

London Borough of Haringey
Partridge Way, Wood Green, London

Air Quality Assessment

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1 Executive Summary

MLM Consulting Engineers Ltd (MLM) was commissioned by Martin Arnold Limited on behalf of London Borough of Haringey ('The Client') to undertake an Air Quality Assessment ('AQA') to support the planning application for a residential development at the Trinity Road/Partridge Way junction, Wood Green, London ('Site'). The site lies within the administrative area of London Borough of Haringey (LBH). The proposal is for a 23-unit residential development in a 9-storey block ('Proposed Development').

Regarding the impact of the proposals on the surrounding area, a screening assessment of the operational phase was undertaken in line with the applicable guidance. The Proposed Development is 'car free', save for two disabled car parking spaces and one visitor space. The Site has good access to public transport. As such, the Proposed Development is not anticipated to generate significant additional vehicle trips on the surrounding road network. Regarding heating and hot water provision, air source heat pumps are to be installed rather than centralised combustion plant. The overall impact on the surrounding area is therefore considered to be 'Not Significant' in accordance with the applicable guidance. In addition, the Proposed Development is considered to be Air Quality Neutral for traffic related emissions and building related emissions. No additional mitigation measures are therefore considered necessary.

To determine the suitability of air quality at the Site for its intended use, detailed dispersion modelling has been undertaken. Concentrations of NO₂, PM₁₀ and PM_{2.5} at the Proposed Development are predicted to be below the relevant health-based air quality objectives at all modelled receptors. The future occupants of the Proposed Development would not be exposed to unacceptable air quality and the Site is deemed suitable for its proposed future use in this respect.

In regards to impacts during construction, a qualitative assessment on the construction phase activities has been carried out following the relevant GLA & IAQM guidance. This identified that there is a 'Low to Medium Risk' of dust soiling impacts and 'Low to Negligible Risk' of increases in particulate matter concentrations that could affect human health due to construction activities. However, through good site practice and the implementation of suitable mitigation measures, the effect of dust and particulate matter releases would be significantly reduced. These measures are expected to form part of a construction management plan. The residual effects of the construction phase on air quality are considered to be 'Negligible'. The air quality impacts from the Proposed Development during the construction phase would be 'Not Significant'. Construction related transport, NRMM and construction plant have the potential to increase pollutant concentrations over the duration of the construction works at nearby sensitive receptors. NRMM and construction plant should meet the relevant emissions standards and a travel plan should be implemented for all construction workers accessing the Site. The air quality impacts from the Proposed Development during the construction phase would be 'Not Significant'.

The air quality effect of the Proposed Development is considered to be 'Not Significant'. The Proposed Development does not, in air quality terms, conflict with national or local policies. There are no constraints to the Proposed Development in the context of air quality.

2 Limitations and Exceptions

This report and its findings should be considered in relation to the terms and conditions proposed and Scope of Works agreed between MLM and the Client.

The Executive Summary, Conclusions and Recommendations sections of the report provide an overview and guidance only, and should not be specifically relied upon until considered in the context of the whole report.

This report provides available factual data for the site and the surrounding area at the time of the study and as obtained by the means described in the text. The data is related to the site on the basis of the site location information provided by the Client.

It should be appreciated that the information that has been made available to date, is not necessarily exhaustive and that further information relevant to the proposed site usage may be provided which could change the overall findings.

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This report is prepared and written in the context of the proposals stated in the introduction to this report and should not be used in a differing context. Furthermore, new information, improved practices and legislation may necessitate an alteration to the report in whole or in part after its submission. Therefore, with any change in circumstances or after the expiry of one year from the date of the report, the report should be referred to us for re-assessment and, if necessary, re-appraisal.

3 Introduction

3.1 General

MLM was commissioned by Martin Arnold Limited ('Client') on behalf of London Borough of Haringey, to undertake an AQA to support the planning application for a residential development at the Trinity Road/Partridge Way junction, Wood Green, London ('Site').

The development proposals are for a 23-unit residential development in a 9-storey block ('Proposed Development').

The approximate central grid reference for the Site is 530416 (Easting) and 190900 (Northing). The Proposed Development lies within the administrative boundary of LBH. The Site is located in close proximity to the A109 (Bounds Green Road), a primary A-road. The main source of pollution in the area is road traffic and the relevant air pollutants for consideration are nitrogen dioxide (NO₂) and particulate matter (PM₁₀ and PM_{2.5}).

The surrounding area is primarily residential. The location of the Site is shown within Figure 1. The proposed site plan, first floor layout and southwest elevation are presented in Figures 2 to 4 respectively.

3.2 Report Structure

This report presents the findings of an assessment of the potential air quality impacts of the Proposed Development during the construction and operational phases. The type, source and significance of potential impacts during construction are identified, and the measures that should be employed to minimise these described.

The structure of the report is summarised below:

- A brief description of the legislation governing air quality in England, London and LBH;
- Details of the method and the input data used for the following assessments;
- Demolition/Construction dust impact assessment;
- Operation Phase impact assessment;
- Results of exposure assessment; and
- Conclusions.

3.3 Objectives

The Proposed Development is in an area where the existing air quality currently exceeds, or is at risk of exceeding, the relevant national air quality objectives (NAQOs). The main objectives of the assessment are to:

- Assess the suitability of the Site for the Proposed Development in terms of potential exposure of future occupants;
- Assess the impact on the local air quality and existing residential receptors during the construction and operational phases of the Proposed Development.

4 Legislation, Policy & Guidance

4.1 International Legislation and Policy

The European Directive (2008/50/EC)¹ sets legally binding limits for concentrations of outdoor air of major air pollutants that impact public health such as particulate matter (PM₁₀ and PM_{2.5}) and nitrogen dioxide (NO₂). The European Directive is implemented in the UK under the Air Quality Standards Regulations 2010². The obligations under the Air Quality Standards Regulations 2010 are separate from those of the 2000³ and 2002⁴ UK Regulations because local authorities in the UK will only have powers to manage some of the pollutants in the Air Quality Standards Regulations 2010, as most of the source pollutants will be managed by the Environment Agency under the IPPC Regime. Therefore, the obligation to meet the Air Quality Standards Regulations 2010 rests with the Secretary of State for Environment.

4.2 National Legislation and Policy

4.2.1 Local Air Quality Management

Part IV of the Environment Act 1995⁵, requires the UK Government to publish an Air Quality Strategy and local authorities to review, assess and manage air quality within their areas. This is known as Local Air Quality Management (LAQM)⁶. The 2007 Air Quality Strategy⁷ establishes the policy for ambient air quality in the UK. It includes the National Air Quality Objectives (NAQOs) for the protection of human health and vegetation for 11 pollutants. Those NAQOs included as part of LAQM are prescribed in the Air Quality (England) Regulations 2000 and the Air Quality (Amendment) (England) Regulations 2002. Table 4.1 presents the NAQOs for Nitrogen dioxide (NO₂) and particulate matter with an aerodynamic diameter of 10µg or less (PM₁₀), the key pollutants of concern in relation to vehicle emissions.

Table 4.1 Relevant Objectives set out in the Air Quality Strategy

Pollutant	Concentrations	Measured As
Nitrogen Dioxide (NO ₂)	200µg/m ³ not to be exceeded more than 18 times per year	One-hour mean
	40µg/m ³	Annual mean
Particulate Matter (PM ₁₀)	50µg/m ³ not to be exceeded more than 35 times per year	24-hour mean
	40µg/m ³	Annual mean
Particulate Matter (PM _{2.5})	25µg/m ³	Annual Mean

The Air Quality Strategy also introduced a new policy framework for tackling fine particles (PM_{2.5}) including an exposure reduction target. However, although EU Directive 2008/50/EC includes a new regulatory framework for PM_{2.5} this pollutant is not included within LAQM, therefore, there is no requirement to assess this pollutant unless as part of an Environmental Impact Assessment (EIA). However, to ensure a robust assessment PM_{2.5} has been considered in this assessment. The objective for this pollutant has been included in Table 4.1.

¹ Directive 2008/50/EC of the European Parliament and of the Council. May 2008. Official Journal of the European Union.

² Air Quality Regulations 2010 – Statutory Instrument 2010 No. 1001

³ The Air Quality (England) Regulations 2000 no. 928. Stationary Office.

⁴ The Air Quality (England) (Amendment) Regulations 2002 No. 4034. Stationary Office.

⁵ Environment Act 1995.

⁶ Local Air Quality Management Technical Guidance LAQM.TG (16). April 2016. Department for Environment, Food and Rural Affairs

⁷ The Air Quality Strategy for England, Scotland, Wales and Northern Ireland. 2007. Department for Environment, Food and Rural Affairs

The NAQOs apply to external air where there is relevant exposure to the public over the associated averaging periods within each objective. Guidance is provided within the London Local Air Quality Management Technical Guidance 2016 (LLAQM.TG (16)) issued by GLA for Local Authorities, on where the NAQOs apply as detailed in Table 4.2. The objectives do not apply in workplace locations, to internal air or where people are unlikely to be regularly exposed (i.e. centre of roadways).

Table 4.2 Locations Where Air Quality Objectives Apply

Averaging Period	Objectives Should Apply at:	Objectives Should Generally 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 and eight-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.
One-hour mean	All locations where the annual mean and: 24 and eight-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 expected to spend one hour or longer.	Kerbside sites where the public would not be expected to have regular access.
15-min mean	All locations where members of the public might reasonably be exposed for a period of 15 minutes.	
* – Such locations should represent parts of the garden where relevant public exposure to pollutants is likely, for example where there is seating or play areas. It is unlikely that relevant public exposure to pollutants would occur at the extremities of the garden boundary, or in front gardens, although local judgement should always be applied.		

4.2.2 National Planning Policy Framework

The latest guidance published in July 2019, the National Planning Policy Framework (NPPF)⁸ sets out the Government's planning policies for England and how these are expected to be applied. It replaces Planning Policy Statement 23⁹: Planning and Pollution Control and NPPF 2012 which provided planning guidance for local authorities with regards to air quality.

At the heart of the NPPF is a presumption in favour of sustainable development.

It provides a framework within which locally-prepared plans for housing and other development can be produced. It requires Local Plans to be consistent with the principles and policies set out in the Framework with the objective of contributing to the achievement of sustainable development.

Current planning law requires that application for planning permissions must be determined in accordance with the relevant development plan (i.e. Local Plan or Neighbourhood Plan). The NPPF should be taken into account in the preparation of development plans and therefore the policies set out within the Framework are a material consideration in planning decisions.

Under paragraph 103, it states that:

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

Under paragraph 170(e), it states that:

"Planning policies and decisions should contribute to and enhance the natural and local environment by preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans."

Under paragraph 181, it 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."

⁸ National Planning Policy Framework. February 2019. Ministry of Housing, Communities and Local Government

⁹ Planning Policy Statement 23 (PPS 23): Planning and Pollution Control (ODPM).

4.2.3 Control of Dust and Particulates Associated with Construction

Section 79 of the Environmental Protection Act (1990)¹⁰ states that where a statutory nuisance is shown to exist, the local authority must serve an abatement notice. Statutory nuisance is defined as:

'Any dust or other effluvia arising on industrial, trade or business premises and being prejudicial to health or a nuisance'

'Any accumulation or deposit which is prejudicial to health or a nuisance'

Failure to comply with an abatement notice is an offence and if necessary, the local authority may abate the nuisance and recover expenses.

In the context of the Proposed Development, the main potential for nuisance of this nature will arise during the construction phase - potential sources being the clearance, earthworks, construction and landscaping processes.

There are no statutory limit values for dust deposition above which 'nuisance' is deemed to exist - 'nuisance' is a subjective concept and its perception is highly dependent upon the existing conditions and the change which has occurred. However, research has been undertaken by a number of parties to determine community responses to such impacts and correlate these to dust deposition rates. However, impacts remain subjective and statutory limits have yet to be derived.

4.3 Regional Planning Policy

4.3.1 Cleaning the Air – The Mayor's Air Quality Strategy, 2010

The Mayor of London's Air Quality Strategy¹¹ sets out a series of policies and proposals for implementation of the UK AQS and for the achievement of the air quality standards and objectives within Greater London. With regards new developments the following policies are of relevance:

- Policy '7 - Using the planning process to improve air quality - new developments in London as a minimum shall be 'air quality neutral': The Mayor will encourage boroughs to require emissions assessments to be carried out alongside conventional air quality assessments. Where air quality impacts are predicted to arise from developments these will have to be offset by developer contributions and mitigation measures secured through planning conditions, section 106 agreements or the Community Infrastructure Levy;
- Policy '8 - Maximising the air quality benefits of low to zero carbon energy supply': The Mayor will apply emission limits for both PM and NO_x for new biomass boilers and NO_x emission limits for Combined Heat and Power Plant (CHPP). Air quality assessments will be required for all developments proposing biomass boilers or CHPPs and operators will be required to provide evidence yearly to demonstrate compliance with the emission limits;
- Policy '9 - Energy efficient buildings': The Mayor will set CO₂ reduction targets for new developments which will be achieved using the Mayor's Energy Hierarchy. These measures will result in reductions of NO_x emissions;
- Policy '10 - Improved air quality in the public realm': The Mayor will encourage the improvement of air quality in the public realm by planting vegetation to trap particulate matter. Through the planning system the Mayor will increase the number of green roofs and living walls across London. Additionally, he will encourage the planting of trees in areas of poor air quality.

¹⁰ Available at https://www.legislation.gov.uk/ukpga/1990/43/pdfs/ukpga_19900043_en.pdf

¹¹ Available at https://www.london.gov.uk/sites/default/files/Air_Quality_Strategy_v3.pdf

4.3.2 The London Plan 2021

The London Plan 2021¹² was first published in March 2021. The Plan is the overall strategic plan for London setting out an integrated economic, environmental, transport and social framework for the development of London over the next 20-25 years. It specifically addresses how development can help support the implementation of the Mayor's Air Quality Strategy and achieve a reduction in pollutant emissions and public exposure to pollution.

'Policy SI1 – Improving Air Quality' of the Intend to Publish London Plan states:

"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.*

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

- a) development proposals must be at least Air Quality Neutral*
- b) development proposals should use design solutions to prevent or minimise increased exposure to existing air pollution and make 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:

- 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 guidance.

¹² Available at https://www.london.gov.uk/sites/default/files/the_london_plan_2021.pdf

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."

'Policy SI3 – Energy Infrastructure' states that major development proposals within Heat Network Priority Areas should have a communal low-temperature heating system:

"D Major development proposals within Heat Network Priority Areas should have a communal low-temperature heating system:

1. The heat source for the communal heating system should be selected in accordance with the following heating hierarchy:

- a) Connect to local existing or planned heat networks;*
- b) Use zero-emission or local secondary heat sources (in conjunction with heat pump, if required);*
- c) Use low-emission combined heat and power (CHP) (only where there is a case for CHP to enable the delivery of an area-wide heat network, meet the development's electricity demand and provide demand response to the local electricity network);*
- d) Use ultra-low NO_x gas boilers.*

2. CHP and ultra-low NO_x gas boiler communal or district heating systems should be designed to ensure that they meet the requirements in Part B of Policy SI 1 Improving air quality.

3. Where a heat network is planned but not yet in existence the development should be designed to allow for the cost-effective connection at a later date."

4.4 Local Planning Policy

4.4.1 LBH Local Plan: Strategic Policies

Haringey's Local Plan: Strategic Policies¹³ was adopted by the LBH Council in 2013, to replace the Unitary Development Plan (UDP) - with subsequent alterations adopted on the 24 July 2017. The purpose of the document is to set out the long term vision of how Haringey should develop by 2026 and sets out the strategy for achieving that vision including high-level strategic policies used in determining planning applications.

