



1rAQ10045r2

REPORT FOR

AIR QUALITY ASSESSMENT

AT

707-725 LORDSHIP LANE, WOOD GREEN, LONDON

PREPARED FOR

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QUALITY ASSURANCE

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Executive Summary	4
1 Introduction	5
1.1 Background	5
1.2 Site Location and Context	5
1.3 Limitations	5
2 Legislation, Guidance and Policy	6
2.1 UK Legislation and Guidance	6
2.2 Local Planning Policy	8
3 Methodology	10
3.1 Construction Phase Assessment	10
3.2 Operational Phase Assessment	10
3.3 Air Quality Neutral Assessment	11
4 Baseline	12
4.1 Local Air Quality Management	12
4.2 Air Quality Monitoring	12
4.3 Background Pollutant Concentrations	13
4.4 Sensitive Receptors	13
5 Assessment	16
5.1 Construction Phase Assessment	16
5.2 Operational Phase Assessment	20
5.3 Air Quality Neutral Assessment	22
6 Conclusion	23
Appendix A – Abbreviations	24
Appendix B - Figures	25
Appendix C – Assessment Inputs	35
Appendix D – Construction Phase Methodology	41
Appendix E – Assessors CV	46

EXECUTIVE SUMMARY

The following Air Quality Assessment has been undertaken and produced by Planning and Environmental Consultants (PEC) Ltd on behalf of Atri7 2 Limited & Fusion Global Management LLP, in support of the proposed mixed use development at 707-725 Lordship Lane, Wood Green, London.

The Site is located within the Wood Green Town Centre, approximately 150m east of Wood Green Station.

The Site is approximately 0.86 hectares (ha) in size and is currently occupied by a single storey building, in use by Mecca Bingo as a bingo hall. The remainder of the Site is occupied by surface level car parking. The site is bound by:

- Lordship Lane (A109) to the north of the site;
- Sultan Terrace and Vincent Square to the east of the site;
- Residential properties along Moselle Avenue to the south of the site; and
- Omnibus House and Redvers Road to the west of the site.

Within the surrounding context, Lordship Lane is characterised by a variety of two and three storey properties, to the east of the application site is bound by a housing estate with three storey blocks, the southern boundary is characterised by Wellesley Road with two and three storey town houses and the rear gardens of the properties along Moselle Avenue. The West of the application site is bound by Omnibus House, a seven to nine storey residential building.

The Site is not located within a Conservation Area, nor does it contain any listed buildings. The Noel Park Conservation Area is located immediately to the south of the site.

Due to the scale of the development, there is potential for the proposals to cause impacts at sensitive receptors during the construction and operational phases. Additionally, given the proximity to the Air Quality Focus Area there is potential to expose future site users to elevated pollutant concentrations. An Air Quality Assessment is therefore required in order to determine baseline conditions at the site, assess site suitability for the proposed end-use and assess the potential impacts as a result of the proposed development.

Potential construction phase air quality impacts from fugitive dust emissions were assessed as a result of demolition, earthworks, construction and trackout activities. It is considered that the use of good practice control measures would provide suitable mitigation for a development of this size and nature and reduce potential impacts to an acceptable level.

Dispersion modelling was undertaken in order to predict annual mean pollutant concentrations across the application site and to predict impacts as a result of additional road vehicle exhaust emissions associated with the proposed development. Results were subsequently verified using local monitoring data provided by the London Borough of Haringey.

The dispersion modelling results indicated that annual mean pollutant concentrations across the application site were below the relevant air quality objectives at proposed sensitive locations. The site is therefore considered suitable for proposed end use without the implementation of protective mitigation techniques.

The level of anticipated traffic generation from the site concluded that impacts on existing pollutant levels as a result of operational phase pollutant emissions were predicted to be **not significant** in accordance with relevant screening criteria. The use of robust assumptions, where necessary, was considered to provide sufficient results confidence for an assessment of this nature.

The London Plan states that new developments must be considered Air Quality Neutral. Pollutant emissions associated with anticipated traffic flows were compared to relevant benchmarks. Following assessment, the development was not anticipated to result in transport or building emissions above the development specific benchmarks. Subsequently, the Proposed Development is considered Air Quality Neutral

Based on the assessment results the site is considered suitable for the proposed end use and complies with the London Borough of Haringey Local Plan, the Greater London Authority Policy and the National Planning Policy Framework.

1 INTRODUCTION

1.1 BACKGROUND

Planning and Environmental Consultants (PEC) Ltd have been commissioned by Atri7 2 Limited & Fusion Global Management LLP, hereafter referred to as “the Client” to undertake an Air Quality Assessment in support of a planning application for a mixed use development at Lordship Lane, London, herein after referred to as the “Proposed Development”.

1.2 SITE LOCATION AND CONTEXT

The application site is located at the former bingo hall at Lordship Lane, London at approximate National Grid Reference (NGR) 531200, 190400. Reference should be made to Figure 1 within Appendix B for a location plan.

The application site is located within the London Borough of Haringey (LBoH) Air Quality Management Area (AQMA) which has been declared due to exceedances of the annual mean Air Quality Objective (AQO) for nitrogen dioxide (NO₂) and 24-hour mean exceedance for PM₁₀. Subsequently, the Proposed Development has the potential to introduce future residential occupants into an area of elevated NO₂ and particulate matter (PM₁₀ and PM_{2.5}) concentrations, as well as to cause impacts at sensitive receptor locations during the construction and operational phases.

An Air Quality Assessment has therefore been produced to quantify annual mean NO₂, PM₁₀ and PM_{2.5} concentrations across the site to consider suitability for the proposed end-use, and to assess potential impacts as a result of the development. The assessment will be undertaken in accordance with the requirements of the National Planning Policy Framework (NPPF), the Greater London Authority (GLA) Policy and the LBoH Local Planning Policy.

1.3 LIMITATIONS

This report has been produced in accordance with PEC Ltd standard terms of engagement. This report is solely for the use of the Client and those parties with whom a warranty agreement has been executed, or with whom an assignment has been agreed. Should any third party wish to use or rely upon the contents of the report, written approval must be sought from PEC Ltd at which point a charge may be levied against such approval.

2 LEGISLATION, GUIDANCE AND POLICY

The following legislation, guidance and policy will be considered and adhered to during the preparation of the Air Screening Quality Assessment:

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- European Union (EU) Directive 2008/50/EC;
- The NPPF, updated on 20th December 2023);
- The National Planning Practice Guidance (NPPG), relevant chapters produced on 1st November 2019;
- Section 82 of the Environment Act (Part IV), updated 9th November 2021;
- The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, Department for Environment, Food and Rural Affairs (DEFRA), 2007¹;
- The Air Quality Standards (Amendment) Regulations (2016);
- Local Air Quality Management Technical Guidance 2022 LAQM.TG(22), DEFRA, August 2022²;
- The Control of Dust and Emissions during Construction and Demolition SPG, July 2014
- Land-Use Planning and Development Control: Planning for Air Quality, Environmental Protection UK (EPUK) and IAQM, January 2017³;
- London Councils Air Quality and Planning Guidance, London Councils, 2007⁴; and
- Air Quality Neutral (AQN) Planning Support: GLA 80371, Air Quality Consultants Ltd in association with ENVIRON UK Ltd, 2014.⁵;
- The London Plan 2021, Mayor of London, March 2021⁶;

2.1 UK LEGISLATION AND GUIDANCE

The Air Quality Standards (Amendment) Regulations (2016) came into force on 31st December 2016. These Regulations amend the Air Quality Standards Regulations 2010 and transpose the EU Directive 2008/50/EC into UK law. Air Quality Limit Values (AQLVs) were published in these regulations for 7 pollutants, as well as Target Values for an additional 6 pollutants.

Part IV of the Environment Act (2021) requires 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 2007¹. 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 compliance vary slightly.

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

Table 1: Air Quality Objectives

Pollutant	Air Quality Objectives	
	Concentration (µg/m ³)	Averaging Periods
NO ₂	40	Annual mean
	200	1-hour mean; not to be exceeded more than 18 times a year
PM ₁₀	40	Annual mean
	50	24-hour mean; not to be exceeded more than 35 times a year
PM _{2.5}	25	Annual mean

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

2 Local Air Quality Management Technical Guidance 2022 LAQM.TG(22), DEFRA, 2022

3 Land-Use Planning and Development Control: Planning for Air Quality, EPUK and IAQM, 2017

4 London Councils Air Quality and Planning Guidance, London Councils, 2007.

5 Air Quality Neutral Planning Support: GLA 80371, Air Quality Consultants Ltd in association with ENVIRON UK Ltd, 2014.

6 The London Plan, The Spatial Development Strategy For Greater London, Mayor of London, 2021

Table 2 summarises the advice provided in DEFRA guidance LAQM.TG(22)² on where the AQOs for pollutants considered within this report apply.

Table 2: Examples of Where the Air Quality Objectives Apply

Averaging Periods	Objectives Should Apply At	Objectives 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-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

The monitoring results provided by LBoH and background concentrations provided by DEFRA will be compared against the relevant AQOs detailed in Table 1, as well as the Air Pollution Exposure Criteria (APEC) contained within the London Councils Air Quality and Planning Guidance⁴ to determine onsite exposure.

The APEC are outlined in Table 3.

Table 3: Air Pollution Exposure Criteria

Category	Applicable Range Annual Mean: NO2 and PM10	Applicable Range 24hr Daily Mean: PM10	Recommendation
APEC - A	Below 5% of the annual mean AQO	> 1-day less than national objective	No air quality grounds for refusal; however mitigation of any emissions should be considered
APEC - B	Between 5% below or above the annual mean AQO	Between 1-day above or below national objective	May not be sufficient air quality grounds for refusal, however appropriate mitigation must be considered e.g. maximise distance from pollutant source, proven ventilation systems, parking considerations, winter gardens, internal layout considered and internal pollutant emissions minimised

Category	Applicable Range Annual Mean: NO ₂ and PM ₁₀	Applicable Range 24hr Daily Mean: PM ₁₀	Recommendation
APEC - C	Above 5% of the annual mean AQO	>1-day more than national objective	Refusal on air quality grounds should be anticipated, unless the LA has a specific policy enabling such land use and ensure best endeavours to reduce exposure are incorporated. Worker exposure in commercial/industrial land uses should be considered further. Mitigation measures must be presented with air quality assessment, detailing anticipated outcomes of mitigation measures

It should be noted that a significant area of London would fall under APEC - C due to high NO₂ concentrations throughout the city. As such, a presumption against planning consent in these locations may result in large areas of land becoming undevelopable and prevent urban regeneration. The inclusion of suitable mitigation measures to protect future users is therefore considered a suitable way to progress sustainable schemes in these locations and has been considered within this assessment.

2.2 LOCAL PLANNING POLICY

2.2.1. THE LONDON PLAN

The Mayor of London formerly adopted The Publication London Plan⁶ as the new London Plan in March 2021. The plan outlines the Spatial Development Plan for London and part of the statutory Development Plan for Greater London from 2019 to 2041. A review of the London Plan Publication indicated the following policy in relation to air quality:

- **Policy SI1 - 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: 1 Development proposals should not: a) lead to further deterioration of existing poor air quality b) create any new areas that exceed air quality limits, or delay the date at which compliance will be achieved in areas that are currently in exceedance of legal limits c) create unacceptable risk of high levels of exposure to poor air quality.

