SYNTEGRA CONSULTING

Ariel Hotel
118 Bath Road
Heathrow
Hayes
UB3 5AH

Air Quality Assessment

September 2023

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1. Introduction

Background

This report has been prepared in respect of development at Ariel Hotel, 118 Bath Road, Heathrow, Hayes, UB3 5AH.

It is proposed to redevelopment of the site to provide the addition of two storeys above the existing hotel building, providing 113 new hotel rooms (a total of 299 hotel rooms), and the erection of a new apart-hotel building comprising 98 apart-hotel rooms, including façade enhancements and associated works.

The proposed development has the potential to cause air quality impacts at sensitive locations during the construction and operational phases, as well as expose future occupants to elevated pollution levels. These may include fugitive dust emissions associated with construction and road traffic exhaust emissions from vehicles travelling to and from the site during the operation. As such, an air quality assessment was required to determine baseline conditions at the site, consider its suitability for the proposed end-use and assess potential effects associated with the scheme. This is detailed in the following report.

Site Location and Context

The site is located on at approximate National Grid Reference (NGR): 508865, 176974. Reference should be made to Figure 1 for a map of the site and surrounding area.

2. Legislation and Policy

UK Legislation

The Air Quality Standards Regulations (2016) came into force on 31st December 2016 and include Air Quality Limit Values (AQLVs) for the following pollutants:

- NO_2;
- Sulphur dioxide;
- Lead;
- Particulate matter with an aerodynamic diameter of less than 10µm (PM_{10});
- Particulate matter with an aerodynamic diameter of less than 2.5µm;
- Benzene; and,
- Carbon monoxide.

Target Values were also provided for an additional 5 pollutants. These include:

- Ozone;
- Arsenic;
- Cadmium;
- Nickel; and,
- Benzo(a)pyrene.

Part IV of the Environment Act (2021) UK Government to produce a national Air Quality Strategy (AQS) which contains standards, objectives, and measures for improving ambient air quality. The most recent AQS was produced by the Department for Environment, Food and Rural Affairs (DEFRA) and published in July 2007[1]. The AQS sets out Air Quality Objectives (AQOs) that are maximum ambient pollutant concentrations that are not to be exceeded either without exception or with a permitted number of exceedances over a specified timescale. These are generally in line with the AQLVs, although the requirements for the determination of compliance vary.

Table 1 presents the AQOs for pollutants considered within this assessment.

Table 1: Air Quality Objectives

Pollutant	Air Quality Objective	
	Concentration (µg/m³)	Averaging Period
NO_2	40	Annual mean
	200	1-hour mean, not to be exceeded on more than 18 occasions per annum
PM_{10}	40	Annual mean
	50	24-hour mean, not to be exceeded on more than 35 occasions per annum

[1] The AQS for England, Scotland, Wales and Northern Ireland, DEFRA, 2007.

Table 2 summarises the advice provided in DEFRA guidance[2] on where the AQOs for pollutants considered within this report apply.

Table 2: Examples of Where the Air Quality Objectives Apply

Averaging Period	Objective Should Apply At	Objective Should Not Apply At
Annual mean	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 mean	All locations where the annual mean objective would apply, together with hotels 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
1-hour mean	All locations where the annual mean and 24 and 8-hour mean objectives apply. Kerbside sites (for example, pavements of busy shopping streets) Those parts of car parks, bus stations and railway stations etc which are not fully enclosed, where members of the public might reasonably be expected to spend one hour or more Any outdoor locations where members of the public might reasonably be expected to spend one hour or longer	Kerbside sites where the public would not be expected to have regular access

Local Air Quality Management

Under Section 82 of the Environment Act (1995) (Part IV) Local Authorities (Councils) are required to periodically review and assess air quality within their area of jurisdiction under the system of Local Air Quality Management (LAQM). This Review and Assessment of air quality involves comparing present and likely future pollutant concentrations against the AQOs. If it is predicted that levels at locations of relevant exposure, as summarised in Table 2, are likely to be exceeded, the council is required to declare an Air Quality Management Area (AQMA). For each AQMA the Council is required to produce an Air Quality Action Plan, the objective of which is to reduce pollutant concentrations in pursuit of the AQOs.

[2] London Local Air Quality Management Technical Guidance (TG19), DEFRA, 2019.

Dust Legislation

The main requirements with respect to dust control from industrial or trade premises not regulated under the Environmental Permitting (England and Wales) Regulations (2016) and subsequent amendments, such as construction sites, is that provided in Section 79 of Part III of the Environmental Protection Act (1990). The Act defines nuisance as:

> *"Any dust, steam, smell or other effluvia arising on industrial, trade or business premises and being prejudicial to health or a nuisance."*

Enforcement of the Act, regarding nuisance, is currently under the jurisdiction of the local Environmental Health Department, whose officers are deemed to provide an independent evaluation of nuisance. If the Council is satisfied that a statutory nuisance exists, or is likely to occur or happen again, it must serve an Abatement Notice under Part III of the Environmental Protection Act (1990). Enforcement can insist that there be no dust beyond the boundary of the works. The only defence is to show that the process to which the nuisance has been attributed and its operation are being controlled according to best practicable means.

National Planning Policy

The National Planning Policy Framework[3] (NPPF) was revised in July 2021 and sets out the Government's planning policies for England and how these are expected to be applied. This revised Framework replaces the previous National Planning Policy Framework published in March 2012, revised in July 2018, updated in February 2019, and subsequently in September 2023.

The purpose of the planning system is to contribute to the achievement of sustainable development. To ensure this, the NPPF recognises 3 overarching objectives, including the following of relevance to air quality:

> *"c) An environmental objective - to protect and enhance our natural, built and historic environment; including making effective use of land, improving biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy."*

Chapter 15 of the NPPF details objectives in relation to conserving and enhancing the natural environment. It states that:

> *"Planning policies and decisions should contribute to and enhance the natural and local environment by:*
>
> *[…]*
>
> *e) 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 […]"*

[3] NPPF, Ministry of Housing, Communities and Local Government, 2019.

The NPPF specifically recognises air quality as part of delivering sustainable development and 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."*

The implications of the NPPF have been considered throughout this assessment.

National Planning Practice Guidance

The National Planning Practice Guidance[4] (NPPG) web-based resource was launched by the Department for Communities and Local Government on 6th March 2014 and updated on 1st November 2019 to support the NPPF and make it more accessible. The air quality pages are summarised under the following headings:

1. What air quality considerations does planning need to address?
2. What is the role of plan-making with regard to air quality?
3. Are air quality concerns relevant to neighbourhood planning?
4. What information is available about air quality?
5. When could air quality considerations be relevant to the development management process?
6. What specific issues may need to be considered when assessing air quality impacts?
7. How detailed does an air quality assessment need to be?
8. How can an impact on air quality be mitigated?

These were reviewed and the relevant guidance considered as necessary throughout the undertaking of this assessment.

Local Planning Policy

<u>The London Plan</u>

The London Pan 2021 is the Spatial Development Strategy for Greater London. It sets out a framework for how London will develop over the next 20-25 years and the Mayor's vision for Good Growth. The Plan is part of the statutory development plan for London, meaning that the policies in the Plan should inform decisions on planning applications across the capital. Borough's Local Plans must be in 'general conformity' with the London Plan, ensuring that the planning system for London operated in a joined-up way and reflects the overall strategy for how London can develop sustainably, which the London Plan sets out.

[4] https://www.gov.uk/guidance/air-quality--3.

