Air Quality Assessment

81 Belsize Park Gardens, Camden

July 2023

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1. Introduction

Background

1.1 Phlorum Limited has been commissioned by Dukes Education Group to undertake an Air Quality Assessment in support of a planning application for a property redevelopment located at 81 Belsize Park Gardens, Camden, London, NW3 4NJ. The National Grid Reference for the centre of the site is 527375, 184640. A site location plan is included in Figure 1.

1.2 The development proposes a change of building use from the existing leisure club use (Class E(d)) to education use (Class F1). The building is proposed to be used by the Fine Arts College, who are an existing education provider in Belsize Park. They are currently using leased accommodation in buildings adjacent to 81 Belsize Park Gardens. They will move out of this leased accommodation and will also have further space to grow the College. The College caters for children aged 13-19 years.

1.3 Land use in the vicinity of the site comprises primarily residential and commercial uses with greenspaces nearby. The proposed development is located south of Belsize Park Gardens and East of Lambolle Place, on the eastern side of the existing Fine Arts College site. Belsize Park underground station is located approximately 450m north of the site.

1.4 The main sources of air pollution in the vicinity of the site are vehicles travelling on the local road network, particularly the adjacent Belsize Park Gardens.

1.5 The Local Planning Authority, the London Borough of Camden (LBC), declared a borough-wide Air Quality Management Area (AQMA) in 2002 due to exceedances of the annual mean Air Quality Standard (AQS) for nitrogen dioxide (NO_2) and the 24-hour mean AQS for particulate matter (PM_{10}).

1.6 In addition to AQMAs, the Greater London Authority (GLA) have identified Air Quality Focus Areas (AQFAs) across the London boroughs. These are defined as locations in which the UK AQS for annual mean NO_2 has been exceeded with high levels of human exposure. There are currently eight AQFAs located within LBC, the closest of which, the Swiss Cottage AQFA, is located approximately 645m west of the site at its closest point.

Scope of Assessment

1.7 This report assesses both the proposed development's sensitivity to, and impact on, local air quality, considering both the operational and construction phases, and recommending mitigation where necessary.

2. Policy Context

The UK Air Quality Strategy

2.1 The UK Air Quality Strategy (UKAQS)[1] sets out air quality standard (AQS) concentrations for a number of key pollutants that are to be achieved at sensitive receptor locations across the UK by corresponding air quality objective (AQO) dates. The sensitive locations at which the standards and objectives apply are those where the population are reasonably expected to be exposed to said pollutants over the particular averaging period.

2.2 For those objectives to which an annual mean standard applies, the most common sensitive receptor locations used to compare concentrations against the standards are areas of residential housing. It is reasonable to expect that people living in their homes could be exposed to pollutants over such a period of time.

2.3 Schools and children's playgrounds are also often used as sensitive locations for comparison with annual mean objectives due to the increased sensitivity of young people to the effects of pollution (regardless of whether or not their exposure to the pollution could be over an annual period). For shorter averaging periods of between 15 minutes, 1 hour or 1 day, the sensitive receptor location can be anywhere where the public could be exposed to the pollutant over these shorter periods of time. A summary of the AQS relevant to this assessment are included in Table 2.1, below.

Table 2.1: UK Air Quality Standards and Objectives

Pollutant	Averaging Period	Air quality standard (µg.m^{-3})	Air quality objective
Nitrogen dioxide (NO_2)	1 hour	200	200 µg.m^{-3} not to be exceeded more than 18 times a year
	Annual	40	40 µg.m^{-3}
Particulate Matter (PM_{10})	24-hour	50	50 µg.m^{-3} not to be exceeded more than 35 times a year
	Annual	40	40 µg.m^{-3}
Particulate Matter ($PM_{2.5}$)	Annual	20	20 µg.m^{-3}

1 Air Quality Strategy for England, Scotland, Wales and Northern Ireland (Volumes 1 and 2) July 2007.

2.4 The objectives adopted in the UK are based on the Air Quality (England) Regulations 2000[2], as amended, for the purpose of Local Air Quality Management. These Air Quality Regulations have been adopted into UK law from the limit values required by European Union Daughter Directives on air quality.

2.5 The UKAQS for $PM_{2.5}$ was recently amended as part of The Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020[3].

London Local Air Quality Management

2.6 The London Local Air Quality Management (LLAQM) framework[4] is the statutory process used by London authorities to review and improve air quality within their administrative boundaries. This framework was designed to specifically meet London's needs.

2.7 The LLAQM framework provides London-specific policy and technical guidance (LLAQM.PG(19)[5] and LLAQM.TG(19)[6]) for the London boroughs. Although both are largely based on the updated national Defra LAQM guidance (2022)[7], they incorporate London-specific elements of the national LAQM system.

2.8 Obligations under the Environment Act 1995 require local authorities to declare an AQMA at sensitive receptor locations where an objective concentration has been predicted to be exceeded. In setting an AQMA, the local authority must then formulate an Air Quality Action Plan (AQAP) to seek to reduce pollution concentrations to values below the objective levels.

2.9 LBC recently updated their AQAP with the Camden Clean Air Action Plan 2023 - 2026[8]. The action plan sets out Camden's approach for improving air quality and protecting health from exposure to air pollution in Camden. This follows on from the previous Camden Clean Air Action Plan 2019-2022.

2.10 The Greater London Authority (GLA) has designated eight Air Quality Focus Areas (AQFAs) within LBC. An AQFA is a location that has been identified by the GLA as having both high levels of NO_2 and significant human exposure. The development site is situated approximately 645m east of the AQFA which spans an area centred on the A41 Finchley Road from South Hampstead to Finchley Road Station.

2 The Air Quality (England) (Amendment) Regulations 2002 - Statutory Instrument 2002 No.3043.
3 The Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020.
4 London Local Air Quality Management (LLAQM) Framework. www.london.gov.uk/what-we-do/environment/pollution-and-air-quality/working-london-Boroughs
5 Mayor of London. (2019). *London Local Air Quality Management (LLAQM) Policy Guidance 2019 (LLAQM.PG(19).*
6 Mayor of London. (2019). *London Local Air Quality Management (LLAQM) Technical Guidance 2019 (LLAQM.TG(19).*
7 Department for Environment Food & Rural Affairs. (2022). *Local Air Quality Management Technical Guidance (TG22).*
8 London Borough of Camden. (2022). *Camden Clean Air Action Plan 2023-2026.*

2.11 The Mayor of London is developing the London Clean Air Action Plan. As part of this process, in addition to the existing Low Emission Zone (LEZ), the central London Ultra-Low Emission Zone (ULEZ) was enforced on 8th of April 2019. The ULEZ was extended to the boundary of the North and South Circular roads on 25th October 2021. The development site is located within the current boundary of the ULEZ.

National Planning Policy Framework

2.12 The National Planning Policy Framework (NPPF)[9], which was updated in July 2021, sets out the Government's planning policy for England. At its heart is an intention to promote more sustainable development. A core principle in the NPPF that relates to air quality effects from development is that planning should "contribute to conserve and enhance the natural and local environment". In achieving this, it states in paragraph 174 that:

"Planning policies and decisions should contribute to and enhance the natural and local environment by: [...]

preventing new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability [...]".

2.13 With regard to assessing cumulative effects the NPPF states the following at paragraph 185:

"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."

2.14 Regarding compliance with relevant limit values and national objectives for pollutants the NPPF, paragraph 186 states:

"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

9 Ministry of Housing, Communities and Local Government. (2021). National Planning Policy Framework.

Management Areas and Clean Air Zones is consistent with the local air quality action plan."

2.15 The NPPF offers a broad framework but does not afford a detailed methodology for assessments. Specific guidance for air quality continues to be provided by organisations such as the Department for Environment, Food and Rural Affairs (Defra), Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM).

National Planning Practice Guidance

2.16 Reference ID 32 (Air Quality) of the National Planning Practice Guidance (PPG)[10], which was updated in July 2021, provides guiding principles on how planning can take account of the impact of new development on air quality. The PPG summarises the importance of air quality in planning and the key legislation relating to it.

2.17 As well as describing the importance of International, National and Local Policies (detailed elsewhere in this report), it summarises the key sources of air quality information. It also explains when air quality is likely to be relevant to a planning decision, stating:

"Considerations that may be relevant to determining a planning application include whether the development would:

- *Lead to changes (including any potential reductions) in vehicle-related emissions in the immediate vicinity of the proposed development or further afield. This could be through the provision of electric vehicle charging infrastructure; altering the level of traffic congestion; significantly changing traffic volumes, vehicle speeds or both; or significantly altering the traffic composition on local roads. Other matters to consider include whether the proposal involves the development of a bus station, coach or lorry park; could add to turnover in a large car park; or involve construction sites that would generate large Heavy Goods Vehicle flows over a period of a year or more;*

- *Introduce new point sources of air pollution. This could include furnaces which require prior notification to local authorities; biomass boilers or biomass-fuelled Combined Heat and Power plant; centralised boilers or plant burning other fuels within or close to an air quality management area or introduce relevant combustion within a Smoke Control Area; or extraction systems (including chimneys) which require approval or permits under pollution control legislation;*

10 Planning Practice Guidance (PPG) 32. (Updated July 2021). Air Quality. http://planningguidance.planningportal.gov.uk/blog/guidance/air-quality/.