Policy SP7: Transport is relevant to this assessment and states:

"...Delivering Action on Climate Change and Quality and Healthy Places

In line with the London Plan, the Council will work with its partners to promote the following travel demand management schemes to tackle climate change, improve local place shaping and public realm, and environmental and transport quality and safety by:

- Minimising congestion and addressing the environmental impacts of travel;*
- Promoting public transport, walking and cycling (including minimum cycle parking standards);*

¹³ Available at https://www.haringey.gov.uk/sites/haringeygovuk/files/final_haringey_local_plan_2017_online.pdf

- *Promoting road safety and pedestrian movement particularly in town centres and close to local services;*
- *Promoting car sharing and establishing car clubs;*
- *Seeking to locate major trip generating developments in locations with good access to public transport and so better integrate transport and land use planning;*
- *Adopting maximum car parking standards and car free housing wherever feasible;*
- *Seeking to mitigate the impact of road based freight and promote alternatives;*
- *Supporting measures to influence behavioural change such as promoting low carbon vehicles; and*
- *Requiring the submission of transport assessments and travel plans for large scale proposals in line with TfL guidance. ”*

4.4.2 Local Plan: Development Management Document

LBH Council has also prepared a Development Management Development Plan Document (DPD)¹⁴ which sets out planning policies to help determine which developments are granted planning permission in Haringey. It was adopted by the council on the 24 July 2017.

Policy DM23: Environmental Protection is relevant and states:

“Air Quality

A All development proposals should consider air quality and be designed to:

a Improve or mitigate the impact on air quality in the Borough; and

b Improve or mitigate the impact on air quality for the occupiers of the building or users of the development.

B Air quality assessments will be required for all major development and other development proposals, where appropriate.

C Where necessary, adequate mitigation must be provided. ”

4.5 Guidance

A summary of the publications referred to in the undertaking of this assessment is provided below.

4.5.1 London Local Air Quality Management Review and Assessment Technical Guidance

The Mayor of London has published guidance for use by the London Boroughs in their review and assessment work. This guidance, referred to in this document as LLAQM.TG (16)¹⁵, has been used where appropriate in the assessment presented herein.

¹⁴ Available at https://www.haringey.gov.uk/sites/haringeygovuk/files/final_haringey_dmp_dtp_online.pdf

¹⁵ Available at https://www.london.gov.uk/sites/default/files/llaqm_technical_guidance_llaqm.tg_16.pdf

4.5.2 Local Air Quality Management Review and Assessment Technical Guidance

The Department for Environment, Food and Rural Affairs (Defra) has published technical guidance for use by local authorities in their review and assessment work. This guidance, referred to in this document as LAQM.TG16¹⁶, has been used where appropriate in the assessment presented herein.

4.5.3 Land-Use Planning & Development Control: Planning For Air Quality

Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM) have published guidance¹⁷ that offers comprehensive advice on: when an air quality assessment may be required; what should be included in an assessment; how to determine the significance of any air quality impacts associated with a development; and, the possible mitigation measures that may be implemented to minimise these impacts.

4.5.4 Greater London Authority: Sustainable Design and Construction Supplementary Planning Guidance

Section 4.3 of this Supplementary Planning Guidance (SPG)¹⁸ provides guidance on when a developer will be required to undertake an air quality assessment, looks at how design and transport measures can be used to minimise emissions to air, and sets out emissions standards for combustion plant.

The SPG also contains guidance on assessing the air quality neutrality of a Proposed Development in order to comply with the London Plan and the Mayor's Air Quality Strategy. Air Quality neutral benchmarks for both transport and buildings NO_x and PM₁₀ emissions are provided within the SPG.

Developments that do not exceed these benchmarks (considered separately) will be considered to be 'air quality neutral', whilst developments that exceed the benchmarks after appropriate on-site mitigation measures have been incorporated will be required to off-set any excess in emissions off site. This can be achieved by providing NO_x and PM abatement measures in the vicinity of the development, such as: green planting/walls and screens, with special consideration given to planting that absorbs or suppresses pollutants; upgrade or abatement work to combustion plant; retro-fitting abatement technology for vehicles and flues; and exposure reduction. These measures can be secured by condition or Section 106 contribution. Air quality monitoring is not eligible for funding as it is not considered to contribute to actual air quality improvements.

4.5.5 Guidance on the Assessment of Dust from Demolition and Construction

Guidance on the Assessment of Dust from Demolition and Construction published by the Institute of Air Quality Management (IAQM)¹⁹ was produced to provide guidance to developers, consultants and environmental health officers on how to assess the impacts arising from construction activities. The emphasis of the methodology is on classifying sites according to the risk of impacts (in terms of dust nuisance, PM₁₀ impacts on public exposure and impact upon sensitive ecological receptors) and to identify mitigation measures appropriate to the level of risk identified.

4.5.6 Mayor of London's Supplementary Planning Guidance for the Control of Dust and Emissions during Construction and Demolition

This Supplementary Planning Guidance (CDECD SPG)²⁰ builds on the voluntary guidance published in 2006 by the London Councils to establish best practice in mitigating impacts on air quality during construction and demolition work. The SPG incorporates more detailed guidance and best practice, and seeks to

¹⁶ Available at <https://iaqm.defra.gov.uk/documents/LAQM-TG16-February-18-v1.pdf>

¹⁷ Available at <http://www.iaqm.co.uk/text/guidance/air-quality-planning-guidance.pdf>

¹⁸ Available at <https://www.london.gov.uk/what-we-do/planning/implementing-london-plan/planning-guidance-and-practice-notes/sustainable-design-and>

¹⁹ Available at <http://iaqm.co.uk/text/guidance/construction-dust-2014.pdf>

²⁰ Available at <https://www.london.gov.uk/what-we-do/planning/implementing-london-plan/planning-guidance-and-practice-notes/control-dust-and>

address emissions from Non-Road Mobile Machinery (NRMM) through the use of a Low Emission Zone, which was introduced in September 2015.

The SPG provides a methodology for assessing the potential impact of construction and demolition activities on air quality following the same procedure as set out in the IAQM guidance. It then identifies the relevant controls and mitigation measures that should be put in place to minimise any adverse impacts, which need to be set out, in draft, in an air quality assessment report submitted with the planning application, and then formalised post submission as an Air Quality and Dust Management Plan. Details of site air quality monitoring protocols are also provided with varying requirements depending on the size of the site and the potential risk of adverse impacts.

5 Local Baseline Air Quality

5.1 Local Air Quality Management

In 2001, the borough wide Haringey Air Quality Management Area (AQMA) was declared by LBH for exceedances of the annual mean NO₂ and daily mean PM₁₀ NAQOs in the borough.

The Proposed Development lies within Haringey AQMA.

5.2 Air Quality Focus Areas

The Greater London Authority (GLA) have designated 183 Air Quality Focus Areas (AQFAs), using the 2016 London Atmospheric Emissions Inventory (LAEI).²¹

AQFAs are locations that not only exceed the EU annual mean limit value for nitrogen dioxide (NO₂), but are also locations with high human exposure. The areas highlight specific locations where air quality improvements are key and a coordinated approach is necessary, involving not only the relevant London Borough Council, but also regional bodies such as GLA, Transport for London (TfL) and Highways England.

The Proposed Development is located 570m southwest of AQFA No. 82 (Bounds Green A109 junction with Durnsford/Brownlow Road B106) and 640m northeast of AQFA No. 78 (Wood Green High Road and Turnpike Lane).

The location of the Proposed Development relative to the AQFAs is shown in Figure 5, together with the local air quality monitoring stations detailed below.

5.3 Local Emission Sources

The Proposed Development is located in an area where air quality is mainly influenced by emissions from road transport using the A109 Bounds Green Road.

5.4 Local Authority Monitoring Data

5.4.1 Automatic Monitoring

According to LBH's latest Air Quality Annual Status Report²², there is one Automatic Monitoring Stations (AMS) within 2.5km of the Site. Table 5.1 below shows the details and the monitoring data from 2016 to 2019 for the AMS, as transcribed from the ASR.

Table 5.1: Monitored NO₂ Concentrations at AMS

MLM Site ID (Site Name)	Site Type	Distance from Development Site (km)	Pollutant	Annual Mean Concentration (µg/m ³)			
				2016	2017	2018	2019
HRAM2 (Haringey South - Priory Park)	Urban Background	2.0	NO ₂	26	24	23	22
Note: Exceedance of the annual mean NAQO of 40µg/m ³ for NO ₂ or PM ₁₀ or 25µg/m ³ for PM _{2.5} are highlighted in bold.							

²¹ Available at <https://data.london.gov.uk/dataset/laei-2013-london-focus-areas>

²² Available at https://www.haringey.gov.uk/sites/haringeygovuk/files/london_borough_of_haringey_2019_annual_status_report.pdf

Table 5.1 indicates that NO₂ concentrations are 'well below' (less than 75% of) the annual average NAQO at the urban background location.

5.4.2 Non-Automatic Monitoring

Non-automatic monitoring using passive diffusion tube samplers was carried out at 16 locations by LBH in 2019. Monitored data for 2016 to 2019 from the diffusion tube sites within 2.5km of the Site are summarised in Table 5.2, as transcribed from the ASR.

Table 5.2: Annual Mean NO₂ Concentrations from Diffusion Tube Sites 2016 – 2019 (Bias Adjusted)

Site ID (Site Name)	Site Type	Distance from Development Site (km)	Annual Mean NO ₂ concentration (µg/m ³)				Within GLA AQFA?
			2016	2017	2018	2019	
HR28 (Bounds Green Primary School, N11)	Roadside	0.6	33.0	34.0	-	30.7	No
HR31 (Wood Green High Road, N22)	Roadside	1.3	59.0	52.0	<u>65.0</u>	<u>67.8</u>	Yes
HR21 (Lordship Lane Primary School)	Roadside	1.6	31.0	30.0	-	23.0	No
HR24 (Westbury Medical Centre)	Roadside	1.8	37.0	33.0	33.0	34.1	No
HR25 (Rowland Hill Nursery, White Hart Lane)	Roadside	2.2	30.0	29.0	35.0	27.4	No
HR27 (The Old Surgery, Green Lanes, N8)	Roadside	2.4	36.0	33.0	31.0	36.4	Yes
HR37 (Weston Park/Broadway, Crouch End.)	Roadside	2.5	-	-	36.0	42.2	No
Note: Exceedance of the annual mean NAQO of 40µg/m ³ for NO ₂ or PM ₁₀ are highlighted in bold. Monitoring locations that have the potential to exceed the hourly mean NAQO of 200µg/m ³ for NO ₂ are highlighted in <u>bold-underline</u> .							

Table 5.2 indicates that the majority of the diffusion tubes to the Site have NO₂ concentrations below the annual average NAQO.

The location of the Proposed Development and the monitoring locations is provided in Figure 5.

5.5 Defra Background Maps

Additional information on estimated background pollutant concentrations has been obtained from the DEFRA background maps provided on UK-AIR, the Air Quality Information Resource²³. These maps are available in 1km x 1km grid squares and provide an estimate of concentrations between 2018 and 2030. Concentrations have been taken from the grid square 530500, 190500; which includes the Proposed

²³ Available at <http://uk-air.defra.gov.uk>

Development site. Estimated air pollution concentrations for NO₂, PM₁₀ and PM_{2.5} have been extracted from the 2018 background pollution maps for 2018 to 2021 and are set out in Table 5.3, below.

Table 5.3 Annual Mean Background Concentrations from Defra based for 2018 and 2021

Grid Square	Year	Background Concentrations (µg/m ³)		
		NO ₂	PM ₁₀	PM _{2.5}
530500, 190500	2018	24.5	18.2	12.0
	2019	23.2	17.7	11.7
	2020	21.8	17.2	11.5
	2021	21.1	17.0	11.3
National Air Quality Objectives (NAQO)		40	40	25

Table 5.3 shows that the estimated background concentrations of NO₂, PM₁₀ and PM_{2.5} are well below the relevant objectives.

5.6 London Atmospheric Emissions Inventory

The London Atmospheric Emissions Inventory (LAEI) provides emissions estimates of key pollutants (NO₂, PM₁₀, PM_{2.5} and CO₂) by source type and have recently been updated for the base year 2016. Key pollutant emission estimates are available on 20m x 20m grid squares for the whole of Greater London within the boundary of the M25.

The maximum, minimum and average concentrations for NO₂ and PM₁₀ is presented within Table 5.4 below for the Site and surrounding area. All figures represent base year 2016 concentrations at ground-level. A contour plot for the 2016 base year, ground-level NO₂ concentrations is presented in Figure 6.

Table 5.4 LAEI Estimated 2016 Ground Level Concentrations

Grid Squares	Concentrations (µg/m ³)		
		NO ₂	PM ₁₀
Xmin: 530360 Xmax: 530480 Ymin: 190840 Ymax: 190940	Max	54.1	27.8
	Min	35.0	21.5
	Average	38.7	22.7
Note: Exceedance of the annual mean NAQO of 40µg/m ³ for NO ₂ or PM ₁₀ are highlighted in bold. Grid squares that have the potential to exceed the hourly mean NAQO of 200µg/m ³ for NO ₂ are highlighted in <u>bold-underline</u> .			

Table 5.4 and Figure 6 shows that the LAEI estimated ground level NO₂ concentrations are exceeding the annual mean NAQO at kerbside locations along the A109 Bounds Green Road. However, concentrations of NO₂ are below the annual mean NAQO at the Site. Furthermore, as per LLAQM.TG (16), the proposed ground floor does not include a residential element. Therefore, it is not considered to be a location where members of the public might be regularly exposed and the annual average NO₂ NAQO does not apply.

In terms of particulate matter, concentrations are well below the NAQO.

5.7 Summary

The concentrations summarised in the above sections are considered to be ground level concentrations and background concentrations at higher floors levels (where future receptors will be located with windows facing A109 Bounds Green Road) are expected to be slightly lower than those shown above.

In addition, it is considered that future developments in vehicle technology and changes to national and local policy are likely to generate additional improvements in NO₂ concentrations, as seen from the data summarised in Tables 5.1, 5.2 and 5.3. As such, NO₂ pollutant concentrations in 2020 and beyond are expected to decrease from the LAEI 2016 base year model.

The Site is likely to be affected by NO₂ road emissions due to the high volume of traffic using A109 Bounds Green Road. Therefore, detailed modelling of NO₂ has been undertaken to determine the suitability of the Site for its intended use.

In terms of particulate matter, concentrations of PM₁₀ and PM_{2.5} in the vicinity of the Proposed Development are well below the relevant objectives, and indicate a decreasing trend. Nonetheless, these are also included in the detailed modelling assessment.

6 Scope & Methodology

6.1 Scope

The scope of the assessment includes consideration of the potential impacts on local air quality resulting from:

- Dust and particulate matter generated by on-site activities during the construction phase;
- Increases in pollutant concentrations as a result of exhaust emissions arising from construction traffic and plant;
- Increases in pollutant concentrations as a result of exhaust emissions arising from traffic generated by the Proposed Development once operational; and,
- The impact of existing poor air quality on future users of the Proposed Development.

6.2 Methodology

6.2.1 Construction Phase

Dust comprises particles typically in the size range 1-75 micrometres (μm) in aerodynamic diameter and is created through the action of crushing and abrasive forces on materials. The larger dust particles fall out of the atmosphere quickly after initial release and therefore tend to be deposited in close proximity to the source of emission. Dust therefore, is unlikely to cause long-term or widespread changes to local air quality; however, its deposition on property and cars can cause 'soiling' and discolouration. This may result in complaints of nuisance through amenity loss or perceived damage caused, which is usually temporary.

The smaller particles of dust (less than $10\mu\text{m}$ in aerodynamic diameter) are known as particulate matter (PM_{10}) and represent only a small proportion of total dust released; this includes a finer fraction, known as $\text{PM}_{2.5}$ (with an aerodynamic diameter less than $2.5\mu\text{m}$). As these particles are at the smaller end of the size range of dust particles they remain suspended in the atmosphere for a longer period of time than the larger dust particles, and can therefore be transported by wind over a wider area. PM_{10} and $\text{PM}_{2.5}$ are small enough to be drawn into the lungs during breathing, which in sensitive members of the public could have a potential impact on health.

An assessment of the likely significant impacts on local air quality due to the generation and dispersion of dust and PM_{10} during the construction phase has been undertaken using the relevant assessment methodology published by the GLA, the available information for this phase of the Proposed Development provided by the Client and Project Team and professional judgement.