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

- a) development proposals must be at least Air Quality Neutral
- b) development proposals should use design solutions to prevent or minimise increased exposure to existing air pollution and make provision to address local problems of air quality in preference to post-design or retro-fitted mitigation measures
- c) major development proposals must be submitted with an Air Quality Assessment. Air quality assessments should show how the development will meet the requirements of B1
- d) development proposals in Air Quality Focus Areas or that are likely to be used by large numbers of people particularly vulnerable to poor air quality, such as children or older people should demonstrate that design measures have been used to minimise exposure.
- 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: 1) how proposals have considered ways to maximise benefits to local air quality, and 2) what measures or design features will be put in place to reduce exposure to pollution, and how they will achieve this.

- 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.

2.2.2. LBOH LOCAL PLAN

The LBoH Local Plan⁷ was published in March 2013 and updated in 2017. The local plan sets out how and where new development can be accommodated throughout the borough. A review of the local plan indicated the following policies in relation to Air Quality.

- SP4: working towards a low carbon Haringey
- SP7: Transport
- ENV7: Air, Water and Light Pollution

Reference has been made to these policies during the undertaking of this Air Quality Screening Assessment.

⁷ Haringey Local Plan March 2013

3 METHODOLOGY

There is the potential for the Proposed Development to expose future site users to elevated NO₂, PM₁₀ and PM_{2.5} concentrations, as well as to cause impacts at sensitive locations during the construction and operational phases.

3.1 CONSTRUCTION PHASE ASSESSMENT

There is the potential for fugitive dust emissions to occur as a result of construction phase activities. These have been assessed in accordance with the methodology outlined within the GLA supplementary planning document 'Control of Dust and Emissions During Construction and Demolition'³.

Reference should be made to Appendix D for details of the relevant IAQM construction phase assessment criteria, which were utilised in conjunction with site specific information

Activities on the proposed construction site have been divided into four 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 three 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 PM₁₀ and PM_{2.5}

A desk top survey will be undertaken to identify human and ecological receptors within the relevant assessment buffers specified by the GLA guidance. Should sensitive receptors not be present within the relevant distances then negligible impacts would be expected and further assessment is not necessary.

Following the identification of sensitive receptors, a site is then allocated a risk category which is assigned to each activity, based on the scale and nature of the works, as well as the sensitivity of the area to dust impacts.

The assigned magnitude and sensitivity will then determine the overall risk and appropriate mitigation measures to be employed during construction phase activities.

The GLA guidance³ is provided in Appendix D, with the details of the assessor's qualifications and experience. provided in Appendix E.

3.2 OPERATIONAL PHASE ASSESSMENT

3.2.1. FUTURE EXPOSURE

The Proposed Development is located within close proximity to with the LBoH AQMA. Subsequently, the proposals have potential to introduce new receptors into an area of elevated NO₂, PM₁₀ and PM_{2.5}. Detailed dispersion modelling was therefore undertaken to quantify NO₂, PM₁₀ and PM_{2.5} pollutant exposure across the site and determine suitability for the proposed use. The following modelling scenarios were utilised during the assessment:

- 2019 as baseline year for verification against latest ratified data;
- Opening year do-something (DS) (predicted traffic flows in 2027 should the proposals be completed)

In light of expected emission improvements to the national vehicle fleet guided by government policy, it would be unrealistic not to assume a reduction to vehicle emission factors in future years, given the anticipated development year of 2027.

The 2027 scenario assumes an emission drop off based on assumptions provided by the Emission Factor Tool Kit (Eft v11.0) supported by the uptake of low emission vehicles and government incentives and targets concerning fleet proportions by 2030.

The results of the dispersion modelling assessment will also be compared against the relevant AQOs detailed in Table 1 to determine significance. Full details of data used for the modelling assessment are presented in Appendix C of this report.

3.2.2. ROAD VEHICLE EXHAUST IMPACT ASSESSMENT

Based on the details of the Proposed Development and anticipated trip generation a screening assessment in accordance with the EPUK and IAQM guidance³ was determined a suitable assessment approach. The assessment will determine road traffic exhaust and combustion emission impacts associated with the Proposed Development, and confirm the requirement for detailed assessment work. The EPUK and IAQM document states the following criteria to help establish when an air quality assessment is likely to be considered necessary:

- Proposals that will cause a change in Light Duty Vehicle (LDV) flows of more than 100 Annual Average Daily Traffic (AADT) within or adjacent to an AQMA or more than 500 elsewhere;
- Proposals that will cause a change in Heavy Duty Vehicle (HDV) flows of more than 25 AADT within or adjacent to an AQMA or more than 100 elsewhere;
- Proposals which include either a centralised plant using biofuel, a combustion plant with single or thermal input >300KWh or a standby emergency generator associated with a centralised energy centre; and
- Proposals which include combustion processes of any size.

Should the above criteria not be met, the EPUK and IAQM document considers air quality impacts associated with the scheme to be not significant and no further assessment is required. Conversely, should the criterion be exceeded it may be deemed necessary that further assessment is required.

3.3 AIR QUALITY NEUTRAL ASSESSMENT

The Proposed Development is anticipated to result in net reductions in traffic generated when compared against the existing bingo hall. The proposed development is anticipated to be car free with the exception of a small number of disabled spaces, as such it should be considered that the proposed development will not result in increases to existing Annual Average Daily Traffic (AADT) flows other than trips generated by disability vehicles, nor does the scheme provide any onsite combustion processes. Subsequently, the Proposed Development will not result in any additional NO_x, PM₁₀ or PM_{2.5} concentrations during operation.

In line with the GLA guidance, and given the lack of development generated emissions, the development should be considered Air Quality Neutral.

4 BASELINE

Existing air quality conditions in the vicinity of the application site were identified in order to provide a baseline for assessment. These are detailed in the following sections.

4.1 LOCAL AIR QUALITY MANAGEMENT

As required by the Environment Act (2021), LBoH, has undertaken review and assessment of air quality within their area of administration. This process has indicated that annual mean concentrations of NO₂ and 24-hour mean PM₁₀ are above the AQO within their administration. As such, one AQMA has been declared, being described as:

- Haringey AQMA – the whole borough.

LBOH have also designated Air Quality Focus Areas (AQFAs) across the borough which are selected hotspots where air quality is predicted to be poor and public exposure is at its highest. The Proposed Development is located adjacent to the Wood Green High Road and Turnpike Lane Focus Area and within the LBoH AQMA.

As such, there is potential for the Proposed Development to introduce future site users into an area of elevated annual mean NO₂ concentrations, and to cause air quality impacts within these sensitive areas during the construction and operational phases. This has been considered within this report.

LBoH has concluded that concentrations of all other pollutants considered within the AQS are currently below the relevant AQOs and as such no further AQMAs have been designated.

4.2 AIR QUALITY MONITORING

Monitoring of pollutant concentrations is undertaken by LBoH using continuous and passive methods throughout their areas of administration. For the purpose of this assessment, 2019 data has been utilised as reductions in pollution levels resulting from Covid 19 related behavioural changes mean that 2020 to 2022 data is unlikely to be representative of longer-term pollution levels.

A review of LBoH's most recent Air Quality Monitoring Data indicated that there is currently 1 automatic analyser operated by LBoH within the vicinity of the Proposed Development (Haringey Wood Green) critically this site was not operational in 2019 and as such has not been considered further within this assessment

LBoH also monitor annual mean NO₂ concentrations across the borough using passive diffusion tubes. A review of the most recent air quality monitoring data indicated 3 diffusion tubes located within the vicinity of the application site which are operational in 2019, presented in Table 4.

Table 4: NO₂ Diffusion Tube Monitoring Results

ID	Site Name	Type	NGR (m)		Dist' to Site (m)	Annual Mean Concentration (µg/m ³)		
			X	Y		2017	2018	2019
HR21	Lordship Lane Primary School	Roadside	532010	190549	821	30.0		23.0
HR24	Westbury Medical Centre	Roadside	532155	190517	959	33.0	33.0	34.1
HR31	97/101 High Road	Roadside	531245	189935	459	52.0	65.0	67.8

As indicated in Table 4, the AQO for NO₂ was exceeded at one roadside location in recent years. It should be noted that HR31 is located within a street canyon and is situated less than 30cm from the road network, as such it is not considered to be representative of conditions at the development site and has not been utilised further within this assessment.

Reference should be made to Figure 2 within Appendix B for a graphical representation of the monitoring locations.

4.3 BACKGROUND POLLUTANT CONCENTRATIONS

The total concentration of a pollutant is comprised of explicit local emission sources (such as roads and industrial sources) and the background component. The background component consists of indeterminate sources which are transported into an area from further away by meteorological conditions. Background pollutant concentrations are therefore the ambient level of pollution that is not affected by local sources of pollution.

In reality, it is not usually practical to obtain a true representation of background levels in urban areas due to corruption by local sources; background levels used in assessments may contain a mixture of both sources.

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 located across grid square:

- NGR: 531500, 190500

Data for this location was downloaded from the DEFRA website For the purpose of this assessment, background concentrations are summarised in Table 5 for the current base year (2019) and the predicted development opening year (2027).

Table 5: Predicted Background Pollutant Concentrations

Pollutant	Predicted Background Concentration ($\mu\text{g}/\text{m}^3$)	
	2019	2027
NO _x	34.57	25.32
NO ₂	23.31	17.88
PM ₁₀	19.38	17.86
PM _{2.5}	12.93	11.93

As indicated in Table 5, background pollutant concentrations of NO₂, PM₁₀ and PM_{2.5} are below the relevant AQOs detailed in Table 1.

4.4 SENSITIVE RECEPTORS

A sensitive receptor is defined as any location which may be affected by changes in air quality as a result of a development. These have been defined for construction dust impacts in the following Sections.

4.4.1. CONSTRUCTION PHASE SENSITIVE RECEPTORS

There are no nationally or European designated ecological receptors within 50m of the Site boundary, or within 50m from a route used by construction vehicles on the public highway (up to 500m from the Site entrance). Therefore, the risk of dust effects at a nationally or European designated ecological receptor site from construction impacts have not been considered further in this assessment.

Human 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 Proposed Development boundary. These are summarised in Table 6.

Table 6: Demolition, Earthworks and Construction Dust Sensitive Receptors

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

Reference should be made to Figure 3 within Appendix B for a graphical representation of demolition, earthworks, and construction dust buffer zones.

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 route. These are summarised in Table 7. The exact construction vehicle access routes were not available for the purpose of this assessment as they will depend on sourcing of materials. This is likely to be decided by the contractor. However, it was assumed that construction traffic would access the Proposed Development via A109 and A105, to ensure a worst case trackout assessment is undertaken.

Table 7: Trackout Dust Sensitive Receptors

Distance from Site Boundary (m)	Approximate Number of Human Receptors
Less than 20	More than 100
20 – 50	More than 100

Reference should be made to Figure 4 within Appendix B for a graphical representation of trackout dust buffer zones.

A number of additional factors have been considered when determining the sensitivity of the surrounding area. These are summarised in Table 8.