- *Expose people to harmful concentrations of air pollutants, including dust. This could be by building new homes, schools, workplaces or other development in places with poor air quality;*
- *Give rise to potentially unacceptable impacts (such as dust) during construction for nearby sensitive locations;*
- *Have a potential adverse effect on biodiversity, especially where it would affect sites designated for their biodiversity value."*

2.18 Details are also provided of what should be included within an air quality assessment. Key considerations include:

- Baseline local air quality;
- Whether the proposed development could significantly affect local air quality during construction/operation; and
- Whether the development is likely to expose more people to poor air quality.

2.19 Examples of potential air quality mitigation measures are also provided in the PPG.

London Specific Planning Policy

2.20 The Mayor's Environment Strategy was published in 2018 and sets out the measures the Greater London Authority (GLA) are taking to improve air quality. The Environment Strategy is supported by the London Plan 2021[11] which was published in March 2021.

2.21 Policy SI1 'Improving air quality' of the London Plan states that:

"To tackle poor air quality, protect health and meet legal obligations the following criteria should be addressed:

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

11 Greater London Authority. (2021). *The London Plan: The Spatial Development Strategy for Greater London.* [Adopted March 2021].

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 air quality, such as children or older people should demonstrate that design measures have been used to minimise exposure […]

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.

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."

Non-Road Mobile Machinery

2.22 It must be ensured that all Non-Road Mobile Machinery (NRMM) operating on site comply with London's current and future policy for NRMM. The current London Policy for NRMM[12] states the following:

"From 1st September 2020 NRMM on all sites within Greater London is required to meet emission Stage IIB as a minimum; and NRMM on all sites within either the Central Activities Zone (CAZ) or Opportunity Areas (OAs) are required to meet emissions Stage IV as a minimum".

2.23 The development site is not located within London's Central Activity Zone (CAZ), nor is it located within an Opportunity Area (OA) and is therefore bound by the emission requirements of the NRMM policy for Greater London.

12 Greater London Authority. (2022). *Non-Road Mobile Machinery Practical Guide*. Available at: https://www.london.gov.uk/sites/default/files/nrmm_practical_guide_april_2022_web.pdf

2.24 Therefore, any NRMM operating on site should meet Stage IIB of EU Directive 97/68/EC as a minimum. Furthermore, all constant speed engines such as those typically found in generators will be required to meet Stage V.

Local Planning Policy

2.25 LBC have adopted a number of planning documents that combine to form the development plan for Camden. The *Camden Local Plan*[13], adopted in July 2017 is LBC's key document in Camden's development plan. The Local Plan sets out a vision for the borough and implements policies to steer development in the borough towards this vision.

2.26 The *Camden Local Plan* details a number of policies with relevance to air quality in the borough, including Policy A1 *Managing the Impact of Development* which states that:

"The Council will seek to protect the quality of life of occupiers and neighbours. We will grant permission for development unless this causes unacceptable harm to amenity.

We will:

a. seek to ensure that the amenity of communities, occupiers and neighbours is protected;

b. seek to ensure development contributes towards strong and successful communities by balancing the needs of development with the needs and characteristics of local areas and communities;

c. resist development that fails to adequately assess and address transport impacts affecting communities, occupiers, neighbours and the existing transport network; and

d. require mitigation measures where necessary.

The factors we will consider include: [...]

h. transport impacts, including the use of Transport Assessments, Travel Plans and Delivery and Servicing Management Plans;

i. impacts of the construction phase, including the use of Construction Management Plans; [...]

k. odour, fumes and dust; [...]".

2.27 The Local Plan also details Policy CC4: Air Quality, which states the following:

"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.

13 London Borough of Camden. (2017). *Camden Local Plan.* [Adopted 2017].

The Council will take into account the impact of air quality when assessing development proposals, through the consideration of both the exposure of occupants to air pollution and the effect of the development on air quality. Consideration must be taken to the actions identified in the Council's Air Quality Action Plan.

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

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

2.28 Other Local Plan policies of relevance to air quality include policies '*CC1 Climate change mitigation*', '*CC2 Adapting to climate change*', and policies T1 to T4 which guide transportation in the borough.

2.29 LBC's Camden Planning Guidance (CPG)[14] on Air Quality was published in January 2021 with the intention to support policies detailed in the Local Plan, and in particular policy '*CC4 Air Quality*'. The document provides guidance on the Council's requirements for an air quality assessment.

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

3. Assessment Methodology

Guidance

3.1 Defra's Local Air Quality Management Technical Guidance (LAQM.TG(22))[7] and London Local Air Quality Management Technical Guidance (LLAQM.TG(19))[6] were followed in carrying out the assessment.

3.2 Guidance from the Greater London Authority's *The Control of Dust and Emissions During Construction and Demolition*[15] was used in assessing construction phase impacts of the proposed development, in conjunction with the Institute of Air Quality Management's (IAQM) *Guidance on the Assessment of Dust from Demolition and Construction*[16]. The GLA guidance is considered to be best practice guidance for the UK and details a number of mitigation measures that should be adopted to minimise adverse impacts from dusts and fine particles.

3.3 The latest EPUK & IAQM guidance on *Planning for Air Quality*[17] was also referred to throughout the assessment.

3.4 Finally, newly adopted Air Quality Neutral guidance[18] by the GLA has been followed while undertaking the air quality neutral assessment. Updated air quality neutral benchmarks are available in the Air Quality Neutral: Update to Benchmarks document[19]. The previous Air Quality Neutral Planning Support Update[20], which supports the GLA Sustainable Design and Construction SPG, has also been given due consideration.

Baseline Conditions

3.5 Baseline air quality conditions in the vicinity of the site are established through the compilation and review of appropriately sourced background concentration estimates and local monitoring data.

15 Greater London Authority. (2014). *The Control of Dust and Emissions During Construction and Demolition*.
16 IAQM. (2014). *Guidance on the assessment of dust from demolition and construction*.
17 EPUK & IAQM. (2017). *Land-Use Planning & Development Control: Planning for Air Quality*.
18 Greater London Authority. (2023). *Air Quality Neutral London Plan Guidance.*
19 Greater London Authority/AQC. (2020). *Air Quality Neutral: Update to Benchmarks.*
https://www.london.gov.uk/sites/default/files/aqn_update_to_benchmarks_report.pdf
20 Greater London Authority/AQC. (2014). *Air Quality Neutral Planning Support Update: GLA 80371*
https://www.aqconsultants.co.uk/CMSPages/GetFile.aspx?guid=226d8d5e-d7e9-40e1-bf0d-85c4554496da

3.6 Defra provides estimated background concentrations of the UKAQS pollutants at the UK Air Information Resource (UK-AIR) website[21]. These estimates are produced using detailed modelling tools and are presented as concentrations at central 1km^2 National Grid square locations across the UK. At the time of writing, the most recent background maps were from August 2020 and based on monitoring data from 2018.

3.7 Being background concentrations, the UK-AIR data are intended to represent a homogenous mixture of all emissions sources within the general area of a particular grid square location. Concentrations of pollutants at various sensitive receptor locations can, therefore, be calculated by modelling the emissions from a nearby pollution source, such as a busy road, and then adding this to the appropriate UK-AIR background datum.

3.8 The London Atmospheric Emissions Inventory[22] (LAEI) provides modelled ground level concentrations of key pollutants at 20m grid resolution across Greater London. Concentration estimates for NO_2, PM_{10} and $PM_{2.5}$ are included for the year 2019. LAEI data within the vicinity of the site have been reviewed.

3.9 Local pollutant monitoring networks are considered an appropriate source of data for the purposes of establishing baseline air quality in the vicinity of the development site. The most recent available local pollutant monitoring data from LBC's *Air Quality Annual Status Report for 2021*[23] have been reviewed and referenced to establish baseline air quality.

Construction Phase Assessment

3.10 The construction phase of the proposed development will involve a number of activities that could potentially produce polluting emissions to air. Predominantly, these will be emissions of dust. However, they could also include releases of odours and/or more harmful gases and particles.

3.11 Both the GLA[15] and IAQM[16] guidance to assess the impacts of construction on human and ecological receptors have been followed in undertaking this air quality assessment.

3.12 The guidance suggests that where a receptor is located within 350m (50m for statutory ecological receptors) of a site boundary and/or 50m of a route used by construction vehicles, up to 500m from the site entrance, a dust assessment should be undertaken. High sensitivity receptors are considered particularly sensitive when located within 20m of a works area. Figure 2 shows receptors that could be sensitive to dust that are located within 350m of the boundaries of the site.

21 Defra: UK-AIR. www.uk-air.defra.gov.uk
22 London Atmospheric Emissions Inventory. (2021.) https://data.london.gov.uk/dataset/london-atmospheric-emissions-inventory--laei--2019
23 London Borough of Camden. (2022). *Air Quality Annual Status Report for 2021*.

