100 Chalk Farm Road

Air Quality Assessment

Prepared by

Submitted on behalf of Regal Chalk Farm Ltd

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Air Quality CONSULTANTS

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Executive Summary

The air quality impacts associated with the proposed mixed-use development at 100 and 100a Chalk Farm Road in Camden have been assessed. The development will consist of residential and commercial uses.

The assessment has demonstrated that future residents and users of the proposed development will experience acceptable air quality, with pollutant concentrations below the respective air quality objectives.

The proposed development will be car free and will be provided with heat and hot water by a combination of air source heat pumps and solar photovoltaic panels. Therefore, the proposed development will have no significant effects on local air quality. While the development will also include an emergency diesel generator, this generator would operate within a maximum of 10 hours a year and is designed to have adequate dispersion so there would be no significant effect on local air quality.

During the construction works, a range of best practice mitigation measures will be implemented to reduce dust emissions and the overall effect will be 'not significant'; appropriate measures have been set out in this report, to be included in the Dust Management Plan for the works.

Overall, the construction and operational air quality effects of the proposed development are judged to be 'not significant'.

The proposed development has also been shown to meet the London Plan's requirement that new developments are at least 'air quality neutral'.

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1 Introduction

1.1 This Air Quality Assessment has been prepared by Air Quality Consultants on behalf of Regal Chalk Farm Limited ('the Applicant') in support of an application for full planning permission for the redevelopment of 100 Chalk Farm Road ('the Site') within London Borough of Camden ('LBC').

1.2 A listed building consent application accompanies the application for works to the adjacent Roundhouse, which is a Grade II* listed building.

1.3 The Site is located on the south-western side of Chalk Farm Road and borders the mainline railway into Euston, with the Juniper Crescent Housing Estate to the south. It lies within the Regents Canal Conservation Area, to which the existing building on the site is a neutral contributor. To the west, the site is adjacent to the Grade II* listed Roundhouse theatre and live music venue. Beyond that, to the north-west is Chalk Farm Underground Station. To the east is the Petrol Filling Station site, which forms part of the Camden Goods Yard development and is currently in use as a temporary supermarket.

1.4 The proposed development will provide 265 student accommodation units, together with 824 m^2 (GIA) of commercial space, 24 affordable residential units, with public realm improvements, new areas of landscaping, amenity and play space, and improved accessibility to the site.

1.5 The description of the proposed development is as follows:

"Demolition of existing buildings and redevelopment of the site to provide two buildings containing purpose-built student accommodation with associated amenity and ancillary space (Sui Generis), affordable residential homes (Class C3), ground floor commercial space (Class E) together with public realm, access, servicing, and other associated works."

1.6 Full details and scope of the planning application is described in the submitted Town Planning Statement, prepared by Gerald Eve LLP.

1.7 This report describes the potential air quality impacts associated with the proposed development. The proposed development lies within a borough-wide Air Quality Management Area (AQMA) declared by LBC for exceedances of the annual mean nitrogen dioxide (NO_2) and 24-hour mean PM_{10} objectives. It is also within 200 m of one of the Greater London Authority's (GLA's) air quality Focus Areas; these are locations with high levels of human exposure where the annual mean limit value for NO_2 is exceeded. The proposed development is located adjacent to the busy Chalk Farm Road and a section of the London Overground railway line used by diesel trains; it will introduce new residential exposure into this area of potentially poor air quality, thus an assessment is required to determine the air quality conditions that future residents and users will experience. The main air pollutants of concern are NO_2 and fine particulate matter (PM_{10} and $PM_{2.5}$).

1.8 The location of the proposed development is shown in Figure 1, along with the nearby Focus Areas.

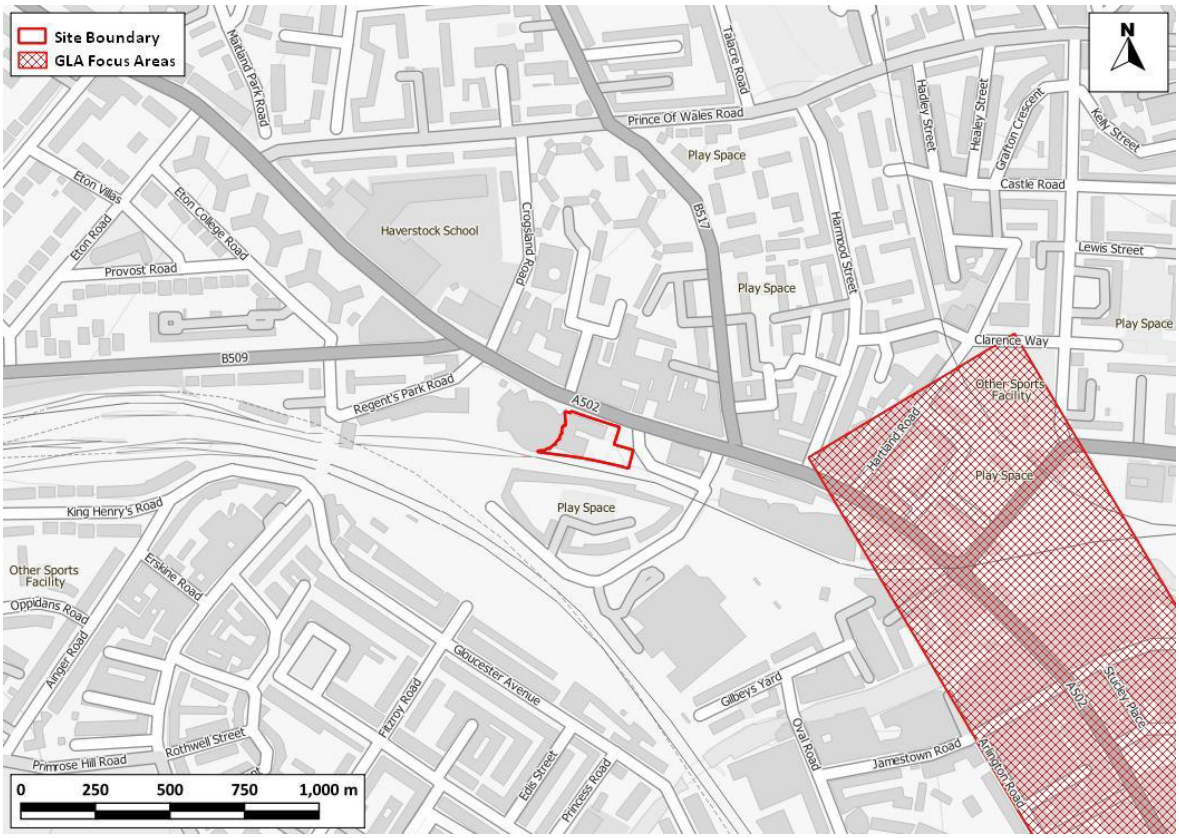

Figure 1: Proposed Development Location

1.9 The energy strategy for the proposed development will include a combination of air source heat pumps (ASHP) and solar photovoltaic (PV) panels); there will be no on-site centralised combustion plant for the routine provision of energy. However, the proposed development will require an emergency diesel generator; emissions from the routine testing and maintenance may impact on air quality at both existing and proposed residential properties. The main pollutants of concern related to generator emissions are nitrogen dioxide, PM_{10} and $PM_{2.5}$.

1.10 The Greater London Authority's (GLA's) London Plan (GLA, 2021) requires new developments to be air quality neutral. The air quality neutrality of the proposed development has been assessed following the methodology provided in the latest GLA's London Plan Guidance (Air Quality Neutral) (GLA, 2023a).

1.11 The GLA has also released Supplementary Planning Guidance on the Control of Dust and Emissions from Construction and Demolition (GLA, 2014). The SPG outlines a risk assessment approach for construction dust assessment and helps determine the mitigation measures that will need to be

applied. A construction dust assessment has been undertaken and the appropriate mitigation has been set out.

1.12 This report describes existing local air quality conditions (base year 2022), and the predicted air quality in the proposed year of opening (2027). The assessment of construction dust impacts focuses on the anticipated duration of the works.

1.13 This report has been prepared taking into account all relevant local and national guidance and regulations, including the LBC Air Quality Camden Planning Guidance (CPG), and follows a methodology agreed with LBC as part of the pre-application process.

2 Policy Context

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

Air Quality Strategy 2007

2.2 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 AQMA, and prepare an action plan which identifies appropriate measures that will be introduced in pursuit of the objectives.

Air Quality Strategy 2023

2.3 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.

The Environmental Permitting (England and Wales) (Amendment) Regulations 2018

2.4 The Medium Combustion Plant Directive (MCPD) (The European Parliament and the Council of the European Union, 2015) regulates pollutant emissions from combustion plant with a rated input between 1 and 50 megawatts (MW_{th}) and was transposed into UK law in January 2018 through an amendment to the Environmental Permitting Regulations (2018). The legislation sets emission limits to be applied from December 2018 for new plant and from 2025 or 2030 for existing plant (depending on the rated input). In addition to addressing emissions from plant with a rated input of 1 to 50 MW_{th}, as required by the MCPD, the amendment also introduces emission limits on generator plant, regardless of their rated input. Generators whose sole purpose is maintaining power supply at a site during an on-site emergency, that are operated for the purpose of testing/maintenance for no more than 50 hours per year, will be exempt from the emission limits.

2.5 The emergency diesel generator within the proposed development will not require a permit under these regulations, as its thermal input rate is below the 1 MW threshold. It will also be tested for fewer than 50 hours per year.

Clean Air Act 1993 & Environmental Protection Act

2.6 Small combustion plants of less than 20 MW net rated thermal input are controlled under the Clean Air Act 1993 (1993). This requires the local authority to approve the chimney height. Plants which are smaller than 366 kW have no such requirement. The local authority's approval will, therefore, be required for the plant to be installed in the proposed development.

2.7 Measures to ensure adequate dispersion of emissions from discharging stacks and vents are included in Technical Guidance Note D1 (Dispersion) (1993), issued in support of the Environmental Protection Act (1990).

Clean Air Strategy 2019

2.8 The Clean Air Strategy (Defra, 2019a) sets out a wide range of actions by which the UK 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

2.9 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.

2.10 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 recently announced that 80% of new cars and 70% of new vans sold in Great Britain must be zero emission by 2030, increasing to 100% by 2035. If these ambitions are realised then road traffic-related NOx emissions can be expected to reduce significantly over the coming decades, likely beyond the scale of reductions forecast in the tools utilised in carrying out this air quality assessment.

Environment Act 2021

2.11 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.

2.12 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 Paragraph 3.5.

Environmental Improvement Plan 2023

2.13 Defra published its 25 Year Environment Plan in 2018 (Defra, 2018a). 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.

2.14 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 more detail in Paragraph 3.5, include the long-term targets in the Statutory Instrument described in Paragraph 2.12, and interim targets to be achieved by 2028.

2.15 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

2.16 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".

2.17 To prevent unacceptable risks from air pollution, Paragraph 180 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 and water quality, taking into account relevant information such as river basin management plans".

2.18 Paragraph 191 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".

2.19 More specifically on air quality, Paragraph 192 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".

2.20 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".

2.21 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".

2.22 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"*.

2.23 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".

2.24 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".

2.25 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

2.26 The key London-specific policies are summarised below, with more detail provided, where required, in Appendix A1.

The London Plan

2.27 The London Plan (GLA, 2021) 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".*

2.28 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".*

2.29 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."*

2.30 The proposed development is not large-scale development subject to an Environmental Impact Assessment, thus an Air Quality Positive statement is not required.

2.31 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".

2.32 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".

2.33 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].

2.34 The London Plan includes a number of other relevant policies, which are detailed in Appendix A1.

London Environment Strategy

2.35 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 $PM_{2.5}$ 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.

Mayor's Transport Strategy

2.36 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".*

[1] The London Plan was developed based on a World Health Organisation guideline for $PM_{2.5}$ of 10 $\mu g/m^3$ (see Paragraph 2.35).

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

2.37 The GLA's 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

2.38 The GLA has identified 160 air quality Focus Areas in London. These are locations that not only exceed the annual mean limit value for NO_2, 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 200 m of the "*Camden High Street from Mornington Crescent to Chalk Farm and Camden Road*" air quality Focus Area.

Local Transport Plan

2.39 The Camden Planning Guidance (CPG) on Transport (London Borough of Camden, 2021a) sets out guidance on Delivery and Servicing Plans (DSPs) in relation to Policies A1, A4, CC4, and T4 of the LBC Local Plan, for development proposals which are likely to have an impact on the local noise and vibration, air quality, congestion and road safety. This guidance describes the aim of a DSP as being "*to minimise motorised freight movements, mitigating against the negative impacts of freight movements in general, in particular those of motorised freight traffic."*

2.40 The CPG on Transport also references requirements for all new residential developments to be car free, and requirements on developers to ensure that there is adequate bike storage provision on site, and in some cases to make financial contributions towards cycle hire schemes if required by the Council.

Local Policies

2.41 The LBC Local Plan (London Borough of Camden, 2017) was adopted in 2017. The Plan sets out the Council's planning policies, covering the period from 2016-2031. 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 Consideration both the exposure of occupants to air pollution and the effect of the development on air quality. must be taken to the actions identified in the Council's Air Quality Action Plan.

Air Quality Assessments (AQAs) are required where development is likely to expose residents to high levels of air pollution. Where the AQA shows that a development would cause harm to air quality, the Council will not grant planning permission unless measures are adopted to mitigate the impact. Similarly, developments that introduce sensitive receptors (i.e. housing, schools) in locations of poor air quality will not be acceptable unless designed to mitigate the impact.

Development that involves significant demolition, construction or earthworks will also be required to assess the risk of dust and emissions impacts in an AQA and include appropriate mitigation measures to be secured in a Construction Management Plan."

2.42 In support of Policy CC4, the Local Plan also includes Policy T2 which requires that *"all new developments in the borough to be car free."*

2.43 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 we will consider include… impacts of the construction phase, including the use of Construction Management Plans…odour, fumes and dust."

2.44 Policy D1 on 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…"

2.45 The plan elaborates that "architecture and urban design can affect human health through the quality and design of buildings and spaces, access to open space and nature, air quality, noise, opportunity for active transport such as walking and cycling, crime reduction and social cohesion."

2.46 LBC has also recently commenced consultation on a new Draft Local Plan (Regulation 18) (London Borough of Camden, 2024). Policy A3 (Air Quality) outlines a number of requirements for new developments including for all developments to be at least air quality neutral, to use design solutions

to reduce exposure to existing poor air quality and to consider emergency backup power for development sites early in the design process.

2.47 To support the current Camden Local Plan, the Council has published a Camden Planning Guidance (CPG) document (London Borough of Camden, 2021b), 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."*

2.48 The CPG describes air quality in the borough and measures to minimise emissions. The CPG references the 2005 WHO guidelines 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 CPG 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 38 µg/m^3 (the 40 µg/m^3 WHO limit less 5%) shall be taken as the limit for this pollutant.*"

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

Building Standards

2.50 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.

2.51 Approved Document F (HM Government, 2021), 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 Paragraph 3.11, later). 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.

2.52 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.

[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.

Air Quality Action Plans

National Air Quality Plan

2.53 Defra has produced an Air Quality Plan to tackle roadside NO_2 concentrations in the UK (Defra, 2017); a supplement to the 2017 Plan (Defra, 2018b) 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 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

2.54 LBC's combined Clean Air Strategy and Air Quality Action Plan (CAAP) (London Borough of Camden, 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.

2.55 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 µg/m^3 for NO_2 by 2034, 15 µg/m^3 for PM_{10} by 2030 and 5 µg/m^3 for $PM_{2.5}$ by 2034. These are more stringent than those published in the Air Quality CPG (see paragraph 2.48), which are based on the 2005 WHO guidelines and which are recommended for use "for the determination of planning applications and appraisal of Construction Management Plans" (London Borough of Camden, 2021a).

2.56 The CAAP 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.

3 Assessment Criteria

UK Criteria

3.1 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. They are based purely upon the scientific and medical evidence of the effects of an individual pollutant. The 'objectives' set out the extent to which the Government expects the standards to be achieved by a certain date. They take account of economic efficiency, practicability, technical feasibility and timescale. The objectives for use by local authorities are prescribed within the Air Quality (England) Regulations (2000) and the Air Quality (England) (Amendment) Regulations (2002).

3.2 The UK-wide objectives for NO_2 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 NO_2 objective is unlikely to be exceeded at roadside locations where the annual mean concentration is below 60 µg/m^3 (Defra, 2022). Therefore, 1-hour NO_2 concentrations will only be considered if the annual mean concentration is above this level. Measurements have also shown that the 24-hour mean PM_{10} objective could be exceeded at roadside locations where the annual mean concentration is above 32 µg/m^3 (Defra, 2022). The predicted annual mean PM_{10} concentrations are thus used as a proxy to determine the likelihood of an exceedance of the 24-hour mean PM_{10} objective. Where predicted annual mean concentrations are below 32 µg/m^3 it is unlikely that the 24-hour mean objective will be exceeded.

3.3 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 NO_2 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. 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 NO_2 applies wherever members of the public might regularly spend 1-hour or more, including outdoor eating locations and pavements of busy shopping streets.

3.4 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 (see Paragraph 3.11), originally set at 25 µg/m^3 and currently set at 20 µg/m^3.

3.5 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[3]. 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.

3.6 Defra will assess compliance with the population exposure targets by averaging concentrations measured at its own background monitoring stations. This will not consider small changes over time to precisely where people are exposed (such as would relate to exposure introduced by a new development). Furthermore, as explained in Paragraph 2.15, all four new targets provide metrics against which central Government can assess its own progress. While local authorities have an important role delivering the required improvements, these are expected to relate to controlling emissions and not to directly assessing $PM_{2.5}$ concentrations against the targets.

