Planning Statement
Air Quality Assessment
6 Lindfield Gardens

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Disclaimer

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Overview

Eight Associates has been commissioned to carry out an Air Quality Assessment (AQA) for the proposed development at 6 Lindfield Gardens, London, NW3 6PU, in the London Borough of Camden. The proposals consist of the conversion and extension of the existing single family dwelling house to form nine residential flats, including rear extensions at ground, first and second floor, alterations to roof pitches and associated landscaping to existing front terrace.

The entire Borough was declared as an Air Quality Management Area (AQMA) in 2002 for exceedances of the annual mean concentration of nitrogen dioxide (NO_2) and the 24-hour mean of particulate matter (PM_{10}). The site is not located in a NO_2 Focus Area.

A review of the latest monitoring data for NO_2 at the closest locations to the development indicate that the NAQOs (National Air Quality Objective) are consistently achieved between 2016-2019. The NAQOs at all the other sites are exceeded, except for monitoring station CA25A. However, compliance with the NAQOs has improved significantly over the years and demonstrate a decreasing trend in NO_2 levels. The hourly mean of NO_2 concentration has been consistently achieved at the automatic monitoring station CD1 for the years 2017 to 2019, with an exceedance in 2016. The LAEI 2016 modelled mean annual NO_2 concentrations were estimated at approximately 38 $\mu g/m^3$ at the site, achieving both the NAQOs and WHO guidelines.

Nearby monitored mean annual PM_{10} concentrations, 24-hourly PM_{10} concentrations and mean annual $PM_{2.5}$ concentrations at automatic monitoring site CD1 achieved the NAQOs but exceeded the WHO objectives. The LAEI 2016 modelled mean annual concentrations of PM_{10} and $PM_{2.5}$ at the site are estimated at approximately 23 $\mu g/m^3$ and 14 $\mu g/m^3$, respectively, achieving the NAQOs but exceeding the WHO guidelines.

As the development proposals introduce new sensitive receptors into an area with potentially poor existing air quality, an AQA has been undertaken to accompany the planning application for the scheme. For developments within London, the AQA methodology incudes the requirement to undertake an assessment against the Air Quality Neutral (AQN) guidance. The scheme has been assessed for both the impacts of transport and building operation against the AQN guidance and it meets the requirements for AQN.

Even though further mitigation measures to reduce exposure of future occupants to pollutants are not explicitly required, the design mitigation hierarchy has been applied nonetheless, to maximise air quality for occupants, where feasible. Measures include, provision of sustainable transport modes, such as cycling, ultra-low NO_X boilers and urban greening.

The unmitigated risk to local sensitive receptors from emissions of dust and pollution from construction is deemed to be medium. However, the risk will be mitigated further through the measures set out in the Air Quality & Dust Management Plan (AQDMP), which will be implemented through the contractor's Construction Environmental Management Plan. With the mitigation measures in place, the residual effects arising from the construction phase of the proposed development would be deemed 'not significant'.

Introduction
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Project Overview

Eight Associates has been commissioned to carry out an Air Quality Assessment (AQA) for the proposed development at 6 Lindfield Gardens, London, NW3 6PU, in the London Borough of Camden. The proposals consist of the conversion and extension of the existing single family dwelling house to form 9 residential flats, including rear extensions at ground, first and second floor, alterations to roof pitches and associated landscaping to existing front terrace.

The London Borough of Camden declared an Air Quality Management Area (AQMA) for the whole of the borough in 2002 due to exceedances of the annual mean concentration of nitrogen dioxide (NO_2) and the 24-hour mean of particulate matter (PM_{10}). The AQMA declaration for the same pollutants still remains as the National Air Quality Objectives (NAQOs) for NO_2 are still exceeded. Although the current objectives for particulate matter (PM_{10} and $PM_{2.5}$) are being met, it remains a pollutant of concern. In recognition that there is no safe exposure limit for particulate matter, Camden committed to target compliance with World Health Organization Guidelines by 2030. Thus, PM_{10} is still part of the AQMA declaration. Due to the location of the development in an area of existing poor air quality, an AQA has been undertaken to accompany the planning application for the development.

Scope of Assessment

An AQA has been undertaken in accordance with relevant planning policy and best-practice guidance at national, regional and local levels. The AQA includes:

- Establishment and review of existing air quality;
- Establishment of nearby sensitive receptors to air pollution;
- Assessment of air quality and dust impacts during the construction phase;
- Assessment of air quality impacts expected during the operation of the new development;
- Evaluation of outline proposals against the Air Quality Neutral (AQN) benchmarks; and
- Assessment of the mitigation strategy to limit the exposure of building users and nearby receptors, to air pollution.

Key policy and guidance documents considered in the AQA are outlined in Table 1.

Table 1: National, regional and local policies and guidance.

National	National Planning Policy Framework (Ministry of Housing, Communities & Local Government, 2019)
	The Air Quality Strategy for England, Scotland, Wales and Northern Ireland (Department for Environment, Food & Rural Affairs, DEFRA), 2007
	Land-Use Planning & Development Control: Planning for Air Quality (Environmental Protection UK (EPUK), Institute of Air Quality Management (IAQM), 2017)
	Clean Air Strategy (Department for Environment, Food & Rural Affairs, DEFRA), 2019
	Air Quality Plan for Nitrogen dioxide (NO_2) in UK (DEFRA, 2017)
	Guidance on the Assessment of Dust from Demolition and Construction (IAQM, 2014)
	Local Air Quality Management: Technical guidance LAQM.TG (16) (Department for Environment, Food & Rural Affairs, DEFRA), 2018
Regional	The London Plan 2019-2041 (Mayor of London, 2021)
	Sustainable Design and Construction: Supplementary Planning guidance (Mayor of London, 2014)
	The Control of Dust and Emissions during Construction and Demolition: Supplementary Planning Guidance (Mayor of London, 2014)
	Clearing the Air – The Mayor's Air Quality Strategy (Mayor of London, 2010)
	Air Quality and Planning Guidance (London Councils, 2007)
Local	Camden Local Plan 2016-2031 (Camden Council, 2017)
	Camden Planning Guidance – Air Quality (Camden Council, 2021)
	Camden Clean Air Quality Action Plan 2019-2022 (Camden Council, 2019)

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International Legislation and Policy

EU Directive 2008/50/EC on Ambient Air Quality and Cleaner Air for Europe (the CAFE Directive) sets out the ambient air quality standards for a range of key pollutants, requiring specific objectives for ambient concentrations for pollutants (EU limit values) to be achieved and maintained (Table 2). EU Directive 2008/50/EC also contains a series of limit values for the protection of human health and critical levels for the protection of vegetation.

Compliance with the EU limit values is mandatory. However, Member States can apply for a time extension for compliance, subject to approval of an action plan by the European Commission. The UK Government applied in autumn 2011 for a time extension for compliance with the NO_2 limit values until 2015 for a number of areas throughout England. However, the UK Government has withdrawn its application for those zones where compliance is not expected until after 2015, which includes central London.

Table 2: EU limit values for key pollutants.[1]

Pollutants	Concentrations	Measured as	Date to be achieved by
Nitrogen dioxide (NO_2)	200 µg/m^3 not to be exceeded more than 18 times per year	1-hour mean	31 December 2005
	40 µg/m^3	Annual mean	31 December 2005
Particles (PM_{10})	50 µg/m^3 not to be exceeded more than 35 times per year	24-hour mean	31 December 2004
	40 µg/m^3	Annual mean	31 December 2004
Particles ($PM_{2.5}$)	25 µg/m^3	Annual mean	31 December 2010

Table 2: EU limit values for key pollutants (continued).

Pollutants	Concentrations	Measured as	Date to be achieved by
Carbon monoxide (CO)	10 mg/m^3	Max. daily 8-hour mean	31 December 2003
Sulphur dioxide (SO_2)	266 µg/m^3 not to be exceeded more than 35 times per year	15-minute mean	31 December 2005
	350 µg/m^3 not to be exceeded more than 24 times per year	1 hour mean	31 December 2004
	125 µg/m^3 not to be exceeded more than 3 times per year	24-hour mean	31 December 2004
Ozone (O_3)	100 µg/m^3 not to be exceeded more than 10 times per year	8-hour mean	31 December 2005

[1] The full UK and EU limit values can be viewed on DEFRA's UK AIR website.

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National Legislation and Policy

The Air Quality Standards Regulations 2010 implements the requirements of EU Directive 2008/50/EC into UK legislation. DEFRA, on behalf of the UK Government, has produced a series of plans for the UK to meet the EU targets in the shortest possible time, the latest being the UK plan for tackling roadside NO_2 concentrations in July 2017 (NO_2 being identified as the primary pollutant for which the EU limit values are exceeded). An overview document has been produced, together with detailed plans for 37 zones where the objectives for NO_2 were not met in 2015.

The plan for the Greater London area sets out a range of measures to reduce NO_2 concentrations and indicates that with these measures, London will be compliant by 2025.

National Planning Policy Framework (Ministry of Housing, Communities & Local Government, 2019)

The National Planning Policy Framework (NPPF) published in February 2019 sets out the UK Government's planning policies for England. Planning law requires that applications for planning permission must be determined in accordance with the local development plan, unless material considerations indicate otherwise.

The NPPF is also a material consideration in planning decisions. It states that the purpose of the planning system is to contribute to the achievement of sustainable development; and that planning decisions on individual applications must reflect relevant EU obligations and statutory requirements. Specifically, in terms of air quality, it requires the planning system to prevent development from contributing to or being put at unacceptable risk from unacceptable levels of air pollution.