3.13 The Multi Agency Geographic Information for the Countryside (MAGIC) website[24], which incorporates Natural England's interactive maps, has been reviewed to identify whether statutory ecological receptors are situated within 50m of the site boundary, or within 50m of any routes to be used by construction vehicles on the public highway.

Construction Significance

3.14 Both the GLA and IAQM guidance suggest that Demolition, Earthworks, Construction and Trackout should all be assessed individually to determine the overall significance of the construction phase.

3.15 The first step in assessing the risk of impacts is to define the potential dust emission magnitude. This can be considered '*Negligible*', '*Small*', '*Medium*' or '*Large*' for each of the construction stages. Whilst the GLA and IAQM provide examples of criteria that may be used to assess these magnitudes, the vast number of potential variables mean that every site is different and therefore professional judgement must be applied by what the GLA and IAQM refer to as a "technically competent assessor". The construction phase assessment therefore relies on the experience of the appraiser.

3.16 As such, attempts to define precisely what constitutes a *Negligible*, *Small*, *Medium* or *Large* dust emission magnitude should be treated with caution. Factors such as the scale of the work, both in terms of size and time, the construction materials and the plant to be used must be considered.

3.17 The second step is to define the sensitivity of the area around the construction site. As stated in the IAQM guidance:

"the sensitivity of the area takes into account 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 concentrations; and*
- *site-specific factors, such as whether there are natural shelters, such as trees, to reduce the risk of wind-blown dust."*

3.18 Based on these factors, the area is categorised as being of '*Low*', '*Medium*' or '*High*' sensitivity.

24 Natural England and MAGIC Partnership Organisations. Multi Agency Geographic Information for the Countryside. https://magic.defra.gov.uk/magicmap.aspx [Accessed March 2023].

3.19 When dust emission magnitudes for each stage and the sensitivity of the area have been defined, the risk of dust impacts can be determined. The GLA's SPG provides a risk of impacts matrix for each construction stage. The overall significance for the construction phase can then be judged from the stages assessed. Again, this is subject to professional judgement.

3.20 Combustion exhaust gases from diesel-powered plant and construction vehicles accessing the site will also be released. However, the volumes and periods over which these releases will occur are unlikely to result in any long-term impacts on local air quality and therefore this has been scoped out of the assessment.

Operational Phase

Road Transport Sources

3.21 Vehicle emissions will arise from the combustion of fossil fuels in vehicle engines and their subsequent release to atmosphere via tailpipe exhausts. The most significant pollutants released by cars and other vehicles are oxides of nitrogen (NO_2/NO_x) and particulate matter (PM_{10} and $PM_{2.5}$). Releases of carbon monoxide (CO) and some volatile hydrocarbons (e.g. benzene and 1,3-butadiene) are of less significance and are not assessed further in this report.

3.22 As it is elevated annual mean concentrations of NO_2 and PM_{10} that have resulted in the declaration of most AQMAs across the UK, these are the pollutants of most concern and they have therefore been the focus of this air quality assessment. $PM_{2.5}$, which is another fraction of particulate matter, has also been considered.

3.23 The latest EPUK & IAQM planning guidance[17] provides indicative thresholds for changes in traffic flows which would require a detailed, dispersion modelling air quality assessment. When within an AQMA, these are a change in 24-hour annual average daily traffic flows (AADT) exceeding 100 light-duty vehicles (LDVs) and/or 25 heavy-duty vehicles (HDVs). Changes below these thresholds can be reasonably considered to have an insignificant impact on local air quality.

3.24 Full justification behind the screening assessment of air quality related impacts on existing receptors in the local area has been provided in Section 6 of this report.

Air Quality Neutral Assessment

3.25 For some time, the standard approach for air quality assessments was to predict the change in pollution concentrations through the use of a screening or detailed dispersion model and, where the potential for a significant impact was identified, recommend mitigation measures so that the significance of effect can be kept to an acceptable level. However, this type of assessment does little to consider the overall emissions from a development and its contribution to broader background concentrations, which can gradually increase due to incremental changes from successive developments, particularly in a large city such as London.

3.26 As a result of these effects, an air quality neutral policy was included in the London Plan. It aims to ensure that developments are air quality neutral or better, particularly in areas where any AQSs are being breached.

3.27 Since the publication of the London Plan, there has been considerable debate as to how the concept should be assessed and implemented. The Air Quality Neutral Planning Support Update[20] was produced in order to further develop the policy and discuss assessment options. The two principal options for the application of the policy were to compare the emissions of a proposed development with the site's previous use, or to establish benchmarks for acceptable emissions for particular planning uses. A combination of these two approaches would also be possible.

3.28 It was decided that a purely benchmarking route should be taken, rather than working on a site-by-site basis, as it would provide a means of ensuring that developments across London as a whole remain air quality neutral. It also allows for the development of long-derelict sites and does not permit large pollution-headroom for former industrial sites, which would be a key problem with the alternative method. The guidance provides building emissions benchmarks for NO_X and also states that PM_{10} benchmarking need not be considered where natural gas is the only fuel used on site.

3.29 It was also concluded that emissions from buildings and transport should be treated separately, with the intent that each should attain air quality neutrality.

3.30 The Air Quality Neutral Planning Support Update, published by the Greater London Authority, and the Sustainable Design and Construction SPG, which supports the London Plan, state that air quality neutral policy applies to all major developments in Greater London.

3.31 An Air Quality Neutral Assessment has been undertaken and is presented in Section 7 of this report. The development is also assessed against the newly drafted Air Quality Neutral London Plan guidance[18] provided by the GLA.

4. Baseline Conditions

4.1 This chapter is intended to establish prevailing air quality conditions in the vicinity of the development site.

UK-AIR Background Pollution

4.2 The UK-AIR[21] predicted background concentrations for NO_2, PM_{10} and $PM_{2.5}$ for 2019 to 2024 are presented in Table 4.1. These data were taken from the central grid square location closest to the application site (i.e. grid reference: 527500, 184500).

Table 4.1: 2019 to 2024 Background Concentrations of Pollutants at the Site

Pollutant	Predicted background concentration (µg.m^{-3})						Averaging Period	AQS concentration (µg.m^{-3})
	2019	2020	2021	2022	2023	2024		
NO_2	27.4	25.9	25.2	24.5	23.9	23.3	annual mean	40
PM_{10}	18.3	17.8	17.6	17.4	17.2	17.0	annual mean	40
$PM_{2.5}$	11.8	11.5	11.4	11.2	11.1	10.9	annual mean	20

4.3 The data in Table 4.1 show that annual mean background concentrations of NO_2, PM_{10} and $PM_{2.5}$ in the vicinity of the application site between 2019 and 2024 are predicted to be well below their respective AQSs.

4.4 The data show that in 2022, annual mean NO_2, PM_{10} and $PM_{2.5}$ concentrations are predicted to be below their respective AQSs by 38.8%, 56.5% and 44.0% respectively. As such, annual mean background pollutant concentrations are likely to be well below their respective AQSs at, and within the vicinity of, the development site.

4.5 Concentrations of all pollutants are predicted to decline each year. These reductions are principally due to the forecast effect of the roll out of cleaner vehicles, but also due to local, London UK national and international efforts to reduce emissions across all sectors.

London Atmospheric Emissions Inventory

4.6 LAEI modelled annual mean pollution concentrations[22] of NO_2, PM_{10} and $PM_{2.5}$ for 2019 are presented in Table 4.2. These data were taken from a central grid square location on the eastern edge of the site boundary (i.e. National Grid Reference: 527380, 184640).

Table 4.2: LAEI (2019) Modelled Annual Mean Concentrations

LAEI Grid Square		Pollutant	Modelled Concentration ($\mu g.m^{-3}$)	Averaging Period	Air quality standard concentration ($\mu g.m^{-3}$)
X	Y		2019		
527380	184640	NO_2	31.3	annual mean	40
		PM_{10}	17.0	annual mean	40
		PM2.5	11.1	annual mean	20

4.7 The data in Table 4.2 show that, based on 2019 data, modelled annual mean concentrations of NO_2, PM_{10}, and $PM_{2.5}$ are expected to be below their long-term AQSs by at least 21.8%, 57.5% and 44.5%, respectively. Therefore, concentrations of NO_2, PM_{10} and $PM_{2.5}$ are predicted to be well below their relevant AQSs at the development site.

Local Sources of Monitoring Data

4.8 Air quality monitoring is considered an appropriate source of data for the purposes of describing baseline air quality. At the time of writing, the most recent ASR[23] released by LBC included local pollutant monitoring data from 2021.

4.9 However, due to the uncertainty surrounding impacts associated with COVID-19 on emissions and subsequent levels of pollution across the UK, this baseline review has focused on the year 2019, which is considered to be the most recent 'normal' year for which baseline conditions can be established.

Automatic Monitoring

4.10 LBC undertook automatic (continuous) pollutant monitoring of NO_2 at four sites within the borough in 2021. The most recent available NO_2 monitoring data from these monitoring stations are included in Table 4.3 below.

