Kairus Ltd

HORTON ROAD
WEST DRAYTON
LONDON BOROUGH OF HILLINGDON

Air Quality Assessment
July 2025

For and on behalf of

LMO Overseas Investment Ltd

Project Reference: 24-2134

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AIR QUALITY ASSESSMENT

HORTON ROAD
WEST DRAYTON
LONDON BOROUGH OF HILLINGDON

JULY 2025

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1 Introduction

1.1 Overview

Kairus Ltd has been instructed by LMO Overseas Investment Limited to carry out an air quality assessment (AQA) in support of the redevelopment of land on the Orbital Industrial Estate, Horton Road, West Drayton, Hillingdon (the 'Site).

The Site falls within the administrative boundary of the London Borough of Hillingdon (LBH). The Council has declared an Air Quality Management Area (AQMA) covering the southern area of the borough below the A40 corridor. The AQMA has been declared due to exceedances of the national air quality annual mean objective for nitrogen dioxide (NO_2). The Site also lies approximately 400 m to the east of the LBH West Drayton/Yiewsley Air Quality Focus Area (AQFA).

This report considers the impact of the proposed development on local air quality. Potential sources of emissions are identified and assessed in the context of existing air quality and emission sources and the nature and location of receptors.

A glossary of common air quality terminology is provided in Appendix A.

1.2 Scope of Assessment

The development will include the demolition of the existing buildings and the construction of two new commercial units for E(g)iii/B2/B8 use. The potential impacts of operational traffic have been assessed in accordance with current air quality planning guidance published by the Institute of Air Quality Management (IAQM)[1]. However, as determined during consultation, LBH do not use the traffic screening criteria set out within the IAQM guidance. As a consequence, due to the site falling within the catchment of the West Drayton/Yiewsley Air Quality Focus Area and resulting in a change in traffic a detailed assessment of operational traffic has been undertaken, as requested by LBH during the consultation process.

Air quality at the Site has also been assessed to determine the suitability of the Site for commercial development.

The assessment has concentrated on nitrogen dioxide (NO_2) and particulate matter with an aerodynamic diameter of less than 10 µm and 2.5 µm (PM_{10} and $PM_{2.5}$), the pollutants most associated with traffic emissions and which can be harmful and cause discomfort to humans.

An assessment of air quality impacts associated with the construction of the proposed development has been undertaken.

As the Site falls within London there is a requirement that the proposals are assessed against London Plan Policy SI1[2], which requires all developments to be Air Quality Neutral (AQN). The development proposals have been assessed against this policy referring to the Greater London

1 IAQM, Land-use Planning and Development Control: Planning for Air Quality, January 2017

2 Mayor of London, The London Plan, The Spatial Development Strategy for Greater London, March 2021

Authority (GLA) 2023 London Plan Guidance[3] and guidance set out in the LBH Air Quality Action Plan[4].

LBH Planning and Sustainable Growth Team has been consulted and the scope of the assessment agreed via email consultant between 13th April 2024 and 23rd April 2024.

3 Greater London Authority, Mayor of London Plan Guidance, Air Quality Neutral, February 2023

4 LBH, Air Quality Action Plan 2019 – 2024, May 2019

2 Site Description

2.1 The Existing Site

The Site is located in the West Drayton and Yiewsley area of Hillingdon and forms part of the Orbital Industrial Estate to the south of Horton Road.

The Site is currently occupied by a number of interlinked commercial units providing small industrial units with associated parking.

The Site is bounded to the north by Horton Road, to the west by the North Point Business Centre and to the east by industrial units within the wider Orbital Industrial Estate. To the south the Site is bounded by the Grand Union Canal.

In the wider area land uses to the northeast and east are predominantly commercial while to the north and west they are residential.

The location of the Site is presented in Figure 2.1, shown by the area bounded in red.

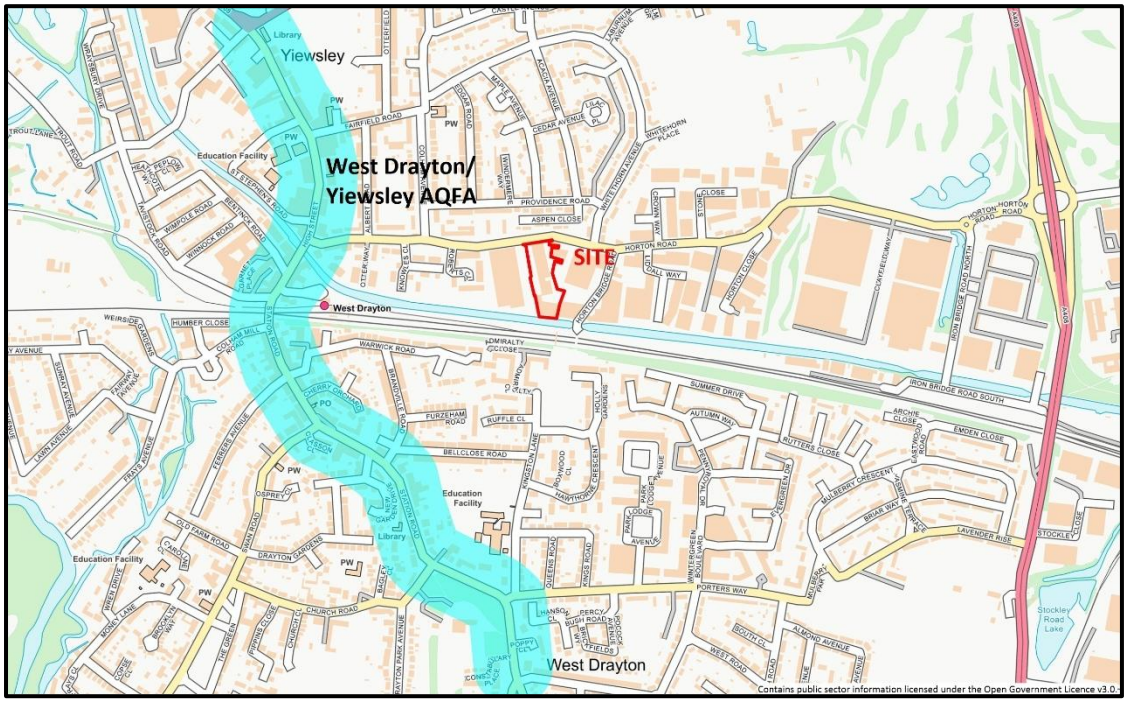

Figure 2.1: Location of Development Site

2.2 The Proposed Development

An application is being submitted for the '*Demolition of existing buildings and structures and redevelopment of the site to provide modern employment units for flexible use across classes E(g)(iii), B2, B8 with ancillary offices areas for car parking, landscaping, service yard areas and ancillary structures, as well as associated works'.*

totalling 32 parking spaces (13 for unit 1 and 19 for unit 2) and 16 cycle parking spaces.

An indicative layout for the Site is provided in Figure 2.2.

Figure 2.2: Indicative Layout

3 Policy Context

3.1 National Legislation and Policy

3.1.1 Air Quality Regulations

The Air Quality Standards Regulations 2010[5] and Air Quality EU Exit Regulations 2019[6] set out a series of air quality limit values (AQLVs) for the protection of human health and critical levels for the protection of vegetation. Concentration limits apply both nationally, where they are the responsibility of national government and locally, where achieving them is the responsibility of the relevant local authority.