The GLA assessment is undertaken where there are: 'human receptors' within 350m of the site boundary, or within 50m of the route(s) used by construction vehicles on the public highway, up to 500m from the site entrance(s); and/or 'ecological receptors' within 50m of the site boundary, or within 50m of the route(s) used by construction vehicles on the public highway, up to 500m from the site entrance(s). It is within these distances that the impacts of dust soiling and increased particulate matter in the ambient air will have the greatest impact on local air quality at sensitive receptors.

The GLA methodology assesses the risk of potential dust and PM_{10} impacts from the following four sources: demolition; earthworks; general construction activities and track-out. It takes into account the nature and scale of the activities undertaken for each source and the sensitivity of the area to an increase in dust and PM_{10} levels to assign a level of risk. Risks are described in terms of there being a low, medium or high risk of dust impacts. Once the level of risk has been ascertained, then site specific mitigation proportionate to the level of risk is identified, and the significance of residual effects determined. A summary of the GLA assessment methodology is provided in Appendix A.

In addition to impacts on local air quality due to on-site construction activities, exhaust emissions from construction vehicles and plant may have an impact on local air quality adjacent to the routes used by these vehicles to access the Site and in the vicinity of the Site itself. As information on the number of vehicles and plant associated with the construction phase was not available at the time of writing, a qualitative assessment of their impact on local air quality has been undertaken using professional judgement and by considering the following:

- The number and type of construction traffic and plant likely to be generated by this phase of the Proposed Development;
- The number and proximity of sensitive receptors to the Site and along the likely routes to be used by construction vehicles;
- The likely duration of the construction phase and the nature of the construction activities undertaken.

6.2.2 Operational Phase

EPUK/IAQM Screening Criteria

A screening assessment for air quality impacts has been undertaken following the EPUK/IAQM guidance screening criteria to establish whether the proposals warrant the need for a detailed air quality assessment. The guidance provides a decision making process which assists with the understanding of air quality impacts and implications as a result of development proposals. It provides a framework for air quality considerations within local development control processes, promoting a consistent approach to the treatment of air quality issues within development control decisions.

The guidance includes a method for screening the requirement for an air quality assessment, the undertaking of an air quality assessment, the determination of the air quality impact associated with a development proposal and whether this impact is significant.

The EPUK/IAQM guidance also provides some clarification as to when air quality constitutes a material consideration and highlights the linkage with other relevant issues (for example traffic speed reduction measures and the use of alternative technology to provide energy) and the importance of the understanding of these with the input from other discipline specialists. The 'creeping baseline' is another issue raised with regard to cumulative impacts.

The EPUK/IAQM guidance note is widely accepted as the most appropriate reference method for this purpose. This guidance makes reference to the Town and Country Planning (Development Management Procedure) Order (England) 2010 [(Wales) 2012] for the definition of a 'major' development when scoping assessments required for the planning process. A 'major' development includes developments where:

- The number of dwellings is ten or above;
- The residential development is carried out on a site of more than 0.5ha where the number of dwellings is unknown;
- The provision of more than 1,000m² commercial floor space; and
- Development carried out on land of 1ha or more.

There are two types of air quality impacts to be considered:

- The impact of existing sources in the local area on the Proposed Development (governed by background pollutant levels and proximity to sources of air pollution); and
- The impacts of the Proposed Development on the local area.

With regard to the changes in air quality or exposure to air pollution, the guidance indicates that each local authority will be likely to have their own view on the significance of this; these are to be described in relation

to whether an NAQO is predicted to be met, or at risk of not being met. Exceedances of these objectives are considered as significant, if not mitigated.

As part of the impact of the Proposed Development on the local area, a two-staged assessment is recommended as per guidance:

Stage 1: review of the development proposals, including number of residential units, floor space, car park spaces and the presence of an energy centre or other combustion processes on site, against the screening criteria. In the event that the Stage 1 criteria are exceeded we will proceed to Stage 2; and,

Stage 2: review of the changes in Light Duty Vehicles (LDVs) and Heavy Duty Vehicles (HDVs), road alignment, and the introduction of new junctions and bus stops (if applicable) due to the Proposed Development. As part of Stage 2, a comparison of the AADT flows associated with the consented development and Proposed Development has also been undertaken to assess if there is a potential for further air quality impacts.

A full list of the screening criteria are presented in Appendix B.

6.2.3 Significance Criteria

Where the EPUK/IAQM screening criteria identify a need for detailed air quality assessment, the guidance recommends that the degree of an impact is described by expressing the magnitude of incremental change in pollution concentration as a proportion of the relevant assessment level and examining this change in the context of the new total concentration and its relationship with the assessment criterion, as summarised in Table 6.1.

Table 6.1 Impact Descriptors for Individual Receptors

Long Term Average Concentration at Receptor in Assessment Year	% Change in Concentration Relative to Air Quality Assessment Level (AQAL)			
	1	2-5	6-10	>10
75% or less of AQAL	Negligible	Negligible	Slight	Moderate
76-94% of AQAL	Negligible	Slight	Moderate	Moderate
95-102% of AQAL	Slight	Moderate	Moderate	Substantial
103-109% of AQAL	Moderate	Moderate	Substantial	Substantial
110% or more of AQAL	Moderate	Substantial	Substantial	Substantial
Notes AQAL = Air Quality Assessment Level, which for this assessment related to the UK Air Quality Strategy objectives. Where the % change in concentrations is <0.5%, the change is described as 'Negligible' regardless of the concentration. When defining the concentration as a percentage of the AQAL, 'without scheme' concentration should be used where there is a decrease in pollutant concentration and the 'with scheme;' concentration where there is an increase. Where concentrations increase, the impact is described as adverse, and where it decreases as beneficial.				

The EPUK/IAQM guidance notes that the criteria in Table 6.1 should be used to describe impacts at individual receptors and should be considered as a starting point to make a judgement on significance of effects, as other influences may need to be accounted for. The EPUK/IAQM guidance states that the assessment of overall significance should be based on professional judgement, taking into account several factors, including:

- 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 approach provided in the EPUK/IAQM guidance has been used within this assessment to assist in describing the air quality effects of additional emissions from the gas-fired boilers required for the Proposed Development once operational.

7 Construction Phase Impacts

7.1 Dust and PM₁₀ from On-Site Activities

Construction activities that have the potential to generate and/or re-suspend dust and PM₁₀ include:

- Site clearance and preparation;
- Demolition activities;
- Preparation of temporary access/egress to the Site and haulage routes;
- Earthworks;
- Materials handling, storage, stockpiling, spillage and disposal;
- Movement of vehicles and construction traffic within the Site (including excavators and dumper trucks);
- Use of crushing and screening equipment/plant;
- Exhaust emissions from site plant, especially when used at the extremes of their capacity and during mechanical breakdown;
- Construction of buildings, roads and areas of hard standing alongside fabrication processes;
- Internal and external finishing and refurbishment;
- Site landscaping after completion.

The majority of the releases are likely to occur during the 'working week'. However, for some potential release sources (e.g. exposed soil produced from significant earthwork activities) in the absence of dust control mitigation measures, dust generation has the potential to occur 24 hours per day over the period during which such activities are to take place.

7.2 Assessment of Potential Dust Emission Magnitude

The GLA & IAQM assessment methodology has been used to determine the potential dust emission magnitude for the following four different dust and PM₁₀ sources: demolition; earthworks; construction; and, trackout. The findings of the assessment are presented below.

7.2.1 Demolition

The Site is presently occupied by 18 'lock-up' garages. It is proposed to demolish the existing structures and replace them with a new 9-storey building.

The building volume to be demolished is estimated to be less than 20,000 m³ and the height of demolition activities would be less than 10 m above the ground. However, a small quantity of on-site crushing and screening is proposed. The potential dust emission magnitude is therefore conservatively considered to be 'Medium' for demolition activities.

7.2.2 Earthworks

The total area of the Site where earthworks would take place is less than 2,500 m². The soil type is a mix of clay and silt, and is therefore potentially dusty. The total material that will be moved is less than 20,000 tonnes with fewer than five heavy earth moving vehicles being active at any one time and the formation of bunds with a height of less than 4m.

Therefore, the potential dust emission magnitude is considered to be 'Small' for earthwork activities.

7.2.3 Construction

Construction activities form part of the substructure work as well as the superstructure work. This includes construction of pile caps; construction of basement slab; construction of reinforced, concrete frame from basement to roof; construction of external walls and cladding; installation of facades and window elements; and roof weathering and finishes.

The total volume of buildings to be constructed on the Proposed Development site will be less than 25,000m³ with potentially dusty construction materials being used. On-site piling, concrete batching and sandblasting may be undertaken at intermittent times during the construction programme.

Therefore, the potential dust emission magnitude is conservatively considered to be 'Medium' for construction activities.

7.2.4 Trackout

Access to the Site for construction vehicles would be from Partridge Way and the A109 Bounds Green Road.

There will be fewer than 10 movements per day moving over moderately dusty road with some clay content. As the unpaved road length in the Proposed Development is likely to be less than 50m, it is considered that the potential dust emission magnitude of is 'Small' for trackout.

7.2.5 Summary

Table 7.1 provides a summary of the potential dust emission magnitude determined for each construction activity considered.

Table 7.1 Summary of Dust Emission Magnitude for Each Activity

Source	Magnitude
Demolition	Medium
Earthworks	Small
Construction	Medium
Trackout	Small

7.3 Sensitivity of the Surrounding Area

Based on the GLA/IAQM guidance, residential dwellings are considered as 'High' sensitivity receptors in relation to both dust soiling and health effects of PM₁₀. The closest residential properties are adjacent to the eastern boundary of the Site. There are no relevant ecological receptors in the vicinity of the Proposed Development.

As seen in Figure 7, there are 10 -100 high sensitive receptors within the 20m buffer zone including residential dwellings to the north and east. As a result, given the distance and number of these receptors, the sensitivity of the surrounding area is considered to be 'High' in relation to dust soiling effects on people and property from the demolition, earthworks and construction activities.

There is no automatic monitors measuring annual mean PM₁₀ within LBH. The 2020 Defra estimated annual mean PM₁₀ background concentration for the grid square which includes the Proposed Development is 17.2 µg/m³. As such, with the sensitivity of the surrounding area is considered to be 'Low' in relation to demolition, earthworks and construction activities.

The Site is small, and trackout may occur up to 50m from the edge of the roads route taken by construction traffic up to 50m from the Site exit without site specific mitigation. There are 10-100 residential receptors

located within 20m of the route likely to be taken by construction traffic to and from the Proposed Development (Partridge Way and the A109 Bounds Green Road). The sensitivity of the surrounding area is therefore considered 'High' in relation to dust soiling effects on people and property from trackout. With regard to the impact upon human health, the sensitivity of the surrounding area is considered to be 'Low' in relation to trackout, owing to background PM₁₀ concentrations that are below 24µg/m³.

Taking the above into account and following the GLA/IAQM assessment methodology, the sensitivity of the area to changes in dust and PM₁₀ has been derived for each of the construction activities considered. The results are shown in Table 7.2.

Table 7.2 Summary of Sensitivity of Surrounding Area

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

7.4 Defining the Risk of Impacts

The predicted dust emission magnitude has been combined with the defined sensitivity of the area to determine the risk of impacts during the construction phase, prior to mitigation. Table 7.3 below provides a summary of the risk of dust impacts for the Proposed Development. The risk category identified for each construction activity has been used to determine the level of mitigation required, which is presented in Appendix C.

Table 7.3 Summary of Risk Effects to Define Site Specific Mitigation

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

7.5 Construction Vehicles & Plant

The greatest impact on air quality due to emissions from vehicles and plant associated with the construction phase will be in the areas immediately adjacent to the site access. Construction traffic will access the Site via Partridge Way and the A109 Bounds Green as outlined in Section 7.2.4. It is considered likely that the construction traffic will be of low volume in comparison to the existing traffic flows on these roads.

Final details of the exact plant and equipment likely to be used on Site will be determined by the appointed contractor. The number of plant and their location within the Site are likely to be variable over the construction period.

Based on the current local air quality in the area, the proximity of sensitive receptors to the roads likely to be used by construction vehicles, and the likely numbers of construction vehicles and plant that will be used, the impacts are therefore considered to be of negligible significance according to the assessment significance criteria.

8 Operational Phase Impacts

8.1 Air Quality Impacts on Surrounding Air Quality

A qualitative assessment has been undertaken following the EPUK/IAQM screening criteria to establish if a detailed air quality assessment is required to determine the impact of the Proposed Development on the surrounding air quality. The results of Stage 1 of the screening assessment is presented in Table 8.1. A full list of the screening criteria are presented in Appendix B.

Table 8.1 EPUK/IAQM Stage 1 Screening Assessment

Screening Criteria	Development Proposal
A: If any of the following apply	
> 10 residential units or a site area of > 10ha or 250 residential units	23 residential units
> 1,000 m ² of floor space for all other uses or a site area > 1 ha	N/A
B. Coupled with any of the following	
Development > 10 parking spaces	'Car free', save for two disabled car parking spaces and one visitor space. 18 existing 'lock-up' garages would be removed, so the net is a 15 reduction in parking spaces.
Central energy facility or centralised combustion process	None proposed. Air Source Heat Pumps to be installed.

Table 8.1 indicates that the development proposals do not exceed the Stage 1 criteria. Therefore, the assessment is not required to proceed to Stage 2.

The overall impact on the surrounding area is therefore considered to be 'Not Significant' in accordance with the applicable guidance.

8.2 Air Quality Suitability of the Site for the Proposed Occupation

The Site is likely to be affected by NO₂ road emissions due to the high volume of traffic using A109 Bounds Green Road. Therefore, detailed modelling of NO₂ has been undertaken to determine the suitability of the Site for its intended use.

9 Input for ADMS Roads Dispersion Modelling

9.1 General

Atmospheric dispersion modelling has been undertaken using the ADMS-Roads Extra software suite (version 5.0) developed by Cambridge Environmental Research Consultants (CERC). The model uses a number of input parameters to simulate the dispersion of emissions and predictions of pollutant concentration at specified receptors are made across the area of interest. The details of the input parameters are described in the following sections.

The following parameters are required to determine the air pollution concentration using the ADMS-Roads Extra model:

- The Assessment years;
- Receptor(s) location(s) details;
- Background pollutant concentrations;
- The road network details (including traffic volume and associated emissions);
- Meteorological data; and
- Traffic data.

The details of the parameters used in the analysis for the Site are presented below.

9.2 The Assessment Years

For the assessment, two scenarios were modelled as follows:

- 2019 – Model Verification;
- Opening Year ‘With Development’ – Using 2019 Emission Factors

For a conservative assessment, 2019 emission factors have been used for the Opening Year scenario.

9.3 Traffic Data

Traffic data for the model has been obtained from the Department for Transport (DfT) website²⁴ for the following roads:

- Partridge Way;
- A109 Bounds Green Road;
- A109 Lordship Lane;
- A109 Lordship Lane;
- A109 Lordship Lane;
- A1080 Westbury Avenue;
- A1080 The Roundway;
- A10 Great Cambridge Road; and,
- White Hart Lane.

DfT flows for 2019 were utilised for both the base and opening year flows, thus predicting no decrease in vehicle movements in London.

²⁴ Available at <https://roadtraffic.dft.gov.uk/#6/55.254/-6.053/basemap-regions-countpoints>

Traffic data entered into the model domain is presented in Table 9.1 and the roads included are illustrated in Figure 8.

Table 9.1 Traffic Data included within Model

Link ID	Link Description	All Scenarios		Speed (km/h)
		AADT	%HGV	
01	Partridge Way	367	0.00	32.2
02	A109 Bounds Green Road	26,075	3.31	32.2 / 48.3
04	A109 Lordship Lane (A105 High Road to A1080 Boreham Road)	18,087	5.07	48.3
05	A109 Lordship Lane (A1080 Boreham Road to A1080 to The Roundway)	24,106	7.80	48.3
06	A109 Lordship Lane (A1080 The Roundway to A10)	16,588	5.24	48.3
07	A1080 Westbury Avenue	14,054	10.84	48.3
08	A1080 The Roundway	32,938	4.23	48.3
09	A10 Great Cambridge Road	43,443	3.75	48.3
10	White Hart Lane	1,593	0.69	32.2 / 48.3

Road dimensions were determined from Google satellite images. A typical national diurnal profile provided by Department for Transport (DfT) for 2019 has been incorporated into the models. The diurnal profile used is presented in Figure 9.

