Aval Consulting Group.

Air Quality Assessment

52 – 54 Avenue Road, St Johns Wood, London NW8 6HS

52 Avenue Road Limited

16 August 2022

Project Information

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1 Introduction

1.1 Overview

52 Avenue Road Ltd is seeking consent for residential development at 52-54 Avenue Road, St Johns Wood, London NW8 6HS (hereafter referred to as the 'proposed development'), which is within the London Borough of Camden (LBC).

AVAL Consulting Group Limited (ACGL) was instructed by the client to produce an Air Quality Assessment to accompany the planning application to the LBC for consent to undertake the proposed work.

The proposed development is for the construction of 12 townhouses with associated amenities and development and a communal Health and Wellness Spa.

The potential local air quality effects of the proposed development have been assessed using the latest planning guidance from Environmental Protection UK (EPUK), the Institute of Air Quality Management (IAQM)[1] and the Department for Environment, Food and Rural Affairs (Defra)[2].

A construction dust risk assessment has been undertaken, to consider the potential risk from dust-generating activities during the construction phase of the development. This has been carried out in accordance with the latest IAQM guidance on construction dust[3].

An Air Quality Neutral Assessment (AQNA) will also be assessed as the proposed development is located within Greater London.

1.2 Objective

This report provides an assessment of the following key impacts associated with the constructional and operational phase of the proposed development:

- Nuisance, loss of amenity and health impacts associated with the construction phase of the development of sensitive receptors;
- Changes in traffic-related pollutant concentrations associated with the operational phase of the proposed development; and
- Residential suitability of the site in terms of existing air quality impacts on existing receptors.
- Air Quality Neutral Assessment associated with the proposed development.

1.3 Site Location

Figure 1.1 shows the location of the proposed development site, which is located within the London Borough of Camden Air Quality Management Area (AQMA) which was declared due to breaches in the NO2 Air Quality Objectives (AQO). The closest Local Nature Reserve is

[1] IAQM (2017): 'Land Use Planning and Development Control: Planning for Air Quality v1.2'.
[2] Defra (2016): 'Local Air Quality Management – Technical Guidance (TG16)'.
[3] IAQM (2016): 'Guidance on the Assessment of Dust from Demolition and Construction v1.1'.

approximately 750m south of the proposed development site.

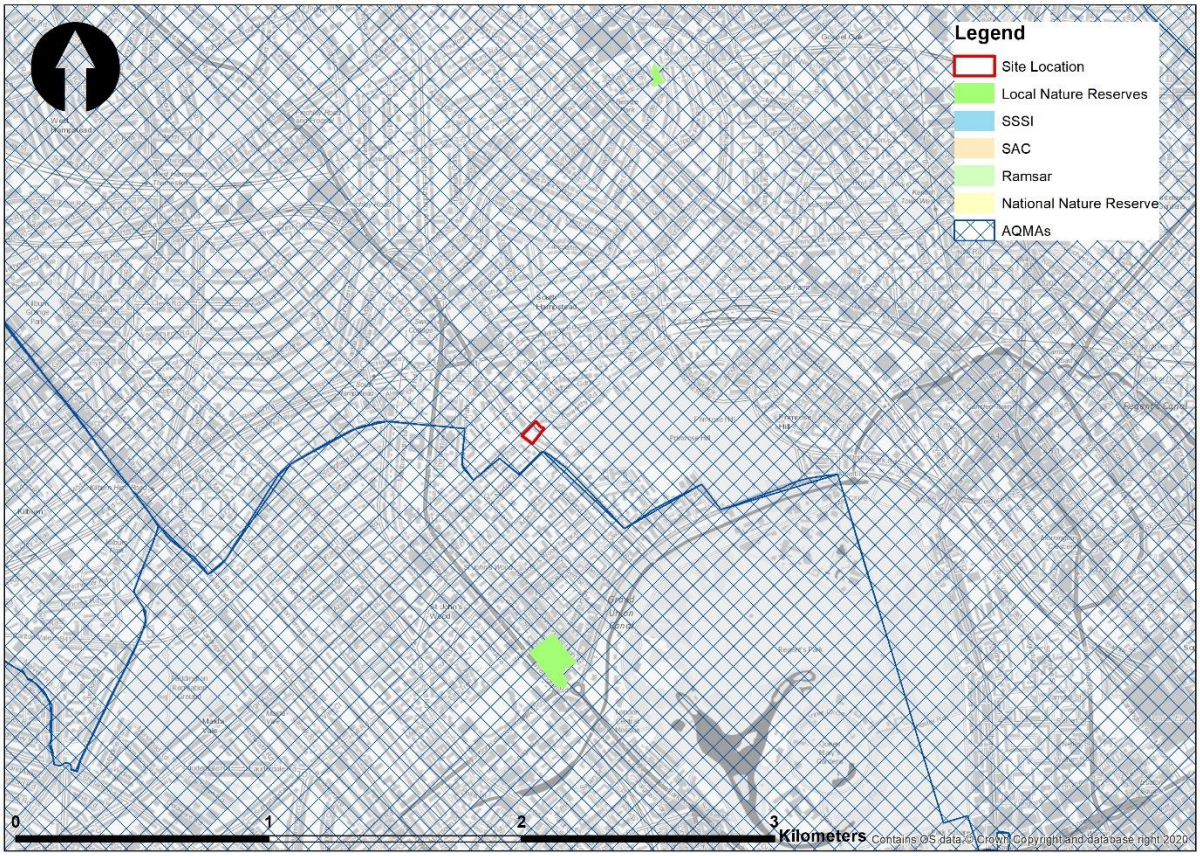

Figure 1.1: Proposed site location

1.4 Key Pollutants

The key pollutants associated with the construction phase of the project will be 'disamenity' or 'nuisance' dust. The key pollutants associated with the operational phase of the proposed development will be road traffic emissions including nitrogen dioxide (NO_2) and particulate matter (PM_{10} and $PM_{2.5}$). These pollutants are therefore considered as part of this assessment. Further details of the key pollutants are presented in Appendix A.

2 Legislation and Policy

This section summarises all legislation, policy, statutory and non-statutory guidelines relevant to the proposed development. Furthermore, the latest regional and local planning policy guidance specifically applicable to the proposed development has been reviewed.

2.1 European Union

The EU sets legally binding limit values for outdoor air pollutants to be met by EU countries by a given date. These limit values are based on the World Health Organisation (WHO) guidelines on outdoor air pollutants. These are legally binding and set out to protect human health and the environment by avoiding, preventing or reducing harmful air pollution effects.

The current air quality directive is the Directive 2008/50/EC[4] on ambient air quality and cleaner air for Europe entered into force in June 2008. This merged most of the existing 'Daughter' Directives[5] (apart from the fourth Daughter Directive); maintaining existing air quality objectives set out by 'Daughter' Directives for sulphur dioxide (SO_2), nitrogen dioxide (NO_2), and oxides of Nitrogen (NO_X), particulate matter (PM_{10} and $PM_{2.5}$), lead (Pb), benzene(C_6 H_6), carbon monoxide (CO), ozone (O_3). It also includes related objectives, exposure concentration obligation and exposure reduction targets for $PM_{2.5}$ (fine particles). The 'Daughter' Directives were based upon requirements set out in the first EU Ambient Air Quality Framework Directive 96/92/EEC[6].

2.2 National Level - England

The UK government has a legal responsibility to meet the EU limit values. Part IV of the 1995 Environment Act[7] sets guidelines for protecting air quality in the UK and forms the basis of the local air quality management. The Environment Act requires local authorities in the UK to review air quality in their area periodically and designate 'Air Quality Management Area' (AQMAs) if improvements are necessary. Where an AQMA is designated, local authorities are also required to produce an 'Air Quality Action Plan' (AQAP) detailing the pollution reduction measures that need to be adopted to achieve the relevant air quality objectives within an AQMA.

As part of the Environment Act, the UK Government was required to publish a National Air Quality Strategy (NAQS) to establish the system of 'local air quality management' (LAQM) for the designation of AQMAs. This led to the introduction of the first Air Quality Strategy (AQS) in 1997[8] which since has progressed through several revisions until it was replaced by the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007[9] . Each revision introduced strategies and regulations that considered measures for different pollutants by

[4] European Union (2008): 'Ambient air quality assessment management', Framework Directive 2004/50/EC.
[5] European Union. (1999), 'Ambient air quality assessment management', Framework Directive 1999/30/EC;
European Union. (2000), 'Ambient air quality assessment management', Framework Directive 2000/3/EC;
European Union. (2002), 'Ambient air quality assessment management', Framework Directive 2002/3/EC;
European Union. (2004), 'Ambient air quality assessment management', Framework Directive 2004/107/EC.
[6] European Union. (1996), 'Ambient air quality assessment management', Framework Directive96/62/EC.
[7] Parliament of the United Kingdom. (1990), 'Environmental Protection Act', Chapter 43. Queen's Printer of Acts of Parliament.
[8] Department for Environment Food and Rural Affairs. (1997), 'The United Kingdom National Air Quality Strategy', Cm 3587, Department for Environment Food and Rural Affairs.
[9] Department for Environment Food and Rural Affairs. (2007), 'The Air Quality Strategy for England, Scotland, Wales and Northern Ireland', Cm 7169, Department for Environment Food and Rural Affairs.

tightening existing objectives and by introducing new ones to establish a common framework to protect human health and the environment by achieving ambient air quality improvements.

