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1 Appendices

A1 Glossary

AADT	Annual Average Daily Traffic
AQAL	Air Quality Assessment Level
AQC	Air Quality Consultants
AQMA	Air Quality Management Area
AURN	Automatic Urban and Rural Network
CAZ	Clean Air Zone
CEMP	Construction Environmental Management Plan
CPG	Camden Planning Guidance
Defra	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
DMP	Dust Management Plan
EPUK	Environmental Protection UK
EU	European Union
EV	Electric Vehicle
Exceedance	A period of time when the concentration of a pollutant is greater than the appropriate air quality objective. This applies to specified locations with relevant exposure
Focus Area	Location that not only exceeds the annual mean limit value for NO_2 but also has a high level of human exposure
GLA	Greater London Authority
HDV	Heavy Duty Vehicles (> 3.5 tonnes)
HMSO	Her Majesty's Stationery Office
IAQM	Institute of Air Quality Management
JAQU	Joint Air Quality Unit
LAEI	London Atmospheric Emissions Inventory
LAQM	Local Air Quality Management
LBC	London Borough of Camden
LDV	Light Duty Vehicles (<3.5 tonnes)
LEZ	Low Emission Zone

µg/m^3	Micrograms per cubic metre
NO_2	Nitrogen dioxide
NPPF	National Planning Policy Framework
NRMM	Non-road Mobile Machinery
OEP	Office for Environmental Protection
Objectives	A nationally defined set of health-based concentrations for nine pollutants, seven of which are incorporated in Regulations, setting out the extent to which the standards should be achieved by a defined date. There are also vegetation-based objectives for sulphur dioxide and nitrogen oxides
OLEV	Office for Low Emission Vehicles
PM_{10}	Small airborne particles, more specifically particulate matter less than 10 micrometres in aerodynamic diameter
$PM_{2.5}$	Small airborne particles less than 2.5 micrometres in aerodynamic diameter
PPG	Planning Practice Guidance
RDE	Real Driving Emissions
SPG	Supplementary Planning Guidance
Standards	A nationally defined set of concentrations for nine pollutants below which health effects do not occur or are minimal
TEB	Transport Emissions Benchmark
TfL	Transport for London
ULEZ	Ultra Low Emission Zone

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A2 Legislative and Planning Policy Context

A2.1 All European legislation referred to in this report is written into UK law and remains in place.

Air Quality Strategy 2007

A2.2 The Air Quality Strategy (Defra, 2007) published by the Department for Environment, Food, and Rural Affairs (Defra) and Devolved Administrations, provides the policy framework for air quality management and assessment in the UK. It provides air quality standards and objectives for key air pollutants, which are designed to protect human health and the environment. It also sets out how the different sectors: industry, transport and local government, can contribute to achieving the air quality objectives. Local authorities are seen to play a particularly important role. The strategy describes the Local Air Quality Management (LAQM) regime that has been established, whereby every authority has to carry out regular reviews and assessments of air quality in its area to identify whether the objectives have been, or will be, achieved at relevant locations, by the applicable date. If this is not the case, the authority must declare an Air Quality Management Area (AQMA) and prepare an Action Plan which identifies appropriate measures that will be introduced in pursuit of the objectives.

Air Quality Strategy 2023

A2.3 The Air Quality Strategy: Framework for Local Authority Delivery 2023 (Defra, 2023a) sets out the strategic air quality framework for local authorities and other Air Quality Partners in England. It sets out their powers and responsibilities, and actions the government expects them to take. It does not replace other air quality guidance documents relevant to local authorities.

Clean Air Strategy 2019

A2.4 The Clean Air Strategy (Defra, 2019) sets out a wide range of actions by which the Government will seek to reduce pollutant emissions and improve air quality. Actions are targeted at four main sources of emissions: Transport, Domestic, Farming and Industry. At this stage, there is no straightforward way to take account of the expected future benefits to air quality within this assessment.

Reducing Emissions from Road Transport: Road to Zero Strategy

A2.5 The Office for Low Emission Vehicles (OLEV) and Department for Transport (DfT) published a Policy Paper (DfT, 2018) in July 2018 outlining how the government will support the transition to zero tailpipe emission road transport and reduce tailpipe emissions from conventional vehicles during the transition. This paper affirms the Government's pledge to end the sale of new conventional petrol and diesel cars and vans by 2040, and states that the Government expects the majority of new cars and vans sold to be 100% zero tailpipe emission and all new cars and vans to have significant zero tailpipe emission capability by this year, and that by 2050 almost every car and van should have

zero tailpipe emissions. It states that the Government wants to see at least 50%, and as many as 70%, of new car sales, and up to 40% of new van sales, being ultra-low emission by 2030.

A2.6 The paper sets out a number of measures by which Government will support this transition but is clear that Government expects this transition to be industry and consumer led. The Government has since announced that the phase-out date for the sale of new petrol and diesel cars and vans will be brought forward to 2030 and that all new cars and vans must be fully zero emission at the tailpipe from 2035. If these ambitions are realised, then road traffic-related NOx emissions can be expected to reduce significantly over the coming decades.

Environment Act 2021

A2.7 The UK's new legal framework for protection of the natural environment, the Environment Act (2021) passed into UK law in November 2021. The Act gives the Government the power to set long-term, legally binding environmental targets. It also establishes an Office for Environmental Protection (OEP), responsible for holding the Government to account and ensuring compliance with these targets.

A2.8 The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023 (SI 2023 No. 96) sets two new targets for future concentrations of $PM_{2.5}$. These targets are described in Chapter 9: Air Quality.

Environmental Improvement Plan 2023

A2.9 Defra published its 25 Year Environment Plan in 2018 (Defra, 2018b). The Environment Act (2021) requires Defra to review this Plan at least every five years. The Environmental Improvement Plan 2023 (Defra, 2023b) is the first revision. This outlines the progress made since 2018 and adds detail to the goals defined in the 2018 Plan, including that of achieving clean air.

A2.10 The Environmental Improvement Plan 2023 sets out the new air quality targets which have been set for concentrations of $PM_{2.5}$. These targets, which are described in Chapter 9: Air Quality, include the long-term targets in the Statutory Instrument described in Paragraph A2.8, and interim targets to be achieved by 2028.

A2.11 The 2023 Plan outlines the role of local authorities in helping it meet both its targets and existing commitments. It also outlines the respective roles of industry, agricultural sectors, and the Department for Transport in providing the coordinated action required to meet both its new, and pre-existing targets and commitments.

Planning Policy

National Policies

A2.12 The National Planning Policy Framework (NPPF) (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 (Paragraph 8c) 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".

A2.13 To prevent unacceptable risks from air pollution, Paragraph 174 of the NPPF states that:

"Planning policies and decisions should contribute to and enhance the natural and local environment by…preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air quality".

A2.14 Paragraph 185 states:

"Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development".

A2.15 More specifically, on air quality, Paragraph 186 makes clear that:

"Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan".

A2.16 The NPPF is supported by Planning Practice Guidance (PPG) (Ministry of Housing, Communities & Local Government, 2019), which includes guiding principles on how planning can take account of the impacts of new development on air quality. The PPG states that:

"Defra carries out an annual national assessment of air quality using modelling and monitoring to determine compliance with Limit Values. It is important that the potential impact of new development on air quality is taken into account where the national assessment indicates that relevant limits have been exceeded or are near the limit, or where the need for emissions reductions has been identified".

A2.17 Regarding plan-making, the PPG states:

"It is important to take into account air quality management areas, Clean Air Zones and other areas including sensitive habitats or designated sites of importance for biodiversity where there could be specific requirements or limitations on new development because of air quality".

A2.18 The role of the local authorities through the LAQM regime is covered, with the PPG stating that a local authority Air Quality Action Plan *"identifies measures that will be introduced in pursuit of the objectives and can have implications for planning"*. In addition, the PPG makes clear that *"Odour and dust can also be a planning concern, for example, because of the effect on local amenity"*.

A2.19 Regarding the need for an air quality assessment, the PPG states that:

"Whether air quality is relevant to a planning decision will depend on the proposed development and its location. Concerns could arise if the development is likely to have an adverse effect on air quality in areas where it is already known to be poor, particularly if it could affect the implementation of air quality strategies and action plans and/or breach legal obligations (including those relating to the conservation of habitats and species). Air quality may also be a material consideration if the proposed development would be particularly sensitive to poor air quality in its vicinity".

A2.20 The PPG sets out the information that may be required in an air quality assessment, making clear that:

"Assessments need to be proportionate to the nature and scale of development proposed and the potential impacts (taking into account existing air quality conditions), and because of this are likely to be locationally specific".

A2.21 The PPG also provides guidance on options for mitigating air quality impacts, as well as examples of the types of measures to be considered. It makes clear that:

"Mitigation options will need to be locationally specific, will depend on the proposed development and need to be proportionate to the likely impact. It is important that local planning authorities work with applicants to consider appropriate mitigation so as to ensure new development is appropriate for its location and unacceptable risks are prevented".

London-Specific Policies

The London Plan

A2.22 The London Plan (GLA, 2021a) sets out an integrated economic, environmental, transport and social framework for the development of London over the next 20-25 years. The key policy relating to air quality is Policy SI 1 on *Improving air quality*, Part B1 of which sets out three key requirements for developments:

"Development proposals should not:

a) lead to further deterioration of existing poor air quality

b) create any new areas that exceed air quality limits, or delay the date at which compliance will be achieved in areas that are currently in exceedance of legal limits

c) create unacceptable risk of high levels of exposure to poor air quality".

A2.23 The Policy then details how developments should meet these requirements, stating:

"In order to meet the requirements in Part 1, as a minimum:

a) development proposals must be at least Air Quality Neutral

b) development proposals 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

c) major development proposals must be submitted with an Air Quality Assessment. Air quality assessments should show how the development will meet the requirements of B1

d) development proposals in Air Quality Focus Areas or that are likely to be used by large numbers of people particularly vulnerable to poor air quality, such as children or older people should demonstrate that design measures have been used to minimise exposure".

A2.24 Part C of the Policy introduces the concept of Air Quality Positive for large-scale development, stating:

"Masterplans and development briefs for large-scale development proposals subject to an Environmental Impact Assessment should consider how local air quality can be improved across the area of the proposal as part of an air quality positive approach. To achieve this a statement should be submitted demonstrating:

1) how proposals have considered ways to maximise benefits to local air quality, and

2) what measures or design features will be put in place to reduce exposure to pollution, and how they will achieve this."

A2.25 Regarding construction and demolition impacts, Part D of Policy SI 1 of the London Plan states:

"In order 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".

A2.26 Part E of Policy SI 1 states the following regarding mitigation and offsetting of emissions:

"Development proposals should ensure that where emissions need to be reduced to meet the requirements of Air Quality Neutral or to make the impact of development on local air quality acceptable, this is done on-site. Where it can be demonstrated that emissions cannot be further reduced by on-site measures, off-site measures to improve local air quality may be acceptable, provided that equivalent air quality benefits can be demonstrated within the area affected by the development".

A2.27 The explanatory text around Policy SI 1 of the London Plan states the following with regard to assessment criteria:

"The Mayor is committed to making air quality in London the best of any major world city, which means not only achieving compliance with legal limits for Nitrogen Dioxide as soon as possible and maintaining compliance where it is already achieved, but also achieving World Health Organisation targets for other pollutants such as Particulate Matter.

The aim of this policy is to ensure that new developments are designed and built, as far as is possible, to improve local air quality and reduce the extent to which the public are exposed to poor air quality. This means that new developments, as a minimum, must not cause new exceedances of legal air quality standards, or delay the date at which compliance will be achieved in areas that are currently in exceedance of legal limits. Where limit values are already met, or are predicted to be met at the time of completion, new developments must endeavour to maintain the best ambient air quality compatible with sustainable development principles.

Where this policy refers to 'existing poor air quality' this should be taken to include areas where legal limits for any pollutant, or World Health Organisation targets for Particulate Matter, are already exceeded and areas where current pollution levels are within 5 per cent of these limits"[1].

Design-led Approach

[1] The London Plan was developed based on a World Health Organisation guideline for $PM_{2.5}$ of 10 µg/m^3 (see Paragraph A2.33).

A2.28 Policy D3 on optimising site capacity through the design-led approach states that *"development proposals should…help prevent or mitigate the impacts of noise and poor air quality"*. The explanatory text around this Policy states the following:

"Measures to design out exposure to poor air quality and noise from both external and internal sources should be integral to development proposals and be considered early in the design process. Characteristics that increase pollutant or noise levels, such as poorly-located emission sources, street canyons and noise sources should also be designed out wherever possible. Optimising site layout and building design can also reduce the risk of overheating as well as minimising carbon emissions by reducing energy demand".

Development Plans

A2.29 Policy SI 1 of the London Plan (GLA, 2021a) states the following regarding strategic development plans:

"Development Plans, through relevant strategic, site-specific and area-based policies, should seek opportunities to identify and deliver further improvements to air quality and should not reduce air quality benefits that result from the Mayor's or boroughs' activities to improve air quality."

Preliminary Air Quality Assessment

A2.30 The London Plan sets out expectations around the consideration of air quality in the design of all major developments:

"For major developments, a preliminary Air Quality Assessment should be carried out before designing the development to inform the design process. The aim of a preliminary assessment is to assess:

- *The most significant sources of pollution in the area*
- *Constraints imposed on the site by poor air quality*
- *Appropriate land uses for the site*
- *Appropriate design measures that could be implemented to ensure that development reduces exposure and improves air quality.*

Further assessments should then be carried out as the design evolves to ensure that impacts from emissions are prevented or minimised as far as possible, and to fully quantify the expected effect of any proposed mitigation measures, including the cumulative effect where other nearby developments are also underway or likely to come forward".

Air Quality Positive

A2.31 The London Plan explains what is meant by 'Air Quality Positive' in the explanatory text around Policy SI 1:

"An air quality positive approach is linked to other policies in the London Plan, such as Healthy Streets, energy masterplanning and green infrastructure. One of the keys to delivering this will be to draw existing good practice together in a holistic fashion, at an early stage in the process, to ensure that the development team can identify which options deliver the greatest improvement to air quality. Large schemes, subject to Environmental Impact Assessment, commonly have project and design teams representing a range of expertise, that can feed in to the development of a statement to set out how air quality can be improved across the proposed area of the development.

Single-site schemes, including referable schemes, are often constrained by pre-existing urban form and structure, transport and heat networks. These constraints may limit their ability to consider how to actively improve local air quality. By contrast, large schemes, particularly masterplans, usually have more flexibility to consider how new buildings, amenity and public spaces, transport and heat networks are deployed across the area and will therefore have greater opportunities to improve air quality and reduce exposure through the careful choice of design and infrastructure solutions. Delivery of an air quality positive approach will be project specific and will rely on the opportunities on site or in the surrounding area to improve air quality.

Statements for large-scale development proposals, prepared in response to Part C of this policy, should set out:

- *How air quality is intended to be analysed and opportunities for its improvement identified as part of the design process.*
- *How air quality improvements have informed the design choices made about layout and distribution of buildings, amenity spaces and infrastructure.*
- *What steps will be taken to promote the uptake and use of sustainable and zero-emission modes of transport beyond minimum requirements. This may include specific measures in transport plans or delivery against Healthy Streets indicators.*
- *How air pollutant emissions from the buildings or associated energy centres can be reduced beyond the minimum requirements set out in Part B of this policy. This may include specific measures in heating masterplans or working with existing heat network providers to reduce or eliminate energy centre emissions.*
- *How specific measures that are identified to deliver air quality improvements will be evaluated and secured, including whether more detailed design specifications will be required so that the final development meets the desired performance".*

Electric Vehicle Charging

A2.32 To support the uptake of zero tailpipe emission vehicles, Policy T6.1 of the London Plan states:

"All residential car parking spaces must provide infrastructure for electric or Ultra-Low Emission vehicles. At least 20 per cent of spaces should have active charging facilities, with passive provision for all remaining spaces".