Table 4.3: NO_2 Monitoring Data from LBC Automatic Monitoring Stations

Monitor	Type	Distance from the Site (km)	Annual mean NO_2 concentration ($\mu g.m^{-3}$)			
			2018	2019	2020	2021
CD1	K	0.8	**54.0**	**43.0**	33.0	**44.0**
CD010	R	1.6	-	-	-	30.0
CD9	R	3.2	**82.0**	**70.0**	**43.0**	**48.0**
BL0	UB	3.8	36.0	32.0	28.0	27.0

Note: "R" = Roadside; "UB" = Urban background; "K" = Kerbside "**Bold**" denotes exceedance of the annual mean AQS. "**Underline**" denotes indicative exceedance of the hourly mean AQS.

4.11 The data in Table 4.3 show that automatic monitoring stations positioned at roadside and kerbside locations within the borough often exceeded the 40 $\mu g.m^{-3}$ AQS between 2018 and 2021. However, no exceedances were recorded at the monitor positioned in an urban background location.

4.12 The closest automatic monitoring station to the site, monitor CD1, is positioned kerbside at A41 Finchley Road, and recorded exceedances of the 40 $\mu g.m^{-3}$ AQS between 2018 and 2021. In 2019 this monitor recorded an annual mean NO_2 concentration of 43 $\mu g.m^{-3}$; above the AQS by 7.5%. In 2020, this monitoring station recorded an NO_2 concentration below the 40 $\mu g.m^{-3}$ AQS by 17.5%, representing a large decrease in concentrations relative to 2019, which is likely to be partly due to the impacts of COVID-19. NO_2 concentrations recorded at monitor CD1 are not considered to be representative of likely concentrations across the site, due to the monitor's kerbside location adjacent to an A-road whereas the development site is distanced much further from local major pollution sources.

4.13 LBC undertook automatic monitoring of NO_2 at one automatic monitoring station set in an urban background location between 2018 to 2021. Urban background monitor BL0 is located in Russel Square Gardens, approximately 3.8km south-east of the development site. This monitor recorded annual mean NO_2 concentrations consistently below the 40 $\mu g.m^{-3}$ AQS between 2018 and 2021 and showed improvements in background NO_2 concentrations across the monitoring period. In 2019, this monitor recorded background NO_2 concentrations below the 40 $\mu g.m^{-3}$ AQS by 20%. Due to its urban background location, this monitor is likely to be most representative of background conditions at the development site.

4.14 LBC also undertook automatic monitoring of PM_{10} at four sites within the borough. The most recent available PM_{10} monitoring data from LBC automatic monitoring stations are included in Table 4.4, below.

Table 4.4: PM_{10} Monitoring Data from LBC Automatic Monitoring Stations

Monitor	Type	Distance from the Site (km)	Annual mean PM_{10} concentration ($\mu g.m^{-3}$)			
			2018	2019	2020	2021
CD1	K	0.8	21.0	19.0	16.0	16.0
KGX	UB / I	2.8	15.0	15.0	13.0	13.0
CD9	R	3.2	21.0	22.0	18.0	19.0
BL0	UB	3.8	17.0	18.0	16.0	16.0

Note: Note: "R" = Roadside; "K" = Kerbside; "UB" = Urban background; "I" = Industrial.

4.15 The data in Table 4.4 show that annual mean PM_{10} concentrations were consistently below the 40 $\mu g.m^{-3}$ AQS at all LBC automatic monitoring stations throughout the 2018 to 2021 monitoring period.

4.16 The closest automatic monitoring station recording PM_{10} to the site again is CD1, as described above. In 2019, CD1 recorded an annual mean PM_{10} concentration of 19.0 $\mu g.m^{-3}$; below the 40 $\mu g.m^{-3}$ AQS by 52.5%.

4.17 The closest automatic monitor set in an urban background location again is monitor BL0. In 2019, BL0 recorded an annual mean PM_{10} concentration of 18.0 $\mu g.m^{-3}$; below the 40 $\mu g.m^{-3}$ AQS by 55%.

4.18 The highest annual mean PM_{10} concentration recorded for all LBH automatic monitoring stations in 2019 was 22.0 $\mu g.m^{-3}$ at CD9, located roadside at the A501 Euston Road. This concentration is below the 40 $\mu g.m^{-3}$ AQS for PM_{10} by 45%. However, given the proximity of this monitor to an A-road, monitored concentrations are not considered to be representative of conditions at the development site.

4.19 LBC also undertook automatic monitoring of $PM_{2.5}$ at three locations within the borough. The most recent available data for these monitoring stations are included in Table 4.5, below.

Table 4.5: $PM_{2.5}$ Monitoring Data from LBC Automatic Monitoring Stations

Monitor	Type	Distance from the Site (km)	Annual mean $PM_{2.5}$ concentration ($\mu g.m^{-3}$)			
			2018	2019	2020	2021
CD1	K	0.8	11.0	11.0	10.0	9.0
CD9	R	3.2	15.0	14.0	11.0	11.0
BL0	UB	3.8	10.0	11.0	9.0	9.0

Note: K" = Kerbside; "R" = Roadside; "UB" = Urban background.

4.20 The data in Table 4.5 show that annual mean $PM_{2.5}$ concentrations were consistently well below 20 $\mu g.m^{-3}$ AQS at all LBC automatic monitoring stations throughout the 2018 to 2021 monitoring period.

4.21 The closest automatic monitoring station for $PM_{2.5}$ to the site is again CD1 with the closest monitor set in an urban background location being monitor BL0. Both monitors recorded an annual mean $PM_{2.5}$ concentration of 11.0 $\mu g.m^{-3}$ in 2019; below the 20 $\mu g.m^{-3}$ AQS by 45%.

Non-Automatic Monitoring

4.22 LBC operate an extensive, non-automatic NO_2 diffusion tube monitoring network comprising 40 sites deployed in strategic locations across the borough. The most recent available monitoring data for diffusion tubes located within 2km of the site are included in Table 4.6, below.

Table 4.6: NO_2 Monitoring data from LBC Diffusion Tubes

Monitor	Type	Distance from the Site (km)	Annual mean NO_2 concentration ($\mu g.m^{-3}$)			
			2018	2019	2020	2021
CTLEN1	R	0.7	-	33.1	23.5	21.2
CA15	K	0.8	**62.3**	**50.9**	-	-
CA17	R	0.9	**48.1**	**43.5**	34.5	30.0
CTLEN2	R	1.2	-	31.7	24.9	20.8
CTLEN3	R	1.3	-	31.8	26.1	20.9
CTLEN13	R	1.4	-	28.1	22.1	18.2
CTLEN8	R	1.4	-	**41.5**	33.1	26.6
CA7	UB	1.4	22.1	23.3	18.7	15.4
CTLEN7	R	1.5	-	38.7	29.9	25.9

Note: "K" = Kerbside, "UB" = Urban Background, "R" = Roadside. **Bold** denotes exceedance of the annual mean AQS. **Underline** denotes indicative exceedance of the hourly mean AQS.

4.23 The data in Table 4.6 show that since 2020 the 40 $\mu g.m^{-3}$ annual mean AQS for NO_2 has not been exceeded at any diffusion tube within 2km of the site. However, exceedances of the AQS were recorded at some roadside and kerbside monitoring sites between 2018 and 2019.

4.24 Diffusion tube CTLEN1 is the closest diffusion tube to the site, located 1.5m from the kerb of the A502 Haverstock Hill, approximately 0.7km east of the site. Annual mean NO_2 concentrations recorded at this diffusion tube have remained well below the 40 $\mu g.m^{-3}$ AQS since monitoring began in 2019. Despite its roadside location this monitor recorded an annual mean NO_2 concentration of 33.1 $\mu g.m^{-3}$ in 2019; below the 40 $\mu g.m^{-3}$ AQS by 17.3%.

4.25 Diffusion tube CA15 recorded the highest NO_2 concentration in 2019 (50.9 $\mu g.m^{-3}$); above the 40 $\mu g.m^{-3}$ AQS by 27.3%. This diffusion tube is co-located with automatic monitor CD1 and is positioned kerbside at the A41 Finchley Road. Given the proximity of this monitor to the nearby A41, monitored pollutant concentrations are not considered to be representative of likely baseline conditions in the vicinity of the development site.

4.26 The closest diffusion tube to the site set in an urban background location is tube CA7 located approximately 1.4km from the site in a residential area at Frognal Way. In 2019, this diffusion tube recorded an annual mean NO_2 concentration of 23.3 $\mu g.m^{-3}$; below the 40 $\mu g.m^{-3}$ AQS by 41.8 %.

5. Construction Phase Impacts

5.1 The construction phase of the proposed development will involve a number of activities that could produce polluting emissions to air. Predominantly, these will be emissions of dust.

5.2 The estimates for the dust emission magnitude for demolition, earthworks, construction and trackout below are based on the professional experience of Phlorum's consultants, information provided by the client and Google Earth imagery.