The 2008 EU ambient air quality directive 2008/50/EC was transposed to England law through the introduction of the Air Quality (Standards) Regulations in 2010[10] which also incorporated the fourth EU Daughter Directive (2004/107/EC) that set target values for certain toxic heavy metals and polycyclic aromatic hydrocarbons, (PAH).

2.2.1 National Planning Policy Framework

The principal national planning policy guidance in respect of the proposed development is the National Planning Policy Framework (NPPF)[11]. The most recent update of the NPPF was published on 20th July 2021 by the Department for Communities and Local Government (DCLG).

The NPPF Section 105 states that:

The planning system should actively manage patterns of growth in support of these objectives. Significant development should be focused on locations which are or can be made sustainable, through limiting the need to travel and offering a genuine choice of transport modes. This can help to reduce congestion and emissions, and improve air quality and public health. However, opportunities to maximise sustainable transport solutions will vary between urban and rural areas, and this should be taken into account in both plan-making and decision-making.

Section 174 states:

"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..."

Section 185 states:

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

[10] Statutory Instrument. (2010), ‘The Air Quality Standards Regulations’, No. 1001. Queen's Printer of Acts of Parliament.
[11] National Planning Policy Framework. Accessible at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/810197/NPPF_Feb_2019_revised.pdf

a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;

b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason; and

c) limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes, and nature conservation.

Section 186 states 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."

2.2.2 Relevant National Planning Practice Guidance

The DCLG published a number of supporting web-based resources of Planning Practice Guidance (PPG)[12] to supplement the NPPF. With respect to air quality PPG provide guidance on when air quality is relevant to a planning application. It states that:

"Concerns could arise if the development is likely to generate air quality impact in an area where air quality is known to be poor. They could also arise where the development is likely to adversely impact upon the implementation of air quality strategies and action plans and/or, in particular, lead to a breach of EU legislation (including that applicable to wildlife)."

The PPG also states that, when deciding whether air quality is relevant to a planning application, the applicant should consider whether the proposal will:

"Significantly affect traffic in the immediate vicinity of the proposed development site or further afield. Introduce new point sources of air pollution…..,

Expose people to existing sources of air pollutants…..,

Give rise to potentially unacceptable impact(such as dust) during construction for nearby sensitive locations….,

- Affect biodiversity….."

[12] National Planning Practice Guidance web-based resource. Accessible at: http://planningguidance.planningportal.gov.uk/

2.2.3 Statutory Nuisance

It is recognised that the planning system presents a way of protecting amenity. However, in cases where planning conditions are not applicable to a development/installation, the requirements of the Environmental Protection Act 1990 still apply. Under Part III of the Environmental Protection Act 1990, local authorities have a statutory duty to investigate any complaints of:

- "any premises in such a state as to be prejudicial to health or a nuisance
- smoke emitted from premises so as to be prejudicial to health or a nuisance
- fumes or gases emitted from premises so as to be prejudicial to health or a nuisance
- any dust, steam, smell or other effluvia arising on industrial, trade or business premises and being prejudicial to health or a nuisance
- any accumulation or deposit which is prejudicial to health or a nuisance"

Where the local authority establishes any one of these issues constitutes a statutory nuisance and believes it to be unreasonably interfering with the use or enjoyment of someone's premises and/or is prejudicial to health, an abatement notice will be served on the person responsible for the offence or the owner/occupier. Failure to comply with the notice could lead to a prosecution. However, it is considered as a defence if the best practicable means to prevent or to counteract the effects of the nuisance are employed.

2.2.4 Relevant National Air Quality Standards

A summary of the relevant Air Quality Standards/Objectives (henceforth referred to as 'AQO') and the types of receptors that are relevant to this assessment are presented in Table 2.1 and Table 2.2. The AQO listed in Table 2.1 applies only at locations with relevant exposure where a member of the public could be exposed to a level of pollution concentration for the specific averaging periods for that pollutant as stated in Table 2.2.

Table 2.1: AQO Relevant to the Proposed Development

Pollutant	Air Quality Objectives		Concentration measured as:	Applicable to:
	Concentration	Allowance		
Nitrogen Dioxide (NO_2)	200 µg/m^3	18 per calendar year	1-hour mean	All local authorities
	40 µg/m^3		Annual mean	All local authorities
Particulate Matter (PM_{10})	50 µg/m^3	35 per calendar year	24-hour mean	All local authorities
	40 µg/m^3		Annual mean	All local authorities
Particulate Matter ($PM_{2.5}$) Exposure reduction[(a)]	25 µg/m^3 [(a)]		Annual	England only

Notes: (a) This is a target value set for a 15% reduction in concentrations at urban background aimed to achieve between 2010 and 2020

Source: Department for Environment Food and Rural Affairs (2014): 'Local Air Quality Management Technical Guidance' (TG.16).

Table 2.2: Examples of Where the AQO Should Apply

Averaging period	***Objectives should apply at***	***Objectives should not apply at***
Annual	*All locations where members of the public might be regularly exposed. Building façades of residential properties, schools, hospitals, care homes etc.*	*Building façades of offices or other places of work where members of the public do not have regular access. Hotels, unless people live there as their permanent residence. Gardens of residential properties. Kerbside sites(as opposed to locations at the building façade), or any other location where public exposure is expected to be short-term.*
24 Hour	*All locations where the annual mean objective would apply, together with hotels. Gardens of residential properties.[(a)]*	*Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short-term.*
1 Hour	*Kerbside sites where the public would not be expected to have regular access.*	

Notes: (a) "Such locations should represent parts of the garden where relevant public exposure to pollutants is likely, for example where there are seating or play areas. It is unlikely that relevant public exposure to pollutants would occur at the extremities of the garden boundary, or in front gardens, although local judgement should always be applied."

Source: Department for Environment Food and Rural Affairs (2014): 'Local Air Quality Management Technical Guidance' (TG.16).

2.3 Regional (London)

2.3.1 The Mayor of London's Air Quality Strategy

The Mayor of London's Air Quality Strategy was published in December 2010 which includes transport and non-transport related policy measures. The document also includes guidance on how regional and local planning processes will be used to enable future developments to be 'air quality neutral or better'.

Policy 15 within the Mayor's air quality strategy is committed to reporting back regularly on the progress made since the strategy has been delivered. The latest progress report was published in July 2015 and includes:

- Analysis of recent trends in air pollution in London;
- An update on the latest understanding of health impacts of air pollution in London;

- An update on the implementation of the transport and non-transport policies included in the Mayor's Air Quality Strategy, including measures announced by the Mayor in February 2013 such as the Ultra-Low Emission Zone;
- Setting out what further action the Mayor will take to improve air quality.

2.3.2 London Plan

The London Plan is the spatial development strategy for London which was first published by then-Mayor Ken Livingstone in 2004. The document has gone through a number of alterations with the most recent alterations published in 2021.

The London Local Plan sets out the overall strategic plan for London with an integrated approach for economic, environmental, transport, and social framework for the development of London over the next 20–25 years and covers a number of strategies including transport and environmental issues such as climate change and air quality.

Policy GG3 "Creating a healthy city" states:

- To improve Londoners' health and reduce health inequalities, those involved in planning and development must… seek to improve London's air quality, reduce public exposure to poor air quality and minimise inequalities in levels of exposure to air pollution"

Policy SI 1 "Improving Air Quality" states that:

- "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."
- "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 an unacceptable risk of high levels of exposure to poor air quality.
    2) 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 provisions 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."

- "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."

- "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."

2.3.3 The Mayor of London Transport Strategy

On the 21st June 2017, the Mayor of London published the draft, The Mayors Transport Strategy setting out the Mayor's "policies and proposals", enabling transport in London to be reshaped over the next 25 years.

The key themes within the strategy are; healthy streets and healthy people, good public transport experiences, new homes, and jobs.

Chapter 3, section C "Improving air quality and the environment" includes policies 5 and 6 which relate to transport and air quality."

Policy 5 states:

"The Mayor, through TfL and working with the boroughs, will take action to reduce emissions – in particular, diesel emissions – from vehicles on London's streets, to improve air quality and support London reaching compliance with UK and EU legal limits as soon as possible. Measures will include retrofitting vehicles with equipment to reduce emissions, promoting electrification, road charging, the imposition of parking charges/ levies, responsible procurement, the making of traffic restrictions/ regulations, and local actions."

Policy 6 states:

"Boroughs, and working with other transport providers, will seek to make London's transport network zero carbon by 2050, which will also deliver further improvements in air quality, by transforming London's streets and transport infrastructure so as to enable zero emission operation, and by supporting and accelerating the uptake of ultra-low and zero emission technologies."