London Environment Strategy

A2.33 The London Environment Strategy was published in May 2018 (GLA, 2018a). The strategy considers air quality in Chapter 4; the Mayor's main objective is to create a "*zero emission London by 2050*". Policy 4.2.1 aims to "*reduce emissions from London's road transport network by phasing out fossil fuelled vehicles, prioritising action on diesel, and enabling Londoners to switch to more sustainable forms of transport*". The strategy sets a target to achieve, by 2030, the guideline value for PM2.5 which was set by the World Health Organisation (WHO) in 2005. An implementation plan for the strategy has also been published which sets out what the Mayor will do between 2018 and 2023 to help achieve the ambitions in the strategy.

A2.34 The air quality chapter of the London Environment Strategy sets out three main objectives, each of which is supported by sub-policies and proposals. The Objectives and their sub-policies are set out below:

"Objective 4.1: Support and empower London and its communities, particularly the most disadvantaged and those in priority locations, to reduce their exposure to poor air quality.

- *Policy 4.1.1 Make sure that London and its communities, particularly the most disadvantaged and those in priority locations, are empowered to reduce their exposure to poor air quality*
- *Policy 4.1.2 Improve the understanding of air quality health impacts to better target policies and action*

Objective 4.2: Achieve legal compliance with UK and EU limits as soon as possible, including by mobilising action from London Boroughs, government and other partners

- *Policy 4.2.1 Reduce emissions from London's road transport network by phasing out fossil fuelled vehicles, prioritising action on diesel, and enabling Londoners to switch to more sustainable forms of transport*
- *Policy 4.2.2 Reduce emissions from non-road transport sources, including by phasing out fossil fuels*
- *Policy 4.2.3 Reduce emissions from non-transport sources, including by phasing out fossil fuels*

- *Policy 4.2.4 The Mayor will work with the government, the London boroughs and other partners to accelerate the achievement of legal limits in Greater London and improve air quality*
- *Policy 4.2.5 The Mayor will work with other cities (here and internationally), global city and industry networks to share best practice, lead action and support evidence based steps to improve air quality*

Objective 4.3: Establish and achieve new, tighter air quality targets for a cleaner London by transitioning to a zero emission London by 2050, meeting world health organization health-based guidelines for air quality

- *Policy 4.3.1 The Mayor will establish new targets for $PM_{2.5}$ and other pollutants where needed. The Mayor will seek to meet these targets as soon as possible, working with government and other partners*
- *Policy 4.3.2 The Mayor will encourage the take up of ultra low and zero emission technologies to make sure London's entire transport system is zero emission by 2050 to further reduce levels of pollution and achieve WHO air quality guidelines*
- *Policy 4.3.3 Phase out the use of fossil fuels to heat, cool and maintain London's buildings, homes and urban spaces, and reduce the impact of building emissions on air quality*
- *Policy 4.3.4 Work to reduce exposure to indoor air pollutants in the home, schools, workplace and other enclosed spaces"*

A2.35 While the policies targeting transport sources are significant, there are less obvious ones that will also require significant change. In particular, the aim to phase out fossil-fuels from building heating and cooling and from NRMM will demand a dramatic transition.

Low Emission Zone

A2.36 The Low Emission Zone (LEZ) was implemented as a key measure to improve air quality in Greater London. It entails charges for vehicles entering Greater London not meeting certain emissions criteria, and affects diesel-engined lorries, buses, coaches, large vans, minibuses and other specialist vehicles derived from lorries and vans. Since 1 March 2021, a standard of Euro VI has applied for HGVs, buses and coaches, while a standard of Euro 3 has applied for large vans, minibuses and other specialist diesel vehicles since 2012.

Ultra Low Emission Zone

A2.37 London's Ultra Low Emission Zone (ULEZ) was introduced on 8 April 2019. The ULEZ currently operates 24 hours a day, 7 days a week and covers the entire area within the North and South Circular roads. All cars, motorcycles, vans and minibuses are required to meet exhaust emission

standards (ULEZ standards) or pay an additional daily charge to travel within the zone. The ULEZ standards are Euro 3 for motorcycles, Euro 4 for petrol cars, vans and minibuses and Euro 6 for diesel cars, vans and minibuses. The ULEZ does not include any requirements relating to heavy vehicle (HGV, coach and bus) emissions, as these are addressed by the amendments to the LEZ described in Paragraph A2.36.

A2.38 The ULEZ was expanded across all London boroughs on the 29th August 2023 and includes the emissions standards set out in Paragraph A2.37.

Other Measures

A2.39 Since 2018, all taxis presented for licencing for the first time had to be zero emission capable (ZEC). This means they must be able to travel a certain distance in a mode which produces no air pollutants, and all private hire vehicles (PHVs) presented for licensing for the first time had to meet Euro 6 emissions standards. Since January 2020, all newly manufactured PHVs presented for licensing for the first time had to be ZEC (with a minimum zero emission range of 10 miles). The Mayor's aim is that the entire taxi and PHV fleet will be made up of ZEC vehicles by 2033.

A2.40 The Mayor has also proposed to make sure that TfL leads by example by cleaning up its bus fleet, implementing the following measures:

- TfL will procure only hybrid or zero emission double-decker buses from 2018;
- a commitment to providing 3,100 double decker hybrid buses by 2019 and 300 zero emission single-deck buses in central London by 2020;
- introducing 12 Low Emission Bus Zones by 2020;
- investing £50m in Bus Priority Schemes across London to reduce engine idling; and
- retrofitting older buses to reduce emissions (selective catalytic reduction (SCR) technology has already been fitted to 1,800 buses, cutting their NOx emissions by around 88%).

Mayor's Transport Strategy

A2.41 The Mayor's Transport Strategy (GLA, 2018b) sets out the Mayor's policies and proposals to reshape transport in London over the next two decades. The Strategy focuses on reducing car dependency and increasing active sustainable travel, with the aim of improving air quality and creating healthier streets. It notes that development proposals should "*be designed so that walking and cycling are the most appealing choices for getting around locally*".

GLA SPG: The Control of Dust and Emissions During Construction and Demolition

A2.42 The Greater London Authority's (GLA's) Supplementary Planning Guidance (SPG) on The Control of Dust and Emissions During Construction and Demolition (GLA, 2014) outlines a risk assessment based approach to considering the potential for dust generation from a construction site, and sets

out what mitigation measures should be implemented to minimise the risk of construction dust impacts, dependent on the outcomes of the risk assessment. This guidance is largely based on the Institute of Air Quality Management's (IAQM's) guidance (IAQM, 2016), and it states that "*the latest version of the IAQM Guidance should be used*".

Air Quality Focus Areas

A2.43 The GLA has identified 160 air quality Focus Areas in London. These are locations that not only exceed the annual mean limit value for nitrogen dioxide, but also have high levels of human exposure. They do not represent an exhaustive list of London's air quality hotspot locations, but locations where the GLA believes the problem to be most acute. They are also areas where the GLA considers there to be the most potential for air quality improvements and are, therefore, where the GLA and Transport for London (TfL) will focus actions to improve air quality. The proposed development is located within the *'Marylebone Road from Marble Arch / Euston / King's Cross Junction'* air quality Focus Area.

Local Policies

A2.44 The Camden Local Plan was adopted in 2017. The Plan sets out the Council's planning policies, covering the period from 2016-2031, and replaces the Core Strategy and Development Policies planning documents (adopted in 2010).

A2.45 Policy A1 on managing the impact of development states that "The Council will seek to protect the quality of life of occupiers and neighbours" and will "seek to ensure that the amenity of communities, occupiers and neighbours is protected […] and require mitigation measures where necessary. Factors that will be considered include odour, fumes and dust".

A2.46 Policy CC4 on Air Quality states 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 (AQA) 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 permissions 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 emission impacts in an AQA and include appropriate mitigation measures to be secured in a Construction Management Plan."

A2.47 To support Policy CC4, the new Local Plan also includes Policy T2 which requires "*all new developments in the borough to be car-free*".

A2.48 Policy D1 Design, has implications to air quality as well:

"*The Council will seek to secure high quality design in development. The Council will require that development […]*

c. is sustainable in design and construction, incorporating best practice in resource management and climate change mitigation and adaptation;

h. promotes health;

The Council will resist development of poor design that fails to take the opportunities available for improving the character and quality of an area and the way it functions…"

A2.49 The plan elaborates that design can impact on air quality and health:

"*The way an area is designed and managed can have a significant impact on people's quality of life, health and wellbeing. Planning has a key role in promoting good physical and mental health by creating streets, spaces and buildings which allow and encourage healthy lifestyles. Architecture and urban design can affect human health through […] air quality [...]. The Council will require applicants to consider how development will contribute to improving health*."

A2.50 To support the Camden Local Plan, the Council has published a Camden Planning Guidance (CPG) document, specifically pertaining to air quality, which forms a Supplementary Planning Document (SPD). The CPG states that:

- "*All developments are to protect future occupants from exposure to poor air quality; and*
- *All developments are to limit their impact on local air quality and be at least air quality neutral*."

A2.51 The CPG describes air quality in the borough and measures to minimise emissions. The CPG references the WHO guideline targets for NO_2, PM_{10} and $PM_{2.5}$ of 40 µg/m^3, 20 µg/m^3 and 10 µg/m^3 respectively which Camden aims to achieve by 2030. The SPD also states that "*For the determination of planning applications and appraisal of Construction Management Plans, consideration must be paid to uncertainty in NO_2 data, therefore 38µg/m^3 (the 40µg/m^3 WHO limit less 5%) shall be taken as the limit for this pollutant*".

A2.52 The SPD outlines when an air quality assessment should be undertaken and what the assessment should cover. With respect to dispersion modelling, the SPD states that "*Modelling should not predict improvements to future years (future vehicle emissions or future background concentrations)*."

Building Standards

A2.53 Part F(1) of Schedule 1 of the Building Regulations 2010 as amended June 2022 (Ministry of Housing, Communities & Local Government, 2022) places a duty on building owners, or those responsible for relevant building work[2], to ensure adequate ventilation is provided to building occupants.

A2.54 Approved Document F (HM Government, 2021a), which accompanies the Building Regulations, explains that care should be taken to minimise entry of external air pollutants. Specific steps should be taken to manage ventilation intakes where the building is near to a significant source of emissions, or if local ambient concentrations exceed values set in the Air Quality Standards Regulations 2010 (see Chapter 9: Air Quality). These steps include maximising the distance between emission source and air intake, considering likely dispersion patterns, and considering the timing of pollution releases when designing the ventilation system.

A2.55 Part S(1) of Schedule 1, and Regulation 44D, of the Building Regulations 2010 (Ministry of Housing, Communities & Local Government, 2022) define a requirement for the provision of infrastructure for charging electric vehicles. Precise requirements are explained further within Approved Document S (HM Government, 2021b) and depend on the overall number of parking spaces provided and the average financial cost of installation.

A2.56 Compliance with the Building Regulations is not required for planning approval, but it is assumed that the Regulations will be complied with in the completed development.

Air Quality Action Plans

National Air Quality Plan

A2.57 Defra has produced an Air Quality Plan to tackle roadside nitrogen dioxide concentrations in the UK (Defra, 2017); a supplement to the 2017 Plan (Defra, 2018a) was published in October 2018 and sets out the steps Government is taking in relation to a further 33 local authorities where shorter-term exceedances of the limit value were identified. Alongside a package of national measures, the 2017 Plan and the 2018 Supplement require those identified English Local Authorities (or the GLA in the case of London Authorities) to produce local action plans and/or feasibility studies. These plans and feasibility studies must have regard to measures to achieve the statutory limit values within the shortest possible time, which may include the implementation of a Clean Air Zone (CAZ). There

[2] Building work is a legal term for work covered by the Building Regulations. With limited exemptions, the Regulations apply to all significant building work, including erecting or extending a building.

is currently no straightforward way to take account of the effects of the 2017 Plan or 2018 Supplement in the modelling undertaken for this assessment; however, consideration has been given to whether there is currently, or is likely to be in the future, a limit value exceedance in the vicinity of the proposed development. This assessment has principally been carried out in relation to the air quality objectives, rather than the limit values that are the focus of the Air Quality Plan.

Local Air Quality Action Plan

A2.58 LBC's combined Clean Air Strategy and Clean Air Action Plan (CAAP) (LBC, 2022) sets out the strategic objectives for improving air quality in the borough between 2019 and 2034 and the actions that will be undertaken between 2023 and 2026 to support the strategic objectives.

A2.59 One of the Clean Air Strategy's key commitments is "achieving the most stringent evidence-based air quality targets available, in as short a timeframe as possible. Currently, these are the World Health Organization's (WHO) air quality guidelines, published in 2021" of 10 $\mu g/m^3$ for NO_2 by 2034, 15 $\mu g/m^3$ for PM_{10} by 2030 and 5 $\mu g/m^3$ for $PM_{2.5}$ by 2034. These are more stringent than those published in the Air Quality CPG, which are based on the previous WHO guidelines but are recommended for use "for the determination of planning applications and appraisal of Construction Management Plans" (LBC, 2021).

A2.60 The Clean Air Action Plan contains 36 *'Clean Air Outcomes'* to help improve air quality and protect health in Camden. The Plan sets out seven themes, around which a number of actions have been developed in order to improve local air quality:

- reducing construction emissions;
- reducing building emissions;
- reducing transport emissions;
- supporting communities and schools;
- indirect emissions and lobbying;
- public health and awareness; and
- indoor air quality and occupational exposure.

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A3 Construction Dust Assessment Procedure

A3.1 The criteria developed by IAQM (2016), upon which the GLA's guidance is based, divide the activities on construction sites into four types to reflect their different potential impacts. These are:

- demolition;
- earthworks;
- construction; and
- trackout.

A3.2 It is noted that whilst there is a new version of the guidance, this has not been used or referenced due to the inconsistencies and errors in the latest version. The IAQM have confirmed a new version will be published which addressed these errors. At the time of writing the corrected IAQM guidance has not been published and as such the 2016 Guidance has been used.

A3.3 The assessment procedure includes the four steps summarised below:

STEP 1: Screen the Need for a Detailed Assessment

A3.4 An assessment is required where there is a human receptor within 350 m of the boundary of the site and/or within 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance(s), or where there is an ecological receptor within 50 m of the boundary of the site and/or within 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance(s).

A3.5 Where the need for a more detailed assessment is screened out, it can be concluded that the level of risk is *negligible* and that any effects will be 'not significant'. No mitigation measures beyond those required by legislation will be required.

STEP 2: Assess the Risk of Dust Impacts

A3.6 A site is allocated to a risk category based on two factors:

- the scale and nature of the works, which determines the potential dust emission magnitude (Step 2A); and
- the sensitivity of the area to dust effects (Step 2B).

A3.7 These two factors are combined in Step 2C, which is to determine the risk of dust impacts with no mitigation applied. The risk categories assigned to the site may be different for each of the four potential sources of dust (demolition, earthworks, construction and trackout).

Step 2A – Define the Potential Dust Emission Magnitude

A3.8 Dust emission magnitude is defined as either 'Small', 'Medium', or 'Large'. The IAQM guidance explains that this classification should be based on professional judgement, but provides the examples in Table A3.1.