The following policy is relevant to this assessment:

"Policy S1 1 Improving Air Quality

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:*

   a. *Development proposals should not:*

      i. *lead to further deterioration of existing poor air quality*

      ii. *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*

      iii. *create unacceptable risk of high levels of exposure to poor air quality.*

   b. *To meet the requirements in Part 1, as a minimum:*

      i. *development proposals must be at least Air Quality Neutral*

      ii. *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 retrofitted mitigation measures*

      iii. *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*

      iv. *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:*

   a. *how proposals have considered ways to maximise benefits to local air quality, and*

   b. *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 guidance5.*

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."*

The Local Plan

The Council's Local Plan is the Local Plan: Part 1 Strategic Policies (Adopted November 2012) which forms the statutory development plan for the borough, along with the London Plan. A review of the Local Plan identified the following policy of relevance to this assessment.

*"**Policy EM8: Land, Water, Air and Noise***

…

Air Quality
All development should not cause deterioration in the local air quality levels and should ensure the protection of both existing and new sensitive receptors.

All major development within the Air Quality Management Area (AQMA) should demonstrate air quality neutrality (no worsening of impacts) where appropriate; actively contribute to the promotion of sustainable transport measures such as vehicle charging points and the increased provision for vehicles with cleaner transport fuels; deliver increased planting through soft landscaping and living walls and roofs; and provide a management plan for ensuring air quality impacts can be kept to a minimum.

The Council seeks to reduce the levels of pollutants referred to in the Government's National Air Quality Strategy and will have regard to the Mayor's Air Quality Strategy.

London Boroughs should also take account of the findings of the Air Quality Review and Assessments and Actions plans, in particular where Air Quality Management Areas have been designated.

The Council has a network of Air Quality Monitoring stations but recognises that this can be widened to improve understanding of air quality impacts. The Council may therefore require new major Development in an AQMA to fund additional air quality monitoring stations to assist in managing air quality improvements.

…"

[5] The Control of Dust and Emissions During Construction and Demolition Supplementary Planning Guidance, Mayor of London, 2014

The implications of this policy were taken into consideration throughout the undertaking of the assessment.

3. Baseline

Existing air quality conditions in the vicinity of the proposed development site were identified to provide a baseline for the assessment. These are detailed in the following Sections.

Local Air Quality Management

As required by the Environment Act (1995), the Council has undertaken Review and Assessment of air quality within their area of jurisdiction. This process has indicated that annual mean concentrations of NO_2 are above the AQO within the borough. As such, one AQMA has been declared. This is described as follows:

> *Hillingdon AQMA: "The area from the southern boundary north to the border defined by, the A40 corridor from the western borough boundary, east to the intersection with the Yeading Brook north until its intersection with the Chiltern-Marylebone railway line."*

The development is located within the AQMA. As such, there is the potential for vehicles travelling to and from the site to increase pollution levels in this sensitive area, as well as the exposure of future residents to poor air quality. These issues have been considered throughout the assessment.

The Council has concluded that concentrations of all other pollutants considered within the AQS are currently below the relevant AQOs. As such, no further AQMAs have been designated.

Air Quality Focus Area

In 2019, 160 Air Quality Focus Areas (AQFAs) were defined across London in locations where the EU annual mean limit value for NO_2 was exceeded and there was high human exposure. These were not designed to be an exhaustive list of London's air pollution hotspots, but where the problem most acute. The Focus Areas have been used by Greater London Authority (GLA), TfL and the boroughs to inform LAQM, the development of air quality interventions and the planning process. Under London LAQM guidelines, boroughs are required to have regard to the Focus Areas in their borough when devising their air quality action plans.

The development is located within the following AQFA:

> *"ID 81: Heathrow area"*

Air Quality Monitoring

Monitoring of pollutant concentrations is undertaken by the Council throughout their area of jurisdiction. Annual mean NO_2 results recorded in the vicinity of the development taken from readily available information online are shown in Table 3. Exceedances of the relevant AQOs are shown in **bold**.

Table 3: Monitoring Results - NO_2

Monitoring Site	Distance to Site (Km)	Monitor Type	Monitored NO_2 Concentration ($\mu g/m^3$)		
			2019	2020	2021
LHR2 - London Heathrow	0.383	Airport (Airside) – Continuous Monitor	**42.0**	25.0	2.05
HILL10 - Brendan Close Harlington (1st lamp post on the left)	0.476	Roadside – Diffusion Tube	39.7	25.2	26.4
HILL38 - Blue street light neat speed camera markings to west of Oxford Ave, Near AQMS. UB3	0.661	Roadside – Diffusion Tube	**44.0**	33.0	28.9
HI3 – Hillingdon 3 - Oxford Avenue	0.693	Roadside – Continuous Monitor	33.0	22.0	25.0

As shown in Table 3, there are two monitoring sites in the vicinity of the development which have recorded exceedances of the annual mean NO_2 AQO of 40 $\mu g/m^3$ in 2019 (Pre-COVID).

Table 4: Monitoring Results – PM_{10}

Monitoring Site	Distance to Site (Km)	Monitor Type	Monitored PM_{10} Concentration ($\mu g/m^3$)		
			2019	2020	2021
LHR2 - London Heathrow	0.383	Airport (Airside) – Continuous Monitor	13.0	11.0	11.0
HI3 – Hillingdon 3 - Oxford Avenue	0.693	Roadside – Continuous Monitor	24.0	23.0	20.0

Table 4 shows there were no recorded exceedances of the annual mean PM_{10} AQO of 40 $\mu g/m^3$ in 2019 (Pre-COVID) in the vicinity of the development site.

Background Pollutant Concentrations

Predictions of background pollutant concentrations on a 1km-by-1km grid basis have been produced by DEFRA for the entire of the UK to assist LAs in their Review and Assessment of air quality. The proposed development site is in grid square NGR: 508500, 176500. Data for this location was downloaded from the DEFRA website[6] for the purpose of this assessment and is summarised in Table 5.

[6] http://uk-air.defra.gov.uk/data/laqm-background-maps?year=2018.

Table 5: Background Pollutant Concentrations

Pollutant	Predicted Background Concentration (µg/m^3)	
	2019	2025
NO_2	40.3	37.3
PM_{10}	16.3	14.9

As shown in Table 5, while predicted background PM_{10} concentrations are below the relevant AQOs at the development site, NO_2 concentrations are predicted to exceed them in 2019. By 2025 pollutant concentrations are expected to decrease.

Sensitive Receptors

A sensitive receptor is defined as any location which may be affected by changes in air quality because of a development. These have been defined for dust and road vehicle exhaust emission impacts in the following Sections.

4. Methodology

Introduction

The proposed development has the potential to cause air quality impacts during the construction and operational phases, as well as expose future occupants to elevated pollution levels. These factors were assessed in accordance with the following methodology.

Construction Phase Fugitive Dust Emissions

There is the potential for fugitive dust emissions to occur because of construction phase activities. These have been assessed in accordance with the methodology outlined within the Institute of Air Quality Management (IAQM) document 'Guidance on the Assessment of Dust from Demolition and Construction V1.1'[7]

Activities on the proposed construction site have been divided into 4 types to reflect their different potential impacts. These are:

- Demolition;
- Earthworks;
- Construction; and
- Trackout.

The potential for dust emissions was assessed for each activity that is likely to take place and considered 3 separate dust effects:

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

The assessment steps are detailed below.

Step 1

Step 1 screens the requirement for a more detailed assessment. Should human receptors be identified within 350m of the boundary or 50m from the construction vehicle route up to 500m from the site entrance, then the assessment proceeds to Step 2. Additionally, should ecological receptors be identified within 50m of the site or the construction vehicle route, then the assessment also proceeds to Step 2.

Should sensitive receptors not be present within the relevant distances then **negligible** impacts would be expected and further assessment is not necessary.

Step 2

Step 2 assesses the risk of potential dust impacts. A site is allocated a risk category based on 2 factors:

[7] Guidance on the Assessment of Dust from Demolition and Construction V1.1, IAWM, 2016

- The scale and nature of the works, which determines the magnitude of dust arising as: small, medium, or large (Step 2A); and

- The sensitivity of the area to dust impacts, which can be defined as low, medium, or high sensitivity (Step 2B).