Road speeds were sourced from speed limits. For junctions, speeds were lowered in accordance with LLAQM.TG (16).

9.4 Emissions from Road Traffic

Roads are the main source of pollution in this area. The road source emissions are calculated from traffic flow data using the latest Defra Emission Factor Toolkit (EFT v10.1 August 2020). The toolkit calculates the emission rate for selected pollutants for each modelled road for input into the atmospheric dispersion modelling.

The general input option along with a vehicle fleet composition from 2019 was used to derive emission rates for all scenarios. This matches the latest LBH monitoring data for model verification purposes. For the future occupation scenario, using 2019 emission rates is considered to be a conservative approach, as future developments in vehicle technology are likely to generate improvements in emission rates in future years.

9.5 Energy Provision

There will be no centralised combustion source. Air Source Heat Pumps will provide heating and hot water.

9.6 Receptor Locations & Background Concentrations Used in the Assessment

The focus of this air quality assessment is to assess the impact of the local air quality on the receptors at the Proposed Development. Specific receptor points were modelled at the Proposed Development to assess the NO₂, PM₁₀ and PM_{2.5} concentrations in the future opening year as shown in Table 9.4 and Figure 10. Defra background concentrations for 2019 were used within all modelling scenarios as shown in Table 9.4.

Table 9.4 Receptor Locations & Background Concentrations

Receptor Location ID	Easting	Nothing	2019 Background Concentrations ($\mu\text{g}/\text{m}^3$)		
			NO ₂	PM ₁₀	PM _{2.5}
PR1	530431.32	190909.16	23.2	17.7	11.7
PR2	530419.12	190906.77	23.2	17.7	11.7
PR3	530406.82	190904.37	23.2	17.7	11.7
PR4	530403.03	190900.72	23.2	17.7	11.7
PR5	530404.50	190897.35	23.2	17.7	11.7
PR6	530410.06	190894.69	23.2	17.7	11.7
PR7	530415.31	190891.64	23.2	17.7	11.7
PR8	530420.67	190888.54	23.2	17.7	11.7
PR9	530426.48	190890.51	23.2	17.7	11.7
PR10	530430.31	190896.91	23.2	17.7	11.7
PR11	530432.96	190901.26	23.2	17.7	11.7

To derive the human receptor heights, a breathable height of 1.5m has been added to the proposed floor height. The proposed floor heights for the southwest elevation facing the A109 Bounds Green Road are shown in Figure 4. The receptor heights relative to the ground floor are shown in Table 9.5.

Table 9.5 Receptor Heights

Receptor Location ID	Floor	Modelled Height (m)
PR1	GF-8F	1.5, 5.184, 8.184, 11.184, 14.784, 17.784, 20.784, 23.784, 26.184
PR2	GF-8F	1.5, 4.497, 7.497, 10.497, 14.097, 17.097, 20.097, 23.097, 25.497
PR3	GF-8F	
PR4	GF-8F	1.5, 4.605, 7.605, 10.605, 14.205, 17.205, 20.205, 23.205, 25.605
PR5	GF-8F	
PR6	GF-8F	
PR7	GF-8F	
PR8	GF-8F	
PR9	GF-8F	1.5, 5.175, 8.175, 11.175, 14.775, 17.775, 20.775, 23.775, 26.175
PR10	GF-8F	
PR11	GF-8F	

9.7 Meteorological Data

ADMS Roads utilises sequential meteorological data to calculate atmospheric dispersion. The minimum meteorological data that must be entered are: wind speed and direction, and cloud cover. The wind, cloud, temperature, rainfall and humidity data were obtained for London City Airport meteorological station for the year 2019 and have been used for the dispersion modelling.

London City Airport's weather station is located approximately 16kms southeast of the Site and the dominant, prevailing wind direction is from the south-west. A wind rose, illustrating the data for the year 2019, is presented in Figure 11.

9.8 Other Parameters

For the modelled scenarios, the site latitude was set to 51.6°, dispersion site surface roughness was set to 1.0m and the Minimum Monin-Obukhov Length (MMOL) was set to 100m (Large Conurbations).

The meteorological measurement site surface roughness was set to 1.0m and the MMOL was set to 100m.

10 Model Verification

10.1 General

The total concentration of oxides of nitrogen (NO_x) at the chosen locations were predicted using dispersion modelling. The verification year of 2019, the latest year for which monitored data was available, was chosen to predict the NO_x levels at the selected diffusion tube sites and these values were compared with monitored NO₂ data to verify the model predictions.

An adjustment factor was determined for the modelling and applied to predicted values for the future year scenarios. The details of the process are presented below.

10.2 Baseline Conditions

10.2.1 Method

Local Authority run monitoring sites HR24, HR25 and HR27 have been selected for model verification due to the close proximity and similarity of the area to the Proposed Development site. HR21 was initially included, but the monitored NO₂ (23.0 µg/m³) was lower than the corresponding Defra background concentration (24.4 µg/m³). HR31 was excluded as the diffusion tube environment is not considered similar to the area of the Proposed Development site. HR28 was not included as the location of the diffusion tube could not be verified.

The modelled and monitored road contributed NO_x values at the monitoring sites with the ratio between them is given in Table 10.1. The monitored road contributed NO_x was calculated using the Defra NO_x/NO₂ calculator.

Table 10.1 Adjustment Factor and Monitored and Modelled Road Contributed NO_x for 2019

Monitor ID	Modelled Road Contributed NO _x (Excluding Background) (µg/m ³)	Monitored Road Contributed NO _x (Excluding Background) (µg/m ³)	% Difference
HR24	12.85	22.95	-44.0
HR25	1.98	10.02	-80.2
HR27	6.46	26.18	-75.3

The modelled road contributed NO_x is adjusted by the factor 2.296 and then converted to total NO₂ using the NO_x-NO₂ calculator as provided by Defra.

In accordance with Defra guidance, the road contributed NO_x adjustment factor was also applied to the road contributed PM concentrations. The total PM₁₀ and PM_{2.5} concentrations are derived by adding the adjusted road contribution value to the Defra background concentrations.

The final adjusted total NO₂ concentration predicted at the diffusion tube site is within ±25% of the measured values and the Root Mean Square Error (RMSE) is 3.6310, within the recommended 10% of the NAQO in LLAQM.TG (16). The model verification is therefore considered satisfactory, so no further adjustment is required. The calculations are shown in Table 10.2 below.

Table 10.2 Ratio of the Measured and Adjusted Modelled total NO₂ for 2019

Monitoring Site	Modelled total NO ₂ (µg/m ³)	Measured total NO ₂ (µg/m ³)	% Difference	Root Mean Square Error
HR24	36.9	34.1	8.2	3.6310
HR25	24.8	27.4	-9.5	
HR27	31.4	36.4	-13.7	

11 Operational Phase Modelled Results

11.1 Air Quality Suitability of the Site for the Proposed Occupation

11.1.1 Residential Receptors

Residential receptors are proposed for the first floor to the eight floor. Table 11.1 shows the receptor with the maximum concentrations of NO₂, PM₁₀ and PM_{2.5} at each floor of the Proposed Development. Full residential receptor results are shown in Appendix D.

Table 11.1 Maximum Modelled NO₂, PM₁₀ and PM_{2.5} Concentrations at Future Residential Receptors in the Operational Year, With Development

Receptor ID	Receptor Height (m)	Concentrations			
		Annual Mean (µg/m ³)			No. of Exceedances of 24-Hour Mean PM ₁₀
		NO ₂	PM ₁₀	PM _{2.5}	
PR5-1F	4.61	27.0	18.5	12.2	2
PR5-2F	7.61	25.6	18.2	12.0	2
PR2-3F	10.50	24.7	18.0	11.9	1
PR2-4F	14.10	24.1	17.9	11.9	1
PR2-5F	17.10	23.8	17.8	11.8	1
PR2-6F	20.10	23.6	17.8	11.8	1
PR2-7F	23.10	23.5	17.8	11.8	1
PR2-8F	25.50	23.5	17.7	11.8	1
Corresponding National Air Quality Objective		40	40	25	35

Comparison with the relevant air quality objectives for Table 11.1 shows that:

- The predicted NO₂ concentrations are expected to be below 40µg/m³ air quality objective on all floors;
- According to LLAQM.TG (16) guidance, exceedance of the one-hour NO₂ mean objective is generally unlikely to occur where annual mean concentrations do not exceed 60µg/m³. Since the annual mean NO₂ concentration at all receptors are below 60µg/m³, it is unlikely the one-hour mean will be exceeded at any of the modelled residential receptor locations;
- The objective for the annual mean PM₁₀ concentration is 40µg/m³. The forecast suggested that this objective will be met at all sensitive receptors;
- LLAQM.TG (16) guidance provides guidance on calculating the number of exceedances, as a 24-hour mean PM₁₀ concentration, of 50µg/m³. The number of exceedances is considerably below the limit of 35;
- The objective for the annual mean PM_{2.5} concentration is 25µg/m³. The forecast suggested that this objective will be met at all sensitive receptors.

11.1.2 Non-Residential Receptors

On the ground floor, a mix of non-residential use is proposed; a post room, plant area, a bin store, a cleaner's store and a bike store. These locations are not considered to be locations where members of the public might be regularly exposed and the annual mean NO₂, PM₁₀ and PM_{2.5} concentration objectives clearly do not apply. However, 1-hour mean NO₂ and 24-hour mean PM₁₀ objectives do apply at these locations. According to LLAQM.TG (16) guidance, exceedance of the one-hour NO₂ mean objective is generally likely to occur where annual mean concentrations exceed 60µg/m³. To estimate potential exceedances of the 24-hour PM₁₀ mean objective of 50µg/m³, LLAQM.TG (16) guidance states that the following relationship should be used.

$$\text{Number of 24 hour mean exceedances} = -18.5 + 0.0145 \times \text{PM}_{10} \text{ annual mean}^3 + \frac{206}{\text{PM}_{10} \text{ annual mean}}$$

Receptors PR1-GF to PR11-GF model the ground floor. The results for these locations are shown in Table 11.2.

Table 11.2 Modelled NO₂, PM₁₀ and PM_{2.5} Concentrations at Future Non-Residential Receptors in the Operational Year, With Development

Receptor ID	Receptor Height (m)	Concentrations			
		Annual Mean (µg/m ³)			No. of Exceedances of 24-Hour Mean PM ₁₀
		NO ₂	PM ₁₀	PM _{2.5}	
PR1-GF	1.5	26.0	18.3	12.1	2
PR2-GF	1.5	26.5	18.4	12.2	2
PR3-GF	1.5	27.3	18.6	12.3	2
PR4-GF	1.5	28.0	18.7	12.4	2
PR5-GF	1.5	28.3	18.8	12.4	2
PR6-GF	1.5	28.1	18.7	12.4	2
PR7-GF	1.5	28.0	18.7	12.4	2
PR8-GF	1.5	28.0	18.7	12.4	2
PR9-GF	1.5	27.3	18.6	12.3	2
PR10-GF	1.5	26.6	18.4	12.2	2
PR11-GF	1.5	26.2	18.3	12.1	2
Corresponding National Air Quality Objective		N/A (60 as an indicator for potential exceedance of one-hour NAQO)	N/A	N/A	35

Comparison with the relevant air quality objectives for Table 11.2 shows that:

- The predicted annual mean NO₂ concentrations are expected to be below 60µg/m³ at all modelled receptors. Therefore in accordance with LLAQM.TG (16) guidance, exceedance of the one-hour NO₂ mean objective is unlikely to occur; and,
- The number of exceedances of the 24-hour mean PM₁₀ concentration objective of 50µg/m³ is considerably below the limit of 35.

12 Air Quality Neutral Assessment

12.1 General

Policy 7.14 within the London Plan requires development to be 'Air Quality Neutral (AQN)', the aim of which is to bring forward developments that are air quality neutral or better and that do not degrade air quality in areas where air quality objectives are not currently being achieved. The Proposed Development is located in LBH, which is categorised as 'Outer London', and as such the appropriate figures for Outer London should be applied.

Guidance for undertaking AQN assessment are given in the following two documents:

- The AQN Planning Support Update 2014²⁵; and
- Mayor of London Sustainable Design and Construction Supplementary Planning Guidance 2014²⁶.

12.2 Method of Assessment

The GLA 80371 guidance recommends that the AQN assessment should focus on the NO_x and PM₁₀ emissions and to consider the emissions from the energy sources used within the building and emissions from transport vehicles associated with buildings use.

12.3 Transport Emissions

12.3.1 Assessment

GLA 80371, provides emission factors in terms of g/vehicle-km based on the land-use type of the development. For transport emissions, only the broad categories of retail (A1), office (B1) and residential (C3) are available.

The Transport Emissions Benchmark for the Proposed Development is shown in Table 12.1.

Table 12.1 Transport Emissions Benchmark

Land Use	Number of Dwellings	Benchmark Emission Rate (g/m ² /annum)		Annual Benchmark Emissions (kg/yr)	
		NO _x	PM ₁₀	NO _x	PM ₁₀
Class C3	23	1553	267	35.72	6.14
Total Emissions Benchmark				35.72	6.14

The Proposed Development is to be 'car free', save for two disabled car parking spaces and one visitor space. However, it is proposed that 18 existing 'lock-up' garages would be removed, so the net is a 15 reduction in parking spaces.

The maximum permissible number of daily trips has been back-calculated and is shown in Table 12.2.

²⁵ The Air Quality Neutral Planning Support Update: GLA 80371 compiled by Air Quality Consultants and published April 2014

²⁶ Available at

https://www.london.gov.uk/sites/default/files/gla_migrate_files_destination/Sustainable%20Design%20%26%20Construction%20SPG.pdf

Table 12.1 Maximum Permissible Transport Emissions

Land Use	Annual Traffic Flow	Average Distance Travelled (km)	Benchmark Emission Rate (g/veh/km)		Maximum Permissible Development Emissions (kg/yr)	
			NO _x	PM ₁₀	NO _x	PM ₁₀
Class C3	8,760	11.4	0.353	0.0606	35.25	6.05
Total Emissions					35.25	6.05

The Public Transport Accessibility Level (PTAL) for the Site is 5 (very good). Due to the proximity of the Proposed Development to these very good public transport links and the lack of parking, it is anticipated that Proposed Development would generate far fewer than 8,760 annual traffic flow (24 daily trips). The total transport emissions are therefore considered likely to be far below the corresponding emissions benchmark.

Therefore, the Proposed Development can be considered air quality neutral in relation to transport emissions.

12.4 Building Emissions

There are no centralised combustion sources proposed. Air Source Heat Pumps are to be installed.

The Proposed Development is therefore Air Quality Neutral in terms of building emissions.

12.5 The Overall Air Quality Neutral Status

Based on the above calculations, the Proposed Development is considered to be Air Quality Neutral for traffic related emissions and building related emissions.

13 Mitigation

13.1 Construction Phase

Particle generation from construction activities can be substantially reduced through carefully selected mitigation techniques and effective management. The most effective technique is to control at source, as once particles are airborne, it is difficult to prevent them from dispersing into the surrounding area. However, once airborne, water sprays are probably the most effective method for suppression.

Pre-project planning, implementation and on-site management issues are an essential requirement for effective dust control. This includes, for example environmental risk assessments, method statements, training and satisfying planning requirements. Before the start of a project, it is also important to identify which construction activities are likely to generate dust and to draw up action plans to minimise emissions to the atmosphere. Dust emissions from construction sites will mainly be the sum of a large number of small activities. Therefore, attention to detail is a critical feature of effective management of the total site emissions.

The appointed contractor should consult with LBH to determine whether a Dust Management Plan (DMP), forming part of the Construction Environmental Management Plan (CEMP), will need to be prepared. This will ensure that the construction phase will cause minimal disruption to the surrounding area and neighbours.

Site specific mitigation measures should be set up based on the outcome of the consultation with LBH. Examples of these measures are provided in the IAQM and GLA guidance documents and detailed in Appendix C.