The air quality limits are long-term benchmarks for ambient pollutant concentrations which represent negligible or zero risk to health, based on medical and scientific evidence reviewed by the Expert Panel on Air Quality Standards (EPAQS) and the World Health Organisation (WHO). These are general concentration limits, above which sensitive members of the public (e.g. children, the elderly and the unwell) might experience adverse health effects.

For some pollutants, there is both a long-term (annual mean) limit and a short-term limit. In the case of NO_2, the short-term standard is for a 1-hour averaging period, whereas for PM_{10} it is for a 24-hour averaging period. These periods reflect the varying impacts on health of differing exposures to pollutants (e.g. temporary exposure on the pavement adjacent to a busy road, compared with the exposure of residential properties adjacent to a road).

Of the pollutants included in the regulations, NO_2, PM_{10} and $PM_{2.5}$ are of particular relevance to this assessment as these are the primary pollutants associated with road traffic. The current UK limit values for these three pollutants in relation to human health are set out in Table 3.1.

In relation to $PM_{2.5}$, new legal targets are set out in the recently published Environmental Improvement Plan (EIP) 2023[7] and Statutory Instrument 'The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023[8]. Although legally binding, it is central government's responsibility for meeting these future targets and therefore Local Authorities currently have no statutory obligation to achieve these targets. However, the Mayor of London has committed to meeting the World Health Organisation (WHO) guideline of 10 $\mu g/m^3$ by 2030 for $PM_{2.5}$[9].

Furthermore, LBH have adopted the use of the 2021 WHO air quality guidelines[10] for annual mean NO_2 and annual mean $PM_{2.5}$. The London Mayoral objective (MO) and LBH WHO guideline levels WGL) are also set out in Table 3.1.

5 Air Quality Regulations 2010-Statutrory Instrument 2010 No.1001

6 Air Quality (Amendment of Domestic Regulations) (EU Exit) Regulations 2019 – Statutory Instrument 2019 No. 74

7 HM Government Environmental Improvement Plan 2023, First Revision of the 25 Year Environment Plan

8 The Environmental Targets (Fine particulate Matter) (England) Regulations 2023 – Statutory Instrument 2023 No.96

9 Mayor of London, London Environment Strategy, May 2018

10 https://www.who.int/news-room/feature-stories/detail/what-are-the-who-air-quality-guidelines

Table 3.1: Relevant Air Quality Limit Values, Objectives and Guidelines				
Pollutant	**Averaging Time**	**UK AQLVs**	**WHO Guideline Levels**	**London Mayoral Objective**
Nitrogen Dioxide (NO2)	1 hour mean	200 µg/m^3 not to be exceeded more than 18 times per year	-	-
	Annual mean	40 µg/m^3	10 µg/m^3	-
Particulate Matter (PM10)	24 hour mean	50 µg/m^3 not to be exceeded more than 35 times per year	-	-
	Annual mean	40 µg/m^3	-	-
Particulate Matter (PM2.5)	Annual mean	20 µg/m^3	5 µg/m^3	10 µg/m^3

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 LAQM.TG(22)[11] on where the objectives apply, as detailed in Table 3.2. 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 3.2: 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 facades of residential properties, schools, hospitals, care home etc.	Building facades 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 facade), or any other location where public exposure is expected to be short term.
24 Hour Mean	All locations where the annual mean objective would apply together with hotels. Gardens of residential properties.	Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term.

11 DEFRA (2022) Part IV of the Environment Act 1995: Local Air Quality management: Technical Guidance LAQM.TG(22), August 2022

Table 3.2: Locations Where Air Quality Objectives Apply		
Averaging Period	**Objectives should apply at:**	**Objectives should generally not apply at:**
1 Hour Mean	All locations where the annual mean and 24-hour mean objectives apply. Kerbside Sites (e.g. pavements of busy shopping streets). Those parts of car parks, bus stations and railway stations etc. which are not fully enclosed, where the public might reasonably be expected to spend 1-hour or more. Any outdoor locations where the public might reasonably be expected to spend 1-hour or longer.	Kerbside sites where the public would not be expected to have regular access.

3.1.2 The UK Air Quality Strategy

The Government's policy on air quality within the UK is set out in the Air Quality Strategy (AQS) published in August 2023[12]. The document sets out the strategic framework for improving air quality and responsibilities of local authorities to address air quality exceedances in their areas. This includes requirements for declaring air quality management areas (AQMA) and publishing Air Quality Action Plans (AQAPs) setting out measures to reduce emissions and comply with the limit values.

The strategy also sets out expectations on local authorities to implement preventative action to ensure future breaches of the limit values do not occur.

3.1.3 Local Air Quality Management – The Environment Act 1995

Local authorities are seen to play a particularly important role. Section 82 of the Environment Act 1995 requires every local authority to conduct a review of the air quality from time to time within the authority's area. The DEFFA technical guidance, LAQM.TG(22), continues with the streamlined approach to the Local Air Quality Management (LAQM) regime, whereby every authority has to undertake and submit a single Annual Status Report/Annual Progress Report within its area, to identify whether the objectives have been or will be achieved at relevant locations by the applicable date. If the objectives are not being met, the authority must declare an Air Quality Management Area (section 83 of the Act) and prepare an action plan (section 84) which identifies measures that will be introduced in pursuit of the objectives.

3.1.4 Control of Dust and Particulates Associated with Construction

Section 79 of the Environmental Protection Act (1990)[13] 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', and*

12 DEFRA (2023) The Air Quality Strategy: Framework for Local Authority Delivery, August 2023
13 Secretary of State, The Environment Act 1990 HMSO

- *'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 would 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.

3.2 Planning Policy

3.2.1 National Planning Policy

The latest edition of the National Planning Policy Framework (NNPF)[14] was published in December 2024 (with minor amendments March 2025), and sets out the Government's planning policies for England and how these are expected to be applied. The main changes to the policy, primarily impact on planning making and on planning decisions on housing proposals. The presumption in favour of sustainable development still remains at the heart of the NNPF which requires Local Plans to be consistent with the principles and policies set out in the NPPF with the objective of contributing to the achievement of sustainable development. In addition, members of the United Nations, including the United Kingdom, '*have agreed to pursue the 17 Global Goals for Sustainable Development in the period to 2030. These address social progress, economic well-being and environmental protection.'*

The three overarching objectives for achieving sustainable development remain the same, including the environmental objective, however, the wording of this objective has been altered slightly. It includes a requirement *'to protect and enhance our natural, built and historic environment; including making effective use of land, improving biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy.'*

Section 15: Conserving and Enhancing the Natural Environment, remains and the NPPF (paragraph 187) requires that *'planning policies and decisions should contribute to and enhance the natural 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.'*

In dealing specifically with air quality the NPPF (paragraph 199) states that *'planning policies and decisions should sustain and contribute towards compliance with relevant limit values or*

14 Department for Levelling up, Housing and Communities, National Planning Policy Framework, December 2024

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.'*

Paragraph 201 states that *'the focus of planning policies and decisions should be on whether proposed development is an acceptable use of land, rather than the control of processes or emissions (where these are subject to separate pollution control regimes). Planning decisions should assume that these regimes will operate effectively'.*

3.3 Regional Legislation and Policy

3.3.1 The Mayor of London's Air Quality Strategy

The Mayor of London's AQS[15] sets out a series of policies and proposals for the implementation of the UK AQS and for the achievement of the air quality standards and objectives in Greater London. With regards new developments the following policies are of relevance:

Policy '1 - Encouraging smarter choices and sustainable travel': The Mayor will support a shift to public transport, by only supporting developments that generate high levels of trips in locations with good public transport accessibility, by supporting car free developments and encouraging the inclusion of infrastructure to support sustainable travel, such as cycling, electric vehicle recharging points and car clubs;

Policy '6 - Reducing emissions from construction and demolition sites': The London Council's Best Practice guidance will be reviewed and updated, and more vigorously implemented;

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 NOx for new biomass boilers and NOx 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;

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

Policy '9 - Energy efficient buildings': The Mayor will set CO_2 reduction targets for new developments which will be achieved using the Mayor's Energy Hierarchy. These measures will result in reductions of NO_x emissions; and

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.