The 2 factors are combined in Step 2C to determine the risk of dust impacts without mitigation applied.

Step 2A defines the potential magnitude of dust emission through the construction phase. The relevant criteria are summarised in Table 6.

Table 6: Construction Dust - Magnitude of Emission

Magnitude	Activity	Criteria
Large	Demolition	Total volume of building to be demolished greater than 50,000m3 Potentially dusty material (e.g., concrete) On site crushing and screening Demolition activities more than 20m above ground level
	Earthworks	Total site area greater than 10,000m2 Potentially dusty soil type (e.g., clay, which will be prone to suspension when dry due to small particle size) More than 10 heavy earth moving vehicles active at any one time Formation of bunds greater than 8m in height More than 100,000 tonnes of material moved
	Construction	Total building volume greater than 100,000m3 On site concrete batching Sandblasting
	Trackout	More than 50 Heavy-Duty Vehicle (HDV) trips per day Potentially dusty surface material (e.g., high clay content) Unpaved road length greater than 100m
Medium	Demolition	Total volume of building to be demolished between 20,000m3 and 50,000m3 Potentially dusty construction material Demolition activities 10m to 20m above ground level
	Earthworks	Total site area 2,500m2 to 10,000m2 Moderately dusty soil type (e.g., silt) 5 to 10 heavy earth moving vehicles active at any one time Formation of bunds 4m to 8m in height Total material moved 20,000 tonnes to 100,000 tonnes
	Construction	Total building volume 25,000m3 to 100,000m3 Potentially dusty construction material (e.g., concrete) On site concrete batching

Magnitude	Activity	Criteria
	Trackout	10 to 50 HDV trips per day Moderately dusty surface material (e.g., high clay content) Unpaved road length 50m to 100m
Small	Demolition	Total volume of building to be demolished less than 20,000m3 Construction material with low potential for dust release (e.g., metal cladding or timber) Demolition activities less than 10m above ground and during wetter months
	Earthworks	Total site area less than 2,500m2 Soil type with large grain size (e.g., sand) Less than 5 heavy earth moving vehicles active at any one time Formation of bunds less than 4m in height Total material moved less than 20,000 tonnes Earthworks during wetter months
	Construction	Total building volume less than 25,000m3 Construction material with low potential for dust release (e.g., metal cladding or timber)
	Trackout	Less than 10 HDV trips per day Surface material with low potential for dust release Unpaved road length less than 50m

Step 2B defines the sensitivity of the area around the development to potential dust impacts. The influencing factors are shown in Table 7.

Table 7: Construction Dust - Examples of Factors Defining Sensitivity of an Area

Receptor Sensitivity	Examples	
	Human Receptors	**Ecological Receptors**
High	Users expect of high levels of amenity High aesthetic or value property People expected to be present continuously for extended periods of time Locations where members of the public are exposed over a time period relevant to the AQO for PM_{10}. e.g., residential properties, hospitals, schools, and residential care homes	Internationally or nationally designated site e.g., Special Area of Conservation
Medium	Users would expect to enjoy a reasonable level of amenity Aesthetics or value of their property could be diminished by soiling People or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land e.g., parks and places of work	Nationally designated site e.g., Sites of Special Scientific Interest

Receptor Sensitivity	Examples	
	Human Receptors	Ecological Receptors
Low	Enjoyment of amenity would not reasonably be expected Property would not be expected to be diminished in appearance Transient exposure, where people would only be expected to be present for limited periods. e.g., public footpaths, playing fields, shopping streets, farmland, short term car parks and roads	Locally designated site e.g., Local Nature Reserve

The guidance also provides the following factors to consider when determining the sensitivity of an area to potential dust impacts:

- Any history of dust generating activities in the area;
- The likelihood of concurrent dust generating activity on nearby sites;
- Any pre-existing screening between the source and receptors;
- Any conclusions drawn from analysing local meteorological data which accurately represent the area; and if relevant the season during which works will take place;
- Any conclusions drawn from local topography;
- Duration of the potential impact, as a receptor may become more sensitive over time; and
- Any known specific receptor sensitivities which go beyond the classifications given in the document.

These factors were considered during the undertaking of the assessment.

The criteria for determining the sensitivity of the area to dust soiling effects on people and property is summarised in Table 8.

Table 8: Construction Dust - Sensitivity of the Area to Dust Soiling Effects on People and Property

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

Table 9 outlines the criteria for determining the sensitivity of the area to human health impacts.

Table 9: Construction Dust - Sensitivity of the Area to Human Health Impacts

Receptor Sensitivity	Annual Mean PM_{10} Concentration	Number of Receptors	Distance from the Source (m)				
			Less than 20	Less than 50	Less than 100	Less than 200	Less than 350
High	Greater than 32µg/m^3	More than 100	High	High	High	Medium	Low
		10 - 100	High	High	Medium	Low	Low
		1 - 10	High	Medium	Low	Low	Low
	28 - 32µg/m^3	More than 100	High	High	Medium	Low	Low
		10 - 100	High	Medium	Low	Low	Low
		1 - 10	High	Medium	Low	Low	Low
	24 - 28µg/m^3	More than 100	High	Medium	Low	Low	Low
		10 - 100	High	Medium	Low	Low	Low
		1 - 10	Medium	Low	Low	Low	Low
	Less than 24µg/m^3	More than 100	Medium	Low	Low	Low	Low
		10 - 100	Low	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low	Low
Medium	-	More than 10	High	Medium	Low	Low	Low
		1 - 10	Medium	Low	Low	Low	Low
Low	-	More than 1	Low	Low	Low	Low	Low

Table 10 outlines the criteria for determining the sensitivity of the area to ecological impacts.

Table 10: Construction Dust - Sensitivity of the Area to Ecological Impacts

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

Step 2C combines the dust emission magnitude with the sensitivity of the area to determine the risk of unmitigated impacts. Table 11 outlies the risk category from demolition activities.

Table 11: Construction Dust - Dust Risk Category from Demolition Activities

Receptor Sensitivity	Dust Emission Magnitude		
	Large	Medium	Small
High	High	Medium	Medium
Medium	High	Medium	Low
Low	Low	Low	Negligible

Table 12 outlines the risk category from earthworks and construction activities.

Table 12: Construction Dust - Dust Risk Category from Earthworks and Construction Activities

Receptor Sensitivity	Dust Emission Magnitude		
	Large	Medium	Small
High	High	Medium	Low
Medium	Medium	Medium	Low
Low	Low	Low	Negligible

Table 13 outlines the risk category from trackout activities.

Table 13: Construction Dust - Dust Risk Category from Trackout Activities

Receptor Sensitivity	Dust Emission Magnitude		
	Large	Medium	Small
High	High	Medium	Low
Medium	Medium	Low	Negligible
Low	Low	Low	Negligible

Step 3

Step 3 requires the identification of site-specific mitigation measures within the IAQM guidance[8] to reduce potential dust impacts based upon the relevant risk categories identified in Step 2. For sites with **negligible** risk, mitigation measures beyond those required by legislation are not required. However, additional controls may be applied as part of good practice.

Step 4

Once the risk of dust impacts has been determined and the appropriate mitigation measures identified, the final Step is to determine the significance of any residual impacts. For almost all construction activity, the aim should be to control effects using effective mitigation. Experience shows that this is normally possible. Hence the residual effect will normally be **not significant**.

[8] Guidance on the Assessment of Dust from Demolition and Construction V1.1, IAQM, 2016.

Operation Phase Road Vehicle Exhaust Emission Assessment

The proposed development has the potential to affect existing air quality because of road traffic exhaust emissions associated with vehicles travelling to and from the site, as well as expose future occupants to elevated pollution levels.

Potential Development Impacts

The development proposals have been screened against the IAQM indicative criteria for requiring an air quality assessment.