2.4 Local Level – London Borough Of Camden

Policy CC4: Air Quality of the 3rd July 2017 Adopted Local Plan states:

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

3 Methodology

3.1 Overview

This section provides the details of the methodological approach taken to assess the impacts on air quality from the construction and operation of the proposed development.

3.2 Scope of the Assessment

3.2.1 Construction Phase

A construction dust assessment was carried out to consider impacts from 'disamenity' (or 'nuisance') dust, as discussed in Appendix A3, associated with annoyance. The development has the potential to generate dust during the construction phase of the project. Although there are no standards (such as AQO) for dust disamenity or annoyance, various 'custom and practice' criteria have become established.

For the purposes of this assessment, IAQM's 2016 construction dust guidance[13] has been used. The IAQM guidance provides a methodology (Appendix B) to evaluate the potential risk of dust generation for development and the level of mitigation required. The impact of the development is described using one of the following three categories: 'Low Risk', 'Medium Risk' and 'High Risk'. Based on the risk level, appropriate mitigation measures can be considered to minimise any effects of dust from the construction phase.

3.2.2 Operational Phase

Based on the EPUK criteria set out in Appendix A, the need for detailed traffic modelling is not considered to be required as the development will not result in over 100 AADT. However for completeness, an impact assessment has been undertaken using a worst-case scenario in terms of trip generation.

Modelling of Avenue Road and the A41 have been undertaken in order to determine that the site is suitable for residential development in terms of existing air quality.

3.3 Detailed Air Quality Assessment

3.3.1 Modelled Scenarios

Traffic counts were undertaken along Avenue Road by 'Traffic Watch UK' and traffic data from the A41 was obtained from the Department for Transport. Traffic data from 2019 was used, as this was the only data available before the pandemic.

According to the guidance provided by Defra in their Air Quality Strategy, vehicle emissions are expected to decrease in future years because of advancements in abatement technologies, hence the 2022 earliest potential opening year has been assessed to demonstrate a worst-case scenario.

[13] Institute of Air Quality Management (2014): 'Guidance on the Assessment of Dust from Demolition and Construction'

It is also expected that more stringent emission limits will be imposed upon manufacturers. However, as traffic levels are predicted to grow, an adjustment factor has been used to predict traffic levels in 2022 from the 2019 data.

The model verification has been carried out using adjustment factor of 2. Further details of the model verification process are presented in Appendix E.

3.3.2 Dispersion Model Used

The assessment on identifying the impact of current traffic-related emissions sources in the area of the proposed development has been carried out using the latest version of 'ADMS-Roads' dispersion modelling software (version 5.0.0.1) developed by Cambridge Environmental Research Consultants (CERC). This model is commonly used in assessing planning application and regulatory assessment of traffic-related emissions.

The science of ADMS-Roads is significantly more advanced than that of most other air dispersion models (such as CALINE, ISC and R91) in that it incorporates the latest understanding of the boundary layer structure, and goes beyond the simplistic Pasquill-Gifford stability categories method with an explicit calculation of important parameters. The model uses advanced algorithms for the height-dependence of wind speed, turbulence and stability to produce improved predictions.

3.3.3 Road Traffic Data

The following key facts of the road traffic data were considered:

- Traffic data has been obtained from road traffic statistics published by the government and accessible via https://roadtraffic.dft.gov.uk
- The speed at junctions has been reduced as advised in Defra Technical Guidance (TG16) for a robust assessment;
- A TEMPRO factor has been applied to predict traffic flows for the year 2022;
- Where measured road speed is not available we have used the existing road speed limit for the purpose of this assessment.

Table 3.1 shows the traffic data for the proposed development, and Figure 3.1 shows the extent of the ADMS-Roads dispersion modelling network.

Table 3.1: Relevant traffic Data for the Proposed Development

Link Name	Without the Development			Opening Year 2022		
	AADT	HDV%	Speed (kph)	AADT	HDV%	Speed (kph)
Avenue Road	99,949	0%	29	100,010	0%	29
A41	44,677	2%	48	44,738	2%	48

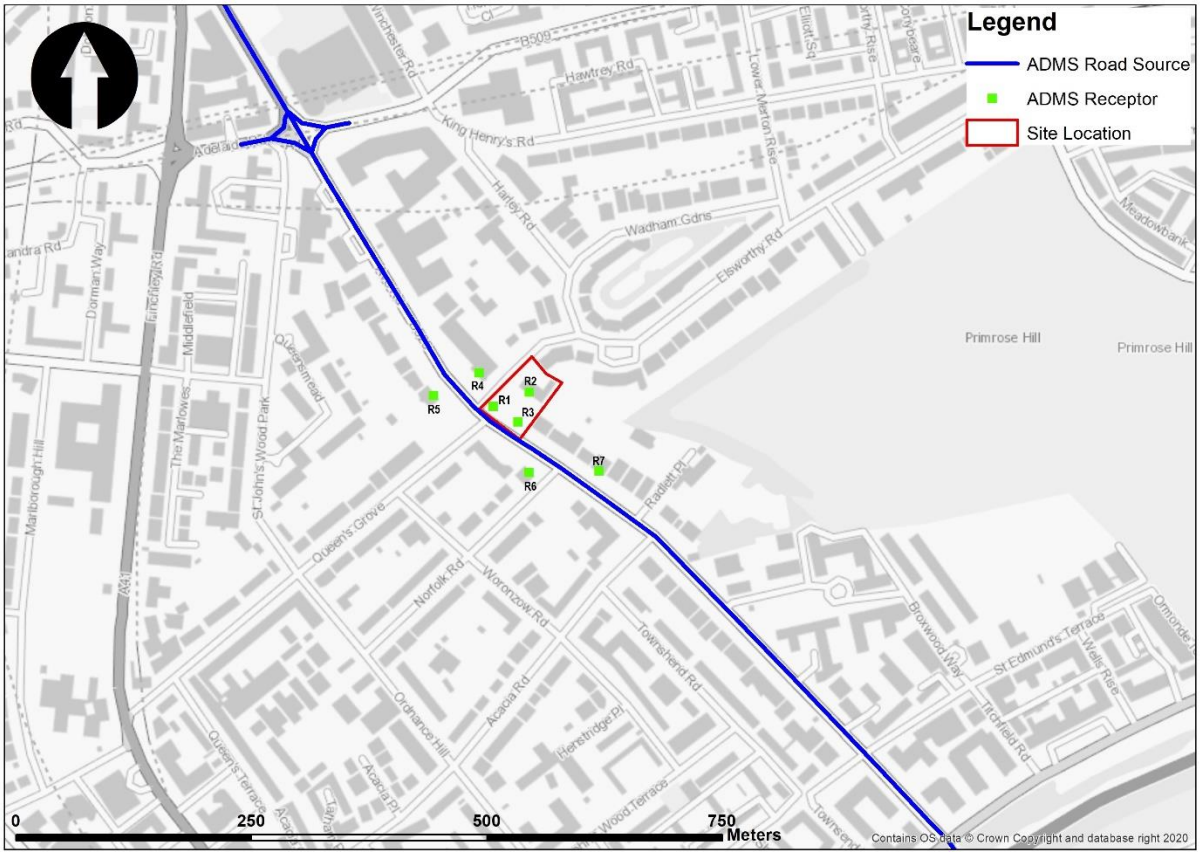

Figure 3.1: Modelling Network of existing road with Receptors used for ADMS-Roads Dispersion Modelling

3.3.4 Meteorological Data

The key meteorological parameters for dispersion modelling are wind speed and wind direction. There are other meteorological parameters, which also need to be taken into accounts such as cloud cover, surface temperature, precipitation rate and relative temperature.

The most representative meteorological monitoring station identified is the City meteorological monitoring site which is located approximately 10.02 miles from the proposed development site.

In order to undertake a worst-case meteorological assessment, dispersion modelling has been carried out with meteorological data from the period 2018 to 2020. The maximum annual mean concentrations predicted across the modelled years have been used for each receptor. Figure 3.3 below presents the wind rose for each modelling year.

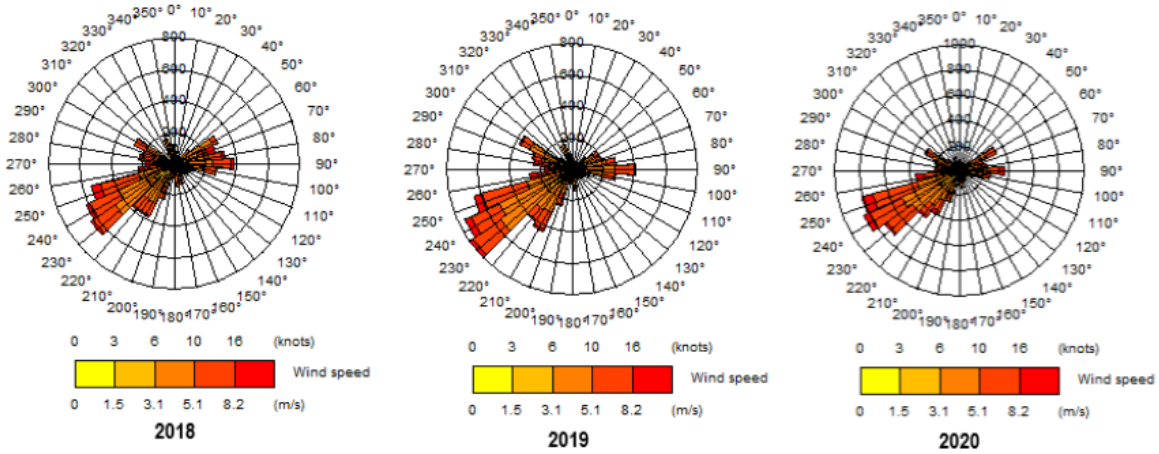

Figure 3.3: Windrose for City Meteorological Station 2018-2020

3.3.5 Assessment of Background Concentrations

This assessment considers road traffic emission sources in detail, and as part of the predictive process, all non-road traffic-related emission sources in the Defra data set were assigned appropriate 'background' concentrations at the modelled receptors. Further details regarding the assignment of background pollution concentration are presented in Section 4.3.