Table A3.1: Examples of How the Dust Emission Magnitude Class May be Defined

Class	Examples
Demolition	
Large	Total building volume >50,000 m^3, potentially dusty construction material (e.g. concrete), on site crushing and screening, demolition activities >20 m above ground level
Medium	Total building volume 20,000 m^3 – 50,000 m^3, potentially dusty construction material, demolition activities 10-20 m above ground level
Small	Total building volume <20,000 m^3, construction material with low potential for dust release (e.g. metal cladding or timber), demolition activities <10 m above ground, demolition during wetter months
Earthworks	
Large	Total site area >10,000 m^2, potentially dusty soil type (e.g. clay, which will be prone to suspension when dry to due small particle size), >10 heavy earth moving vehicles active at any one time, formation of bunds >8 m in height, total material moved >100,000 tonnes
Medium	Total site area 2,500 m^2 – 10,000 m^2, moderately dusty soil type (e.g. silt), 5-10 heavy earth moving vehicles active at any one time, formation of bunds 4 m – 8 m in height, total material moved 20,000 tonnes – 100,000 tonnes
Small	Total site area <2,500 m^2, soil type with large grain size (e.g. sand), <5 heavy earth moving vehicles active at any one time, formation of bunds <4 m in height, total material moved <20,000 tonnes, earthworks during wetter months
Construction	
Large	Total building volume >100,000 m^3, piling, on site concrete batching; sandblasting
Medium	Total building volume 25,000 m^3 – 100,000 m^3, potentially dusty construction material (e.g. concrete), piling, on site concrete batching
Small	Total building volume <25,000 m^3, construction material with low potential for dust release (e.g. metal cladding or timber)
Trackout [a]	
Large	>50 HDV (>3.5t) outward movements in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length >100 m
Medium	10-50 HDV (>3.5t) outward movements in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length 50 m – 100 m
Small	<10 HDV (>3.5t) outward movements in any one day, surface material with low potential for dust release, unpaved road length <50 m

[a] These numbers are for vehicles that leave the site after moving over unpaved ground.

Step 2B – Define the Sensitivity of the Area

A3.9 The sensitivity of the area is defined taking account of a number of factors:

- the specific sensitivities of receptors in the area;

- the proximity and number of those receptors;
- in the case of PM_{10}, the local background concentration; and
- site-specific factors, such as whether there are natural shelters to reduce the risk of wind-blown dust.

A3.10 The first requirement is to determine the specific sensitivities of local receptors. The IAQM guidance recommends that this should be based on professional judgment, taking account of the principles in Table A3.2. These receptor sensitivities are then used in the matrices set out in

A3.11 Table A3.3, Table A3.4 and Table A3.5 to determine the sensitivity of the area. Finally, the sensitivity of the area is considered in relation to any other site-specific factors, such as the presence of natural shelters etc., and any required adjustments to the defined sensitivities are made.

Step 2C – Define the Risk of Impacts

A3.12 The dust emission magnitude determined at Step 2A is combined with the sensitivity of the area determined at Step 2B to determine the *risk* of impacts with no mitigation applied. The IAQM guidance provides the matrix in Table A3.6 as a method of assigning the level of risk for each activity.

STEP 3: Determine Site-specific Mitigation Requirements

A3.13 The IAQM guidance provides a suite of recommended and desirable mitigation measures which are organised according to whether the outcome of Step 2 indicates a low, medium, or high risk. The list provided in the IAQM guidance has been used as the basis for the requirements set out in Appendix A11.

STEP 4: Determine Significant Effects

A3.14 The IAQM guidance does not provide a method for assessing the significance of effects before mitigation and advises that pre-mitigation significance should not be determined. With appropriate mitigation in place, the IAQM guidance is clear that the residual effect will normally be 'not significant'.

A3.15 The IAQM guidance recognises that, even with a rigorous dust management plan in place, it is not possible to guarantee that the dust mitigation measures will be effective all of the time, for instance under adverse weather conditions. The local community may therefore experience occasional, short-term dust annoyance. The scale of this would not normally be considered sufficient to change the conclusion that the effects will be 'not significant'.

Table A3.2: Principles to be Used When Defining Receptor Sensitivities

Class	Principles	Examples
Sensitivities of People to Dust Soiling Effects		
High	users can reasonably expect enjoyment of a high level of amenity; or the appearance, aesthetics or value of their property would be diminished by soiling; and the people or property would reasonably be expected to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land	dwellings, museum and other culturally important collections, medium and long term car parks and car showrooms
Medium	users would expect to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home; or the appearance, aesthetics or value of their property could be diminished by soiling; or the people or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land	parks and places of work
Low	the enjoyment of amenity would not reasonably be expected; or there is property that would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling; or there is transient exposure, where the people or property would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land	playing fields, farmland (unless commercially-sensitive horticultural), footpaths, short term car parks and roads
Sensitivities of People to the Health Effects of PM_{10}		
High	locations where members of the public may be exposed for eight hours or more in a day	residential properties, hospitals, schools and residential care homes
Medium	locations where the people exposed are workers, and where individuals may be exposed for eight hours or more in a day.	may include office and shop workers, but will generally not include workers occupationally exposed to PM_{10}
Low	locations where human exposure is transient	public footpaths, playing fields, parks and shopping streets
Sensitivities of Receptors to Ecological Effects		
High	locations with an international or national designation and the designated features may be affected by dust soiling; or locations where there is a community of a particularly dust sensitive species	Special Areas of Conservation with dust sensitive features
Medium	locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown; or locations with a national designation where the features may be affected by dust deposition	Sites of Special Scientific Interest with dust sensitive features
Low	locations with a local designation where the features may be affected by dust deposition	Local Nature Reserves with dust sensitive features

Table A3.3: Sensitivity of the Area to Dust Soiling Effects on People and Property [3]

Receptor Sensitivity	Number of Receptors	Distance from the Source (m)			
		<20	<50	<100	<350
High	>100	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

[3] For demolition, earthworks and construction, distances are taken either from the dust source or from the boundary of the site. For trackout, distances are measured from the sides of roads used by construction traffic. Without mitigation, trackout may occur from roads up to 500 m from sites with a *large* dust emission magnitude for trackout, 200 m from sites with a *medium* dust emission magnitude and 50 m from sites with a *small* dust emission magnitude, as measured from the site exit. The impact declines with distance from the site, and it is only necessary to consider trackout impacts up to 50 m from the edge of the road.

Table A3.4: Sensitivity of the Area to Human Health Effects [3]

Receptor Sensitivity	Annual Mean PM_{10}	Number of Receptors	Distance from the Source (m)				
			<20	<50	<100	<200	<350
High	>32 µg/m³	>100	High	High	High	Medium	Low
		10-100	High	High	Medium	Low	Low
		1-10	High	Medium	Low	Low	Low
	28-32 µg/m³	>100	High	High	Medium	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	High	Medium	Low	Low	Low
	24-28 µg/m³	>100	High	Medium	Low	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	<24 µg/m³	>100	Medium	Low	Low	Low	Low
		10-100	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Medium	>32 µg/m³	>10	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	28-32 µg/m³	>10	Medium	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	24-28 µg/m³	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	<24 µg/m³	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Low	-	>1	Low	Low	Low	Low	Low

Table A3.5: Sensitivity of the Area to Ecological Effects [3]

Receptor Sensitivity	Distance from the Source (m)	
	<20	<50
High	High	Medium
Medium	Medium	Low
Low	Low	Low

Table A3.6: Defining the Risk of Dust Impacts

Sensitivity of the Area	Dust Emission Magnitude		
	Large	Medium	Small
Demolition			
High	High Risk	Medium Risk	Medium Risk
Medium	High Risk	Medium Risk	Low Risk
Low	Medium Risk	Low Risk	Negligible
Earthworks			
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible
Construction			
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible
Trackout			
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Low Risk	Negligible
Low	Low Risk	Low Risk	Negligible

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A4 EPUK & IAQM Planning for Air Quality Guidance

A4.1 The guidance issued by Environmental Protection UK (EPUK) and the IAQM (Moorcroft and Barrowcliffe et al, 2017) is comprehensive in its explanation of the place of air quality in the planning regime. Key sections of the guidance not already mentioned above are set out below.

Air Quality as a Material Consideration

"Any air quality issue that relates to land use and its development is capable of being a material planning consideration. The weight, however, given to air quality in making a planning application decision, in addition to the policies in the local plan, will depend on such factors as:

- *the severity of the impacts on air quality;*
- *the air quality in the area surrounding the proposed development;*
- *the likely use of the development, i.e. the length of time people are likely to be exposed at that location; and*
- *the positive benefits provided through other material considerations".*

Recommended Best Practice

A4.2 The guidance goes into detail on how all development proposals can and should adopt good design principles that reduce emissions and contribute to better air quality management. It states:

"The basic concept is that good practice to reduce emissions and exposure is incorporated into all developments at the outset, at a scale commensurate with the emissions".

A4.3 The guidance sets out a number of good practice principles that should be applied to all developments that:

- include 10 or more dwellings;
- where the number of dwellings is not known, residential development is carried out on a site of more than 0.5 ha;
- provide more than 1,000 m^2 of commercial floorspace;
- are carried out on land of 1 ha or more.

A4.4 The good practice principles are that:

- New developments should not contravene the Council's Air Quality Action Plan, or render any of the measures unworkable;
- Wherever possible, new developments should not create a new "street canyon", as this inhibits pollution dispersion;

- Delivering sustainable development should be the key theme of any application;
- New development should be designed to minimise public exposure to pollution sources, e.g. by locating habitable rooms away from busy roads;
- The provision of at least 1 Electric Vehicle (EV) "rapid charge" point per 10 residential dwellings and/or 1000 m^2 of commercial floorspace. Where on-site parking is provided for residential dwellings, EV charging points for each parking space should be made available;
- Where development generates significant additional traffic, provision of a detailed travel plan (with provision to measure its implementation and effect) which sets out measures to encourage sustainable means of transport (public, cycling and walking) via subsidised or free-ticketing, improved links to bus stops, improved infrastructure and layouts to improve accessibility and safety;
- All gas-fired boilers to meet a minimum standard of <40 mgNOx/kWh;
- Where emissions are likely to impact on an AQMA, all gas-fired CHP plant to meet a minimum emissions standard of:
  - Spark ignition engine: 250 mgNOx/Nm^3;
  - Compression ignition engine: 400 mgNOx/Nm^3;
  - Gas turbine: 50 mgNOx/Nm^3.
- A presumption should be to use natural gas-fired installations. Where biomass is proposed within an urban area it is to meet minimum emissions standards of 275 mgNOx/Nm^3 and 25 mgPM/Nm^3.

A4.5 The guidance also outlines that offsetting emissions might be used as a mitigation measure for a proposed development. However, it states that:

"It is important that obligations to include offsetting are proportional to the nature and scale of development proposed and the level of concern about air quality; such offsetting can be based on a quantification of the emissions associated with the development. These emissions can be assigned a value, based on the "damage cost approach" used by Defra, and then applied as an indicator of the level of offsetting required, or as a financial obligation on the developer. Unless some form of benchmarking is applied, it is impractical to include building emissions in this approach, but if the boiler and CHP emissions are consistent with the standards as described above then this is not essential".

A4.6 The guidance offers a widely used approach for quantifying costs associated with pollutant emissions from transport. It also outlines the following typical measures that may be considered to offset emissions, stating that measures to offset emissions may also be applied as post assessment mitigation:

- Support and promotion of car clubs;
- Contributions to low emission vehicle refuelling infrastructure;
- Provision of incentives for the uptake of low emission vehicles;
- Financial support to low emission public transport options; and
- Improvements to cycling and walking infrastructures.

Screening

Impacts of the Local Area on the Development

"There may be a requirement to carry out an air quality assessment for the impacts of the local area's emissions on the proposed development itself, to assess the exposure that residents or users might experience. This will need to be a matter of judgement and should take into account:

- *the background and future baseline air quality and whether this will be likely to approach or exceed the values set by air quality objectives;*
- *the presence and location of Air Quality Management Areas as an indicator of local hotspots where the air quality objectives may be exceeded;*
- *the presence of a heavily trafficked road, with emissions that could give rise to sufficiently high concentrations of pollutants (in particular nitrogen dioxide), that would cause unacceptably high exposure for users of the new development; and*
- *the presence of a source of odour and/or dust that may affect amenity for future occupants of the development".*

Impacts of the Development on the Local Area

A4.7 The guidance sets out two stages of screening criteria that can be used to identify whether a detailed air quality assessment is required, in terms of the impact of the development on the local area. The first stage is that you should proceed to the second stage if any of the following apply:

- 10 or more residential units or a site area of more than 0.5 ha residential use; and/or
- more than 1,000 m^2 of floor space for all other uses or a site area greater than 1 ha.

A4.8 Coupled with any of the following:

- the development has more than 10 parking spaces; and/or
- the development will have a centralised energy facility or other centralised combustion process.

A4.9 If the above do not apply then the development can be screened out as not requiring a detailed air quality assessment of the impact of the development on the local area. If they do apply then you proceed to stage 2, which sets out indicative criteria for requiring an air quality assessment. The stage 2 criteria relating to vehicle emissions are set out below:

- the development will lead to a change in LDV flows of more than 100 AADT within or adjacent to an AQMA or more than 500 AADT elsewhere;
- the development will lead to a change in HDV flows of more than 25 AADT within or adjacent to an AQMA or more than 100 AADT elsewhere;
- the development will lead to a realigning of roads (i.e. changing the proximity of receptors to traffic lanes) where the change is 5m or more and the road is within an AQMA;
- the development will introduce a new junction or remove an existing junction near to relevant receptors, and the junction will cause traffic to significantly change vehicle acceleration/deceleration, e.g. traffic lights or roundabouts;
- the development will introduce or change a bus station where bus flows will change by more than 25 AADT within or adjacent to an AQMA or more than 100 AADT elsewhere; and
- the development will have an underground car park with more than 100 movements per day (total in and out) with an extraction system that exhausts within 20 m of a relevant receptor.

A4.10 The criteria are more stringent where the traffic impacts may arise on roads where concentrations are close to the objective. The presence of an AQMA is taken to indicate the possibility of being close to the objective, but where whole authority AQMAs are present and it is known that the affected roads have concentrations below 90% of the objective, the less stringent criteria are likely to be more appropriate.

A4.11 Should none of the above apply then the development can be screened out as not requiring a detailed air quality assessment of the impact of the development on the local area, provided that professional judgement is applied; the guidance importantly states the following:

"The criteria provided are precautionary and should be treated as indicative. They are intended to function as a sensitive 'trigger' for initiating an assessment in cases where there is a possibility of significant effects arising on local air quality. This possibility will, self-evidently, not be realised in many cases. The criteria should not be applied rigidly; in some instances, it may be appropriate to amend them on the basis of professional judgement, bearing in mind that the objective is to identify situations where there is a possibility of a significant effect on local air quality".

A4.12 Even if a development cannot be screened out, the guidance is clear that a detailed assessment is not necessarily required:

"The use of a Simple Assessment may be appropriate, where it will clearly suffice for the purposes of reaching a conclusion on the significance of effects on local air quality. The principle underlying this guidance is that any assessment should provide enough evidence that will lead to a sound conclusion on the presence, or otherwise, of a significant effect on local air quality. A Simple Assessment will be appropriate, if it can provide this evidence. Similarly, it may be possible to conduct a quantitative assessment that does not require the use of a dispersion model run on a computer".

A4.13 The guidance also outlines what the content of the air quality assessment should include, and this has been adhered to in the production of this chapter.