1. A change in Light-Duty Vehicle[9] (LDV) traffic flows on local roads with relevant receptors
   - more than 100 Annual Average Daily Traffic (AADT) within or adjacent to an AQMA
   - more than 500 AADT elsewhere

2. A change in HDV[10] flows on local roads with relevant receptors
   - more than 25 AADT within or adjacent to an AQMA
   - more than 100 AADT elsewhere

3. A change in the alignment of roads by 5m or more and the road is within an AQMA

4. Introduction of 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:
     (a) more than 25 AADT within or adjacent to an AQMA
     (b) more than 100 AADT elsewhere

6. Has an underground car park with an extraction system within 20 m of a relevant receptor. Coupled with the car park having more than 100 movements per day (total in and out).

7. Has one or more substantial combustion processes, where there is a risk of impacts at relevant receptors.
   - includes combustion plant associated with standby emergency generators (typically associated with centralised energy centres) and shipping.

Where IAQM indicative criteria for requiring an air quality assessment was met, potential impacts were defined by predicting pollutant concentrations at sensitive locations using Design Manual for Roads and Bridges (DMRB)[11] and/or ADMS-Roads dispersion modelling.

[9] Cars and small vans <3.5t gross vehicle weight
[10] Goods vehicles + buses >3.5t gross vehicle weight
[11] DMRB Volume 11, Section 3, Part 1, LA 105, Highways England, 2019.

Where necessary, locations sensitive to potential changes in pollutant concentrations were identified within 200m of the highway network following the guidance provided within DMRB on the likely limits of pollutant dispersion from road sources. The criteria provided within DEFRA guidance[12] on where the AQOs apply, as summarised in Table 2, was utilised to determine appropriate receptor positions.

Reference should be made to the Appendix for assessment input data and details of the verification process.

Dispersion Modelling Input Data

Dispersion modelling was undertaken using the ADMS-Roads dispersion model (version 5.0.0.1). ADMS-Roads are developed by Cambridge Environmental Research Consultants (CERC) and is routinely used throughout the world for the prediction of pollutant dispersion from road sources. Modelling predictions from this software package are accepted within the UK by the Environment Agency and DEFRA.

Table 14 shows the datasets/values were used as input to the model.

Table 14: Model Input

Parameter	Value/Source
Traffic Flow Data	2019 London Atmospheric Emissions Inventory (LAEI)
Emission Factors	Defra Emissions Factor Toolkit (v 11.0)
Meteorological Data	2019 London Heathrow Airport. See Figure 3 for a wind rose.
Surface Albedo	0.23
Surface Roughness Length	Development Site: 1.5m suitable for 'Large Urban Areas' Meteorological Site: 0.005m for 'Short Grassland'
Monin-Obukhov Length	Development Site: 100m suitable for 'Large Conurbations >1 million' Meteorological Site: 100m suitable for 'Large Conurbations >1 million'
Background Concentrations	Defra Background Pollution Concentration Maps (2018 Base)
NO_x to NO_2 Conversion	Defra NO_x to NO_2 Spreadsheet (v. 8.1)

Impact Significance

The significance of predicted air quality impacts was determined following the guidance provided within the IAQM document 'Land-Use Planning & Development Control: Planning for Air Quality'[13].

[12] Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.
[13] Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.

Using this methodology impacts were defined based on the interaction between the predicted pollutant concentration in the Do Something (DS) or With Development scenario and the magnitude of change between the Do Minimum (DM) or Without Development and DS scenarios, as outlined in Table 15.

Table 15: Significance of Road Vehicle Exhaust Emissions Impact

Concentration at Receptor in Assessment Year	Predicted Concentration Change as a Proportion of AQO (%)			
	1	2 - 5	6 - 10	> 10
75% or less of AQO	Negligible	Negligible	Slight	Moderate
76 - 94% of AQO	Negligible	Slight	Moderate	Moderate
95 - 102% of AQO	Slight	Moderate	Moderate	Substantial
103 - 109% of AQO	Moderate	Moderate	Substantial	Substantial
110% or more of AQO	Moderate	Substantial	Substantial	Substantial

The matrix shown in Table 15 is intended to be used by rounding the change in percentage pollutant concentration to whole numbers, which makes it clearer which cell the impact falls within. It should be noted that changes of 0%, i.e., less than 0.5%, are described as **negligible**.

Following the prediction of impacts at discrete receptor locations, the IAQM document[14] provides guidance on determining the overall air quality impact significance of the operation of a development. The following factors are identified for consideration by the assessor:

- The existing and future air quality in the absence of the development;
- The extent of current and future population exposure to the impacts; and
- The influence and validity of any assumptions adopted when undertaking the prediction of impacts.

The IAQM guidance states that an assessment must conclude the likely significance of the predicted impact. It should be noted that this is a binary judgement of either it is **significant,** or it is **not significant**.

The determination of significance relies on professional judgement, and reasoning should be provided as far as practicable. This has been considered throughout the assessment when defining predicted impacts. The IAQM guidance[15] suggests the provision of details of the assessor's qualifications and experience. These can be provided upon request.

Future Exposure

The proposal has the potential to expose future occupants to poor air quality. To assess pollutant concentrations across the development site, consideration was made of the proximity of the site to major roads and background pollution concentrations.

[14] Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.
[15] Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.

Likely pollution concentrations at the development site were compared against the relevant AQOs to determine the potential for exposure of future occupants to elevated pollutant concentrations and identify any appropriate mitigation, if necessary.

5. Assessment

Construction Phase Fugitive Dust Emissions

Receptors sensitive to potential dust impacts during demolition, earthworks and construction were identified from a desk top study of the area up to 350m from the development boundary. These are summarised in Table 16.

Table 16: Demolition, Earthworks and Construction Dust Sensitive Receptors

Distance from Site Boundary (m)	Approximate Number of Human Receptors	Approximate Number of Ecological Receptors
Less than 20	1-10	0
Less than 50	10 – 100	0
Less than 100	10 – 100	0
Less than 350	More than 100	0

Receptors sensitive to potential dust impacts from trackout were identified from a desk top study of the area up to 50m from the road network within 500m of the site access. These are summarised in Table 17.

Table 17: Trackout Dust Sensitive Receptors

Distance from Access Route (m)	Approximate Number of Human Receptors	Approximate Number of Ecological Receptors
Less than 20	1-10	0
Less than 50	10 – 100	0

There are no ecological receptors within 50m of the development boundary or the access route within 500m of the site entrance. As such, ecological impacts have not been assessed further within this report.

Several additional factors have been considered when determining the sensitivity of the surrounding area. These are summarised in Table 18.

Table 18: Additional Area Sensitivity Factors to Potential Dust Impacts

Guidance	Comment
Whether there is any history of dust generating activities in the area	The desk top study did not indicate any dust generating activities in the local area
The likelihood of concurrent dust generating activity on nearby sites	A review of the planning portal did not indicate any additional development proposals likely to result in concurrent dust generation in the vicinity of the site
Pre-existing screening between the source and the receptors	There is no pre-existing screening between the site and surrounding receptors

Guidance	Comment
Conclusions drawn from analysing local meteorological data which accurately represent the area: and if relevant the season during which works will take place	As shown in Figure 3, the predominant wind bearing at the site is from the southwest. As such, receptors to the northeast are most likely to be affected by dust releases
Conclusions drawn from local topography	There are no significant topographical constraints to dust dispersion
Duration of the potential impact, as a receptor may become more sensitive over time	Currently it is unclear as to the duration of the construction phase. However, it is possible that it will extend over one year
Any known specific receptor sensitivities which go beyond the classifications given in the document	No specific receptor sensitivities identified during the baseline assessment

Based on the criteria shown in Table 7 the sensitivity of the receiving environment to potential dust impacts was determined as **medium**. This was because the identified receptors included mostly workplaces and people wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land. It should be noted that all receptors were assumed to be of **high** sensitivity to provide a robust assessment.