Planning policies should promote compliance with or contribute towards achievement of EU limit values and NAQOs, taking into account the presence of AQMAs and the cumulative impacts on air quality from individual sites in local areas. Planning decisions should ensure that any new development within an AQMA is consistent with the local Air Quality Action Plan (AQAP).

The NPPF is supported by a series of Planning Practice Guidance (PPG) documents. The guidance in relation to air quality provides guiding principles on how planning can take account of the impact of new development on air quality.

National Air Quality Management

Part IV of the Environment Act 1995 requires the UK Government to publish an Air Quality Strategy and for local authorities to review, assess and manage air quality within their areas, known as Local Air Quality Management (LAQM).

The Air Quality Strategy for England, Scotland, Wales and Northern Ireland (DEFRA, 2007)

The 2007 Air Quality Strategy establishes the policy for ambient air quality in the UK. It includes the National Air Quality Objectives (NAQOs) for the protection of human health and vegetation for 11 pollutants. Those NAQOs included as part of LAQM are prescribed in the Air Quality Standards Regulations 2010 and the Air Quality (Amendment) (England) Regulations 2002. It should be noted that the EU limit values are numerically the same as the NAQO values but differ in terms of compliance dates, locations where they apply and legal responsibility.

The EU limit values are mandatory whereas the NAQOs are policy objectives. Local authorities are not required to achieve them but have to work towards their achievement. In addition, the EU limit values apply in all locations except where members of the public do not have access and there is no fixed habitation, on factory premises or at industrial installations, and on the carriageway/central reservation of roads except where there is normally pedestrian access. Where a local authority's review and assessment of its air quality identifies that air quality is likely to exceed the NAQOs, it must designate these areas as AQMAs and develop an Air Quality Action Plan (AQAP) setting out measures to reduce pollutant concentrations with the aim of meeting the NAQOs.

Clean Air Strategy (DEFRA, 2019)

Additionally, the Clean Air Strategy 2019 sets outs goals that will be more stringent than EU requirements with the aim of reducing human exposure to toxic pollutants by taking into account the World Health Organisation's guidelines. The policies in the Strategy aim to reduce $PM_{2.5}$ concentrations across the UK so that the number of people living in locations above the WHO annual mean guideline limit of 10 $\mu g/m^3$ is reduced by 50% by 2025. Moreover, the Strategy will feed information to local authorities on how the cumulative impacts of nitrogen deposition in natural habitats should be assessed and mitigated through the planning system.

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Regional Policy and Guidance

The London Plan 2019–2041 (Mayor of London, 2021)

Policy SI 1 in the London Plan 'Improving air quality' states that:

A 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.

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

1 Development proposals should not:

- lead to further deterioration of existing poor air quality
- 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
- 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:

- development proposals must be at least Air Quality Neutral
- 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
- 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
- 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.

C 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:

- how proposals have considered ways to maximise benefits to local air quality, and
- what measures or design features will be put in place to reduce exposure to pollution, and how they will achieve this.

D 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.

E 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.

Clearing the Air – The Mayor's Air Quality Strategy (Mayor of London, 2010)

The Mayor of London produced an Air Quality Strategy in 2002 under the requirements of the Greater London Authority Act 1999, which was superseded by the subsequent Air Quality Strategy, published in December 2010. The Air Quality Strategy sets out how the National Air Quality Strategy would be implemented in London as a whole.

The Mayor's Air Quality Strategy outlines a number of policies to deliver the required reductions in PM_{10} and NO_2 concentrations in Greater London, to meet the EU limits. The planning process is required to improve air quality by ensuring that new developments, as a minimum, are 'air quality neutral'. With regard to the proposed development the key policies are as follows:

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- Policy '6 – Reducing emissions from construction and demolition sites' which states that the Mayor will work with the London Council to review and update the Best Practice guidance for construction and demolition sites and create supplementary planning guidance to assist implementation;
- Policy '7 – Using the planning process to improve air quality – new developments in London as a minimum shall be 'air quality neutral' which states that the Mayor will encourage boroughs to require emissions assessments to be carried out alongside conventional air quality assessments. Where air quality impacts are predicted to arise from developments these will have to be offset by developer contributions and mitigation measures secured through planning conditions, section 106 agreements or the Community Infrastructure Levy;
- Policy '8 – Maximising the air quality benefits of low to zero carbon energy supply' which states that the Mayor will apply emission limits for both PM and NO_x for new biomass boilers and NO_x emission limits for Combined Heat and Power (CHP) plant. Air quality assessments will be required for all developments proposing biomass boilers or CHP plants and operators will be required to provide evidence yearly to demonstrate compliance with the emission limits; and
- Policy '9 – Energy efficient buildings' which states that the Mayor will set CO_2 reduction targets for new developments which will be achieved using the Mayor's Energy Hierarchy. These measures will result in reductions of NO_x emissions.

Sustainable Design and Construction: Supplementary Planning Guidance (Mayor of London, 2014)

The Supplementary Planning Guidance (SPG), which supports the London Plan, was first published in 2006 and was updated in April 2014. The following guidance on air quality is provided in Section 4:

- Developers should design schemes to be 'Air Quality Neutral';
- Developments should be designed to minimise the generation of air pollutants;
- Developments should be designed to minimise exposure to poor air quality;
- Energy plant, including boilers and CHP) should meet relevant emission limits; and
- Developers and contractors should follow the relevant guidance on minimising impacts from construction and demolition

The SPG states that where developers are unable to meet the 'air quality neutral' benchmark, consideration should be given to off-site NO_x and PM_{10} abatement measures.

The Control of Dust and Emissions during Construction and Demolition: Supplementary Planning Guidance (SPG) (Mayor of London, 2014)

This SPG provides detailed best practice guidance, seeking to address emissions from construction activities, including construction machinery with respect to London's 'low emission zone' for non-road mobile machinery (NRMM), introduced in 2015. The SPG incorporates the Institute of Air Quality Management (IAQM) 'Guidance on the assessment of dust from demolition and construction' approach for assessing the risk of dust impacts from construction.

Local Policy and Guidance

Camden Local Plan 2016–2031 (Camden Council, 2017)

The Camden Local Plan sets out the Council's planning policies and it ensures that Camden continues to have robust, effective and up-to-date planning policies that respond to changing circumstances and the borough's unique characteristics. It will cover the period from 2016–2031.

The following policies relate directly to air quality:

Policy CC4 – Air Quality:

- 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 measures adopted should be provided 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.

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Camden Planning Guidance – Air Quality (Camden Council, 2021)

This guidance provides information on key air quality issues within the borough and supports Local Plan Policy CC4 Air quality. It also highlights other relevant policies within the Local Plan:

- C1– Health and wellbeing
- A2 – Open space
- A3 – Biodiversity
- CC1 – Climate change mitigation
- CC2 – Adapting to climate change
- T1 – Prioritising walking, cycling and public transport
- T2 – Parking and car free development
- T3 – Transport infrastructure
- T4 – Sustainable movement of goods and vehicles

The following key messages are important in addressing air quality:

- All developments are to protect future occupants from exposure to poor air quality.
- All developments are to limit their impact on local air quality and be at least air quality neutral.
- All proposals involving demolition and construction should adopt best practice measures to reduce and mitigate emissions.
- On–site monitoring may be required dependant on the scale of demolition and construction.
- Certain developments using Non Road Mobile Machinery (within the KW range) need to meet standards in the Mayor's Dust and emissions SPD.
- The impact of outdoor air pollution on indoor air quality in new developments needs to be taken into account at the earliest stages of building design.
- Development should take into consideration the location of amenity space and opportunities for appropriate planting 'greening'.
- Development should reduce emissions by being energy efficient (reducing emissions associated with the operation of the building).
- Development should prioritise more sustainable modes of transport and where applicable improve the walking and cycling environment.

Camden Clean Air Quality Action Plan 2019–2022 (Camden Council, 2019)

Camden's Clean Air Action Plan has been produced in recognition of the legal requirement on the local authority to work towards air quality objectives under Part IV of the Environment Act 1995 and to meet the requirements of the London Local Air Quality Management statutory process. It outlines the actions that will be taken to improve air quality in Camden between 2019 and 2022. Importantly, this Clean Air Action Plan is the first of three plans, which, with the support of residents, businesses and partners, aims to bring Camden into compliance with World Health Organization guidelines for air quality by 2030.

The Clean Air Action Plan is organised around seven broad theme and the following are the relevant ones with regards to developments.

1. Building Emissions

Emissions from buildings account for about 15% of the NO_X emissions across London, so are important in affecting NO_2 concentrations. Energy efficiency and retrofitting workplaces and homes as well as enforcing Smoke Control regulations are examples of how we will work to reduce these emissions.

2. Construction Emissions

The Greater London Authority estimates that construction and non–road mobile machinery (NRMM) account for around 15% of particulate matter (PM_{10}) and 12% of nitrogen oxide (NO_X) emissions. Measures such as enforcing NRMM will help to reduce these emission sources.

3. Transport Emissions

Transport emissions account for approximately 50% of Camden's NO_2 and PM_{10} emissions. We need to encourage a shift to more sustainable forms of transport such as walking, cycling and ultra–low emission vehicles (such as electric). Installing more cycle lanes and installing more EV charging points are measures that help to address this.

Site Overview
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Site Overview

The development site at 6 Lindfield Gardens is located in the London Borough of Camden, approximately 100m from the junction of Lindfield Gardens and Arkwright Road, in a highly residential area. The OS grid reference for the centre of the dwelling is X (Eastings) 526098, Y (Northings) 185280 and the postcode is NW3 6PU (Figure 1).

The total area of the site is approximately 0.1184 hectares (1,184m^2). The existing property is a substantial detached six-bedroom single family dwelling house with a generously sized rear garden, which also features an ancillary outbuilding located at the rear of the garden. The house has a GIA of approximately 605.1m^2. The exiting front elevation (street view) is illustrated in Figure 2.