3.3.2 The London Plan

The London Plan 2021[16] was published in March 2021. The Plan is the overall Spatial Development Strategy (SDS) 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 SI 1 – Improving Air Quality sets out the following to reduce emissions and exposure across the city:

A Development Plans, through relevant strategic, site-specific and area-based polices, 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 of 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

16 Greater London Authority (2021) The London Plan 2021: The Spatial Development Strategy for Greater London, March 2021

local problems of air quality in preference to post-design or retro-fitted mitigation measures

c) major development proposals must be submitted with an Air Quality Assessment. Air quality assessments should show how the development will meet the requirements of B1

d) development proposals in Air Quality Focus Areas or that are likely to be used by large numbers of people particularly vulnerable to poor air quality, such as children or older people should demonstrate that design measures have been used to minimise exposure.

C Masterplans and development briefs for large-scale development proposals subject to an Environmental Impact Assessment should consider how local air quality can be improved across the area of the proposal as part of an air quality positive approach. To achieve this a statement should be submitted demonstrating:

1) how proposals have considered ways to maximise benefits to local air quality, and

2) what measures or design features will be put in place to reduce exposure to pollution, and how they achieve this.

D In order to reduce the impact on air quality during the construction and demolition phase development proposals must demonstrate how they plan to comply with the Non-Road Mobile Machinery Low Emission Zone and reduce emissions from the demolition and construction of buildings following best practice guidance.

E Development proposals should ensure that where emissions need to be reduced to meet the requirements of Air Quality neutral or to make the impact of development on local air quality acceptable, this is done on-site. Where it can be demonstrated that emissions cannot be further reduced by on-site measures, off-site measures to improve local air quality may be acceptable, provided that equivalent air quality benefits can be demonstrated within the area affected by the development.

3.3.3 London Environment Strategy

The London Environmental Strategy[17] considers policies aimed at improving the environment in London, across a number of different areas such as air quality, noise and climate change. There are a number of objectives but notable in relation to air quality is the objective: *'for London to have the best air quality of any major world city by 2050, going beyond the legal requirements to protect human health and minimise inequalities.'*

Chapter 4 of the Environmental Strategy relates specifically to air quality and identifies a number of key issues to be addressed:

- Achieving legal compliance as quickly as possible;

17 Mayor of London (2018) London Environment Strategy

- Diesel vehicles, especially cars and vans;
- Tackling all sources of pollution;
- Government action;
- Maximising co-benefits between air quality and climate change policies; and
- Further reductions are needed in PM_{10} and $PM_{2.5}$, particularly from transboundary pollution, tyre and brake wear and wood burning.

3.4 Local legislation and Policy

3.4.1 Hillingdon Local Plan: Part 1 Strategic Policies

The Hillington Local Plan: Part 1 Strategic policies document[18] was adopted in November 2012 and is the key strategic planning document for Hillingdon. It sets out the long-term vision and objectives for the borough.

Under Policy EM8: Land, Water, Air and Noise the Council sets out the following:

Air Quality

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

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

The Council seeks to reduce levels of pollutants referred to in the Government's National Air Quality Strategy and will have regard to the Mayor's Air Quality Strategy. London Boroughs should also take account of the findings of the Air Quality Review and Assessments and Action Plans, in particular where Air Quality Management Areas have been designated.

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

3.4.2 Hillingdon Local Plan: Part 2 Development Management Policies

The Hillington Local Plan: Part 2 Development Management Policies[19] was adopted on 16th January 2020 and sets out detailed policies to guide planning decisions.

Policy DMEI 1: Living Walls and Roofs and on-site Vegetation sets out the following requirements:

18 London Borough of Hillingdon (2012) Hillingdon Local Plan: Part 1 Strategic Policies, November 2012
19 London Borough of Hillingdon (2012) Hillingdon Local Plan: Part 2 Development Management Policies, 2020

'All development proposals are required to comply with the following:

i) All major development should incorporate living roofs and/or walls into the development. Suitable justification should be provided where living walls and roofs cannot be provided; and

ii) Major development in Air Quality Management Areas must provide onsite provision of living roofs and/or walls. A suitable offsite contribution may be required where onsite provision is not appropriate'.

Policy DMEI 14 deals specifically with air quality and sets out the following:

'A) Development proposals should demonstrate appropriate reductions in emissions to sustain compliance with and contribute towards meeting EU limit values and national air quality objectives for pollutants.

B) Development proposals should, as a minimum:

i) be at least 'air quality neutral;

ii) include sufficient mitigation to ensure there is no unacceptable risk from air pollution to sensitive receptors, both existing and new;

iii) Actively contribute towards the improvement of air quality especially within the Air Quality Management Area.'

3.5 Air Quality Guidance

3.5.1 DEFRA Technical Guidance, LAQM.TG(22) and London LAQM.TG(19)

LAQM.TG(22) sets out detailed guidance on how air quality should be assessed and monitored by all local authorities and LLAQM.TG(19)[20] sets out guidance specific to the London boroughs. The documents provide useful guidance on how air quality from specific sources should be screened and the approaches that should be used to undertake detailed assessment where potentially significant emissions are identified, including details on model verification and consideration of monitoring data for use in assessments.

3.5.2 IAQM Land-Use Planning and Development Control: Planning for Air Quality

The EPUK and IAQM have published joint guidance on the assessment of air quality impacts for planning purposes. This includes information on when an air quality assessment is required, what should be included in an assessment and criteria for assessing the significance of any impacts.

3.5.3 IAQM Guidance on the Assessment of Dust from Demolition and Construction

Guidance produced by the IAQM on assessing impacts from construction and demolition activities[21] includes a methodology for identifying the risk magnitude of potential dust sources

20 Mayor of London (2019) London Local Air Quality Management Technical Guidance 2019 LLAQM.TG(19)
21 IAQM (2024) Guidance on the Assessment of Dust from Demolition and Construction Version 2.1 , February 2024

associated with demolition, construction, earthworks and trackout. This is then used to identify the level of mitigation necessary in order for the impacts to be not significant.

3.5.4 Mayor of London The Control of Dust and Emissions During Construction and Demolition SPG

The Mayor of London has published guidance on assessing the risk of significant effects during construction[22]. The methodology sets out an initial approach for identifying the risk magnitude of potential dust sources associated with demolition, construction, earthworks and trackout. This is then used to identify the level of mitigation necessary in order for the impacts to be not significant. This guidance is based on the 2014 version of the IAQM's 'Guidance of the Assessment of Dust from Demolition and Construction'[23]. However, new IAQM guidance was published in January 2024. The GLA guidance states that the latest version of the IAQM should be used where a newer version is issued. The assessment therefore draws on the SPG but the risk assessment is based on the updated approach within the 2024 IAQM guidance

3.5.5 Mayor of London Air Quality Neutral Guidance

'Air Quality neutral' is a term that refers to developments that do not contribute to air pollution beyond allowable benchmarks, which is a requirement for all development within London to meet the requirements of Policy SI1 of the London Plan. The AQN benchmarks relate to both transport and building emissions and a development must meet both benchmarks separately in order to be AQN.

