-24,969,985 kg CO ₂ e
1,162 kg CO ₂ e/m ² GIA	10 kg CO ₂ e/m ² GIA	25 kg CO ₂ e/m ² GIA	14 kg CO ₂ e/m ² GIA	23 kg CO ₂ e/m ² GIA	1 kg CO ₂ e/m ² GIA	2,397 kg CO ₂ e/m ² GIA	-313 kg CO ₂ e/m ² GIA

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A3 Extract from Energy Strategy

	Total regulated emissions (Tonnes CO2 / year)	CO2 savings (Tonnes CO2 / year)	Percentage savings (%)
Baseline: Part L 2021	297.8		
Be lean: Savings from energy demand reduction	275.1	22.7	8%
Be clean: Savings from heat network	275.1	0.0	0%
Be green: Savings from renewable energy	251.2	13.0	8%
Cumulative on-site savings	-	46.5	16%
Annual savings from off-set payment	-	251.2	-
Cumulative savings for off-set payment (t CO2)	7,537		
Cash in-lieu contribution (£)	£716,023		

Table 1: Total Proposed Development regulated carbon emissions results, savings, off-set calculation and cash in-lieu contribution.

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A4 GHG Emissions for Budget Comparisons

Demolition and Construction

Table A4-1: Breakdown of Demolition and Construction Emissions ^a

WLCA Module / Emissions Source	Total Lifetime Emissions (tonnes CO ₂ e)	Demolition and Construction Period (tonnes CO ₂ e)				
		2026	2027	2028	2029	2030
A1-A3 (Embedded Carbon)	47,263	9,453	9,453	9,453	9,453	9,453
A4 (Transport)	4,261	852	852	852	852	852
A5 (Site Activities)	4,608	922	922	922	922	922
TOTAL	56,132	11,226	11,226	11,226	11,226	11,226

^a All values are rounded to the nearest tonne.

A4.1 Utilising the data in the above table, the corresponding emissions within each of the UK's 4th (2023-2027) and 5th (2028-2032) Carbon Budget periods can be deduced:

- 4th Carbon Budget (2023 – 2027) = 22,453 tonnes CO₂e (equivalent to 0.02 MTCO₂e when rounded); and
- 5th Carbon Budget (2028 – 2032) = 33,679 tonnes CO₂e (equivalent to 0.03 MTCO₂e when rounded).

Completed and Operational Development

Table A4-2: Breakdown of Completed and Operational Development Emissions ^a

WLCA Module / Emissions Source	Total Lifetime Emissions (tonnes CO ₂ e) ^b	2031	2032	2033	2034	2035	2036	2037
B1-B4 (Use, Maintenance, Repair and Replacement)	37,822	630	630	630	630	630	630	630
Operational Energy ^c	2,214	300	236	186	150	143	143	129
Operational Transport ^c	8,077	992	861	754	667	595	527	469
B7 (Operational Water Use)	776	13	13	13	13	13	13	13
TOTAL	48,889	1,936	1,740	1,583	1,460	1,382	1,313	1,241

^a All values are rounded to the nearest tonne.

^b Based on a 60-year lifetime in accordance with British Standard EN 15978:2011.

^c Taking account of decarbonisation utilising DESNZ electricity emissions factors and DfT's WebTAG data book.

A4.2 Utilising the data in the above table, the corresponding emissions within each of the UK's 5th (2028-2032) and 6th (2033-2037) Carbon Budget periods can be deduced:

- 5th Carbon Budget (2028 – 2032) = 3,675 tonnes CO₂e (equivalent to 0.005 MTCO₂e when rounded); and
- 6th Carbon Budget (2033 – 2037) = 6,979 tonnes CO₂e (equivalent to 0.009 MTCO₂e when rounded).