Figure 1: Location plan of 6 Lindfield Gardens (taken from the Design and Access Statement, October 2020).

Figure 2: Existing front elevation of 6 Lindfield Gardens.

Development Overview
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Description of Proposed Development

The proposals consist of the conversion and extension of the existing single family dwelling house to create nine residential flats, including rear extensions at ground, first and second floor, alterations to roof pitches and associated landscaping to existing front terrace. The proposed GIA is approximately 807.9m^2. Illustrations of the proposed site plan and the sections of the dwelling are shown in Figure 3 and Figure 4, respectively.

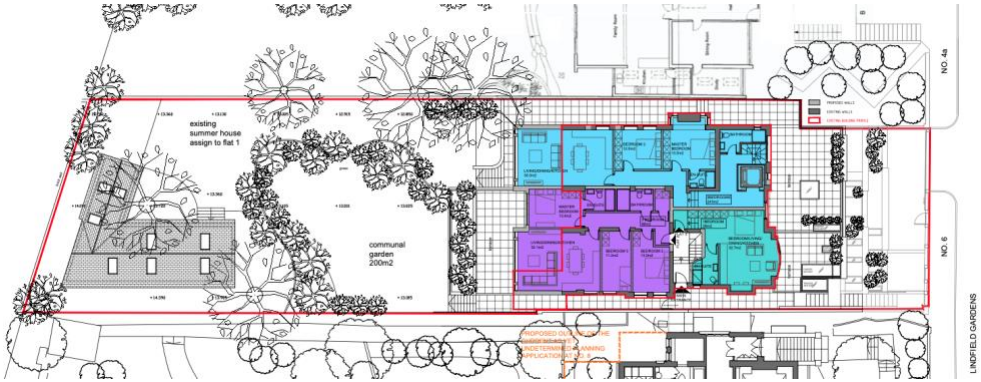

Figure 3: Proposed site plan of 6 Linfield Gardens.

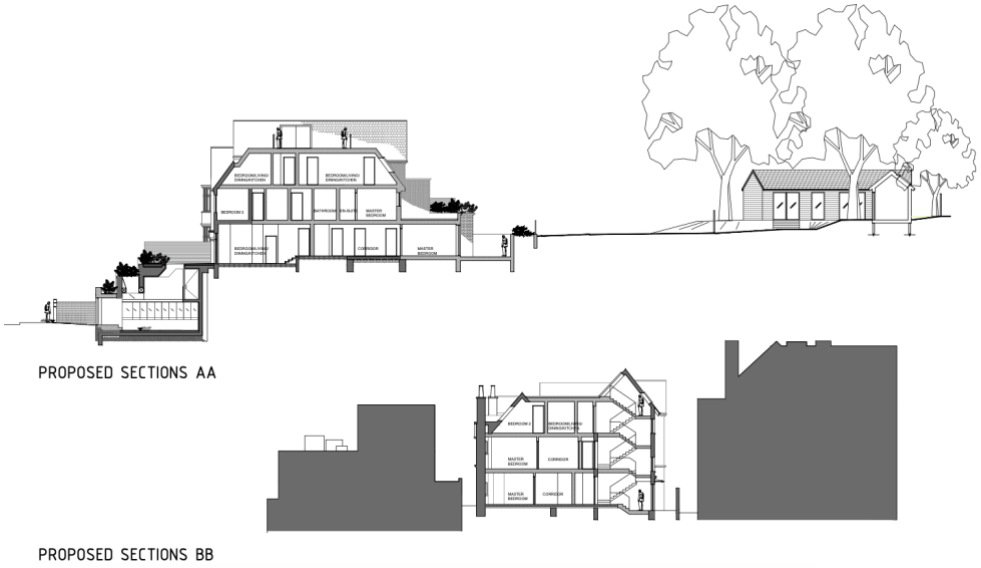

Figure 4: Proposed sections of 6 Lindfield Gardens.

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Overview of Local Sensitive Receptors

A sensitive receptor is a location that may be affected by the emission of pollutants and / or particulate matter during construction or from the operation of a completed development, including from building plant and transport uses as a result of the new development.

In accordance with the Institute of Air Quality Management (IAQM) 'Guidance on the assessment of dust from demolition and construction', the need for a detailed assessment of the air quality impacts from construction should be determined where the following receptors are present:

- Where there is a human receptor within:
  - 350m of the boundary of the site; and/or
  - 50m of the route used by construction vehicles on the public highway, up to 500m from the site entrance(s).
- Where there is an ecological receptor within:
  - 50m of the boundary of the site; and/or
  - 50m of the route(s) used by construction vehicles on the public highway, up to 500m from the site entrance(s).

For the purposes of identifying receptors, which may be sensitive to potential air quality impacts of dust and emissions from construction, a 350m radius from the development site is used for human receptors, a 50m radius for ecological receptors and a 500m radius is used for the trackout route for both types of receptors, as shown in Figure 5.

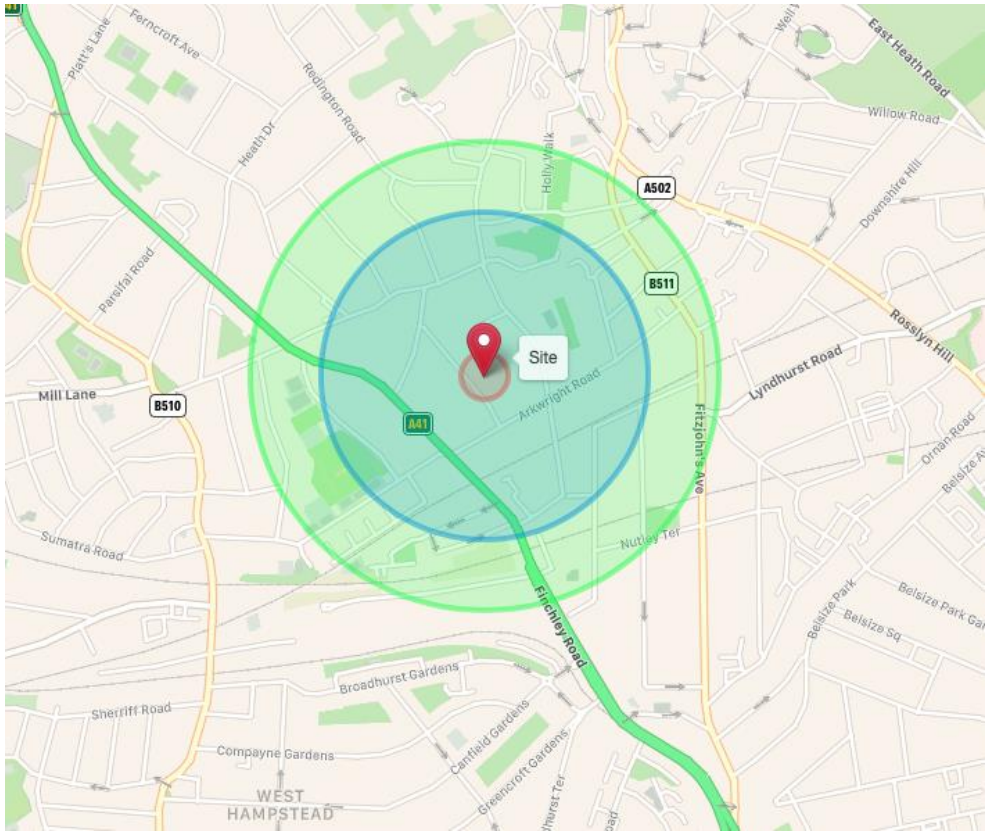

Figure 5: Map view showing a 500m radius (green), a 350m radius (blue) and a 50m radius (red) from the site.

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Human Receptors

A human receptor refers to any location where a person or property may experience the adverse effects of airborne dust or dust soiling, or exposure to PM_{10} over a time period relevant to the air quality objectives, as defined in the Government's technical guidance for Local Air Quality Management. In terms of annoyance effects, this will most commonly relate to residential dwellings, but may also refer to other premises such as schools, hospitals, museums, vehicle showrooms, food manufacturers and amenity areas.

The surrounding area is predominantly residential. Key human receptors are described below (all distances detailed are approximate).

Schools

The following schools have been identified within 350m of the development or within 500m of the trackout route:

- University College School Senior School – approximately 160m west.
- Casa Dei Bambini Montessori School – approximately 260m south west.
- Southbank International School Hampstead – approximately 425m south.
- St Mary's School Hampstead – approximately 470m south east.
- Devonshire House Pre-Preparatory School (Junior School) – approximately 440m east.
- St Anthony's Junior School – approximately 470m east.
- Fitzjohn's Primary School – approximately 475m east.
- Hampstead Parochial Church of England Primary – approximately 500m north east.

Nurseries

The following nurseries / pre-schools have been identified within 350m of the development or within 500m of the trackout route:

- Bright Horizons JW3 Finchley Road Day Nursery and Preschool – approximately 210m south west.
- Nido Montessori Nursery – approximately 260m south west.
- Devonshire House School and the Oak Tree Nursery – approximately 379m east.

Hospitals

No hospitals have been identified within 350m of the development or within 500m of the trackout route.

Doctors

The following doctor's surgeries are within 350m of the development or within 500m of the trackout route.

- Doctor Today Private Medical Centre – approximately 265m south.
- The Practice at 322 – approximately 470m south.

Ecological Receptors

Potential sensitive ecological receptors have been determined using geographic information obtained from MAGIC's website.