Table 8: Additional Area Sensitivity Factors

Guidance	Comment
Whether there is any history of dust generating activities in the area	The site is located in a predominantly residential and commercial area. There is likely to have been a history of dust generating activities due to redevelopment processes in the locality.
The likelihood of concurrent dust generating activity on nearby sites.	A review of the LBoH Planning Portal indicated that there are several planning applications within 500m of the Proposed Development. As such, there is potential for concurrent dust generation should the construction phases of the aforementioned developments overlap.
Pre-existing screening between the source and the receptors	There is no dense vegetation present along the development boundaries. Hence, there is no level of natural protective screening in any directions.
Conclusions drawn from analysing local meteorological data which accurately represent the area: and if relevant the season during which works will take place	The wind direction is predominantly from the south west of the development. As such, properties to the north east of the site would be most affected by dust emissions
Conclusions drawn from local topography	The topography of the area appears to be predominantly flat. As such, there are no constraints to dust dispersion.

Guidance	Comment
Duration of the potential impact, as a receptor may become more sensitive over time	Currently the duration of the construction phase is unknown.
Any known specific receptor sensitivities which go beyond the classifications given in the document.	No specific receptor sensitivities identified during the baseline.

4.4.2. OPERATIONAL PHASE SENSITIVE RECEPTORS

A desk top study was undertaken to identify the closest receptor locations to the application site. This indicated residential locations within close proximity to all development boundaries. There are educational and medical facility in vicinity of the application site and affected road networks, with the nearest education facility, Noel Park Primary School, and medical facility, Hornsey Wood Green GP, located approximately 260m south east and 880m south west of the site, respectively.

5 ASSESSMENT

5.1 CONSTRUCTION PHASE ASSESSMENT

5.1.1. STEP 1 – SCREENING

The desk-study detailed in Section 4.4.1 identified a number of receptors with a high classification of sensitivity within 350m of the site boundary, and within 50m of the anticipated trackout routes. As such, a detailed assessment of potential dust impacts was required, and summarised in the below sections.

5.1.2. STEP 2A – MAGNITUDE

The scale and nature of the works was determined to assess the magnitude of dust arising from each construction phase activity. The determination of magnitude was based upon the criteria detailed in Appendix D with the outcome of Step 2A is summarised below in Table 9.

Demolition

Demolition will involve the removal of the existing bingo hall. The volume of buildings to be demolished is therefore likely to be between 20,000 m³ and 50,000m³. With this considered the magnitude of potential dust emissions related to demolition activities is considered medium.

Earthworks

The Proposed Development site is estimated to cover an area of approximately 8100m². The magnitude of potential dust emissions related to earthwork activities is therefore considered medium.

Construction

The proposals comprise the construction of a 629-bed purpose-built student accommodation, 76 affordable homes, and 985m² flexible ground floor commercial (Class E) floorspace within buildings ranging between 3 – 9 storeys. Given the scale of the Proposed Development the total building and infrastructure volume is greater than 100,000m³. The magnitude of potential dust emissions related to construction activities is therefore considered large.

Trackout

Information on the number of HDV trips to be generated during the construction phase of the Proposed Development was not available at the time of assessment. Similarly, the surface material and unpaved road length was not known at this stage of the project. Based on the site area, it is anticipated that the unpaved road length is likely to be between 50 and 100m. The magnitude of potential dust emissions from trackout is therefore considered medium.

Table 9: Dust Emission Magnitude

Magnitude of Activities			
Demolition	Earthworks	Construction	Trackout
Medium	Medium	Large	Medium

5.1.3. STEP 2B – SENSITIVITY

The next step (Step 2B) is to determine the sensitivity of the surrounding area, based on general principles such as amenity and aesthetics, as well as human exposure sensitivity.

Dust Soiling

As shown in Section 4.4.1, the desk top study indicated are approximately more than 100 sensitive receptors within 350m of the Proposed Development boundary and more than 100 within 50m of the anticipated trackout routes.

Based on the assessment criteria detailed in Appendix D, the sensitivity of the receiving environment to potential dust soiling impacts was considered to be high for all construction phase activities. This is because the site is situated in a predominantly residential area and the people or property would reasonably be expected to be present here for extended periods of time.

Human Health

The annual mean concentration of PM₁₀ is 19.38µg/m³ as detailed in Section 4. Based on the receptor counts provided above, the area is considered to be of low sensitivity for demolition, earthworks and construction phase activities and medium for trackout activities.

The sensitivity of the receiving environment to specific potential dust impacts, based on the criteria detailed in Appendix D is summarised in Table 10.

Table 10: Sensitivity of the Surrounding Area

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

5.1.4. STEP 2C – RISK

Both the magnitude and sensitivity factors are combined in Step 2C to determine the risk of dust impacts without the application of best practice mitigation measures.

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 the majority of the construction phase. A summary of the risk from each dust generating activity is provided in Table 11.

Table 11: Summary of Potential Unmitigated Dust Risks

Potential Impact	Risk			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	Medium	Medium	High	Medium
Human Health	Low	Low	Low	Low

5.1.5. STEP 3 – MITIGATION

The IAQM guidance provides a number of potential mitigation measures to reduce impacts during the construction phase. These measures have been adapted for the Proposed Development site as summarised in Table 12.

Table 12: Fugitive Dust Mitigation Measures

Issue	Control Measure
Site Management	• Develop and implement a stakeholder communications plan that includes community engagement before work commences on site. • Develop a Dust Management Plan. • Display the name and contact details of person(s) accountable for air quality pollutant emissions and dust accountable for air quality pollutant emissions and dust issues on the site boundary. • Display the head or regional office contact information. • Record and respond to all dust and air quality pollutant emissions complaints. • Make a complaints log available to the local authority when asked. • Carry out regular site inspections to monitor compliance with air quality and dust control procedures, record inspection results, and make an inspection log available to the local authority when asked. • Increase the frequency of site inspections by those accountable for dust and air quality pollutant emissions issues when activities with a high potential to produce dust and emissions and dust are being carried out, and during prolonged dry or windy conditions. • Record any exceptional incidents that cause dust and air quality pollutant emissions, either on or off the site, and the action taken to resolve the situation is recorded in the log book. • Hold regular liaison meetings with other high-risk construction sites within 500m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised.
Preparing & Maintaining Site	• Plan site layout: machinery and dust causing activities should be located away from receptors. • Erect solid screens or barriers around dust activities or the site boundary that are, at least, as high as any stockpiles on site. • Fully enclosure site or specific operations where there is a high potential for dust production and the site is active for an extensive period. • Install green walls, screens or other green infrastructure to minimise the impact of dust and pollution. • Avoid site runoff of water or mud. • Keep site fencing, barriers and scaffolding clean using wet methods. • Remove materials from site as soon as possible. • Cover, seed or fence stockpiles to prevent wind whipping. • Carry out regular dust soiling checks of buildings within 100m of site boundary and cleaning to be provided if necessary. • Provide showers and ensure a change of shoes and clothes are required before going off-site to reduce transport of dust. • Agree monitoring locations with the Local Authority • Where possible, commence baseline monitoring at least three months before phase begins. • Put in place real-time dust and air quality pollutant monitors across the site and ensure they are checked regularly.
Operating vehicle/machinery and sustainable travel	• Ensure all on-road vehicles comply with the requirements of the London Low Emission Zone. • Ensure all non-road mobile machinery (NRMM) comply with the standards set within this guidance. • Ensure all vehicles switch off engines when stationary – no idling vehicles.

Issue	Control Measure
	• Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where possible. • Impose and signpost a maximum-speed-limit of 10mph on surfaced haul routes and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate). • Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials. • Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).
Operations	• Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems. • Ensure an adequate water supply on the site for effective dust/particulate matter mitigation (using recycled water where possible). • Use enclosed chutes, conveyors and covered skips. • Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate. • Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.
Waste management	• Reuse and recycle waste to reduce dust from waste materials • Avoid bonfires and burning of waste materials.
Demolition	• Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust). • Ensure water suppression is used during demolition operations. • Avoid explosive blasting, using appropriate manual or mechanical alternatives. • Bag and remove any biological debris or damp down such material before demolition.
Earthworks & Construction	• Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces. • Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil to re-vegetate or cover with topsoil. • Only remove secure covers in small areas during work and not all at once. • Avoid scabbling (roughening of concrete surfaces) if possible • Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place • Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery. • For smaller supplies of fine powder materials ensure bags are sealed after use and stored appropriately to prevent dust.

Issue	Control Measure
Trackout	- Regularly use a water-assisted dust sweeper on the access and local roads, as necessary, to remove any material tracked out of the site. - Avoid dry sweeping of large areas. - Ensure vehicles entering and leaving sites are securely covered to prevent escape of materials during transport. - Record all inspections of haul routes and any subsequent action in a site log book. - Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems and regularly cleaned. - Inspect haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable; - Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable). - Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits. - Access gates to be located at least 10m from receptors where possible. - Apply dust suppressants to locations where a large volume of vehicles enter and exit the construction site

5.1.6. STEP 4 – RESIDUAL IMPACTS

Assuming the relevant mitigation measures outlined in Table 12 are implemented, the residual effect from all dust generating activities is predicted to be negligible and therefore **not significant** in accordance with the IAQM guidance.

5.2 OPERATIONAL PHASE ASSESSMENT

The assessment was undertaken in accordance with the methodology detailed in Section 3.2.

5.2.1. FUTURE EXPOSURE

Annual mean NO₂, PM₁₀ and PM_{2.5} concentrations were predicted across the Proposed Development for the 2027 DS scenario at a height of 1.5m to represent exposure across the ground floor level, as shown in Figures 7 to 9 within Appendix B.

Background NO₂ PM₁₀ and PM_{2.5} levels are likely to be lower at elevated heights due to increased distance from emission sources, such as roads. Therefore, predicted concentrations at heights above ground floor level are considered acceptable in regards to future exposure and have not been assessed further.

Nitrogen Dioxide (NO₂)

Predicted annual mean NO₂ concentrations across the Proposed Development site during the DS scenario are summarised in Table 13.

Table 13: Modelling Results - Annual Mean NO₂ at Proposed Development

Floor Level	Predicted 2027 Annual Mean NO ₂ Concentration (µg/m ³)	APEC Category
Ground (1.5m)	18.15 – 21.64	A

The predicted concentrations shown in Table 13 indicate that there were no exceedances of the AQO across the Proposed Development. In addition, concentrations across the Proposed Development are classified as APEC-A (no air quality grounds for refusal). As such, it is considered that annual mean NO₂ levels at the Proposed Development site should not be viewed as a constraint to development.

Predictions of 1-hour NO₂ concentrations were not produced as part of the dispersion modelling assessment. LAQM.(TG22)² states if annual mean NO₂ concentrations are below 60µg/m³ then it is unlikely that the 1-hour AQO will be exceeded. As such, based on the results in Table 13, it is not predicted that on-site concentrations will exceed the 1-hour mean AQO for NO₂.

Based on the results of the dispersion modelling assessment, the site is considered to be suitable for residential use without the implementation of mitigation techniques to protect future site users from elevated NO₂ concentrations.

Particulate Matter (PM₁₀ & PM_{2.5})

Predicted annual mean PM₁₀ and PM_{2.5} concentrations across the Proposed Development site during the DS scenario are summarised in Table 14.