The London AQN guidance[24] was published in February 2023 and sets out guidance on how to calculate the relevant benchmarks against which developments should be assessed and the approach to calculating both building and transport emissions specific to a development that should be used to assess the proposals against the calculated benchmarks.

The document also sets out guidance on where a development can be excluded from the AQN calculations and classed as AQN without considering an assessment against the relevant benchmarks.

As detailed in the guidance, where a development is not found to be AQN appropriate on and off-site mitigation measures should be identified and agreed with the local planning authority to sufficiently reduce emissions to achieve AQN status. Where it is not possible to identify appropriate and adequate mitigation the guidance sets out an approach to calculating and agreeing offsetting payments which will be provided to the Local Planning Authority to mitigate air quality impacts within the wider area.

The GLA AQN guidance has been used to assess the development proposals against Policy SI1 of the London Plan.

22 Mayor of London (2014) The Control of Dust and Emissions During Construction and Demolition SPG

23 IAQM (2014) Guidance on the Assessment of Dust from Demolition and Construction Version 1.1 , February 2014

24 Mayor of London (2023) London Plan Guidance Air Quality Neutral, February 2023

4 Methodology

4.1 Baseline Assessment

A baseline assessment of air quality in the vicinity of the Site and the surrounding area has been carried out through a review of monitoring data available within the LBH air quality review and assessment reports, most notably the LBH 2024 Air Quality Annual Status Report (ASR)[25]. Additional data has been obtained from the UK Air Information Resource (UK-AIR) background pollution maps[26].

The results of the baseline assessment have been used to determine the suitability of the Site for commercial use and identify whether any mitigation measures are required to reduce exposure.

4.2 Construction and Demolition Assessment

4.2.1 Construction Traffic

During construction of the proposed development, lorries will require access to the Site to deliver and remove materials; earthmoving plant and other mobile machinery may also work on site including generators and cranes. These machines produce exhaust emissions; of particular concern are emissions of NO_2 and PM_{10}. As detailed in the IAQM guidance, emissions associated with on-site mobile machinery are unlikely to cause a significant impact on local air quality and therefore the main concern is related to on-road construction vehicles.

The IAQM air quality planning guidance sets out criteria for establishing when there is a risk of significant impacts on local air quality as a result of traffic generated by a proposed development. The guidance states that where the following criteria are exceeded a more detailed assessment is required:

- An increase in Light Duty Vehicle (LDV) traffic of >500 annual average daily traffic (AADT) (or >100 AADT within or adjacent to an AQMA); and/or
- An increase in Heavy Duty Vehicle (HDV) traffic of >100 AADT (or >25 AADT within or adjacent to an AQMA).

The above criteria apply to any individual link and therefore, a development generating >100 HGV AADT (or >25 AADT within an AQMA) may be considered to fall below the screening criteria where the increase is spread over a number of different road links.

In addition to the above screening criteria, the assessment of potential impacts as a result of demolition and construction traffic generated by the proposed development also takes into consideration the anticipated duration of the demolition and construction period and any anticipated mitigation measures that are likely to be applied.

Where it is not possible to screen out significant effects from road sources, detailed modelling may be required.

25 London Borough of Hillingdon, Air Quality Annual Status Report for 2024, June 2022
26 https://uk-air.defra.gov.uk/data/laqm-background-home

4.2.2 Construction/Fugitive Dust Emissions

Construction phase activities associated with the Proposed Development may result in the generation of fugitive dust emissions (i.e. dust emissions generated by site-specific activities that disperse beyond the construction site boundaries).

If transported beyond the site boundary, dust can have an adverse impact on local air quality. The IAQM guidance on assessing dust from demolition and construction considers the potential for dust nuisance and impacts to human health and ecosystems to occur due to activities carried out during the following stages of construction:

- Demolition (removal of existing structures);
- Earthworks (soil-stripping, ground-leveling, 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).

A qualitative assessment of air quality impacts due to the release of fugitive dust and particulates (PM_{10}) during the construction phase was undertaken in accordance with the methodology detailed in the IAQM guidance.

The assessment 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, thus enabling a level of risk to be assigned. 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 IAQM assessment methodology is provided in Appendix B.

4.3 Operational Phase

4.3.1 On-site Energy Plant Emissions

A qualitative review of the proposed energy strategy has been carried out to determine whether the proposals will result in any significant on-site emissions. Where significant emissions are identified a detailed assessment may be required.

4.3.2 Operational Traffic Impacts

Potential impacts on air quality due to operational traffic emissions have been predicted using the ADMS dispersion model (version 5.0.1.3, released March 2023). This is a commercially available dispersion model and has been widely validated for this type of assessment and used extensively in the Air Quality Review and Assessment process.

The model uses detailed information regarding traffic flows on the local road network and local meteorological conditions to predict pollution concentrations at specific locations

selected by the user. Meteorological data from the Heathrow Airport Meteorological Station for 2023 has been used for the assessment.

Quantitative assessment of the impacts on local air quality from road traffic emissions associated with the operation of the development have been completed against the AQLVs, MO and WGL set out in Table 3.1 for NO_2, PM_{10} and $PM_{2.5}$.

Emissions Data

The model has been used to predict road specific concentrations of oxides of nitrogen (NO_x) and particulate matter (PM_{10} and $PM_{2.5}$) at selected receptors.

The assessment has predicted air quality during 2023 for model verification.

The modelling assessment has subsequently predicted concentrations in 2030, the expected first year of operation, to assess the impact of the operational development on local air quality.

The emission factors released by Defra in November 2023, provided in the emissions factor toolkit EFT2023_v12.0[27], have been used to predict traffic related emissions of PM and NO_x.

Emission factors and background data used in the prediction of future air quality concentrations predict a gradual decline in pollution levels over time due to improved emissions from new vehicles and the gradual renewal of the vehicle fleet. In recent years the Defra emission factors published within the Emission Factor Toolkits (EFT) have been found to predict lower NO_x concentrations in future years compared to concentrations measures at roadside locations across the UK. However, research carried out by Air Quality Consultants Ltd (AQC) has now shown that emissions of NO_x from vehicles within the 2019 EFTv9 matched concentrations recorded at roadside locations between 2013 to 2019. The report[28] concluded that '*the EFT is now unlikely to over-state the rate at which NOx emissions decline into the future at an 'average' site in the UK. Indeed, the balance of evidence suggests that, on average, NOx concentrations are likely to decline more quickly in the future than predicted by the EFT'.* This has removed the need for the use of any sensitivity tests for future year scenarios.

In light of the above, the 2023 EFTv12 is also considered to be representative of future year emissions and suitable for use without sensitivity tests. As a consequence, 2030 emission factors have been sued for the future year 2030 assessment.

Background Concentrations

The ADMS model estimates concentrations arising as a result of vehicle emissions. It is necessary to add an estimate of local background concentrations to obtain the total concentration for comparison against the air quality objectives.

Background concentrations of NO_2, PM_{10} and $PM_{2.5}$ have been taken from the Defra background maps[29.] for 2023. The NO_2 data has been calibrated against locally monitored background concentrations to derive an adjustment factor that has subsequently been applied to the Defra background data to ensure the data better represents locally measures concentrations.

27 https://laqm.defra.gov.uk/review-and-assessment/tools/emissions-factors-toolkit.html

28 https://www.aqconsultants.co.uk/news/march-2020/defra%E2%80%99s-emission-factor-toolkit-now-matching-measu

29 https://uk-air.defra.gov.uk/data/laqm-background-home

Details of the calibration are provided in Appendix C.