Dust Emission Magnitude

Demolition

5.3 The total building volume to be demolished on site is approximately 137m^3, although the existing building will be retained, and demolition works will be limited to internal works and works to alter the façade of the building including the introduction of additional window openings and works to the roof. Therefore, demolition works fall into the *Small* dust emission category for demolition with reference to the IAQM guidance[16].

5.4 All buildings where demolition work will occur are expected to be less than 10m in height, falling into the IAQMs *Small* dust emission category, and no mobile crushing equipment is expected on site.

5.5 Based on the expected volume and height of the buildings being demolished, the overall dust emission magnitude from the demolition phase is considered *Small* with reference to the IAQM guidance.

Earthworks

5.6 The total area of the site is approximately 736m^2, which falls within the IAQM's *Small* dust emission magnitude category for earthworks.

5.7 It is anticipated that less than 20,000 tonnes of earth will be moved on site and this work is expected to be carried out by fewer than 5 heavy earth moving vehicles at any one time. No bunds are expected to be formed on site. Therefore, falling within the IAQM's *Small* dust emission magnitude category.

5.8 An asbestos survey has been commissioned and asbestos has been found within the building. The potential health effects from the release of contaminated dusts are not considered by this report, and should be dealt with by a separate, specialist asbestos risk assessment.

5.9 Therefore, the overall dust emission magnitude for the earthworks phase is considered to be *Small* with reference to the IAQM guidance.

Construction

5.10 During construction, activities that have the potential to cause emissions of dust may include concrete batching sandblasting and piling. Localised use of cement powder and general handling of construction materials also have the potential to generate dust emissions, as does the effect of wind-blow from stockpiles of friable materials. The primary construction materials and methods to be used are currently unknown.

5.11 The total volume of all buildings to be constructed on site is anticipated to be less than 25,000m^3, falling within the IAQM's *Small* dust emission magnitude category for construction.

5.12 Therefore, based on the expected volume of buildings proposed, the overall dust emission magnitude for the construction phase is considered to be *Small*.

Trackout

5.13 Construction traffic, when travelling over soiled road surfaces, has the potential to generate dust emissions and to also add soil to the local road network. During dry weather, soiled roads can lead to dust being emitted due to physical and turbulent effects of vehicles. The site will likely be accessed via Belsize Park Gardens road, and there will be no use of unpaved road surfaces by vehicles accessing the site during construction.

5.14 It is anticipated that fewer than 10 HDVs would access the site per day during the construction phase, falling within the IAQM *Small* dust emission magnitude category.

5.15 Given that no unpaved road surfaces will be used during construction, the overall dust emission magnitude for the trackout is considered to be *Small* with reference to the IAQM guidance[16].

Emission Magnitude Summary

5.16 A summary of the dust emission magnitude as a result of the activities of Demolition, Earthworks, Construction and Trackout as specified in the IAQM guidance, and discussed above, are listed in Table 5.1 below.

Table 5.1: Dust Emission Magnitude for the construction activities, based on the IAQM's guidance.

Activity	Dust Emission Magnitude
Demolition	Small
Earthworks	Small
Construction	Small
Trackout	Small

Sensitivity of the Area

5.17 Having established the emission magnitudes for each phase above, the sensitivity of the area must be considered to establish the significance of effects. The effect of dust emissions depends on the sensitivity of each receptor.

5.18 High sensitivity human receptors include residential dwellings, schools, and hospitals, but can include locations such as car showrooms when considering the impacts of dust soiling.

5.19 The impacts of dust emissions from the sources discussed above have the potential to cause an annoyance to human receptors living in the local area. Within distances of 20m of the site boundary there is a high risk of dust impacts, regardless of the prevailing wind direction. Up to 100m from the construction site, there may still be a high risk, particularly if the receptor is downwind of the dust source.

5.20 With the exponential decline in dust concentrations with distance from dust generating activities, it is considered that for receptors more than 350m from the site boundary, the risk is *Negligible*. Furthermore, the risks at over 100m only have the potential to be significant in certain weather conditions, e.g. downwind of the source during dry periods.

5.21 The approximate number of high sensitivity human receptors in the vicinity of the site is detailed in Table 5.2 below.

Table 5.2: Approximate number of High Sensitivity Receptors close to the site.

Distance to site (m)	Approximate number of receptors	Receptor Details
<20	>100	Residential Dwellings, Fine Arts College
<50	>150	Residential Dwellings, Fine Arts College
<100	>250	Residential Dwellings, Fine Arts College
<350	>1,000	Residential Dwellings, Fine Arts College, Sarum Hall School, Rathmore House Assisted Living

5.22 Figure 4 shows that the predominant wind direction at the closest relevant meteorological station at London City Airport (2019) is from the south-west. As demonstrated in Table 5.2, there are more than 100 high sensitivity receptors within 20m of the site. Therefore, regardless of the prevailing wind direction the sensitivity of the area to dust soiling impacts can be defined as *High*.

5.23 Both UK-AIR predicted annual mean concentrations and LAEI modelled pollutant concentrations of PM_{10} are below 24 $\mu g.m^{-3}$ at the site, as well as concentrations recorded at LBC urban background automatic monitoring stations in the surrounding area. This indicates that annual mean PM_{10} concentrations are likely to be below the respective AQSs at the site and adjacent uses. Taking into consideration the number of sensitive receptors in close proximity to the site, the sensitivity of the area to human health impacts is defined as *Medium*.

5.24 Review of the MAGIC website[24], which incorporates Natural England's interactive maps, has identified statutory ecological receptors within 50m of the site, or 50m of roads to be used by construction traffic. The closest statutory ecological site is the Adelaide Local Nature Reserve (LNR), located approximately 350m south-east of the site. Therefore, based on distance alone, the construction phase of the proposed development can be considered to have a *Negligible* impact on local designated ecological sites.

5.25 The development site is located with the Belsize Park Conservation Area. Therefore, guidance provided in the *Belsize Conservation Area Statement*[25] specific to the demolition phase of the project should be adhered to.

Risk of Impacts

5.26 Having established the potential dust emission magnitudes and sensitivity of the area, the risk of impacts can be determined in accordance with the IAQM guidance. These are summarised in Table 5.3.

Table 5.3: Summary of Impact Risk by Construction Stage based on the IAQM's dust guidance.

Stage	Impact Risk		
	Nuisance Dust	Ecology	PM_{10} Health Effects
Demolition	Medium	Negligible	Low
Earthworks	Low	Negligible	Low
Construction	Low	Negligible	Low
Trackout	Low	Negligible	Negligible

5.27 Overall, the proposed development is considered to present a *Medium Risk* for nuisance dust soiling effects, a *Low Risk* for PM_{10} health effects, and to be *Negligible* for ecological impacts, in the absence of mitigation.

25 Conservation & Urban Design Team, London Borough of Camden. (2003). *Belsize Conservation Area Statement.*

Site Specific Mitigation

5.28 The GLA guidance[15] suggests a number of mitigation measures that should be adopted in order to minimise impacts from dusts and fine particles. Appropriate measures that could be included during construction of the proposed development include:

- ideally cutting, grinding and sawing should not be conducted on-site and pre-fabricated material and modules should be brought in where possible;
- where such work must take place, water suppression should be used to reduce the amount of dust generated;
- skips, chutes and conveyors should be completely covered and, if necessary, enclosed to ensure that dust does not escape;
- no burning of any materials should be permitted on site;
- any excess material should be reused or recycled on-site in accordance with appropriate legislation;
- developers should produce a waste or recycling plan;
- following earthworks, exposed areas and soil stockpiles should be re-vegetated to stabilise surfaces, or otherwise covered with hessian or mulches;
- stockpiles should be stored in enclosed or bunded containers or silos and kept damp where necessary;
- hard surfaces should be used for haul routes where possible;
- haul routes should be swept/washed regularly;
- vehicle wheels should be washed on leaving the site;
- all vehicles carrying dusty materials should be securely covered; and
- delivery areas, stockpiles and particularly dusty items of construction plant should be kept as far away from neighbouring properties as possible.

5.29 In addition, the IAQM lists recommended mitigation measures for *Low, Medium* and *High* dust impact risk sites. The highly recommended mitigation measures for *Medium Risk* sites are included in Appendix A of this report.

5.30 Where dust generation cannot be avoided in areas close to neighbouring properties, additional mitigation measures should be put in place, such as: windbreaks, sprinklers, and/or time/weather condition limits on the operation of some items of plant or the carrying out of activities that are likely to generate a particularly significant amount of dust.

Residual Effects

5.31 After the implementation of the mitigation measures listed above and in Appendix A, the significance of each phase of the construction programme will be reduced and the residual significance of impact for the construction phase is expected to be *Negligible*.

6. Operational Phase

Impacts on Local Air Quality

6.1 The latest EPUK & IAQM planning guidance[17] provides indicative thresholds for changes in traffic flows which would require a detailed air quality assessment when within an AQMA. This is a change in 24-hour AADT flows of more than 100 LDVs and/or 25 HDVs. Changes below these thresholds can be reasonably considered to have an insignificant impact on local air quality. The site is located within the borough-wide Camden AQMA.

6.2 The site's existing use includes leisure club use (Class E(d)), with a change of use proposed to education use (Class F1).