No statutory or non-statutory ecological sites have been identified within 50m of the development or within 500m of the trackout route. The following habitats, that could represent ecological receptors but are not defined as either statutory or non-statutory ecological sites, have been identified within 500m of the development site:

- Woodland and deciduous woodland in the rear gardens of residential properties – approximately 50m, 350m and 500m around the development site.

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Current Local Status

The London Borough of Camden declared an AQMA for the whole of the borough in 2002 due to exceedances of the annual mean concentration of nitrogen dioxide (NO_2) and the 24-hour mean of particulate matter (PM_{10}). The AQMA declaration for the same pollutants still remains as the NAQOs for NO_2 are still exceeded. Although the current objectives for particulate matter PM_{10} and $PM_{2.5}$ are being met, it remains a pollutant of concern. In recognition that there is no safe exposure limit for particulate matter, Camden committed to target compliance with World Health Organization Guidelines by 2030. Thus, PM_{10} is still part of the AQMA declaration.

Of the pollution that originates in Camden, the main sources of NO_2 are road transport and commercial and domestic gas boilers, and the main sources of particulate matter are road transport, the resuspension of particulates and construction-related emissions.

Camden Clean Air Action Pan 2019-2022 identifies five focus areas for NO_2 that have been declared based on modelling using London Atmospheric Emissions Inventory (LAEI) 2013[2], as shown in Figure 6 and the list below. These areas are identified as having high levels of pollution and human exposure. The site is not located in a Focus Area.

- Camden High Street from Mornington Crescent to Chalk Farm and Camden Road
- Holborn and Southampton Row junction
- Kilburn Town Centre
- Euston Road
- Swiss Cottage from South Hampstead to Finchley Road Station

LAEI 2016 is the latest version and the same focus areas still feature on the list.

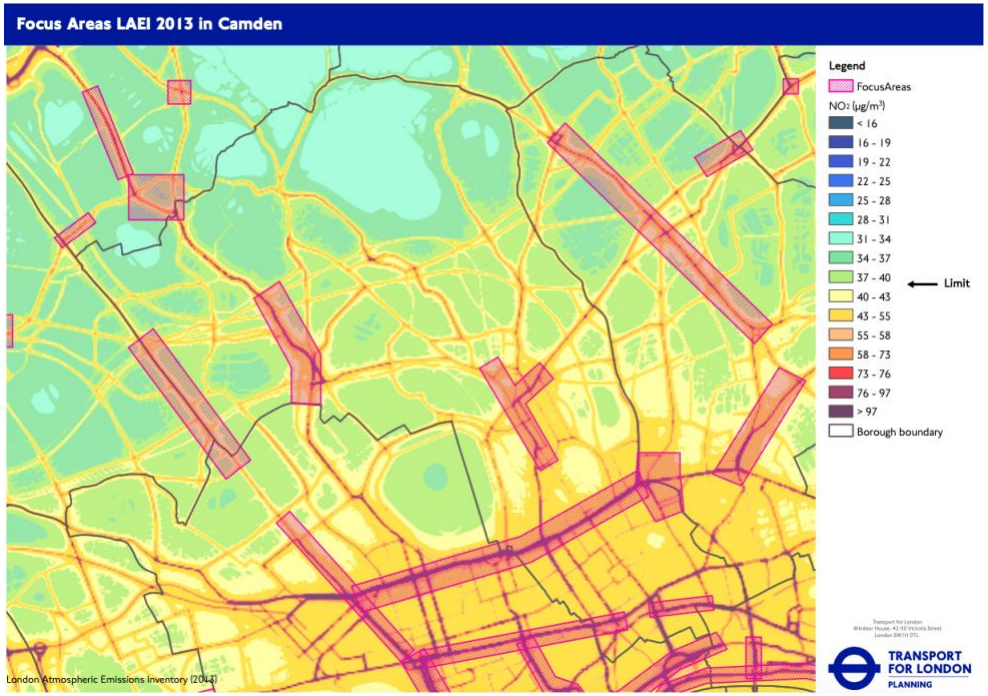

Figure 6: Designated focus areas in the London Borough of Camden.

[2] LAEI 2013 datasets were the latest one at the time of writing the AQAP.

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Local Monitoring Stations

Four automatic monitoring sites and 33 non-automatic monitoring sites have been identified in the London Borough of Camden Air Quality Annual Status Report for 2019. Based on their proximity to the development site, completeness of data and relevance to the site, the following monitoring sites are reviewed in Table 3.

Table 3: Air quality monitoring stations identified near the site.

Site ID	Site name and type	Pollutants monitored	Distance to exposure (m)	Distance to kerb (m)	Inlet height (m)	Distance from site (m)
CA7	Frognal Way, diffusion tube, urban background	NO_2	6.0	30.0	3.0	264
CA17	47 Fitzjohn's Road, diffusion tube, roadside	NO_2	5.0	5.0	2.0	470
CA25A	Emmanuel Primary School, diffusion tube, roadside	NO_2	3.0	2.0	2.0	740
CA15	Swiss Cottage, diffusion tube, kerbside	NO_2	7.0	<1.0	2.5	1,040
CD1	Swiss Cottage, automatic monitoring (TEOM-FDMS, AC31 NO_X), kerbside	NO_2, PM_{10}, $PM_{2.5}$	7.0	1.5	3.0	1,040

A map, showing the approximate locations of the closest automatic monitoring stations and NO_2 diffusion tubes, in relation to the development site, is shown in Figure 7.

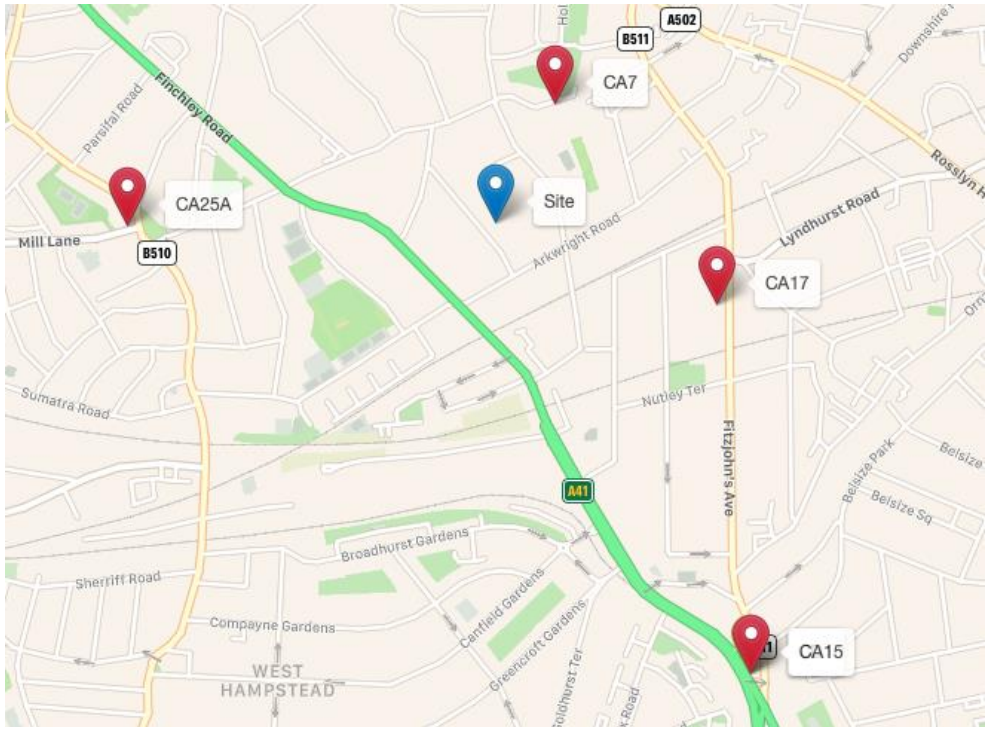

Figure 7: Map showing location of development site (shown in blue) in relation to nearby automatic monitoring stations (shown in yellow) and NO_2 diffusion tubes (shown in red). The automatic monitoring station CD1 is overlapped by diffusion tube CA15.

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Monitored Nitrogen Dioxide (NO_2)

A summary of the latest monitoring results for NO_2 annual mean concentrations at the closest monitoring stations to the development site is given in Table 4. Results for each monitoring station and reporting year are shown in green where the NAQOs are achieved, in red where the NAQOs are exceeded and in grey where data have not been reported.

The data show that the NAQOs for mean annual NO_2 concentration (for the mean annual concentration to be no more than 40 µg/m^3) closest to the development site, have been consistently achieved at CA7 between the latest reporting years of 2016–2019. NAQOs at all the other sites are exceeded, except for monitoring station CA25A. However, the NAQOs have improved significantly over the years and demonstrates a decreasing trend.

Table 4: 2016–2019 NO_2 annual mean concentrations near the site.[3]

Site ID	Monitoring station type	Distance from site (m)	Annual mean concentration (µg/m^3)			
			2019	2018	2017	2016
CA7	Non-automatic, urban background (30.0m from kerb)	264	22.82	22.12	29.64	27.91
CA17	Non-automatic, roadside (5.0m from kerb)	470	42.53	48.13	66.27	56.38

Table 4: 2016–2019 NO_2 annual mean concentrations near the site (continued).[3]

Site ID	Monitoring station type	Distance from site (m)	Annual mean concentration (µg/m^3)			
			2019	2018	2017	2016
CA25A	Non-automatic, roadside (2.0m from kerb)	740	37.88			
CA15	Non-automatic, kerbside (<1.0m from kerb)	1,040	49.74	62.30		73.86
CD1	Automatic, kerbside (1.5m from kerb)	1,040	43.0	54.0	53.0	66.0

A summary of the latest monitoring results for the annual exceedances of the NO_2 hourly mean concentration of 200 µg/m^3 is given in Table 5. Only continuous monitoring stations are capable of monitoring progress against this NAQO. The NAQO (for no more than 18 exceedances of the 200 µg/m^3 hourly mean) has been achieved at automatic monitoring station CD1 for the years 2017–2019, with an exceedance in 2016.