Calibration of PM_{10} or $PM_{2.5}$ has also been carried out against the LBH HIL automatic monitoring site for 2023. Comparison of the data showed higher background concentrations estimated within the Defra maps compared to locally measured data. Data from the Defra maps has therefore been used without adjustment to ensure a cautious approach to the assessment.

The assessment assumes no change in pollution levels in future years with 2023 background concentrations used in the 2030 assessment scenarios. This is considered to represent a cautious prediction of future concentrations.

The background data used in the modelling assessment is provided in Table 5.5.

Traffic Data

Traffic data for use in the assessment has been provided by SLR for the 2023 base scenario (to allow model verification), 2030 Do-minimum (DM) scenario (which includes traffic growth associated with committed development and trips associated with the current Site operations) and 2030 Do-Something (DS) scenario (with existing trips removed from the network and proposed trips added).

To allow the model to be verified against local 2023 monitoring data, 2023 traffic data has also been extracted from the Department of Transport (DfT) online data source[30] for Uxbridge Road/Hillingdon Road (A4020), the B483 and the A437. Data for Porters Way and Kingston Lane have been taken from the DfT TRA0302 workbook which provides average traffic flows by road type across the UK.

The operational trip data has been calculated based on an end us of B8 to ensure a worst-case prediction of potential impacts.

The traffic data used within the assessment are provided in Appendix D and are based on traffic data set out in the Transport Assessment (TA) completed by SLR.

Model Outputs and Results Processing

The ADMS Model has predicted traffic related annual mean emissions of NO_x and PM at sensitive receptors (residential, educational and community uses) located adjacent to the road links set out in Appendix D. Relevant background concentrations have subsequently been added to the model outputs to provide the total concentrations of each pollutant.

The predicted concentrations of NO_2, NO_x have been converted to NO_2 using the LAQM calculator (Version 8.1, released August 2020) available on the Defra air quality website[31].

Analysis of long-term monitoring data[32] suggests that if the annual mean NO_2 concentration is less than 60 µg/m^3 then the one-hour mean NO_2 AQLV is unlikely to be exceeded where road transport is the main source of pollution. Therefore, in this assessment the annual mean concentration has been used to screen whether the one-hour mean objective is likely to be achieved as recommended within LAQM.TG(22). Similar to NO_2, an annual mean PM_{10}

30 https://roadtraffic.dft.gov.uk/downloads

31 http://uk-air.defra.gov.uk

32 D Laxen and B Marner: Analysis of the relationship between 1-hour and annual mean nitrogen dioxide at UK roadside and kerbside monitoring sites (July 2003).

concentrations below 32 µg/m^3 is used to screen whether the 24-hour PM_{10} mean AQLV is likely to be achieved, the approach also recommended within LAQM.TG(22).

Verification of Model Results

It is recommended that the model results are compared with measured data to determine whether the model results need adjusting to more accurately reflect local air quality. This process is known as verification.

LAQM.TG(22) recommends that model predictions should be within 25% (preferably 10%) of monitored concentrations for the model to be predicting with any degree of accuracy. Also, the guidance recommends that any adjustment factors applied to model results should be calculated based on verification using monitoring sites in a similar location i.e. roadside, intermediate or background sites.

To verify the model results, the ADMS model has been used to predict NO_x concentrations at the LBH monitoring sites HILL04 (Uxbridge Road), HILL20 (Potters Way) and HILL24 (Hillingdon Road) (See Appendix H for location of monitoring sites).

Verification has been carried out against 2023 monitoring data.

Further details on the verification process are provided in Appendix E.

There is no suitable monitoring of PM data to allow verification of the PM model results. However, LAQM.TG (22) suggests applying the NO_x adjustment factor to modelled road-PM where no appropriate verification against PM data can be carried out. Therefore, the adjustment applied to predicted NO_x concentrations has also been applied to the modelled PM concentrations.

Selection of Receptors

As set out in Table 3.2, LAQM.TG(22) describes in detail typical locations where consideration should be given to pollutants defined in the Regulations. Generally, the guidance suggests that all locations *'where members of the public are regularly present'* should be considered. At such locations, members of the public would be exposed to pollution over the time that they are present, and the most suitable averaging period of the pollutant needs to be used for assessment purposes.

For instance, on a footpath, where exposure would be transient (for the duration of passage along that path) comparison with short-term standards (i.e. 15-minute mean or 1-hour mean) may be relevant. In a school, or adjacent to a private dwelling, however; where exposure may be for longer periods, comparison with long-term standards (such as 24-hour mean or annual mean) may be most appropriate. In general terms, concentrations associated with long-term standards are lower than short-term standards owing to the chronic health effects associated with exposure to low level pollution for longer periods of time.

For the completion of this assessment, air quality has been predicted at discrete sensitive receptors (residential, Health and Education facilities) located adjacent to the road links in the vicinity of the Site, with particular focus on Horton Road and High Street which fall within the Horton Road/Yiewsley AQFA.

Details of the receptors are set out in Table 4.1 and their locations provided in Appendix F.

Table 4.1: Receptors used in ADMS Modelling Assessment			
Receptor Number	**Location**	**OS Grid Reference**	**Height above Ground (m)**
R1	201 Horton Road	506943, 180262	1.5
R2	231 Horton Road	507018, 180278	1.5
R3	201 Whitethorn Avenue	506698, 180249	1.5
R4	129 Horton Road	506489, 180268	1.5
R5	Yiewsley Court	506377, 180256	1.5
R6	Roberts Close	506391, 180229	1.5
R7	67 Horton Road	506294, 180263	1.5
R8	18 Horton Road	506173, 180252	1.5
R9	Yiewsley Health Centre	506085, 180267	1.5
R10	Keelson House	506090, 180236	1.5
R11	Art Wood Apts	506059, 180262	1.5
R12	81 High Street – 1st Floor Apts	506077, 180409	4.5
R13	Iceland – 1st Floor Apts	506087, 180452	4.5
R14	126 High St – 1st Floor Apts	506046, 180535	4.5
R15	115B High Street – 1st Floor Apts	506031, 180530	4.5
R16	Ashley Court	506053, 180213	1.5
R17	Rail Road Café – 1st Floor Apt	505999, 180159	4.5
R18	Maksons Hse	506055, 179893	1.5
R19	Garden Court	506154, 179814	1.5
R20	Oakwood B&B	506261, 179764	1.5

Significance Criteria

The guidance issued by EPUK & IAQM relates to Air Quality considerations within the planning process and sets criterion which identify the need for an Air Quality Assessment, the type of Air Quality assessment required, and the significance of any predicted impact.

The guidance suggests expressing the magnitude of incremental change in concentrations as a proportion of an Air Quality Assessment Level (AQAL) such as the AQLV, objectives and targets set out in Table 3.1.

The significance of impact is then identified based on the incremental change in the context of the new total concentrations and its relationship with the assessment criteria, noting whether the impact is adverse or beneficial based on a positive or negative change in concentrations. The criteria suggested for assigning significance is set out in Table 4.2 below.

To assess the overall significance of the predicted impact the assessment draws on the approach used for undertaking environmental impact assessments where a moderate and

major impact is deemed to be significant while a minor or negligible impact would not be classed as significant.

The approach set out in Table 4.2 has been used within this assessment for assessing the significance of predicted impacts. However, LBH have also developed their own significance criteria for assessing impacts on NO_2 and $PM_{2.5}$. The LBH significance criteria are provided in Table 4.3 and 4.4 and have also been used to assess the significance of predicted impacts within the assessment.