Assessment of Significance

A4.14 There is no official guidance in the UK in relation to development control on how to describe the nature of air quality impacts, nor how to assess their significance. The approach within the EPUK/IAQM guidance has, therefore, been used in this assessment. This approach involves a two stage process:

- a qualitative or quantitative description of the impacts on local air quality arising from the development; and
- a judgement on the overall significance of the effects of any impacts.

A4.15 The guidance recommends that the assessment of significance should be based on professional judgement, with the overall air quality impact of the development described as either 'significant' or 'not significant'. In drawing this conclusion, the following factors should be taken into account:

- the existing and future air quality in the absence of the development;
- the extent of current and future population exposure to the impacts;
- the influence and validity of any assumptions adopted when undertaking the prediction of impacts;
- the potential for cumulative impacts and, in such circumstances, several impacts that are described as '*slight*' individually could, taken together, be regarded as having a significant effect for the purposes of air quality management in an area, especially where it is proving difficult to reduce concentrations of a pollutant. Conversely, a '*moderate*' or '*substantial*' impact may not have a significant effect if it is confined to a very small area and where it is not obviously the cause of harm to human health; and
- the judgement on significance relates to the consequences of the impacts; will they have an effect on human health that could be considered as significant? In the majority of cases, the impacts from an individual development will be insufficiently large to result in

measurable changes in health outcomes that could be regarded as significant by health care professionals.

A4.16 The guidance is clear that other factors may be relevant in individual cases. It also states that the effect on the residents of any new development where the air quality is such that an air quality objective is not met will be judged as significant. For people working at new developments in this situation, the same will not be true as occupational exposure standards are different, although any assessment may wish to draw attention to the undesirability of the exposure.

A4.17 A judgement of the significance should be made by a competent professional who is suitably qualified. A summary of the professional experience of the staff contributing to this assessment is provided in Appendix A5.

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A5 Professional Experience

Guido Pellizzaro, BSc (Hons) MIAQM MIEnvSc PIEMA

Mr Pellizzaro is a Technical Director with AQC, with more than 15 years' experience in the field of air quality management and assessment. His main experience relates to managing and delivering air quality assessments for major planning applications and EIA development. He is a Member of the Institution of Environmental Sciences and of the Institute of Air Quality Management, and a Practitioner of the Institute of Environmental Management and Assessment.

Julia Burnell, MEnvSci (Hons) MIEnvSc MIAQM

Miss Burnell is a Senior Consultant with AQC with over seven years' experience in the field of air quality. She has experience of undertaking a range of air quality assessments for power, transportation, and mixed-use development projects both in the UK and internationally. She is also experienced at preparing environmental permit applications for medium combustion plant/specified generator sites and has commissioned and maintained numerous ambient air quality monitoring surveys. Prior to her work with AQC, Julia completed an MEnvSci (Hons) in Environmental Science (four-year integrated master's). She is a Member of both the Institute of Air Quality Management and the Institution of Environmental Sciences.

George Chousos, BSc MSc AMIEnvSc AMIAQM

Mr Chousos is a Consultant with AQC, having joined in May 2019. Prior to joining AQC, he completed an MSc in Air Pollution Management and Control at the University of Birmingham, specialising in air pollution control technologies and management, and data processing using R. He also holds a degree in Environmental Geoscience from the University of Cardiff, where he undertook a year in industry working in the field of photo-catalytic technology. Since joining AQC, George has been gaining experience in undertaking air quality assessments, both qualitatively and using atmospheric dispersion modelling, to accompany planning and permitting applications. Projects have ranged in scale, from small scale residential development to Environmental Impact Assessments (EIAs). The assessments have considered the effects on both human health and ecological habitats. George also has experience completing construction dust risk assessments, Air Quality Neutral assessments, Local Authority Annual Status Reports (ASRs), as well as odour assessments.

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A6 Modelling Methodology

Model Inputs

A6.1 Predictions have been carried out using the ADMS-Roads dispersion model (v5). The model requires the user to provide various input data, including emissions from each section of road and the road characteristics (including road width, street canyon width, street canyon height and porosity, where applicable). Vehicle emissions have been calculated based on vehicle flow, composition and speed data using the EFT (Version 11.0) published by Defra (2023c). Model input parameters are summarised in Table A6.1 and, where considered necessary, discussed further below.

Table A6.1: Summary of Model Inputs

Model Parameter	Value Used
Terrain Effects Modelled?	No
Variable Surface Roughness File Used?	No
Urban Canopy Flow Used?	Yes
Advanced Street Canyons Modelled?	Yes
Noise Barriers Modelled?	No
Meteorological Monitoring Site	London City
Meteorological Data Year	2022
Dispersion Site Surface Roughness Length (m)	1.5
Dispersion Site Minimum MO Length (m)	100
Met Site Surface Roughness Length (m)	0.2
Met Site Minimum MO Length (m)	75
Gradients?	No

A6.2 AADT flows and the proportions of HDVs for the future year scenarios, for the majority of the modelled road network, have been provided by Velocity Transport Ltd, who have undertaken the transport assessment work for the Proposed Development. In addition, 2019 AADT flows, and the proportions of HDVs, for Albany Street have been taken from the London Atmospheric Emissions Inventory (LAEI) (GLA, 2021b). The LAEI flows have been subsequently factored forwards to the assessment years of 2022 and 2030 using growth factors, 1.0369 and 1.1128 respectively, derived using the TEMPro System v7.2 (DfT, 2017).

A6.3 Traffic speeds have been estimated based on professional judgement, taking account of the LAEI modelled speeds, road layout, speed limits and the proximity to a junction. The traffic data used in this assessment are summarised in Table A6.2 and Table A6.3, for the operational and construction phase respectively. Diurnal and monthly flow profiles for the traffic have been derived from the national profiles published by DfT (2020).

A6.4 Velocity Transport Ltd have confirmed that the baseline traffic scenario (2022) has been based on a vacant site, with only a small number of operational vehicles associated with the retail uses currently operating within the tower.

Table A6.2: Summary of Traffic Data used in the Assessment – Operational Phase

Road Link	2022		2030 (Without Scheme)		2030 (With Scheme)	
	AADT	%HDV	AADT	%HDV	AADT	%HDV
Hamstead Road	12,680	14.5	12,710	14.5	12,809	14.4
Euston Road (underpass)	41,501	2.4	41,700	2.5	41,720	2.5
Euston Road off-slip (EB)	8,983	8.9	8,998	8.9	9,027	8.9
Euston Road on-slip (WB)	5,922	12.9	5,937	12.9	5,967	12.9
Euston Road on-slip (EB)	5,056	16.4	5,071	16.4	5,071	16.4
Euston Road off-slip (WB)	7,687	13.7	7,702	13.7	7,742	13.7
Tottenham Court Road	7,514	10.6	7,604	10.7	7,643	10.6
Drummond Street	3,032	6.0	3,032	6.0	3,132	6.1
Longford Street	3,263	7.0	3,263	7.0	3,383	7.0
Albany Street (north of junction)	10,943	11.9	11,744	11.9	11,744	11.9
Albany Street (south of junction)	14,050	9.8	15,078	9.8	15,078	9.8

Table A6.3: Summary of Traffic Data used in the Assessment – Construction Phase

Road Link	2025 (Without Scheme)		2025 (With Scheme)	
	AADT	%HDV	AADT	%HDV
Hamstead Road	12,710	14.5	12,737	14.6
Euston Road (underpass)	41,700	2.5	41,727	2.6
Euston Road off-slip (EB)	8,998	8.9	9,025	9.2
Euston Road on-slip (WB)	5,937	12.9	5,964	13.3
Euston Road on-slip (EB)	5,071	16.4	5,098	16.8
Euston Road off-slip (WB)	7,702	13.7	7,729	14.0
Tottenham Court Road	7,604	10.7	7,631	11.0
Drummond Street	3,032	6.0	3,059	6.9
Longford Street	3,263	7.0	3,290	7.7
Albany Street (north of junction)	11,800	11.9	11,827	12.1
Albany Street (south of junction)	15,150	9.8	15,177	9.9
Marylebone Road	56,635	4.6	56,662	4.7

A6.5 Figure A6.1 and Figure A6.2 show the road network included within the model, for the operational and construction phases respectively, along with the speed at which each link was modelled.

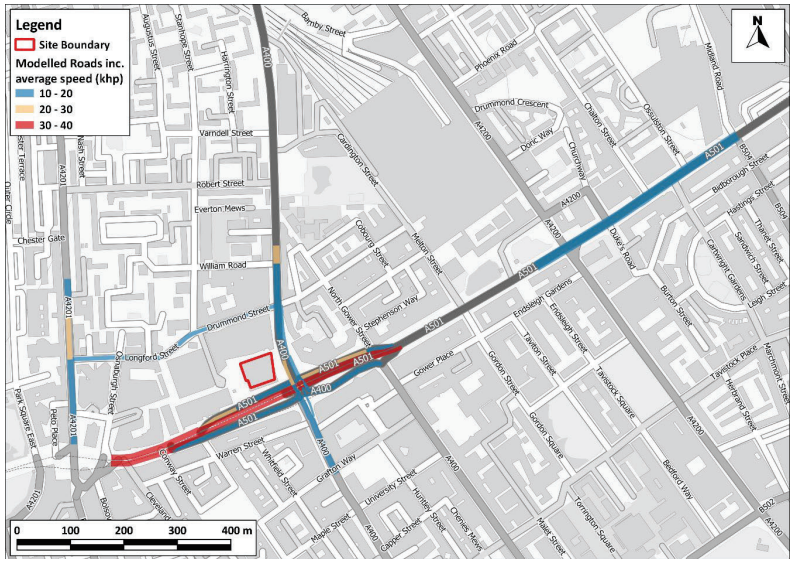

Figure A6.1: Modelled Road Network & Speed – Operational Phase

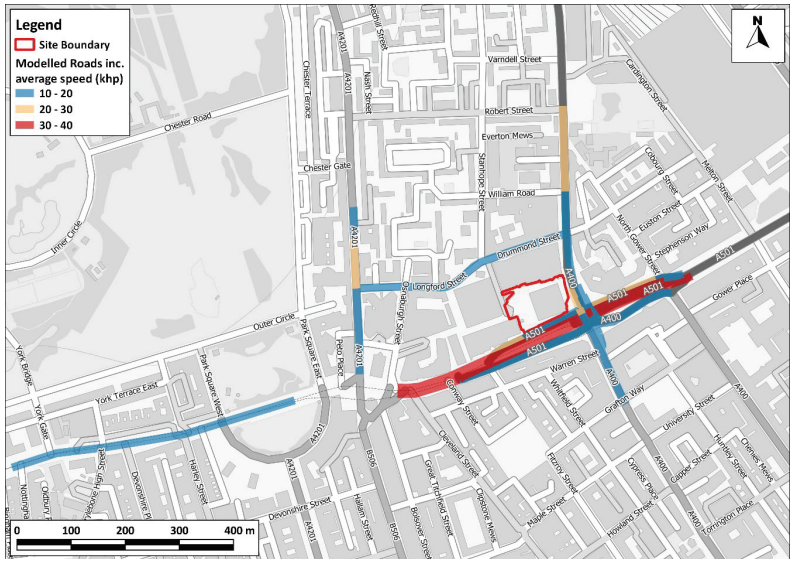

Figure A6.2: Modelled Road Network & Speed – Construction Phase

A6.6 For the purposes of modelling, it has been assumed that sections of Longford Street, Marylebone Road and Hamstead Road are within canyons formed by the existing buildings. These roads have a number of canyon-like features, which reduce dispersion of traffic emissions, and can lead to concentrations of pollutants being higher here than they would be in areas with greater dispersion. They have, therefore, been modelled as street canyons using ADMS-Roads' advanced canyon module, with appropriate input parameters determined from plans, on-site measurements, local mapping and photographs. The advanced canyon module has been used along with the urban canopy flow module, the input data for which have been published by Cambridge Environmental Research Consultants (CERC, 2016), who developed the ADMS models. The modelled canyons are shown in Figure A6.3.

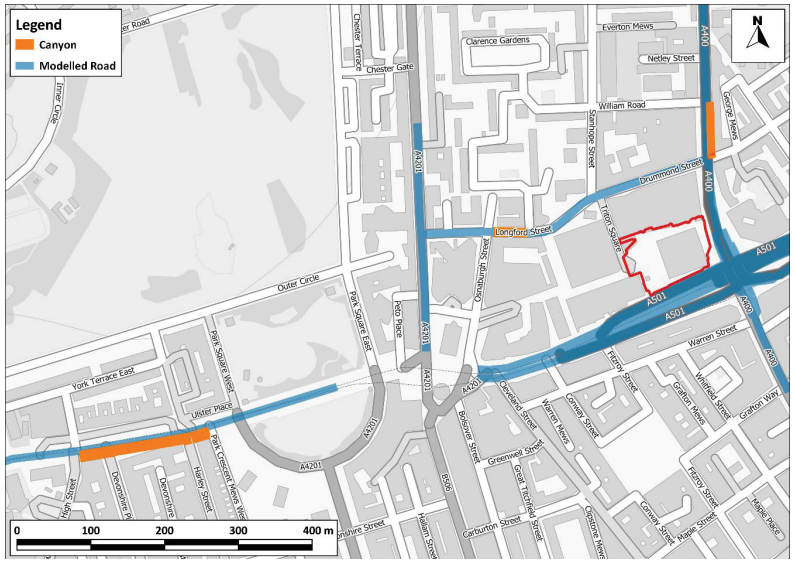

Figure A6.3: Modelled Canyons

A6.7 Hourly sequential meteorological data in sectors of 10 degrees from London City for 2019 have been used in the model. The London City meteorological monitoring station is located at London City Airport, approximately 15 km to the east of the Proposed Development. Both the application site and the London City meteorological monitoring station are located in the Greater London Area where they will be influenced by the effects of inland meteorology over urban topography. The topography of the model domain is similar to that around the meteorological monitoring station and measurements from this site are considered to provide the most robust basis to predict meteorology within the model domain. A wind rose for the site for the year 2019 is provided in Figure A6.4. Raw data were provided by the Met Office and processed by AQC for use in ADMS.

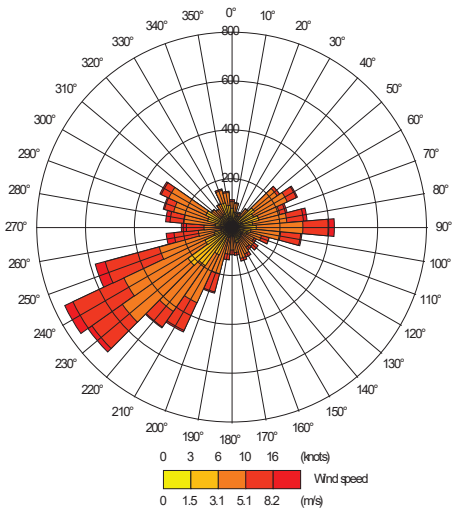

Figure A6.4: Wind Rose

Model Verification

A6.8 Evidence collected over many years has shown that, in most urban areas, dispersion modelling relying upon Defra's EFT has tended to systematically under-predict roadside nitrogen dioxide concentrations. To account for this, it is necessary to adjust the model against local measurements. The model has been run to predict annual mean nitrogen dioxide concentrations during 2022 at the 'CD9' automatic monitoring station. This site has been selected because it is located on the same road (Euston Road (A502)) as the Proposed Development and is considered to be the most representative of conditions found at the site.

Nitrogen Dioxide

A6.9 Most nitrogen dioxide (NO_2) is produced in the atmosphere by reaction of nitric oxide (NO) with ozone. It is therefore most appropriate to verify the model in terms of primary pollutant emissions of nitrogen oxides (NOx = NO + NO_2). The model has been run to predict the annual mean NOx concentrations during 2019 at diffusion tube automatic monitoring site 'CD9'. Concentrations have been modelled at 2.5 m, the height of the monitor.