6.3 Information provided by Robert West, the transport consultants for the project, indicate that the development is predicted to generate a net increase in 24-hour AADT of 17 LDV and 1 HDV.

6.4 Therefore, the proposed development is not expected to increase 24-hour AADT flows on any single road link within the Camden AQMA by more than 100 LDVs or 25 HDVs, and as such, it can be reasonably assumed that the operation of the proposed development would have an insignificant impact on local air quality.

Site Suitability

6.5 LAQM.TG(22)[7] (Tables 7-7 and 7-8) sets out the classification of monitoring locations and where these are in relation to sources of pollution. The guidance states that an urban background location is, as follows:

"An urban location distanced from sources and therefore broadly representative of city-wide background conditions, e.g. urban residential areas."

6.6 The AEA *Diffusion Tube for Ambient NO_2 Monitoring: Practical Guide*[26] (AEA guidance) provides further detailed definitions which help to classify urban background sites. Specifically, Section 3.2.2 states that, where a site meets the following criteria, it can be reasonably defined as being set in an urban background location, away from adverse impacts associated with emissions from road sources:

- >50m from any major source of NO_2 (e.g. multi-storey car parks)
- >30m from any very busy road (>30,000 vehicles per day);
- >20m from any busy road (10,000 – 30,000 vehicles per day);
- >10m from any main road; and

26 AEA Energy and Environment. (2008). *Diffusion Tubes for Ambient NO_2 Monitoring: Practical Guidance for Laboratories and Users.*

- >5m from locations where vehicles may stop with their engines idling.

6.7 The primary sources of air pollution within the vicinity of the site are vehicles travelling on the nearby local road network including on Belsize Park Gardens to the north, Eton Avenue to the south and Lambolle Place to the west. All three roads are not considered to be main roads and can reasonably be classed as locations where vehicles may stop with their engines idling, with regards to the AEA guidance[26].

6.8 As sensitive uses proposed at the development site are distanced over 5m from Belsize Park Gardens, 70m from Eton Avenue and 27m from Lambolle Place, all proposed sensitive uses can be considered to be set in an urban background location with reference to the AEA guidance. Following LAQM.TG(22) guidance, it is expected that pollutant concentrations across these areas are likely to be similar to those identified at urban background sites within the local area, which are well below the relevant AQSs.

6.9 UK-AIR background concentrations as well as local pollutant monitoring data from representative urban background monitors within LBC's authoritative boundaries, including automatic monitor BL0 and diffusion tube CA7, indicate that NO_2, PM_{10} and $PM_{2.5}$ concentrations across the development site are likely to be well below their relevant AQSs, and are expected to decrease further in future years.

6.10 All sensitive uses proposed at the new college building will be set behind existing buildings including the current Fine Arts College building to the west and residential buildings to the east, helping to provide a barrier from nearby sources of pollution.

6.11 2019 LAEI modelled pollution concentrations[22] for NO_2 across the development site are displayed in Figure 3. Figure 3 shows that modelled NO_2 concentrations in 2019 across the development site are between 31 and 32 $\mu g.m^{-3}$. Therefore, modelled NO_2 concentrations across the site are at least 20% below the annual mean 40 $\mu g.m^{-3}$ AQS.

6.12 Therefore, the site is anticipated to be suitable, in air quality terms, for its proposed end use, and no further assessment of site suitability is required.

7. Air Quality Neutral Assessment

7.1 The Air Quality Neutral Assessment (AQNA) compares the expected emissions from both traffic generation and building emissions with benchmarked emissions for particular land use classes derived from the Air Quality Neutral Guidance[18].

7.2 The development comprises land-use class F1 for education use for which Transport Emission Benchmarks (TEBs) and Building Emission Benchmarks (BEBs) are available[19].

Transport Emissions

7.3 The proposed development will include no general parking and is therefore considered 'car free' as defined in the London Plan[11] Policy T6 *Car parking*.

7.4 Therefore, following Policy 4.1 *Calculating the TEB* of the London Plan air quality neutral guidance[18] for 'car-free' developments which states:

"4.1.2 Where major developments meet the definition of 'car-free', they can be assumed to meet the TEB[…]"

7.5 It is expected that the proposed development would achieve air quality neutrality with respect to transport emissions.

Building Emissions

7.6 The proposed development does not include any new sources of on-site combustion and will adopt and all-electric energy strategy that is expected to utilise Air Source Heat Pumps (ASHP) and Photovoltaic Arrays (PV).

7.7 Therefore, the proposed development is not expected to generate building emissions of NO_x or PM_{10} and so it is anticipated that the proposed development will achieve Air Quality Neutrality with respect to building emissions.

Mitigation

7.1 Mitigation measures that have already been proposed for this development include:

- Implementation of a Travel Plan, including mechanisms to discourage high emission vehicle use and encourage uptake of low emissions technologies;
- A welcome pack available to all new occupants to encourage the use of sustainable transport modes;
- Provision of cycle storage;
- Use of Air Source Heat Pumps (ASHP) and Photovoltaic Arrays (PV) to meet heating and energy demands; and

- Air handling equipment will utilise predominantly Mechanical Ventilation with Heat Recovery (MVHR).

8. Discussion

Construction Phase Impacts

8.1 The construction phase of the development could give rise to emissions which could cause dust soiling effects on adjacent uses. Following the IAQM guidance, the construction phase of the development can be considered to be *Medium Risk* for nuisance dust impacts, *Low Risk* for PM_{10} health effects, and to be *Negligible* for ecology, in the absence of mitigation.

8.2 Following the implementation of the mitigation measures provided in Appendix A and listed in Section 5.28, emissions from the construction programme will be reduced and the residual significance of impact for the construction phase is expected to be reduced to *Negligible*, thus complying with the requirements of the NPPF[9].

Operational Phase Impacts

8.3 The need for a detailed pollutant dispersion modelling assessment of the proposed development's sensitivity to local air quality has been screened out using Defra and AEA guidance, along with a review of local pollutant monitoring data. This was primarily due to the site's end use being distanced away from nearby sources of pollution, including Belsize Park Gardens road, and the proposed college building being set behind existing buildings including the current Fine Arts college building to the west and residential buildings to the east. Furthermore, background concentrations of NO_2, PM_{10} and $PM_{2.5}$ are anticipated to be well below their respective AQSs in the surrounding area. Therefore, the site is considered to be suitable, in air quality terms, for the proposed end use, and no further assessment of site suitability is considered necessary.

8.4 The proposed development is not expected to generate volumes of traffic in exceedance of the indicative screening thresholds prescribed by the EPUK & IAQM planning guidance. Therefore, the need to undertake a detailed dispersion modelling assessment of the proposed development's impact on local air quality has been screened out with reference to the EPUK & IAQM guidance. Therefore, it can be reasonably assumed that the operation of the proposed development would have an insignificant impact on local air quality.

Air Quality Neutral Assessment

8.5 The proposed development is considered to be 'car-free'.

8.6 The proposed development will utilise an all-electric energy strategy with the proposed use of ASHPs and photovoltaic arrays, and as such, the proposed development is not expected to generate building emissions of NO_x or PM_{10}.

8.7 Therefore, the proposed development is expected to achieve air quality neutrality with regard to both transport and building emissions.

9. Conclusions

9.1 Dukes Education Group commissioned Phlorum Limited to undertake an Air Quality Assessment in support of a planning application for a property redevelopment located at 81 Belsize Park Gardens, Camden, London, NW3 4NJ. The proposal comprises a change of building use from the existing leisure club use (Class E(d)) to education use (Class F1). The building is proposed to be used by the Fine Arts College that caters for children aged 13- 19 years.

9.2 Local air quality monitoring data, London Atmospheric Emissions Inventory modelled pollutant concentrations and UK Air Information Resource background concentrations indicate that whilst air quality within the local area can sometimes be poor at roadside and kerbside locations, background pollutant concentrations in the vicinity of the site are likely to be well below the relevant UK Air Quality Standard concentrations.

9.3 The construction phase of the development could give rise to emissions which could cause dust soiling effects on adjacent uses. However, by adopting appropriate mitigation measures to reduce emissions and their potential impact, there should be no significant residual effects, thus complying with the requirements of the National Planning Policy Framework.

9.4 The operation of the proposed development is not expected to significantly impact on local air quality, nor is it anticipated to introduce new sensitive receptors into an area of existing poor air quality. Furthermore, the proposed development is anticipated to be air quality neutral in relation to both building and transport emissions.

9.5 As such, the proposed development is expected to comply with all relevant local and national air quality policy. Air quality should not, therefore, pose any significant obstacles to the planning process.