3.7 In March 2023, the Department for Levelling Up, Housing and Communities (DLUHC, 2023) explained that the new $PM_{2.5}$ targets will:

"need to be integrated into the planning system, and in setting out planning guidance for local authorities and businesses, we will consider the specific characteristics of $PM_{2.5}$. The guidance will be forthcoming in due course, until then we expect local authorities to continue to assess local air quality impacts in accordance with existing guidance."

3.8 Defra has also provided advice (Defra, 2023c) which explains that there is no current requirement to consider the new $PM_{2.5}$ targets in planning decisions and that guidance to local planning authorities will be forthcoming before this position changes. In the future, when planning decisions do need to consider the new targets, the expectation is that this will focus on reducing emissions from new development rather than there being a direct requirement for planning-related air quality assessments to predict $PM_{2.5}$ concentrations.

3.9 For the time being, therefore, no assessment is required, and indeed no robust assessment is possible, in relation to the new $PM_{2.5}$ targets and they are not considered further.

3.10 As explained in Paragraph 2.35, 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 WHO in 2005. In 2021, WHO updated its guidelines, but the London Environment Strategy (GLA, 2018a) considers the 2005 guideline of 10 µg/m^3. While there is no explicit requirement to assess against the GLA target of 10 µg/m^3, it has nevertheless been included within this assessment.

3.11 EU Directive 2008/50/EC (The European Parliament and the Council of the European Union, 2008) sets limit values for NO_2, PM_{10} and $PM_{2.5}$, and is implemented in UK law through the Air Quality

[3] 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.

Standards Regulations (2010)[4]. The limit values for NO_2 and PM_{10} are the same numerical concentrations as the UK objectives, but achievement of the limit values is a national obligation rather than a local one and concentrations are reported to the nearest whole number. In the UK, only monitoring and modelling carried out by UK Central Government meets the specification required to assess compliance with the limit values. Central Government does not normally recognise local authority monitoring or local modelling studies when determining the likelihood of the limit values being exceeded, unless such studies have been audited and approved by Defra and DfT's Joint Air Quality Unit (JAQU).

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

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

Pollutant	Time Period	Value
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 [a]
$PM_{2.5}$	Annual Mean	20 µg/m^3 [b]
	Annual Mean	10 µg/m^3 by 2030

[a] A proxy value of 32 µg/m^3 as an annual mean is used in this assessment to assess the likelihood of the 24-hour mean PM_{10} objective being exceeded. Measurements have shown that, above this concentration, exceedances of the 24-hour mean PM_{10} objective are possible (Defra, 2022).

[b] There is no numerical $PM_{2.5}$ objective for local authorities (see Paragraph 3.4). Convention is to assess against the UK limit value which is currently 20 µg/m^3.

Camden Criteria

3.13 LBC has committed within their Air Quality CPG and CAAP to meeting the WHO guideline limits for NO_2, PM_{10} and $PM_{2.5}$, as discussed in paragraphs 2.48 and 2.55. However, the two documents quote different WHO limits; the CPG refers to the previous (2005) WHO limits to be met in 2030 while the CAAP refers to the current (2021) WHO limits to be met in 2034.

3.14 The commitment to meet the new WHO guidelines in the CAAP is described within the context of the Council's local air quality management; the CAAP states that "*We will not consider that we have achieved the WHO guideline objectives until every monitoring location at which the pollutants are measured records annual mean concentrations which meet the relevant standards*". The purpose of the CAAP is to help fulfil their requirements under the LAQM regime, rather than development

[4] As amended through The Air Quality Standards (Amendment) Regulations 2016 and The Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020.

control. The CAAP does not reference the WHO guidelines for planning, nor does the CAAP include any measures with respect to updating the Air Quality CPG to account for the latest WHO guidelines.

3.15 For the purpose of this assessment, the WHO guidelines outlined in the Air Quality CPG have been used as these relate to planning and are the guidelines quoted in the Council's Air Quality Proforma to be submitted to accompany planning applications (London Borough of Camden, 2023a). These guidelines are presented in Table 2 below. The target years for achievement as outlined in the Camdem CAAP have also been provided.

Table 2: Camden Air Quality CPG Criteria for NO_2, PM_{10}, and $PM_{2.5}$

Pollutant	Guideline Target (as an annual mean)	Target achievement year
NO_2	38 µg/m^3 [a]	-[b]
PM_{10}	20 µg/m^3	2026
$PM_{2.5}$	10 µg/m^3	2030

[a] While the WHO guideline is 40 µg/m^3, 38 µg/m^3 has been used in accordance with the Air Quality CPG which states that "*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*."

[b] No achievement target timeframe for NO_2 as a target of 38 µg/m^3 should have already been met.

Construction Dust Criteria

3.16 There are no formal assessment criteria for dust. In the absence of formal criteria, the approach developed by the Institute of Air Quality Management (IAQM)[5] (2016)[6] has been used (the GLA's SPG (GLA, 2014) recommends that the assessment be based on the latest version of the IAQM guidance). Full details of this approach are provided in Appendix A2.

Screening Criteria

Road Traffic Assessments

3.17 Environmental Protection UK (EPUK) and the IAQM recommend a two-stage screening approach (Moorcroft and Barrowcliffe et al, 2017) to determine whether emissions from road traffic generated by a development have the potential for significant air quality impacts. The approach, as described in Appendix A3 first considers the size and parking provision of a development; if the development is residential and is for fewer than ten homes or covers less than 0.5 ha, or is non-residential and will provide less than 1,000 m^2 of floor space or cover a site area of less than 1 ha, and will provide ten or fewer parking spaces, then there is no need to progress to a detailed assessment.

[5] The IAQM is the professional body for air quality practitioners in the UK.

[6] The IAQM issued revised guidance in August 2023, however the guidance included a number of errors and inconsistencies and has since been withdrawn.

3.18 The second stage then compares the changes in vehicle flows on local roads that a development will lead to against specified screening criteria. The screening thresholds (described in full in Appendix A3) inside an AQMA are a change in flows of more than 25 heavy duty vehicles (HDVs) or 100 light duty vehicles (LDVs) per day. Where these criteria are exceeded, a detailed assessment is likely to be required, although the guidance advises that *"the criteria provided are precautionary and should be treated as indicative"*, and *"it may be appropriate to amend them on the basis of professional judgement"*.

Point Source Assessments

3.19 EPUK and the IAQM have developed an approach (Moorcroft and Barrowcliffe et al, 2017) to determine whether emissions from point sources, such as energy plant, have the potential for significant air quality impacts. The first step of the approach, as described in Appendix A3, is to screen the emissions and the emissions parameters to determine whether an assessment is necessary:

"Typically, any combustion plant where the single or combined NOx emission rate is less than 5 mg/sec is unlikely to give rise to impacts, provided that the emissions are released from a vent or stack in a location and at a height that provides adequate dispersion.

In situations where the emissions are released close to buildings with relevant receptors, or where the dispersion of the plume may be adversely affected by the size and/or height of adjacent buildings (including situations where the stack height is lower than the receptor) then consideration will need to be given to potential impacts at much lower emission rates.

Conversely, where existing nitrogen dioxide concentrations are low, and where the dispersion conditions are favourable, a much higher emission rate may be acceptable".

3.20 This screening approach requires professional judgement, and the experience of the consultants preparing the assessment is set out in Appendix A4.

Railway Locomotive Emissions

3.21 Defra guidance (Defra, 2022) outlines that large numbers of moving diesel trains can give rise to high levels of NO_2 close to railway tracks.

3.22 The guidance outlines where there may be the potential for an exceedance of the NO_2 objectives as a result of emissions from diesel trains. Residential properties within 30 m of railway lines where there are large numbers of diesel train movements (these lines are identified in the Defra guidance), and where background annual mean NO_2 concentrations are greater than 25 µg/m^3, may be at risk of elevated NO_2 concentrations. Only locations which meet these criteria require further assessment.

4 Assessment Approach

Consultation

4.1 The assessment follows a methodology agreed with LBC via email correspondence between Katherine Frost (Senior Sustainability Officer at Camden) and Julia Burnell (Air Quality Consultants), with subsequent comments from Christopher Winters (Sustainability Officer at Camden), between August and November 2023.

4.2 In initial correspondence between Julia Burnell and Katherine Frost (Senior Sustainability Officer at Camden) on 16 August 2023, it was requested by LBC that:

- an air quality neutral assessment and a construction dust risk assessment should be provided;
- since the proposed development was a major development "*in an area of poor air quality*" (as the WHO targets for PM_{10} and $PM_{2.5}$ were exceeded at the Site in the 2019 London Atmospheric Emissions Inventory (LAEI) and would introduce new receptors, a detailed air quality assessment would be required;
- the diesel railway line should be considered within the air quality modelling undertaken for the detailed air quality assessment;
- the results presented in the main body of the report should be in line with the Air Quality CPG and not project air quality values forward to the year 2025 and should use emission factors and background concentrations for the base year;
- for background concentrations, the nearest automatic monitoring station's most recent valid data or the Defra mapped value should be used, whichever is greater; and
- the WHO standards referred to in the London Plan 2021 for PM_{10} and $PM_{2.5}$ should be considered (20 µg/m^3 for PM_{10} and 10 µg/m^3 for $PM_{2.5}$).

4.3 Additional comments were provided in November 2023 from Chistopher Winters (Sustainability Officer at Camden) which stated that the Preliminary Air Quality Assessment (see Appendix A5) was considered satisfactory and highlighted that:

- the air quality of the area could be significantly affected by the railway line if it was used by diesel freight trains; and
- the diesel generators should:
    - have flues at least 1 m (preferably 3 m) and they should be the tallest point in the surrounding 20 m radius;

- be sized appropriately for life safety functions only, unless clearly justified for other reasons;
- have a cumulative capacity that does not exceed 1 MWth; and
- provide evidence that alternative technologies to diesel have been fully considered and options such as Uninterruptable Power Supply (UPS) or Secondary mains feed have been considered.

Study Area

4.4 The study area for the assessment has been identified using professional judgement, focussing on the areas where impacts are anticipated to be greatest. It includes roads and railway lines within 200 m of the Site and roads within 200 m of the monitoring sites used for the model verification. Specifically, the assessment has focussed on Chalk Farm Road, and sections of Haverstock Hill and Camden High Street, as well as sections of relevant roads branching off from these roads (Prince of Wales Road, the B509, the B517, Jamestown Road, Hawley Road and Hawley Crescent). Figure 1 in Section 1 of this report effectively shows the study area.

4.5 The construction dust assessment considers the potential for impacts within 350 m of the site boundary, or within 50 m of roads used by construction vehicles within 500 m of the site. The specific areas considered are detailed in Section 6.

Receptors

4.6 Concentrations of NO_2, PM_{10} and $PM_{2.5}$ have been predicted at a number of locations within the proposed development. Receptors have been identified to represent a range of exposure, including worst-case locations (the façades of the residential properties closest to the sources). When selecting receptors, particular attention has been paid to assessing concentrations close to Chalk Farm Road and the southern boundary of the Site, adjacent to the railway line.

4.7 Fifteen receptor locations have been identified within the new development, which represent exposure to existing sources. These locations are described in Table 3 and shown in Figure 2. In addition, concentrations have been modelled at the nearby diffusion tube monitoring sites located on Prince of Wales Road, Haverstock Hill, Camden High Street and Chalk Farm Road, in order to verify the model outputs (see Appendix A6 for verification method).

Table 3: Description of Receptor Locations

Receptor	Type	X coordinate	Y coordinate	Heights Modelled (m) [a]
Receptor 1	Residential	528289.8	184291.0	1.5
Receptor 2	Residential	528328.2	184285.1	1.5
Receptor 3	Residential	528331.0	184299.4	1.5
Receptor 4	Residential	528322.5	184320.3	1.5
Receptor 5	Residential	528302.6	184327.6	1.5
Receptor 6	Playground	528300.1	184287.2	1.5
Receptor 7	Residential	528329.9	184311.2	1.5
Receptor 8	Residential	528351.3	184293.6	1.5
Receptor 9	Residential	528347.3	184281.4	1.5
Receptor 10	Residential	528294.4	184323.3	1.5
Receptor 11	Residential	528308.4	184320.9	1.5
Receptor 12	Residential	528282.3	184299.4	1.5
Receptor 13	Residential	528303.1	184297.0	1.5
Receptor 14	Playground	528307.6	184286.1	1.5
Receptor 15	Playground	528321.1	184283.9	1.5

[a] A height of 1.5 m is used to represent ground-floor level exposure. It is noted that the current plans for the proposed development indicate that residential uses will be on the first-floor and above however the assessment has assumed residential exposure will be at ground-floor level as a worst-case.

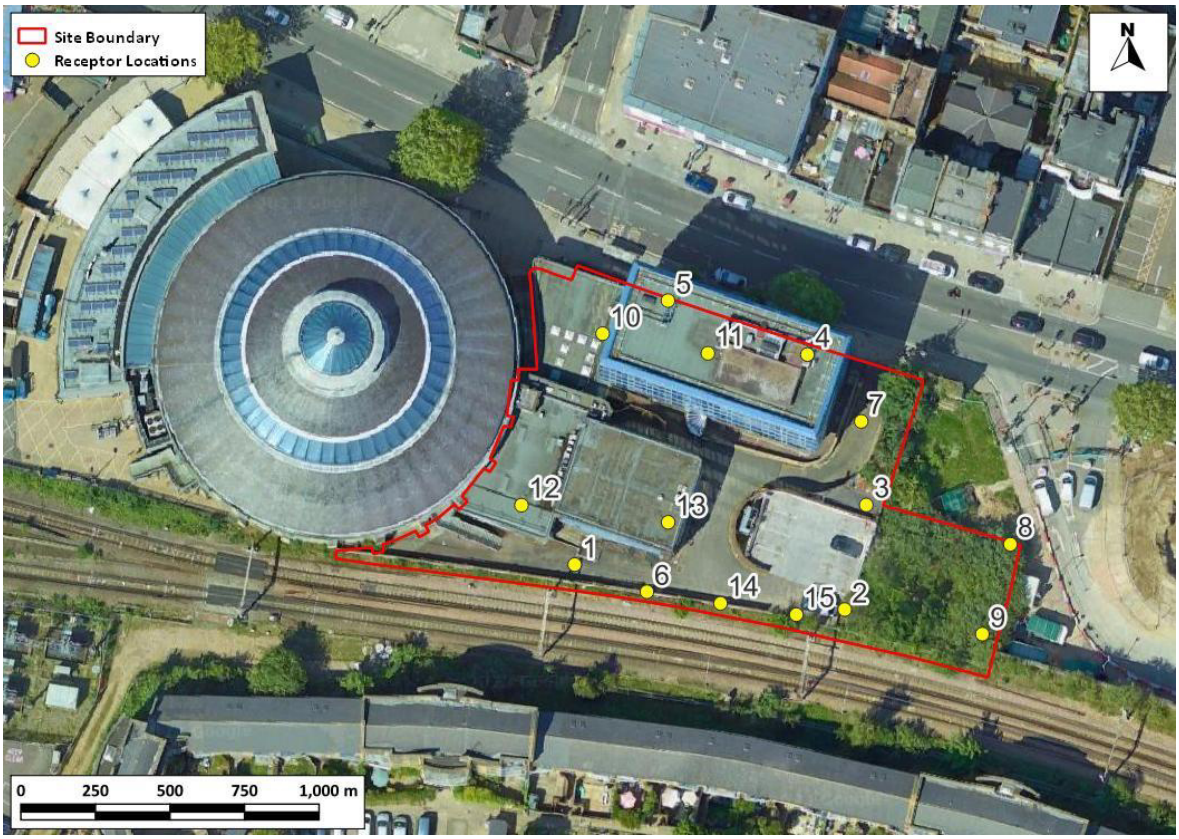

Figure 2: Receptor Locations

Imagery ©2024 Airbus, Bluesky, CNES/Airbus, Getmapping plc, Infoterra Ltd & Bluesky, Maxar Technologies, The GeoInformation Group, Map data ©2024.

4.8 Selected receptors may be representative of air quality conditions at a number of properties; consideration has been given to how many sensitive locations each modelled receptor represents when considering the impacts of the proposed development and the overall significance of effects.

4.9 The construction dust risk assessment approach does not require specific receptors to be identified; instead, the numbers of different types of receptors within given distance bands are counted. These receptor counts are provided in Section 6.

Existing Conditions

4.10 Existing sources of emissions and baseline air quality conditions within the study area have been defined using a number of approaches:

- industrial and waste management sources that may affect the area have been identified using Defra's Pollutant Release and Transfer Register (Defra, 2024a);
- local sources have been identified through discussions with the LBC's Sustainability, Air Quality & Energy Team and examination of the Council's Air Quality Review and Assessment reports;

- information on existing air quality has been obtained by collating the results of monitoring carried out by the local authority;
- background concentrations have been defined using Defra's 2018-based background maps (Defra, 2024b). These cover the whole of the UK on a 1x1 km grid. The NO_2 background maps for 2022 have been calibrated against measurements made at urban background monitoring sites across Camden. As presented in Section 5, the measured concentrations at these sites have been compared to the Defra background maps and subsequently, all mapped background NO_2 concentrations have been calibrated by applying a factor of 0.662. Mapped background concentrations of PM_{10} and $PM_{2.5}$ have not been adjusted; and
- whether or not there are any exceedances of the annual mean limit value for NO_2 in the study area has been identified using the maps of roadside concentrations published by Defra (2020) (Defra, 2024c). These are the maps used by the UK Government, together with the results from national Automatic Urban and Rural Network (AURN), to identify and report exceedances of the limit value. The national maps of roadside PM_{10} and $PM_{2.5}$ concentrations (Defra, 2024c), which are available for the years 2009 to 2019, show no exceedances of the limit values anywhere in the UK in 2019.