3.3.6 Emissions Factors

For the purpose of this assessment, the latest Defra Emission Factor Toolkit (EFT 10.1) has been used for the earliest opening year. The EFT Version 10.1 has been developed for the UK by the National Atmospheric Emissions Inventory (NAEI) and Transport for London (TfL). The EFT is based on data collected from a number of sources, including the European Environment Agency (EEA) COPERT (Computer Programme to calculate Emissions from Road Transport) emission calculator.

3.3.7 NO_X to NO_2 Conversion Method

This assessment uses the latest NO_X to NO_2 conversion factor toolkit for the operational phase of this development (version 8.1, August 2020), provided by Defra as a Microsoft Excel-based calculation tool which is available from Defra's web-based air quality resource centre. This method is considered to be the most appropriate technique for determining NO_2 concentrations from road NO_X contributions.

3.3.8 Estimating Hourly and Daily Mean Concentrations

The latest Local Air Quality Management (LAQM) Technical Guidance (TG 16) has been used for predicting 1 hourly and 24-hourly pollutant concentrations. The guidance suggests that the

short term hourly NO_2 AQO of 200 µg/m^3 (not to be exceeded more than 18 times per year) is not likely to exceed at any roadside locations if the annual mean concentration is below 60 µg/m^3. Based on this guidance, the hourly mean NO_2 AQO is only considered when the annual mean NO_2 concentrations are over 60 µg/m^3.

In accordance with the guidance, the short term 24 hourly PM10 mean concentration can be calculated using the following equation as presented below:

$$Number\ of\ 24\ hour\ mean\ exceedence = 18.5 + 0.00145\ x\ annual\ mean^3 + (\frac{206}{annual\ mean})$$

3.3.9 Relevant Sensitive Receptors

Table 3.2 below presents the locations of sensitive receptors considered within this assessment. No designated sites such as Special Areas of Conservation (SAC), Special Protection Areas (SPA) or Sites of Special Scientific Interest (SSSI) were identified within 200 m of the affected road network.

LAQM technical guidance (TG16) clarifies where likely exceedances of the objectives should be assessed and states that Review and Assessment should focus on:

“Locations where members of the public are likely to be regularly present and are likely to be exposed for a period of time appropriate to the averaging period of the relevant air quality objective”.

Table 2.2 above provides details of where the respective objectives should and should not apply and therefore, the types of receptors that are relevant to the assessment. The greatest impact on a human health receptor situated within the proposed development is considered to be at the closest point of the proposed building facade or the development site boundary for the purpose of assessing the worst case. Therefore in order to assess a worst-case scenario, the closest building façades to the road have been assessed.

It is also considered that receptors at the ground floor level are likely to experience the highest traffic-related pollution concentrations. Receptors located on the first floor and above are likely to experience lower concentrations than ground floor receptors due to the increasing height from the ground level. Figure 3.3 below shows the modelled receptor location.

Table 3.2: Sensitive Receptors Identified for the Proposed Development

Receptor name	*Height*	*National Grid Reference (X)*	*National Grid Reference (Y)*
R1 (West Block)	1.5	526978.75	183841.03
R2 (Pavilion)	1.5	527017.12	183856.23
R3 (East Block)	1.5	527005.12	183824.62
R4 (Residential Unit – At the junction of Elsworthy Road and Avenue Road)	1.5	526963.81	183876.83
R5 (Residential Unit – At the junction of Queens Grove Road and Avenue Road)	1.5	526915.44	183852.77
R6 (Residential Unit – At the junction of Norfolk Road and Avenue Road)	1.5	527017.00	183771.00
R7 (Residential Unit – Opposite to Norfolk Road)	1.5	527091.25	183772.42

3.3.10 Model Uncertainties, Assumptions and Limitations

The assessment has been carried out based on the following assumptions:

- The earliest possible year of occupation is assumed to be 2022.
- The mitigation measures proposed in Section 6 will be implemented in order to mitigate construction-related dust nuisance.
- Emissions from vehicles are expected to decrease in the future, as mentioned in Section 3.4.1. Hence, the 2022 opening year scenario was considered to be the worst-case and therefore no further future year scenario was considered in this assessment.
- There were no suitable monitoring locations for model verification and therefore an adjustment factor was applied.
- For the construction dust risk assessment, it has been assumed that all construction activities will be carried out for the duration of the construction period in order to assess a worst-case scenario.

No assessment of any potential onsite energy plants has been carried out as it is understood that Ground Source Heat Pumps will be installed to provide heating and hot water to the proposed development.

3.3.11 Criteria Used to Assess Site Suitability

For the purposes of this assessment, the IAQM (2017) criteria have been used for calculating the magnitude descriptors for predicted change in annual mean concentrations at individual receptors (Table 3.6). The IAQM recognise that professional judgement is required in the interpretation of air quality assessment significance. Table 3.6 is intended to be used as a tool to assist with interpretation of the air quality assessment.

Table 3.3:Impact descriptors for predicted change in annual mean concentrations at individual receptors (Reproduced from EPUK and IAQM Guidance)

Long term average concentration at the receptor in assessment year	***% Change in concentration relative to Air Quality Assessment Level (AQAL)***			
	1	*2-5*	*6-10*	*>10*
75% or less of AQAL	*Negligible*	*Negligible*	*Slight*	*Moderate*
76-94% of AQAL	*Negligible*	*Slight*	*Moderate*	*Moderate*
95%-102% of AQAL	*Slight*	*Moderate*	*Moderate*	*Substantial*
103-109% of AQAL	*Moderate*	*Moderate*	*Substantial*	*Substantial*
110% or more of AQAL	*Moderate*	*Substantial*	*Substantial*	*Substantial*

4 Baseline Conditions

4.1 Overview

The following section sets out the baseline conditions in relation to air quality for the proposed development. Baseline air quality information is available from a number of sources, including local and national monitoring data reports and websites. For the purposes of this assessment, data has been obtained from the Defra air quality resource website[14] and from the London Borough of Camden ASR[15].

4.2 Existing Baseline Conditions

London Borough of Camden undertook automatic air quality monitoring at 4 sites and non-automatic monitoring at 33 sites during 2019 using diffusion tubes.

Figure 4.1 shows the location of the monitoring location in relation to the proposed development site.

The nearest monitoring site is CD1 Automatic Monitoring Site which is approximately 250m from the proposed site location. A Diffusion Monitoring (CA15) was also done at the same location of the CD1 Automatic Monitoring. The data obtained by CD1 from the local authority recorded the NO_2 concentration at this location as 43.0µg/m^3 which is above the AQO limit of 40 µg/m^3. Diffusion Monitoring CA15 recorded the NO2 concentration of 49.74µg/m^3.

However, the positions of the monitors are beside an A road (A41) which would include more traffic than the roads immediately beside the proposed development. Therefore, concentrations within the area of the proposed development could potentially be lower than the levels experienced at the monitors.

This is evident when analysing the PCM Defra data which is located within 500m from the proposed development. Census ID 802016434 has a projected background 2022 NO_2 reading of 27µg/m^3. Further background pollution concentration derived from the Defra backgrounds maps has been used within the assessment and presented in section 4.3.