Table 14: Modelling Results - Annual Mean PM₁₀ and PM_{2.5} at Proposed Development

Floor Level	Predicted 2027 Annual Mean Concentration (µg/m ³)		APEC Category
	PM ₁₀	PM _{2.5}	
Ground (1.5m)	17.93 - 19.29	11.97 – 12.73	A

The predicted concentrations shown in Table 14 indicate that there were no exceedances of the annual mean AQOs for PM₁₀ or PM_{2.5} throughout the modelling area. In addition, concentrations across the Proposed Development are classified as APEC-A (no air quality grounds for refusal). As such, it is considered that annual mean PM₁₀ or PM_{2.5} levels at the Proposed Development site should not be viewed as a constraint to development.

Based on the results of the dispersion modelling assessment, the site is considered to be suitable for proposed end use without the implementation of mitigation techniques to protect future site users from elevated PM₁₀ and PM_{2.5} concentrations.

24-hour Particulate Matter (PM₁₀)

For consideration of the 24-hour mean PM₁₀ AQO, the number of days with 24-hour mean PM₁₀ concentrations greater than 50µg/m³ must not exceed 35 in any given calendar year. In order to assess modelled results against the 24-hour mean AQO for PM₁₀, the guidance document LLAQM.TG(22) confirms the method by which the number of days in which the PM₁₀ 24-hour AQO is exceeded can be obtained based on a relationship with the predicted PM₁₀ annual mean concentration using the formula below, where (C) denotes the annual mean concentration of PM₁₀:

$$\text{No. of Exceedances} = 0.0014 * C^3 + \frac{206}{C} - 18.5$$

The number of days was calculated to be between 1.059 and 2.228 days across the Proposed Development. As such, the permitted number of 35 days has not been exceeded, and onsite 24-hour mean PM₁₀ concentrations are classified as APEC-B.

Based on these results and given the proposed setback distance of the site from the local road network along with the predicted annual mean PM₁₀ concentrations remaining below 50% of the AQO across the site, the

development is considered to be suitable for the proposed end use without the implementation of mitigation techniques to protect future site users from elevated 24-hour mean PM₁₀ concentrations.

5.2.2. IMPACT ASSESSMENT - PREDICTED CONCENTRATIONS AT EXISTING SENSITIVE USE

Any additional vehicle movements associated with the Proposed Development will generate exhaust emissions, such as NO₂, PM₁₀ and PM_{2.5} on the local and regional road networks.

Traffic data provided by Calibro, the appointed traffic consultant for the scheme, indicated the Proposed Development is anticipated to result in a net decrease from the existing site use as the development will be car free with the exception of a small number of disabled spaces. As such, it is considered that the operational phase of the site will not result in a change of AADT flows of more than 100, produce over 25 HDV movements per day or significantly affect average speeds on the local road network.

Subsequently, potential air quality impacts associated with operational phase road vehicle exhaust emissions are predicted to be **not significant** in accordance the EPUK and IAQM³ screening criteria shown in Section 3.2.2.

5.3 AIR QUALITY NEUTRAL ASSESSMENT

As noted in Section 3.3, the Proposed Development will not result in increases to existing AADT flows other than trips by disability vehicles, nor does the scheme provide any onsite combustion processes. Subsequently, the Proposed Development will not result in any additional NO_x, PM₁₀ or PM_{2.5} concentrations during operation.

In line with the GLA guidance⁵, and given the lack of development generated emissions, an Air Quality Neutral assessment has been screened out

6 CONCLUSION

PEC Ltd were commissioned by the Client to undertake an Air Quality Assessment in support of a proposed mixed use development at 707-725 Lordship Lane, Wood Green, London.

During the construction phase of the Proposed Development there is the potential for air quality impacts as a result of fugitive dust emissions from the site. These were assessed in accordance with the GLA methodology. Assuming good practice dust control measures are implemented, the residual potential air quality impacts from dust generated by construction, earthworks and trackout activities was predicted to be **not significant**.

Dispersion modelling was undertaken to quantify annual mean NO₂, PM₁₀ and PM_{2.5} concentrations across the application to assess suitability for proposed use. Modelling results were subsequently verified using LBoH local monitoring data.

The dispersion modelling results indicated that annual mean NO₂, PM₁₀ and PM_{2.5} concentrations across the application site were below the relevant AQOs at the proposed sensitive use. The site is therefore considered suitable for the proposed end-use without the implementation of protective mitigation techniques to protect future amenity.

An assessment was undertaken using the EPUK and IAQM screening criteria to determine the potential for vehicle trips generated by the Proposed Development to affect local air quality. The traffic data provided by Calibro, indicated that Proposed Development is anticipated to result in a net decrease in traffic on the local road network. Anticipated development traffic flows are **below** the relevant EPUK and IAQM assessment thresholds and operational impacts could be screened out as **not significant**.

The GLA states that new developments must be considered Air Quality Neutral. The development is not anticipated to result in any additional traffic other than from disability vehicles or introduce any onsite combustion, as such transport and building emissions are considered to be below the development specific benchmarks. Subsequently, the Proposed Development is considered Air Quality Neutral.

Based on the assessment results the site is considered suitable for the proposed end use and complies with the LBoH Local Plan, the GLA Policy and the NPPF.

APPENDIX A – ABBREVIATIONS

AADT	Annual Average Daily Traffic
ADM	Atmospheric Dispersion Modelling
APEC	Air Pollution Exposure Criteria
APPLE	Air Pollution Planning and the Local Environment
AQLV	Air Quality Limit Value
AQMA	Air Quality Management Area
AQO	Air Quality Objectives
AQS	Air Quality Strategy
CERC	Cambridge Environmental Research Consultants
DEFRA	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
DMP	Dust Management Plan
EPUK	Environmental Protection UK
EU	European Union
GIA	Gross Internal Area
GLA	Gross Internal Area
HDV	Heavy Duty Vehicle
IAQM	Institute of Air Quality Management
LLAQM	London Local Air Quality Management
LA	Local Authority
LBoH	London Borough of Haringey
LDV	Light Duty Vehicle
NGR	National Grid Reference
NO ₂	Nitrogen dioxide
NO _x	Oxides of nitrogen
NPPF	National Planning Policy Framework
NPPG	National Planning Practice Guidance
NRMM	Non Road Mobile Machinery
PM _{2.5}	Particulate matter with an aerodynamic diameter of less than 2.5µm
PM ₁₀	Particulate matter with an aerodynamic diameter of less than 10µm
TEB	Transport Emission Benchmark
TEMPRO	Trip End Model Presentation Program
z ₀	Roughness Length

APPENDIX B - FIGURES



530000 530200 530400 530600 530800 531000 531200 531400 531600 531800 532000 532200 532400 532600 532800 533000 533200 533400 533600 533800 534000

Legend



Site Boundary

Title

Figure 1

Site Location

Project

Lordship Lane, London

Project Number

AQ10045

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Legend

-  Site Boundary
-  Air Quality Focus Area
-  Diffusion Tube Monitoring Locations

Title

Figure 2
Diffusion Tube Monitoring Locations

Project

Lordship Lane, London

Project Number

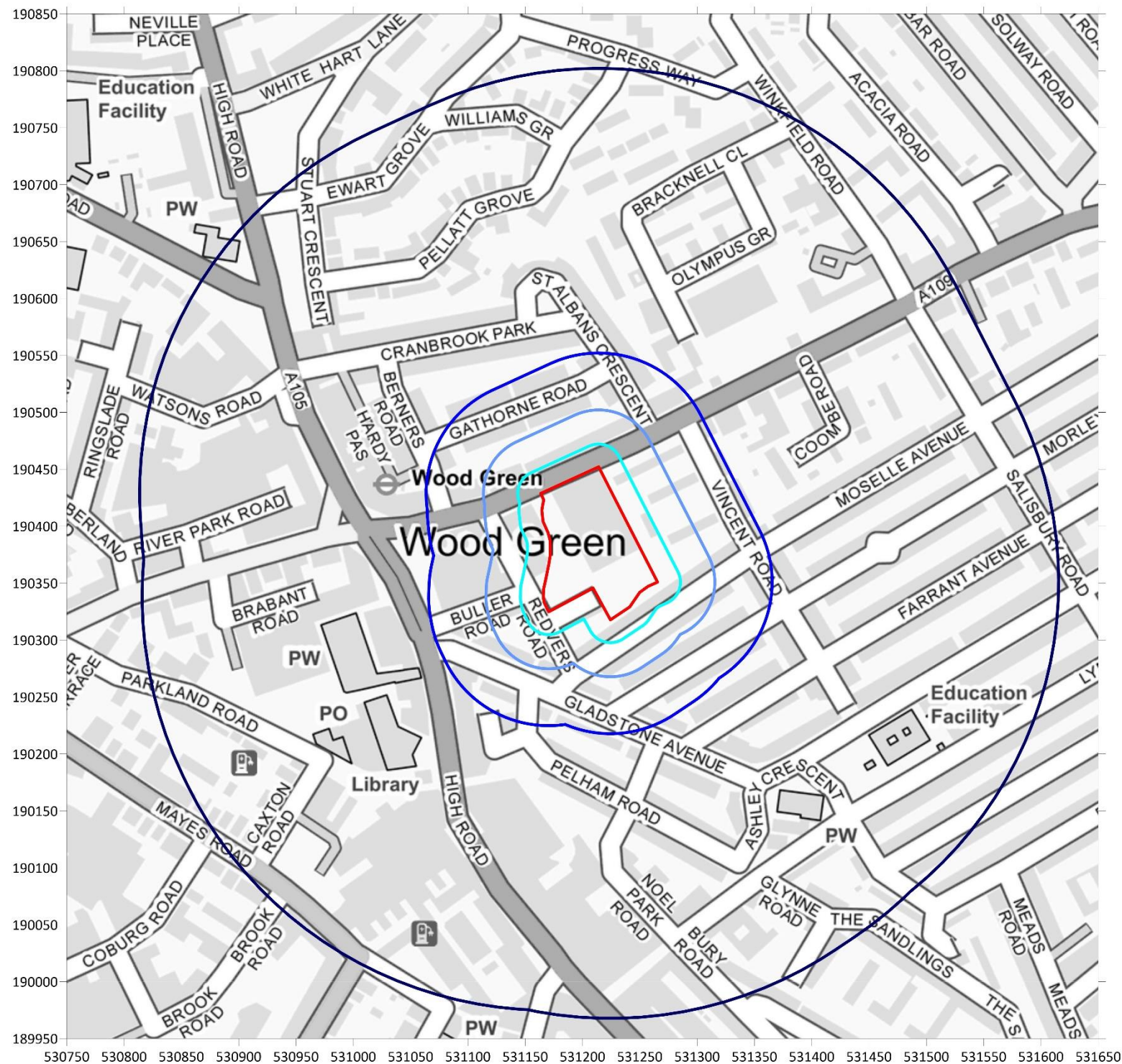
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 Site Boundary
 20m from Site Boundary
 50m from Site Boundary
 100m from Site Boundary
 350m from Site Boundary