Construction Impacts

4.11 The construction dust assessment considers the potential for impacts within 350 m of the site boundary, or within 50 m of roads used by construction vehicles. The assessment methodology follows the GLA's SPG on the Control of Dust and Emissions During Construction and Demolition (GLA, 2014), which is based on that provided by IAQM (2016). This follows a sequence of steps. Step 1 is a basic screening stage, to determine whether the more detailed assessment provided in Step 2 is required. Step 2a determines the potential for dust to be raised from on-site works and by vehicles leaving the site. Step 2b defines the sensitivity of the area to any dust that may be raised. Step 2c combines the information from Steps 2a and 2b to determine the risk of dust impacts without appropriate mitigation. Step 3 uses this information to determine the appropriate level of mitigation required to ensure that there should be no significant impacts. Appendix A2 explains the approach in more detail.

Road Traffic Impacts

Screening

4.12 The first step in considering the road traffic impacts of the proposed development has been to screen the development and its traffic generation against the criteria set out in the EPUK/IAQM guidance (Moorcroft and Barrowcliffe et al, 2017), as described in Paragraph 3.17 and detailed further in

Appendix A3. Where impacts can be screened out there is no need to progress to a more detailed assessment.

4.13 Detailed modelling has been requested by LBC to determine the site suitability for new sensitive receptors. The following sections describe the approach to dispersion modelling of road traffic emissions.

Modelling Methodology

4.14 Concentrations have been predicted using the ADMS-Roads dispersion model, with vehicle emissions derived using Defra's Emission Factor Toolkit (EFT) (v12.0) (Defra, 2024b). Details of the model inputs and the model verification are provided in Appendix A6.

Assessment Scenarios

4.15 NO_2, PM_{10} and $PM_{2.5}$ concentrations have been predicted for the following scenarios:

- base year 2022; and
- the proposed year of opening of the proposed development (2027).

4.16 In accordance with LBC's Air Quality CPG, concentrations have also been predicted for the proposed year of opening (2027) assuming no improvement in emission factors or background concentrations from the base year (i.e. using 2022 emission factors and background concentrations, with 2027 traffic data). As discussed in paragraphs 4.20 and 4.21 below, this is a highly conservative assumption.

Uncertainty

4.17 There are many components that contribute to the uncertainty of modelling predictions. The road traffic emissions dispersion model used in this assessment is dependent upon the traffic data that have been input, which will have inherent uncertainties associated with them. There are then additional uncertainties, as models are required to simplify real-world conditions into a series of algorithms.

4.18 An important stage in the process is model verification, which involves comparing the model output with measured concentrations (see Appendix A6). Because the model has been verified and adjusted, there can be reasonable confidence in the prediction of base year (2022) concentrations.

4.19 Predicting pollutant concentrations in a future year will always be subject to greater uncertainty. For obvious reasons, the model cannot be verified in the future, and it is necessary to rely on a series of projections provided by DfT and Defra as to what will happen to traffic volumes, background pollutant concentrations and vehicle emissions. Historic versions of Defra's EFT tended to over-state emissions reductions into the future. However, analyses of the more recent versions of Defra's EFT carried out by AQC (2020a) (2020b) suggest that, on balance, these versions are unlikely to over-

state the rate at which Nox emissions decline in the future at an 'average' site in the UK. In practice, the balance of evidence suggests that NOx concentrations are most likely to decline more quickly in the future, on average, than predicted by the current EFT, especially against a base year of 2016 or later. Using EFT v12.0 for future-year forecasts in this report thus provides a robust assessment, given that the model has been verified against measurements made in 2022.

4.20 In spite of the large body of evidence described above indicating that the EFT vehicle projection factors are robust and LBC monitoring data indicating the concentrations have improved in the borough since 2015 (presented in Table 4), the Air Quality CPG requests that concentrations are predicted assuming no improvements in vehicle emissions, which is unrealistic given expected future changes in the vehicle fleet (discussed in Paragraph 4.21 and Paragraph 2.9). The results from this scenario are considered highly conservative; the concentrations at the proposed development are expected to be closer to those described for 2027 as presented in Section 5 of this report. The LBC approach of disregarding expected future improvements in air quality will more than offset any other uncertainties in the assumptions.

4.21 Changes were made to the LEZ and the Ultra Low Emission Zone (ULEZ) in 2021, and the ULEZ was expanded further in 2023. The changes are described in detail in Appendix A1, and can be expected to significantly reduce Nox emissions in London. Defra's latest EFT is representative of London-Specific policies, now accounting for the LEZ and ULEZ changes in 2021 and 2023.

Assumptions

4.22 It is necessary to make a number of assumptions when carrying out an air quality assessment; in order to account for some of the uncertainty in the approach, as described above, assumptions made have generally sought to reflect a realistic worst-case scenario. Key assumptions made in carrying out this assessment include:

- the assumption that the proposed development is complete and fully occupied in 2027; and
- that the Northolt meteorological monitoring station appropriately represents conditions in the study area (this is discussed further in Appendix A6).

Impacts of the Proposed Emergency Generator

4.23 The proposed development will be provided with heat and hot water using a combination of ASHPs and solar PV panels. However, a diesel generator will also be installed to provide back-up power in the event of an emergency.

4.24 The first step in considering the emergency generator impacts has been to screen the pollutant emissions against the criteria set out in the EPUK/IAQM guidance (Moorcroft and Barrowcliffe et al, 2017), as described in Paragraphs 3.19 and 3.20. Where impacts can be screened out there is no need to progress to a more detailed assessment.

Railway Impacts

4.25 The potential for significant impacts as a result of emissions from diesel trains on the railway line adjacent to the proposed development has been considered by comparing the specific development scenario to the criteria set out in the Defra guidance (Defra, 2022).

4.26 However, as requested by LBC, the contribution to concentrations of NO_2, PM_{10} and $PM_{2.5}$ from the diesel trains have also been included in the ADMS-Roads dispersion model, with emissions derived using the LAEI (GLA, 2023b). Details of model inputs are provided in Appendix A6.

4.27 It has not been possible to verify the railway emissions as there are no nearby monitoring sites representative of railway emissions only (all nearby local authority monitoring sites are located adjacent to roads so would be representative of emissions from roads). However, the railway emissions used in this assessment are based on those presented in the LAEI and therefore there is a relatively high level of confidence in the emissions used within the assessment. Furthermore, as the emissions are based on the 2019 LAEI, the emission factors used in the assessment are likely to overestimate the railway emissions in the base year (2022) and the opening year (2027).

4.28 The model includes all railway lines within 200 m of the proposed development site boundary.

Assessment of Significance

Construction Dust Significance

4.29 Guidance from IAQM (2016) is that, with appropriate mitigation in place, the effects of construction dust will be 'not significant'. This is the latest version of the guidance upon which the assessment methodology set out in the GLA guidance (GLA, 2014) is based (the GLA guidance advises that the latest version of the IAQM guidance should always be used). The assessment thus focuses on determining the appropriate level of mitigation so as to ensure that effects will normally be 'not significant'.

Operational Significance

4.30 There is no official guidance in the UK in relation to development control on how to assess the significance of air quality impacts. The approach developed jointly by EPUK and the IAQM (Moorcroft and Barrowcliffe et al, 2017) has therefore been used. The overall significance of the air quality impacts is determined using professional judgement; the experience of the consultants preparing the report is set out in Appendix A4. Full details of the EPUK/IAQM approach are provided in Appendix A3.

'Air Quality Neutral'

4.31 The GLA's London Plan Guidance (Air Quality Neutral) (GLA, 2023a) sets out guidance on how an 'air quality neutral' assessment should be undertaken. It also provides a methodology for calculating

an offsetting payment if a development is not ‘air quality neutral’ and it is not possible to identify or agree appropriate and adequate mitigation.

4.32 The guidance provides a simplified assessment approach for major developments which are car free and have no on-site combustion sources (except for emergency generators), which has been followed in this report.

5 Baseline Conditions

Relevant Features

5.1 The proposed development is located approximately 150 m east of the Chalk Farm Underground Station. The application site is bounded to the north by Chalk Farm Road (A502), beyond which are multiple commercial premises and residential properties. To the east is a car park and supermarket and to the south is a section of the London Overground railway line (which is part of the mainline rail to Euston and used for passenger trains and freight), beyond which are multiple residential properties. To the west is the Roundhouse Theatre. The proposed development site currently consists of offices and commercial premises.

5.2 The proposed development is located within a borough-wide AQMA and within 200 m of an air quality Focus Area, as highlighted in Figure 1.

Industrial Sources

5.3 No significant industrial or waste management sources have been identified that are likely to affect the proposed development, in terms of air quality.

Local Air Quality Monitoring

5.4 LBC currently operates five automatic monitoring stations, one of which (Camden High Street) is within close proximity to the proposed development. This automatic monitor measures NO_2 concentrations only. The Council also operates a number of NO_2 monitoring sites using diffusion tubes prepared and analysed by Gradko International (using the 50% TEA in acetone method). These include three deployed on Chalk Farm Road, one of which is located opposite the proposed development (CAM135), and seven of which are deployed on nearby side roads off Chalk Farm Road. Annual mean results for the years 2019 to 2022 are summarised in Table 4, while results relating to the 1-hour mean objective are summarised in Table 5. Exceedances of the objectives are shown in bold. The monitoring locations are shown in Figure 3. The monitoring data have been taken from LBC's Air Quality Annual Status Report for 2022 (London Borough of Camden, 2023b).

Table 4: Summary of Annual Mean NO_2 Monitoring (2019-2022) (µg/m^3)

Site No.	Site Type[a]	Location	2019	2020	2021	2022
CD010	Roadside	Camden High Street	-	-	30.0	29.0
CAM45	Roadside	Haverstock School – Crogsland Road south	-	-	23.4	23.4
CAM64	Roadside	Prince of Wales Road/Haverstock Hill	36.6	22.1	23.5	22.5
CAM121	Roadside	Haverstock Hill/Haverstock School	33.1	23.5	21.0	22.0
CAM122	Roadside	Harmood Street	31.7	24.9	20.7	18.5
CAM123	Roadside	Hartland Road	31.8	26.1	20.7	21.4
CAM128	Roadside	Camden High Street (Camden Market)	**41.5**	33.1	26.3	27.2
CAM133	Roadside	Holy Trinity and St. Silas Primary School (Clarence Way)	28.1	22.1	17.9	19.9
CAM134	Roadside	Regent's Park Road	31.4	22.2	20.9	21.5
CAM135	Roadside	Chalk Farm Road	**42.4**	33.3	27.1	26.7
CAM136	Roadside	Ferdinand Street	36.7	30.3	29.4	27.8
CAM137	Roadside	Hartland Street	33.7	25.2	22.7	22.8
Objective			**40**			

[a] Estimated based on location of monitor and proximity to nearest road.

Table 5: Number of Hours With NO_2 Concentrations Above 200 µg/m^3

Site No.	Site Type	Location	2021	2022
CD10	Roadside	Camden High Street[a]	0	0
Objective			**18**	

[a] Monitor installed in mid-2021.

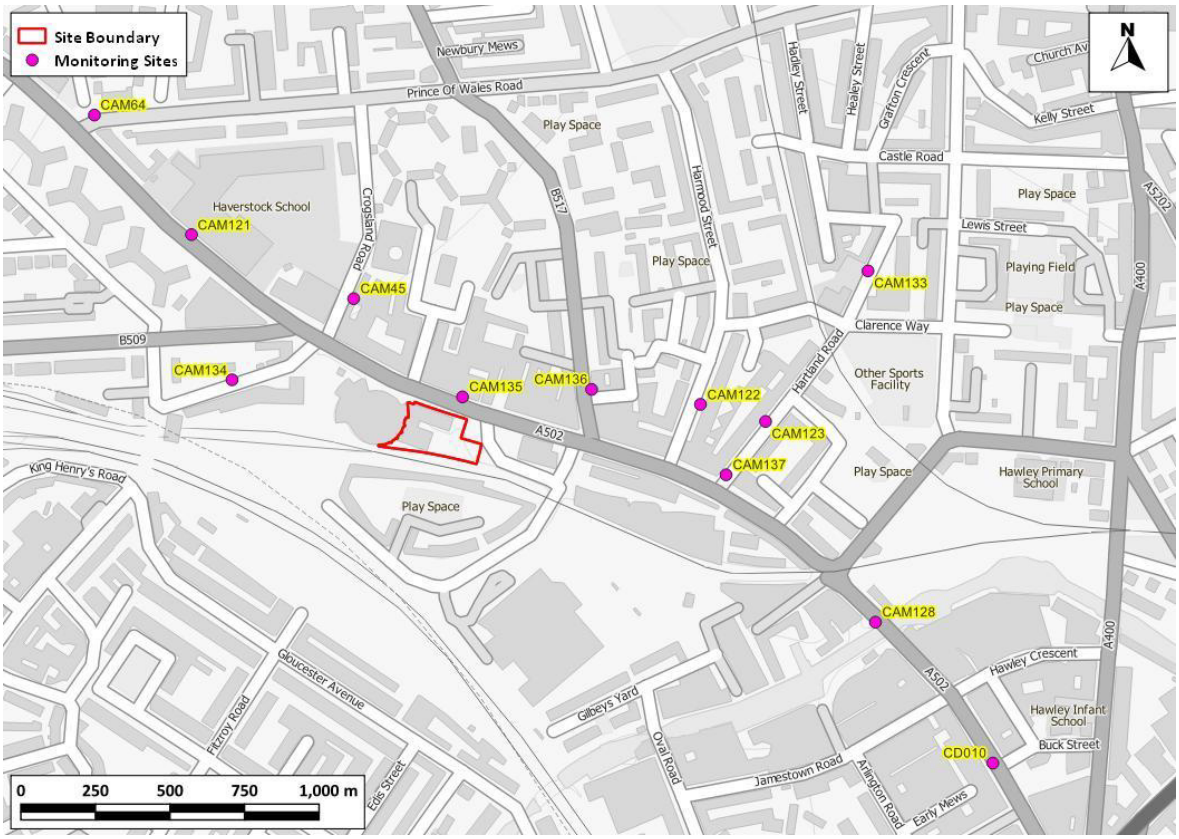

Figure 3: Monitoring Locations

5.5 No exceedances of the annual mean NO_2 objective or the Air Quality CPG criteria were measured in 2022. No exceedance of the hourly mean NO_2 objective were measured in 2022 at the Camden High Street automatic monitor, and annual mean concentrations were less than 60 µg/m^3 at all nearby diffusion tube sites, indicating it is unlikely there would have been exceedances of the 1-hour mean objective at these locations. The 2022 concentration measured at CAM135, which was well below the annual mean objective, is considered most representative of the proposed development (adjacent to Chalk Farm Road), although CAM 135 is closer to the kerb than the façade of the proposed development and is located downwind of Chalk Farm Road more frequently than the proposed development (the predominant wind direction is from the southwest, as shown in Figure A5.2), and therefore CAM135 is expected to experience higher concentrations.

5.6 There are no automatic monitoring sites within close proximity to the proposed development which monitor PM_{10} or $PM_{2.5}$ concentrations. However, between 2016 and 2022, at the monitoring sites across Camden which monitor PM_{10} and $PM_{2.5}$, concentrations were all below the respective UK air quality objectives, although they were above the Air Quality CPG criteria.

Exceedances of Limit Value

5.7 There are several AURN monitoring sites within the Greater London Urban Area that have measured exceedances of the annual mean NO_2 limit value (Defra, 2024d). Furthermore, Defra's roadside annual mean NO_2 concentrations (Defra, 2024c), which are used to identify and report exceedances of the limit value, identify exceedances of this limit value in 2019 along many roads in London but not for the roads close to the proposed development, including Chalk Farm Road (A502). The Greater London Urban Area has thus been reported as exceeding the limit value for annual mean NO_2 concentrations. Defra's predicted concentrations for 2022 (Defra, 2020) also do not identify any exceedances within the study area. As such, there is considered to be no risk of a limit value exceedance in the vicinity of the proposed development by the time that it is operational.

5.8 Defra's Air Quality Plan requires the GLA to prepare an action plan that will "*deliver compliance in the shortest time possible*", and the 2015 Plan assumed that a CAZ was required. The GLA has already implemented an LEZ and a ULEZ, thus the authority has effectively already implemented the required CAZ. These have been implemented as part of a package of measures including 12 Low Emission Bus Zones, Low Emission Neighbourhoods, the phasing out of diesel buses and taxis and other measures within the Mayor's Transport Strategy.

Background Concentrations

5.9 The 2022 Defra background NO_2 concentrations were found to be greater than measured 2022 roadside NO_2 concentrations at multiple monitoring sites within the study area, and therefore the Defra background concentrations in this area are overly conservative. A comparison of the 2022 measured NO_2 concentrations at LBC urban background sites with the 2022 Defra mapped background for the corresponding 1x1 km grid square has been undertaken, as presented below in Table 6.

Table 6: Comparison of Urban Background Pollutant Concentrations with Defra Background Map Concentrations in 2022 (µg/m^3)

Monitoring Site	2022 Measured Concentration	2022 Defra Background	Ratio of Measured Concentration and Defra Background
BL0	26.0	35.5	0.732
CAM73	19.2	35.5	0.541
CAM75	16.4	23.3	0.701
CAM79	23.9	35.4	0.675

5.10 The comparison demonstrates that, across Camden, measured background concentrations are significantly lower than the corresponding Defra mapped background concentrations. An average local adjustment factor of 0.662 has therefore been calculated and applied to Defra mapped NO_2 background concentrations used in the assessment.