Table 5: 2016–2019 NO_2 annual exceedances of hourly mean of 200 µg/m^3 near the site.

Site ID	Monitoring station type	Distance from site (m)	Count of annual exceedances of hourly mean of 200 µg/m^3			
			2019	2018	2017	2016
CD1	Automatic, kerbside (1.5m from kerb)	1,040	1	2	1	37

[3] Data are obtained from the London Borough of Camden Air Quality Annual Status Report (2019). A national bias adjustment factor of 0.87 was applied to all diffusion tube data to ensure that results are comparable across reporting years and with other datasets (including DEFRA Background Concentrations). PM_{10} data have not been adjusted using the Volatile Correction Model (VCM) as CD1 is certified to MCERTS reference equivalent standard. No annualization was carried out.

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Monitored Particulate Matter under 10 µm diameter (PM_{10})

A summary of the latest monitoring results for PM_{10} annual mean concentrations at the closest monitoring station to the development site is given in Table 6. Only continuous monitoring stations have the capability of monitoring mean annual PM_{10} concentrations. The NAQOs (for the mean annual concentration to be no more than 40 µg/m^3) has been consistently achieved at the automatic monitoring site CD1 for the years 2016–2019.

Table 6: 2016–2019 PM_{10} annual mean concentrations near the site.[3]

Site ID	Monitoring station type	Distance from site (m)	Annual mean concentration (µg/m^3)			
			2019	2018	2017	2016
CD1	Automatic, kerbside (1.5m from kerb)	1,040	19	21	20	21

A summary of the latest monitoring results for the annual exceedances of the PM_{10} daily mean concentration of 50 µg/m^3 is given in Table 7. Only continuous monitoring stations are capable of monitoring progress against this NAQO. The NAQO (for no more than 35 exceedances of the 50 µg/m^3 daily mean) has been consistently achieved at the automatic monitoring site CD1 for the years 2016–2019.

Table 7: 2016–2019 PM_{10} annual exceedances of daily mean of 50 µg/m^3 near the site.

Site ID	Monitoring station type	Distance from site (m)	Count of annual exceedances of daily mean of 50 µg/m^3			
			2019	2018	2017	2016
CD1	Automatic, kerbside (1.5m from kerb)	1,040	8	4	8	7

Monitored Fine Particulate Matter 2.5 µm diameter ($PM_{2.5}$)

A summary of the latest monitoring results for $PM_{2.5}$ annual mean concentrations at the closest monitoring station to the development site is given in Table 8. Only continuous monitoring stations have the capability of monitoring mean annual $PM_{2.5}$ concentrations. The NAQOs (for the mean annual concentration to be no more than 25 µg/m^3) has been consistently achieved at the automatic monitoring site CD1 for the years 2016–2019.

Table 8: 2016–2019 $PM_{2.5}$ annual mean concentrations near the site.

Site ID	Monitoring station type	Distance from site (m)	Annual mean concentration (µg/m^3)			
			2019	2018	2017	2016
CD1	Automatic, kerbside (1.5m from kerb)	1,040	11	11	16	15

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Modelled Nitrogen Dioxide (NO_2)

The London Atmospheric Emissions Inventory (LAEI)[4] is a database of geographically referenced datasets of pollutant emissions and sources in Greater London. The base year for the latest and current LAEI is 2016 and includes NO_2, PM_{10} and $PM_{2.5}$ as key pollutants.

The LAEI 2016 modelled mean annual concentrations of NO_2 for the site and surrounding area are shown in Figure 8. Mean annual NO_2 concentrations were estimated at approximately 38 µg/m^3 at the site for 2016. The modelled data indicate that the NAQOs and WHO guidelines (mean annual concentration no greater than 40 µg/m^3) were both achieved at the site during 2016.

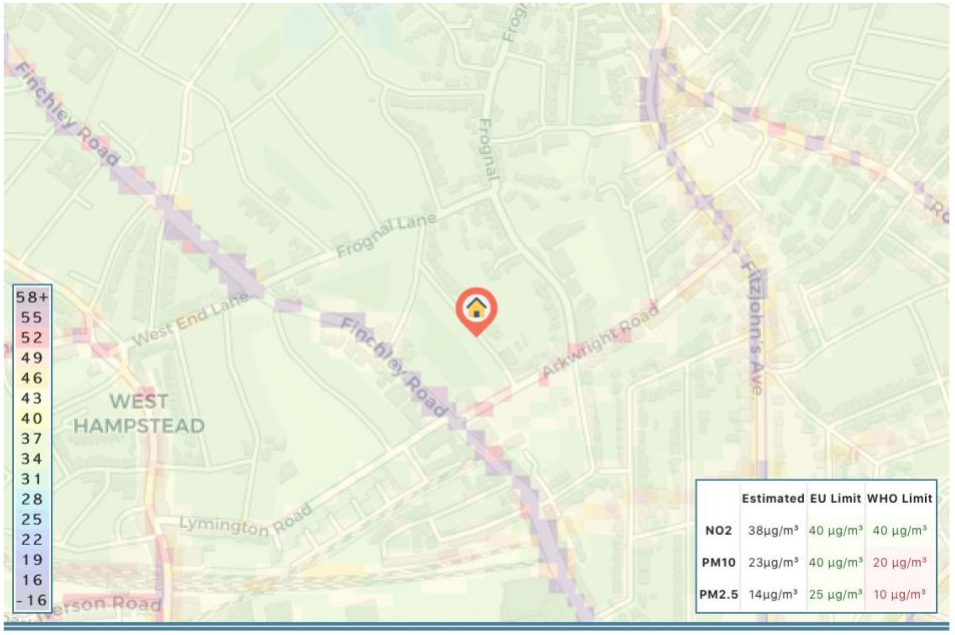

Figure 8: 2016 modelled NO_2 concentrations for the site and surrounding area.

[4] London Atmospheric Emissions Inventory (LAEI) 2016, Greater London Authority. LAEI 2016 mapped data accessed from London Air.

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Modelled Particulate Matter under 10 µm Diameter (PM_{10})

The LAEI 2016 modelled mean annual concentrations of PM_{10} are shown in Figure 9. Mean annual PM_{10} concentrations at the site were estimated at approximately 23 µg/m^3 for 2016. The modelled data indicate that the NAQOs (mean annual concentration no greater than 40 µg/m^3) was achieved at the site for 2016 but the WHO guidelines (mean annual concentration no greater than 20 µg/m^3) was exceeded.

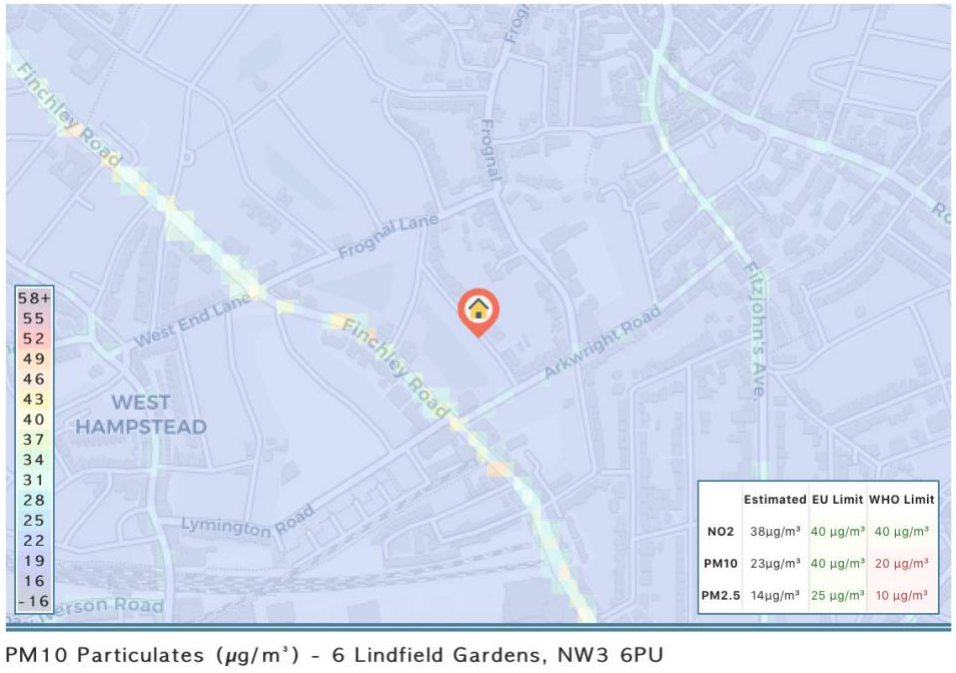

Figure 9: 2016 modelled PM_{10} concentrations for the site and surrounding area.

Monitored Fine Particulate Matter 2.5 µm Diameter ($PM_{2.5}$)

The LAEI 2016 modelled mean annual concentrations of $PM_{2.5}$ are shown in Figure 10. Mean annual $PM_{2.5}$ concentrations at the site were estimated to be approximately 14 µg/m^3 for 2016. The modelled data indicate that the NAQOs (mean annual concentration no greater than 25 µg/m^3) for 2016 was achieved at the site, but the WHO guidelines (mean annual concentration no greater than 10 µg/m^3) was exceeded.