A6.10 The model output of road-NOx (i.e., the component of total NOx coming from road traffic) has been compared with the 'measured' road-NOx. Measured road-NOx has been calculated from the measured NO_2 concentration and the predicted background NO_2 concentration using the NOx from NO_2 calculator (Version 8.1) available on the Defra LAQM Support website (Defra, 2023c).

A6.11 An adjustment factor has been determined as the ratio of the 'measured' road contribution and the model derived road contribution. This factor has then been applied to the modelled road-NOx concentration for each receptor to provide adjusted modelled road-NOx concentrations. The total nitrogen dioxide concentrations have then been determined by combining the adjusted modelled road-NOx concentrations with the predicted background NO_2 concentration within the NOx to NO_2 calculator (Defra, 2023c).

A6.12 The data used to calculate the adjustment factor are provided below:

- Measured NO_2 : 45.0 µg/m^3
- Background NO_2 : 35.4 µg/m^3
- 'Measured' road-NOx (using NOx from NO_2 calculator): 22.3 µg/m^3
- Modelled road-NOx = 21.2 µg/m^3
- Road-NOx adjustment factor: 22.3/21.2 = **1.0522**[4]

A6.13 The factor implies that the unadjusted model is marginally under-predicting the road-NOx contribution. This is a common experience with this and most other road traffic emissions dispersion models.

PM_{10} and $PM_{2.5}$

A6.14 The approach described above for NOx and nitrogen dioxide determines the road increment of concentrations by subtracting the predicted local background from the roadside measurements. This works well for NOx because the differences between roadside and background concentrations typically represent a large proportion of the total measured value. The same is not true for PM_{10} and $PM_{2.5}$ concentrations, which are dominated by non-road emissions, even at the roadside. In practice, the influence of a local road on concentrations can often be smaller than the uncertainty in the mapped background concentration. As an example of this, 31% of all roadside and kerbside sites in London which measured $PM_{2.5}$ in 2019 with >75% data capture, recorded an annual mean concentration lower than the equivalent Defra mapped background value. Using measured background concentrations does not provide any significant benefit, owing largely to the spatial resolution of available measurements, but also because of measurement uncertainty. For example, hourly-mean $PM_{2.5}$ concentrations measured at roadside sites are often lower than those measured at nearby urban background sites, while concentrations at urban background sites are often lower than those measured at rural sites.

[4] Based on un-rounded values.

A6.15 For these reasons, it is not appropriate to calculate the annual mean road-increment to PM_{10} and $PM_{2.5}$ concentrations by subtracting either the mapped background or a local measured background concentration. This, in turn, means that the approach to model adjustment which is described for NOx and NO_2 is not appropriate for PM_{10} and $PM_{2.5}$. Historically, many studies have derived a model adjustment factor for NOx and applied this to PM_{10} and $PM_{2.5}$. This is also not appropriate, since there is no reason to expect the same bias in emissions of NOx, PM_{10} and $PM_{2.5}$.

A6.16 While there is very strong evidence that EFT-based models have consistently under-predicted road-NOx concentrations in urban areas, there is no equivalent evidence for PM_{10} and $PM_{2.5}$. There is currently no strong basis for applying any adjustment to the model outputs. Predicted concentrations of PM_{10} and $PM_{2.5}$ have thus not been adjusted.

Post-processing

A6.17 The model predicts road-NOx concentrations at each receptor location. These concentrations have been adjusted using the adjustment factor set out above, which, along with the background NO_2, has been processed through the NOx to NO_2 calculator available on the Defra LAQM Support website (Defra, 2023c). The traffic mix within the calculator has been set to “All London UK traffic”, which is considered suitable for the study area. The calculator predicts the component of NO_2 based on the adjusted road-NOx and the background NO_2.

Appendix: Air Quality

A7 No Improvement Scenario

A7.1 As required by LBC, a no improvement scenario has been undertaken which considers concentrations at the proposed earliest year of operation (2030) and for the peak construction year scenario (2025) assuming no improvement in emission factors or background concentrations from the base year, i.e., using 2022 emission factors and background concentrations with the respective 2030 operational traffic data and 2025 construction traffic data.

Existing Receptors

Operational Phase

Baseline and Future Baseline Dispersion Model Results

A7.2 Baseline concentrations of NO_2, PM_{10} and $PM_{2.5}$, when considering a no improvement scenario, have been modelled at the two existing receptor locations and are set in Table A7.1 and Table A7.2.

Table A7.1: Modelled Annual Mean Baseline Concentrations of NO_2 at Existing Receptors (µg/m³) Assuming 2022 Emission Factors

Receptor	2022 Baseline	2030 Without Proposed Development
E1	32.7	32.6
E2	36.8	36.7
Objective	40 / 38 [a]	

[a] 38 µg/m³ is the LBC Air Quality CPG target for annual mean NO_2

Table A7.2: Modelled Annual Mean Baseline Concentrations of PM_{10} and $PM_{2.5}$ at Existing Receptors (µg/m³) Assuming 2022 Emission Factors

Receptor	PM_{10}		$PM_{2.5}$	
	2022 Baseline	2030 Without Proposed Development	2022 Baseline	2030 Without Proposed Development
E1	19.3	19.3	12.3	12.3
E2	19.4	19.4	12.4	12.4
Objective	32 [a] / 20 [b]		20 [c] /10 [d]	

[a] While the annual mean PM_{10} objective is 40 µg/m³, 32 µg/m³ is the annual mean concentration above which an exceedance of the 24-hour mean PM_{10} objective is possible, as outlined in LAQM.TG (Defra, 2022). A value of 32 µg/m³ is thus used as a proxy to determine the likelihood of exceedance of the 24-hour mean PM_{10} objective, as recommended in EPUK & IAQM guidance (Moorcroft and Barrowcliffe et al, 2017).

[b] 20 µg/m³ is the LBC Air Quality CPG target for annual mean PM_{10}; there is no requirement to meet this until 2026.

[c] The 20 µg/m³ $PM_{2.5}$ objective, which was to be met by 2020, is not in Regulations and there is no requirement for local authorities to meet it.

[d] 10 µg/m³ is the GLA target and the LBC Air Quality CPG target for annual mean $PM_{2.5}$; again, there is no requirement for local authorities to meet this until 2030. Exceedances of this target are shown in *italic*.

A7.3 As shown in Table A7.1, the predicted annual mean concentrations of NO_2 are below the objective and the LBC Air Quality CPG target at both receptors and are also below 60 µg/m³, indicating an exceedance of the 1-hour mean NO_2 objective is unlikely.

A7.4 As shown in Table A7.2, the predicted annual mean concentrations of PM_{10} and $PM_{2.5}$ are below the objective in both years at both receptors. The annual mean PM_{10} concentrations are also below the LBC Air Quality CPG criteria and below 32 µg/m³ so it is unlikely that the 24-hour mean PM_{10} objective will be exceeded.

A7.5 The annual mean concentrations of $PM_{2.5}$ exceed the GLA target/ LBC Air Quality CPG target in all years; however, exceedances of the guideline are common, and their nationwide achievement is very unlikely to be possible before 2030, especially in London.

Detailed Assessment of Development-Generated Road Traffic Emissions

A7.6 Future baseline concentrations of NO_2, PM_{10} and $PM_{2.5}$, when considering a no improvement scenario, in 2030 have been modelled at the two existing receptor locations and are set in Table A7.3 and Table A7.4.

Table A7.3: Predicted Impacts on Annual Mean NO_2 Concentrations in 2030 Assuming 2022 Emission Factors (µg/m³)

Receptor	Without Proposed Development	With Proposed Development	% Change [a]	Impact Descriptor
E1	32.6	32.7	0	Negligible
E2	36.7	36.8	0	Negligible
Objective	40 / 38 [b]		-	-

[a] % changes are relative to the objective and have been rounded to the nearest whole number.

[b] 38 µg/m³ is the LBC Air Quality CPG target for annual mean NO_2

Table A7.4: Predicted Impacts on Annual Mean PM_{10} and $PM_{2.5}$ Concentrations in 2030 Assuming 2022 Emission Factors (µg/m³)

Receptor	Annual Mean PM_{10} (µg/m³)				Annual Mean $PM_{2.5}$ (µg/m³)			
	Without Proposed Development	With Proposed Development	% Change [a]	Impact Descriptor	Without Proposed Development	With Proposed Development	% Change [a]	Impact Descriptor
E1	19.3	19.3	0	Negligible	12.3	12.3	0	Negligible
E2	19.4	19.4	0	Negligible	12.4	12.4	0	Negligible
Criterion	32 [b] / 20 [c]		-	-	20 [d]		-	-

[a] % changes are relative to the criterion and have been rounded to the nearest whole number.

[b] While the annual mean PM_{10} objective is 40 µg/m³, 32 µg/m³ is the annual mean concentration above which an exceedance of the 24-hour mean PM_{10} objective is possible, as outlined in LAQM.TG22 (Defra, 2022). A value of 32 µg/m³ is thus used as a proxy to determine the likelihood of exceedance of the 24-hour mean PM_{10} objective, as recommended in EPUK & IAQM guidance (Moorcroft and Barrowcliffe et al, 2017).

[c] 20 µg/m³ is the LBC Air Quality CPG target for annual mean PM_{10}; there is no requirement to meet this until 2026.

[d] The $PM_{2.5}$ objective, which was to be met by 2020, is not in Regulations and there is no requirement for local authorities to meet it.

A7.7 As shown in Table A7.3 the annual mean NO_2 concentrations for the no improvement scenario are below the objective and the LBC Air Quality CPG criteria at both receptors, with and without the Proposed Development. Furthermore, as the annual mean NO_2 concentrations are below 60 µg/m³, it is unlikely that the 1-hour mean NO_2 objective will be exceeded.

A7.8 The percentage change in concentrations, relative to the air quality objective (when rounded), is predicted to be zero. Using the matrix in Table 8.3 of the ES Chapter, this impact is described as negligible, and the effects are permanent, direct, long-term 'not significant' at the local level.

A7.9 Table A7.4 show the annual mean PM_{10} and $PM_{2.5}$ concentrations for the no improvement scenario are well below the respective objectives and the LBC Air Quality CPG criteria for PM_{10} at both receptors, with or without the Proposed Development. Furthermore, as the annual mean PM_{10} concentrations are below 32 µg/m³, it is unlikely that the 24-hour mean PM_{10} objective will be exceeded. The long-term average concentration at both receptors in assessment year is 75% or less of AQAL.

A7.10 Table A7.5 presents the same $PM_{2.5}$ concentrations as Table A7.4 but assesses the impacts against the GLA target for this pollutant (which is the same as the LBC Air Quality CPG criteria).

Table A7.5: Assessment of Annual Mean $PM_{2.5}$ Concentrations in 2030 against the GLA Target Assuming 2022 Emission Factors (µg/m³)

Receptor	Annual Mean $PM_{2.5}$ (µg/m³)			
	Without Scheme	With Scheme	% Change [a]	Impact Descriptor
E1	12.3	12.3	0	Negligible
E2	12.4	12.4	0	Negligible
GLA Target/Air Quality CPG criteria	10		-	-

[a] % changes are relative to the objective and have been rounded to the nearest whole number.

A7.11 The annual mean concentrations of $PM_{2.5}$ for the no improvement scenario exceed the GLA target and the LBC Air Quality CPG criteria with and without the Proposed Development; using the matrix in Table 8.3 in the ES Chapter, the impact is described as Negligible. The GLA aims to achieve the target for $PM_{2.5}$ of 10 µg/m³ by 2030. Exceedances of the target, however, are common and based on Defra's background maps, their achievement is very unlikely to be possible before 2030. As such, it is unsurprising that there are exceedances for both 'with Proposed Development' and 'without Proposed Development' scenarios.

Construction Phase

Baseline and Future Baseline Dispersion Model Results

A7.12 Baseline concentrations of NO_2, PM_{10} and $PM_{2.5}$, when considering a no improvement construction scenario, have been modelled at the four existing receptor locations and are set in Table A7.1 and Table A7.2.

Table A7.6: Modelled Annual Mean Baseline Concentrations of NO_2 at Existing Receptors Assuming 2022 Emission Factors (µg/m³)

Receptor	2022 Baseline	2025 Without Proposed Development
E3	29.9	**40.7**
E4	29.9	**43.8**
E5	29.9	39.7
E6	39.5	**42.5**
Objective	40 / 38 [a]	

[a] 38 µg/m³ is the LBC Air Quality CPG target for annual mean NO_2

Table A7.7: Modelled Annual Mean Baseline Concentrations of PM_{10} and $PM_{2.5}$ at Existing Receptors Assuming 2022 Emission Factors (µg/m³)

Receptor	PM_{10}		$PM_{2.5}$	
	2022 Baseline	2025 Without Proposed Development	2022 Baseline	2025 Without Proposed Development
E3	18.6	21.0	11.9	13.3
E4	18.6	21.8	11.9	13.8
E5	18.6	20.8	11.9	13.2
E6	19.8	20.3	12.6	12.9
Objective	32 [a] / 20 [b]		20 [c] /10 [d]	

[a] While the annual mean PM_{10} objective is 40 µg/m³, 32 µg/m³ is the annual mean concentration above which an exceedance of the 24-hour mean PM_{10} objective is possible, as outlined in LAQM.TG (Defra, 2022). A value of 32 µg/m³ is thus used as a proxy to determine the likelihood of exceedance of the 24-hour mean PM_{10} objective, as recommended in EPUK & IAQM guidance (Moorcroft and Barrowcliffe et al, 2017).

[b] 20 µg/m³ is the LBC Air Quality CPG target for annual mean PM_{10}; there is no requirement to meet this until 2026.

[c] The 20 µg/m³ $PM_{2.5}$ objective, which was to be met by 2020, is not in Regulations and there is no requirement for local authorities to meet it.

[d] 10 µg/m³ is the GLA target and the LBC Air Quality CPG target for annual mean $PM_{2.5}$; again, there is no requirement for local authorities to meet this until 2030. Exceedances of this target are shown in *italic*.

A7.13 As shown in Table A7.1, the predicted annual mean concentrations of NO_2 are above the objective and the LBC Air Quality CPG target at three of the receptors (E3, E4 and E6) in 2025 for the no improvement construction scenario; however, they are all below 60 µg/m³, indicating an exceedance of the 1-hour mean NO_2 objective is unlikely.

A7.14 As shown in Table A7.2, the predicted annual mean concentrations of PM_{10} and $PM_{2.5}$ are below the objective in both years at all receptors. The annual mean PM_{10} concentrations are above the LBC Air Quality CPG criteria for all receptors in 2025 but below 32 µg/m³ so it is unlikely that the 24-hour mean PM_{10} objective will be exceeded.

A7.15 The annual mean concentrations of $PM_{2.5}$ exceed the GLA target/ LBC Air Quality CPG target in all years for the no improvement construction scenario; however, exceedances of the guideline are common, and their nationwide achievement is very unlikely to be possible before 2030, especially in London.

Detailed Assessment of Development-Generated Road Traffic Emissions

A7.16 Future baseline concentrations of NO_2, PM_{10} and $PM_{2.5}$, when considering a no improvement construction scenario, in 2025 have been modelled at the four existing receptor locations and are set in Table A7.3 and Table A7.4.