5.11 Background concentrations in the study area used in the assessment, with NO_2 concentrations adjusted using the calibration factor calculated above, are set out in Table 7; they are all well below the objectives and below the Air Quality CPG criteria for NO_2 and PM_{10}. However, background $PM_{2.5}$ concentrations are above the GLA target. A range of values is presented as the study area covers multiple 1x1 km grid squares.

Table 7: Estimated Annual Mean Background Pollutant Concentrations in 2022 and 2027 (µg/m^3)

Year	NO_2	PM_{10}	$PM_{2.5}$
2022	16.2-17.3	17.4-18.1	11.2-11.6
2027	14.8-15.8	16.8-17.4	10.8-11.2
Objective / GLA target	**40**	**40**	**20/10** [a]

[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.

6 Construction Phase Impact Assessment

Construction Traffic

6.1 Based on data provided by Regal London, the construction works are estimated to generate up to 38 Heavy Goods Vehicle (HGV) movements per day in the peak month of construction (August 2026). However, outside of this peak month, construction traffic volumes will be lower, and the site will operate for a maximum of 5.5 days per week. The maximum traffic volume generated by the site during the construction works will be 20 as an annual average (Annual Average Daily Traffic; AADT), which is below the relevant screening criteria of 25 AADT for heavy vehicles. Typical LDV traffic volumes generated by the site during the construction works are also expected to be below the relevant screening criteria of 100 AADT for light vehicles recommended by EPUK/IAQM guidance (Moorcroft and Barrowcliffe et al, 2017).

6.2 It is, therefore, not considered necessary to assess the impacts of traffic emissions during the construction phase and it can be concluded that the proposed development will not have a significant impact on local roadside air quality as a result of construction traffic emissions.

On-Site Exhaust Emissions

6.3 The IAQM guidance (IAQM, 2016) states:

"Experience of assessing the exhaust emissions from on-site plant (also known as non-road mobile machinery or NRMM) and site traffic suggests that they are unlikely to make a significant impact on local air quality, and in the vast majority of cases they will not need to be quantitatively assessed. For site plant and on-site traffic, consideration should be given to the number of plant/vehicles and their operating hours and locations to assess whether a significant effect is likely to occur".

6.4 Since the proposed development is in London, any NRMM used during construction are expected to comply with emissions standards, in line with the GLA's Control of Dust and Emissions During Construction and Demolition SPG, as described in Appendix A7. Additionally, there will be no idling when vehicles are not in use, and machinery will be located away from sensitive receptors as far as possible. It is therefore judged that there will be no risk of significant effects at existing receptors as a result of on-site machinery emissions.

Construction Dust and Particulate Matter Emissions

6.5 The construction works will give rise to a risk of dust impacts during demolition, earthworks and construction, as well as from trackout of dust and dirt by vehicles onto the public highway. Step 1 of the assessment procedure is to screen the need for a detailed assessment. There are receptors within 350 m of the proposed site (see Appendix A2), thus a detailed assessment is required. The following section sets out Step 2 of the assessment procedure.

Potential Dust Emission Magnitude

Demolition

6.6 There will be a requirement to demolish the existing office block, annex and car park on the Site. These buildings comprise of a concrete frame with metal cladding with an approximate total volume of up to 20,000 m^3. The tallest of these buildings approximately 25 m. A mobile crusher will be used on site before removal of the material; such crushing plant may require a valid Environmental Permitting Regulations permit. Based on the example definitions set out in Table A2.1 in Appendix A2, although the demolition volume is small, as a mobile crusher will be used on site and the maximum demolition height is 25 m, the dust emission class for demolition is considered to be *medium*.

Earthworks

6.7 The characteristics of the soil at the site have been defined using the British Geological Survey's UK Soil Observatory website (British Geological Survey, 2024), as set out in Table 8. Overall, it is considered that, when dry, this soil has the potential to be moderately dusty.

Table 8: Summary of Soil Characteristics

Category	Record
Soil Layer Thickness	Deep
Soil Parent Material Grain Size	Argillaceous [a]
European Soil Bureau Description	Pre-quaternary Marine/Estuarine Sand and Silt
Soil Group	Medium to Light (Silty) to Heavy
Soil Texture	Clayey Loam [b] to Silty Loam

[a] grain size < 0.06 mm.

[b] a loam is composed mostly of sand and silt.

6.8 The site covers approximately 3,000 m^2, with 1,250 m^2 of this subject to earthworks, involving removal of the foundations of the demolished buildings and breaking up of a paved area. The earthworks will arise mainly from vehicles travelling over unpaved ground and from the handling of dusty materials (such as dry soil). A maximum number of 20 earth-moving vehicles will be active at any one time. The total material to be moved is estimated to be 8,193 tonnes and the earthworks are expected to take 8 months. Based on the example definitions set out in Table A2.1 in Appendix A2, although the earthworks site area and the total material moved is small, the soil type is moderately dusty and the number of heavy vehicles active at any one time is large, so the dust emission class for earthworks is considered to be *medium*.

Construction

6.9 The proposed development will involve the construction of 24 affordable housing units and 265 student rooms, together with commercial space, with a total building volume of approximately 40,500 m^3. Construction will include erection of a reinforced concrete frame with a terracotta façade. Dust will arise from vehicles travelling over unpaved ground, the handling and storage of dusty materials, the cutting of concrete and piling. Based on the example definitions set out in Table A2.1 in Appendix A2, the dust emission class for construction is considered to be *medium*.

Trackout

6.10 The number of heavy vehicles accessing the site, which may track out dust and dirt, will be a maximum of 19 outward heavy vehicle movements per day. Based on the example definitions set out in Table A2.1 in Appendix A2, the dust emission class for trackout is considered to be *medium*.

6.11 Table 9 summarises the dust emission magnitude for the proposed development.

Table 9: Summary of Dust Emission Magnitude

Source	Dust Emission Magnitude
Demolition	Medium
Earthworks	Medium
Construction	Medium
Trackout	Medium

Sensitivity of the Area

6.12 This assessment step combines the sensitivity of individual receptors to dust effects with the number of receptors in the area and their proximity to the site. It also considers additional site-specific factors such as topography and screening, and in the case of sensitivity to human health effects, baseline PM_{10} concentrations.

6.13 The IAQM guidance, upon which the GLA's guidance is based, explains that residential properties are 'high' sensitivity receptors to dust soiling, while the Roundhouse theatre is considered a 'medium' sensitivity receptor (Table A2.2 in Appendix A2). Residential properties are also classified as being of 'high' sensitivity to human health effects, while places of work are classified as being of 'medium' sensitivity. There are more than 10 residential properties within 20 m of the site, as well as the Roundhouse theatre (see Figure 4).

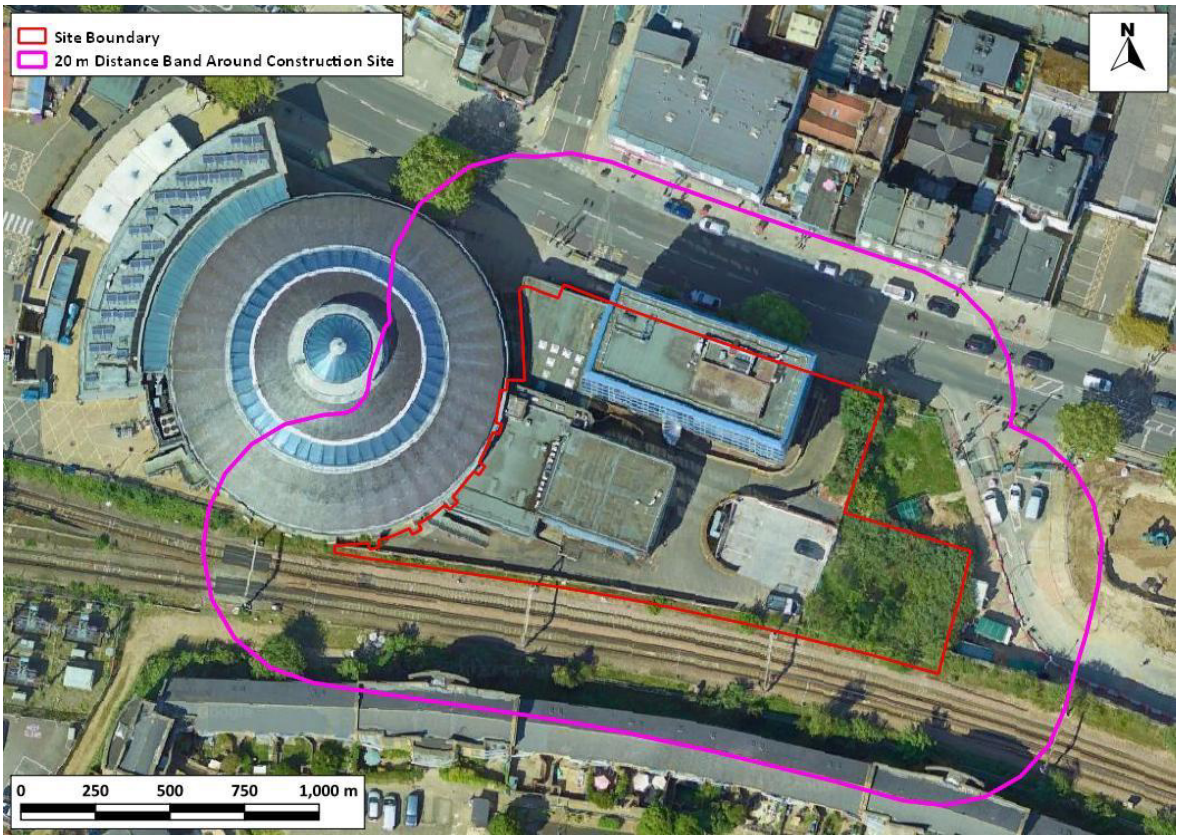

Figure 4: 20 m Distance Band around Site Boundary

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6.14 Table 9 shows that the dust emission magnitude for trackout is medium and Table A2.3 in Appendix A2 thus explains that there is a risk of material being tracked 200 m from the site exit. Construction traffic will travel northbound along Chalk Farm Road (A502). There are more than 10 residential properties, mainly residential flats above commercial properties, as well as the Roundhouse theatre within 20 m of the roads along which material will be tracked (see Figure 5).

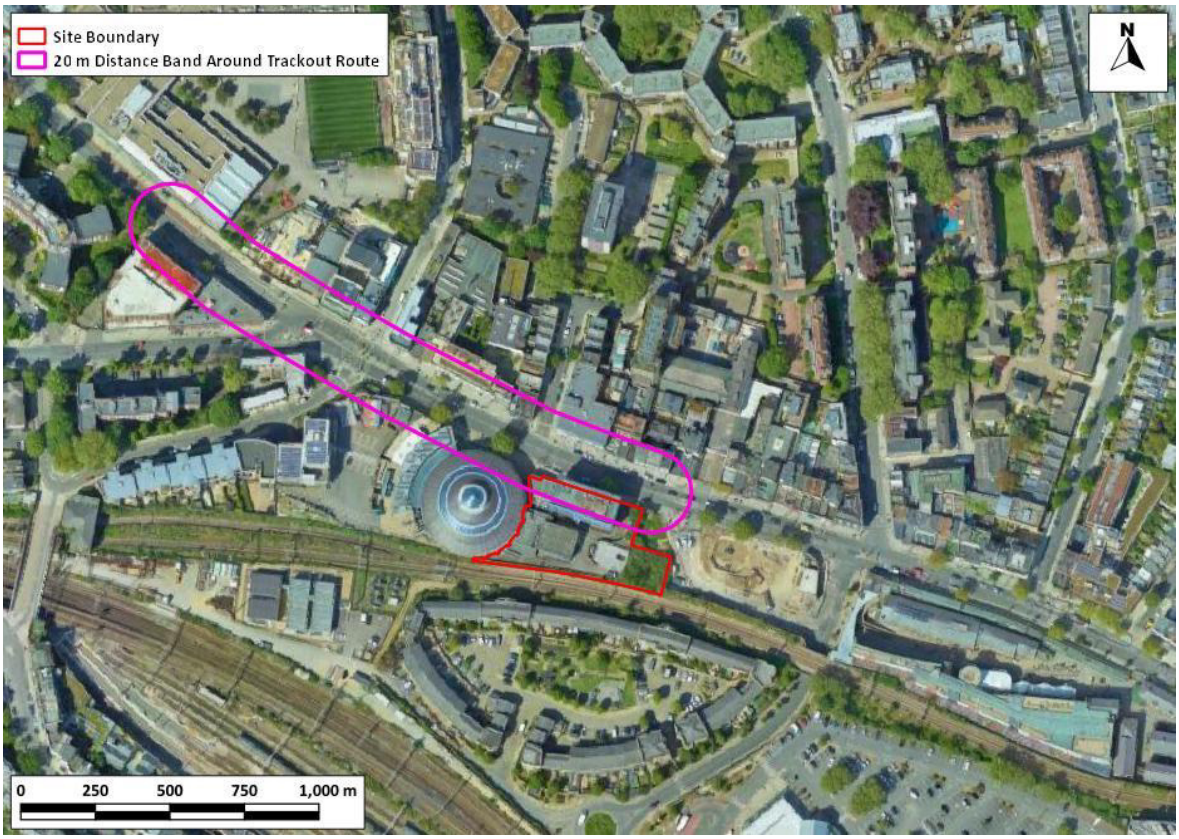

Figure 5: 20 m Distance Band around Roads Used by Construction Traffic Within 200 m of the Site

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Sensitivity of the Area to Effects from Dust Soiling

6.15 Using the information set out in Paragraph 6.13 and Figure 4 alongside the matrix set out in Table A2.3 in Appendix A2, the area surrounding the on-site works is of 'high' sensitivity to dust soiling. Using the information set out in Paragraph 6.14 and Figure 5 alongside the same matrix, the area is also of 'high' sensitivity to dust soiling due to trackout.

Sensitivity of the Area to any Human Health Effects

6.16 The matrix in Table A2.4 in Appendix A2 requires information on the baseline annual mean PM_{10} concentration in the area. Since many of the commercial properties along the trackout route have flats above them, the existing annual mean PM_{10} concentration at these properties is best described by the PM_{10} concentration predicted at Receptor 5 in the 2027 scenario which assumes no improvement in future backgrounds as presented in Table 12 (19.2 µg/m^3). Using the information set out in Paragraphs 6.13 and Figure 4 alongside the matrix in Table A2.4 in Appendix A2, the area surrounding the on-site works is of 'low' sensitivity to human health effects. Using the information

set out in Paragraph 6.14 and Figure 5 alongside the same matrix, the area surrounding roads along which material may be tracked from the site is also of 'low' sensitivity.

Sensitivity of the Area to any Ecological Effects

6.17 The guidance only considers designated ecological sites within 50 m to have the potential to be impacted by the construction works. There are no designated ecological sites within 50 m of the site boundary or those roads along which material may be tracked, thus ecological impacts will not be considered further.

Summary of the Area Sensitivity

6.18 Table 10 summarises the sensitivity of the area around the proposed construction works.

Table 10: Summary of the Area Sensitivity

Effects Associated With:	Sensitivity of the Surrounding Area	
	On-site Works	Trackout
Dust Soiling	High Sensitivity	High Sensitivity
Human Health	Low Sensitivity	Low Sensitivity

Risk and Significance

6.19 The dust emission magnitudes in Table 9 have been combined with the sensitivities of the area in Table 10 using the matrix in Table A2.6 in Appendix A2, in order to assign a risk category to each activity. The resulting risk categories for the four construction activities, without mitigation, are set out in Table 11. These risk categories have been used to determine the appropriate level of mitigation as set out in Section 8 (step 3 of the assessment procedure).

Table 11: Summary of Risk of Impacts Without Mitigation

Source	Dust Soiling	Human Health
Demolition	Medium Risk	Low Risk
Earthworks	Medium Risk	Low Risk
Construction	Medium Risk	Low Risk
Trackout	Medium Risk	Low Risk

6.20 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' (IAQM, 2016).

7 Operational Phase Impact Assessment

Impacts at Existing Receptors

Assessment of Development-Generated Road Traffic Emissions

7.1 The proposed development is car free and provides no on-site parking. Iceni, the transport consultants appointed on the project, have estimated there will be a maximum of 22 two-way, daily servicing trips (likely to be a mix of LDVs and HDVs) associated with the proposed development and therefore the development generated traffic will be well below the screening threshold of 100 LDVs and 25 HDVs recommended for use within an AQMA in the EPUK/IAQM guidance (Moorcroft and Barrowcliffe et al, 2017) (see Paragraph 3.18).

7.2 As such, it is judged that the relevant screening thresholds will not be exceeded and there is no requirement for a detailed assessment of road traffic impacts at existing receptors; it can be concluded that the proposed development will not have a significant impact on local roadside air quality.

Assessment of Emergency Diesel Generator Emissions

7.3 The precise make and specification of the generator to be installed is still to be established, but Whitecode Consulting, who have prepared the energy strategy for the proposed development, have advised that the current plans are for a 550 kW generator. Whitecode has confirmed this generator is sized appropriately for life safety functions only and alternative technologies to diesel have been considered however, due to the commercial nature of the site and the need to comply with BS 9999, a diesel generator was selected. Specifically, use of a secondary mains feed would not comply with the requirements of BS 9999 (and various other regulations) while an Uninterruptable Power Supply (UPS) is not viable for the potential size of load and duration required in an emergency.