Construction related transport, NRMM and construction plant have the potential to increase pollutant concentrations over the duration of the construction works at nearby sensitive receptors. NRMM and construction plant should meet the relevant emissions standards and a travel plan should be implanted for all construction workers accessing the site. All Non-Road Mobile Machinery (NRMM) and plant to be used on the site of net power between 37kW and 560 kW must be registered at <http://nrmm.london/>. Furthermore these will be controlled as part of the construction management plan.

13.2 Operational Phase

Based on the operational phase impacts detailed in Section 11 of this report, concentrations of NO₂, PM₁₀ and PM_{2.5} at the Proposed Development are predicted to be below the relevant health-based air quality objectives at all modelled receptors. The future occupants of the Proposed Development would not be exposed to unacceptable air quality and the Site is deemed suitable for its proposed future use in this respect.

Regarding the impact of the proposals on the surrounding area, a screening assessment of the operational phase was undertaken in line with the applicable guidance. The Proposed Development is 'car free', save for two disabled car parking spaces and one visitor space. The Site has good access to public transport. As such, the Proposed Development is not anticipated to generate significant additional vehicle trips on the surrounding road network. Regarding heating and hot water provision, air source heat pumps are to be installed rather than centralised combustion plant. The overall impact on the surrounding area is therefore considered to be 'Not Significant' in accordance with the applicable guidance. In addition, the Proposed Development is considered to be Air Quality Neutral for traffic related emissions and building related emissions. No additional mitigation measures are therefore considered necessary.

14 Conclusions

MLM was commissioned by Martin Arnold Limited on behalf of London Borough of Haringey to undertake an AQA to support the planning application for a residential development at the Trinity Road/Partridge Way junction, Wood Green, London ('Site'). The site lies within the administrative area of LBH. The proposal is for a 23-unit residential development in a 9-storey block.

Regarding the impact of the proposals on the surrounding area, a screening assessment of the operational phase was undertaken in line with the applicable guidance. The Proposed Development is 'car free', save for two disabled car parking spaces and one visitor space. The Site has good access to public transport. As such, the Proposed Development is not anticipated to generate significant additional vehicle trips on the surrounding road network. Regarding heating and hot water provision, air source heat pumps are to be installed rather than centralised combustion plant. The overall impact on the surrounding area is therefore considered to be 'Not Significant' in accordance with the applicable guidance. In addition, the Proposed Development is considered to be Air Quality Neutral for traffic related emissions and building related emissions. No additional mitigation measures are therefore considered necessary.

To determine the suitability of air quality at the Site for its intended use, detailed dispersion modelling has been undertaken. Concentrations of NO₂, PM₁₀ and PM_{2.5} at the Proposed Development are predicted to be below the relevant health-based air quality objectives at all modelled receptors. The future occupants of the Proposed Development would not be exposed to unacceptable air quality and the Site is deemed suitable for its proposed future use in this respect.

In regards to impacts during construction, a qualitative assessment on the construction phase activities has been carried out following the relevant GLA & IAQM guidance. This identified that there is a 'Low to Medium Risk' of dust soiling impacts and 'Low to Negligible Risk' of increases in particulate matter concentrations that could affect human health due to construction activities. However, through good site practice and the implementation of suitable mitigation measures, the effect of dust and particulate matter releases would be significantly reduced. These measures are expected to form part of a construction management plan. The residual effects of the construction phase on air quality are considered to be 'Negligible'. The air quality impacts from the Proposed Development during the construction phase would be 'Not Significant'. Construction related transport, NRMM and construction plant have the potential to increase pollutant concentrations over the duration of the construction works at nearby sensitive receptors. NRMM and construction plant should meet the relevant emissions standards and a travel plan should be implemented for all construction workers accessing the Site. The air quality impacts from the Proposed Development during the construction phase would be 'Not Significant'.

The air quality effect of the Proposed Development is considered to be 'Not Significant'. The Proposed Development does not, in air quality terms, conflict with national or local policies. There are no constraints to the Proposed Development in the context of air quality.

Figures

Figure 1: Site Location Plan

Figure 2: Proposed Site Plan

Figure 3: Proposed First Floor Layout Plan

Figure 4: Proposed Southwest Elevation

Figure 5: Local Air Quality Monitoring within 2.5km, AQMA and AQFAs

Figure 6: LAEI NO₂ Ground Level Concentrations - 2016 Base Year

Figure 7: Dust Buffers for Demolition, Earthworks and Construction Activities

Figure 8: Modelled Road Links

Figure 9: Diurnal Profile for Roads for the year 2019

Figure 10: Modelled Proposed Receptors

Figure 11: Windrose at London City Airport Meteorological Station, 2019



COORDINATE SYSTEM: BRITISH NATIONAL GRID
UNITS: METRE
SCALE: 1:550
BASEMAP SOURCE: OS MASTERMAP AND OPEN STREET MAP



779168-MLM-ZZ-XX-DR-J-FIGURE 1

REV	DATE	DESCRIPTION	MADE	CKD

PARTRIDGE WAY

TRINITY ROAD

Landscaped area with Children's
natural play area - min 115.3m2
Refer to Landscape architects
drawings

2

10

20



DRAWING STATUS:

FINAL

CLIENT:

LONDON BOROUGH OF HARINGEY

PROJECT:

PARTRIDGE WAY, WOOD GREEN, LONDON

DRAWING TITLE:

PROPOSED SITE PLAN

DRAWN/DESIGN:

JJ

DATE:

13/05/2021

STATUS:

S2

CHECKED:

KN

APPROVED:

KN

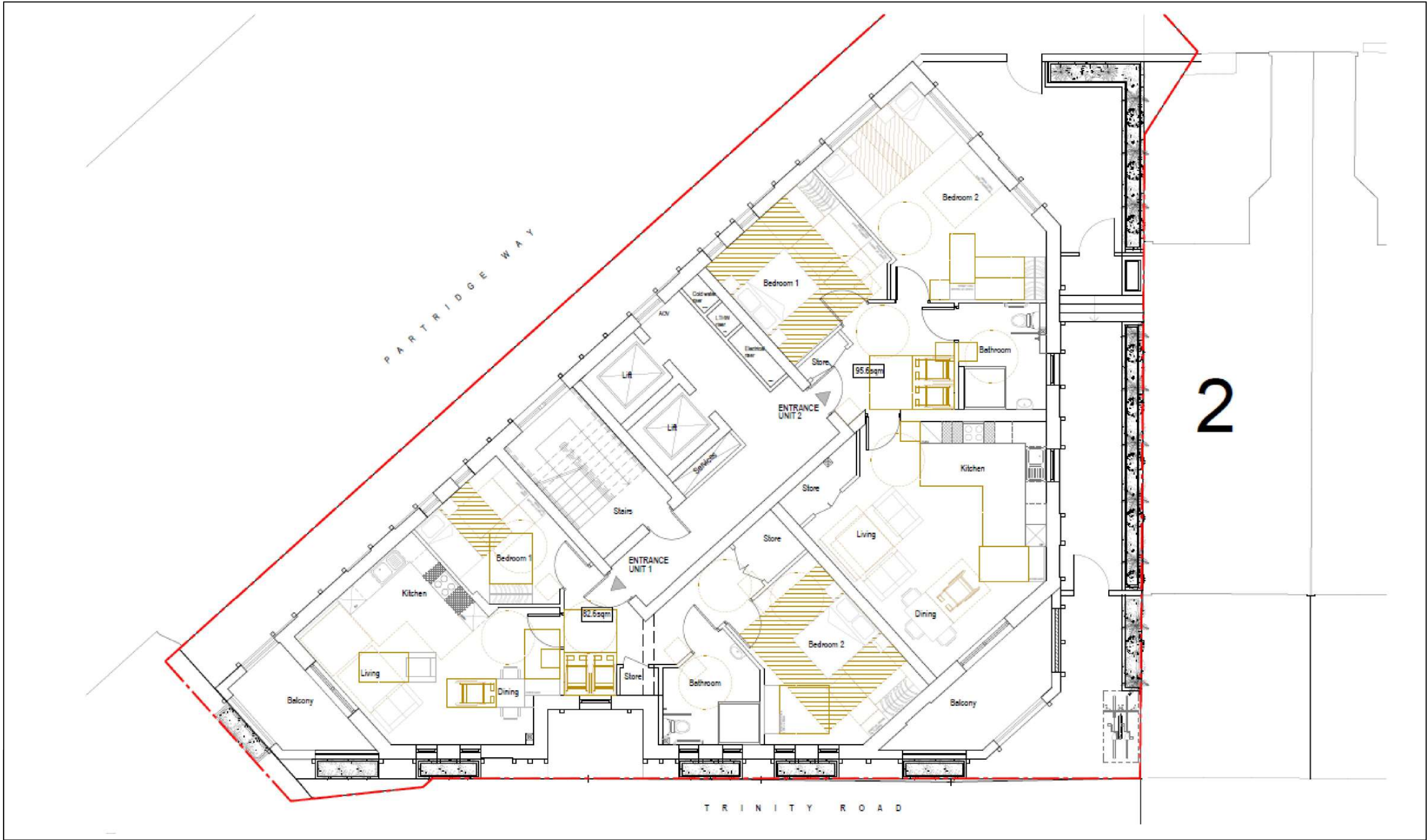
REVISION:

C02

DRAWING NO:

779168-MLM-ZZ-XX-DR-J-FIGURE 2

REV	DATE	DESCRIPTION	MADE	CKD



DRAWING STATUS:

FINAL

CLIENT:

LONDON BOROUGH OF HARINGEY

PROJECT:

PARTRIDGE WAY, WOOD GREEN, LONDON

DRAWING TITLE:

PROPOSED FIRST FLOOR LAYOUT PLAN

DRAWN/DESIGN:

JJ

DATE:

13/05/2021

STATUS:

S2

CHECKED:

KN

APPROVED:

KN

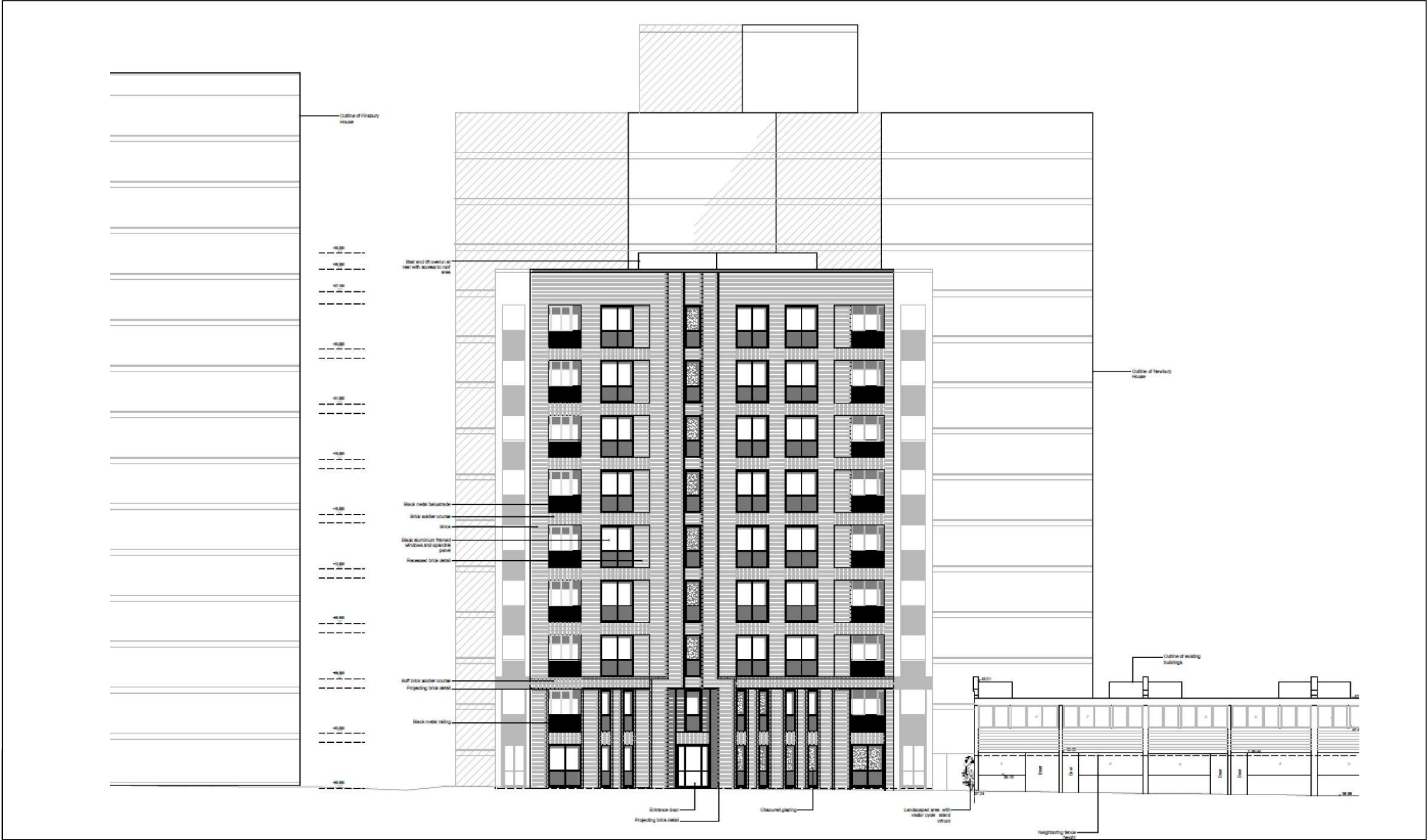
REVISION:

C02

DRAWING NO:

779168-MLM-ZZ-XX-DR-J-FIGURE 3

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REVDATEDESCRIPTIONMADECKD					MLM. Group Part of Sweco		DRAWING STATUS:		DRAWING TITLE:		
							FINAL		PROPOSED SOUTHWEST ELEVATION		
							CLIENT:		DRAWN/DESIGN:	DATE:	STATUS:
							LONDON BOROUGH OF HARINGEY		JJ	13/05/2021	S2
		PROJECT:		CHECKED:	APPROVED:	REVISION:					
PARTRIDGE WAY, WOOD GREEN, LONDON		KN	KN	C02	DRAWING NO:						
		779168-MLM-ZZ-XX-DR-J-FIGURE 4									