Figures and Appendices

Figure 1: Site Location Plan

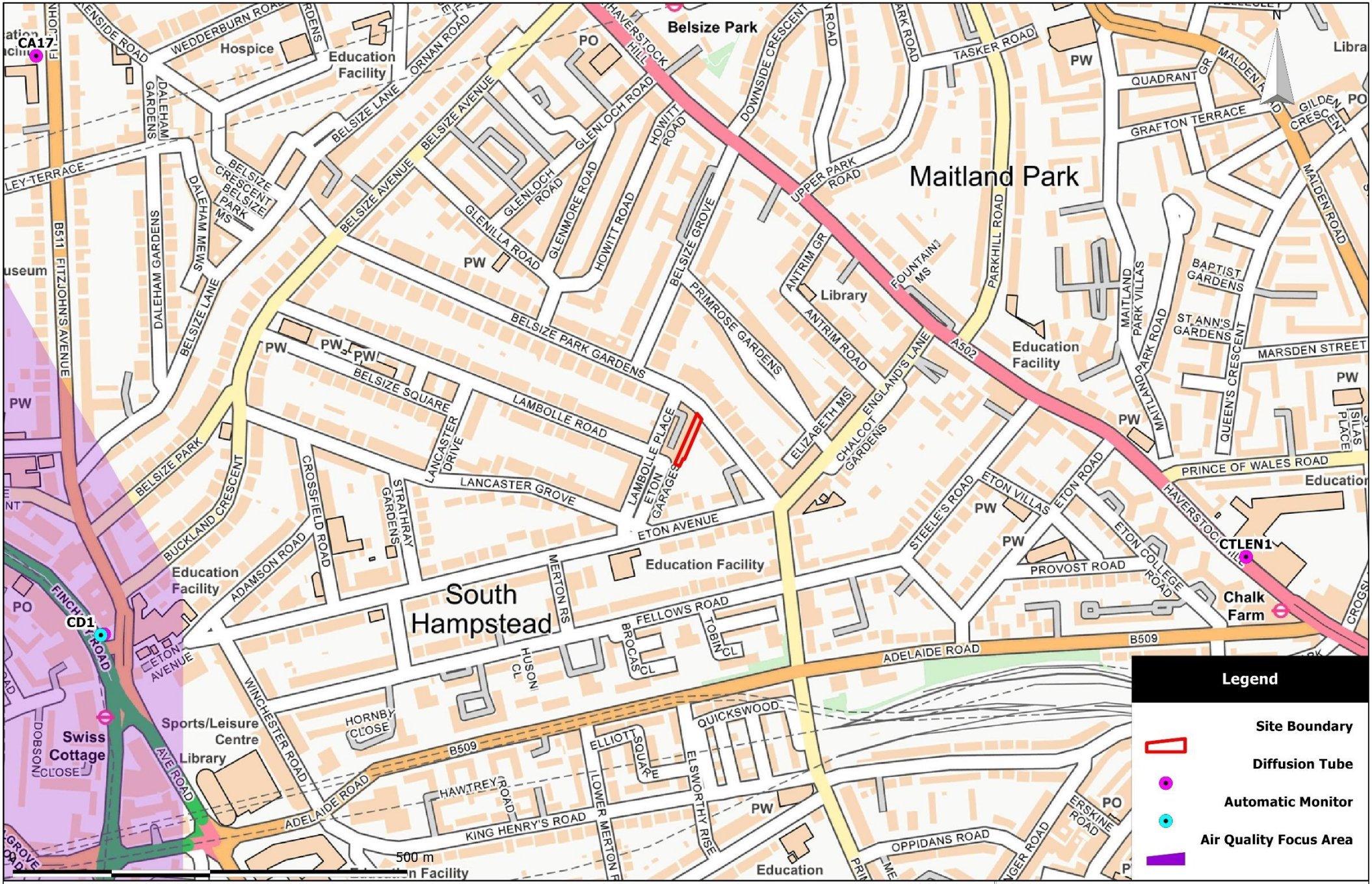

Figure 1: Site Location Plan

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Figure 2: Construction Phase Receptors

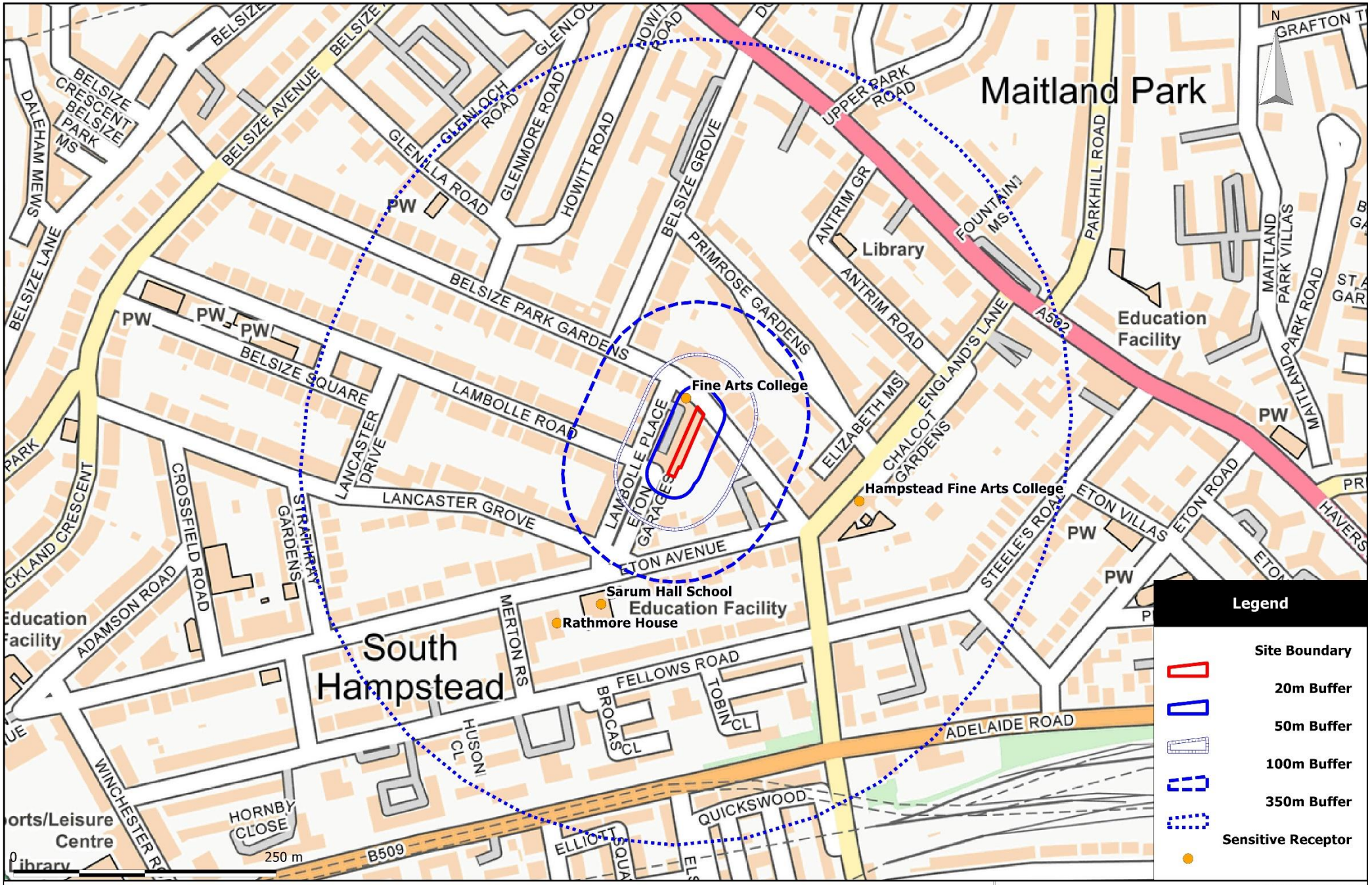

Figure 2: Construction Phase Receptors

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Figure 3: LAEI NO_2 Concentration Contours (2019)