Table A7.8: Predicted Impacts on Annual Mean NO_2 Concentrations in 2025 Assuming 2022 Emission Factors (µg/m³)

Receptor	Without Proposed Development	With Proposed Development	% Change [a]	Impact Descriptor
E3	**40.7**	**40.8**	0	Negligible
E4	**43.8**	**43.8**	0	Negligible
E5	39.7	39.7	0	Negligible
E6	**42.5**	**42.6**	0	Negligible
Objective	40 / 38 [b]		-	-

[a] % changes are relative to the objective and have been rounded to the nearest whole number.

[b] 38 µg/m³ is the LBC Air Quality CPG target for annual mean NO_2

Table A7.9: Predicted Impacts on Annual Mean PM_{10} and $PM_{2.5}$ Concentrations in 2025 Assuming 2022 Emission Factors (µg/m³)

Receptor	Annual Mean PM_{10} (µg/m³)				Annual Mean $PM_{2.5}$ (µg/m³)			
	Without Proposed Development	With Proposed Development	% Change [a]	Impact Descriptor	Without Proposed Development	With Proposed Development	% Change [a]	Impact Descriptor
E3	21.0	21.1	0	Negligible	13.3	13.3	0	Negligible
E4	21.8	21.8	0	Negligible	13.8	13.8	0	Negligible
E5	20.8	20.8	0	Negligible	13.2	13.2	0	Negligible
E6	20.3	20.3	0	Negligible	12.9	12.9	0	Negligible
Criterion	32 [b] / 20 [c]		-	-	20 [d]		-	-

[a] % changes are relative to the criterion and have been rounded to the nearest whole number.

[b] While the annual mean PM_{10} objective is 40 µg/m³, 32 µg/m³ is the annual mean concentration above which an exceedance of the 24-hour mean PM_{10} objective is possible, as outlined in LAQM.TG22 (Defra, 2022). A value of 32 µg/m³ is thus used as a proxy to determine the likelihood of exceedance of the 24-hour mean PM_{10} objective, as recommended in EPUK & IAQM guidance (Moorcroft and Barrowcliffe et al, 2017).

[c] 20 µg/m³ is the LBC Air Quality CPG target for annual mean PM_{10}; there is no requirement to meet this until 2026.

[d] The $PM_{2.5}$ objective, which was to be met by 2020, is not in Regulations and there is no requirement for local authorities to meet it.

A7.17 As shown in Table A7.3 the annual mean NO_2 concentrations for the no improvement construction scenario are above the objective and the LBC Air Quality CPG criteria at three receptors (E3, E4 and E6), with and without the Proposed Development. However, as the annual mean NO_2 concentrations are below 60 µg/m^3, it is unlikely that the 1-hour mean NO_2 objective will be exceeded.

A7.18 The percentage change in concentrations, relative to the air quality objective (when rounded), is predicted to be zero. Using the matrix in Table 8.3 of the ES Chapter, this impact is therefore described as negligible, and the effects are permanent, direct, long-term 'not significant' at the local level.

A7.19 Table A7.4 show the annual mean PM_{10} and $PM_{2.5}$ concentrations for the no improvement construction scenario are well below the respective objectives; however, they are above the LBC Air Quality CPG criteria for PM_{10} at all receptors, with or without the Proposed Development. However, as the annual mean PM_{10} concentrations are below 32 µg/m^3, it is unlikely that the 24-hour mean PM_{10} objective will be exceeded. The long-term average concentration at all receptors in assessment year is 75% or less of AQAL.

A7.20 Table A7.5 presents the same $PM_{2.5}$ concentrations as Table A7.4 but assesses the impacts against the GLA target for this pollutant (which is the same as the LBC Air Quality CPG criteria).

Table A7.10: Assessment of Annual Mean $PM_{2.5}$ Concentrations in 2025 against the GLA Target Assuming 2022 Emission Factors (µg/m^3)

Receptor	Annual Mean $PM_{2.5}$ (µg/m^3)			
	Without Scheme	With Scheme	% Change [a]	Impact Descriptor
E3	13.3	13.3	0	Negligible
E4	13.8	13.8	0	Negligible
E5	13.2	13.2	0	Negligible
E6	12.9	12.9	0	Negligible
GLA Target/Air Quality CPG criteria	10		-	-

[a] % changes are relative to the objective and have been rounded to the nearest whole number.

A7.21 The annual mean concentrations of $PM_{2.5}$ for the no improvement construction scenario exceed the GLA target and the LBC Air Quality CPG criteria with and without the Proposed Development; using the matrix in Table 8.3 in the ES Chapter, the impact is described as Negligible. The GLA aims to achieve the target for $PM_{2.5}$ of 10 µg/m^3 by 2030. Exceedances of the target, however, are common and based on Defra's background maps, their achievement is very unlikely to be possible before

2030. As such, it is unsurprising that there are exceedances for both 'with Proposed Development' and 'without Proposed Development' scenarios.

Proposed Receptors

A7.22 Predicted air quality conditions for future retail users of the Proposed Development in 2030 for the no improvement operation phase scenario, taking account of emissions from the adjacent road network, are set out in Table A7.11. The maximum modelled annual mean NO_2 concentration within the Proposed Development is 42.3 µg/m^3. As concentrations are less than 60 µg/m^3, there are unlikely to be exceedances of the 1-hour mean objective at these locations.

Table A7.11: Predicted 1-hour Mean Concentrations of NO_2 in 2030 for New Receptors in the Proposed Development Assuming 2022 Emission Factors (µg/m^3)

Receptor	NO_2
D1	38.7
D2	42.3
D3	40.1
D4	37.1
Objective / Criterion	60[a]

[a] Measurements across the UK have shown that the 1-hour nitrogen dioxide objective is unlikely to be exceeded at roadside locations where the annual mean concentration is below 60 µg/m^3.

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A8 London Vehicle Fleet Projections

A8.1 TfL has published an Integrated Impact Assessment (Jacobs, 2017) setting out the impacts of the changes to the LEZ and ULEZ described in Paragraphs A2.36 and A2.37. The assessment predicts that the changes will reduce overall NOx emissions from vehicles in London by 28% in 2021 (32% in Inner London and 27% in Outer London) and by 21% in 2025 (24% in Inner London and 21% in Outer London). The percentage reduction reduces with time due to the natural turnover of the fleet that would have occurred regardless of the introduction of the proposed changes. The proposed changes will not significantly affect emissions in Central London, where the ULEZ will already be implemented, but concentrations here will still reduce due to the lower emissions in surrounding areas.

A8.2 The report projects that the changes will reduce exposure to exceedances of the annual mean nitrogen dioxide objective by 40% and 21% in Central London in 2021 and 2025, respectively; by 4% and 0% in Inner London in 2021 and 2025, respectively; and by 23% and 27% in Outer London in 2021 and 2025, respectively, when compared to the baseline scenario.

A8.3 The changes are not projected to have a significant effect on PM_{10} and $PM_{2.5}$ concentrations, although a small reduction is predicted.

A8.4 AQC's report on the performance of Defra's EFT (AQC, 2020) also highlighted that the EFT's assumptions regarding future fleet composition in London and across the UK may be over-pessimistic in terms of NOx emissions (and no changes to the fleet mix within London were made between versions 9 and 10 of the EFT). The future fleet projection derived from the EFT for Outer London, for example, shows a very small reduction in the proportion of diesel cars between 2016 and 2030, and a very limited uptake of electric cars. The AQC report highlights that this contrasts with the expectations of many observers, as well as the most recent trends publicised by the media. When considered alongside the future requirements of the LEZ and ULEZ, these future fleet projections seem all the more unrealistic (i.e., worst-case in terms of emissions), as the changes to the LEZ and ULEZ would reasonably be expected to significantly increase the uptake of lower emissions vehicles in London.

A8.5 The changes to the LEZ and ULEZ announced by the Mayor of London in June 2018 are not reflected in Defra's latest EFT and thus have not been considered in this assessment. The potentially over-pessimistic fleet projections built into the EFT have not been addressed in this report either. Paragraphs A8.1 and A8.2 highlight that the changes to the LEZ and ULEZ will result in significant reductions in vehicle nitrogen oxides emissions and resultant nitrogen dioxide concentrations. The changes might reasonably also be expected to expedite the uptake of cleaner vehicles well beyond that projected in the EFT's fleet projections for London. As such, while the results presented in this report represent a reasonably conservative reflection of likely concentrations and impacts in the absence of the changes to the LEZ and ULEZ, they almost certainly represent an unrealistically worst-case assessment of likely concentrations and impacts bearing in mind the implementation of these changes.

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A9 Preliminary Air Quality Assessment

A9.1 This Preliminary Air Quality Assessment was undertaken in May 2023, in order to provide design advice as part of the Air Quality Positive approach required by Policy SI 1 of the London Plan. The most up to date and accurate air quality assessment is presented in ES Volume 1, Chapter 8: Air Quality.

Preliminary Air Quality Assessment:

Euston Tower, Camden

May 2023

Experts in air quality management & assessment

Document Control

Client	British Land Property Management Ltd.		

Job Number	J10/14095A/10

Report Prepared By:	George Chousos and Julia Burnell

Document Status and Review Schedule

Report No.	Date	Status	Reviewed by
J10/14095A/10/1/F1	4 May 2023	Final	Martin Peirce (Associate Director)

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1 Introduction

1.1 This report provides a preliminary air quality assessment, as required by the Greater London Authority's (GLA's) London Plan (GLA, 2021a), for the proposed development at Euston Tower in the London Borough of Camden (LB of Camden) (hereafter referred to as the 'proposed development'). The proposed development comprises the partial demolition of the existing building on-site, with the building's central core, basement and foundations to be retained, and the construction of a commercial-led development designed to accommodate office, dry laboratory enabled floorspace, retail and flexible commercial space.

1.2 Policy SI 1 of the London Plan specifically states *"development proposals 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".*

1.3 This preliminary air quality assessment has thus been undertaken to identify any constraints to the proposed development in terms of air quality, and to allow for air quality design principles to be included within the design of the proposed development. The aim of the preliminary assessment is to assess:

- the most significant sources of pollution in the area;
- constraints imposed on the site by poor air quality;
- appropriate land uses for the site; and
- appropriate design measures that could be implemented to ensure that the proposed development reduces exposure and improves air quality.

1.4 The Government has established a set of air quality standards and objectives to protect human health. The 'standards' are set as concentrations below which effects are unlikely even in sensitive population groups, or below which risks to public health would be exceedingly small. The objectives for use by local authorities are prescribed within the Air Quality (England) Regulations (2000) and the Air Quality (England) (Amendment) Regulations (2002).

1.5 The UK-wide objectives for nitrogen dioxide and PM_{10} were to have been achieved by 2005 and 2004 respectively and continue to apply in all future years thereafter. Measurements across the UK have shown that the 1-hour nitrogen dioxide objective is unlikely to be exceeded at roadside locations where the annual mean concentration is below 60 µg/m^3 (Defra, 2022e).

1.6 The objectives apply at locations where members of the public are likely to be regularly present and are likely to be exposed over the averaging period of the objective. The GLA explains where these objectives will apply in London (GLA, 2019). The annual mean objectives for nitrogen dioxide and PM_{10} are considered to apply at the façades of residential properties, schools, hospitals and care homes etc., the gardens of residential properties, school playgrounds and the grounds of hospitals and care homes. Meanwhile, the annual mean objectives do not apply at the "*building facades of offices or other places of work where members of the public do not have regular access*". The 24-hour mean objective for PM_{10} is considered to apply at the same locations as the annual mean objective, as well as at hotels. The 1-hour mean objective for nitrogen dioxide applies wherever members of the public might regularly spend 1-hour or more, including outdoor eating locations and pavements of busy shopping streets.

1.7 For $PM_{2.5}$, the objective set by Defra for local authorities is to work toward reducing concentrations without setting any specific numerical value. In the absence of a numerical objective, it is convention to assess local air quality impacts against the limit value, originally set at 25 µg/m^3 and currently set at 20 µg/m^3.

1.8 Defra has also recently set two new targets, and two new interim targets, for $PM_{2.5}$ concentrations in England. One set of targets focuses on absolute concentrations. The long-term target is to achieve an annual mean $PM_{2.5}$ concentration of 10 µg/m^3 by the end of 2040, with the interim target being a value of 12 µg/m^3 by the start of 2028[1]. The second set of targets relate to reducing overall population exposure to $PM_{2.5}$. By the end of 2040, overall population exposure to $PM_{2.5}$ should be reduced by 35% compared with 2018 levels, with the interim target being a reduction of 22% by the start of 2028.

1.9 The GLA has set a target to achieve an annual mean $PM_{2.5}$ concentration of 10 µg/m^3 by 2030. This target was derived from an air quality guideline set by the World Health Organisation (WHO) in 2005. In 2021, WHO updated its guidelines, but the London Environment Strategy (GLA, 2018) considers the 2005 guideline of 10 µg/m^3. The guideline is not currently in UK regulations and there is no explicit requirement to assess against it.

1.10 The relevant air quality criteria for this assessment are provided in Table 1.

[1] Meaning that it will be assessed using measurements from 2027. The 2040 target will be assessed using measurements from 2040. National targets are assessed against concentrations expressed to the nearest whole number, for example a concentration of 10.4 µg/m^3 would not exceed the 10 µg/m^3 target.

Table 1: Air Quality Criteria for Nitrogen Dioxide (NO_2), PM_{10} and $PM_{2.5}$

Pollutant	Time Period	Objective
NO_2	1-hour Mean	200 µg/m^3 not to be exceeded more than 18 times a year
	Annual Mean	40 µg/m^3
PM_{10}	24-hour Mean	50 µg/m^3 not to be exceeded more than 35 times a year
	Annual Mean	40 µg/m^3
$PM_{2.5}$	Annual Mean	20 µg/m^3 [a]
	Annual Mean	10 µg/m^3 by 2030
	Annual Mean	12 µg/m^3 before 2028 [b]
	Annual Mean	10 µg/m^3 by 2040 [b]

[a] There is no numerical $PM_{2.5}$ objective for local authorities. Convention is to assess against the UK limit value which is currently 20 µg/m^3.

[b] Expressed to the nearest whole number. Defra has explained in the 2023 Environmental Improvement Plan (Defra, 2023a) that local authority responsibilities in relation to these targets relate to controlling emissions and not determining concentrations.

2 Baseline Air Quality

2.1 The proposed development is located within the borough-wide Camden Air Quality Management Area (AQMA) declared by LB of Camden for exceedances of the annual mean nitrogen dioxide and 24-hour particulate matter (PM_{10}) objectives. The proposed development is also located within one of the GLA's Air Quality Focus Areas (*Marylebone Road from Marble Arch / Euston / King's Cross Junction*), as shown in Figure 1; these are locations with high levels of human exposure where the annual mean limit value for nitrogen dioxide is exceeded.