[14] Department for Environmental Food and Rural Affairs. Accessible at: https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2015
[15] London Borough of Camden (2020): 'London Borough of Camden Air Quality Annual Status Report for 2019'

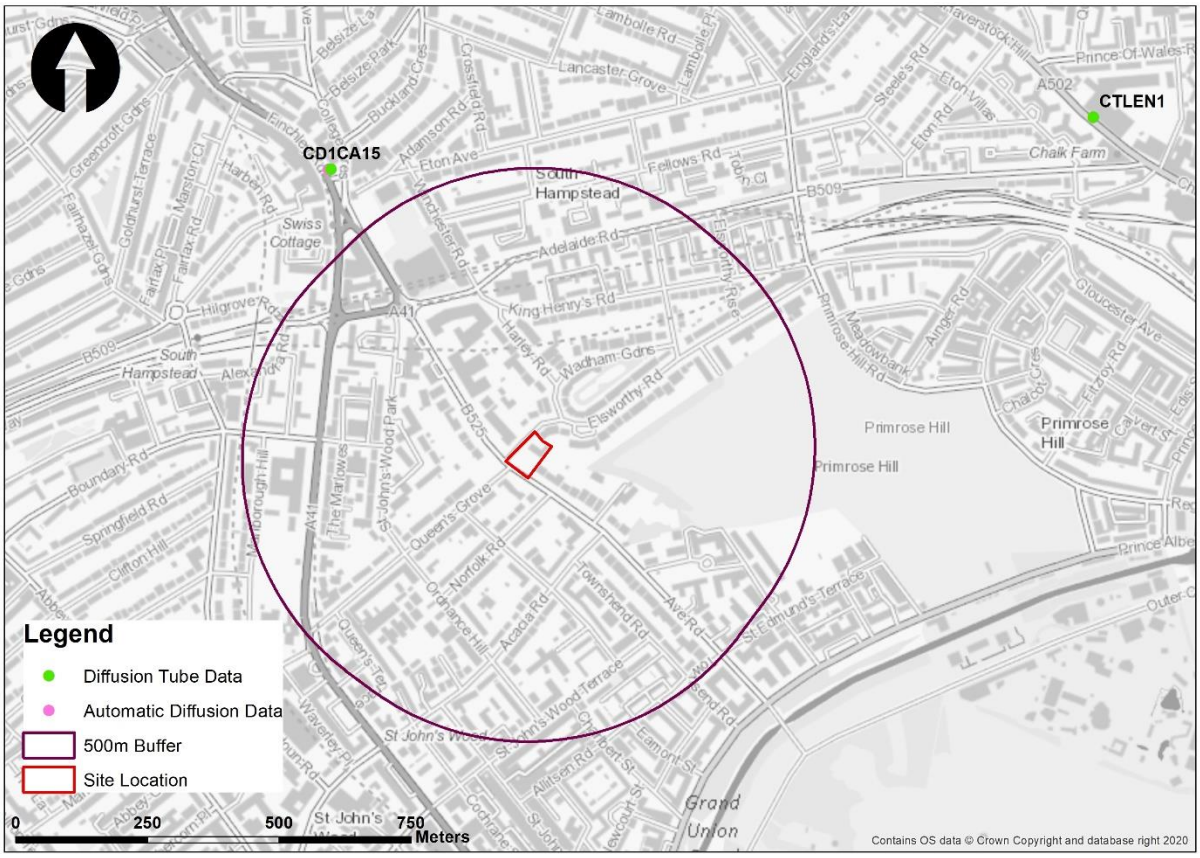

Figure 4.1: Existing nearby monitoring sites

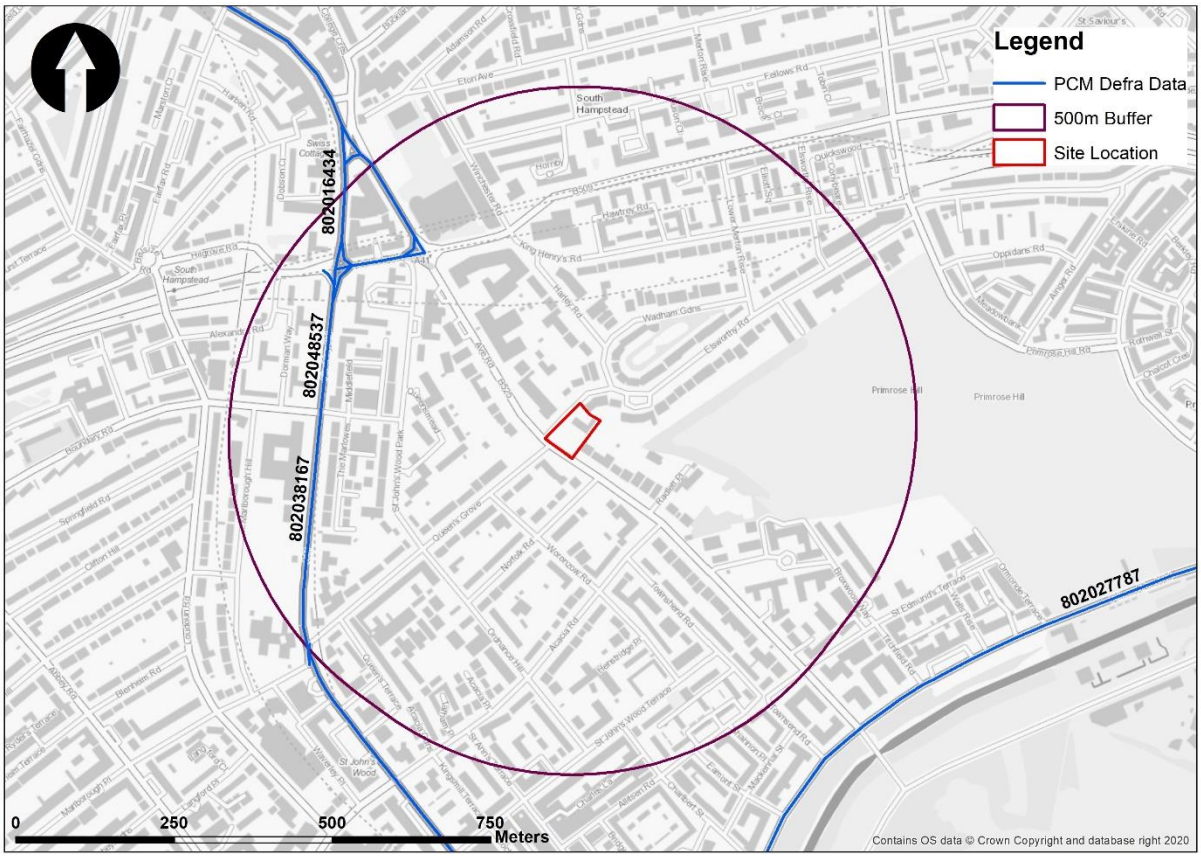

Figure 4.2: PCM Data Locations

4.3 Defra Background Pollution Concentrations

Defra provides background pollution concentration estimates to assist local authorities to undertake their 'Review and Assessment' work. This data is available to download from the Defra air quality resource website for NO_X, NO_2, PM_{10} and $PM_{2.5}$ for every 1 km X 1 km grid square for all local authorities. The current dataset is based on 2022 background data and the future year projections are available for 2017 to 2030. The background dataset provides a breakdown of pollution concentrations by different sources (both road and non-road sources).

Table 4.1 presents the predicted background concentrations for the study area for the earliest year of occupation (2022) for the relevant receptor locations. Background concentrations for all pollutants presented in Table 4.1 are well below the relevant AQO.

Table 4.1: Defra Projected Background Concentrations (for all receptors)

Pollutant	Concentration (µg/m^3)
NO_2	25.07
NO_X	37.88
PM_{10}	17.23
$PM_{2.5}$	11.12

Notes: Data presented within the table are derived from the following ordinance survey grid squares: 527500, 183500.

5 Potential Impacts

5.1 Construction Phase

The construction phase of the proposed development is yet to be decided. For the purpose of this assessment, the earliest construction year is assumed to be 2022. The impacts from demolition, earthworks, construction and track-out have been considered. In order to assess the worst-case scenario, it has been assumed that all activities will be carried out for the duration of the construction period. Figure 5.1 shows the construction dust assessment study area based on the recommended distances by IAQM.

Magnitude and sensitivity descriptors that have been applied to assess the overall impact of the construction phase are presented in Appendix C.

Table 5.1 presents the potential dust emission magnitude based on project-specific construction activities and is based on the criteria presented in Table C1 within Appendix C.