The sensitivity of the receiving environment to specific potential dust impacts, based on the criteria shown in Section 4, is shown in Table 19.

Table 19: Sensitivity of the Surrounding Area to Potential Dust Impacts

Potential Impact	Sensitivity of the Surrounding Area			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	Medium	Medium	Medium	Medium
Human Health	Low	Low	Low	Low

The potential risk of dust impacts at the identified receptors is considered in the following Sections.

Step 1

The undertaking of activities such as demolition, ground works, cutting, construction, concrete batching and storage of materials has the potential to result in fugitive dust emissions throughout the construction phase. Vehicle movements both on site and on the local road network also have the potential to result in the re-suspension of dust from haul roads and highway surfaces.

The potential for impacts at sensitive locations depends significantly on local meteorology during the undertaking of dust generating activities, with the most significant effects likely to occur during dry and windy conditions.

The desk-study undertaken to inform the baseline identified several sensitive receptors within 350m of the site boundary. As such, a detailed assessment of potential dust impacts was required.

Step 2

Demolition

Table 20 show the evaluation of the potential magnitude of impacts from demolition activities.

Table 20: Demolition Impact Magnitude

Category	Criteria	Evaluation
Large	Total volume of building to be demolished greater than 50,000m^3	Unlikely
	Potentially dusty material (e.g., concrete)	
	On-site crushing and screening	
	Demolition activities more than 20m above ground level	
Medium	Total volume of building to be demolished between 20,000m^3 and 50,000m^3	Unlikely
	Potentially dusty construction material	
	Demolition activities 10m to 20m above ground level	
Small	Total volume of building to be demolished less than 20,000m^3	Yes
	Construction material with low potential for dust release (e.g., metal cladding or timber)	
	Demolition activities less than 10m above ground and during wetter months	

The potential magnitude of impacts from demolition activities is estimated to be **small**.

Earthworks

Table 21 show the evaluation of the potential magnitude of impacts from earthworks activities.

Table 21: Earthworks Impact Magnitude

Category	Criteria	Evaluation
Large	Total site area greater than 10,000m^2	Unlikely
	Potentially dusty soil type (e.g., clay, which will be prone to suspension when dry due to small particle size)	
	More than 10 heavy earth moving vehicles active at any one time	
	Formation of bunds greater than 8m in height	
	More than 100,000 tonnes of material moved	
Medium	Total site area 2,500m^2 to 10,000m^2	Potentially
	Moderately dusty soil type (e.g., silt)	
	5 to 10 heavy earth moving vehicles active at any one time	
	Formation of bunds 4m to 8m in height	
	Total material moved 20,000 tonnes to 100,000 tonnes	

Category	Criteria	Evaluation
Small	Total site area less than 2,500m^2	Potentially
	Soil type with large grain size (e.g., sand)	
	Less than 5 heavy earth moving vehicles active at any one time	
	Formation of bunds less than 4m in height	
	Total material moved less than 20,000 tonnes	
	Earthworks during wetter months	

The potential magnitude of impacts from construction activities is estimated to be **medium**.

Construction

Table 22 show the evaluation of the potential magnitude of impacts from construction activities.

Table 22: Construction Impact Magnitude

Category	Criteria	Evaluation
Large	Total building volume greater than 100,000m3	Unlikely
	On site concrete batching	
	Sandblasting	
Medium	Total building volume 25,000m^3 to 100,000m^3	Potentially
	Potentially dusty construction material (e.g., concrete)	
	On site concrete batching	
Small	Total building volume less than 25,000m^3	No
	Construction material with low potential for dust release (e.g., metal cladding or timber)	

The potential magnitude of impacts from construction activities is estimated to be **medium**.

Trackout

Table 23 show the evaluation of the potential magnitude of impacts from trackout.

Table 23: Trackout Impact Magnitude

Category	Criteria	Evaluation
Large	More than 50 HDV trips per day	Unlikely
	Potentially dusty surface material (e.g., high clay content)	
	Unpaved road length greater than 100m	
Medium	10 to 50 HDV trips per day	Unlikely

Category	Criteria	Evaluation
	Moderately dusty surface material (e.g., high clay content)	
	Unpaved road length 50m to 100m	
Small	Less than 10 HDV trips per day	Yes
	Surface material with low potential for dust release	
	Unpaved road length less than 50m	

The potential magnitude of impacts from trackout is estimated to be **small**.

Summary of Potential Unmitigated Dust Risks

A summary of the risk from each dust generating activity is provided in Table 24.

Table 24: Summary of Potential Unmitigated Dust Risks

Potential Impact		Risk				
		Demolition	Earthworks	Construction	Trackout	Overall
Magnitude / Sensitivity		Small	Medium	Medium	Small	
Dust Soiling	Medium	Low	Medium	Medium	Negligible	Medium
Human Health	Low	Negligible	Low	Low	Negligible	Low
Overall						Medium

It should be noted that the potential for impacts depends significantly on the distance between the dust generating activity and receptor location. Risk was predicted based on a worst-case scenario of works being undertaken at the site boundary closest to each sensitive area. Therefore, actual risk is likely to be lower than that predicted during most of the construction phase.

Step 3

The Mayor of London's guidance[16] provides potential mitigation measures to reduce impacts because of fugitive dust emissions during the construction phase. These have been adapted for the development site as summarised in Table 25.

These may be reviewed prior to the commencement of construction works and incorporated into a Construction Environmental Management Plan or similar if required by the LA.

[16] The Control of Dust and Emissions During Construction and Demolition Supplementary Planning Guidance, The Mayor of London, 2014.

Table 25: Fugitive Dust Emission Mitigation Measures

Issue / Control Measure	Site Risk		
	Low	Medium	High
General			
Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.	-	Committed	
Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager	Committed		
Display the head or regional office contact information	Committed		
Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk and should include as a minimum the highly recommended measures in this document. The desirable measures should be included as appropriate for the site. The DMP may include monitoring of dust deposition, dust flux, real-time PM_{10} continuous monitoring and/or visual inspections.	As required	Committed	
Site Management			
Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.	Committed		
Make the complaints log available to the Local Authority when asked	Committed		
Record any exceptional incidents that cause dust and/or air emissions, either on- or off site, and the action taken to resolve the situation in the logbook.	Committed		
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. It is important to understand the interactions of the offsite transport/ deliveries which might be using the same strategic road network routes.	As required		Committed
Monitoring			
Undertake daily onsite and offsite inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the Local Authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars, and windowsills within 100 m of site boundary, with cleaning to be provided if necessary.	As required		Committed
Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and inspect log available to the Local Authority when asked	Committed		
Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.	Committed		

Issue / Control Measure	Site Risk		
	Low	Medium	High
Agree dust deposition, dust flux, or real-time PM_{10} continuous monitoring locations with the Local Authority. Where possible commence baseline monitoring at least 3 months before work commences on site or, if it a large site, before work on a phase commences. Further guidance is provided by IAQM on monitoring during demolition, earthworks, and construction.	As required	Committed	
Preparing And Maintaining the Site			
Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.	Committed		
Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.	Committed		
Fully enclose site or specific operations where there is a high potential for dust production and the site is actives for an extensive period	As required	Committed	
Install green walls, screens, or other green infrastructure to minimise the impact of dust and pollution.		As required	
Avoid site runoff of water or mud.	Committed		
Keep site fencing, barriers and scaffolding clean using wet methods.	As required	Committed	
Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on site cover as described below	As required	Committed	
Cover, seed, or fence stockpiles to prevent wind whipping	As required	Committed	
Provide showers and ensure a change of shoes and clothes are required before going off site to reduce transport of dust.			As required
Operating Vehicle/Machinery and Sustainable Travel			
Ensure all on-road vehicles comply with the requirements of the London Low Emission Zone.	Committed		
Ensure all non-road mobile machinery (NRMM) comply with the standards set within this guidance.	Committed		
Ensure all vehicles switch off engines when stationary - no idling vehicles.	Committed		
Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable	Committed		
Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the Local Authority, where appropriate)	As required		Committed
Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.	-	Committed	