Figure 3
Demolition, Earthworks and Construction
Dust Buffer Zones

Lordship Lane, London

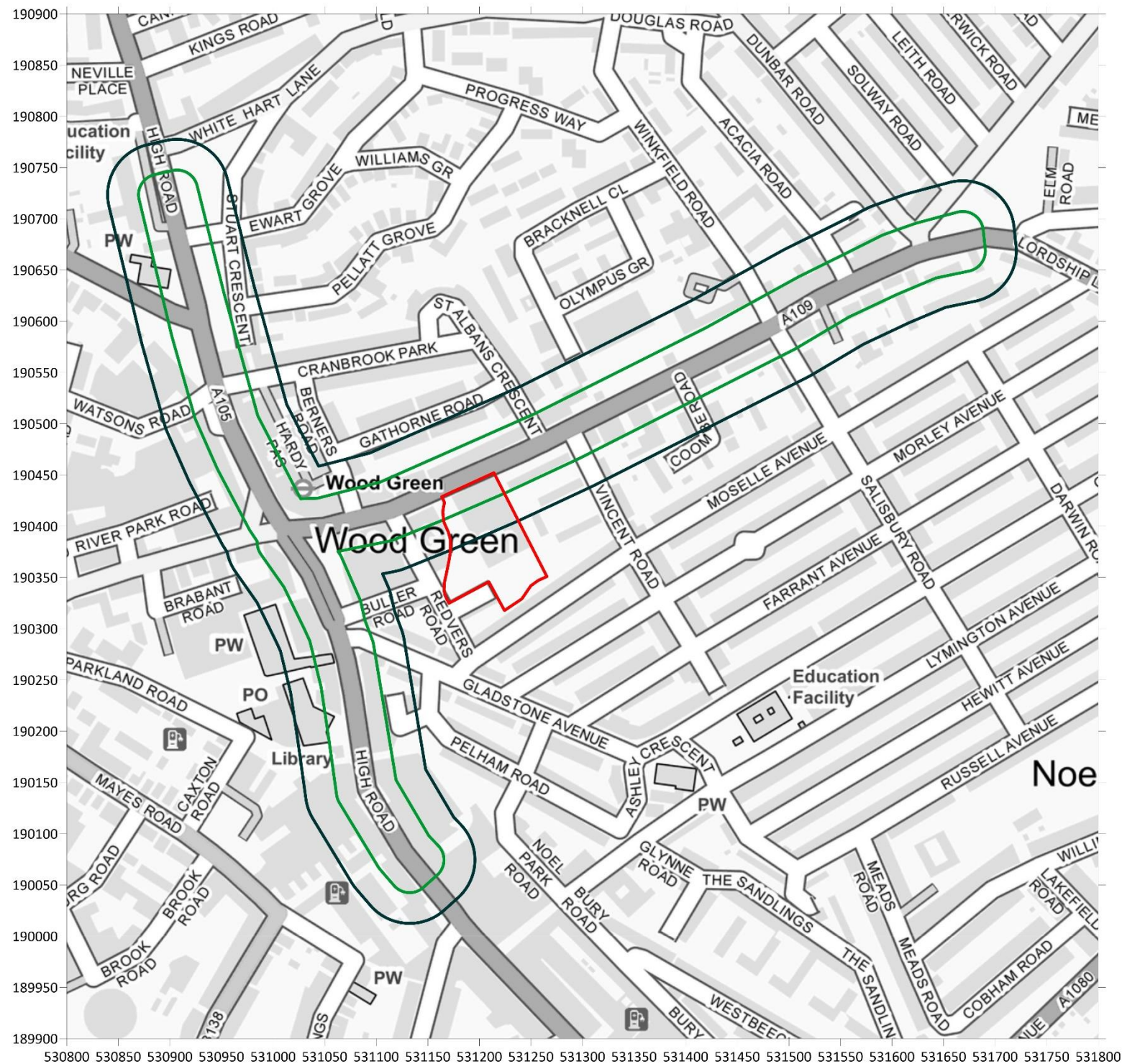
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 Site Boundary
 20m from Site Access Route
 50m from Site Access Route

Figure 4
Trackout Dust Buffer Zones

Lordship Lane, London

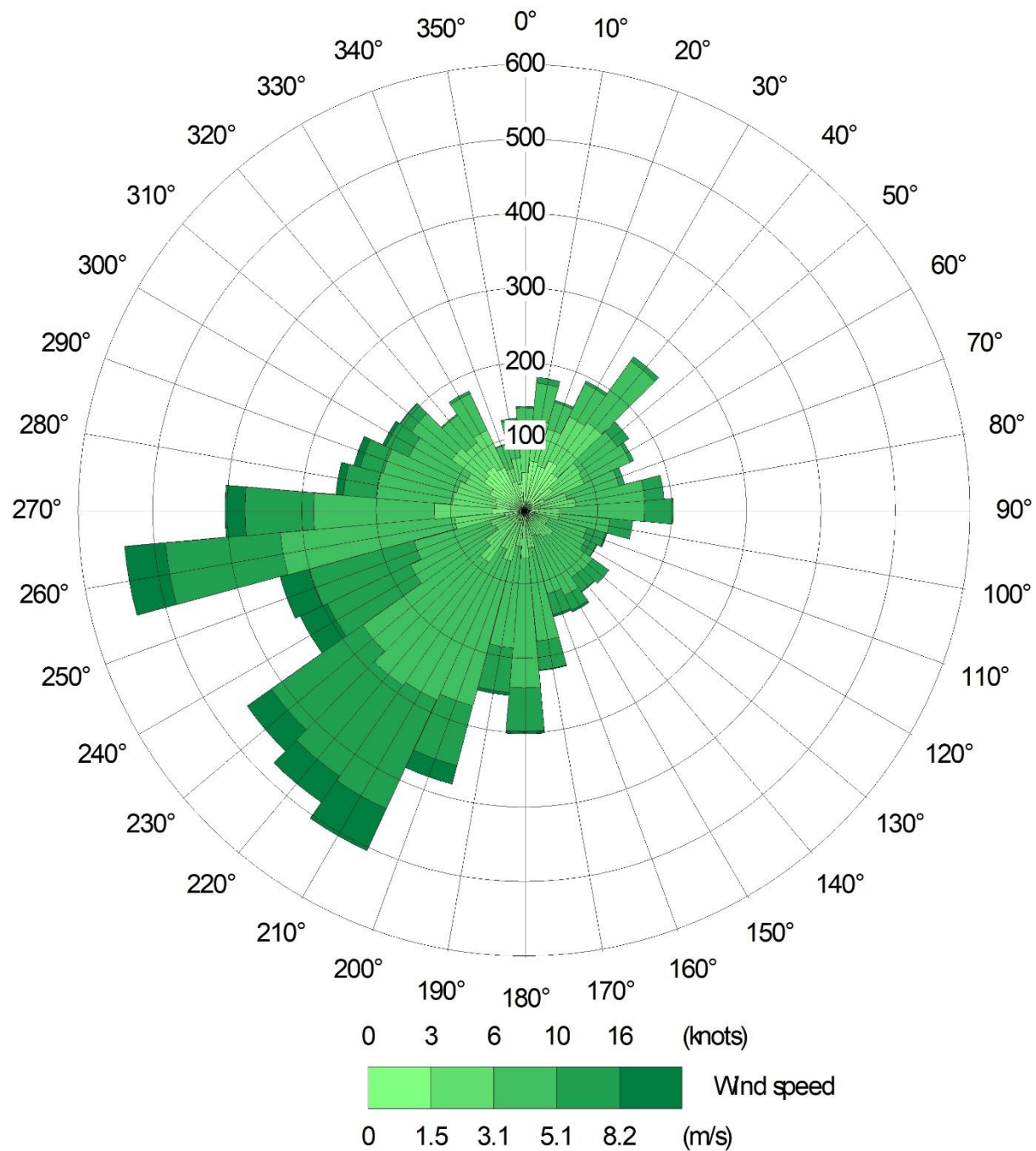
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Title

Figure 5

Wind Rose
Heathrow Airport Meteorological Station
2019

Project

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Project Number

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Legend

-  Site Boundary
-  Modelled Road Link
-  Cartesian Grid
-  Diffusion Tube Monitoring

Title

Figure 6
ADMS-Roads Input

Project

Lordship Lane, London

Project Number

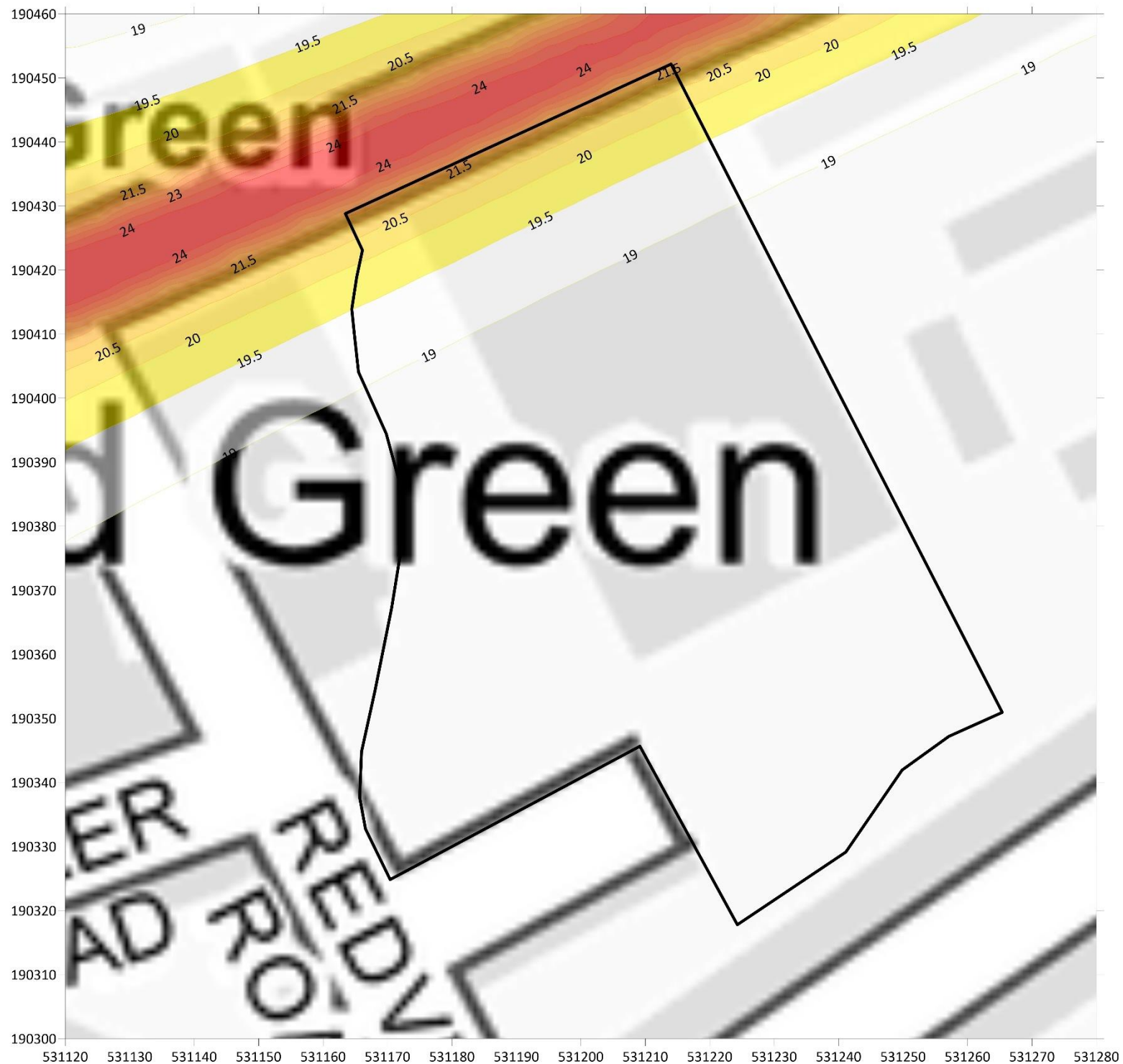
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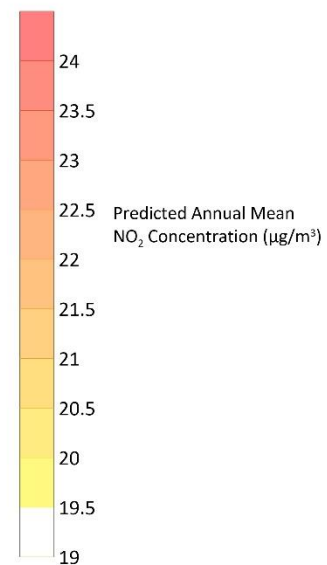
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Legend