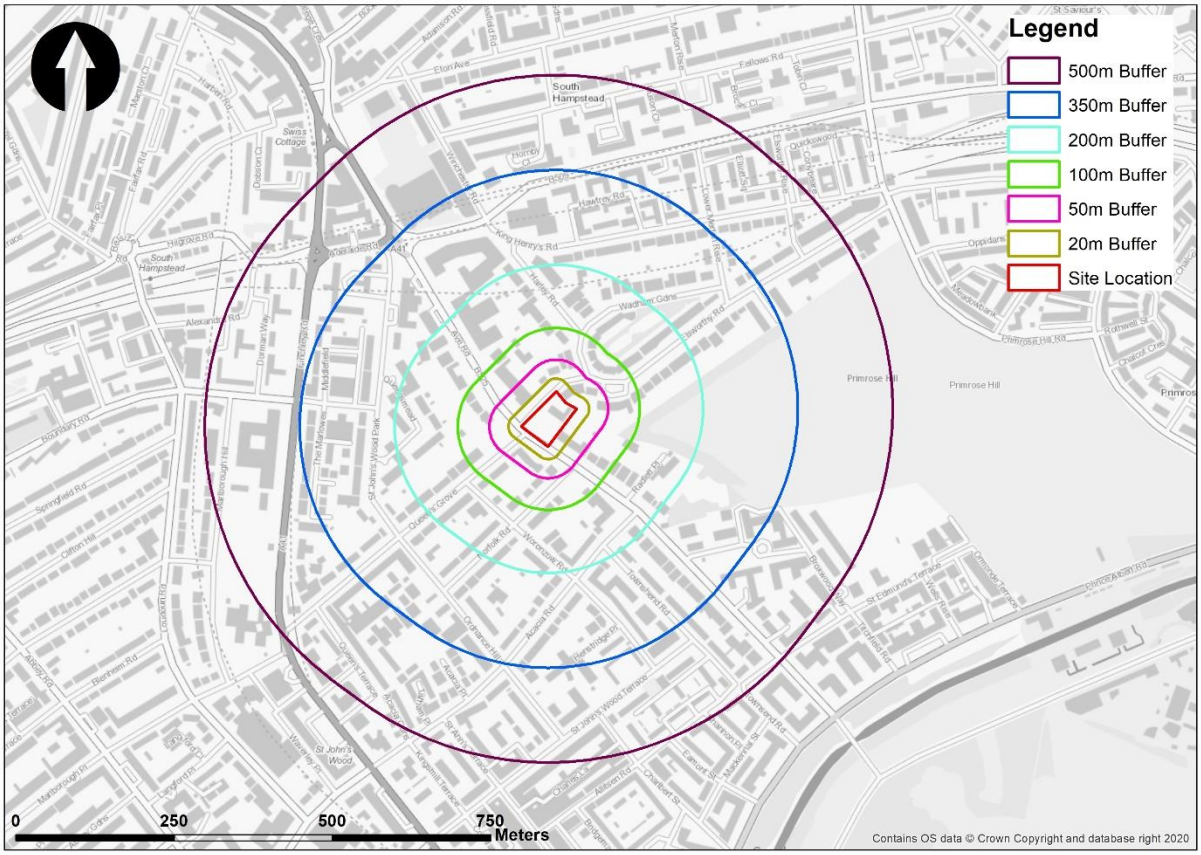

Figure 5.1: Construction assessment buffers

Table 5.1: Dust Emission Magnitude

Activity	Dust Emission Magnitude
Demolition	Medium
Earthworks	Medium
Construction	Large
Track Out	Medium

Table 5.2 presents the sensitivity of receptors to effects caused by construction activities and is based on the criteria presented in Table C 2 within Appendix C.

Table 5.2: Sensitivity of Study Area

Potential Impact	Sensitivity of the surrounding area			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	High	High	High	High
Human Health	Low	Low	Low	Low

The overall risk of receptors to dust soiling effects and PM10 effects are presented in Table 5.3. Risk is based on the criteria presented in Table C 3 to Table C 6 within Appendix C.

Table 5.3: Summary of the Risk of Construction Effects

Sensitivity of Area	Risk			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	Medium Risk	Medium Risk	High Risk	Medium Risk
Human Health	Low Risk	Low Risk	Low Risk	Low Risk

Based on the above, the largest risk associated with all construction activities are considered to be 'High Risk' with regards to dust soiling and ‘Low Risk’ with regards to human health. Based on the outcome of the construction dust assessment, mitigation measures appropriate for the proposed development have been presented in Section 6. Overall, the impacts from disamenity dust and PM_{10} from the construction phase of the proposed development are considered to be not significant.

5.2 Operational Impacts

As discussed in Section 3.2, the operational phase of the development does not have the potential to impact local air quality, as the proposed development will not result in a significant increase in traffic compared to the existing use. However, for completeness an impact assessment has been undertaken along with a residential suitability assessment. This has been carried out by comparing the existing air quality in relation to the relevant air quality objective using a dispersion model approach.

Based on the methodology described in Section 3, the following section provides the results of the predicted concentration at the nearest site boundary of the proposed development.

Table 5.4 to Table 5.9 present predicted NO_2, PM_{10}, and $PM_{2.5}$ pollutant concentrations, respectively, for all floors at varying heights of the development.

Table 5.4 presents the NO_2 predicted annual mean concentrations for all modelled facades of the building. The results show that the concentration of NO_2 is slightly above the AQO for all facades of the building. Table 5.5 shows the concentration of NO2 at nearby receptors with and without the development. The results show that there are already breaches in the AQO at nearby receptors.

According to Defra LAQM.TG (16) guidance, exceedance of the one-hour NO_2 mean objective is generally unlikely to occur where annual mean concentrations do not exceed 60 µg/m^3. The annual mean NO_2 concentration at all modelled receptors is comfortably lower than 60 µg/m^3, and it is unlikely the one-hour mean will be exceeded for any modelled receptor.

Table 5.6 and Table 5.8 show that both PM_{10} and $PM_{2.5}$ predicted annual mean concentrations for all modelled facades are well below the relevant AQO. The predicted concentrations show an improvement in air quality due to improvements in emission factors.

As previously mentioned there were no suitable monitoring stations available for model verification so an adjustment factor was applied. It should be noted that an adjustment factor of 1 is presented in the tables below and results with an adjustment factor of 2 are presented in Appendix E. No further adjustment factors were applied because it was clear that mechanical ventilation would be required.

Table 5.4: Annual mean NO_2 predicted pollutant concentrations (µg/m^3).

Receptor number	***Concentration (µg/m^3)***	***Air Quality Objective (µg/m^3)***
R1 (West Block)	48.74	40
R2 (Pavilion)	35.48	40
R3 (East Block)	46.71	40

Table 5.5: Annual mean of NO_2 predicted pollutant concentrations at nearby receptors (µg/m^3).

Receptor number	***Without Development (µg/m^3)***	***With Development (µg/m^3)***	***Change in Concentrations relative to AQO (%)***	***Significance Descriptor***
R4 (Residential Unit)	40.48	40.53	0.13	Negligible
R5 (Residential Unit)	36.27	36.32	0.12	Negligible
R6 (Residential Unit)	37.01	37.01	0.00	Negligible
R7 (Residential Unit)	43.62	43.62	0.00	Negligible

Table 5.6: Annual Mean PM_{10} Predicted Pollutant Concentrations (µg/m^3).

Receptor number	***Concentration (µg/m^3)***	***Air Quality Objective (µg/m^3)***
R1 (West Block)	22.84	40
R2 (Pavilion)	19.54	40
R3 (East Block)	22.32	40

Table 5.7: Annual Mean of PM_{10} Predicted Pollutant Concentrations (µg/m^3).

Receptor number	***Without Development (µg/m^3)***	***With Development (µg/m^3)***	***Change in Concentrations relative to AQO (%)***	***Significance Descriptor***
R4 (Residential Unit)	20.74	20.74	0.004	Negligible
R5 (Residential Unit)	19.73	19.73	0.003	Negligible
R6 (Residential Unit)	19.90	19.90	0.003	Negligible
R7 (Residential Unit)	21.52	21.52	0.005	Negligible

Table 5.8: Annual Mean $PM_{2.5}$ Predicted Pollutant Concentrations (µg/m^3)

Receptor number	***Concentration (µg/m^3)***	***Air Quality Objective (µg/m^3)***
R1 (West Block)	14.38	25
R2 (Pavilion)	12.46	25
R3 (East Block)	14.07	25

Table 5.9: Annual Mean of $PM_{2.5}$ Predicted Pollutant Concentrations at nearby receptors (µg/m^3).

Receptor number	***Without Development (µg/m^3)***	***With Development (µg/m^3)***	***Change in Concentrations relative to AQO (%)***	***Significance Descriptor***
R4 (Residential Unit)	13.16	13.16	0.004	Negligible
R5 (Residential Unit)	12.57	12.57	0.003	Negligible
R6 (Residential Unit)	12.67	12.67	0.003	Negligible
R7 (Residential Unit)	13.61	13.61	0.005	Negligible

5.3 Air Quality Neutral Assessment

Policy within the London Plan requires developments to be 'air quality neutral', the aim of which is to bring forward developments that are air quality neutral or better and that do not degrade air quality in areas where air quality objectives are not currently being achieved.

Guidance for undertaking the assessment is given in the following two documents:

- The Air Quality Neutral Planning Support Update 2014

- Mayor of London Sustainable Design and Construction Supplementary Planning Guidance 2014

The Sustainable Design and Construction SPG provides typical emission rates of NOx and PM10 for transport and building emissions for each land-use class. The Transport Emission Benchmarks (TEB) are location dependant: as per the guidance typical emission rates have been applied for a development within Inner London. The Buildings Emissions Benchmark (BEB) is not location dependant.

The development's Urban Greening Factor's basic requirements will be doubled with a score of approximately 0.95. This exceeds the policy requirements of the local authority. This has the ability to improve air quality in terms of carbon emissions, as the plants will absorb CO_2. However this pollutant would not be considered in the AQ neutral test.

5.3.1 Building Emissions

It is proposed that the development will include Ground Source Heat Pumps with electric mini boilers as back up to provide heating and hot water and therefore there are no associated emissions with the heating system. An assessment against the BEB has been scoped out.

5.3.2 Transport Emissions

As the proposed development is car-free, it is not expected to generate a significant number of trips and therefore an assessment against the TEB is also considered to not be required.