7.4 The diesel generator will only be operated routinely for testing and maintenance for up to 10 hours per year. Therefore, the generator will not operate frequently enough to cause an exceedance of the hourly mean objective (which allows 18 hours above the objective before there is an exceedance) or the 24-hour objective for PM_{10} (which allows no more than 35 days). These tests are also likely to occur under a variety of meteorological conditions (and wind directions), meaning that it is unlikely that any periods of elevated concentrations would occur at the same location each time the generator is run.

7.5 Furthermore, given the low number of annual operating hours and the small size of the generator, the NOx emission rate of the generator is expected to be well below 5 mg/sec when the emissions generated during testing are averaged over a year.

7.6 The exhaust stack of the emergency generator will discharge 3 m above roof level of Block B, which is higher than all surrounding buildings. Therefore, in accordance with the EPUK/IAQM screening

criteria, the effect on local air quality of emissions associated with the proposed emergency generator testing is considered insignificant.

Impacts of Existing Sources on Future Residents and Users of the Development

Screening Assessment of Emergency Generator Emissions

7.7 As discussed above, given the low number of annual operating hours and the small size of the generator, the total NOx emission rate from the emergency generator is expected to be well below the screening threshold set out in the EPUK/IAQM guidance (see Paragraph A3.11 in Appendix A3). The flue will also exhaust into a good environment for dispersion (terminating at 3 m above roof level of the tallest building within several hundred metres). As such, the need for a detailed assessment of emergency generator emissions has been screened out, and it can be assumed that there will be no significant impacts at new properties within the development as a result of the emergency generator plant emissions, and the emergency generator emissions do not require further consideration.

Screening Assessment of Railway Locomotive Emissions

7.8 Defra guidance (Defra, 2022) outlines that there is only the potential for an exceedance of the annual mean NO_2 objective where there is:

- *long-term exposure within 30 m of railway lines;*
- *these lines see a high volume of diesel trains (as identified in Table 7-2 of the Defra guidance); and*
- *the annual mean background concentration of nitrogen dioxide is above 25 µg/m^3.*

7.9 The application site falls outside these criteria; while there will be exposure within 30 m of the railway lines, the background concentration is below 25 µg/m^3 (see Table 7), and these specific railway lines are not identified in the Defra guidance as having a high volume of diesel passenger trains. It can, therefore, be concluded that there is no risk of an objective exceedance within the proposed development as a result of emission from trains using the adjacent railway lines.

7.10 Nonetheless, as requested by LBC, the contribution of emissions from diesel trains to concentrations within the proposed development has been included within the dispersion modelling presented below. Predicted air quality conditions for future residents and users of the proposed development, taking account of emissions from the adjacent road network and railway lines, are set out in Table 12 for all receptors.

Detailed Assessment of Road Traffic and Rail Emissions

7.11 Predicted air quality conditions for future residents and users of the proposed development, taking account of emissions from the adjacent road and rail sources, are set out in Table 12.

7.12 All predicted concentrations are below the respective objectives for NO_2, PM_{10} and $PM_{2.5}$ for both the 2027 scenario and the no improvement scenario. Predicted concentrations are also below the Air Quality CPG criteria for NO_2 and PM_{10} at all modelled receptors, however $PM_{2.5}$ concentrations at receptors for both scenarios exceed the GLA target of 10 µg/m^3 at all receptors. Exceedances of the guideline are common, and its achievement is very unlikely to be possible before 2030, especially in London (Defra, 2019b). As such, it is unsurprising that there are modelled exceedances.

On the basis that concentrations throughout the site are below the respective objectives and predicted exceedances of the GLA $PM_{2.5}$ target are common and unlikely to be possible before 2030, it is considered that air quality for future residents and users within the development will be acceptable.

Table 12: Predicted Annual Mean Concentrations of NO_2, PM_{10} and $PM_{2.5}$ for New Receptors in the Proposed Development (µg/m^3)

Receptor	2027			2027 (no improvement)		
	NO_2	PM_{10}	$PM_{2.5}$	NO_2	PM_{10}	$PM_{2.5}$
1	21.3	17.8	11.5	22.0	18.5	11.9
2	21.1	17.9	11.5	22.0	18.5	11.9
3	19.8	17.9	11.4	21.2	18.6	11.9
4	21.1	18.5	11.7	24.9	19.2	12.2
5	21.2	18.5	11.7	25.0	19.2	12.2
6	22.1	17.9	11.5	22.8	18.6	12.0
7	20.2	18.1	11.5	22.6	18.8	12.0
8	19.9	17.9	11.5	21.4	18.6	11.9
9	20.9	17.9	11.5	21.9	18.5	11.9
10	20.0	18.1	11.5	22.3	18.8	12.0
11	20.4	18.2	11.6	23.2	18.9	12.1
12	20.0	17.8	11.4	20.9	18.4	11.8
13	20.0	17.8	11.4	21.0	18.5	11.9
14	22.0	17.9	11.5	22.8	18.6	12.0
15	21.9	17.9	11.5	22.7	18.6	12.0
Objective / Criterion / Guideline	**40 / 38 [b]**	**32 [a] / 20 [b]**	**20 / 10 [c]**	**40 / 38 [b]**	**32 [a] / 20 [b]**	**20 / 10 [c]**

[a] While the annual mean PM_{10} objective is 40 µg/m^3, 32 µg/m^3 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/m^3 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] The Camden criteria, as outlined in the Air Quality CPG. For NO_2 this is 38 µg/m^3. For PM_{10} this is 20 µg/m^3 to be met by 2026. For $PM_{2.5}$ this is 10 µg/m^3 to be met by 2030.

[c] 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.

Significance of Operational Air Quality Effects

7.13 The operational air quality effects without mitigation are judged to be 'not significant'. This professional judgement is made in accordance with the methodology set out in Appendix A3 and takes account of the assessment that:

- pollutant concentrations at worst-case locations within the proposed development will all be below the objectives when considering emissions from the railway line and the local road network, thus future residents and users will experience acceptable air quality;
- the proposed development will be car free and generate traffic well below industry screening thresholds;
- the proposed development will generate heat and hot water via ASHPs and solar PV. While the development will also include an emergency generator, this will operate for less than 10 hours a year and the exhaust stack will be located at roof level to ensure good dispersion of emissions.

8 'Air Quality Neutral'

8.1 The purpose of the London Plan's requirement that development proposals be 'air quality neutral' is to prevent the gradual deterioration of air quality throughout Greater London. The 'air quality neutrality' of a proposed development, as assessed in this section, does not directly indicate the potential of the proposed development to have significant impacts on human health (this has been assessed separately in the previous section). The air quality neutral assessment has been undertaken using the latest GLA's London Plan Guidance (Air Quality Neutral) (GLA, 2023a).

Building Emissions

8.2 The proposed development will be provided with heat and hot water by ASHPs and solar PV. Paragraph 3.1.3 of the guidance states "*most non-combustion heat sources such as electric panel heaters and heat pumps (including air source and ground source heat pumps) are assumed to have zero heat-related NOx emissions*".

8.3 While the proposed development will include an emergency diesel generator, the GLA's Air Quality Neutral guidance states that "backup plant installed for emergency and life safety power supply, such as diesel generators, may be excluded from the calculation of predicted building emissions". The proposed development is, therefore, better than air quality neutral in terms of building emissions.

Road Transport Emissions

8.4 The proposed development, which is classified as a 'major' development, is car free and provides no parking spaces. Paragraph 4.1.3 of the GLA's Air Quality Neutral guidance states "*where major developments meet the definition of car free, they can be assumed to meet the TEB*."

8.5 The proposed development is thus better than air quality neutral in terms of transport emissions.

Summary

8.6 As the proposed development is car free and the only source of on-site combustion will be an emergency generator, it therefore complies with the requirement that all new developments in London should be at least air quality neutral.

9 Mitigation

Good Design and Best Practice

9.1 The EPUK/IAQM guidance advises that good design and best practice measures should be considered, whether or not more specific mitigation is required.

9.2 The proposed development incorporates the following good design and best practice measures, which have been accounted for in the assessment as far as is possible:

- scheme design such that the most sensitive uses are the furthest from source of pollution, for example the ground floor of both the student accommodation and the affordable housing is commercial, with residential occupation only on the first floor and higher;
- provision of no on-site car parking spaces to discourage the use of private vehicles to access the proposed development;
- provision of on-site bike storage facilities;
- provision of ASHPs and PV panels for heat and hot water provision to avoid the need for on-site combustion;
- designing the flue of the emergency generator to be 3 m above roof level to ensure the best possible dispersion environment; and
- limiting operation of the emergency generator to a maximum of 10 hours per year.

Recommended Mitigation

Construction Impacts

9.3 Measures to mitigate dust emissions will be required during the construction phase of the development in order to minimise effects upon nearby sensitive receptors.

9.4 The site has been identified as a Medium Risk site during demolition, earthworks and construction, and for trackout, as set out in Table 11. GLA's SPG on The Control of Dust and Emissions During Construction and Demolition (GLA, 2014) describes measures that should be employed, as appropriate, to reduce the impacts, along with guidance on what monitoring should be undertaken during the construction phase. This reflects best practice experience and has been used, together with the professional experience of the consultant who has undertaken the dust impact assessment and the findings of the assessment, to draw up a set of measures that should be incorporated into the specification for the works. These measures are described in Appendix A7.

9.5 The mitigation measures should be written into a dust management plan (DMP). The DMP may be integrated into a Code of Construction Practice or the Construction Environmental Management Plan, and may require monitoring. The GLA's guidance suggests that, for a Medium Risk site,

automatic monitoring of particulate matter (as PM_{10}) will be required. It also states that, on certain sites, it may be appropriate to determine the existing (baseline) pollution levels before work begins. However, the guidance is clear that the Local Authority should advise as to the appropriate air quality monitoring procedure and timescale on a case-by-case basis.

9.6 Where mitigation measures rely on water, it is expected that only sufficient water will be applied to damp down the material. There should not be any excess to potentially contaminate local watercourses.

Road Traffic Impacts

9.7 The assessment has demonstrated that that future residents and users of the proposed development will be exposed to pollutants concentrations below the respective air quality objectives in the year of opening, even when using the worst-case and unrealistic modelling assumptions requested by LBC which assume no improvement in emissions or background concentrations between 2022 and 2027.

9.8 Therefore, the overall air quality effect of the proposed development will be 'not significant'; it will not introduce any new exposure into areas of unacceptable air quality and, as the development is car free, development-generated traffic emissions will not have a significant impact on local air quality. It is, therefore, not considered appropriate to propose further mitigation measures for this development.

9.9 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). The local air quality plan that the GLA is required to produce in order to address limit value exceedances in its area will also help to improve air quality; the implementation and expansion of the ULEZ can reasonably be expected to lead to significant improvements. The Council's Local Transport Plan and CAAP will also be helping to deliver improved air quality.

Diesel Generator Plant Impacts

9.10 The assessment has demonstrated that the emissions from the emergency diesel generator will have an insignificant impact on air quality. As such, there is no requirement for mitigation beyond the best practice design measures highlighted above. However, if the size, stack design or testing and maintenance profile increases, additional assessment and/or mitigation may be required.

10 Residual Impacts

Construction

10.1 The IAQM guidance, on which the GLA's guidance is based, is clear that, with appropriate mitigation in place, the residual effects will normally be 'not significant'. The mitigation measures set out in Section 8 and Appendix A7 are based on the GLA guidance. With these measures in place and effectively implemented the residual effects are judged to be 'not significant'.

10.2 The IAQM guidance does, however, recognise 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. During these events, short-term dust annoyance may occur, however, the scale of this would not normally be considered sufficient to change the conclusion that overall the effects will be 'not significant'.

Operational Impacts

10.3 The residual impacts will be the same as those identified in Section 7. The overall effects of the proposed development with the mitigation proposed will be 'not significant'.

11 Conclusions

11.1 The assessment has considered the impacts of the proposed development on local air quality in terms of dust and particulate matter emissions during construction, emissions from road traffic generated by the completed and occupied development, and emissions from the testing and maintenance of an emergency diesel generator. It has also identified the air quality conditions that future residents and users will experience, and whether or not the proposed development is air quality neutral (as required by the London Plan).

Construction Impacts

11.2 The construction works have the potential to create dust. During construction it will therefore be necessary to apply a package of mitigation measures to minimise dust emissions. Appropriate measures have been recommended and, with these measures in place, it is expected that any residual effects will be 'not significant'.

Operational Impacts

11.3 Air quality conditions for future residents and users of the proposed development, taking account of emissions from the local road network and nearby railway emissions, have been shown to be acceptable, with concentrations well below the air quality objectives for NO_2, PM_{10} and $PM_{2.5}$ and below the Air Quality CPG criteria for NO_2 and PM_{10}.

11.4 $PM_{2.5}$ concentrations are predicted to marginally exceed the GLA target. However, exceedances of the guideline are common, and their nationwide achievement is very unlikely to be possible before 2030, especially in London (Defra, 2019b).

11.5 A number of best practice measures have been included within the design of the proposed development to reduce the impact of the proposed development on air quality. Furthermore, the proposed development is car free and does not include any on-site combustion for the routine provision of energy, and it will have a negligible effect on local air quality.

11.6 The overall operational air quality effects of the proposed development are judged to be 'not significant'.

Air Quality Neutral

11.7 As the development is car free and does not include any on-site combustion plant for the routine provision of energy, the proposed development complies with the requirement that all new developments in London should be at least air quality neutral.

Policy Implications

11.8 Taking into account these conclusions, it is judged that the proposed development is consistent with Paragraph 191 of the NPPF, being appropriate for its location both in terms of its effects on the local air quality environment and the air quality conditions for future residents and users. It is also consistent with Paragraph 192, as it will not affect compliance with relevant limit values or national objectives.

11.9 The proposed development is also consistent with Policy CC4 LBC's Local Plan, as the development does not increase exposure to poor air quality, and with policy T2 as the it will be car free.

11.10 The proposed development is compliant with Policy SI 1 of the London Plan in the following ways:

- it will not lead to further deterioration of existing poor air quality;
- it will not cause exceedances of legal air quality limits;
- it will not create unacceptable risk of high levels exposure to poor air;
- design solutions have been used to address air quality issues rather than post-design mitigation, including design measures to minimise exposure; and
- it is better than air quality neutral.

12 References

AQC (2020a) *Performance of Defra's Emission Factor Toolkit 2013-2019*, Available: https://www.aqconsultants.co.uk/CMSPages/GetFile.aspx?guid=7fba769d-f1df-49c4-a2e7-f3dd6f316ec1.

AQC (2020b) *Comparison of EFT v10 with EFT v9*, Available: https://www.aqconsultants.co.uk/CMSPages/GetFile.aspx?guid=9d6b50e1-3897-46cf-90f1-3669c6814f1d.

British Geological Survey (2024) *UK Soil Observatory Map Viewer*, Available: http://mapapps2.bgs.ac.uk/ukso/home.html.

Clean Air Act 1993 (1993), HMSO, Available: http://www.legislation.gov.uk/ukpga/1993/11/contents.

Defra (2007) *The Air Quality Strategy for England, Scotland, Wales and Northern Ireland*, Defra.

Defra (2017) *Air quality plan for nitrogen dioxide (NO2) in the UK*, Available: https://www.gov.uk/government/publications/air-quality-plan-for-nitrogen-dioxide-no2-in-uk-2017.

Defra (2018a) *A Green Future: Our 25 Year Plan to Improve the Environment*, [Online], Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/693158/25-year-environment-plan.pdf.

Defra (2018b) *Supplement to the UK plan for tackling roadside nitrogen dioxide concentrations*, Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/746100/air-quality-no2-plan-supplement.pdf.

Defra (2019a) *Clean Air Strategy 2019*, Available: https://www.gov.uk/government/publications/clean-air-strategy-2019.

Defra (2019b) *Assessing progress towards WHO guideline levels of PM2.5 in the UK*, Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/930104/air-quality-who-pm25-report.pdf.

Defra (2020) *2020 NO2 projections data (2018 reference year)*, Available: https://uk-air.defra.gov.uk/library/no2ten/2020-no2-pm-projections-from-2018-data.

Defra (2022) *Review & Assessment: Technical Guidance LAQM.TG22 August 2022 Version*, [Online], Available: https://laqm.defra.gov.uk/wp-content/uploads/2022/08/LAQM-TG22-August-22-v1.0.pdf.

Defra (2023a) *Air Quality Strategy: Framework for Local Authority Delivery*, [Online], Available: https://www.gov.uk/government/publications/the-air-quality-strategy-for-england/air-quality-strategy-framework-for-local-authority-delivery.

Defra (2023b) *Environmental Improvement Plan 2023*, [Online], Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1133967/environmental-improvement-plan-2023.pdf.

Defra (2023c) *Integrating the Environment Act air quality targets into the planning system*, 102023rd edition.

Defra (2024a) *UK Pollutant Release and Transfer Register*, Available: http://prtr.defra.gov.uk/map-search.

Defra (2024b) *Local Air Quality Management (LAQM) Support Website*, Available: http://laqm.defra.gov.uk/.

Defra (2024c) *UK Ambient Air Quality Interactive Map*, Available: https://uk-air.defra.gov.uk/data/gis-mapping.

Defra (2024d) *Defra AURN Archive*, Available: https://uk-air.defra.gov.uk/interactive-map?network=aurn.

Department for Levelling Up, Housing and Communities (DLUHC) (2023) *National Planning Policy Framework*, [Online], Available: https://assets.publishing.service.gov.uk/media/65829e99fc07f3000d8d4529/NPPF_December_2023.pdf.

DfT (2018) *The Road to Zero: Next steps towards cleaner road transport and delivering our Industrial Strategy*.

DFT (2023a) *TEMPro (Version 8.1) Software, Available: https://www.gov.uk/government/collections/tempro*.

DfT (2023b) *DfT Road traffic statistics (TRA03)*, Available: https://www.gov.uk/government/statistical-data-sets/road-traffic-statistics-tra.