 Site Boundary



Title

Figure 7

Predicted Annual Mean NO₂
Concentrations (µg/m³)

Project

Lordship Lane, London

Project Number

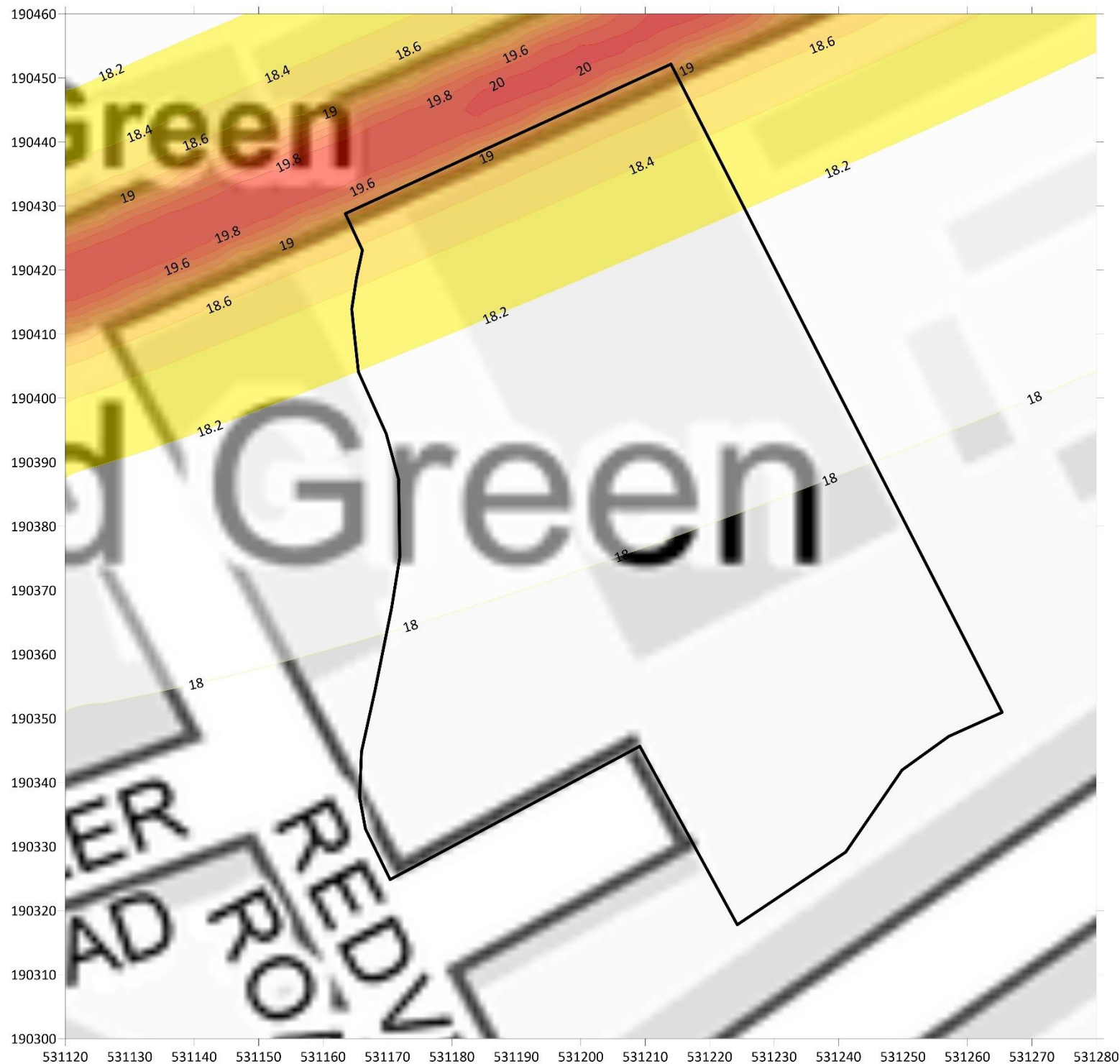
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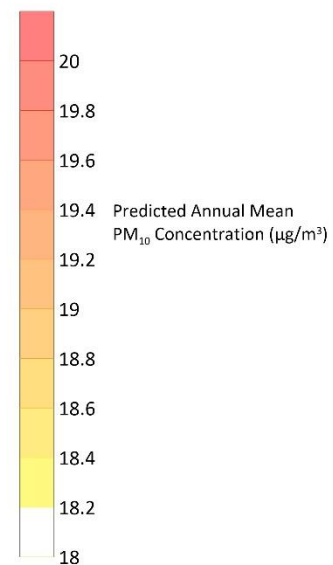
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Legend

 Site Boundary



Title

Figure 8
Predicted Annual Mean PM₁₀
Concentrations (µg/m³)

Project

Lordship Lane, London

Project Number

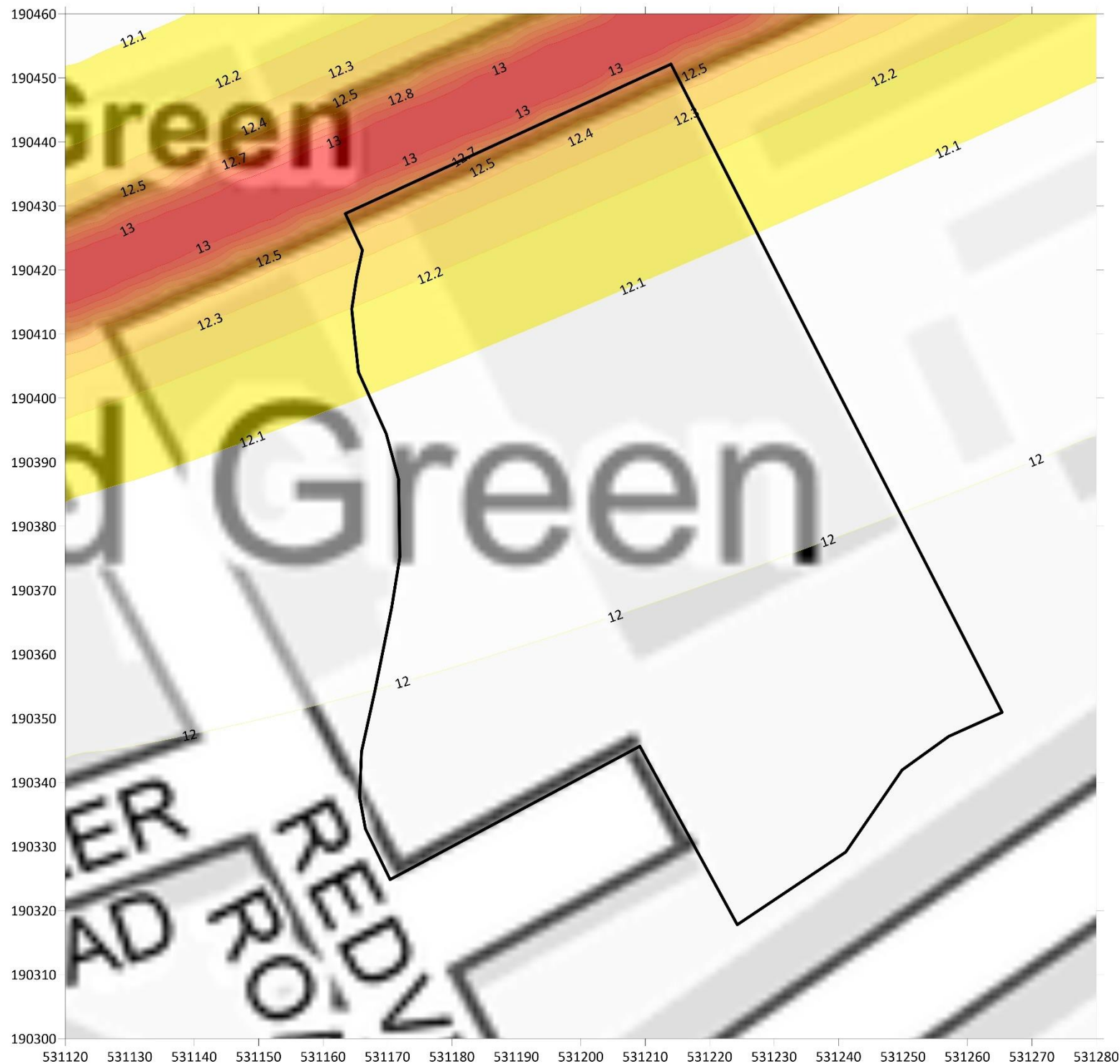
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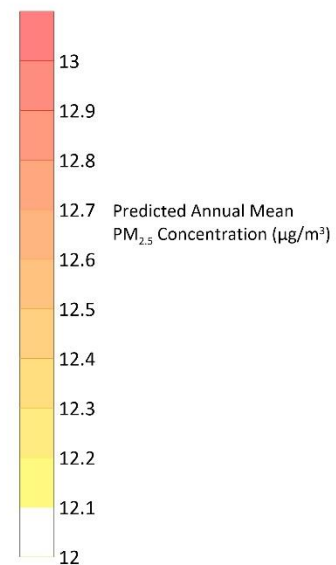
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Legend

 Site Boundary



Title

Figure 9
Predicted Annual Mean PM_{2.5}
Concentrations (µg/m³)

Project

Lordship Lane, London

Project Number

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APPENDIX C – ASSESSMENT INPUTS

The Proposed Development has the potential to introduce future site users to poor air quality. Dispersion modelling using ADMS Roads was therefore undertaken to predict pollutant concentrations across the site to consider site suitability for the proposed end-use.

The assessment was undertaken in accordance with the guidance contained within the DEFRA document LAQM.TG(22)² and the EPUK and IAQM guidance³.

Dispersion Model

Dispersion modelling was undertaken using the ADMS-Roads dispersion model (version 5.0). ADMS-Roads is 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.