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A5 Annex References

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INTRODUCTION

- 1 This technical note describes a future climate scenario for the London region which has been developed by Trium using the future climate projections data published by the Met Office (UKCP18). UKCP18 projections consider the climate effects arising from a series of 'Representative Concentration Pathways' (RCP) emissions scenarios (described further below).
- 2 The purpose of this technical note is to present projection data for the future climate and to provide guidance to the EIA technical team on how to consider whether the effects of the Proposed Development (defined under the current climate conditions) may alter under the future climate scenario. In the context of the future climate condition, consideration needs to be given to:
 - The change in the magnitude of impact of the Proposed Development;
 - Receptor vulnerability to changes in climate;
 - Vulnerability of the Proposed Development to climate change; and
 - Resilience of the Proposed Development to climate change.

Climate Projections

- 3 UKCP18 gives probabilistic projections¹ for a number of atmospheric variables, with different temporal and spatial averaging, for several future time periods, under four different future RCP emissions scenarios.
- 4 In general, the longer the lifetime of a development, the greater the uncertainty about the impact of climate change over time. Uncertainty is dealt with by presenting projections which are probabilistic in nature, and which give the probability of different climate outcomes.
- 5 To make use of the probabilistic projections, an emissions scenario and percentile outcome (i.e. the likelihood of the change in climate occurring) needs to be identified.
- 6 The emissions scenario and probabilistic projection are detailed within this document and have been used by all technical disciplines contributing to the Environmental Impact Assessment (EIA), to ensure consistency in approach.

Emission Scenarios

- 7 The RCP emission scenarios represent four distinct Representative Concentration Pathways (RCP2.6, RCP4.5, RCP6.0 and RCP8.5) available in the UKCP18 climate projections. These are named according to the concentration of greenhouse gas modelled to occur in the atmosphere in 2100. The RCPs have been developed for long-term and near-term climate modelling and provide time-dependant projections of atmospheric greenhouse gas concentrations. These pathways were developed based on a literature review of current climate modelling research and have been chosen to represent the full range of climate outcomes presented within the literature.
- 8 The emission scenarios represent assumptions in terms of climate policy, land use and technological development, with RCP2.6 representing the 'optimum' emission scenario (i.e. measures aimed at achieving the maximum reduction in GHG emissions).
- 9 RCP 8.5 is the most conservative, highest emission, and highest-impact scenario. It assumes that technological development will slow and that there will be little to no decarbonisation of world power from new technology. It also assumes that no further climate mitigation or regulations to reduce climate change or air pollution will be implemented.

¹ Probabilistic projections give a range of possible climate change outcomes and their relative likelihoods i.e. unlikely, likely or very likely ranging across 10th to 90th percentiles.

- 10 More information on the RCPs can be found in the UKCP18 Guidance: Representative Concentration Pathways².

Adopted Emissions Scenario: RCP8.5

- 11 RCP8.5 has been used in the climate projections presented in this technical note as it represents a suitably conservative emissions scenario with regards to climate policy, land use, and technological development. This is in accordance with the Institute of Environmental Management and Assessment's (IEMA's) Climate Change Resilience and Adaptation guidance³, which states that "*Recommended best practice is to use the higher emissions scenario (RCP 8.5 in the latest UKCP18 projections) at the 50th percentile, for the 2080s timelines, unless a substantiated case can be made for not doing this (e.g. anticipated lifespan of the project is shorter than 2080s)*".
- 12 The use of RCP8.5 is also in accordance with "*the National Policy Statement on National Networks, which states that developments should use the UKCP09 high emissions scenario at the 50% probability level*"³. RCP8.5 is the UKCP18 high emissions scenario and therefore has been identified as the most reasonable conservative emissions scenario for identifying future climate change projections in EIA.
- 13 The IEMA guidance recommends the use of RCP8.5 against a baseline period of 1980-2000 unless strong justification can be provided otherwise.
- 14 In line with the IEMA guidance, the climate projection data provided in this technical note are produced using RCP8.5 against the 1980-2000 baseline at the 50% probability level (or percentile).