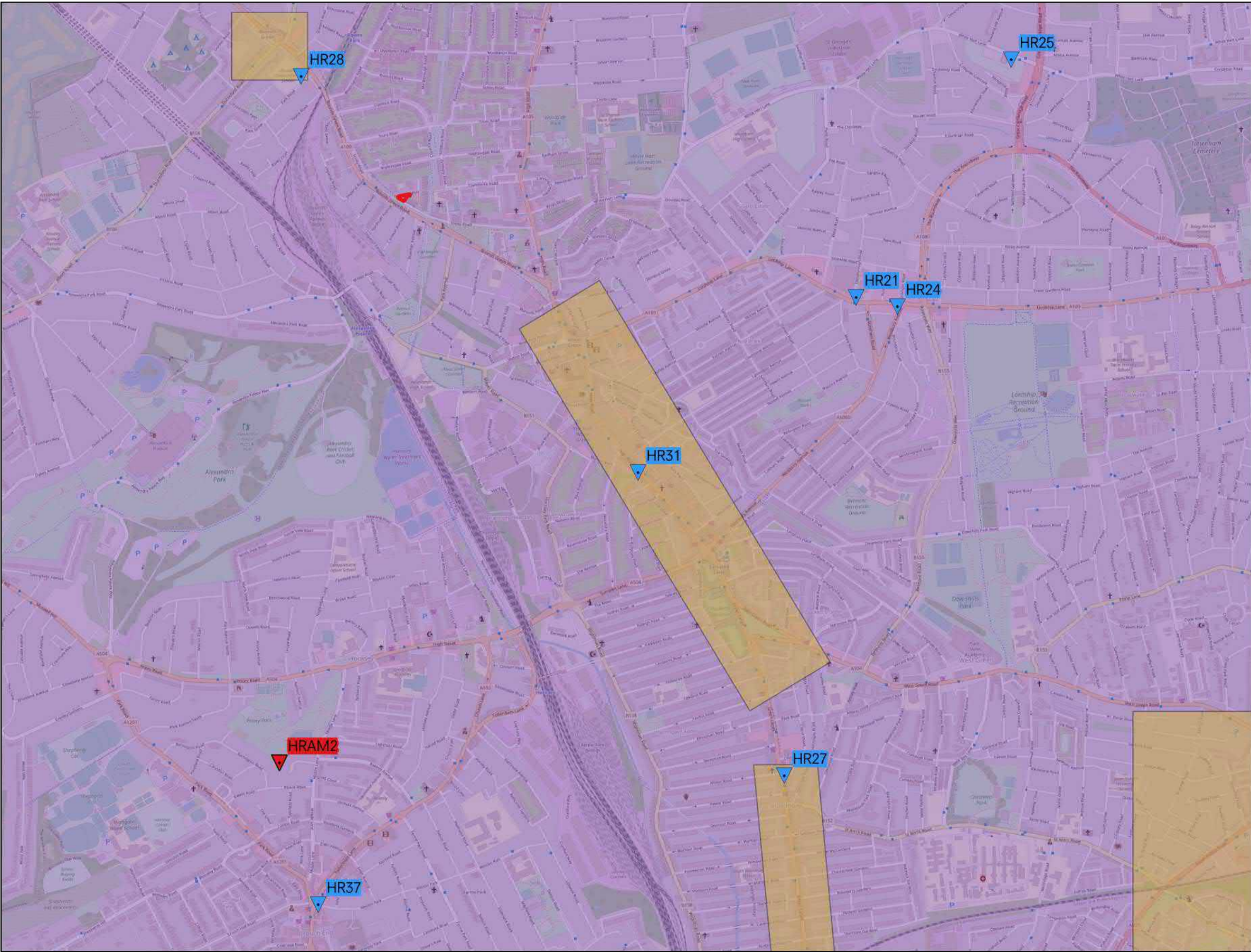
LEGEND

- SITE BOUNDARY
- DIFFUSION TUBES <2.5KM
- AUTOMATIC MONITORING <2.5KM
- AIR QUALITY MANAGEMENT AREA
- AIR QUALITY FOCUS AREAS



THIS DRAWING IS INDICATIVE ONLY

COORDINATE SYSTEM: BRITISH NATIONAL GRID
UNITS: KILOMETRE
SCALE: 1:14000
BASEMAP SOURCE: OS MASTERMAP AND OPEN STREET MAP



DRAWING STATUS:

FINAL

CLIENT:

LONDON BOROUGH OF HARINGEY

PROJECT:

PARTRIDGE WAY, WOOD GREEN, LONDON

DRAWING TITLE:

LOCAL AIR QUALITY MONITORING WITHIN 2.5KM,
AQMA AND AQFAS

DRAWN/DESIGN:

JJ

DATE:

14/10/2020

STATUS:

S2

CHECKED:

KN

APPROVED:

KN

REVISION:

C01

DRAWING NO:

779168-MLM-ZZ-XX-DR-J-FIGURE 5

REV	DATE	DESCRIPTION	MADE	CKD



LEGEND

 SITE BOUNDARY

LAEI NO₂ CONTOUR

 34.96 - 36.00

 36.00 - 38.00

 38.00 - 40.00

 40.00 - 42.00

 42.00 - 44.00

 44.00 - 50.00

 50.00 - 54.08



0 10 20 30 m



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UNITS: METRE
SCALE: 1:500
BASEMAP SOURCE: GOOGLE SATELLITE IMAGERY



DRAWING STATUS:

FINAL

CLIENT:

LONDON BOROUGH OF HARINGEY

PROJECT:

PARTRIDGE WAY, WOOD GREEN, LONDON

DRAWING TITLE:

LAEI NO₂ GROUND LEVEL CONCENTRATIONS -
2016 BASE YEAR

DRAWN/DESIGN:

JJ

DATE:

13/05/2021

STATUS:

S2

CHECKED:

KN

APPROVED:

KN

REVISION:

C02

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779168-MLM-ZZ-XX-DR-J-FIGURE 6

REV	DATE	DESCRIPTION	MADE	CKD



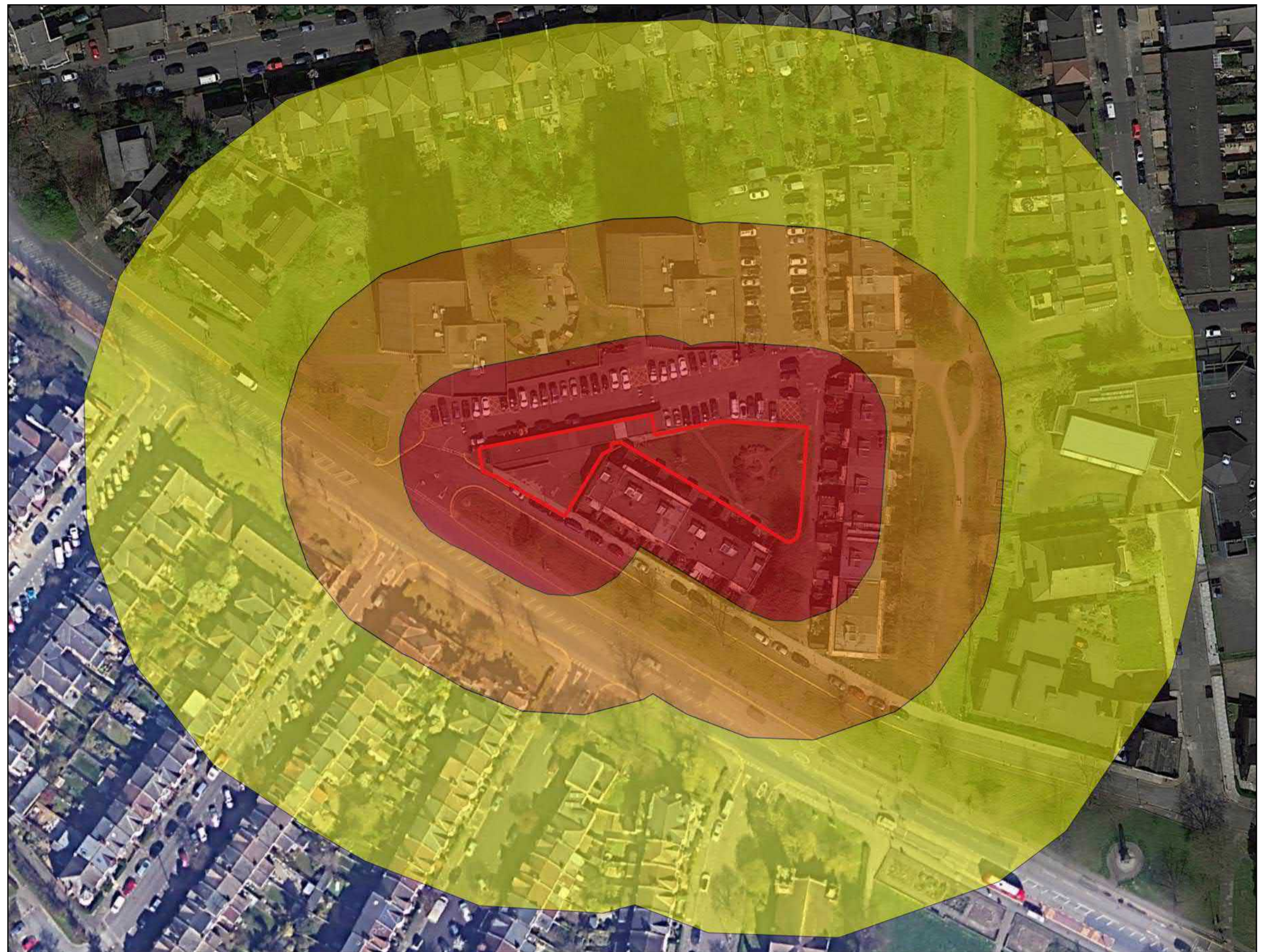
LEGEND

-  SITE BOUNDARY
- DUST BUFFER ZONES**
-  20 M
-  50 M
-  100 M

0 20 40 60 m

THIS DRAWING IS INDICATIVE ONLY

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UNITS: METRE
SCALE: 1:1000
BASEMAP SOURCE: GOOGLE SATELLITE IMAGERY



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FINAL

CLIENT:

LONDON BOROUGH OF HARINGEY

PROJECT:

PARTRIDGE WAY, WOOD GREEN, LONDON

DRAWING TITLE:

DUST BUFFERS FOR DEMOLITION, EARTHWORKS
AND CONSTRUCTION ACTIVITIES

DRAWN/DESIGN:

JJ

DATE:

13/05/2021

STATUS:

S2

CHECKED:

KN

APPROVED:

KN

REVISION:

C02

DRAWING NO:

779168-MLM-ZZ-XX-DR-J-FIGURE 7

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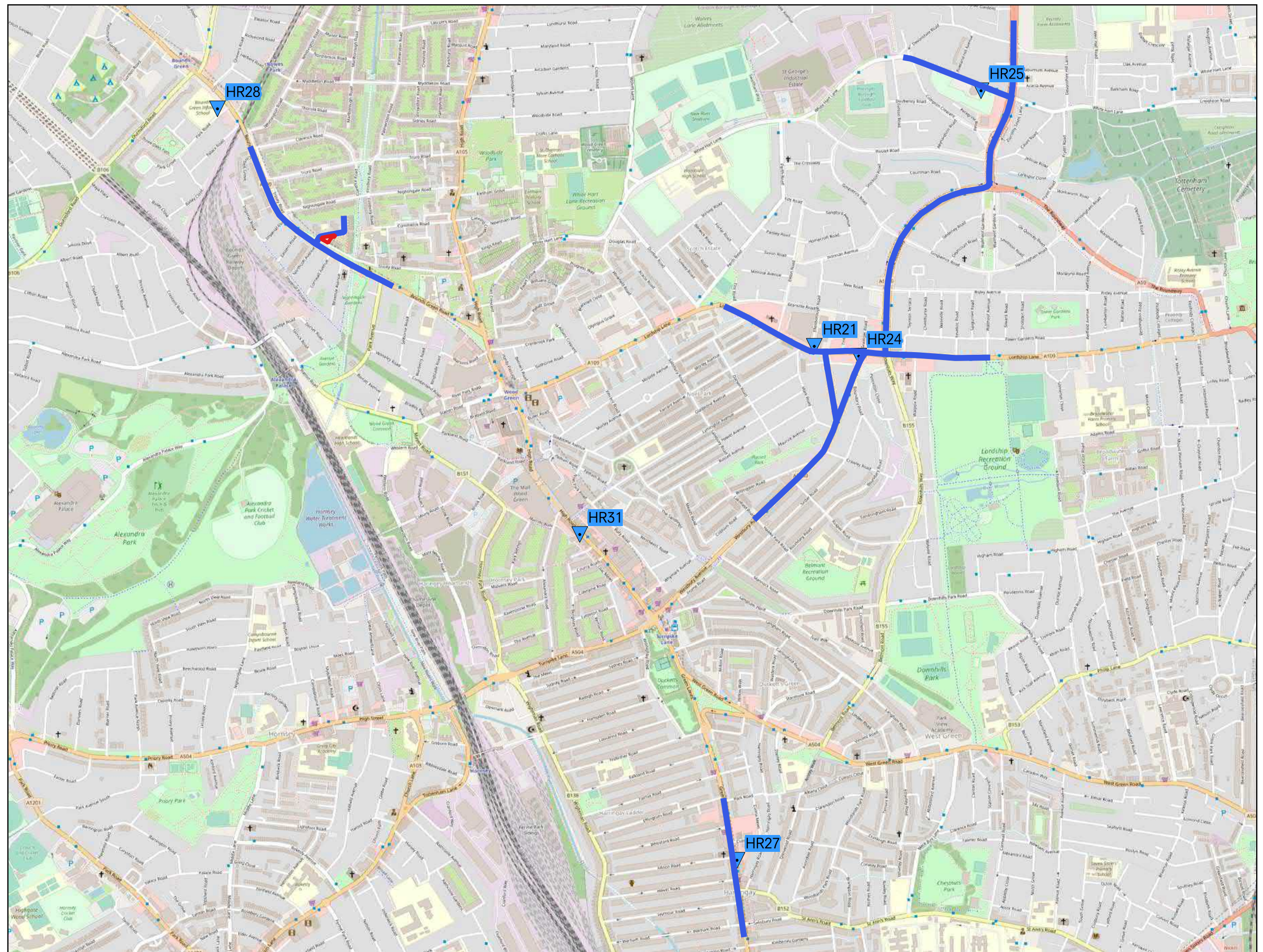
LEGEND

- SITE BOUNDARY
- MODELLED ROAD LINKS
- ▼ LBH DIFFUSION TUBES

0 0.25 0.5 0.75 km

THIS DRAWING IS INDICATIVE ONLY

COORDINATE SYSTEM: BRITISH NATIONAL GRID
UNITS: KILOMETRE
SCALE: 1:13000
BASEMAP SOURCE: OPEN STREET MAP



DRAWING STATUS:

FINAL

CLIENT:

LONDON BOROUGH OF HARINGEY

PROJECT:

PARTRIDGE WAY, WOOD GREEN, LONDON

DRAWING TITLE:

MODELLED ROAD LINKS

DRAWN/DESIGN:

JJ

DATE:

20/10/2020

STATUS:

S2

CHECKED:

KN

APPROVED:

KN

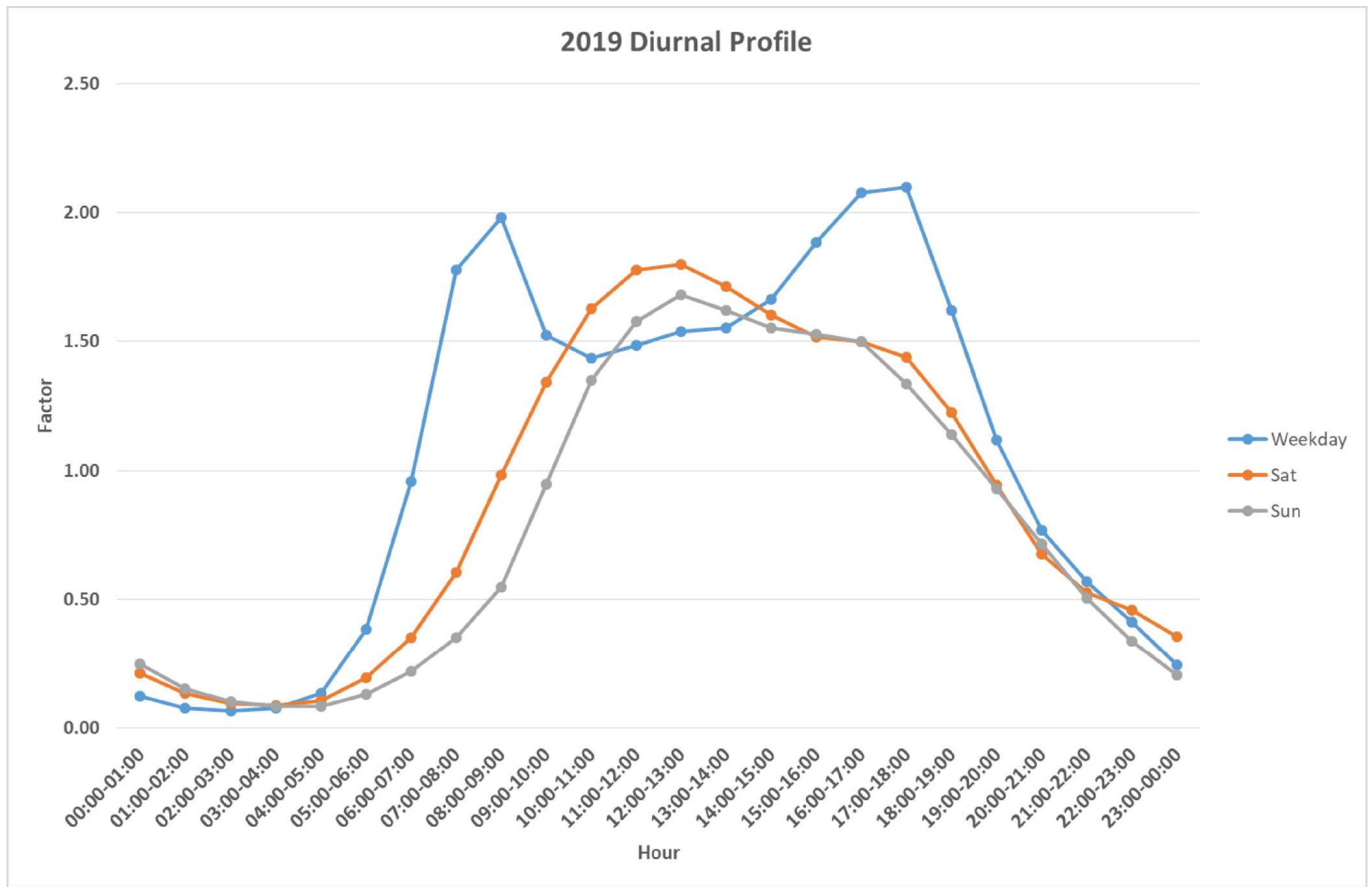
REVISION:

C01

DRAWING NO:

779168-MLM-ZZ-XX-DR-J-FIGURE 8

REV	DATE	DESCRIPTION	MADE	CKD



DRAWING STATUS: FINAL		DRAWING TITLE: DIURNAL PROFILE FOR ROADS FOR THE YEAR 2019		
CLIENT: LONDON BOROUGH OF HARINGEY		DRAWN/DESIGN: JJ	DATE: 13/10/2020	STATUS: S2
PROJECT: PARTRIDGE WAY, WOOD GREEN, LONDON		CHECKED: KN	APPROVED: KN	REVISION: C01
		DRAWING NO: 779168-MLM-ZZ-XX-DR-J-FIGURE 9		

REV	DATE	DESCRIPTION	MADE	CKD



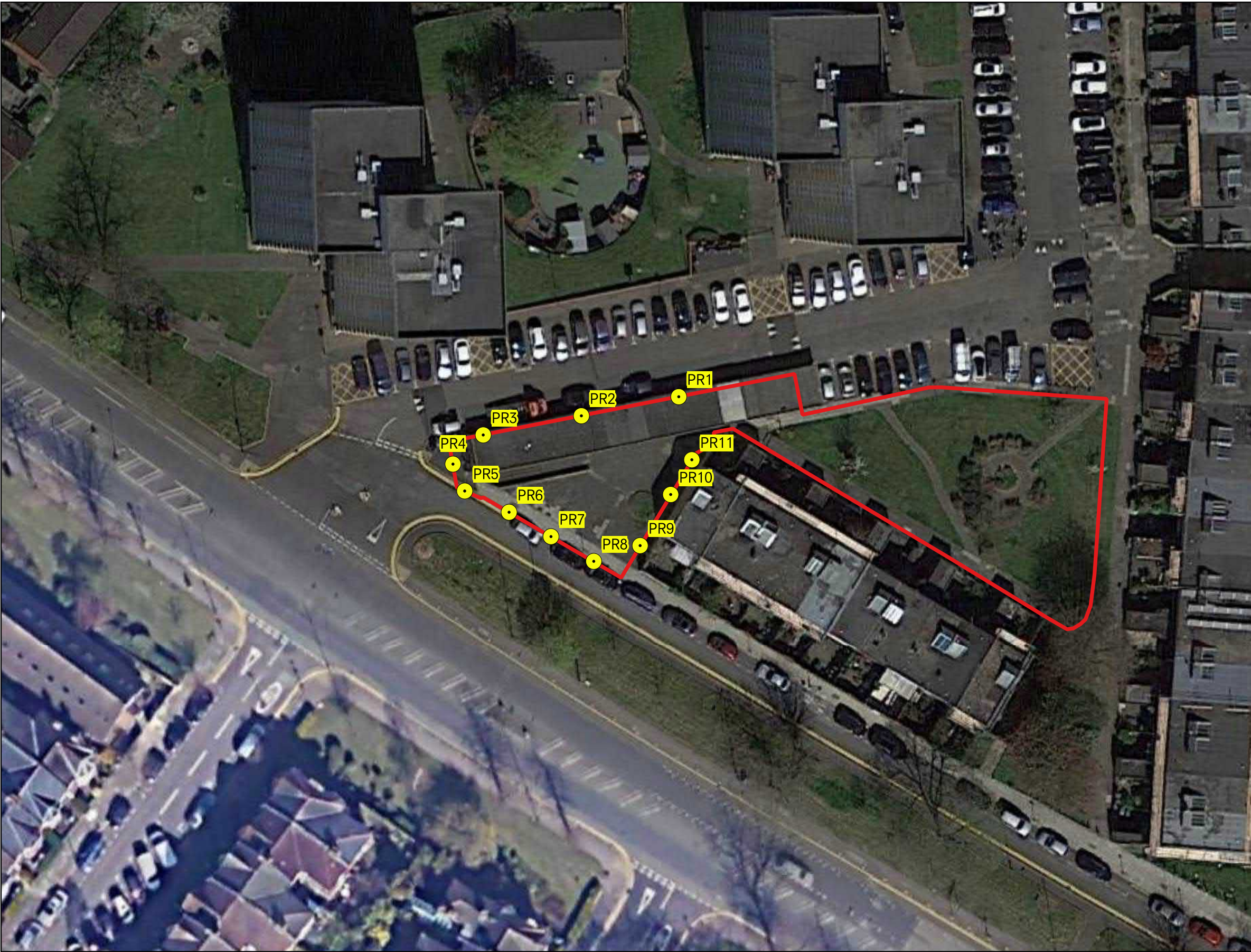
LEGEND

- SITE BOUNDARY
- MODELLED RECEPTORS



THIS DRAWING IS INDICATIVE ONLY

COORDINATE SYSTEM: BRITISH NATIONAL GRID
UNITS: METRE
SCALE: 1:500
BASEMAP SOURCE: GOOGLE SATELLITE IMAGERY



DRAWING STATUS:

FINAL

CLIENT:

LONDON BOROUGH OF HARINGEY

PROJECT:

PARTRIDGE WAY, WOOD GREEN, LONDON

DRAWING TITLE:

MODELLED PROPOSED RECEPTORS

DRAWN/DESIGN:

JJ

DATE:

13/05/2021

STATUS:

S2

CHECKED:

KN

APPROVED:

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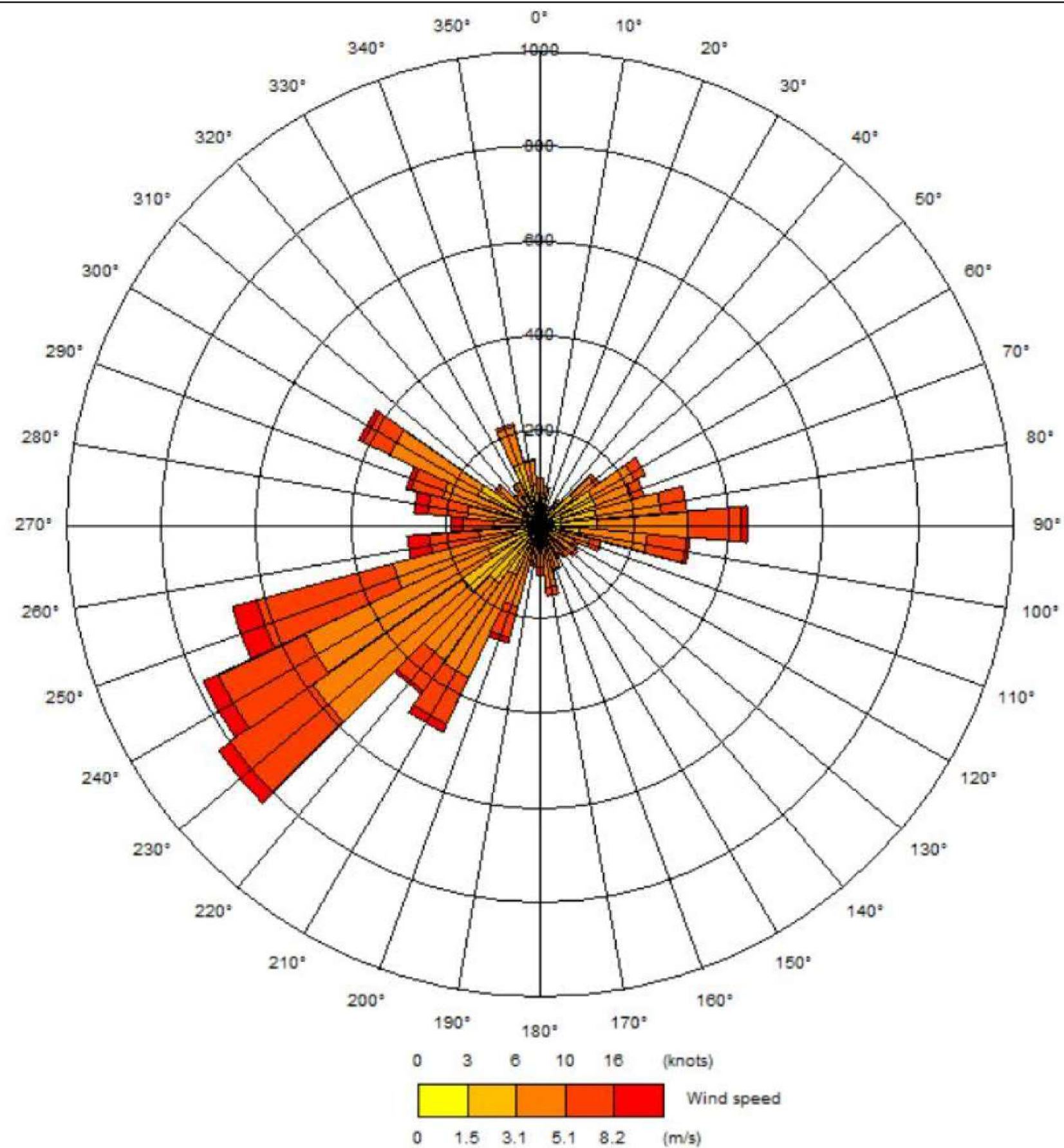
REVISION:

C02

DRAWING NO:

779168-MLM-ZZ-XX-DR-J-FIGURE 10

REV	DATE	DESCRIPTION	MADE	CKD



DRAWING STATUS:

FINAL

CLIENT:

LONDON BOROUGH OF HARINGEY

PROJECT:

PARTRIDGE WAY, WOOD GREEN, LONDON

DRAWING TITLE:

WINDROSE AT LONDON CITY AIRPORT
METEOROLOGICAL STATION, 2019

DRAWN/DESIGN:

JJ

DATE:

13/10/2020

STATUS:

S2

CHECKED:

KN

APPROVED:

KN

REVISION:

C01

DRAWING NO:

779168-MLM-ZZ-XX-DR-J-FIGURE 11

REV	DATE	DESCRIPTION	MADE	CKD

Appendix A - IAQM Construction Assessment Methodology

It is inevitable that with any development, demolition and construction activities would cause some disturbance to those nearby. Dust arising from most construction activities tends to be of a coarse nature, which through dispersion by the wind, can lead to soiling of property including windows, cars, external paintwork and laundry.

The ability of dust particles to remain suspended in the air depends on its shape, size and density. Coarse particles ($>30\mu\text{m}$) tend to be deposited within 100m of source. Finer particles, between $10\text{--}30\mu\text{m}$, are generally deposited within 200 to 500m of source, while very fine particles ($<10\mu\text{m}$), which remain suspended for longer, can travel up to 1km from source. The greatest proportion of construction dust is made up of coarse particles, thus the majority of dust emissions are deposited within 100m of source.

However, as well as giving rise to annoyance due to soiling of surfaces from dust emissions, there is evidence of major construction activities causing increases in long term PM_{10} concentrations and in the number of days exceeding the short term PM_{10} objective of $50\mu\text{g}/\text{m}^3$. The potential for impacts to occur during the construction of a proposed development must therefore be considered, to ensure appropriate mitigation measures are applied to reduce potential impacts at adjacent receptors. However, it should be noted that disruption due to demolition and construction is a localised phenomenon and is temporary in nature.

During the construction of the proposed development, lorries would require access to the site to deliver and remove materials; earthmoving plant and other mobile machinery will work on site and generators and cranes will also be in operation. These machines produce exhaust emissions; of particular concern are emissions of NO_2 and PM_{10} .

The assessment of construction impacts has followed the methodology set out within guidance produced by the Greater London Authority (GLA) and Institute of Air Quality Management (IAQM) on assessing impacts from construction activities and is set out below.

Prediction Method and Approach

In order to assess the potential impacts, the activities on construction sites are divided into four categories. These are:

- Demolition (removal of existing structures);
- Earthworks (soil-stripping, ground-levelling, excavation and landscaping);
- Construction (activities involved in the provision of a new structure); and
- Trackout (the transport of dust and dirt from the construction site onto the public road network where it may be deposited and then re-suspended by vehicles using the network).

For each activity, the risk of dust annoyance, health and ecological impact is determined using three risk categories: low, medium and high risk. The risk category may be different for each of the four activities. The risk magnitude identified for each of the construction activities is then compared to the number of sensitive receptors in the near vicinity of the site in order to determine the risks posed by the construction activities to these receptors.

Step 1: Screen the Need for an Assessment

The first step is to screen the requirement for a more detailed assessment. An assessment is required where there is:

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

Step 2A: Define the Potential Dust Emission Magnitude

This is based on the scale of the anticipated works and the proximity of nearby receptors. The risk is classified as small, medium or large for each of the four categories.

Demolition: The potential dust emission classes for demolition are:

- Large: Total building volume $>50,000\text{m}^3$, potentially dusty construction material (e.g. Concrete), on site crushing and screening, demolition activities $>20\text{m}$ above ground level;
- Medium: total building volume $20,000\text{m}^3$ - $50,000\text{m}^3$, potentially dusty construction material, demolition activities $10\text{-}20\text{m}$ above ground level; and
- Small: total building volume $<20,000\text{m}^3$, construction material with low potential for dust release (e.g. metal cladding or timber), demolition activities $<10\text{m}$ above ground, demolition during wetter months.

Earthworks: This involves excavating material, haulage, tipping and stockpiling. The potential dust emission classes for earthworks are:

- Large: Total site area $>10,000\text{m}^2$, potentially dusty soil type (e.g. clay, which would be prone to suspension when dry due to small particle size), >10 heavy earth moving vehicles active at any one time, formation of bunds $>8\text{m}$ in height, total material moved $>100,000$ tonnes;
- Medium: Total site area $2,500\text{m}^2$ - $10,000\text{m}^2$, moderately dusty soil (e.g. silt), five - ten heavy earth moving vehicles active at any one time, formation of bunds 4m - 8m in height, total material moved $20,000$ tonnes- $100,000$ tonnes; and
- Small: Total site area $<2,500\text{m}^2$, soil type with large grain size (e.g. sand), <5 heavy earth moving vehicles active at any one time, formation of bunds $<4\text{m}$ in height, total material moved $<20,000$ tonnes, earthworks during wetter months.

Construction: The important issues when determining the potential dust emission magnitude include the size of the building(s)/infrastructure, method of construction, construction materials, and duration of build. The categories are:

- Large: Total building volume $>100,000\text{m}^3$, on site concrete batching, sandblasting;
- Medium: Total building volume $25,000\text{m}^3$ - $100,000\text{m}^3$, potentially dusty construction material (e.g. concrete), on site concrete batching; and
- Small: Total building volume $<25,000\text{m}^3$, construction material with low potential for dust release (e.g. metal cladding or timber).

Trackout: The risk of impacts occurring during trackout is predominantly dependent on the number of vehicles accessing the Site on a daily basis. However, vehicle size and speed, the duration of activities and local geology are also factors which are used to determine the emission class of the Site as a result of the trackout. The categories are:

- Large: >50 HDV ($>3.5\text{t}$) outward movements in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length $>100\text{m}$;
- Medium: $10\text{-}50$ HDV ($>3.5\text{t}$) outward movements in any one day, moderately dusty surface material (e.g. high clay content, unpaved road length $50\text{-}100\text{m}$; and
- Small: <10 HDV ($>3.5\text{t}$) outward movements in any one day, surface material with low potential for dust release, unpaved road length $>50\text{m}$.