DLUHC (2023) 'Planning Newsletter'.

Environment Act 2021 (2021).

Environmental Protection Act 1990 (1990), Available: http://www.legislation.gov.uk/ukpga/1990/43/contents.

GLA (2014) *The Control of Dust and Emissions from Construction and Demolition SPG*, Available: https://www.london.gov.uk/what-we-do/planning/implementing-london-plan/supplementary-planning-guidance/control-dust-and.

GLA (2018a) *London Environment Strategy*, Available: https://www.london.gov.uk/what-we-do/environment/london-environment-strategy.

GLA (2018b) *Mayor's Transport Strategy*, Available: https://www.london.gov.uk/sites/default/files/mayors-transport-strategy-2018.pdf.

GLA (2019) 'London Local Air Quality Management Technical Guidance 2019', no. https://www.london.gov.uk/sites/default/files/llaqm_technical_guidance_2019.pdf.

GLA (2021) *The London Plan: The Spatial Development Strategy for London*, Available: https://www.london.gov.uk/sites/default/files/the_london_plan_2021.pdf.

GLA (2023a) *London Plan Guidance - Air Quality Neutral.*, Available: https://www.london.gov.uk/programmes-strategies/planning/implementing-london-plan/london-plan-guidance/air-quality-neutral-aqn-guidance.

GLA (2023b) *London Atmospheric Emissions Inventory (LAEI) 2019. Updated 2023*, Available: https://data.london.gov.uk/dataset/london-atmospheric-emissions-inventory--laei--2019.

HM Government (2021) *Ventilation - Approved Document F*, [Online], Available: https://www.gov.uk/government/publications/ventilation-approved-document-f.

IAQM (2016) *Guidance on the Assessment of Dust from Demolition and Construction v1.1*, Available: http://iaqm.co.uk/guidance/.

London Borough of Camden (2017) *Camden Local Plan 2017*.

London Borough of Camden (2021a) *Transport Camden Planning Guidance*.

London Borough of Camden (2021b) *Air Quality Camden Planning Guidance*.

London Borough of Camden (2022) *Camden Clean Air Strategy 2019-2034 Camden Clean Air Action Plan 2023-2026*.

London Borough of Camden (2023a) *AIr Quality Assessment in Planning Applications, [Online], Available: https://www.camden.gov.uk/air-quality-assessment*.

London Borough of Camden (2023b) *London Borough of Camden Air Quality Annual Status Report for 2022*.

London Borough of Camden (2024) 'Draft New Camden Local Plan - Regulation 18 Consultation Version'.

Ministry of Housing, Communities & Local Government (2019) *Planning Practice Guidance*, Available: https://www.gov.uk/government/collections/planning-practice-guidance.

Ministry of Housing, Communities & Local Government (2022) *The Building Regulations 2010 Schedule 1*, 201022141st edition, Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/899279/Single_stitched_together_pdf_of_all_ADs__Jun20_.pdf.

Moorcroft and Barrowcliffe et al (2017) *Land-Use Planning & Development Control: Planning For Air Quality v1.2*, IAQM, London, Available: http://iaqm.co.uk/guidance/.

Technical Guidance Note D1 (Dispersion) (1993), HMSO.

The Air Quality (England) (Amendment) Regulations 2002, Statutory Instrument 3043 (2002), HMSO, Available: https://www.legislation.gov.uk/uksi/2002/3043/contents/made.

The Air Quality (England) Regulations 2000 Statutory Instrument 928 (2000), HMSO, Available: http://www.legislation.gov.uk/uksi/2000/928/contents/made.

The Air Quality Standards Regulations 2010 Statutory Instrument 1001 (2010), HMSO, Available: http://www.legislation.gov.uk/uksi/2010/1001/pdfs/uksi_20101001_en.pdf.

The Environmental Permitting (England and Wales) (Amendment) Regulations 2018 Statutory Instrument 110 (2018), HMSO, Available: http://www.legislation.gov.uk/uksi/2018/110/pdfs/uksi_20180110_en.pdf.

The European Parliament and the Council of the European Union (1997) *Directive 97/68/EC of the European Parliament and of the Council*, Available: http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:31997L0068.

The European Parliament and the Council of the European Union (2008) *Directive 2008/50/EC of the European Parliament and of the Council*, Available: http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32008L0050.

The European Parliament and the Council of the European Union (2015) *Directive 2015/2193/EU of the European Parliament and of the Council*, Available: http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32015L2193.

13 Glossary

AADT	Annual Average Daily Traffic
ADMS-Roads	Atmospheric Dispersion Modelling System model for Roads
AQC	Air Quality Consultants
AQMA	Air Quality Management Area
AURN	Automatic Urban and Rural Network
CAZ	Clean Air Zone
CHP	Combined Heat and Power
Defra	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
DMP	Dust Management Plan
EFT	Emission Factor Toolkit
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
GIA	Gross Internal Floor Area
GLA	Greater London Authority
HDV	Heavy Duty Vehicles (> 3.5 tonnes)
HGV	Heavy Goods Vehicle
HMSO	Her Majesty's Stationery Office
IAQM	Institute of Air Quality Management
JAQU	Joint Air Quality Unit
kph	Kilometres Per hour
kW	Kilowatt
LAEI	London Atmospheric Emissions Inventory

LAQM	Local Air Quality Management
LB	London Borough
LDV	Light Duty Vehicles (<3.5 tonnes)
LEZ	Low Emission Zone
LGV	Light Goods Vehicle
µg/m^3	Microgrammes per cubic metre
MCPD	Medium Combustion Plant Directive
MW$_{th}$	Megawatts Thermal
NO	Nitric oxide
NO$_2$	Nitrogen dioxide
NOx	Nitrogen oxides (taken to be NO_2 + NO)
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
PHV	Private Hire Vehicle
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
SCR	Selective Catalytic Reduction
SPG	Supplementary Planning Guidance
SPD	Supplementary Planning Document
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

TEMPro	Trip End Model Presentation Program
TfL	Transport for London
ULEZ	Ultra Low Emission Zone
WHO	World Health Organisation

14 Appendices

A1 London-Specific Policies and Measures

London Plan

Design-led Approach

A1.1 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

A1.2 Policy SI 1 of the London Plan (GLA, 2021) 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

A1.3 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".

London Environment Strategy

A1.4 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"*

A1.5 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 (LEZ)

A1.6 The 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 (ULEZ)

A1.7 London's ULEZ was introduced on 8 April 2019 and expanded across all London boroughs in August 2023. The ULEZ currently operates 24 hours a day, 7 days a week in the same area as the current Congestion Charging zone. 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 A1.6.

Other Measures

A1.8 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.

A1.9 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%).

A2 Construction Dust Assessment Procedure

A2.1 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.

A2.2 The assessment procedure includes the four steps summarised below:

STEP 1: Screen the Need for a Detailed Assessment

A2.3 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).

A2.4 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

A2.5 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).

A2.6 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

A2.7 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 A2.1.

Table A2.1: 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

A2.8 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.

A2.9 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 A2.2. These receptor sensitivities are then used in the matrices set out in Table A2.3. and Table A2.5 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

A2.10 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 A2.6 as a method of assigning the level of risk for each activity.

STEP 3: Determine Site-specific Mitigation Requirements

A2.11 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 A7.

STEP 4: Determine Significant Effects

A2.12 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'.

A2.13 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 A2.2: 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 A2.3: Sensitivity of the Area to Dust Soiling Effects on People and Property [7]

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

[7] 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 A2.4: Sensitivity of the Area to Human Health Effects [7]

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 A2.5: Sensitivity of the Area to Ecological Effects [7]

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

Table A2.6: 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

A3 EPUK & IAQM Planning for Air Quality Guidance

A3.1 The guidance issued by EPUK and 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

A3.2 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".

A3.3 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.

A3.4 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.

A3.5 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".

A3.6 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

A3.7 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.

A3.8 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.

A3.9 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.

A3.10 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.

A3.11 On combustion processes (including standby emergency generators and shipping) where there is a risk of impacts at relevant receptors, the guidance states that:

"Typically, any combustion plant where the single or combined NOx emission rate is less than 5 mg/sec is unlikely to give rise to impacts, provided that the emissions are released from a vent or stack in a location and at a height that provides adequate dispersion. As a guide, the 5 mg/s criterion equates to a 450 kW ultra-low NOx gas boiler or a 30kW CHP unit operating at <95mg/Nm^3.

In situations where the emissions are released close to buildings with relevant receptors, or where the dispersion of the plume may be adversely affected by the size and/or height of adjacent buildings (including situations where the stack height is lower than the receptor) then consideration will need to be given to potential impacts at much lower emission rates.

Conversely, where existing nitrogen dioxide concentrations are low, and where the dispersion conditions are favourable, a much higher emission rate may be acceptable".

A3.12 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".

A3.13 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".

A3.14 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 report.

Assessment of Significance

A3.15 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.

A3.16 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.

A3.17 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.

A3.18 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 A4.

A4 Professional Experience

Dr Denise Evans, BSc (Hons) PhD MIEnvSc MIAQM

Dr Evans is an Associate Director with AQC, with more than 24 years' relevant experience. She has prepared air quality review and assessment reports for local authorities, and has appraised local authority air quality assessments on behalf of the UK governments, and provided support to the Review and Assessment helpdesk. She has extensive modelling experience, completing air quality and odour assessments to support applications for a variety of development sectors including residential, mixed use, urban regeneration, energy, commercial, industrial, and road schemes, assessing the effects of a range of pollutants against relevant standards for human and ecological receptors. Denise has acted as an Expert Witness and is a Member of the Institute of Air Quality Management.

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.

Meg Saunders, BSc MSc

Miss Saunders is an Assistant Consultant with AQC and joined the company in 2023. During her MSc degree in Sustainability Science and Practice at Stanford University, she joined Stanford Future Bay Initiative, completing project work related to extreme heat forecasting. She went on to complete a summer internship focussed on developing the foundations for an open-source methodology for urban air quality modelling in collaboration with community partners in the Bay Area. Her master's practicum project with the NGO Groundwater Collaborative analysed data relevant to sustainable groundwater management in California

A5 Preliminary Air Quality Assessment

Air Quality CONSULTANTS

Preliminary Air Quality Assessment:

Chalk Farm Road, Camden

August 2023

Experts in air quality management & assessment

Document Control

Client	Regal Chalk Farm Ltd	**Principal Contact**	Charlotte Wheeler

Job Number	J10/14846A/10

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1 Introduction

Background

1.1 This report provides a preliminary air quality assessment, as required by the Greater London Authority's (GLA's) London Plan (GLA, 2021), for the proposed development at 100 Chalk Farm Road in the London Borough of Camden (LB of Camden) (hereafter referred to as the 'proposed development').

1.2 The proposed development comprises the demolition of existing buildings at the site and erection of four new buildings; one for affordable housing and three for student accommodation with ground floor commercial/retail use. The student accommodation will provide approximately 267 beds while the affordable housing will provide approximately 24 units. The plans also include a public play space. The earliest year of opening of the proposed development is 2026.

1.3 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".*

1.4 This preliminary air quality assessment has 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. 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.

Assessment Criteria

1.5 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. They are based purely upon the scientific and medical evidence of the effects of an individual pollutant. The 'objectives' set out the extent to which the Government expects the standards to be achieved by a certain date. They take account of economic efficiency, practicability, technical feasibility and timescale. The objectives for use by local authorities are prescribed within the Air Quality (England) Regulations (2000) and the Air Quality (England) (Amendment) Regulations (2002).

1.6 The UK-wide objectives for nitrogen dioxide (NO_2) 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 NO_2 objective is unlikely to be exceeded at roadside locations where the annual mean concentration is below 60 µg/m^3 (Defra, 2022).

1.7 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 NO_2 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. 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 NO_2 applies wherever members of the public might regularly spend 1-hour or more, including outdoor eating locations and pavements of busy shopping streets.

1.8 The GLA has also 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. The GLA target is not currently in UK regulations and there is no explicit requirement to assess against it. However, achievement of the guideline is a long-term aspiration of the UK Government (Defra, 2019), and the London Environment Strategy (GLA, 2018) sets out the what the Mayor will do to help achieve the ambitions in the strategy.

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

Table 1: Air Quality Criteria for 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

[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.

1.10 In addition to the above, the LB of Camden has committed within its Air Quality Camden Planning Guidance (CPG) (LB of Camden, 2021) to meeting the WHO guidelines for NO_2, PM_{10} and $PM_{2.5}$. The WHO guidelines outlined within the Air Quality CPG, are presented in Table 2 below and have been considered within this assessment. These guidelines broadly align with the current UK objectives for NO_2 and PM_{10} and the GLA target for $PM_{2.5}$. The target for achievement of the $PM_{2.5}$ guideline in Camden is 2030 while the target for PM_{10} is 2026 (LB of Camden, 2022).

Table 2: Camden Air Quality CPG Criteria for NO_2, PM_{10} and $PM_{2.5}$

Pollutant	Guideline target (as an annual mean)
NO_2	38 µg/m^3 [a]
PM_{10}	20 µg/m^3
$PM_{2.5}$	10 µg/m^3

[a] While the WHO guideline is 40 µg/m^3, 38 µg/m^3 has been used in accordance with the Air Quality CPG which states that "*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*."

2 Baseline Air Quality

2.1 The proposed development is located approximately 150 m east of the Chalk Farm Underground Station. The application site is bounded to the north by the busy Chalk Farm Road, beyond which are multiple commercial premises and residential properties. To the east is a car park and supermarket and to the south is a section of the London Overground railway line which is used for passenger trains and freight, beyond which are multiple residential properties. To the west is the Roundhouse Theatre. The proposed development site currently consists of offices and commercial premises.

2.2 The proposed development is within a borough-wide Air Quality Management Area (AQMA) declared by the LB of Camden for exceedances of the annual mean NO_2 and 24-hour mean PM_{10} objectives. It is also located close to one of the Greater London Authority's (GLA's) air quality Focus Areas; these are locations with high levels of human exposure where the annual mean limit value for NO_2 is exceeded.

2.3 The location of the proposed development is highlighted in Figure 1, along with the nearby Focus Area.

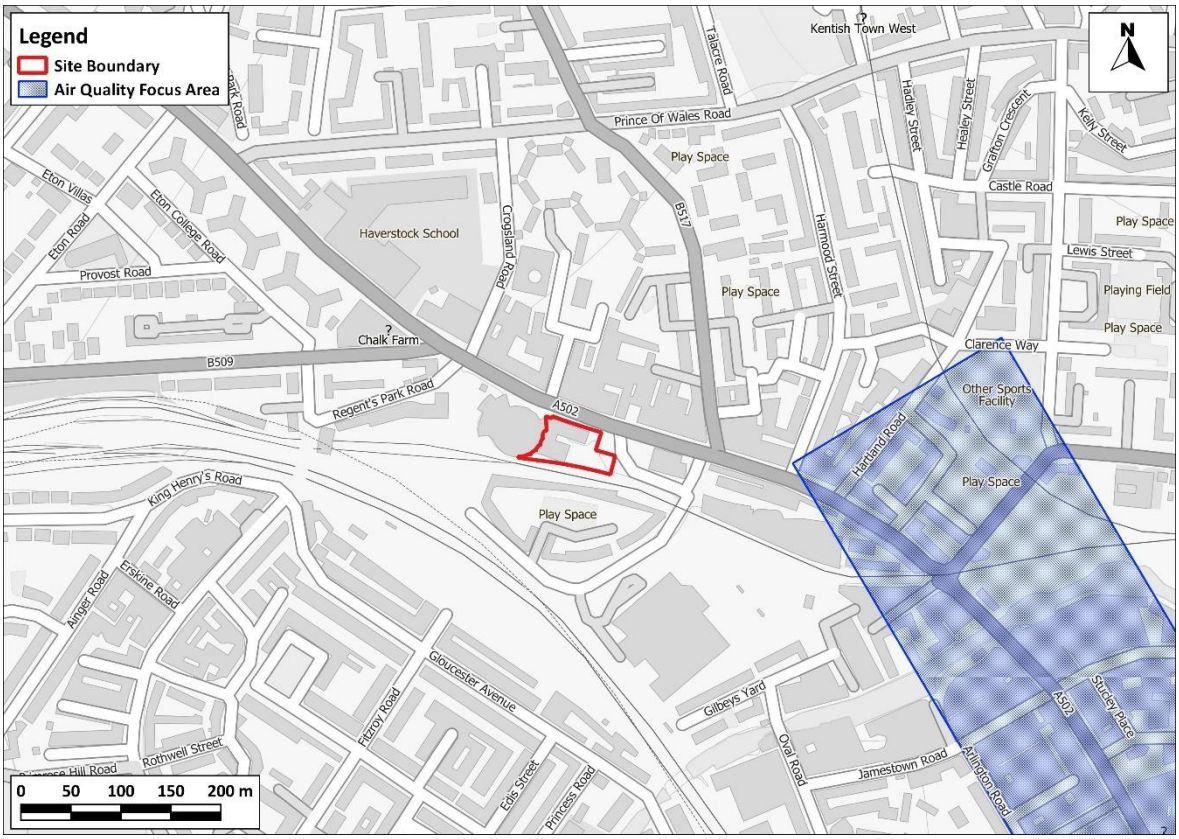

Figure 1: Location of the Proposed Development

2.4 A search of the UK Pollutant Release and Transfer Register website (Defra, 2023a) 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

2.5 LB of Camden currently operates five automatic monitoring stations, one of which (Camden High Street) is within close proximity to the proposed development. This automatic monitor measures NO_2 concentrations only. The Council also operates a number of NO_2 monitoring sites using diffusion tubes prepared and analysed by Gradko International (using the 50% TEA in acetone method). These include three deployed on Chalk Farm Road, one of which is located opposite the proposed development (CAM135), and six which are deployed on nearby side roads off Chalk Farm Road. Annual mean results for the years 2019 to 2022 are summarised in Table 3, while results relating to the 1-hour mean objective are summarised in Table 4. Exceedances of the objectives are shown in bold. The monitoring locations are shown in Figure 2. The monitoring data have been taken from LB of Camden's Air Quality Monitoring website (LB of Camden, 2023).