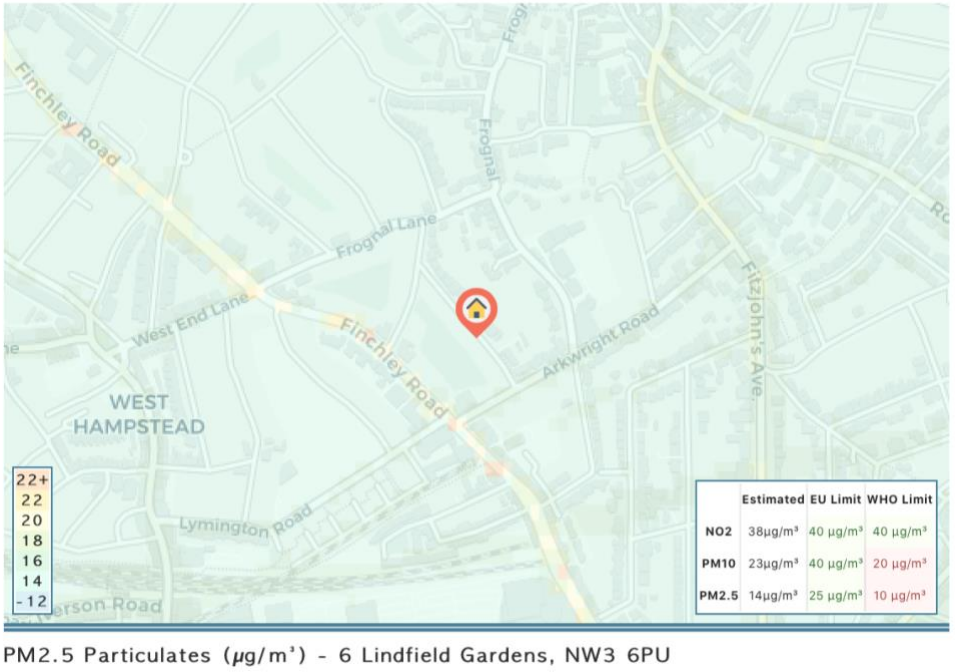

Figure 10: 2016 modelled PM_{10} concentrations for the site and surrounding area.

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Modelled Background Concentrations

DEFRA provides modelled background concentrations for key pollutants across the UK. The 2019–2023 modelled background concentrations for NO_2, PM_{10} and $PM_{2.5}$ for the surrounding site are given in Table 9. The background concentrations for NO_2, PM_{10} and $PM_{2.5}$ consistently achieve the NAQOs and unfailingly decrease between the modelled years of 2019–2023.

Table 9: 2018–2022 modelled background concentrations near the site.[5]

Pollutant/particulate matter	Background concentration (µg/m^3)				
	2023	2022	2021	2020	2019
NO_2	22.8	23.3	24.0	24.8	26.3
PM_{10}	16.7	17.0	17.2	17.4	17.9
$PM_{2.5}$	11.0	11.1	11.2	11.4	11.7

Existing Air Quality Conclusions

Nitrogen Dioxide (NO_2)

A total of four NO_2 diffusion tubes and one automatic monitoring station, monitoring mean annual NO_2 concentrations, have been identified close to the development site. The NAQO at the closest monitoring station to the site, CA7, consistently achieved between 2016–2019. NAQO at all the other sites are exceeded, except for monitoring station CA25A. However, the NAQO has improved significantly over the years and demonstrates a decreasing trend. Moreover, the NAQO (for no more than 18 exceedances of the 200 µg/m^3 hourly mean) has been consistently achieved at monitoring station CD1for the years 2017 to 2019, with an exceedance in 2016.

The LAEI 2016 modelled mean annual NO_2 concentrations were estimated at approximately 38 µg/m^3 at the site, achieving both the NAQO and WHO guidelines. The DEFRA modelled background concentration of NO_2 is 26.3 µg/m^3 for 2019, decreasing to 22.8 µg/m^3 by 2023. It is likely that mean annual NO_2 concentrations currently achieve both the NAQOs and WHO guidelines at the development site.

Coarse particulate matter (PM_{10})

Nearby monitored mean annual PM_{10} concentrations and 24–hourly PM_{10} concentrations at CD1consistently achieved NAQOs from 2016–2019 with exceedances of the WHO objectives from 2016–2018. The LAEI 2016 modelled mean annual concentrations of PM_{10} at the site are estimated at approximately 23 µg/m^3, achieving the NAQO but exceeding the WHO guidelines. The DEFRA modelled background concentration of PM_{10} is 20.0 µg/m^3 for 2019, decreasing to 18.7 µg/m^3 by 2023. It is likely that mean annual PM_{10} concentrations at the development site currently achieve the NAQOs but exceed the WHO guidelines at the site.

Fine particulate matter ($PM_{2.5}$)

Nearby monitored mean annual $PM_{2.5}$ concentrations at CD1 achieved the NAQO but exceeded the WHO objective. The LAEI 2016 modelled mean annual concentrations of $PM_{2.5}$ are estimated as approximately 14 µg/m^3, achieving the NAQO but exceeding the WHO guideline. The DEFRA modelled background concentration of $PM_{2.5}$ is 11.7 µg/m^3 for 2019, decreasing to 11.0 µg/m^3 by 2023. It is likely that mean annual $PM_{2.5}$ concentrations at the development site currently achieve the NAQOs but exceed the WHO guidelines.

[5] DEFRA Local Air Quality Management – Background Maps. Data obtained for London Borough of Camden for nearest grid square (X coordinate 526500, Y coordinate 185500) for years 2019–2023 (from 2018 baseline).

Construction Phase Impacts

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Introduction

Construction phase impacts, as a result of the proposed development, have been assessed using the Institute of Air Quality Management (IAQM) 'Guidance on the assessment of dust from demolition and construction'. The construction phase impacts have been assessed for their risks in line with section 5 of the IAQM guidance.

Assessment of Construction Impacts

Using the evaluation criteria within the IAQM's guidance, the potential dust emission magnitude has been identified for each stage of the proposed development as shown in Table 10.

Table 10: Dust emission magnitudes for construction activities.

Activity	Dust emission magnitude	Justification
Demolition	Small	The total building volume to be demolished will be less than 20,000m^3 and demolition activities will occur at no greater than 10m above ground – **approximately 93.0m^3.**
Earthworks	Small	The total site area is less than 2,500 m^2. There would be less than 5 heavy earth moving vehicles active at any one time– **approximately 1,184m^2.**
Construction	Small	The total new building volume will be less than 25,000 m^3 **approximately 2,520.5m^3.**
Trackout	Small	It is anticipated that there will be a minimal unpaved site area, which will be used for vehicle trackout. It is considered likely that there would be no more than approximately 8 outward vehicle movements of HDV (>3.5t) vehicles in any one day.

The overall sensitivity of the surrounding area to dust soiling, human health impacts and ecological effects has been determined by reviewing the sensitivity of the receptors and distance from the source. A summary of sensitivity of nearby receptors to dust impacts is given in Table 11.

Table 11: Sensitivity of nearby receptors to dust impacts.

Sensitivity of people to dust soiling	Sensitivity of people to PM_{10} health impacts	Sensitivity to ecological effects
High	High	Low
Places of work and parks are located in close vicinity to the development site. Users would expect to enjoy a reasonable level of amenity. The appearance, aesthetics or value of their property could be diminished by soiling.	Residential properties, schools, nurseries, doctors' surgeries and care homes are present within 350 m of the development site. Nearby annual mean PM_{10} monitoring is within the range of 19.0–21.0 µg/m^3 (2016–2019).	No internationally or nationally designated ecological sites are in proximity of the site. It can not be established whether there are particularly important or vulnerable plant species in nearby green spaces, therefore precautionary principle is applied.

The dust emission magnitude determined in Table 10 has been combined with the sensitivity assessment in Table 11 to define the risk of impacts for each phase of development in the absence of mitigation measures. The sensitivity of the surrounding area has been defined in accordance with IAQM guidance and the results are given in Table 12.

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Table 12: Risk to local sensitive receptors from construction dust impacts.

	Risk without mitigation	Activity			
		Demolition	Earthworks	Construction	Trackout
Potential impact	Dust soiling	Medium	Low	Low	Low
	Human health	Medium	Low	Low	Low
	Ecological effects	Negligible	Negligible	Negligible	Negligible
Overall risk of dust impacts with no mitigation		Medium risk			

The overall risk of dust impacts from the construction phase without mitigation measures proposed has been assessed as medium low risk. The risk across the demolition activity has been determined to be medium risk. The risk of the other three construction activities against dust soiling and human health is low. Additionally, the risk of all the activities with regards to ecology is deemed to be negligible. Therefore, no further mitigation measures need specifically be recommended for protecting ecology.

Effects of Mitigation Measures

A schedule of mitigation measures has been developed for the construction phase, based on the 'Control of Dust and Emissions during Construction and Demolition: Supplementary Planning Guidance' (Mayor of London, 2014). These measures are outlined in the Air Quality & Dust Management Plan (AQDMP) (Appendix A). The measures will be incorporated in the appointed Contractor's Construction Environmental Management Plan.

The recommended AQDMP measures address the key construction activities identified and a summary of the proposed measures to satisfactorily reduce the risks from the respective construction phases is given in Table 13. The implementation of the proposed measures is deemed to mitigate the risk for each activity and thus the residual effects are deemed to be negligible.

Table 13: Summary of proposed AQDMP mitigation measures for construction phase.

Activity	Relevant mitigation measures
General (all activities)	Site management measures 1–10. Preparing and maintaining the site measures 11–23. Operating vehicle/machinery and sustainable travel measures 24–30. Operations measures 31–35. Waste management measure 36–37.
Demolition	Measures 38–41.
Earthworks	Measures 42–44
Construction	Measures 45–48.
Trackout	Measures 49–58.