Issue / Control Measure	Site Risk		
	Low	Medium	High
Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing)	-	As required	Committed
Operations			
Only use cutting, grinding, or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g., suitable local exhaust ventilation systems	Committed		
Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate	Committed		
Use enclosed chutes and conveyors and covered skips.	Committed		
Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.	Committed		
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.	As required	Committed	
Waste Management			
Avoid bonfires and burning of waste materials	Committed		
Reuse and recycle waste to reduce dust from waste materials	Committed		
Measures Specific to Demolition			
Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).	As required		Committed
Ensure effective water suppression is used during demolition operations. Handheld sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition, high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground.	Committed		
Avoid explosive blasting, using appropriate manual or mechanical alternatives	Committed		
Bag and remove any biological debris or damp down such material before demolition.	Committed		
Measures Specific to Earthworks			
Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.	-	As required	Committed
Use Hessian, mulches or tackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable.	-	As required	Committed
Only remove the cover in small areas during work and not all at once.	-	As required	Committed

Issue / Control Measure	Site Risk		
	Low	Medium	High
Measures Specific to Construction			
Avoid scabbling (roughening of concrete surfaces) if possible.	As required		Committed
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.	As required	Committed	
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.	-	As required	Committed
For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust.	-	As required	
Measures Specific to Trackout			
Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use.	As required	Committed	
Avoid dry sweeping of large areas.	As required	Committed	
Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.	As required	Committed	
Inspect on site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.	-	Committed	
Record all inspections of haul routes and any subsequent action in a site logbook.	As required	Committed	
Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.	-	Committed	
Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).	As required	Committed	
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.	-	Committed	
Access gates to be located at least 10 m from receptors where possible.	-	Committed	
Apply dust suppressants to locations where a large volume of vehicles enter and exit the construction site.	-	As required	Committed

Step 4

Assuming the relevant mitigation measures outlined in Table 21 are implemented, the residual impacts from all dust generating activities are predicted to be **not significant**, in accordance with the IAQM guidance[17].

Operational Phase Road Vehicle Exhaust Emission Assessment

Future Impacts

The development proposals have been screened out against the following IAQM indicative criteria for requiring an air quality assessment.

The Transport Consultant has confirmed the following:

1. There will not be a change in more than 100 LDV AADT flows on local roads with relevant receptors.

2. There will not be a change in more than 25 HDV AADT flows on local roads with relevant receptors.

3. There are no plans to change in the alignment of roads by 5m or more, and the roads are not within an AQMA.

4. There are no plans to introduce a new junction or remove an existing junction near to relevant receptors.

5. There are no plans to introduce or change a bus station where bus flows will change by more than 25 AADT.

6. There will not be an underground car park with an extraction system within 20 m of a relevant receptor, coupled with the car park having more than 100 movements per day (total in and out).

7. There will not be one or more substantial combustion processes, where there is a risk of impacts at relevant receptors.

In accordance with the IAQM indicative criteria an air quality assessment of operation phase road traffic emissions is **not required**, and impacts are considered **not significant**.

Future Exposure

Table 26 shows the annual mean NO_2 and PM_{10} concentrations at the façade(s) of the new units were estimated using dispersion modelling.

[17] Guidance on the Assessment of Dust from Demolition and Construction V1.1, IAQM, 2017.

Table 26: 2019 Predicted Annual Mean NO_2 and PM_{10} Concentrations

Receptor	X(m)	Y(m)	Z(m)	Total NO_2 ($\mu g/m^3$)	Total PM_{10} ($\mu g/m^3$)
Aparthotel Rear Left GF	508835.88	177025.88	1.8	**47.7**	17.7
Aparthotel Front Left GF	508835.88	177009.48	1.8	**47.7**	17.7
Aparthotel Front Right GF	508899.22	177006.14	1.8	**44.0**	17
Aparthotel Rear Right GF	508900.41	177023.5	1.8	**43.6**	16.9
Aparthotel Rear Left 1F	508835.88	177025.88	5	**46.1**	17.4
Aparthotel Front Left 1F	508835.88	177009.48	5	**46.4**	17.4
Aparthotel Front Right 1F	508899.22	177006.14	5	**43.8**	16.9
Aparthotel Rear Right 1F	508900.41	177023.5	5	**43.5**	16.9
Aparthotel Rear Left 2F	508835.88	177025.88	8.2	**44.5**	17.1
Aparthotel Front Left 2F	508835.88	177009.48	8.2	**44.8**	17.1
Aparthotel Front Right 2F	508899.22	177006.14	8.2	**43.5**	16.9
Aparthotel Rear Right 2F	508900.41	177023.5	8.2	**43.2**	16.8
Aparthotel Rear Left 3F	508835.88	177025.88	11.4	**43.4**	16.9
Aparthotel Front Left 3F	508835.88	177009.48	11.4	**43.6**	16.9
Aparthotel Front Right 3F	508899.22	177006.14	11.4	**43.1**	16.8
Aparthotel Rear Right 3F	508900.41	177023.5	11.4	**42.9**	16.8
Ariel Front Left GF	508856.19	176981.66	1.8	**46.1**	17.4
Ariel Rear Left GF	508846.72	176986.98	1.8	**46.7**	17.5
Ariel Front Right GF	508863.31	176988.97	1.8	**45.5**	17.2
Ariel Rear Right GF	508874.16	177001	1.8	**44.7**	17.1
Ariel Front 4F	508865.09	176946.33	14.6	**43.4**	16.9
Ariel Left 4F	508838.84	176975.94	14.6	**43.2**	16.8
Ariel Right 4F	508893.5	176975.34	14.6	**43.1**	16.8
Ariel Rear 4F	508866.06	177002.78	14.6	**42.9**	16.8
Ariel Front 5F	508865.09	176946.33	17.8	**42.6**	16.7
Ariel Left 5F	508838.84	176975.94	17.8	**42.5**	16.7
Ariel Right 5F	508893.5	176975.34	17.8	**42.5**	16.7
Ariel Rear 5F	508866.06	177002.78	17.8	**42.4**	16.7

2019 predicted annual mean NO_2 concentrations at all modelled locations at the development were above the respective AQO of 40 $\mu g/m^3$. This is due to background pollutant concentrations already exceeding the AQO.

2019 predicted annual mean PM_{10} concentrations were all below respective AQOs of 40 $\mu g/m^3$.

Based on the assessment results, future occupant exposure to exceedances of the NO_2 AQO is therefore likely, and an alternative means of ventilation should be provided, such as Mechanical Ventilation and Heat Recovery (MVHR). In addition to the provision of MVHR, as annual mean NO_2 concentrations exceed the AQO at all Floor-levels, NO_x filtration will also be required for each MVHR unit.

While modelling results do not indicate that the filtration of PM_{10} particles is necessary, it is considered best-practice to employ a particle pre-filter prior to the NO_x filter. Such a configuration will also reduce the exposure of occupants to PM_{10} concentrations.

6. Air Quality Neutral Statement

Introduction

Per London Plan Policy SI1 Improving Air Quality Part B(2)(a) and Part E, all development, unless specifically excluded, is required to submit an Air Quality Neutral Assessment (AQN Assessment) demonstrating how Air Quality Neutral benchmarks will be met.

An Air Quality Neutral development is one that meets, or improves upon, the Air Quality Neutral benchmarks set out in the adopted Air Quality Neutral guidance[18]. These benchmarks set out the maximum allowable emissions of NO_x and particulate matter based on the size and use class of the proposed development. These benchmarks are based on research and evidence carried out by building and transport consultants and are designed to prevent the degradation of air quality from the combined emissions of individual developments.