2.6 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 3: Summary of Annual Mean NO_2 Monitoring (2019-2022) (µg/m^3)

Site No.	Site Type[a]	Location	2019	2020	2021	2022
CD010	Roadside	Camden High Street	-	-	-	29.0
CAM45	Roadside	Haverstock School - Crogsland Road south (outside 56-6, LC9)	-	-	23.4	23.4
CAM121	Roadside	Haverstock Hill/Haverstock School	33.1	23.5	21.0	22.0
CAM122	Roadside	Harmood Street (lighting column 11)	31.7	24.9	20.7	18.5
CAM123	Roadside	Hartland Road (lighting column 4)	31.8	26.1	20.7	21.4
CAM128	Roadside	Camden High Street (Camden Market)	**41.5**	33.1	26.3	27.2
CAM133	Roadside	Holy Trinity and St. Silas Primary School (Clarence Way)	28.1	22.1	17.9	19.9
CAM134	Roadside	Regent's Park Road (lighting column 3)	31.4	22.2	20.9	21.5
CAM135	Roadside	Chalk Farm Road	**42.4**	33.3	27.1	26.7
CAM136	Roadside	Ferdinand Street	36.7	30.3	29.4	27.8
CAM137	Roadside	Hartland Road	33.7	25.2	22.7	22.8
Objective			**40**			

[a] Estimated based on location of monitor and proximity to nearest road

Table 4: Number of Hours With NO_2 Concentrations Above 200 µg/m^3

Site No.	Site Type	Location	2022[a]
CD010	Roadside	Camden High Street	0
Objective			**18**

[a] Data only available for 2022 as automatic monitor installed on Camden High Street in mid-2021

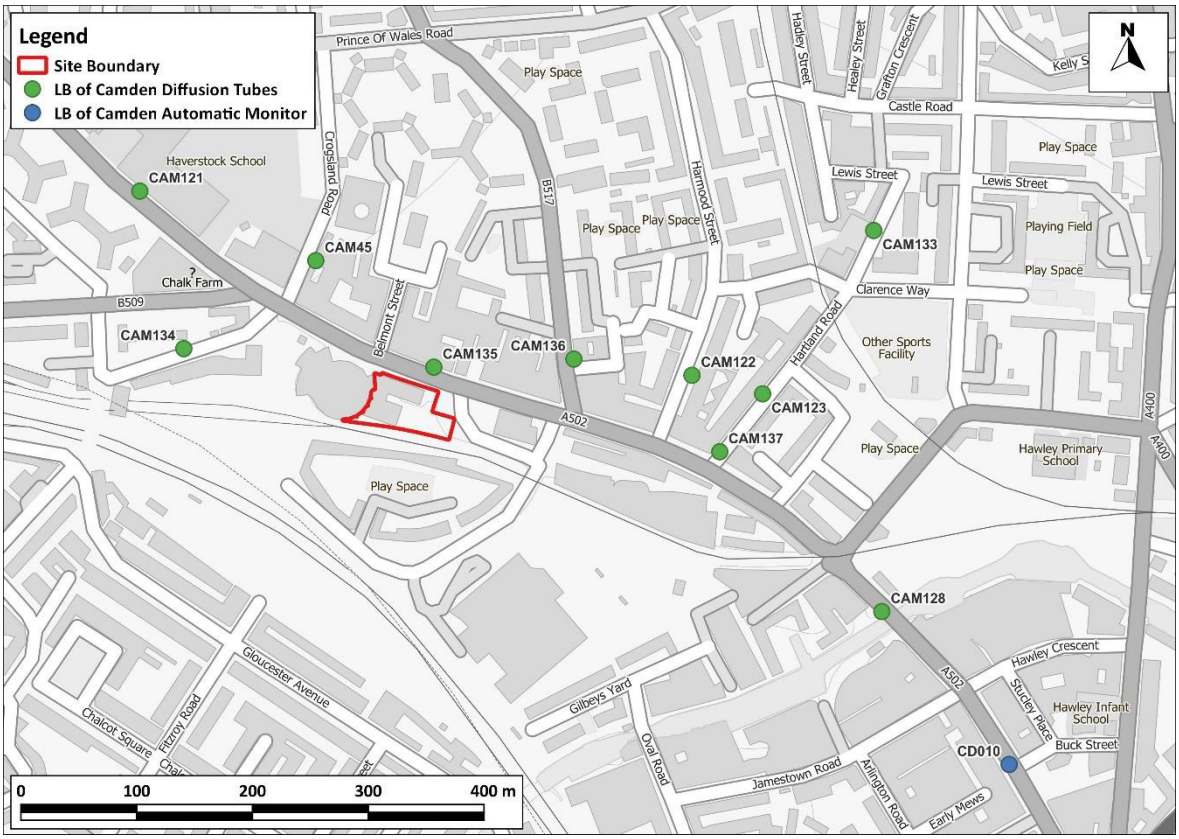

Figure 2: Monitoring Locations

Imagery ©2023 Bluesky, CNES / Airbus, Getmapping plc, Infoterra Ltd & Bluesky, Naxar Technologies, The GeoInformation Group, Map data ©2023.

2.7 As shown in Table 3, no exceedances of the annual mean NO_2 objective or the Air Quality CPG criteria occurred in 2022. No exceedance of the hourly NO_2 objective were measured in 2022 at the Camden High Street automatic monitor and annual mean concentrations were less than 60 µg/m^3 at all nearby diffusion tube sites, indicating it is unlikely there would have been exceedances of the 1-hour mean objective at these locations. The 2022 concentration measured at CAM135 is considered most representative of the highest level at the northern façade of the proposed development (adjacent to Chalk Farm Road), although CAM135 is closer to the kerbside than the façade of the proposed development and therefore is expected to experience higher concentrations.

2.8 There are no automatic monitoring sites within close proximity to the proposed development which monitor PM_{10} or $PM_{2.5}$ concentrations. However, between 2015 and 2021, at the monitoring sites across Camden which monitor PM_{10} and $PM_{2.5}$, concentrations were all below the respective air quality objectives.

LAEI Mapped Concentrations

2.9 Modelled annual mean NO_2, PM_{10} and $PM_{2.5}$ concentrations presented in the London Atmospheric Emissions Inventory (LAEI) database (GLA, 2023) in the vicinity of the proposed development have

been examined, with the 2019 modelled NO_2 concentrations at the proposed development presented in Figure 3. These concentrations are considered worst-case as the opening year of the proposed development is 2026 and historic monitoring across LB of Camden has demonstrated that concentrations in the Borough have improved over time. Therefore, concentrations at the proposed development in 2026 are expected to be lower than presented below.

2.10 The maximum modelled annual mean NO_2 concentration in 2019 at the proposed development is 36.0 µg/m^3 (at the northern façade closest to the A502), which is below the annual mean NO_2 objective and the CPG criteria. At distances further from Chalk Farm Road, including at locations adjacent to the railway line, modelled concentrations are lower.

2.11 As modelled concentrations across the site in 2019 are below 60 µg/m^3, this indicates that exceedances of the 1-hour mean objective are unlikely.

2.12 The maximum modelled 2019 annual mean PM_{10} and $PM_{2.5}$ concentrations within the proposed development boundary are 18.9 µg/m^3 and 11.8 µg/m^3, which are below the respective objectives and the Air Quality CPG criteria for PM_{10}. While modelled annual mean $PM_{2.5}$ concentrations are above the GLA target and Air Quality CPG criteria of 10 µg/m^3 in 2019, modelled 2030 LAEI concentrations predict the maximum $PM_{2.5}$ concentration at the proposed development façade will be 9.6 µg/m^3 and therefore meet the GLA target.

Figure 3: LAEI modelled 2019 NO_2 concentrations

3 Proposed Development Emissions

3.1 The trip generation of the proposed development is currently unknown. However, the proposed development is 'car-free' and there will be no onsite parking provision. It is therefore 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'.

3.2 The energy strategy for the proposed development is expected to include Air Source Heat Pumps (ASHPs) and solar photovoltaics (PV) or a connection to a District Heat Network. There will be no onsite combustion and therefore the air quality impacts from energy provision can also be considered to be 'not significant'.

3.3 On the basis of the above, it is expected that the proposed development will be air quality neutral, although this will be confirmed within the Air Quality Assessment.

4 Site Suitability

4.1 The residential units and children's play area represent relevant exposure to the long- and short-term air quality objectives (annual, 24-hour and 1-hour means). The commercial floorspace, and any publicly accessible elements of the proposed development, represent relevant exposure to the 1-hour mean NO_2 objective only.

Traffic emissions

4.2 As shown in Table 3, measured annual mean NO_2 concentrations at all monitoring sites in the vicinity of the proposed development were below the objective and Air Quality CPG criteria in 2022. Specifically, at monitoring site CAM135, located immediately north of the proposed development on Chalk Farm Road, the measured annual mean concentration was 26.7 µg/m^3 in 2022. As concentrations drop off with increasing distance from the roadside, and measured concentrations at the roadside of Chalk Farm Road are well below the objective, concentrations across the proposed development are expected to also be well below the objective.

4.3 This is demonstrated by the 2019 modelled LAEI concentrations which predict that the maximum concentration at the façade of the proposed development is below the annual mean NO_2 objective and Air Quality CPG criteria. As measured and modelled NO_2 concentrations are less than 60 µg/m^3, it is unlikely that the 1-hour mean objective will be exceeded at the proposed development. Based on 2019 modelled LAEI PM_{10} and $PM_{2.5}$ concentrations, it is also expected that the respective objectives and Air Quality CPG criteria for PM_{10} would be met at the proposed development. Nonetheless, this will be confirmed within the Air Quality Assessment.

4.4 Concentrations of $PM_{2.5}$ across the proposed development may have exceeded the GLA target and Air Quality CPG criteria of 10 µg/m^3 in 2019; however, exceedances of this target are widespread and the LAEI concentrations predict compliance at the proposed development by 2030, the target year for compliance with this target. 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).

4.5 Best practice design methods are set out in Section 5 to mitigate the impacts of emissions from road traffic on future users of the proposed development.

Railway locomotive emissions

4.6 Due to the proximity of the proposed development to the London Overground railway (adjacent to the southern boundary of the site), there is potential for emissions from railway locomotives to affect air quality at the proposed development. Defra guidance (Defra, 2022) outlines that there is only the

potential for an exceedance of the annual mean NO_2 objective in association with moving locomotives where there is:

- long-term exposure within 30 m of a railway line with a high volume of diesel passenger trains (as identified in Table 7-2 of the Defra guidance); and
- the annual mean background concentration of NO_2 is above 25 µg/m^3.

4.7 While there will be exposure within 30 m of the railway line, this line has not been identified in the Defra guidance as having a high volume of diesel passenger trains. Furthermore, in the opening year of the development (2026), annual mean background concentrations of NO_2 are below 25 µg/m^3 (Defra, 2023b). The 2019 LAEI concentrations at the proposed development, which includes the contribution from railway locomotives, also predict that NO_2 concentrations across the site are below the air quality objective.

4.8 It can therefore be concluded that there is no risk of an exceedance of the NO_2 objective at nearby sensitive receptors, such as the children's play area, as a result of emissions from locomotives using the adjacent railway line.

5 Air Quality Design Principles

5.1 The current plans for the scheme includes no onsite combustion sources and is car-free with no onsite parking provision. No design measures are therefore required to minimise the impacts of emissions from the proposed development site.

5.2 The following design principles to reduce exposure to air pollution and improve air quality should be considered, and incorporated within the design of the proposed development:

- ensuring that any ventilation air intakes, where proposed, are located as far away as possible from sources of air pollution (i.e. located away from Chalk Farm Road);
- the use of the diesel generators for emergency power provision should be avoided to reduce or avoid associated emissions (i.e. through connection to a second sub-station, for example). However, if any emergency generators are required:
    - the exhaust should be located at the highest point within the proposed development (i.e. at the highest 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;
    - the distance from diesel generator exhausts and any ventilation air intakes, accessible terraces and openable windows should be maximised;
    - the testing and maintenance schedule for any diesel generator(s) should be minimised as far as possible; and
    - any diesel generators should meet Stage V emission standards, if possible;
- access to public transport options should be maximised, as well as access to cycle and walking routes;
- cycle storage facilities should be provided at locations that are easy to access and are close to cycle routes both within and outside of the proposed development, and showers / changing facilities for commercial uses to enable staff to cycle to work, where applicable; and,
- incorporating the Healthy Streets Approach into the scheme to reduce the need to travel, or to promote sustainable transport opportunities.

6 Conclusions

6.1 The proposed development is located within the borough-wide Camden AQMA. Baseline conditions show pollutant concentrations in the vicinity of the proposed development were below the respective annual and 1-hour mean NO_2 objectives and Air Quality CPG criteria in 2022 based on measured data and, therefore, concentrations at the proposed development site are expected to also be below the objectives and criteria. Modelled LAEI NO_2, PM_{10} and $PM_{2.5}$ concentrations also indicate that concentrations at the site are below the respective objectives and the Air Quality CPG criteria for NO_2 and PM_{10}, including at locations close to the London Overground railway line.

6.2 While $PM_{2.5}$ concentrations are currently predicted to marginally exceed the GLA target and CPG criteria at the proposed development, this is widespread across London. However, $PM_{2.5}$ concentrations are expected to reduce in future years and meet the target by 2030 through the implementation of stringent vehicle emission standards, reduced background pollutant concentrations and the uptake of zero emission vehicles within the fleet. The predicted $PM_{2.5}$ concentrations at the proposed development in 2030 meet the GLA target.

6.3 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 Air Quality Assessment.

6.4 The trip generation of the proposed development is expected to be well 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.

6.5 There will be no onsite combustion plant, and thus there will be no associated emissions.

6.6 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.

7 References

Defra (2019) *Clean Air Strategy 2019*, Available: https://www.gov.uk/government/publications/clean-air-strategy-2019.

Defra (2022) *Review & Assessment: Technical Guidance LAQM.TG22 August 2022 Version*, [Online], Available: https://laqm.defra.gov.uk/wp-content/uploads/2022/08/LAQM-TG22-August-22-v1.0.pdf.

Defra (2023a) *UK Pollutant Release and Transfer Register*, [Online], Available: prtr.defra.gov.uk.

Defra (2023b) *Local Air Quality Management (LAQM) Support Website*, Available: http://laqm.defra.gov.uk/.

GLA (2018) *London Environment Strategy*, Available: https://www.london.gov.uk/what-we-do/environment/london-environment-strategy.

GLA (2019) 'London Local Air Quality Management Technical Guidance 2019', no. https://www.london.gov.uk/sites/default/files/llaqm_technical_guidance_2019.pdf.

GLA (2021) *The London Plan: The Spatial Development Strategy for London*, Available: https://www.london.gov.uk/sites/default/files/the_london_plan_2021.pdf.

GLA (2023) *London Atmospheric Emissions Inventory (LAEI) 2019*, Available: https://data.london.gov.uk/dataset/london-atmospheric-emissions-inventory--laei--2019.

LB of Camden (2021) *Camden Planning Guidance Air Quality*.

LB of Camden (2022) *Camden Clean Air Action Plan 2023-2026*.

LB of Camden (2023) *Camden Air Quality Monitoring*, [Online], Available: https://opendata.camden.gov.uk/stories/s/Camden-Air-Quality-Monitoring/bmrm-k7pv/.

The Air Quality (England) (Amendment) Regulations 2002, Statutory Instrument 3043 (2002), HMSO, Available: https://www.legislation.gov.uk/uksi/2002/3043/contents/made.

The Air Quality (England) Regulations 2000 Statutory Instrument 928 (2000), HMSO, Available: http://www.legislation.gov.uk/uksi/2000/928/contents/made.

8 Glossary

AADT	Annual Average Daily Traffic
AQC	Air Quality Consultants
AQMA	Air Quality Management Area
CAZ	Clean Air Zone
CPG	Camden Planning Guidance
Defra	Department for Environment, Food and Rural Affairs
EU	European Union
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
LAEI	London Atmospheric Emissions Inventory
LAQM	Local Air Quality Management
LB	London Borough
LEZ	Low Emission Zone
µg/m^3	Microgrammes per cubic metre
NO	Nitric oxide
NO_2	Nitrogen dioxide
NOx	Nitrogen oxides (taken to be NO_2 + NO)
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
ULEZ	Ultra Low Emission Zone
WHO	World Health Organisation

9 Appendices

A1 Professional Experience

Dr Denise Evans, BSc (Hons) PhD MIEnvSc MIAQM

Dr Evans is an Associate Director with AQC, with more than 23 years' relevant experience. She has prepared air quality review and assessment reports for local authorities, and has appraised local authority air quality assessments on behalf of the UK governments, and provided support to the Review and Assessment helpdesk. She has extensive modelling experience, completing air quality and odour assessments to support applications for a variety of development sectors including residential, mixed use, urban regeneration, energy, commercial, industrial, and road schemes, assessing the effects of a range of pollutants against relevant standards for human and ecological receptors. Denise has acted as an Expert Witness and is a Member of the Institute of Air Quality Management.

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.