Step 2B: Defining the Sensitivity of the Area

The sensitivity of the area is defined for dust soiling, human health (PM₁₀) and ecological receptors. The sensitivity of the area takes into account the following factors:

- The specific sensitivities of receptors in the area;
- The proximity and number of receptors
- In the case of PM₁₀, the local background concentration; and
- Site specific factors, such as whether there are natural shelters, such as trees, to reduce the risk of wind-blown dust.

Table A1.1 is used to define the sensitivity of different types of receptors to dust soiling, health effects and ecological effects.

Table A1.1 Examples of Factors Defining Sensitivity of an Area

Sensitivity of Area	Dust Soiling	Human Receptors	Ecological Receptors
High	Users can reasonably expect enjoyment of a high level of amenity. The appearance, aesthetics or value of their property would be diminished by soiling. The people or property would reasonably be expected to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land. E.g. dwellings, museums and other important collections, medium and long-term car parks and car showrooms.	10 – 100 dwellings within 20m of site. Local PM ₁₀ concentrations close to the objective (e.g. annual mean 36 -40µg/m ³), e.g. residential properties, hospitals, schools and residential care homes.	Locations with an international or national designation and the designated features may be affected by dust soiling. Locations where there is a community of a particularly dust sensitive species such as vascular species included in the Red List for Great Britain. E.g. A Special Area of Conservation (SAC).
Medium	Users would expect to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home. The appearance, aesthetics or value of their property could be diminished by soiling. The 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.	Less than 10 receptors within 20m. Local PM ₁₀ concentrations below the objective (e.g. annual mean 30-36µg/m ³). e.g. office and shop workers but would generally not include workers occupationally exposed to PM ₁₀ as protection is covered by the Health and Safety at Work legislation	Locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown. Locations with a national designation where the features may be affected by dust deposition E.g. A Site of Special Scientific Interest (SSSI) with dust sensitive features.

Sensitivity of Area	Dust Soiling	Human Receptors	Ecological Receptors
Low	The enjoyment of amenity would not reasonably be expected. Property would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling. There is transient exposure, where the people or property would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land. E.g. playing fields, farmland unless commercially sensitive horticultural, footpaths, short lived car parks and roads.	Locations where human exposure is transient. No receptors within 20m. Local PM₁₀ concentrations well below the objectives (less than 75%). E.g. public footpaths, playing fields, parks and shopping streets.	Locations with a local designation where the features may be affected by dust deposition. E.g. Local Nature Reserve with dust sensitive features.

Based on the sensitivities assigned to the different receptors surrounding the site and numbers of receptors within certain distances of the site, a sensitivity classification can be defined for each. Tables A1.2 to A1.4 indicate the criteria used to determine the sensitivity of the area to dust soiling, human health and ecological impacts.

Table A1.2 Sensitivity of the Area to Dust Soiling on People and Property

Pollutant	Concentrations	Distance from the Source (m)			
		<20	<50	<100	<350
High	>100	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

Table A1.3 Sensitivity of the Area to Human Health Impacts

Receptor Sensitivity	Annual Mean PM ₁₀ Concentrations	Number of Receptors	Distance from the Source (m)				
			<20	<50	<100	<200	<350
High	>32µg/m ³	>100	High	High	High	Medium	Low
		10-100	High	High	Medium	Low	Low
		1-10	High	Medium	Low	Low	Low
	28-32µg/m ³	>100	High	High	Medium	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	High	Medium	Low	Low	Low
		>100	High	Medium	Low	Low	Low

Receptor Sensitivity	Annual Mean PM ₁₀ Concentrations	Number of Receptors	Distance from the Source (m)				
			<20	<50	<100	<200	<350
	24-28µg/m³	10-100	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	<24µg/m³	>100	Medium	Low	Low	Low	Low
		10-100	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Medium	>32µg/m³	>10	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	28-32µg/m³	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	24-28µg/m³	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	<24µg/m³	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Low		≥1	Low	Low	Low	Low	Low

Table A1.4 Sensitivity of the Area to Ecological Impacts

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

Step 2C: Define the Risk of Impacts

The final step is to combine the dust emission magnitude determined in step 2A with the sensitivity of the area determined in step 2B to determine the risk of impacts with no mitigation applied. Tables A1.5 to A1.7 indicate the method used to assign the level of risk for each construction activity.

The identified risk of impact is then used to identify appropriate mitigation measures for inclusion with a Dust Management Plan (DMP) which is usually incorporated within the Site's Construction Environmental Management Plan (CEMP).

Table A1.5 Risk of Dust Impacts from Demolition

Sensitivity of Area	Large	Medium	Small
High	High Risk	Medium Risk	Medium Risk
Medium	High Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Table A1.6 Risk of Dust Impacts from Earthworks/Construction

Sensitivity of Area	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Table A1.7 Risk of Dust Impacts from Trackout

Sensitivity of Area	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Low Risk	Negligible
Low	Low Risk	Low Risk	Negligible

Appendix B - IAQM Screening Criteria

Stage 1 Criteria to Proceed to Stage 2

Criteria to Proceed to Stage 2	
A.	If any of the following apply: - Ten or more residential units of a site area of more than 0.5ha; - More than 1,000m² of floor space for all other uses or a site area greater than 1ha.
B.	Coupled with any of the following: - The development has more than ten parking spaces; - The development will have a centralised energy facility or other centralised combustion process.

Indicative Criteria at Stage 2 to determine if an Air Quality Assessment is required

The Development will	Indicative Criteria to Proceed to an Air Quality Assessment
1 Cause a significant change in Light Duty Vehicle (LDV) traffic flows on local roads with relevant receptors.	A change of LDV flows of: - More than 100 AADT within or adjacent to an AQMA; - More than 500 AADT elsewhere.
2 Cause a significant change in Heavy Duty Vehicle (HDV) flows on local roads with relevant receptors.	A Change of HDV flows of: - More than 25 AADT within or adjacent to an AQMA; - More than 100AADT elsewhere.
3 Realign roads, i.e. changing the proximity of receptors to traffic lanes.	Where the change is 5m or more and the road is within an AQMA.
4 Introduce a new junction or remove an existing junction near to relevant receptors.	Applies to junctions that cause traffic to significantly change vehicle accelerate/decelerate, egg traffic-lights, or roundabouts.
5 Introduce or change a bus station.	Where bus flows will change by: - More than 25 AADT within or adjacent to an AQMA; - More than 100AADT elsewhere.

6 Have an underground car park with extraction system.	The ventilation extract for the car park will be within 20m of a relevant receptor. Coupled with the car park having more than 100 movements per day (total in and out).
7 Have one or more substantial combustion processes.	Where the combustion unit is: • Any centralised plant using bio fuel; • Any combustion plant with single or combined thermal input >300kWh; • A standby emergency generator associated with a centralised energy centre (if likely to be tested/used >18 hours a year).
8 Have a combustion process of any size.	Where the pollutants are exhausted from a vent or stack in a location and at a height that may give rise to impacts at receptors through insufficient dispersion. This criterion is intended to address those situations where a new development may be close to other buildings that could be residential and/or which could adversely affect the plume's dispersion by way or their size and/or height.

Appendix C - Dust Mitigation Measures

It is recommended that the 'desirable' and 'highly recommended' measures set out below are incorporated into the DMP and approved by LBH prior to commencement of any work on site. The 'desirable' measures are shown in italics.

General Measures

- Display the name and contact details of the person accountable for air quality and dust issues on the site boundary (i.e. the environment manager/engineer or site manager);
- Display the head or regional office contact information on the site boundary;
- Record and respond to all dust and air quality pollutant emissions complaints, identify cause, take appropriate measures to reduce emissions in a timely manner and record the measures taken;
- Make the complaints log available to the local authority when asked;
- Carry out regular site inspections to monitor compliance air quality and dust control procedures, record inspection results, and make inspection log available to LBH Council when asked;
- Increase the frequency of site inspection by those accountable for dust and air quality pollutant emission issues when activities with a high potential to produce dust and emissions are being carried out, and during prolonged periods of dry or windy conditions;
- 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 log book;
- Plan site layout: machinery and dust causing activities should be located away from receptors;
- Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site;
- *Fully enclose site or specific operations where there is a high potential for dust production and the activities are being undertaken for an extensive period;*
- Avoid site runoff of water or mud;
- *Keep site fencing, barriers and scaffolding clean using wet methods;*
- *Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If being re-used on site, cover;*
- Ensure all on-road vehicles comply with the requirements of the London Low Emission Zone;
- Ensure all non-road mobile machinery (NRM) comply with the standards;
- Ensure all vehicles switch off engines when stationary - no idling vehicles;
- Avoid the use of diesel or petrol-powered generators and use mains electricity or battery powered equipment where possible;
- *Impose and signpost a maximum-speed-limit of 10mph on surfaced haul routes and work areas;*
- Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).
- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems;
- Ensure an adequate water supply on site for effective dust/particulate matter suppression/mitigation, (using recycled water where possible);
- Use enclosed chutes and conveyors and covered skips;
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate;
- Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods;
- Reuse and recycle waste to reduce dust from waste materials; and
- Avoid bonfires and burning of waste.

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);*
- Ensure water suppression is used during demolition operations;
- Avoid explosive blasting, using appropriate manual or mechanical alternatives; and
- Bag and remove any biological debris or damp down such material before demolition.

Measures specific to Construction

- *Avoid scabbling (roughening of concrete surfaces) if possible; and*
- 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.*

Measures specific to 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; and*
- *Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).*

Appendix D - Modelling Results for Proposed Residential Receptors

Table D1.1 Modelled NO₂, PM₁₀ and PM_{2.5} Concentrations at Future Residential Receptors in the Operational Year, With Development

Receptor ID	Receptor Height (m)	Concentrations			
		Annual Mean (µg/m³)			No. of Exceedances of 24-Hour Mean PM ₁₀
		NO ₂	PM ₁₀	PM _{2.5}	
PR1-1F	5.18	25.5	18.2	12.0	2
PR2-1F	4.50	26.0	18.3	12.1	2
PR3-1F	4.50	26.5	18.4	12.2	2
PR4-1F	4.61	26.8	18.5	12.2	2
PR5-1F	4.61	27.0	18.5	12.2	2
PR6-1F	4.61	26.9	18.5	12.2	2
PR7-1F	4.61	26.9	18.5	12.2	2
PR8-1F	4.61	26.9	18.5	12.2	2
PR9-1F	5.18	26.3	18.3	12.1	2
PR10-1F	5.18	25.9	18.3	12.1	2
PR11-1F	5.18	25.7	18.2	12.1	2
PR1-2F	8.18	25.0	18.1	12.0	1
PR2-2F	7.50	25.3	18.1	12.0	2
PR3-2F	7.50	25.5	18.2	12.0	2
PR4-2F	7.61	25.5	18.2	12.0	2
PR5-2F	7.61	25.6	18.2	12.0	2
PR6-2F	7.61	25.6	18.2	12.0	2
PR7-2F	7.61	25.6	18.2	12.0	2
PR8-2F	7.61	25.5	18.2	12.0	2
PR9-2F	8.18	25.3	18.1	12.0	2
PR10-2F	8.18	25.2	18.1	12.0	2
PR11-2F	8.18	25.1	18.1	12.0	2
PR1-3F	11.18	24.5	18.0	11.9	1
PR2-3F	10.50	24.7	18.0	11.9	1
PR3-3F	10.50	24.7	18.0	11.9	1
PR4-3F	10.60	24.6	18.0	11.9	1
PR5-3F	10.60	24.6	18.0	11.9	1
PR6-3F	10.60	24.6	18.0	11.9	1
PR7-3F	10.60	24.6	18.0	11.9	1
PR8-3F	10.60	24.6	18.0	11.9	1
PR9-3F	11.18	24.5	18.0	11.9	1
PR10-3F	11.18	24.5	18.0	11.9	1
PR11-3F	11.18	24.5	18.0	11.9	1

Receptor ID	Receptor Height (m)	Concentrations			
		Annual Mean ($\mu\text{g}/\text{m}^3$)			No. of Exceedances of 24-Hour Mean PM_{10}
		NO_2	PM_{10}	$\text{PM}_{2.5}$	
PR1-4F	14.78	24.1	17.9	11.9	1
PR2-4F	14.10	24.1	17.9	11.9	1
PR3-4F	14.10	24.1	17.9	11.8	1
PR4-4F	14.20	24.0	17.9	11.8	1
PR5-4F	14.20	24.0	17.8	11.8	1
PR6-4F	14.20	24.0	17.9	11.8	1
PR7-4F	14.20	24.0	17.9	11.8	1
PR8-4F	14.20	24.0	17.9	11.8	1
PR9-4F	14.77	24.0	17.8	11.8	1
PR10-4F	14.77	24.0	17.9	11.8	1
PR11-4F	14.77	24.0	17.9	11.8	1
PR1-5F	17.78	23.8	17.8	11.8	1
PR2-5F	17.10	23.8	17.8	11.8	1
PR3-5F	17.10	23.8	17.8	11.8	1
PR4-5F	17.20	23.8	17.8	11.8	1
PR5-5F	17.20	23.7	17.8	11.8	1
PR6-5F	17.20	23.8	17.8	11.8	1
PR7-5F	17.20	23.8	17.8	11.8	1
PR8-5F	17.20	23.8	17.8	11.8	1
PR9-5F	17.77	23.7	17.8	11.8	1
PR10-5F	17.77	23.8	17.8	11.8	1
PR11-5F	17.77	23.8	17.8	11.8	1
PR1-6F	20.78	23.6	17.8	11.8	1
PR2-6F	20.10	23.6	17.8	11.8	1
PR3-6F	20.10	23.6	17.8	11.8	1
PR4-6F	20.20	23.6	17.8	11.8	1
PR5-6F	20.20	23.6	17.8	11.8	1
PR6-6F	20.20	23.6	17.8	11.8	1
PR7-6F	20.20	23.6	17.8	11.8	1
PR8-6F	20.20	23.6	17.8	11.8	1
PR9-6F	20.77	23.6	17.8	11.8	1
PR10-6F	20.77	23.6	17.8	11.8	1
PR11-6F	20.77	23.6	17.8	11.8	1
PR1-7F	23.78	23.5	17.8	11.8	1
PR2-7F	23.10	23.5	17.8	11.8	1

Receptor ID	Receptor Height (m)	Concentrations			
		Annual Mean ($\mu\text{g}/\text{m}^3$)			No. of Exceedances of 24-Hour Mean PM_{10}
		NO_2	PM_{10}	$\text{PM}_{2.5}$	
PR3-7F	23.10	23.5	17.8	11.8	1
PR4-7F	23.20	23.5	17.8	11.8	1
PR5-7F	23.20	23.5	17.8	11.8	1
PR6-7F	23.20	23.5	17.8	11.8	1
PR7-7F	23.20	23.5	17.8	11.8	1
PR8-7F	23.20	23.5	17.8	11.8	1
PR9-7F	23.77	23.5	17.7	11.8	1
PR10-7F	23.77	23.5	17.8	11.8	1
PR11-7F	23.77	23.5	17.8	11.8	1
PR1-8F	26.18	23.5	17.7	11.8	1
PR2-8F	25.50	23.5	17.7	11.8	1
PR3-8F	25.50	23.5	17.7	11.8	1
PR4-8F	25.60	23.5	17.7	11.8	1
PR5-8F	25.60	23.5	17.7	11.8	1
PR6-8F	25.60	23.5	17.7	11.8	1
PR7-8F	25.60	23.5	17.7	11.8	1
PR8-8F	25.60	23.5	17.7	11.8	1
PR9-8F	26.17	23.5	17.7	11.8	1
PR10-8F	26.17	23.5	17.7	11.8	1
PR11-8F	26.17	23.5	17.7	11.8	1
Corresponding National Air Quality Objective		40	40	25	35



T +44 20 7422 7800
A 3rd Floor Eldon House
2 Eldon Street
London, EC2M 7LS

www.mlmggroup.com