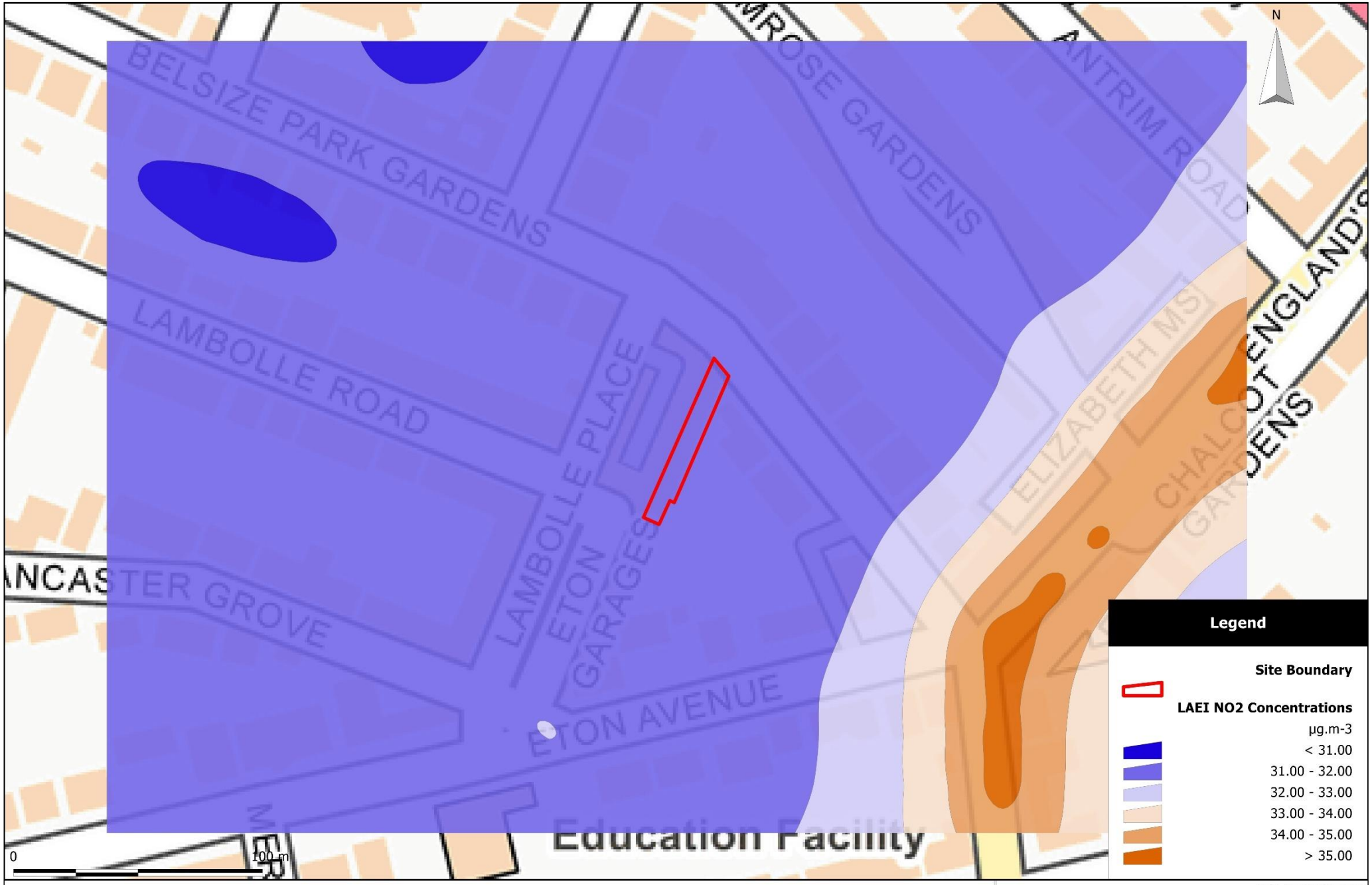

Figure 3: LAEI NO2 Concentration Contours (2019)

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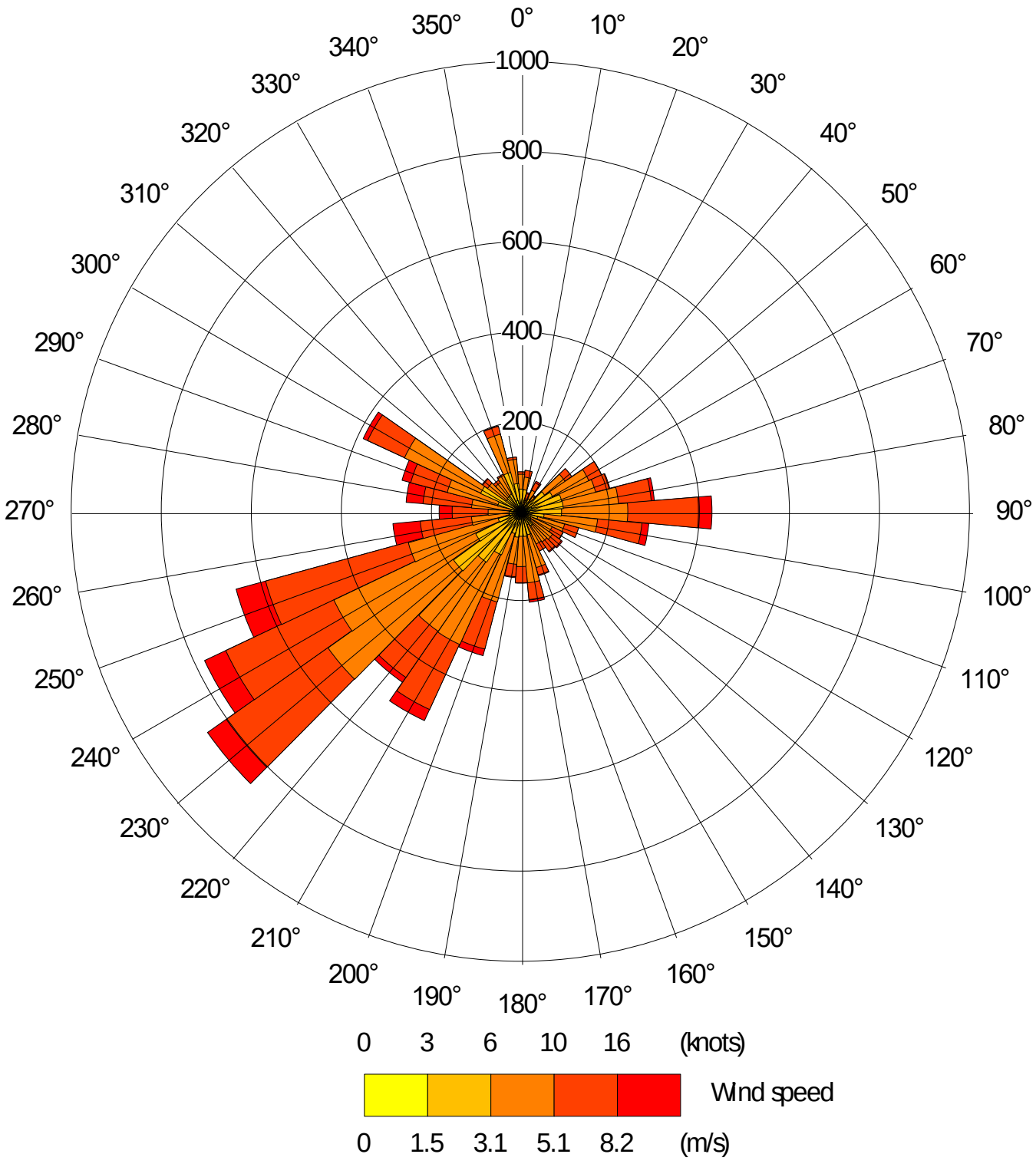
Figure 4: Wind Rose for London City Airport (2019)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10°
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30°
40°
50°
60°
70°
80°
90°
100°
110°
120°
130°
140°
150°
160°
170°
180°
190°
200°
210°
220°
230°
240°
250°
260°
270°
280°
290°
300°
310°
320°
330°
340°
350°
1000
800
600
400
200
0 3 6 10 16 (knots)
Wind speed
0 1.5 3.1 5.1 8.2 (m/s)

Appendix A: IAQM Highly Recommended Mitigation Measures for Medium Risk Sites

Appendix A: IAQM Highly Recommended Mitigation Measures for sites with a Medium Risk of Dust Impacts

Please refer to the IAQM's construction dust guidance[16] and *Guidance on Air Quality Monitoring in the Vicinity of Demolition and Construction Sites (2018)*[27] for further, "desirable", mitigation measures.

Communications

- Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.
- Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager.
- Display the head or regional office contact information.
- Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk, and should include as a minimum the highly recommended measures in this Appendix. The DMP may include monitoring of dust deposition, dust flux, real-time PM_{10} continuous monitoring and/or visual inspections.

Site Management

- Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.
- Make the complaints log available to the local authority when asked.
- Record any exception incidents that cause dust and/or air emissions, either on- or off-site, and the action taken to resolve the situation in the log book.

Monitoring

- Carry out regular site inspections to monitor compliance with the Dust Management Plan, record inspection results, and make an inspection log available to the local authority when asked.
- Increase the frequency of inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.
- Agree dust deposition, dust flux, or real-time PM_{10} continuous monitoring locations with the Local Authority. Where possible commence baseline monitoring at least three months before work commences on site or, if it is a large site, before work on a phase commences. Further guidance is provided by the IAQM[16] on *monitoring during demolition, earthworks and construction*.

Preparing and Maintaining the Site

27 Institute of Air Quality Management. (2018). *Guidance on Air Quality Monitoring in the Vicinity of Demolition and Construction Sites*. https://iaqm.co.uk/text/guidance/guidance_monitoring_dust_2018.pdf

- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as 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.
- 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.

Operating Vehicles & Sustainable Travel

- Ensure all on-road vehicles comply with the requirements of the London Low Emission Zone and the London NRMM standards, where applicable.
- 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.
- Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.

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 and conveyors and covered skips.
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on 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

- Avoid bonfires and burning of waste materials.

Demolition

- Ensure effective water suppression is used during demolition operations. Hand held sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground.

- Avoid explosive blasting, using appropriate manual or mechanical alternatives.
- Bag and remove any biological debris or damp down such material before demolition.

Construction

- 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.

Trackout

- Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use.
- 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 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 to be located at least 10m from receptors where possible.

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