² UKCP18 Guidance: Representative Concentration Pathways
<https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/research/ukcp/ukcp18-guidance---representative-concentration-pathways.pdf> [accessed 16/02/22]

³ Institute of Environmental Management and Assessment, (2020); Environmental Impact Assessment Guide to: Climate Change Resilience and Adaptation.

APPROACH TO ASSESSMENT

- 15 The future climate scenario is presented in this note in ‘*The Future Climate Condition in London for EIA*’. In line with the IEMA guidance and based on the approach, methodology and significance criteria relevant to the technical assessment, each technical specialist should consider this future climate scenario in respect of potential alterations to the following, within their ES chapter:
- The sensitivity of identified receptors;
 - The magnitude of impacts;
 - The resultant effects; and
 - Any additional mitigation that might be required to address the future climate scenario.

Mitigation Measures

- 16 Mitigation measures should identify appropriate resilience and adaptive management measures.
- 17 Resilience measures include design features (e.g. habitable rooms within residential units located above the flood level which accounts for climate change) and construction materials (e.g. materials resistant to increases in temperature), to provide an appropriate resilience to changes in the existing climatic conditions, as well as occurrences of extreme weather.
- 18 Adaptive management measures account for the anticipated changes in the future climate. Consideration should be given as to whether there are opportunities to introduce mitigation measures later into the project when they are required, instead of including them from the outset when they’re not required. These measures could be secured through a commitment to prepare a management plan/strategy (or equivalent) which would periodically review the need for such measures and their integration into the scheme when required.
- 19 Where mitigation is proposed, narrative should be provided on the anticipated effectiveness of the measures against the predicted future climate conditions.
- 20 A statement should be provided to clarify whether or not the projected future climate change is anticipated to alter the findings of the assessment as already presented for the Proposed Development under the current climate conditions.

THE FUTURE CLIMATE CONDITION IN LONDON FOR EIA

- 21 The 2022 UKCP Headline Findings⁴ highlights the key climate projections for the UK as follows:
- By the end of the 21st century, all areas of the UK are projected to be warmer, more so in summer than in winter;
 - Hot summers are expected to become more common. The temperature of hot summer days, by the 2070s, show increases of 3.8°C to 6.8°C, under a high emissions scenario, along with an increase in the frequency of hot spells;
 - Rainfall patterns across the UK are not uniform and vary on seasonal and regional scales and will continue to vary in the future;
 - Significant increases in hourly precipitation extremes in the future;
 - Despite overall summer drying trends in the future, future increases in the intensity of heavy summer rainfall events are likely;
 - Future climate change is projected to bring about a change in the seasonality of extremes; and
 - Sea levels rising.

⁴ UKCP (August 2022), UK Climate Projections: Headline Findings.

- 22 The future climate projections for London, based on RCP8.5, are presented and described below for the climatic variables:
- Temperature
 - Precipitation; and
 - Wind speed.
- 23 When assessing the effects of climate change in a technical ES chapter, the data presented in the proceeding tables should be used by the technical specialist as the basis for their assessment.

Temperature

- 24 Table 1 presents the projected air temperature data for London up until 2099, in 20 year timeslices, from 2020. In line with the Met Office predictions⁵, the data present future summers to be hotter and winters to be warmer, with the annual temperature steadily increasing.
- 25 Depending on the lifetime of the Proposed Development, different timeslices will need to be considered. When developing adaptive mitigation measures, consideration should be given to the appropriate time to implement these measures based on the temperature increase at each timeslice.
- 26 The data are presented for the Annual Mean, Summer Maximum, and Winter Minimum temperature for each timeslice. It is the responsibility of the technical specialist to select the most relevant and appropriate data for their technical discipline.