Therefore, the need to do an Air Quality Neutral Assessment can be scoped out.

6 Proposed Mitigation Measures

6.1 Construction Phase Mitigation Measures

Mitigation measures have been set out in Appendix D in accordance with mitigation measures set out in the IAQM guidance for construction dust to reduce the potential impacts presented in Section 5.

The risks of construction activities in relation to dust soiling were deemed ‘High Risk’, and all risks to human health were also deemed ‘Low Risk’. Therefore, it is recommended that the mitigation measures appropriate to mitigate ‘Medium Risk’ effects, as proposed in Appendix D are applied during the construction phase.

6.2 Operational Phase Mitigation Measures

Monitoring data within close proximity to the site indicated that there are potential breaches in the AQO. Therefore, modelling has been undertaken. The results of the traffic-related air quality dispersion model also indicated potential breaches at the site and within the local area. Although, the impact of the development on nearby sensitive receptors was found to be negligible.

The IAQM guidance states that an AQMA should not halt development and instead careful consideration should be taken with regards to the design of the development. It is recommended that mechanical ventilation with a NOx filter is installed into the proposed development. Mechanical ventilation has been proposed from the early stages of the design processes, and will ensure that air of adequate quality will be available for all occupants. Therefore, no further mitigation measures are considered necessary beyond those already incorporated in to the design.

7 Conclusion

This report provides an assessment of the following potential key impacts associated with the construction and operational phases of the proposed development at 52 – 54 Avenue Road, St Johns Road, London NW8 6HS.

- Nuisance, loss of amenity and health impacts associated with the construction phase of the development on sensitive receptors;
- Changes in traffic-related pollutant concentrations associated with the operational phase of the proposed development; and
- Residential suitability of the site in terms of air quality impact on existing receptors;
- Air Quality Neutral Assessment associated with the proposed development.

A qualitative assessment of construction dust effects has been undertaken for the proposed scheme. The construction phase is predicted to have a 'High Risk' of nuisance and/or loss of amenity impacts due to dust nuisance. However, the risk of dust nuisance can be mitigated by implementing the appropriate mitigation measures listed in Appendix D.

The Neutral Test has been scoped out as the proposed development is considered to generate very few trips due to the proposed development being car-free.

It can, therefore, be concluded that the proposed development is not considered to conflict with any national, regional, or local planning policy in relation to construction and operation phase dust and air quality nuisance.

Appendices

Appendix A:	Key Pollutants
Appendix B:	Operational Impact Assessment Methodology
Appendix C:	Construction Dust Assessment Criteria
Appendix D:	Mitigation Measures for Construction Impacts
Appendix E:	Model Verification
Appendix F:	Site Drawings

Appendix A : Key Pollutants

A1. Nitrogen Dioxide (NO_2)

Nitrogen dioxide (NO_2) and nitric oxide (NO) are collectively referred as oxides of nitrogen (NO_x). During fuel combustion, atmospheric nitrogen combines with oxygen to form nitric oxide (NO), which is not considered harmful. Through, a chemical reaction with ozone (O_3), however NO can further combine with oxygen to create NO_2 which is harmful to human health and vegetation. The foremost sources of NO_2 in the UK are from combustion sources produced mainly by road traffic and power generation.

A2. Particulate Matter

Particulate matter is a term which refers to a mixture of solid particles and liquid droplets found in the air. These particles come in many sizes and shapes and can be made up of hundreds of different chemicals. Some particles, such as dust, dirt, soot, or smoke, are large or dark enough to be seen with the naked eye. Others can be so small that they can only be detected using an electron microscope. Fine dust, essentially particles up to 10 micron (µm), is commonly referred to as PM_{10}.

PM_{10} is known to arise from a number of sources such as construction sites, road traffic movement, industrial and agricultural activates. Very fine particles ($PM_{2.5}$ – $PM_{0.1}$) are known to be associated with pollutants such as oxides of nitrogen (NO_x) and sulphur dioxide (SO_2) emitted from power plants, industrial installation and road transport sources.

$PM_{2.5}$ is generally associated with combustion and traffic sources and is more likely to be associated with the operational phase of the proposed development.

A3. 'Disamenity' Dust

'Dust' is generally regarded as particulate matter up to 75 µm (micron) diameter and in an environmental context can be considered in two categories, according to size: coarser dust (essentially particles greater than 10 µm) and fine particulate matter (PM_{10} and $PM_{2.5}$) as set out above. Coarser dust (essentially particles greater than 10 µm) is generally regarded as 'disamenity dust' and can be associated with annoyance, although there are no official standards (such as AQO) for dust annoyance. Disamenity dust is more readily described than defined as it relates to the visual impact of short-lived dust clouds and the long-term soiling of surfaces.

Although it is a widespread environmental phenomenon, dust is also generated through many human activities including industrial and materials handling sites, construction and demolition sites and roads. Dust is generally produced by mechanical action on materials and is carried by moving air when there is sufficient energy in the airstream. More energy is required for dust to become airborne than for it to remain suspended.

Appendix B : Operational Impact Assessment Methodology

The EPUK & IAQM guidance refers to the Town and Country Planning (Development Management Procedure) Order (England) 2010 [(Wales) 2012] for a definition of a 'major' development when scoping assessments required for the planning process. Based on the guidance, a 'major' development is such development where:

- The number of dwellings is 10 or above;
- The residential development is carried out of a site of more than 0.5ha where the number of dwellings is unknown;
- The provision of more than 1,000 m^2 commercial floorspace; or,
- Development carried out on land of 1ha or more.

It is recommended that consideration should be given to reduce impacts from any 'major' developments by considering:

- The impact of existing sources in the local area on the proposed development; and
- The impacts of the proposed development on the local area.

The assessment process involves two stages where:

Stage 1 scope out the need for an air quality assessment and **Stage 2** provide guidance of determining the level of assessment required for a project.

Table B 1 below sets out the Stage 1 criteria to determine the need to assess impacts arising from small developments and Table B 2 provides more specific guidance as to when an air quality assessment is likely to be required to assess the impacts of the proposed development on the local area.

Table B 1: Stage 1 Criteria to proceed to Stage 2

Criteria to Proceed to Stage 2	
A	If any of the following apply: • or more residential units of a site area of more than 0.5ha • More than 1,000m^2 of floor space for all other uses or a site area greater than 1ha
B	Coupled with any of the following: • The development has more than 10 parking spaces • The development will have a centralised energy facility or other centralised combustion process

Table B 2: Indicative Criteria for Requiring an Air Quality Assessment

The development will	Indicative Criteria to Proceed to an Air Quality Assessment
1. Cause a significant change in Light Duty Vehicle (LDV) traffic flows on local roads with relevant receptors. (LDV = cars and small vans <3.5t gross vehicle weight).	A change of LDV flows of: - more than 100 AADT within or adjacent to an AQMA - more than 500 AADT elsewhere.
2. Cause a significant change in Heavy Duty Vehicle (HDV) flows on local roads with relevant receptors. (HDV = goods vehicles + buses >3.5t gross vehicle weight).	A change of HDV flows of: - more than 25 AADT within or adjacent to an AQMA - more than 100 AADT elsewhere.
3.Realign roads, i.e.changing the proximity of receptors to	Where the change is 5m or more and the road is within an AQMA.
4. Introduce a new junction or remove an existing junction near to relevant receptors.	Applies to junctions that cause traffic to significantly change vehicle accelerate/decelerate, e.g. traffic lights, or roundabouts.
5. Introduce or change a bus station.	Where bus flows will change by: - more than 25 AADT within or adjacent to an AQMA - more than 100 AADT elsewhere.
6. Have an underground car park with extraction system.	The ventilation extract for the car park will be within 20 m of a relevant receptor. Coupled with the car park having more than 100 movements per day(total in and out).
7. Have one or more substantial combustion processes, where there is a risk of impacts at relevant receptors. NB. this includes combustion plant associated with standby emergency generators (typically associated with centralised energy centres) and shipping.	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.

Appendix C : Construction Dust Assessment Criteria

IAQM guidance framework on assessing the risk of dust proposes the construction phase should be split into phases dependent on their potential impacts, determining the risk for each individually. Therefore, this assessment has determined the risk of the four construction categories put forward by the IAQM guidance:

- Demolition;
- Earthworks;
- Construction; and
- Track out (transport of dust and dirt onto the public road network).

The IAQM guidance framework states that the risk of dust impacts from the four categories can be defined as 'negligible', 'low risk', 'medium risk' or 'high risk' depending upon the scale and nature of the construction activity and the sensitivity and proximity of receptors to the construction site boundary. This categorisation is used to put forward appropriate mitigation measures, reducing the level of effects from the dust impacts so they are not significant.

The assessment of dust impacts using the IAQM guidance considers three separate effects from dust:

- Annoyance due to dust soiling;
- Harm to ecological receptors; and
- The risk of health effects due to significant increase in exposure to PM_{10}.