Operational Impacts: Air Quality Neutral

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Introduction

Policy SI 1 in The London Plan 2021, 'Improving air quality' requires that development proposals should not lead to further deterioration of exiting poor air quality and that they must be at least Air Quality Neutral (AQN). The proposed development has been assessed for its performance against the AQN guidance and benchmarks, for both transport and building-related emissions.

Air Quality Neutral: Transport Emissions

The AQN guidance provides a methodology for calculating the Transport Emissions Benchmark (TEB) for specific land use types. The (TEB) has been calculated for the residential units (Table 14) using the factors for Class C3.

As described in the Planning and Heritage Statement, produced in October 2020, it is fully intended that Flat 1 will be retained and occupied by the existing owner and occupier of the dwelling house and, on this basis, the single car parking space shown at street level adjacent to the main entrance to this flat will be demised to this flat/ occupier alone. All the remaining flats are designed to be car-free with no resident permits or off-street spaces. Therefore, it can be concluded that only Flat 1 will generate car trips.

Since the scheme is classified as a minor development, a Transport Assessment was not undertaken. Thus, the number of car trips generated by Flat 1 has been estimated based on a Technical Note by TRICS Consortium Limited.[6] A two-way vehicular daily trip of 0.645 per dwelling for Greater London is selected from Table 10 of the Technical Note. This value is based on a survey of 10 days during weekdays.

Table 14: Transport Emissions Benchmark (TEB).

Development metric	Residential	Total
Applicable planning use class for TEB	Residential (C3,4)	–
Gross Internal Area (m^2)	807.9	807.9
Number of dwellings	9	9
Location (CAZ/inner/outer)	Inner	–
NO_x TEB factor (g/dwelling/year)	558.0	–
Total NO_x TEB (kg/year)	**5.0**	**5.0**
PM_{10} TEB factor (g/dwelling/year)	100.0	–
Total PM_{10} TEB (kg/year)	**0.9**	**0.9**

[6] A comparison of Vehicular Trip Rate Variation by TRICS Regions and Location Types – Technical Note, October 2019.

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Table 15: Comparison of calculated transport emissions against TEBs.

Development metric	Residential	Total
Applicable planning use class for TEB	Residential (C3,4)	–
Daily trips by car	0.645	0.645
Annual car trips by car	235	235
Location (CAZ/inner/outer)	Inner	–
Average distance travelled per car trip (km)	3.7	3.7
Annual distance travelled by car (km/year)	870.9	870.9
NO_x emissions factor (g/km)	0.370	–
Total NO_x emissions (kg/year)	0.3	0.3
Difference from NO_x TEB to actual	**–4.7**	**–4.7**
Transport NO_x AQN result	**Pass**	**Pass**
PM_{10} emissions factor (g/km)	0.0665	–
Total PM_{10} emissions (kg/year)	0.1	0.1
Difference from PM_{10} TEB to actual	**–0.8**	**–0.8**
Transport PM_{10} AQN result	**Pass**	**Pass**

Based on the daily trips generated by Flat 1, the proposed development passes the AQN test for transport emissions (Table 15).

Air Quality Neutral: Building Emissions

The AQN guidance provides a methodology for calculating the Building Emissions Benchmark (BEB) for specific land use types. The (BEB) has been calculated for the development (Table 16) using the factors for Class C3.

Table 16: Building Emissions Benchmark (BEB)

Development metric	Residential	Total
Applicable planning use class for BEB	Residential (C3,4)	–
Gross internal area (m^2)	807.9	807.9
NO_x BEB factor (g/m^2/year)	26.2	26.2
Total NO_x BEB (kg/year)	**21.2**	**21.2**
PM_{10} BEB factor (g/m^2/year)	2.28	2.28
Total PM_{10} BEB (kg/year)	**1.8**	**1.8**

An Energy Assessment report was produced by Eight Associates in September 2020, which is based on a strategy to reduce energy demand as far as practically and economically possible, by implementing energy efficiency measures before applying low carbon and renewable energy technologies.

The use of biomass and combined heat and power (CHP) have been excluded from the scheme. Additionally, no renewable technologies have been specified due to site constrains and conservation criteria. Individual gas boilers with an efficiency of 89.5% have been specified to provide heating and hot water to the nine residential units. However, it is recommended to install ultra-low NO_X gas boilers with a NO_X emissions rating of 38 mg/kWh.

Operational Impacts: Air Quality Neutral

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Based on the annual gas consumption, the development passes the AQN test for building emissions (Table 17).

Table 17: Comparison of calculated building emissions against BEBs.

Development metric	Residential	Total
Applicable planning use class for BEB	Residential (C3,4)	–
Total annual gas consumption from boilers (mg/kWh)	87,700	87,700
Boilers NO_x emissions factor (mg/kWh)	38	–
Total NO_x emissions from boilers (kg/year)	3.3	3.3
Total annual gas consumption from CHP (kWh/year)	0.0	0.0
CHP NO_x emissions factor (mg/kWh)	–	–
Total NO_x emissions from CHP (kg/year)	0.0	0.0
Total NO_x emissions (kg/year)	0.0	0.0
Difference from NO_x BEB to actual	**–17.8**	**–17.8**
Building NO_x AQN result	**Pass**	**Pass**
Total annual oil or solid fuel consumption (kWh/year)	0.0	0.0
PM_{10} emissions factor (mg/kWh)	–	–
Total PM_{10} emissions (kg/year)	0.0	0.0
Difference from PM_{10} BEB to actual	**–1.8**	**–1.8**
Building PM_{10} AQN result	**Pass**	**Pass**

Air Quality Neutral Statement

The Sustainable Design and Construction SPG issued by the Mayor of London, sets out the requirement for all major developments in Greater London to undertake an Air Quality Neutral Test and be designed so that they are at least 'air quality neutral' (AQN). A development is considered to be AQN if it can be demonstrated that either emissions from the operation of a proposed development and transport as a result of the proposed development achieve the relevant emissions benchmarks provided in the AQN guidance.

The development achieves both the Transport Emissions Benchmark (TEB) and Building Emissions Benchmark (BEB) and, therefore, passes the AQN test. No additional mitigation for the purposes of AQN is required.

Operational Impacts: Mitigation Measures

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Pollution Mitigation Hierarchy

The development passes the AQN test for transport and building emissions. Therefore, no additional mitigation or off-setting measures for the operational phase of the development will be required. However, the proposal is located in an area that is likely to have poor existing air quality (most notably for NO_2). Therefore, mitigation measures should be incorporated to reduce the exposure of future building users and occupants.

The principles of the pollution mitigation hierarchy, outlined in the Institute of Air Quality Management (IAQM) 'Mitigation of Development Air Quality: Position Statement', have been applied to the proposed development.

1. Prevention and Avoidance

Preference should be given to preventing or avoiding exposure/impacts to the pollutant in the first place by eliminating or isolating potential sources or by replacing sources or activities with alternatives.

Cycle storage

The Design and Access Statement, produced in October 2020, confirmed that the existing garage is to be converted into an internal cycle storage to provide 15 cycle spaces with the provision of an additional two cycle spaces at the front of the internal bike store. Cycling will, thus, be promoted by the inclusion of cycle storage.

2.a Reduction and Minimisation: Mitigation Measures that act on the Source

Reduction and minimisation of exposure/impacts should next be considered, once all options for prevention/avoidance have been implemented so far as is reasonably practicable (both technically and economically). To achieve this reduction/minimisation, preference should be given, in order, to:

Ultra-low NO_X boilers

As described in the Energy Statement, individual gas boilers with an efficiency of 89.5% have been specified to provide heating and hot water to the residential units. However, it is recommended that ultra-low NOx boilers, with NO_x emissions rating of 38 mg/kWh be installed to minimise emissions.

2.b. Reduction and Minimisation: Mitigation Measures that act on the Pathway

Green and soft landscaping

The proposed development will include soft landscaping to the terraced brick framed front elevation and additional landscaping to the proposed rear elevation patio area and terraces. These will include a mix of planting, namely evergreen to provide year-round cover and long flowering plants that will provide opportunities to increase biodiversity and attract beneficial insects and birds.

Additionally, a dedicated communal garden area at the rear garden for the sole use of Flats 2-8 with a separate section of the rear garden being for the exclusive use of Flat 1 have been designed. These gardens will retain all trees and grassed areas.

These strategies of urban greening will not only introduce a new biodiversity to the development but will help to alleviate pollution, benefitting the air quality of the development.

Operational Impacts: Mitigation Measures
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2.c. Reduction and Minimisation: Mitigation Measures at or Close to the Point of Receptor Exposure

No mitigation measures are proposed.

3. Off-setting

Off-setting a new development's air quality impact by proportionately contributing to air quality improvements elsewhere (including those identified in Air Quality Action Plans and low emission strategies) should only be considered once the solutions for preventing/avoiding, and then for reducing/minimising, the development-specific impacts have been exhausted. Even then, offsetting should be limited to measures that are likely to have a beneficial impact on air quality in the vicinity of the development site. It is not appropriate to attempt to offset local air quality impacts by measures that may have some effect remote from the vicinity of the development site.

The mitigation measures proposed are appropriate to the scale and nature of the development (see sections 1. to 2.c. above). No additional off-setting measures are proposed.

Conclusions
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Conclusions

6 Lindfield Gardens is located in an AQMA, which has been declared for exceedances of the annual average limit for nitrogen dioxide (NO_2) and the World Health Organisation (WHO) limit for particulate matter (PM_{10}). The site is not located in a NO_2 Focus Area.