There are two sets of benchmarks, which cover the two main sources of air pollution from new developments:

1. Building Emissions Benchmark (BEB)
    - emissions from equipment used to supply heat and energy to the buildings.

2. Transport Emissions Benchmark (TEB)
    - emissions from private vehicles travelling to and from the development.

Where applicable, a development must meet both benchmarks separately in order to be Air Quality Neutral. If one or both benchmarks are not met, appropriate mitigation or offsetting will be required.

Excluded Development

Developments, including major developments which do not include additional emissions sources are assumed to be Air Quality Neutral and to meet the Air Quality Neutral benchmarks. As such, they do not need an Air Quality Neutral assessment.

The proposed development has been screened against the following criteria to determine if it is an Excluded Development:

Table 27: Excluded Development Criteria

Criteria	Evaluation (Yes/No)
Has no additional motor vehicle parking (beyond the provision for disabled persons)[19]	Yes
Does not lead to an increase in motor vehicle movements[20]	Yes
Does not include new combustion plant, such as gas-fired boilers	Yes

[18] London Plan Guidance Air Quality Neutral, Greater London Authority, February 2023.
[19] Developments that are defined as 'car-free' may include provision for disabled persons parking.
[20] Taxi, delivery, and servicing vehicle trips, as well as heavy vehicle trips produced by the operation of an industrial or commercial premises are not covered by Air Quality Neutral.

As the proposed development meets the Excluded Development criteria, it is assumed to be Air Quality Neutral.

Material and non-material amendments

Changes to the design, energy, or transport strategy after planning permission has been granted may affect whether the development is Air Quality Neutral. A reassessment will be required for amendments to a planning consent that affect any of the following:

- energy strategy
- the proposed type or number of power and/or heating appliances
- transport strategy and/or travel plan
- number of parking spaces
- parking management plan
- number of residential units
- floorspace assigned to non-residential use classes

7. Conclusion

The proposals have the potential to cause air quality impacts because of fugitive dust emissions during construction and road traffic exhaust emissions associated with vehicles travelling to and from the site during operation, as well as expose future occupants to any existing air quality issues. As such, an air quality assessment was required to determine baseline conditions and assess potential effects because of the scheme.

During the construction phase of the development there is the potential for air quality impacts because of fugitive dust emissions from the site. These were assessed in accordance with the IAQM methodology. Assuming good practice dust control measures are implemented, the residual significance of potential air quality impacts from dust generated by demolition, earthworks, construction and trackout was predicted to be **not significant**.

The proposed development is expected to be sited at a highly sustainable location for public transportation, and in accordance with the IAQM indicative criteria an air quality assessment of operation phase road traffic emissions is not required, and impacts are considered **not significant**.

The proposed development has the potential to expose future users to elevated pollution levels in the vicinity of the site during operation. Dispersion modelling was therefore undertaken using ADMS-Roads to predict pollutant concentrations because of emissions from the local highway network. Results were then verified using local monitoring data. While model results indicates that future users are likely to be exposed to annual mean NO_2 concentrations that exceed AQOs, given that hotel occupants are unlikely to be present beyond short-stays, the installation of MVHR with NO_x filtration for each occupiable unit will mitigate the potential impacts of exposure.

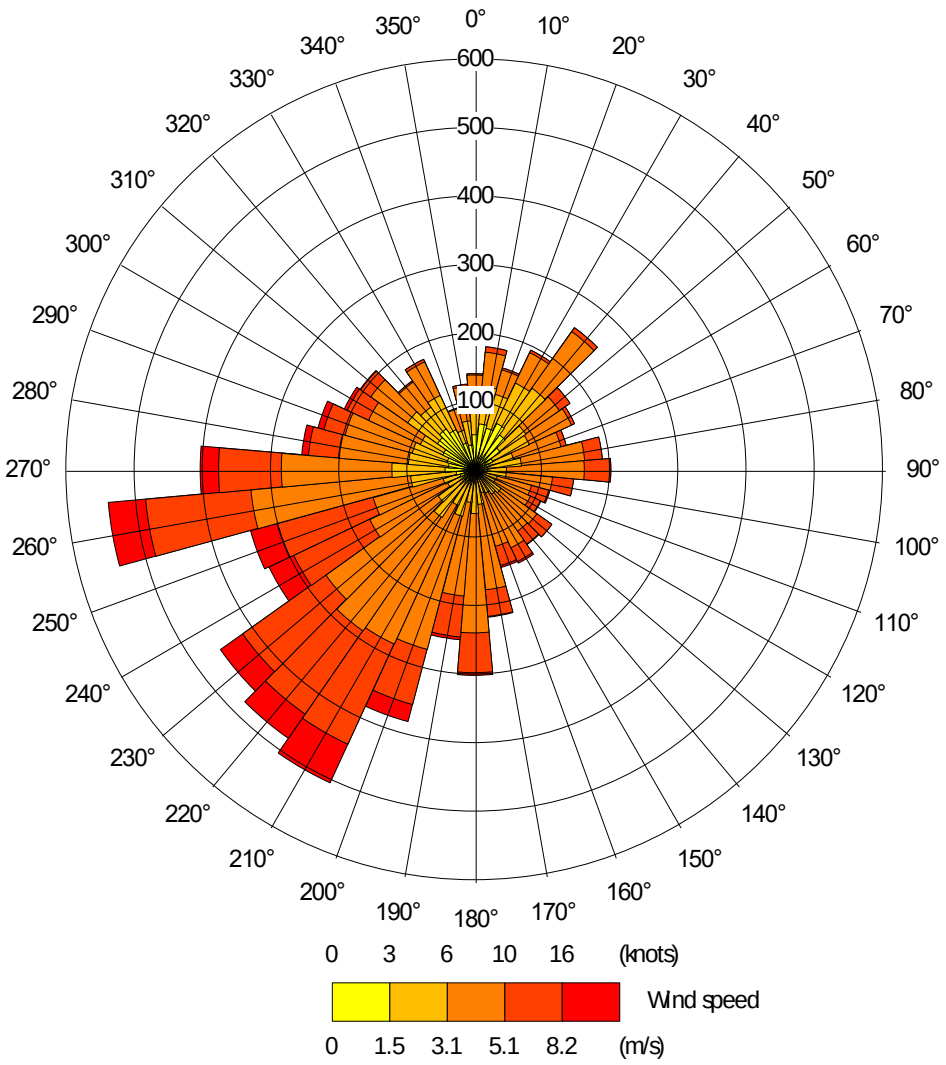
Based on the assessment results, air quality factors are not considered a constraint to planning consent for the development.

8. Figures

Figure 1: Site Location

Figure 2: Monitoring Sites

Figure 3: Meteorological Wind Rose (Heathrow 2019)



9. Appendix

Modelled Network

The modelled network is shown in Figure 4.

Figure 4: Modelled Network

Model Verification

The predicted results from a dispersion model may differ from measured concentrations for a number of reasons, including:

- Estimates of background concentrations;
- Uncertainties in source activity data such as traffic flows and emission factors;
- Variations in meteorological conditions;
- Overall model limitations; and
- Uncertainties associated with monitoring data, including locations.

Model verification is the process by which these and other uncertainties are investigated and where possible minimised. The differences between modelled and monitored results are likely to be a combination of all of these aspects. Model verification was undertaken as per the methodology outlined in Defra's LLAQM (TG19). For the purpose of this assessment model verification was undertaken for 2019 using traffic data, meteorological data and monitoring results from this year.

The following monitoring results were used/excluded from the verification of the dispersion model:

- Included
  - LHR2
  - HILL38

- Excluded
  - HILL10
    - (The LAEI Traffic Network does not include minor road links which could be used to model this location).
  - HI3
    - The Total NO_2 concentration (Road Contribution plus Background Contribution) recorded at this location in 2019 was much lower than the DEFRA Background Mapping Concentration, leading to a negative Road Contribution calculation.