Step 1 of the assessment is set out to screen for the requirement for a more detailed assessment for the proposed development. The screening criteria states:

A 'human receptor' within:

- 350 m of the boundary of the application site; or
- 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance(s).

An 'ecological receptor' within:

- 50 m of the boundary of the application site; or
- 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance(s).

Where there are no receptors and the level of risk is deemed 'negligible', there is no need for further assessment.

Step 2A of the assessment enables the overall dust emission magnitude (small, medium or large) from each dust source (demolition, earthworks, construction and trackout) to be identified in relation with the criteria outlined in Table C 1.

Table C 1: Dust emission magnitude

Source	Large	Medium	Small
Demolition	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.	Total building volume 20,000 m^3 – 50,000 m^3, potentially dusty construction material, demolition activities <10 – 20 m above ground level.	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	Total site area >10,000 m^2, potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to 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.	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.	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	Total building volume >100,000 m^3, on site concrete batching or sandblasting.	Total building volume 25,000 m^3 – 100,000 m^3, potentially dusty construction material (e.g. concrete), on site concrete batching.	Total building volume <25,000 m^3, construction material with low potential for dust release (e.g. metal cladding or timber).
Track out	>50 HDV (>3.5t) outward movements[a] in any one day[b], potentially dusty surface material (e.g. high clay content), unpaved road length >100 m.	10-50 HDV (>3.5t) outward movements[a] in any one day[b], moderately dusty surface material (e.g. high clay content), unpaved road length 50 m – 100 m.	<10 HDV (>3.5t) outward movements[a] in any one day[b], surface material with low potential for dust release, unpaved road length <50 m.

Notes: [a] Vehicle movement is a one-way journey. i.e. from A to B, and excludes the return journey.

[b] HDV movements during a construction project vary over its lifetime, and the number of movements is the maximum not the average.

Step 2B allows for the sensitivity of the area (high, medium or low) to be assessed and 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 PM10, the existing local background concentration; and
- Site specific factors, such as whether there are natural shelters, such as trees, to reduce the risk of wind-blown dust.

Receptor sensitivity has been based on the highest of any criteria being met thus, the assessment is considered as robust. The sensitivity of the area is further determined for dust soiling, human health and ecosystem effects by considering the criteria presented in Table C 2.

Table C 2: Magnitude of Receptor Sensitivity

Source	High	Medium	Low
Sensitivities of people to dust soiling effects	• 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. • Indicative examples include dwellings, museums and other culturally important collections,	• Users would expect[a] to enjoy a reasonable level of amenity, but would not reasonably expect[a] 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[a] to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land. • Indicative examples include parks and places of work.	• The enjoyment of amenity would not reasonably be expected[a]; or • Property would not reasonably be expected[a] 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. • Indicative examples include playing fields, farmland (unless commercially-sensitive horticultural), footpaths, short

	medium and long term car parks[b] and car showrooms.		term car parks[b] and roads.
Sensitivities of people to health effects of PM_{10}	• Locations where members of the public are exposed over a time period relevant to the air quality objective for PM_{10} (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day).[c] • Indicative examples include residential properties. Hospitals, schools and residential care homes should also be considered as having equal sensitivity to residential areas for the purposes of this assessment.	• Locations where the people exposed are workers[d], and exposure is over a time period relevant to the air quality objective for PM_{10} (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day). • Indicative examples include office and shop workers, but will generally not include workers occupationally exposed to PM_{10}, as protection is covered by Health and Safety at Work legislation.	• Locations where human exposure is transient.[e] • Indicative examples include public footpaths, playing fields, parks and shopping streets.
Sensitivities of receptors to ecological effects	• 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	• Locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown; or • Locations with a national designation	• Locations with a local designation where the features may be affected by dust deposition. • Indicative example is a local Nature Reserve with dust

particularly dust sensitive species such as vascular species included in the Red Data List For Great Britain.

- Indicative examples include a Special Area of Conservation (SAC) designated for acid heathlands or a local site designated for lichens adjacent to the demolition of a large site containing concrete (alkali) buildings.

where the features may be affected by dust deposition.

- Indicative example is a Site of Special Scientific Interest (SSSI) with dust sensitive features.

sensitive features.

Notes: [a] People's expectations will vary depending on the existing dust deposition in the area, see Section 4.2.

[b] Car parks can have a range of sensitivities depending on the duration and frequency that people would be expected to park their cars there, and the level of amenity they could reasonably expect whilst doing so. Car parks associated with work place or residential parking might have a high level of sensitivity compared to car parks used less frequently and for shorter durations, such as those associated with shopping. Cases should be examined on their own merits.

[c] This follows Defra guidance as set out in LAQM.TG (09).

[d] Notwithstanding the fact that the air quality objectives and limit values do not apply to people in the workplace, such people can be affected to exposure of PM10. However, they are considered to be less sensitive than the general public as a whole because those most sensitive to the effects of air pollution, such as young children are not normally workers. For this reason workers have been included in the medium sensitivity category.

[e] There are no standards that apply to short-term exposure, e.g. one or two hours, but there is still a risk of health impacts, albeit less certain.

[f] Cheffing C. M. & Farrell L. (Editors) (2005), The Vascular Plant. Red Data List for Great Britain, Joint Nature Conservation Committee.

The final step, step 2C allows for the risk of impacts to be defined. The dust emission magnitude derived in step 2A is combined with the sensitivity of the area defined in step 2B to determine the risk of effects on:

- Annoyance due to dust soiling;
- Harm to ecological receptors; and
- The risk of health effects due to an increase in exposure to PM_{10}.

The criteria for each of the dust sources are presented in Table C 3, Table C 4, Table C 5 and Table C 6.

Table C 3: Demolition

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small

High	High Risk	Medium Risk	Medium Risk
Medium	High Risk	Medium Risk	Low Risk
Low	Medium Risk	Low Risk	Negligible

Table C 4: Earthworks

Sensitivity of Area	**Dust Emission Magnitude**		
	Large	**Medium**	**Small**
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Table C 5: Construction

Sensitivity of Area	**Dust Emission Magnitude**		
	Large	**Medium**	**Small**
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Table C 6: Track out

Sensitivity of Area	**Dust Emission Magnitude**		
	Large	**Medium**	**Small**
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Negligible
Low	Low Risk	Low Risk	Negligible

Appendix D : Mitigation Measures for Construction Impacts

Mitigation measures set out are from IAQM guidance for construction dust and are appropriate for the mitigation of 'High Risk' effects as proposed below:

- Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.
- Develop a Dust Management Plan.
- 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 and dust 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 the action taken to resolve the situation is recorded in the log book.
- Hold regular liaison meetings with other high-risk construction sites within 500m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised.
- Plan site layout: machinery and dust causing activities should be located away from receptors.
- Erect solid screens or barriers around dust activities or the site boundary that are, at least, as high as any stockpiles on site.
- Fully enclosure 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 from site as soon as possible.
- Cover, seed or fence stockpiles to prevent wind whipping.

- Carry out regular dust soiling checks of buildings within 100m of site boundary and cleaning to be provided if necessary.
- Provide showers and ensure a change of shoes and clothes are required before going off-site to reduce transport of dust.
- Agree monitoring locations with the Local Authority.
- Where possible, commence baseline monitoring at least three months before phase begins.
- Put in place real-time dust and air quality pollutant monitors across the site and ensure they are checked regularly.
- Ensure all on-road vehicles comply with the requirements of the London Low Emission Zone.
- Ensure all non-road mobile machinery (NRMM) comply with the standards set within this guidance.
- 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 possible.
- Impose and signpost a maximum-speed-limit of 10mph on surfaced haul routes 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 travel (public transport, cycling, walking, and car-sharing).
- 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 mitigation (using recycled water where possible).
- 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.
- Reuse and recycle waste to reduce dust from waste materials.
- Avoid bonfires and burning of waste materials.

- 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.
- Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces.
- Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil.
- Only remove secure covers in small areas during work and not all at once.
- 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.
- 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 securely covered to prevent escape of materials during transport.
- 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 and regularly cleaned.
- Inspect haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.
- 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 to be located at least 10m from receptors where possible.
- Apply dust suppressants to locations where a large volume of vehicles enter and exit the construction site.

Appendix E : Model Verification

Table E1 presents the maximum NO2 concentrations assuming adjustment factor 2 was applied.

Table E1: Concentrations of NO_2 with adjustment factor 2.

Receptor number	***Without Development (µg/m³)***	***With Development (µg/m³)***	***Change in Concentrations relative to AQO (%)***	***Significance Descriptor***
R1 (West Block)	68.08	68.08	0.00	Negligible
R2 (Pavilion)	44.91	44.95	0.10	Negligible
R3 (East Block)	64.66	64.66	0.00	Negligible
R4 (Residential Unit)	53.89	53.89	0.00	Negligible
R5 (Residential Unit)	46.38	46.38	0.00	Negligible
R6 (Residential Unit)	47.67	47.67	0.00	Negligible
R7 (Residential Unit)	59.33	59.37	0.10	Negligible

Appendix F : Site Drawings

Please see planning portal for the most recent drawings submitted as part of the planning application