Carys Williams, MChem (Hons)

Miss Williams is an Assistant Consultant with AQC, having joined the company in August 2022. Prior to joining, she completed an MChem degree in Chemistry at the University of York. She undertook her final year project at the Wolfson Atmospheric Chemistry Laboratories which involved the investigation of aerosol concentrations in Asian megacities. She is now gaining experience in the field of air quality monitoring and assessment.

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/rail and the road/rail characteristics (including width). Road vehicle emissions have been calculated based on vehicle flow, composition and speed data using the EFT (Version 12.0) published by Defra (Defra, 2024b). 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?	No
Noise Barriers Modelled?	No
Meteorological Monitoring Site	Northolt
Meteorological Data Year	2022
Dispersion Site Surface Roughness Length (m)	1
Dispersion Site Minimum MO Length (m)	100
Met Site Surface Roughness Length (m)	0.3
Met Site Minimum MO Length (m)	75
Gradients?	No

A6.2 For all road links modelled within the study area, AADT flows, speeds, and proportion of HDVs data for all road links modelled within the study area have been taken from the LAEI (GLA, 2023b). The 2019 AADT flows have been factored forwards to the base year of 2022 and the assessment year of 2027 using growth factors derived using the TEMPro System v8.1 (DFT, 2023a). The traffic data used in this assessment are summarised in Table A6.2. Diurnal and monthly flow profiles for the traffic have been derived from the national profiles published by DfT (2023b).

A6.3 For all rail links modelled within the study area, emission factors have been obtained from the 2010 LAEI. The 2010 emissions have then been factored to 2019 by comparing the total diesel rail emissions for the grid square the railway links are located within between the 2010 LAEI and 2019 LAEI. There has been a reduction in rail emissions between 2010 and 2019 within the study area and therefore using the emissions for 2019 for the future year scenarios is considered worst-case as it is expected this downward trend will continue in the future as progress is made towards net

zero targets and the number of diesel trains on the railways reduces. The emission factors used for the rail links modelled in this assessment are summarised in Table A5.3.

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

Road Link	2022		2027	
	AADT	%HDV	AADT	%HDV
446814	14283	5.9	14961	5.9
448202	7096	13.1	7433	13.1
369548	3066	14.1	3211	14.1
369437	4032	12.4	4223	12.4
369435	7695	7.6	8061	7.6
477983	17120	6.9	17933	6.9
205786	8621	7.8	9030	7.8
205788	9163	10.5	9598	10.5
369436	9258	10.5	9698	10.5
477982	9573	8.9	10027	8.9
368942	18828	9.7	19722	9.7
196124	18828	9.7	19722	9.7
369438	9573	8.9	10027	8.9
369909	9050	9.5	9480	9.5
196125	18982	10.0	19883	10.0
210406	9280	10.6	9720	10.6
489831	9083	6.6	9514	6.6
205787	10067	13.9	10544	13.9
179287	17646	12.6	18484	12.6
196126	17661	12.7	18499	12.7
196127	17682	12.7	18521	12.7
489427	17682	12.7	18521	12.7
489642	9040	11.3	9469	11.3
489830	8446	13.2	8847	13.2
459190	11468	11.6	12012	11.6
458580	12007	9.2	12577	9.2
205785	12007	9.2	12577	9.2
196149	12007	9.2	12577	9.2
458279	11468	11.6	12012	11.6

Road Link	2022		2027	
	AADT	%HDV	AADT	%HDV
179197	8482	15.1	8885	15.1
205734	8482	15.1	8885	15.1
477734	2624	8.6	2749	8.6
489428	2658	12.3	2784	12.3
223607	2674	12.6	2801	12.6
205789	5323	7.3	5576	7.3
196128	4415	10.2	4625	10.2
477642	9738	8.6	10200	8.6
196058	0	1.9	0	1.9
162376	4979	1.9	5215	1.9
179210	4979	2.0	5215	2.0
223608	7534	12.3	7892	12.3
173895	2658	5.2	2784	5.2
223610	14066	8.6	14733	8.6
196130	2626	8.6	2751	8.6
210407	2626	8.6	2751	8.6
223609	2626	12.8	2751	12.8
489835	2686	12.8	2813	12.8
489833	2686	15.3	2813	15.3
489834	983	11.5	1030	11.5
489754	1709	12.8	1790	12.8
478631	2686	7.3	2813	7.3
478632	5326	10.0	5579	10.0
478628	4402	8.6	4611	8.6
477224	9731	8.6	10192	8.6
205804	9731	8.8	10192	8.8
378917	14270	0.8	14947	0.8
369217	1836	8.9	1923	8.9

Road Link	2022		2027	
	AADT	%HDV	AADT	%HDV
196152	12549	9.2	13144	9.2
428127	2837	1.8	2972	1.8
477391	2837	1.8	2972	1.8
438111	2624	8.6	2749	8.6
179289	2626	8.6	2751	8.6

Table A6.3: Summary of Rail Emission Factors used in the Assessment

Rail Link	NOx	PM
132	0.037608	0.001202
133	0.025145	0.000487

A6.4 Figure A6.1 shows the road network and rail links included within the model, along with the speed at which each road link was modelled.

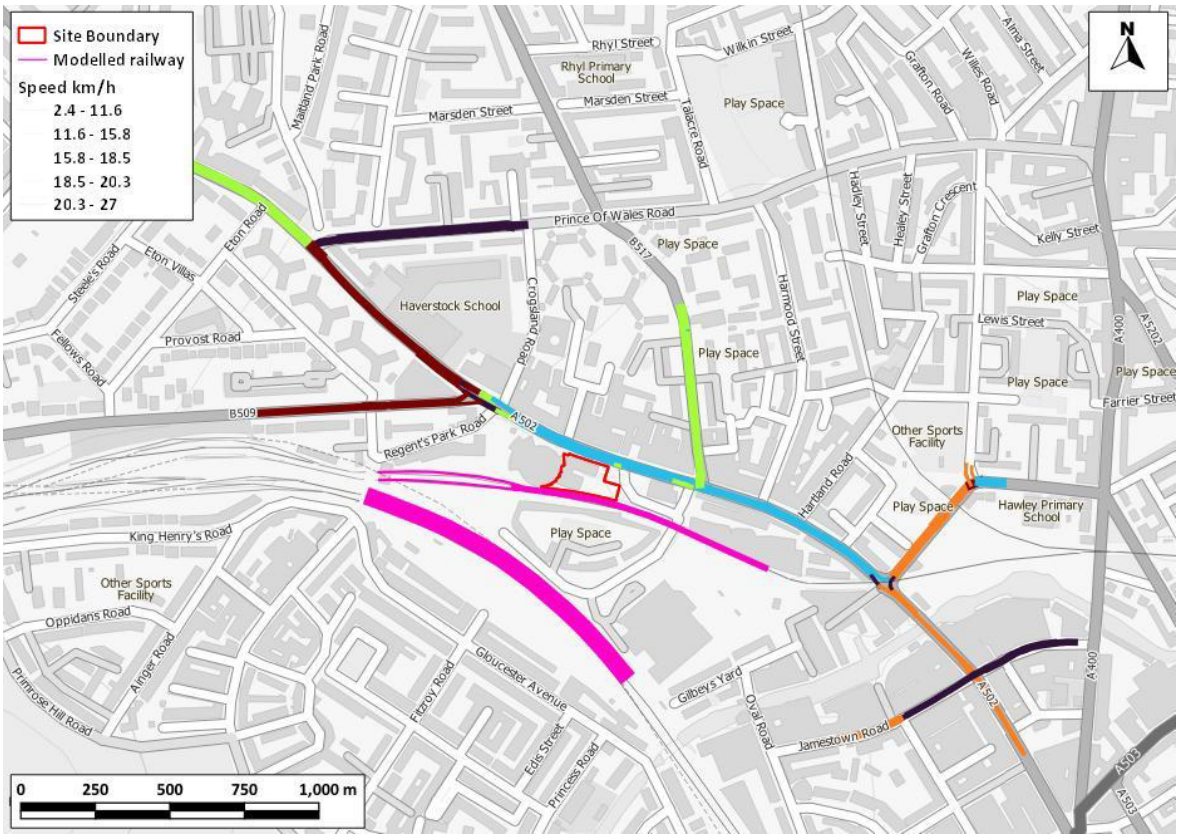

Figure A6.1: Modelled Road Network & Speed

A6.5 Hourly sequential meteorological data in sectors of 10 degrees from Northolt for 2022 been used in the model. The Northolt meteorological monitoring station is located at Northolt Universal Aviation, approximately 18 km west of the proposed development. Both the application site and the Northolt meteorological monitoring station are located in London where they will be influenced by the effects of inland meteorology over urban topography. The topography and elevation 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 2022 is provided in Figure A6.2. Raw data were provided by the Met Office and processed by AQC for use in ADMS.

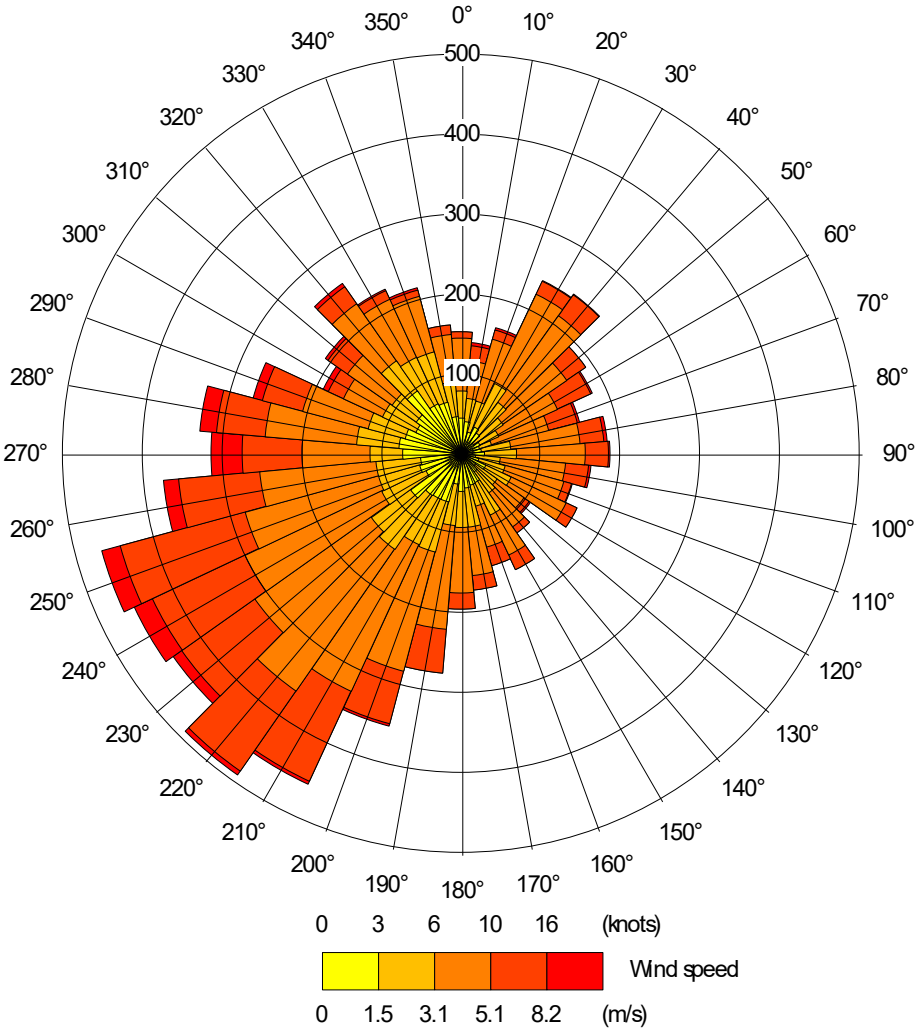

Figure A6.2: Wind Rose

Model Verification

A6.6 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 NO_2 concentrations during 2022 at the CAM64, CAM121, CAM128 and CAM135 diffusion tube monitoring sites. The CAM121, CAM128, and CAM135 sites have been selected because they are all monitoring sites located close to the roadside on Chalk Farm Road. In addition, CAM64 was selected as it is close to Chalk Farm Road and CAM121. The other monitoring sites presented in the baseline section have not been included as

they are setback further away from Chalk Farm Road in locations not considered representative of the Site.

Nitrogen Dioxide

A6.7 Most 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).

A6.8 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 concentrations 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, 2024b).

A6.9 The unadjusted model has under predicted the road-NOx contribution; this is a common experience with this and most other road traffic emissions dispersion models. An adjustment factor has been determined as the slope of the best-fit line between the 'measured' road contribution and the model derived road contribution, forced through zero (Figure A6.3). The calculated adjustment factor of 1.87 has been applied to the modelled road-NOx concentration for each receptor to provide adjusted modelled road-NOx concentrations.

A6.10 The total NO_2 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. Figure A5.3 compares final adjusted modelled total NO_2 at each of the monitoring sites to measured total NO_2, and shows a close agreement. After adjustment, the concentrations at CAM121 and CAM135, which are the Chalk Farm Road monitoring sites closest to the proposed development, are shown to be marginally overpredicting concentrations while those further away are marginally underpredicting. This suggests that, after adjustment, the area of the model the proposed development lies within is overpredicting concentrations and therefore modelled concentrations at the Site are judged to be conservative.

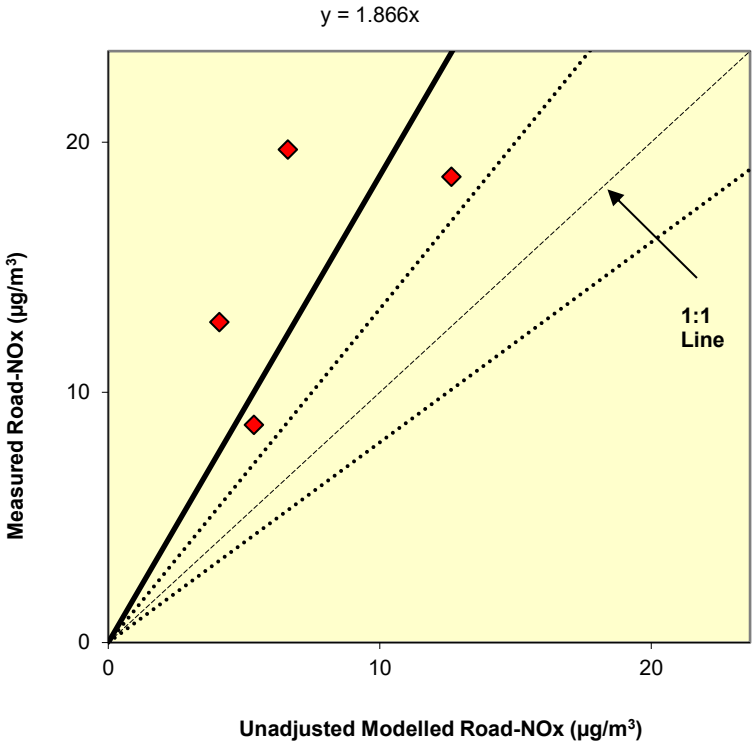

Figure A6.3: Comparison of Measured Road NOx to Unadjusted Modelled Road NOx Concentrations. The dashed lines show ± 25%.

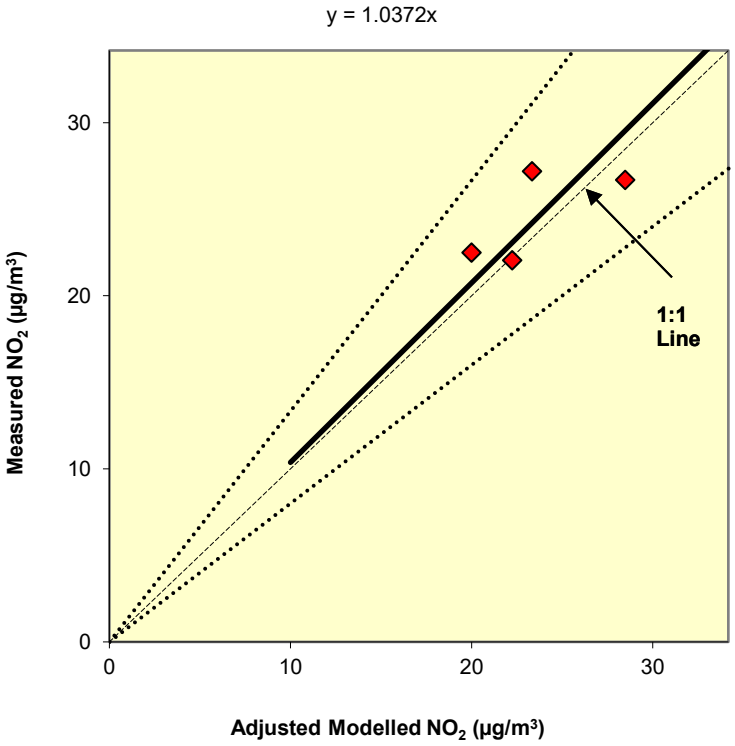

Figure A6.4: Comparison of Measured Total NO_2 to Final Adjusted Modelled Total NO_2 Concentrations. The dashed lines show ± 25%.

PM_{10} and $PM_{2.5}$

A6.11 The approach described above for NOx and NO_2 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.

A6.12 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 $PM_{2.5}$.

A6.13 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

A6.14 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, 2024b). The traffic mix within the calculator has been set to “All London 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.

A7 Construction Mitigation

A7.1 Table A7.1 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 A7.1: 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 not 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		✓
Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable;		✓
Record all inspections of haul routes and any subsequent action in a site log book;		✓

Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems or mobile water bowsers, and regularly cleaned;		✓
Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable);		✓
Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits;		✓
Access gates should be located at least 10 m from receptors, where possible; and		✓
Apply dust suppressants to locations where a large volume of vehicles enter and exit the construction site.	✓	