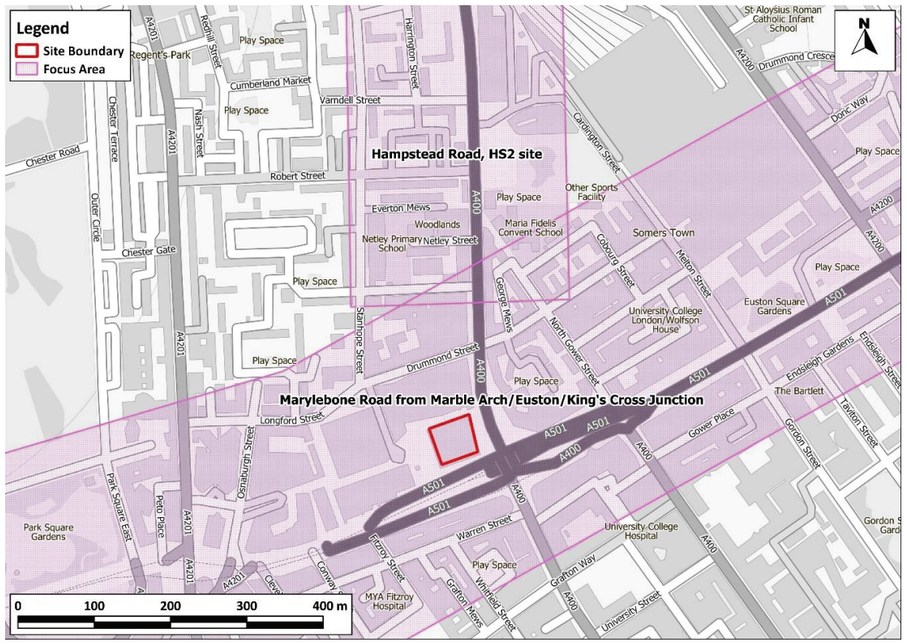

Figure 1: Indicative Site Boundary (May 2023), AQMAs and Focus Areas

2.2 A search of the UK Pollutant Release and Transfer Register website (Defra, 2023b) has not identified any significant industrial or waste management sources that are likely to affect the proposed development, in terms of air quality.

Local Air Quality Monitoring

2.3 LB of Camden currently operates five automatic monitoring stations within its area, with three monitoring stations located within 1.5 km of the site ('BL0', 'CD9' and 'KGX'). All three stations monitor PM_{10} while BL0 and CD9 also monitor NO_2 and $PM_{2.5}$ concentrations. LB of Camden also operates a network of nitrogen dioxide monitoring sites using diffusion tubes prepared and analysed by Gradko International Ltd (using the 50% TEA in acetone method), with eight diffusion tube monitoring sites located within 1.5 km of the site. In addition, Westminster City Council (WCC) operates eleven automatic monitoring stations, with three stations also located within 1.5 km of the site ('Marylebone Road', 'Cavendish Square' and 'Oxford Street East').

2.4 Annual mean results for the years 2015 to 2021 are summarised in Table 2, while results relating to the 1-hour mean objective are summarised in Table 3. The locations of the monitoring sites are

displayed in Figure 2. The monitoring data for Camden have been taken from LB of Camden's 2021 Annual Status Report (LB of Camden, 2022) and for Westminster they have been taken from WCC's ASR for 2020 (Westminster City Council, 2021).

2.5 While 2020 and 2021 results have been presented for completeness, they are not relied upon in any way as they will not be representative of 'typical' air quality conditions due to the impact of the Covid-19 pandemic on traffic volumes and thus pollutant concentrations.

Table 2: Summary of Annual Mean NO_2 Monitoring (2015 – 2021) (µg/m^3) [a, b]

ID	Site Type	Location	2015	2016	2017	2018	2019	2020	2021
BL0	Urban Background	London Bloomsbury (Russell Square Gardens)	**48**	**42**	38	36	32	28	27
CD9	Roadside	Euston Road	**90**	**88**	**83**	**82** [c]	**70**	**43**	**48**
Marylebone Road	Kerbside	-	**88**	**87**	**84**	**85**	**63**	**44**	**-**
Cavendish Square	Roadside	-	-	-	-	**64**	**50**	32	**-**
Oxford Street East	Roadside	-	-	-	-	**76**	**51**	35	**-**
CA4A	Kerbside	Euston Road	-	-	-	-	**70.7**	**53.7**	**57.1** [c]
CA6	Urban Background	St George's Gardens (prev. "Wakefield Gardens")	35.8	31.3	34.8 [c]	26.7	25.2	- [d]	- [d]
CA10	Urban Background	Tavistock Gardens	**44.6**	39.7	**46.2** [c]	35.4	33.9	26.8	22.3 [c]
CA11	Kerbside	Tottenham Court Road	**85.6**	**83.6**	**74.0** [c]	**65.8**	**62.6**	**43.3**	**44.4** [c]
CA20A	Roadside	Brill Place	-	-	-	-	**44.1**	**43.9**	34.5 [c]
CA28	Urban Background	St George's Gardens East	-	-	-	-	28.3	22.5	17.4 [c]
CA29	Roadside	Endsleigh Gardens	-	-	-	-	**49.5**	35.3	34.5 [c]
Objective			**40**						

[a] Exceedances are shown in **bold.**

[b] Exceedances of the 60 µg/m^3 proxy value, indicating a potential exceedance of the 1-hour mean NO_2 objective, are shown in ***bold and underlined***.

[c] Data capture for the monitoring period was less than 75%, and as such the results were annualised in accordance with LLAQM Technical Guidance.

[d] The monitor was decommissioned in 2020.

Table 3: Number of Hours With NO_2 Concentrations Above 200 µg/m^3 [a]

Site ID	Site Type	Location	2015	2016	2017	2018	2019	2020	2021
BL0	Urban Background	London Bloomsbury (Russell Square Gardens)	0	0	0	0	0	0	0
CD9	Roadside	Euston Road	**54**	**39**	**25**	18	7	0	1
Marylebone Road	Kerbside	-	**56**	**49**	**38**	29	0	0	-
Cavendish Road	Roadside	-	**-**	**-**	**-**	0	0	0	-
Oxford Street Road	Roadside	-	**-**	**-**	**-**	11	5	0	-
Objective			**18**						

[a] Exceedances of the objectives are shown in **bold**.

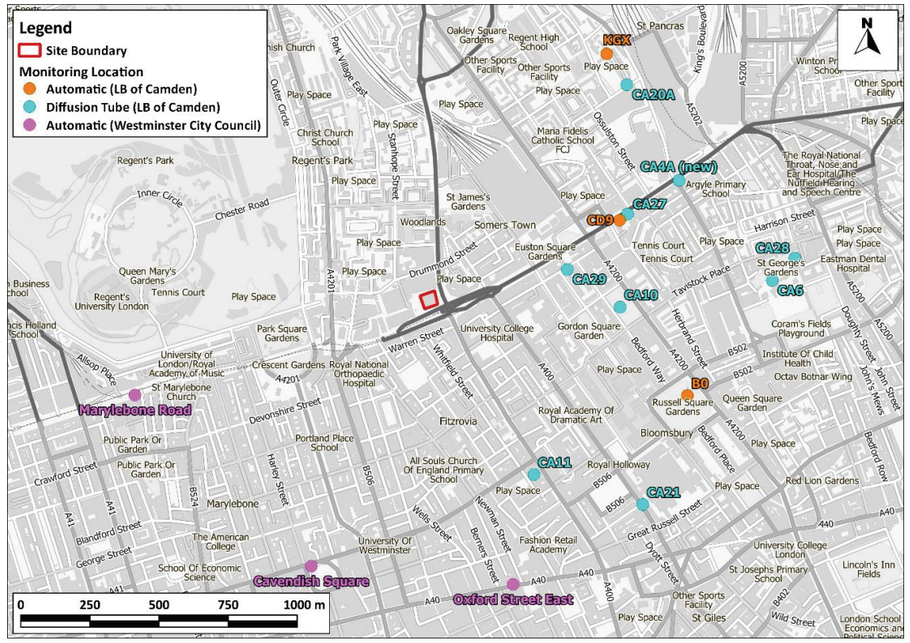

Figure 2: Monitoring Locations and the Indicative Site Boundary (May 2023)

2.6 As shown in Table 2, exceedances of the annual mean nitrogen dioxide objective occurred at all the kerbside and roadside locations within 1.5 km of the Proposed Development between 2015 and 2021, with the exception of 'Cavendish Square' and 'Oxford Street East' in 2020 and 'CA29' in 2020 and 2021. Concentrations of more than 60 µg/m^3 were also measured at five sites (three of which are located on the A501), indicating potential exceedances of the 1-hour mean objective. However, as shown in Table 3, all automatic monitoring sites recorded concentrations below this level in 2019, including the 'CD9' and 'Marylebone Road' automatic monitors which, despite measuring concentrations above 60 µg/m^3, have not measured any exceedances of the 1-hour mean objective since 2017. There was an overall downward trend in nitrogen dioxide concentrations between 2015 and 2019.

2.7 The LB of Camden also measures PM_{10} and $PM_{2.5}$ concentrations at 'BL0' and 'CD9' automatic stations, and only PM_{10} concentrations at 'KGX'; WCC measures PM_{10} concentrations at all aforementioned stations, and 'Marylebone Road' monitor also measures $PM_{2.5}$ concentrations. Annual mean results for the years 2015 to 2021 are summarised in Table 4, while results relating to the daily mean objective are summarised in Table 5. Exceedances of the objectives are shown in bold.

Table 4: Summary of Annual Mean PM_{10} and $PM_{2.5}$ Monitoring (2015-2021) (µg/m^3)

Site ID	Site Type	Location	2015	2016	2017	2018	2019	2020	2021
PM_{10}									
BL0	Urban Background	London Bloomsbury (Russell Square Gardens)	22	20	19	17	18	16	16
CD9	Roadside	Euston Road	28	24	20	21	22	18	19
KGX	Urban Background / Industrial	Coopers Lane	-	-	-	15	15	13	13 [a]
Marylebone Road	Kerbside	-	30	29	27	26	24	-	-
Cavendish Square	Roadside	-	-	-	-	28	25	17	-
Oxford Street East	Roadside	-	-	-	-	28	24	22	-
Objective			**40**						
$PM_{2.5}$									
BL0	Urban Background	London Bloomsbury (Russell Square Gardens)	11	12	13	10	11	9	9
CD9	Roadside	Euston Road	17	17	14	15	14	11	11
Marylebone Road	Kerbside	-	16	16	15	16	14	9	-
Objective/GLA target			**20/10 [b]**						

[a] Data capture for the monitoring period was less than 75%, and as such the result was annualised according to the LLAQM Technical Guidance.

[a] The 20 µg/m^3 $PM_{2.5}$ objective, which was to be met by 2020, is not in Regulations and there is no requirement for local authorities to meet it. 10 µg/m^3 is the GLA target for annual mean $PM_{2.5}$; again, there is no requirement for local authorities to meet this.

Table 5: Number of Days With PM_{10} Concentrations Above 50 µg/m³

Site ID	Site Type	Location	2015	2016	2017	2018	2019	2020	2021
BL0	Urban Background	London Bloomsbury (Russell Square Gardens)	6	9	6	1	9	4	0
CD9	Roadside	Euston Road	5	10	3	2	8	2	2
KGX	Urban Background / Industrial	Coopers Lane	-	-	-	1	5	1	0
Marylebone Road	Kerbside	-	13	15	12	5	11	-	-
Cavendish Road	Roadside	-	-	-	-	3	10	0	-
Oxford Street Road	Roadside	-	-	-	-	1	0	6	-
Objective			**35**						

2.8 As shown in Table 4 and Table 5, the measured annual mean and 24-hour mean PM_{10} concentrations were below their respective objectives in all years presented. PM_{10} concentrations at the proposed development are, therefore, likely to also be below the objectives. In addition, $PM_{2.5}$ concentrations were also below the objective in all years presented. However, $PM_{2.5}$ concentrations exceed the GLA target value at the 'BL0' and 'Marylebone Road' monitoring stations between 2015 and 2019 and at 'CD9' monitoring station in all years presented, which is common across much of London. The nationwide achievement is very unlikely to be possible before 2030, especially in London (Defra, 2019).

3 LAEI Mapped Concentrations

3.1 Modelled annual mean nitrogen dioxide concentrations presented in the London Atmospheric Emissions Inventory (LAEI) database (GLA, 2021b) in the vicinity of the proposed development are shown in Figure 3. The maximum modelled annual mean concentration in 2019 within the proposed development site boundary (located in the southeast corner of the site) is 65.6 µg/m³, which is above both the annual mean objective of 40 µg/m³ and the proxy concentration of 60 µg/m³ (see Paragraph 1.5), indicating that an exceedance of the 1-hour mean objective might be likely.

3.2 The maximum 2019 annual mean PM_{10} and $PM_{2.5}$ concentrations within the site boundary are 30.8 µg/m³ and 15.6 µg/m³, respectively, which are below the relevant objectives. However, the annual mean $PM_{2.5}$ concentration is above the GLA $PM_{2.5}$ target of 10 µg/m³.

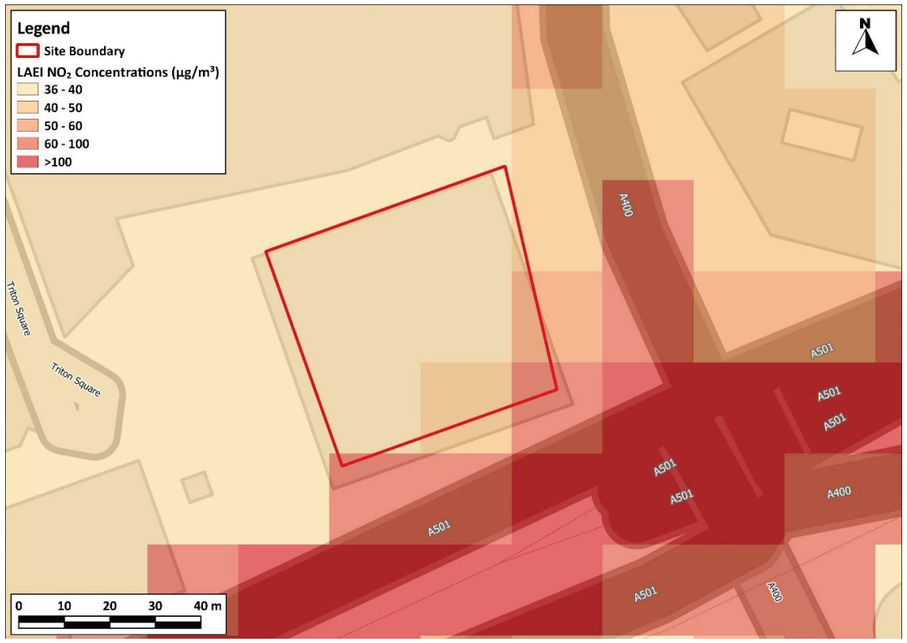

Figure 3: LAEI modelled 2019 NO_2 concentrations with Indicative Site Boundary (May 2023)

4 Proposed Development Emissions

4.1 The site currently comprises the existing Euston Tower building and is bounded by: Brock Street and commercial properties to the north, Hampstead Road (A400) to the east, Euston Road (A501) to the south and commercial properties to the west.

4.2 The trip generation of the proposed development is currently unknown. However, the proposed development has just three blue-badge vehicle parking spaces, and it is anticipated that the proposed development will not generate more than 100 Light Duty Vehicle (LDV) trips, as an Annual Average Daily Traffic (AADT) flow rate, or 25 Heavy Duty Vehicle (HDV) AADT trips on the local road network once operational; on this basis the air quality impacts from development-generated road traffic emissions can be considered to be 'not significant'. Should these thresholds be

exceeded, then detailed dispersion modelling of road traffic emissions will need to be undertaken to determine the impact of these emissions upon existing sensitive receptors in the surrounding area.

4.3 The proposed development will be provided with heat and hot water via an all-electric solution, which includes Air Source Heat Pumps (ASHPs); as such, there will be no associated point-source emissions. A life safety generator is currently being considered. When details of any other plant to be installed at the site are available, the emissions will be initially screened against IAQM guidance, in combination with their proposed location, operating profile and dispersion parameters, to identify whether the impacts from the plant will be significant.