Table 4.2: Impact Descriptors for Individual Receptors

Long-term Average Concentration at Receptor in Assessment Year	% Change in Concentrations 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% of AQAL	Moderate	Substantial	Substantial	Substantial
AQAL – Air Quality Assessment Level which in this assessment refers to the AQLV set out in Table 3.1				

Table 4.3: LBH Significance Matrix for NO2

Annual Mean at Receptor in Assessment Year	Change in Concentration				
	<0.05 µg/m³	≥0.05 - <0.15 µg/m³	≥0.15 - <0.55 µg/m³	≥0.55 - <0.95 µg/m³	≥0.95 µg/m³
75% or less of 10 µg/m³ (<7.5 µg/m³)	Negligible	Negligible	Negligible	Slight	Moderate
76-94% of 10 µg/m³ (7.5 – 9.4 µg/m³)	Negligible	Negligible	Slight	Moderate	Moderate
95-102% of 10 µg/m³ (9.5 – 10.2 µg/m³)	Negligible	Slight	Moderate	Moderate	Substantial
103-109% of 10 µg/m³ (10.3 – 10.9 µg/m³)	Negligible	Moderate	Moderate	Substantial	Substantial
110% of 10 µg/m³ (> 10.1 µg/m³)	Negligible	Moderate	Substantial	Substantial	Substantial

Table 4.4: LBH Significance Matrix for PM2.5					
Annual Mean at Receptor in Assessment Year	**Change in Concentration**				
	<0.05 µg/m³	**≥0.05 - <0.15 µg/m³**	**≥0.15 - <0.55 µg/m³**	**≥0.55 - <0.95 µg/m³**	**≥0.95 µg/m³**
<5 µg/m³	Negligible	Negligible	Negligible	Slight	Moderate
5 – 7 µg/m³	Negligible	Negligible	Slight	Moderate	Moderate
8 – 10 µg/m³	Negligible	Slight	Moderate	Moderate	Substantial
< 10 µg/m³	Negligible	Moderate	Moderate	Substantial	Substantial

In undertaking the assessment of significance the following have also been taken into consideration:

- The percentage change in concentration should be rounded to a whole number
- The table should only be used with annual mean concentrations
- The descriptors are for individual receptors only: overall significance should be based on professional judgment
- When defining the concentrations as a percentage of the AQAL use the 'without scheme' concentration where there is a decrease in pollutant concentrations and the 'with scheme' concentrations for an increase
- The total concentration categories reflect the degree of potential harm by reference to the AQAL value. At exposure, less than 75% of this value i.e. well below, the degree of harm is likely to be small. As exposure approaches and exceeds the AQAL, the degree of harm increases. This change naturally becomes more important when the result is an exposure that is approximately equal to, or greater than the AQAL

It is unwise to ascribe too much accuracy to incremental changes or background concentrations, and this is especially important when total concentrations are close to the AQAL. For a given year, it is impossible to define the new total concentrations without recognising the inherent uncertainty, which is why there is a category that has a range around the AQAL, rather than being exactly equal to it.

4.4 Air Quality Neutral

The London Plan requires all developments in London to be Air Quality neutral (AQN).

The GLA AQN guidance, published in February 2023, has been used for undertaking the assessment. The guidance sets out benchmarks for different land use classes against which the calculated transport and building emissions from a development can be compared. Where a development falls below these benchmarks it can be classed as 'Air Quality Neutral' and no mitigation is considered necessary.

4.4.1 Building Emissions

To calculate the building emission from the proposed development the following data should be used:

- Gross internal floor area (GIA)(m²) of development;

- Annual on-site energy demand from new buildings (kWh/annum);
- NO_x and where relevant PM_{10} emission factors for proposed energy plant such as gas fired boilers.

The calculated building emissions are then compared against the Building Emission Benchmark (BEB) for each relevant land-use class i.e. B8 (Industrial).

Emissions of PM_{10} are not considered to be significant from natural gas and therefore the assessment of building emissions usually relates specifically to emission of NO_x. However, where a biomass boiler is proposed the calculation should include emissions of PM_{10}.

The AQN guidance also states that '*backup generators installed for emergency and life safety power supply, such as diesel generators, may be excluded from the calculation of predicted building emissions.'*

Where the development building emissions are found to exceed the BEB appropriate mitigation is discussed and recommended.

Where the calculated building emissions fall below the BEB then the development is considered to be air quality neutral.

The approach to undertaking the assessment of building emissions is set out in Appendix G.

4.4.2 Transport Emissions

The TEB is calculated as the annual trip rate per year from each identified land-use. The calculation of transport trip rates for the purpose of the AQN assessment excludes trips associated with operational vehicles (i.e. it excludes trips associated with taxi, delivery and servicing vehicles as well as HGV).

The calculated annual trip rate for the development is then compared to the transport emission benchmark (TEB).

Where the development trip rate falls below the TEB then the development is considered to be AQN and no further consideration is required.

Full details on the approach to calculating the TEB and development trip rates is provided in Appendix G.

4.4.3 Mitigation and Offsetting

Where the development proposals fail to meet the building or transport benchmarks, LBH require the DEFRA damage cost approach and toolkit[33] to be used to calculate the cost equivalent of the impact of development emissions on local air quality.

The calculated damage cost, which is calculated over a 30 year period, is then used as a basis for an off-setting payment to LBH to be used to implement the LBH air quality action plan measures and help improve air quality across the borough.

Discounts are applied to reduce the damage cost based on % reductions for certain mitigation measures included within the development, for example a 5-10% discount would be applied where a site-specific travel plan is developed.

33 https://www.gov.uk/government/publications/assess-the-impact-of-air-quality/air-quality-appraisal-damage-cost-guidance

Where the site is shown to be exceeding the relevant AQN benchmarks a calculation of NO_2 and $PM_{2.5}$ emissions from the operational site have been calculated from the operational daily trip generation in conjunction with the latest emissions factors set out within EFTv13.

The data have subsequently been used within the 2022 damage cost appraisal toolkit published by Defra in January 2023[34] incorporating the updated 2023 damage costs, to calculate the anticipated damage costs associated with the proposals over a 30 year period.

Where mitigation measures are known and associated discounts can be applied the damage cost has been reduced accordingly, however in the majority of instances LBH will apply appropriate discounts following internal discussion of the proposed mitigation.

34 https://www.gov.uk/government/publications/assess-the-impact-of-air-quality

5 Baseline Assessment

5.1 London Borough of Hillingdon Review and Assessment of Air Quality

LBH has completed a number of detailed assessments of air quality across the district and declared an AQMA covering the southern part of the borough from the A40 corridor downwards, due to exceedances of the annual mean NO_2 AQLV.

The Site is located within the AQMA.

LBH have also designated a number of Air Quality Focus Areas (AQFAs) within the borough which identify locations where there is a high risk of exposure to poor air quality. A map showing the current AQFA is provided in Figure 2.1.

The Site falls within the catchment of the Horton Road/Yiewsley AQFA.

5.2 Air Quality Monitoring

5.2.1 Nitrogen Dioxide

As detailed in the LBH 2024 ASR, LBH measures NO_2 concentrations extensively across the borough using both automatic and non-automatic monitors. The closest monitoring sites to the Site are shown in Appendix H and the concentrations measured are set out in Table 5.1.

The data presented in Table 5.1 shows NO_2 concentrations have met the annual mean AQLV since 2018 at all monitoring sites in the West Drayton and Yiewsley area with the exception of the Hillingdon automatic site which exceeded the AQLV in 2018 and 2019.