A review of the latest monitoring data for NO_2 at the closest locations to the development indicate that the NAQO at the closest monitoring station is consistently achieved between 2016–2019. NAQO at all the other sites are exceeded, except for monitoring station CA25A. However, compliance with the NAQO has improved significantly over the years and demonstrates a decreasing trend. The hourly mean of NO_2 concentration has been consistently achieved at monitoring station CD1 for the years 2017 to 2019, with an exceedance in 2016. The LAEI 2016 modelled mean annual NO_2 concentrations were estimated at approximately 38 $\mu g/m^3$ at the site, achieving both the NAQO and WHO guidelines.

Nearby monitored mean annual PM_{10} concentrations, 24–hourly PM_{10} concentrations and mean annual $PM_{2.5}$ concentrations at CD1 achieved the NAQOs but exceed the WHO objectives. The LAEI 2016 modelled mean annual concentrations of PM_{10} and $PM_{2.5}$ at the site are estimated at approximately 23 $\mu g/m^3$ and 14 $\mu g/m^3$, respectively, achieving the NAQOs but exceeding the WHO guidelines.

For developments within London, the AQA methodology incudes the requirement to undertake an assessment against the Air Quality Neutral (AQN) guidance. The scheme has been assessed for both the impacts of transport and building operation against the AQN guidance and it meets the requirements for AQN.

Even though further mitigation measures to reduce exposure of future occupants to pollutants are not explicitly required, the design mitigation hierarchy has been applied nonetheless, to maximise air quality for occupants, where feasible. Measures include, provision of sustainable transport modes, such as cycling, ultra–low NO_X boilers and urban greening.

The unmitigated risk to local sensitive receptors from emissions of dust and pollution from construction is deemed to be medium. However, the risk will be mitigated further through the measures set out in the Air Quality & Dust Management Plan (AQDMP), which will be implemented through the contractor's Construction Environmental Management Plan. With the mitigation measures in place, the residual effects arising from the construction phase of the proposed development would be deemed 'not significant'.

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Roles and Responsibilities

The Site Manager will have overall responsibility for dust management during construction and will ensure that all site personnel are effectively briefed and given adequate resources to undertake the air quality and dust management requirements, as set out in this Air Quality & Dust Management Plan (AQDMP).

Key roles and responsibilities for the Site Manager and site personnel are outlined in Table A–1.

Table A–1: Schedule of AQDMP responsibilities.

Role	Responsibilities
Site manager	Ensure that the mitigation and monitoring requirements outlined in the AQDMP are carried out during works on site.
	Ensure that staff are aware of the requirements of the AQDMP and have access to the document. Regular training of staff should be implemented.
	Undertake and record dust inspections of the site as required by the AQDMP.
	Ensure that site documentation (including method statements and risk assessments) include adequate dust mitigation.
	Act on complaints and dust alerts as detailed in the AQDMP.
	Maintain up–to–date site log of air quality events and complaints.
	Investigate the cause of air quality events and apply additional mitigation are required.
	Act as the key point of contact for queries and complaints regarding air quality emissions from site.
	Report observations of dust events or deviations from the AQDMP procedures.

Table A–1: Schedule of AQDMP responsibilities (continued).

Role	Responsibilities
Site personnel	Carry out the works in accordance with the AQDMP requirements.
	Report observations of dust events or deviations from the AQDMP procedures.
	Attend environmental management training.

Hours of Work

Normal working hours for 6 Lindfield Gardens construction site will be as follows:

- Monday – Friday: 08:00 – 18:00 hrs.
- Saturday: 08:00 – 13:00 hrs.

There will not typically be any construction activities undertaken outside of the stated working hours, including on Sundays, Public Holidays or Bank Holidays. In the event that construction activities are sought to be undertaken outside of the normal working hours, these will be agreed in writing with the local planning authority in advance.

Measures Relevant for Demolition, Earthworks, Construction and Trackout

Robust site management will be required to control the dust emissions from construction activities. Mitigation methods, in accordance with 'The Control of Dust and Emissions during Construction and Demolition' SPG (Mayor of London, 2014) have been proposed for the site.

All 'required' mitigation measures must be implemented. We would strongly recommend that all 'recommended' measures are implemented, along with those that are 'not required' where feasible.

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It is recommended that these measures, as detailed in Table A–2, be set out in the site–specific Construction Environmental Management Plan, which will form part of the proposed development's overall Construction Management Plan.

Table A–2: Schedule of construction phase mitigation measure requirements.

Site management	
Mitigation measure	**Compliance requirements**
1) Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.	Required
2) Develop a Dust Management Plan.	Required
3) Display the name and contact details of person(s) accountable for air quality pollutant emissions and dust issues on the site boundary.	Required
4) Display the head or regional office contact information.	Required
5) Record and respond to all dust and air quality pollutant emissions complaints.	Required
6) Make a complaint log available to the local authority when asked.	Required
7) 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.	Required
8) 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.	Required
9) 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.	Required

Table A–2: Schedule of construction phase mitigation measure requirements (continued).

Site management	
Mitigation measure	**Compliance requirements**
10) Hold regular liaison meetings with other high–risk construction sites within 500 m of the site boundary, to ensure plans are co–ordinated and dust and particulate matter emissions are minimised.	Not required

Preparing and maintaining the site	
Mitigation measure	**Compliance requirements**
11) Plan site layout: machinery and dust causing activities should be located away from receptors	Required
12) Erect solid screens or barriers around dust activities or the site boundary that are, at least, as high as any stockpiles on site.	Required
13) Full enclosure of the site or specific operations where there is a high potential for dust production and the site is active for an extensive period..	Required
14) Install green walls, screens or other green infrastructure to minimise the impact of dust and pollution.	Recommended
15) Avoid site runoff of water and mud.	Required
16) Keep site fencing, barriers and scaffolding clean using wet methods.	Required
17) Remove materials from site as soon as possible.	Required
18) Cover, seed or fence stockpiles to prevent wind whipping.	Required
19) Carry out regular dust soiling checks of buildings within 100 m of site boundary and cleaning to be provided if necessary.	Recommended

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Table A–2: Schedule of construction phase mitigation measure requirements (continued).

Preparing and maintaining the site	
Mitigation measure	**Compliance requirements**
20) Provide showers and ensure a change of shoes and clothes are required before going off–site to reduce transport of dust.	Not required
21) Agree monitoring locations with the Local Authority.	Required
22) Where possible, commence baseline monitoring at least three months before phase begins.	Required
23) Put in place real–time dust and air quality pollutant monitors across the site and ensure they are checked regularly.	Required

Operating vehicles/machinery and sustainable travel	
Mitigation measure	**Compliance requirements**
24) Ensure all on–road vehicles comply with the requirements of the London Low Emission Zone.	Required
25) Ensure all non–road mobile machinery (NRMM) comply with the standards set within this guidance.	Required
26) Ensure all vehicles switch off engines when stationary – no idling vehicles.	Required
27) Avoid the use of diesel– or petrol–powered generators and use mains electricity or battery powered equipment where possible.	Required
28) 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).	Recommended

Table A–2: Schedule of construction phase mitigation measure requirements (continued).

Operating vehicles/machinery and sustainable travel	
Mitigation measure	**Compliance requirements**
29) Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.	Required
30) Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car–sharing).	Required

Operations	
Mitigation measure	**Compliance requirements**
31) 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.	Required
32) Ensure an adequate water supply on the site for effective dust/particulate matter mitigation (using recycled water where possible).	Required
33) Use enclosed chutes, conveyors and covered skips.	Required
34) Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.	Required
35) 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.	Required

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Table A–2: Schedule of construction phase mitigation measure requirements (continued).

Waste management	
Mitigation measure	**Compliance requirements**
36) Reuse and recycle waste to reduce dust from waste materials.	Required
37) Avoid bonfires and burning of waste materials.	Required

Measures Specific to Demolition

Table A–2: Schedule of construction phase mitigation measure requirements (continued).

Demolition	
Mitigation measure	**Compliance requirements**
38) Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).	Recommended
39) Ensure water suppression is used during demolition operations.	Required
40) Avoid explosive blasting, using appropriate manual or mechanical alternatives.	Required
41) Bag and remove any biological debris or damp down such material before demolition.	Required

Measures Specific to Earthworks

Table A–2: Schedule of construction phase mitigation measure requirements (continued).

Earthworks	
Mitigation measure	**Compliance requirements**
42) Re–vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces.	Recommended
43) Use Hessian, mulches or trackifiers where it is not possible to re–vegetate or cover with topsoil.	Recommended
44) Only remove secure covers in small areas during work and not all at once.	Recommended

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Measures Specific to Construction

Table A–2: Schedule of construction phase mitigation measure requirements (continued).

Construction	
Mitigation measure	**Compliance requirements**
45) Avoid scabbling (roughening of concrete surfaces) if possible.	Recommended
46) 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.	Required
47) 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.	Recommended
48) For smaller supplies of fine powder materials ensure bags are sealed after use and stored appropriately to prevent dust.	Recommended

Measures Specific to Trackout

Table A–2: Schedule of construction phase mitigation measure requirements (continued).

Trackout	
Mitigation measure	**Compliance requirements**
49) Regularly use a water–assisted dust sweeper on the access and local roads, as necessary, to remove any material tracked out of the site.	Required
50) Avoid dry sweeping of large areas.	Required
51) Ensure vehicles entering and leaving sites are securely covered to prevent escape of materials during transport.	Required
52) Record all inspections of haul routes and any subsequent action in a site logbook.	Required
53) Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems and regularly cleaned.	Required
54) Inspect haul routes for integrity and instigate necessary repairs to the surface, as soon as reasonably practicable.	Required
55) Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).	Required
56) 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.	Required
57) Access gates to be located at least 10m from receptors, where possible.	Required
58) Apply dust suppressants to locations where a large volume of vehicles enters and exit the construction site.	Recommended