Table 1 Air Temperature Anomaly at 1.5m Above Ground Level (°C) Relative to Baseline

Timeslice	Predicted Change from Baseline (°C)		
	Annual Mean	Summer Max	Winter Min
	50 th Percentile	50 th Percentile	50 th Percentile
2020-2039	1.04	1.46	0.90
2040-2059	1.87	2.75	1.65
2060-2079	2.96	4.26	2.52
2080-2099	4.28	6.39	3.58

Precipitation

- 27 Table 2 presents the predicted percentage change in precipitation levels relative to the 1980-2000 baseline. In line with the Met Office predictions⁶, the data present future Summers to be drier and Winters to be wetter. The data also predict that annual precipitation will reduce marginally up to 2099.
- 28 Depending on the lifetime of the Proposed Development, different timeslices will need to be considered. When developing adaptive mitigation measures, consideration should be given to the appropriate time to implement these measures based on the precipitation change at each timeslice.
- 29 The data are presented for the seasonal extremes of Winter and Summer, as well as an Annual projection for each timeslice. It is the responsibility of the technical specialist to select the most relevant and appropriate data for their technical discipline.

⁵ Met Office Hadley Centre, 2018. ‘UKCP18 Factsheet: Temperature’
<https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/research/ukcp/ukcp18-fact-sheet-temperature.pdf>
 [accessed 09/03/22]

⁶ Met Office Hadley Centre, 2018. ‘UKCP18 Factsheet: Precipitation’
<https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/research/ukcp/ukcp18-fact-sheet-precipitation.pdf>
 [accessed 09/03/22]

Table 2 Precipitation Rate Anomaly (%) Relative to Baseline

Timeslice	Predicted Change from Baseline (%)		
	Annual	Summer	Winter
	50 th Percentile	50 th Percentile	50 th Percentile
2020-2039	1.54	-8.66	7.35
2040-2059	-1.36	-19.99	11.42
2060-2079	-1.92	-29.04	17.90
2080-2099	-2.50	-40.10	23.61

Wind Speed

- 30 UKCP18 probabilistic data for wind is not available, nor any RCP8.5 data for wind through alternative projections. For this reason, UKCP09 wind data has been reviewed for the A1B scenario, as it is comparable to RCP8.5. This data indicates that there is currently no clear trend in the speed and frequency of winds that would make a meaningful difference to wind microclimate assessments. The small changes to the average wind speeds and frequency by 2080 remain substantially less than the typical year-to-year variability. It is considered that applying a 'worst-case' factor would introduce an unhelpful and unrealistic level of conservatism into the results, and hence wind speed is not a factor taken into account when considering the future climate condition.
- 31 The long term climate change projections will be kept under review to identify any potential clear trends to projected future changes in wind speed and frequency, that can then be considered within the assessments.

Extreme Weather Events

- 32 Extreme weather events associated with the above climate change projections should also be considered by each technical specialist contributing to the ES, i.e. heat waves and conversely, heavy rainfall events leading to flooding.

SUMMARY

- 33 This note provides the future climate condition in London for the technical assessment of the Proposed Development, when assessing climate change. It has been developed to ensure consistency across the technical topics covered in the EIA.
- 34 It is the responsibility of the technical specialist for each topic in the Environmental Statement to follow the steps set out in this note when considering climate change in their technical assessment.
- 35 The data provided within this technical note is up to date as of 09 March 2022. It is acknowledged that more information will become available on the UKCP18 interface over time, and revisions of this note shall be provided as appropriate.

Appendix A: Policy and Guidance

Policy and Guidance

- EU Guidance on Integrating Climate Change and Biodiversity into the Environmental Impact Assessment (2013)⁷
- IEMA Environmental Impact Assessment Guide to Climate Change Resilience and Adaptation (2020)⁸
- UK Climate Change Risk Assessment Evidence Report (2017)⁹
- 2017 EIA Regulations (as amended)¹⁰

⁷ European Union, 2013. *Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessments*

⁸ Institute of Environmental Management and Assessment, (2020); *Environmental Impact Assessment Guide to: Climate Change Resilience and Adaptation*.

⁹ HM Government, 2017. *UK Climate Change Risk Assessment 2017*

¹⁰ His Majesty's Stationery Office (HMSO) 2017. *The Town and Country Planning (Environmental Impact Assessment) (England) Regulations 2017 (amended in 2018 and 2020)*.