When assessed against the WGL annual mean concentrations are exceeding the guideline level of 10 µg/m^3 at all monitoring locations within the area.

The monitoring shows an overall downward trend in concentrations since 2018.

Short-term NO_2 concentrations cannot be recorded by diffusion tubes. However, the LAQM.TG(22) guidance indicates that where the annual mean is below 60 µg/m^3 it can be assumed that exceedances of the 1 hour AQLV for NO_2 are unlikely to occur. Based on the data provided in Table 5.1, it is unlikely that the short-term NO_2 objective was exceeded at any of the monitoring locations between 2018 and 2023. Monitoring at the Hillingdon automatic site showed no exceedances of the 1-hour AQLV over the last 6 years.

Table 5.1: Diffusion Tube Annual Average Nitrogen Dioxide Concentrations (µg/m^3)

Site	Classification	Year					
		2018	2019	2020[2]	2021[2]	2022	2023
HIL – London Hillingdon Automatic	UB	**46**	**45**	28	25	28	25

Table 5.1: Diffusion Tube Annual Average Nitrogen Dioxide Concentrations (µg/m^3)							
Site	**Classification**	**Year**					
		2018	**2019**	**2020[2]**	**2021[2]**	**2022**	**2023**
HILL04 – Hillingdon Primary Sch	R	28.5	27.8	22.6	23.3	24.7	21.3
HILL05 – Hillingdon Hospital	R	33.4	34.1	27.4	25.4	27.8	26.7
HILL13 – 31 Tavistock Road	R	29.5	27.9	19.9	21.0	21.0	21.3
HILL19 – 104 Yiewsley High Street	UB	35.0	34.6	27.1	27.6	28.7	26.2
HILL20 – 1 Porters Way	UB	36.6	36.6	31.6	31.5	34.5	29.2
HILL21 – 5-7 Mulberry Crescent	UB	34.9	32.3	23.4	24.1	27.9	24.5
[1]TAVIS – 69 Tavistock Road	R	-	-	-	24.1	23.1	20.7
[1]HARRD – 485A High Street, Harlington	R	-	-	-	-	26.7	24.4

R – roadside, UB- Urban Background

Numbers in **BOLD** represent exceedance of the annual mean limit value of 40 µg/m^3

[1] these are low cost monitors providing additional data

[2] data for 2020 and 2021 has been included for consistency purposes only. Due to travel restrictions as a result of the COVID -19 pandemic, pollution levels during 2020 and 2021 were significantly suppressed. Data from both years is therefore considered unsuitable for assessing baseline concentrations. The data has been presented for completeness but not given any weight as part of the baseline assessment.

5.2.0 Particulate Matter (PM_{10} and $PM_{2.5}$)

LBH monitor PM_{10} concentrations at 11 locations across the borough. The closest to the Site is the HIL Hillingdon automatic site. In the absence of any closer monitoring sites all the sites and associated data have been presented in Table 5.2.

The data in Table 5.2 shows that the annual mean PM_{10} concentrations are well below AQLV of 40 µg/m^3 at all 11 monitoring locations.

All 11 sites have recorded exceedances of the 24-hour limit value, however at no time has the number of exceedances exceeded 35 in any given year, indicating that the 24-hour AQLV has not been breached at any of the monitoring locations since 2018

The data shows little change in concentrations since 2018, with a very slight downward trend at some monitoring locations.

Table 5.2: PM_{10} Concentrations Recorded Across Hillingdon

Site ID	Averaging period	Year					
		2018	2019	2020[1]	2021[1]	2022	2023
LHR2 Heathrow	Annual Mean	14	13	11	11	13	13
	24-hour	1	6	0	0	2	1
HIL – London Hillingdon	Annual Mean	-	-	-	-	14	14
	24-hour	-	-	-	-	0	3
HI1 – South Ruislip	Annual Mean	17	17	18	17	19	19
	24-hour	1	3	1	0	4	1
HI3 - Oxford Avenue	Annual Mean	24	24	23	20	22	26
	24-hour	2	4	6	0	1	4
HRL – London Harlington	Annual Mean	15	15	14	13	13	12
	24-hour	1	6	1	0	2	0
HIL1 – Hillingdon Harmondsworth	Annual Mean	18	15	16	14	16	13
	24-hour	1	0	0	0	0	0
HIL4 – Harmondsworth Osiris	Annual Mean	16	14	15	13	14	12
	24-hour	0	1	0	0	0	0
T55 – Heathrow Green Gates	Annual Mean	14	13	12	12	13	12
	24-hour	1	4	0	0	2	0
T54 - Heathrow Oaks Road	Annual Mean	15	15	13	12	13	12
	24-hour	1	4	0	0	2	0
HIL5 – Hillingdon Hayes	Annual Mean	30	28	25	16	30	27
	24-hour	22	25	16	25	23	16
LHRBR – Heathrow Bath Road	Annual Mean	-	-	14	14	16	14
	24-hour	-	-	0	0	4	1

Figures in **BOLD** represent an exceedance of the annual mean objective of 40 µg/m^3

[1] data for 2020 and 2021 has been included for consistency purposes only. Due to travel restrictions as a result of the COVID -19 pandemic, pollution levels during 2020 and 2021 were significantly suppressed. Data from both years is therefore considered unsuitable for assessing baseline concentrations.

Monitoring of $PM_{2.5}$ is carried out at nine locations across the borough. Data from these sites is set out in Table 5.3.

The data shows concentrations are below the AQLV of 20 µg/m^3 across the borough.

During 2023 concentrations also met the MO of 10 µg/m^3, although is was exceeded at a number of locations in the preceding years, including the TAVIS site during 2021 and 2022, which falls within the West Drayton/Yiewsley AQFA. However, the monitoring site at TAVIS using a light scattering method so should be treated with caution when comparing against the guideline levels.

Concentrations at all monitoring sites have been above the WGL of 5 µg/m^3 since 2018.

Table 5.3: $PM_{2.5}$ Concentrations Recorded Across Hillingdon (µg/m^3)

Site	Year					
	2018	2019	2020[2]	2021[2]	2022	2023
LHR2 Heathrow	8	9	7	7	8	8
HIL – London Hillingdon Automatic	-	-	-	-	7	8
HRL – London Harlington	9	10	8	8	8	7
HIL4 – Harmondsworth Osiris	6	5	7	6	7	6
T55 – Heathrow Green Gates	7	8	7	7	8	7
T54 - Heathrow Oaks Road	10	10	7	7	8	7
LHRBR – Heathrow Bath Road	-	-	11	8	9	8
[1]TAVIS – 69 Tavistock Road	-	-	-	12.2	10.6	8.5
[1]HARRD – 485A High Street, Harlington	-	-	-	-	10.5	8.3

Numbers in **BOLD** represent exceedance of the annual mean limit value of 40 µg/m^3

[1] these are low cost monitors providing additional data, but use light scattering techniques so comparison against the AQLV/Guideline levels should be treated with caution

[2] data for 2020 and 2021 has been included for consistency purposes only. Due to travel restrictions as a result of the COVID -19 pandemic, pollution levels during 2020 and 2021 were significantly suppressed. Data from both years is therefore considered unsuitable for assessing baseline concentrations. The data has been presented for completeness but not given any weight as part of the baseline assessment.

5.3 Predicted Baseline Concentrations

Pollutant concentrations predicted as part of the detailed modelling exercise in the 2023 base and 2030 DM scenarios are set out in Table 5.4.