4.4 The proposed development will include an allocation for fume cupboards to allow potential end users operating research and development type activities to occupy some of the development. Although the use of such facilities requires extraction of air, there are tight regulations on the design and operation of fume cupboards. Any such end users will need to ensure that all activities meet the requirements of various British Standards (e.g., BSEN 14175) and Health and Safety Executive (HSE)/Control of Substances Hazardous to Health (COSHH) standards for all substances handled. Any residual emissions will need to be appropriately minimised using filtration where necessary. Given the strict regulations on the operation of fume cupboards, there can be a high level of confidence that provided the air extraction system is appropriately designed, that significant air quality effects will be avoided.

5 Site Suitability

5.1 The retail floorspace and any publicly accessible elements of the proposed development represent relevant exposure to the 1-hour mean nitrogen dioxide objective only. In contrast, the office and lab floorspaces are not considered relevant sensitive receptors to the air quality objectives as they are places of work where a member of the public would not have access (see Paragraph 1.6).

5.2 As shown in Table 2, measured annual mean nitrogen dioxide concentrations at roadside monitoring site ‘CD9’ and kerbside monitoring site ‘Marylebone Road’, both located on the A501 (the same road the proposed development is located on), have remained above the objective for all years between 2015 and 2021. Concentrations until 2019 also exceeded 60 µg/m^3, indicating a potential exceedance of the 1-hour mean objective. However, as shown in Table 3, both automatic monitoring stations have not measured an exceedance of the 1-hour objective since 2017, indicating that it is unlikely that the 1-hour mean objective will be exceeded at the retail and publicly accessible elements of the proposed development by the time it is operational. Nonetheless, this will be assessed and confirmed within the Environmental Statement (ES) Chapter.

5.3 Measures to reduce pollutant emissions from road traffic are principally being delivered in the longer term by the introduction of more stringent emissions standards, largely via European legislation (which is written into UK law), as well as the implementation of the Low Emission Zone (LEZ) and

Ultra Low Emission Zone (ULEZ), and the implementation of the London Environment Strategy (GLA, 2018).

5.4 Best practice design methods are set out in Section 6 to mitigate the impacts of emissions from road traffic on future users of the proposed development.

6 Air Quality Design Principles

6.1 The following design principles to reduce exposure to air pollution and improve air quality will be considered, and, where possible, may be incorporated within the design of the proposed development:

- ensuring that any ventilation air intakes, where proposed, are distanced appropriately from sources of air pollution;
- the exhaust flue of the proposed life-safety generator should be located at the highest point within the proposed development (i.e., at Level 31 (roof level)) to ensure adequate dispersion and minimise the impact of emissions upon surrounding sensitive properties, as well as minimising the impact upon the proposed development itself;
- maximise access to public transport options, prioritisation of cycle parking, as well as cycle and walking routes (mainly via the south-eastern corner of Hampstead Road, the southwestern corner of Euston Road and the Regent’s Place public realm), to minimise private car trips to and from the site;
- provision of cycle storage facilities at basement level, which are easily accessible either by a bike ramp accessed in the southwest corner of the building or via a set of steps and a lift located to the east of the building, as well as provision of showers / changing facilities for commercial uses to enable staff to cycle to work;
- incorporating the Healthy Streets Approach into the scheme to reduce the need to travel, or to promote sustainable transport opportunities; and,
- limiting car parking provision to only three blue-badge car parking spaces, which will all be provided with electric vehicle charging capabilities, in line with the London Plan requirements.

7 Conclusions

7.1 The proposed development is located within the borough-wide Camden AQMA, as well as one of the GLA’s air quality Focus Areas.

7.2 Baseline conditions show pollutant concentrations in the vicinity of the proposed development were above the annual and 1-hour mean nitrogen dioxide objectives in 2019, but below the respective objectives for PM_{10} and $PM_{2.5}$. Based on the likely users of the proposed development, the only relevant objective is the 1-hour mean nitrogen dioxide objective, and local, long-term monitoring has shown that there have been no exceedances of this objective since 2018 along A501 (where both the automatic monitors and proposed development are located). Concentrations are expected to reduce in future years through the implementation of stringent vehicle emission standards, reduced background pollutant concentrations and the uptake of zero emission vehicles within the fleet. It is therefore expected that future users will experience acceptable air quality in the anticipated year of opening, but this will be confirmed within the ES Chapter.

7.3 The trip generation of the proposed development is expected to be below published thresholds, and the impact of additional road traffic emissions will not, therefore, be significant. Further assessment of road traffic emissions will, however, be undertaken if the thresholds are exceeded, to determine the air quality impacts upon sensitive land-uses in the surrounding area, utilising detailed dispersion modelling.

7.4 The proposed development will be provided with heat and hot water via an all-electric solution, which includes Air Source Heat Pumps (ASHPs); as such, there will be no associated point-source emissions. A life safety generator is currently being considered for incorporation within the proposed development, the impacts of which will be considered within the ES Chapter based on information available.

7.5 A list of design principles to reduce exposure to air pollution has been provided, which should be considered and incorporated within the design of the proposed development.

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9 Glossary

AADT	Annual Average Daily Traffic
AQMA	Air Quality Management Area
ASR	Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
Exceedance	A period of time when the concentration of a pollutant is greater than the appropriate air quality objective. This applies to specified locations with relevant exposure
Focus Area	Location that not only exceeds the EU annual mean limit value for NO_2 but also has a high level of human exposure
GLA	Greater London Authority
µg/m^3	Microgrammes per cubic metre
NO_2	Nitrogen dioxide
Objectives	A nationally defined set of health-based concentrations for nine pollutants, seven of which are incorporated in Regulations, setting out the extent to which the standards should be achieved by a defined date. There are also vegetation-based objectives for sulphur dioxide and nitrogen oxides
PM_{10}	Small airborne particles, more specifically particulate matter less than 10 micrometres in aerodynamic diameter
$PM_{2.5}$	Small airborne particles less than 2.5 micrometres in aerodynamic diameter
Standards	A nationally defined set of concentrations for nine pollutants below which health effects do not occur or are minimal
TEA	Triethanolamine – used to absorb nitrogen dioxide
WHO	World Health Organisation

10 Appendices

A1 Professional Experience

Martin Peirce, BSc (Hons), MSc, MIEncSci, MIAQM

Mr Peirce has some thirty years' experience in environmental modelling and assessment, most relating to air quality and carbon and greenhouse gases (GHGs). He has extensive experience in the calculation of emissions to air and compiling emission inventories, for both local air quality assessments and carbon footprinting. For air quality, he also has extensive expertise in modelling the atmospheric dispersion of pollutants for comparison against regulatory limits and for assessment of health and environmental impacts. He has prepared assessments in support of Environmental Impact Assessments (EIA), permit applications and planning applications (under both Town and Country Planning Act (TCPA) and Development Consent Order (DCO) regimes). He has particular experience in modelling aviation and transport sources, non-road mobile machinery, construction and industrial sources.

Julia Burnell, MEnvSci (Hons) MIEnvSc MIAQM

Miss Burnell is a Senior Consultant with AQC with over seven years' experience in the field of air quality. She has experience of undertaking a range of air quality assessments for power, transportation, and mixed-use development projects both in the UK and internationally. She is also experienced at preparing environmental permit applications for medium combustion plant/specified generator sites and has commissioned and maintained numerous ambient air quality monitoring surveys. Prior to her work with AQC, Julia completed an MEnvSci (Hons) in Environmental Science (four-year integrated master's). She is a Member of both the Institute of Air Quality Management and the Institution of Environmental Sciences.

George Chousos, BSc MSc AMIEnvSc AMIAQM

Mr Chousos is a Consultant with AQC, having joined in May 2019. Prior to joining AQC, he completed an MSc in Air Pollution Management and Control at the University of Birmingham, specialising in air pollution control technologies and management, and data processing using R. He also holds a degree in Environmental Geoscience from the University of Cardiff, where he undertook a year in industry working in the field of photo-catalytic technology. He is now gaining experience in the field of air quality monitoring and assessment.

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A10 Air Quality Positive Statement

Introduction

A10.1 The Proposed Development involves the:

"Redevelopment of Euston Tower, including the partial retention (retention of existing core, foundations and basement), disassembly, reuse and extension of the existing building, to provide a 32-storey building for use as offices and research and development floorspace (Class E(g)) and office, retail, café and restaurant space (Class E) and learning and community space (Class F) at ground, first and second floors, and associated external terraces. Provision of public realm enhancements, including new landscaping, and provision of new publicly accessible steps and ramp. Provision of short and long-stay cycle storage, servicing, refuse storage, plant and other ancillary and associated works."

A10.2 The Proposed Development will include only two blue-badge car parking spaces and will utilise an all-electric energy strategy for the provision of heating and hot water (ASHP systems, alongside PVs). There are also two options under consideration for emergency power provision to incorporate either a life safety generator and future tenant generator (Option 1) or Dual Utility Supplies (Option 2), for emergency purposes. It is not currently known which option will be included within the Proposed Development's design, but once details become available, the air quality positive statement will be updated accordingly.

Constraints and Opportunities

A10.3 The air quality objectives apply only at the retail spaces within the Proposed Development; however, they are only of relevant exposure to the 1-hour nitrogen dioxide objective. The Proposed Development will not generate any significant emissions once operational from road traffic. The predicted impact at the existing, and proposed, sensitive receptors, taking account the road traffic emissions, are all negligible and the annual mean concentrations are below the relevant objectives both with and without the Proposed Development.

A10.4 The Site itself is in a well-connected location for public transport providing a wide range of transport services, including buses and London Underground and national rail services from Euston Square and Warren Street stations.

A10.5 Table A10.1 details the measures that have been adopted within the design of the Proposed Development.

Table A10.1: Measures Adopted

Measure	Summary of the Measure	Reason for Undertaking Measure	Expected Benefits	Assessment and Reporting			How Will This Measure be Secured?
				Methods	Quantitative	Qualitative	
Better Design and Reducing Exposure							
Locations of sensitive land uses	The proposed masterplan has been designed to reduce exposure to emissions, including only receptors that are sensitive to the 1-hour NO_2 objective and locating these most sensitive receptors (i.e., the retail floorspace) approximately 14 m away from the nearest road.	To reduce exposure for future users.	Future users will experience acceptable air quality.	Air quality assessment shows air quality is acceptable for future users.	Y	N	Secured through approved plans
Building Emissions							
Energy Strategy	The energy strategy is all electric (ASHPs and PVs). High energy efficient building fabric will be utilised to reduce carbon emissions and energy demand through good practice design measures.	The Energy Strategy sets out the rationale for the measures.	The selected option will meet the carbon emission targets set by the London Plan. Reduced NOx emissions.	Energy Assessment	N	Y	Delivery is subject to s106 agreement.
Transport Emissions							
Pedestrian and Cycle Access	The Proposed Development will provide cycle and pedestrian access and include cycle parking that meets the requirements of Policy T5 of the London Plan	To encourage users and residents to travel using sustainable modes of transport.	Reduced emissions associated with increased walking and cycling, in particular for short journeys.	Framework Travel Plan	N	Y	Transport infrastructure secured by approved plans or conditions

Car Parking	The Proposed Development will be 'car-free'. This will discourage the use of private cars and encourage the use of existing public transport options.	To facilitate a move towards car free lifestyle and promote the future use of local public transport provisions.	The lack of car parking provision will reduce the number of private car trips during the operation of the Proposed Development and therefore vehicle tailpipe emissions.	Framework Travel Plan	N	Y	Transport infrastructure secured by approved plans or conditions

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A11 Construction Mitigation

A11.1 Table A11.1 presents a set of best-practice measures from the GLA guidance (GLA, 2014) that should be incorporated into the specification for the works. These measures should be written into a Dust Management Plan. Some of the measures may only be necessary during specific phases of work, or during activities with a high potential to produce dust, and the list should be refined and expanded upon in liaison with the construction contractor when producing the Dust Management Plan.

Table A11.1: Best-Practice Mitigation Measures Recommended for the Works

Measure	Desirable	Highly Recommended
Site Management		
Develop and implement a stakeholder communications plan that includes community engagement before work commences on site		✓
Develop a Dust Management Plan (DMP)		✓
Display the name and contact details of person(s) accountable for air quality pollutant emissions and dust issues on the site boundary		✓
Display the head or regional office contact information		✓
Record and respond to all dust and air quality pollutant emissions complaints		✓
Make a complaints log available to the local authority when asked		✓
Carry out regular site inspections to monitor compliance with air quality and dust control procedures, record inspection results, and make an inspection log available to the Local Authority when asked		✓
Increase the frequency of site inspections by those accountable for dust and air quality pollutant emissions issues when activities with a high potential to produce dust and emissions are being carried out and during prolonged dry or windy conditions		✓
Record any exceptional incidents that cause dust and air quality pollutant emissions, either on or off the site, and ensure that the action taken to resolve the situation is recorded in the log book		✓
Preparing and Maintaining the Site		
Plan the site layout so that machinery and dust-causing activities are located away from receptors, as far as is possible		✓
Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site		✓
Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period		✓
Install green walls, screens or other green infrastructure to minimise the impact of dust and pollution	✓	
Avoid site runoff of water or mud		✓

Keep site fencing, barriers and scaffolding clean using wet methods		✓
Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below		✓
Cover, seed, or fence stockpiles to prevent wind whipping		✓
Carry out regular dust soiling checks of buildings within 100 m of site boundary and provide cleaning if necessary	✓	
Put in place real-time dust and air quality pollutant monitors across the site and ensure they are checked regularly		✓
Agree monitoring locations with the Local Authority		✓
Where possible, commence baseline monitoring at least three months before work begins		✓
Operating Vehicle/Machinery and Sustainable Travel		
Ensure all on-road vehicles comply with the requirements of the London LEZ (and ULEZ)		✓
Ensure all Non-road Mobile Machinery (NRMM) comply with London's NRMM emission standards. Currently, NRMM used on any site within Greater London are required to meet Stage IIIB of EU Directive 97/68/EC (The European Parliament and the Council of the European Union, 1997) and its subsequent amendments as a minimum, while NRMM used on any site within the Central Activity Zone, Canary Wharf or one of London's Opportunity Areas are required to meet Stage IV of the Directive as a minimum. The proposed development is within an area where this stricter requirement applies. From January 2025, NRMM used anywhere in London will be required to meet stage IV, while from January 2030 the stage V standard will apply. From January 2040 only zero emission machinery will be allowed.		✓
Ensure all vehicles switch off engines when stationary – no idling vehicles		✓
Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery-powered equipment where practicable		✓
Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on un-surfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate)	✓	
Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials		✓
Implement a Travel Plan that supports and encourages sustainable staff travel (public transport, cycling, walking, and car-sharing)		✓
Operations		
Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems		✓
Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate		✓
Use enclosed chutes, conveyors and covered skips		✓

Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate		✓
Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods		✓
Waste Management		
Reuse and recycle waste to reduce dust from waste materials		✓
Avoid bonfires and burning of waste materials		✓
Measures Specific to Demolition		
Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust)	✓	
Ensure water suppression is used during demolition operations.		✓
Avoid explosive blasting, using appropriate manual or mechanical alternatives		✓
Bag and remove any biological debris or damp down such material before demolition		✓
Measures Specific to Earthworks		
Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable	✓	
Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable	✓	
Only remove the cover from small areas during work, not all at once	✓	
Measures Specific to Construction		
Avoid scabbling (roughening of concrete surfaces), if possible	✓	
Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place		✓
Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery	✓	
For smaller supplies of fine powder materials ensure bags are sealed after use and stored appropriately to prevent dust	✓	
Measures Specific to Trackout		
Regularly use a water-assisted dust sweeper on the access and local roads, as necessary, to remove any material tracked out of the site		✓
Avoid dry sweeping of large areas		✓
Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport		✓
Access gates should be located at least 10 m from receptors, where possible		✓
Apply dust suppressants to locations where a large volume of vehicles enter and exit the construction site	✓	

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