The model requires input data that details the following parameters:

- Assessment area;
- Traffic flow data;
- Vehicle emission factors;
- Spatial co-ordinates of emissions;
- Street width;
- Meteorological data;
- Roughness length; and
- Monin-Obukhov length.

Assessment Area

Ambient concentrations were predicted over the Proposed Development site and surrounding highway network. One Cartesian grid was included in the model over the area at approximately NGR: 531120, 190300 and 531280, 190460 at height of 1.5m to represent the proposed ground floor level for the 2027 opening year scenario.

Results were subsequently used to produce contour plots within the Surfer software package. Reference should be made to Figure 6 within Appendix B for a graphical representation of the verification inputs and operation phase DS extents, respectively.

Traffic Flow Data

Development flow traffic data and associated network distribution was provided by Calibro, the appointed Transport Consultants for the scheme, and indicated net reduction in traffic is anticipated as a result of the Purposed Development.

Baseline traffic data has been obtained from the Department for Transport (DfT). The DfT Matrix web tool enables the user to view and download traffic flows on every link of the A-road and motorway network in Great Britain for the years 1999 to 2019. The DfT matrix is referenced in DEFRA guidance LAQM.TG(22)² as being a suitable source of data for air quality assessments and is therefore considered to provide a reasonable representation of traffic flows in the vicinity of the site.

Growth factors provided by the Trip End Model Presentation Program (TEMPRO) software package were utilised to allow for conversion from the obtained 2019 traffic flow to 2027 which was used to represent the opening year scenario. Vehicle speeds were estimated based on the free flow potential of each link and local speed limits. Road widths were estimated from aerial photography and UK highway design standards.

A summary of the traffic data used in the verification scenario is provided in Table C1.

Table C1: 2019 Verification Traffic Data

Road Link		Road Width (m)	24 Hour AADT Flow	HDV Pop (%)	Mean Vehicle Speed (km/hr)	Data Source
L1	Lordship Lane, east of High Road	11	18,087	5.1	5	DFT
L2	Lordship Lane, east of Berners Road	11	18,087	5.1	20	DFT
L3	Lordship Lane, west of Gladstone Avenue	10	18,087	5.1	25	DFT
L4	Lordship Lane, east of Gladstone Avenue	11	18,087	5.1	10	DFT
L5	Lordship Lane, east of Boreham Road	8	24,106	7.8	5	DFT
L6	Boreham Road	9	7,027	10.8	10	DFT
L7	Westbury Avenue	7	7,027	10.8	20	DFT

Reference should be made to Figure 6 within Appendix B for a graphical representation of the road link locations used within the verification assessment. The road width and mean vehicle speed shown in Table C1 remained the same for the 2027 scenarios.

A summary of the 2027 traffic data is shown in Table C2.

Table C2: 2027 Traffic Data

Road Link		DS Scenario	
		24 Hr AADT Flow	HDV Prop (%)
L1	Lordship Lane, east of High Road	18,724	5.1
L2	Lordship Lane, east of Berners Road	18,724	5.1
L3	Lordship Lane, west of Gladstone Avenue	18,724	5.1
L4	Lordship Lane, east of Gladstone Avenue	18,724	5.1
L5	Lordship Lane, east of Boreham Road	24,955	7.8
L6	Boreham Road	7,274	10.8
L7	Westbury Avenue	7,274	10.8

Reference should be made to Figure 6 within Appendix B for a graphical representation of the road link locations used within the operation phase assessment.

Emission Factors

Emission factors for each link were calculated using the relevant traffic flows and the Emissions Factor Toolkit (version 11.0) released in November 2021, which incorporates updated COPERT 5.3 vehicle emissions factors for NO_x, PM₁₀ and PM_{2.5} and EURO 6 vehicle fleet sub-categories.

NO_x to NO₂ Conversion

Predicted annual mean NO_x concentrations from the dispersion model were converted to NO₂ concentrations using the NO_x to NO₂ Calculator (v.8.1) provided by DEFRA, which is the method detailed within LAQM.TG(22)².

Meteorological Data

Meteorological data used in this assessment was taken from Heathrow Airport meteorological station over the period 1st January 2019 to 31st December 2019(inclusive).

Heathrow Airport meteorological station is located at approximate NGR: 507060, 176500 which is approximately 27.8km south west of the Proposed Development. Although there is a large distance between the application site and Heathrow Airport the use of this data is considered to provide a reasonable representation of conditions at the development site.

All meteorological records used in the assessment were provided by Atmospheric Dispersion Modelling (ADM) Ltd, which is an established distributor of data within the UK. Reference should be made to Figure 5 within Appendix B for a wind rose of utilised meteorological data.

Roughness Length

The specific roughness length (z_0) values used to represent conditions during the verification process, DS scenario, as well as conditions at the Heathrow Airport meteorological station are summarised in Table C3.

Table C3: Utilised Roughness Lengths

Scenario	Roughness Length (m)	ADMS Description
Verification, future year Scenarios	1	Cities and Woodlands
Heathrow Airport Meteorological Station	0.5	Parkland and Open Suburbia

These values of z_0 are considered appropriate for the morphology of the assessment area.

Monin-Obukhov Length

The Monin-Obukhov length provides a measure of the stability of the atmosphere within certain urban or rural contexts. The specific length values used to represent conditions during the verification process, DS scenario, as well as conditions at the Insert Met Station are summarised in Table C4.

Table C4: Utilised Monin-Obukhov Lengths

Scenario	Monin-Obukhov Length (m)	ADMS Description
Verification, future year Scenarios	100	Large Conurbations > 1million
Heathrow Airport Meteorological Station	30	Mixed Urban/Industrial

This Monin-Obukhov value is considered appropriate for the morphology of the assessment area.

Background Concentrations

The 2027 annual mean background concentrations detailed in Table 5, was used in the dispersion modelling assessment to represent annual mean pollutant levels at the Proposed Development site.

Table C5 displays the specific background concentrations as predicted by DEFRA, utilised to represent the condition at the monitoring locations used within the verification process.

Table C5: Predicted Background Pollutant Concentrations for Monitoring Locations

Monitoring Location	DEFRA Grid Square	Pollutant	2019 Predicted Background Concentration ($\mu\text{g}/\text{m}^3$)
HR21 and HR24	532500, 190500	NO _x	34.74
		NO ₂	23.44 (21.69*)

*Following implementation of DEFRA NO₂ adjustment for NO_x sector removal tool

Verification

The predicted results from a dispersion model may differ from measured concentrations for a large 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. In reality, the differences between modelled and monitored results are likely to be a combination of all of these aspects.

For the purpose of this assessment model verification was undertaken for 2019, using traffic data, meteorological data and monitoring results from this year.

LBoH undertakes periodic monitoring of NO₂ concentrations at 2 roadside monitoring location within the assessment extents. The road contribution to total NO_x concentration was calculated from the monitored NO₂ result for use in the verification process. This was undertaken following the methodology contained within DEFRA guidance LAQM.TG(22)². The monitored annual mean NO_x concentration and calculated road NO_x concentration are summarised in Table C6.

Table C6: NO_x Concentrations

Site ID	Monitored Road NO _x Concentration (µg/m ³)	Modelled Road NO _x Concentration (µg/m ³)	% Difference ((Monitored - Modelled)/Monitored) * 100
HR21	2.64	6.00	-127
HR24	26.72	24.62	8

The monitored and modelled NO_x road contribution concentrations were graphed and the equation of the trend line based on the linear progression through zero was calculated, as shown in Graph 1. This indicated that a verification factor of **1.0491** was required to be applied to all NO_x modelling results, showing the model overestimated pollutant concentrations throughout the assessment extents.

Graph 1 is provided below.

Graph 1 - Verification Adjustment Factor

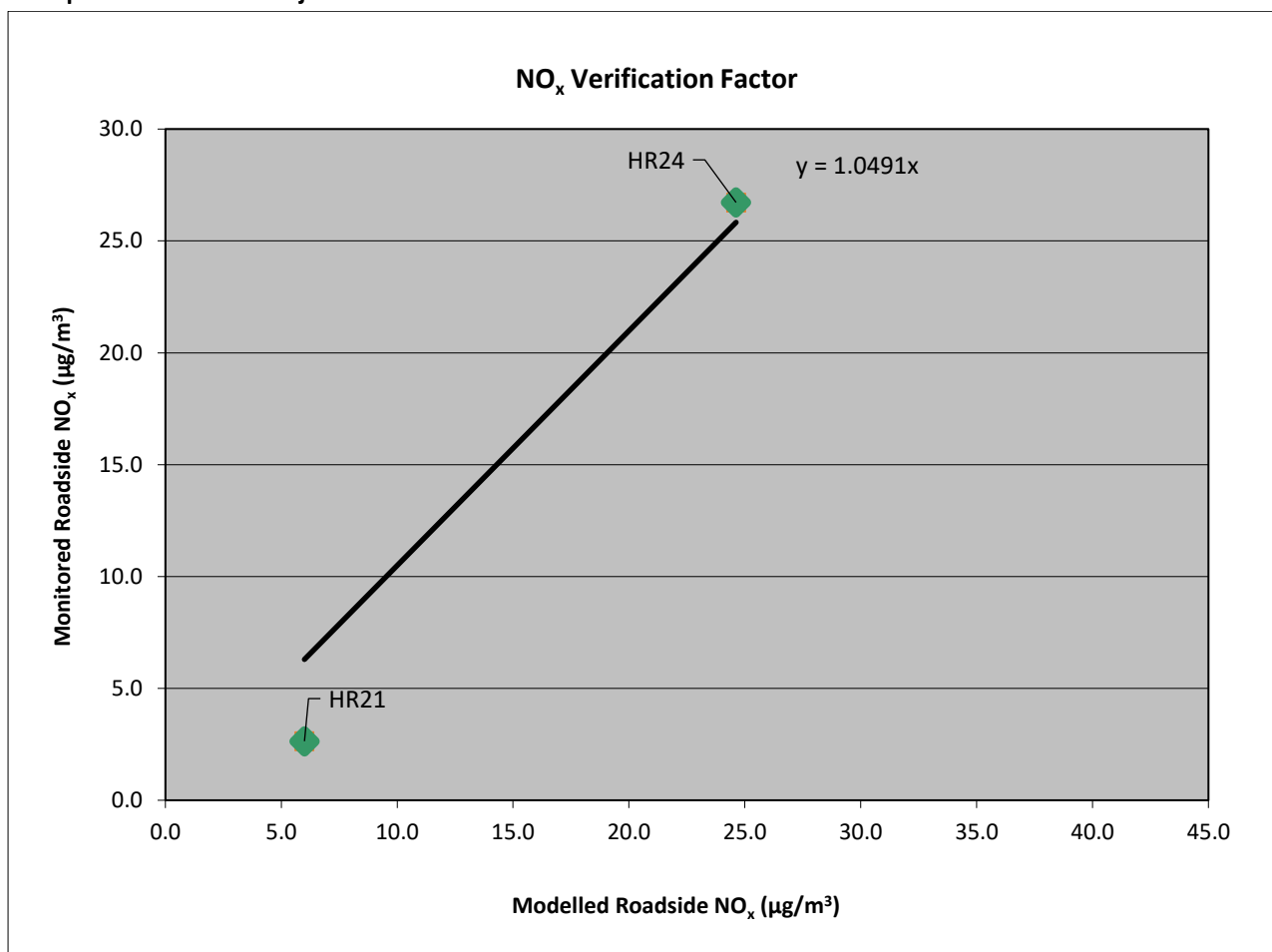


Table C7 presents the monitored annual mean NO₂ concentrations and the adjusted modelled total NO₂ concentration based on the above verification factor. Exceedances of the annual mean NO₂ AQO are highlighted in **bold**.