An evaluation of model performance has been undertaken to establish confidence in model results. LLAQM.TG19 identifies several statistical procedures that are appropriate to evaluate model performance and assess the uncertainty.

The statistical parameters used in this assessment are:

- Root mean square error (RMSE);
- Fractional bias (FB); and
- Correlation coefficient (CC).

A brief explanation of each statistic is provided in Table 28, and further details can be found in LLAQM.TG (19) Box A3.7 (Defra, 2016). These parameters estimate how the model results agree or diverge from observations.

Table 28: Model Performance Statistics

Statistical Parameter	Comments	Ideal Value
RMSE	RMSE is used to define the average error or uncertainty of the model. If the RMSE values are higher than 25% of the objective being assessed, it is recommended that the model inputs and verification should be revisited in order to make improvements. For example, if model predictions are of an annual mean NO_2 objective of 40 µg/m^3 and the RMSE is 10 µg/m^3 or above, it is advised to revisit the model parameters and model verification. Ideally an RMSE within 10% of the air quality objective would be derived, which equates to 4µg/m^3 for the annual mean NO_2 objective.	0.00
FB	It is used to identify if the model shows a systematic tendency to over or under predict. FB values vary between +2 and -2 and has an ideal value of zero. Negative values suggest a model over-prediction and positive values suggest a model under-prediction.	0.00

Statistical Parameter	Comments	Ideal Value
CC	It is used to measure the linear relationship between predicted and observed data. A value of zero means no relationship and a value of 1 means absolute relationship. This statistic can be particularly useful when comparing a large number of model and observed data points.	1.00

These calculations have been conducted prior to, and after, model adjustment and provide information on the improvement of the model predictions as a result of the application of the adjustment factor. The verification process involves a review of the annual mean modelled pollutant concentrations against corresponding monitoring data to determine how closely the air quality model agrees.

The acceptable limits of model verification are set out in LLAQM.TG19. Depending on the outcome it may be considered that there is no need to adjust any of the modelled results.
Alternatively, the model may not correlate against the monitoring data. There is then a need to check all the input data to ensure that it is reasonable and accurately represented in the air quality modelling process.

Where all input data, such as traffic data, emissions rates, and background concentrations have been checked and considered reasonable, a model can be adjusted to better agree with locally monitored data. This may either be a single adjustment factor to be applied to modelled concentrations across the study area, or a range of different adjustment factors to account for different zones in the study area e.g., motorways, local roads. Suitable monitoring locations were selected and used in the verification process, considering the site types, position of the diffusion tubes and representation of local air quality environment.

The non-adjusted modelled versus monitored NO_2 concentrations at those locations determined to be suitable for model verification are presented in Table 29.

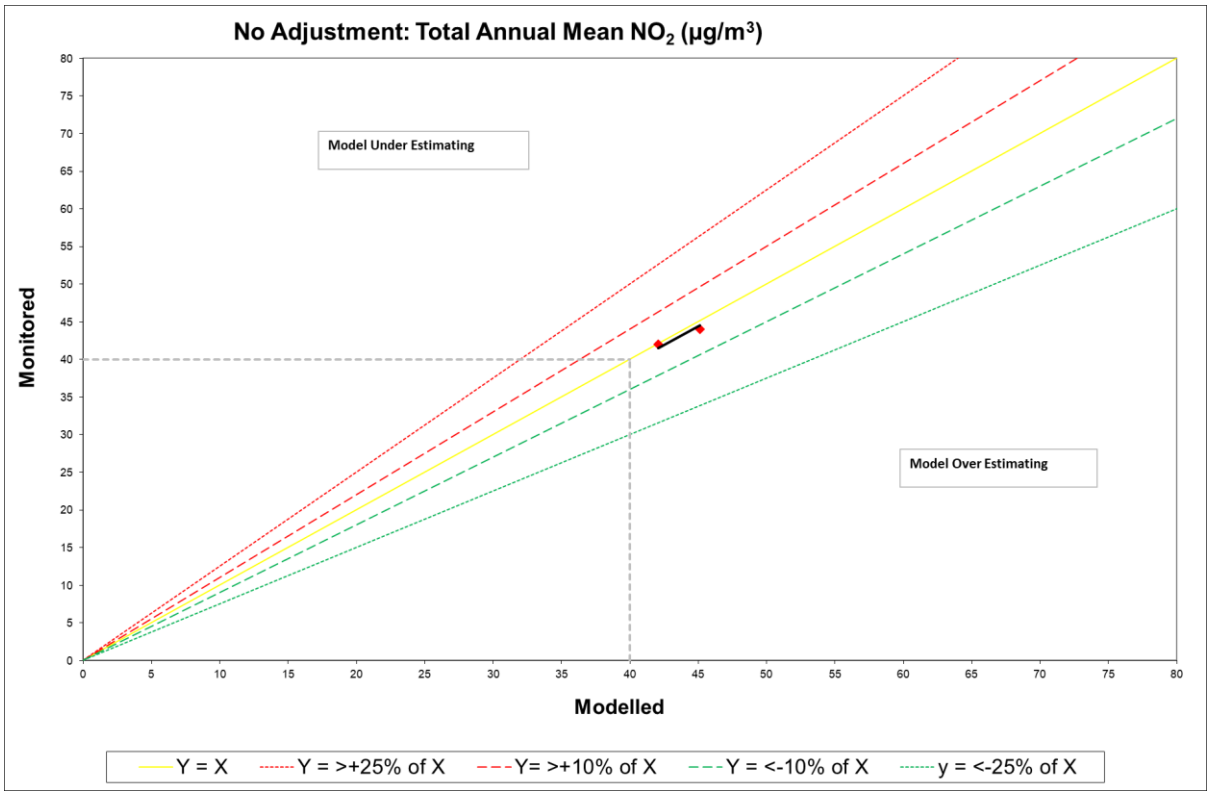
Table 29: Model Performance Statistics

Summary Table	No Adjustment	NO_x Roads Adjustment	NO_2 Roads Adjustment	NO_2 Total Adjustment
Within +10%	2	1	1	1
Within -10%	0	1	1	1
Within +-10%	2	2	2	2
Within +10 to 25%	0	0	0	0
Within -10 to 25%	0	0	0	0
Within +-10 to 25%	0	0	0	0
Over +25%	0	0	0	0
Under -25%	0	0	0	0
Greater +-25%	0	0	0	0
Within +-25%	2	2	2	2
Total	2	2	2	2

Summary Table	No Adjustment	NO_x Roads Adjustment	NO_2 Roads Adjustment	NO_2 Total Adjustment
Adjustment Factors				
NOx Roads Adjustment	n/a	0.907	0.907	0.907
NO2 Roads Adjustment		n/a	1.002	1.002
NO2 Total Adjustment			n/a	0.996
Uncertainties Assessment				
Correlation	1.000	1.000	1.000	1.000
RMSE (mg/m^3)	0.808	0.290	0.298	0.245
Fractional Bias	-0.014	-0.004	-0.004	0.000

The initial comparison between the predicted concentrations and monitoring data illustrates that the model tends to over predict NO_2 concentrations over the modelled area, see Figure 4.

Figure 4: Modelled Total Annual Mean NO_2 (before adjustment) vs Monitored Total Annual Mean NO_2



To maintain a conservative estimate of pollutant concentrations modelled Road NO_x concentrations predicted at sensitive receptors were not adjusted to account for the over-prediction of annual mean Road NO_x in the model. As a worst-case this process was also applied to modelled road PM_{10} concentrations.

The model performance statistics show that without adjustment the residual uncertainty in the predictions of total annual mean NO_2 are less than 4 µg/m^3 (RMSE of 0.808).