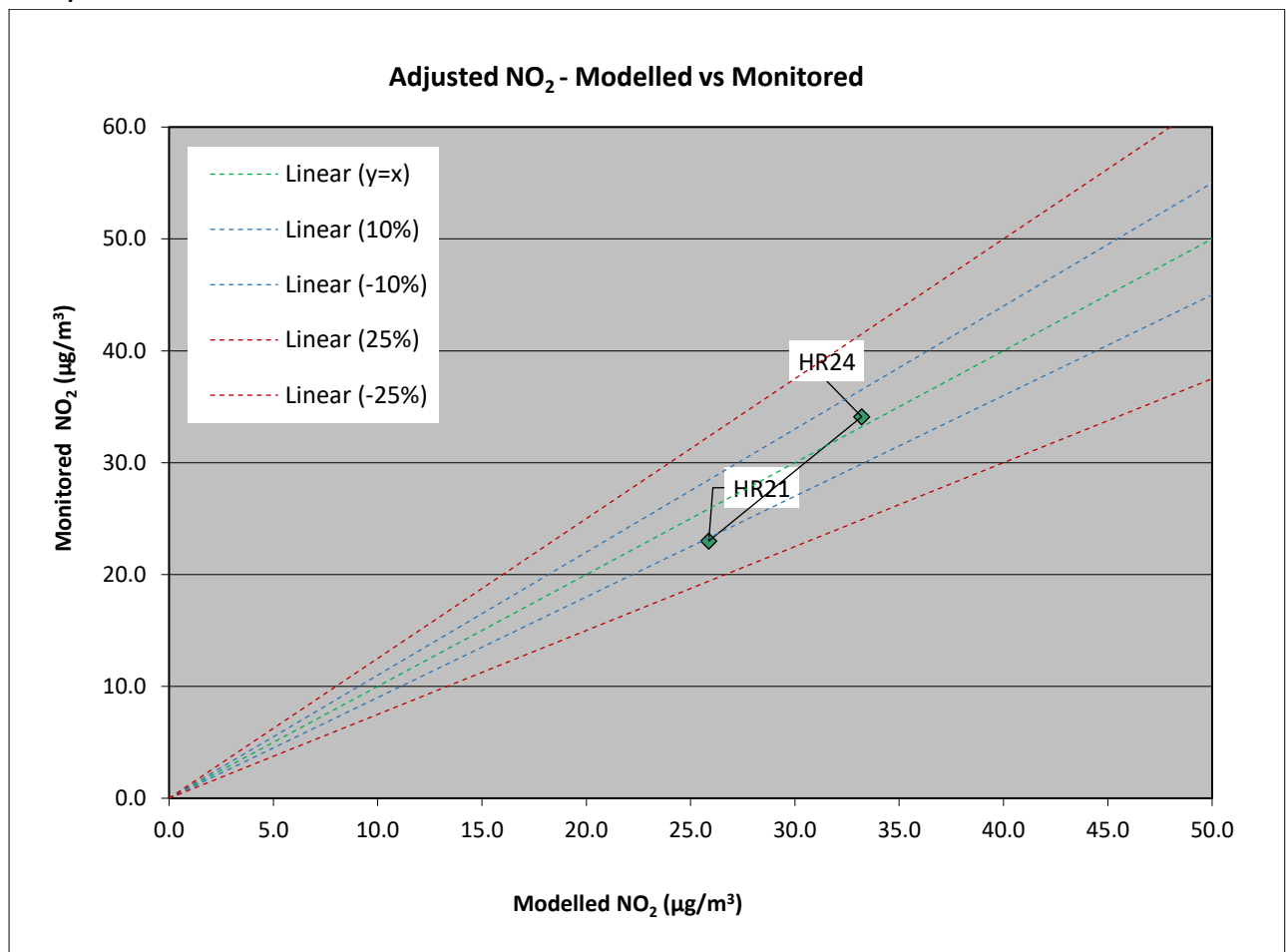
Table C7: NO₂ Concentrations

Site ID	Monitored Total NO ₂ Concentration (µg/m³)	Adjusted Modelled Total NO ₂ Concentration (µg/m³)	% Difference ((Monitored - Modelled)/Monitored) * 100
HR21	23.00	25.87	-12
HR24	34.10	33.20	2

As demonstrated in Table C7, the percentage difference between modelled and monitored concentrations is deemed acceptable and is less than 25% in all cases, and less than 10% at 1 locations. This reduces uncertainties in the model predictions and provide a robust representation of pollutant concentrations in accordance with the guidance suggested in LAQM.TG(22)².

A graphical representation of the adjusted NO₂ concentrations is provided within Graph 2.

Graph 2 – Modelled vs Monitored NO₂



As PM₁₀ and PM_{2.5} monitoring is not undertaken within the assessment extents, the NO_x adjustment factor of 1.0491 was utilised to adjust model predictions of PM₁₀ and PM_{2.5} in accordance with the guidance provided within LAQM.TG(22)².

APPENDIX D – CONSTRUCTION PHASE METHODOLOGY

There is the potential for fugitive dust emissions to occur as a result 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'.

Activities are divided into four 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 three 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 PM₁₀ and PM_{2.5}.

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 from the site boundary or 50m from the construction vehicle route up to 500m from the site entrance, then the assessment should proceed to Step 2. Additionally, should ecological receptors be identified within 50m of the boundary site or 50m from the construction vehicle route up to 500m from the site entrance, then the assessment should also proceed 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 to a risk category based on two factors:

- 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 two 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 F1.

Table F1: Construction Dust - Magnitude of Emission

Magnitude	Activity	Criteria
Large	Demolition	Total building volume greater than 50,000m ³ Potentially dusty construction material (e.g. concrete) On-site crushing and screening Demolition activities greater than 20m above ground level
	Earthworks	Total site area greater than 10,000m ² Potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size)

Magnitude	Activity	Criteria
		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 100,000m ³ 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 building volume 20,000m ³ to 50,000m ³ Potentially dusty construction material Demolition activities 10m to 20m above ground level
	Earthworks	Total site area 2,500m ² to 10,000m ² 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 25,000m ³ to 100,000m ³ Potentially dusty construction material (e.g. concrete) On site concrete batching
	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 building volume under 20,000m ³ Construction material with low potential for dust release (e.g. metal cladding or timber) Demolition activities less than 10m above ground level Demolition during wetter months
	Earthworks	Total site area less than 2,500m ² 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 25,000m ³ Construction material with low potential for dust release (e.g. metal cladding or timber)
	Trackout	<10 HDV (3.5t) outward movements in any one day Surface material with low potential for dust release Unpaved road length <50m

Step 2B defines the sensitivity of the area around the development site for construction, earthworks and trackout. The factors influencing the sensitivity of the area are shown in Table F2.

Table F2: Examples of Factors Defining Sensitivity of an Area

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	Internationally or nationally designated site e.g. Special Area of Conservation

Sensitivity	Examples	
	Human Receptors	Ecological Receptors
	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	
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
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, playing fields, farmland, footpaths, short term car park 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 during the construction phase:

- 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 the 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 in the undertaking of this assessment.

The sensitivity of the area to dust soiling effects on people and property is shown in Table F3.

Table F3: 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 F4 outlines the sensitivity of the area to human health impacts.

Table F4: 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
	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	Greater than 32µg/m ³	More than 10	High	Medium	Low	Low	Low
		1 - 10	Medium	Low	Low	Low	Low
	28 - 32µg/m ³	More than 10	Medium	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low	Low
	24 - 28µg/m ³	More than 10	Low	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low	Low
	Less than 24µg/m ³	More than 10	Low	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low	Low
Low	-	More than 1	Low	Low	Low	Low	Low

Table F5 outlines the sensitivity of the area to ecological impacts.

Table F5: 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 F6 outlines the risk category from demolition activities.

Table F6: Dust Risk Category from Demolition

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

Table F7 outlines the risk category from earthworks and construction activities.

Table F7: Dust Risk Category from Earthworks and Construction

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

Table F8 outlines the risk category from trackout.

Table F8: Dust Risk Category from Trackout

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 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 through the use of effective mitigation. Experience shows that this is normally possible. Hence the residual effect will normally be 'not significant'.

APPENDIX E – ASSESSORS CV

Lewis Ellison Technical Director MOcean, AMIEnvSc, MIAQM
KEY EXPERIENCE
Lewis is a Technical Director with specialist experience in the air quality sectors. His key capabilities include: • Production of Air Quality Assessments to the Department for Environment, Food and Rural Affairs (DEFRA), Environment Agency and Environmental Protection UK (EPUK) methodologies for clients from the residential, retail and commercial sectors. • Detailed dispersion modelling of road vehicle emissions using ADMS-Roads. Studies have included impact assessment of pollutant concentrations at various floor levels and assessment of suitability of development sites for proposed end-use. • Assessment of dust impacts from construction sites to the Institute of Air Quality Management (IAQM) methodology. • Assessment of Odour Impact from commercial and industrial processes in line with Environment Agency (EA) and IAQM methodologies and guidance • Quantification of Ecological Impacts associated with Nitrogen and Acid Deposition from industrial processes • Production of air quality mitigation strategies for developments throughout the UK.
SELECT PROJECTS SUMMARY
Permit Application Support • Elliot Hire Salford • Elliot Hire Wakefield • Elliot Hire Scunthorpe ES Chapters • Lyle Park West, Newham – residential development in close proximity to an active industrial estate. • Deansgate, Manchester – residential multistorey development in the centre of Manchester. • Land West of Stevenage – 1350 residential unit development with the potential to negatively impact local air quality Air Quality • Goulton Street Hull – Outline planning permission for 7 industrial units within Hull • Empire Cinema, Birmingham – Diffusion tube survey and air quality assessment for an assisted living accommodation • Tirrell's Lane, Tenbury Wells – residential assessment in the village of Tenbury Wells. Odour Assessments • Gowanbank, Forfar – Odour survey to support a residential development in close proximity to Gowanbank recycling centre • Squires Close, Pocklington – Odour risk assessment in support of a residential in close proximity to a sewage treatment works • Hawthorn Fields, Rufforth - Odour risk assessment in support of a residential in close proximity to a waste water treatment works Dust Assessment • Liverpool Docks – Construction dust monitoring survey • Lyle Park West – Dust impact assessment from adjacent concrete batching plant • High Street, Burton – Construction dust risk assessment London Experience • Gurnell Leisure Centre – mixed use development including residential, sports and commercial land use • Springfield Village Wandsworth – residential development and extension to the existing hospital building • Evelyn House, Greenwich – residential apartment block Monitoring & Surveying Experience • Liverpool Waters – Frisbee Dust gauge monitoring • Gownbank, Forfar – Field odour survey “sniff test” • Empire Cinema Birmingham – Diffusion tube survey
QUALIFICATIONS
• Masters of Geological Oceanography • Odour Acuity Certified Master of Science