The data shows that predicted annual mean NO_2, PM_{10} and $PM_{2.5}$ concentrations are below the relevant annual mean AQLV for all three pollutants at all the selected receptor locations. However, annual mean NO_2 and $PM_{2.5}$ concentrations are predicted to exceed the WGL of 10µg/m^3 and 5 µg/m^3, respectively, although the MO of 10 µg/m^3 for $PM_{2.5}$ is being met at all receptor locations.

As annual mean NO_2 concentrations are predicted to be less than 60 µg/m^3 and PM_{10} concentrations less than 32 µg/m^3, both pollutants are meeting the relevant 1-hour and 24-hour AQLVs for both pollutants, respectively.

The data set out in Table 5.4 shows little change in concentrations of PM_{10} and $PM_{2.5}$ between the 2023 and 2030 base years. In contrast NO_2 concentrations are predicted to decline between the two base years at all receptor locations. This is due to improvements within the emissions of fuel driven vehicles in conjunction with an increase in the number of low emissions and electric vehicles within the vehicle fleet in future years. As vehicle related emissions make up a significantly smaller proportion of total PM matter compared to NO_2, and a proportion of particulate matter is also caused by tyre and break wear (which will increase where the number of vehicles increases) the reductions in vehicle emissions are not seen to such an extent in future PM concentrations.

The assessment has also assumed no change in background concentrations between 2023 and 2030, therefore the expected reductions in concentrations due to estimated declines in background levels are not represented within the predicted results.

Table 5.4: Predicted Annual Mean Baseline Air Quality (µg/m^3)

Receptor	NO_2		PM_{10}		$PM_{2.5}$	
	2023	2030	2023	2030	2023	2030
R1	24.6	23.8	14.0	14.0	8.3	8.3
R2	23.9	22.9	13.8	13.8	8.2	8.2
R3	25.0	24.0	14.2	14.2	8.4	8.4
R4	24.3	23.7	13.9	13.8	8.3	8.3
R5	24.9	23.9	14.1	14.1	8.4	8.4
R6	24.7	23.8	14.0	14.0	8.4	8.4
R7	25.2	24.0	14.3	14.2	8.5	8.5
R8	26.3	24.5	14.8	14.7	8.7	8.7
R9	27.6	24.9	15.4	15.3	9.1	9.0
R10	26.3	24.4	14.7	14.6	8.7	8.7
R11	27.2	24.7	15.2	15.1	9.0	8.9
R12	26.1	24.4	14.7	14.7	8.7	8.7
R13	25.6	24.2	14.5	14.4	8.6	8.6
R14	25.5	24.1	14.4	14.4	8.6	8.5

Table 5.4: Predicted Annual Mean Baseline Air Quality (µg/m^3)						
Receptor	NO_2		PM_{10}		$PM_{2.5}$	
	2023	2030	2023	2030	2023	2030
R15	25.0	23.9	14.2	14.2	8.4	8.4
R16	26.3	24.3	14.8	14.7	8.8	8.7
R17	25.6	23.3	15.1	15.0	8.7	8.7
R18	26.9	24.6	15.0	14.9	8.8	8.8
R19	27.7	24.9	15.5	15.4	9.1	9.0
R20	26.5	24.5	14.9	14.8	8.8	8.7

5.4 DEFRA Background Maps

Additional information on estimated background pollutant concentrations has been obtained from the DEFRA 2021 background maps provided on UK-AIR, the Air Quality Information Resource (http://uk-air.defra.gov.uk). Estimated air pollution concentrations for NO_2, PM_{10} and $PM_{2.5}$ have been extracted from the 2021 based background pollution maps for the UK and are set out in Table 5.5.

These maps are available in 1km by 1km grid squares and provide an estimate of concentrations between 2021 and 2030. The average concentrations for the grid squares representing the Site and study area have been extracted from the 2023 base year and 2030 future year.

As detailed in Section 4.3.2 and set out in Appendix C, background NO_2 data has been adjusted to better represent locally monitored concentrations. The NO_2 data set out in Table 5.5 represents the adjusted Defra data using the factors presented in Appendix C.

The data indicates that background concentrations in the study area are expected to be well below the annual mean AQLVs for all three pollutants, however the data indicates annual mean NO_2 and $PM_{2.5}$ concentrations above the WGL, although $PM_{2.5}$ concentrations are below the MO of 10 µg/m^3.

Table 5.4: Annual Mean Background Air Pollution Concentrations from DEFRA Maps						
OS Grid Square	2023			2030		
	NO_2	PM_{10}	$PM_{2.5}$	NO_2	PM_{10}	$PM_{2.5}$
507500, 185500	20.3	14.3	8.1	15.6	13.8	7.6
506500, 179500	24.1	13.8	8.2	19.8	13.2	7.7
506500, 183500	21.3	13.6	8.0	16.7	13.0	7.5
506500, 180500	23.8	13.7	8.2	19.6	13.2	7.7
507500, 180500	22.7	13.3	8.0	18.6	12.7	7.5
505500, 180500	22.7	13.8	8.1	17.9	13.3	7.5

Table 5.4: Annual Mean Background Air Pollution Concentrations from DEFRA Maps						
OS Grid Square	2023			2030		
	NO_2	PM_{10}	$PM_{2.5}$	NO_2	PM_{10}	$PM_{2.5}$
506500, 179500	24.1	13.8	8.2	19.8	13.2	7.7

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6 Construction Impacts

6.1 Road Traffic Impacts

The volume of demolition and construction traffic generated by the proposed development is not known at this stage, however, due to the nature of demolition and construction works there will be a significant fluctuation in the numbers of vehicle movements generated on the surrounding network throughout this phase of the development. When averaged over a year the total daily trips will be significantly lower than peak movements. Furthermore, volumes of demolition and construction traffic generated by the proposed development are anticipated to be lower than trips generated during the operational phase, as this is typically the case for developments of this size and type. This being the case, it is reasonable to expect that impacts associated with emissions from demolition and construction vehicles will be less significant than those detailed in section 7.

It should also be taken into consideration that any potential impacts associated with demolition and construction traffic will be temporary in nature. Furthermore, a Construction Environmental Management Plan (CEMP) will be developed which will include measures to minimise emissions associated with demolition and construction vehicles, thus further reducing any potential impacts.

Taking into consideration the above and based on professional judgment, the impact of emissions associated with demolition and construction traffic is concluded as being negligible and therefore not significant.

6.2 Site and Surroundings

A summary of the proposed development is provided in Section 2 of this report.

The Site covers an area of approximately 9,300 m^2. There are sensitive receptors within 250 m of the Site, therefore, an assessment of impacts on human receptors has been carried out.

Dust emissions from construction activities are unlikely to result in significant impacts on ecologically sensitive receptors beyond 50 m from the site boundary. A review of data held on the DEFRA MAGIC website[35] shows no sites designated as important for wildlife within 50 m of the Site, therefore impacts on ecological receptors have not been considered any further within this assessment.

As discussed in Section 5, PM_{10} concentrations in the vicinity of the Site are expected to be well below the relevant limit value (Table 5.5). The data indicates background concentrations in the region of 13-15µg/m^3. The baseline assessment (Table 5.4) also indicates that PM_{10} concentrations in the vicinity of the Site will remain below 24 µg/m^3.

The precise behaviour of the dust, its residence time in the atmosphere, and the distance it may travel before being deposited would depend upon a number of factors. These include wind direction and strength, local topography and the presence of intervening structures

35 http://magic.defra.gov.uk/

(buildings, etc.) that may intercept dust before it reaches sensitive locations. Furthermore, dust would be naturally suppressed by rainfall.

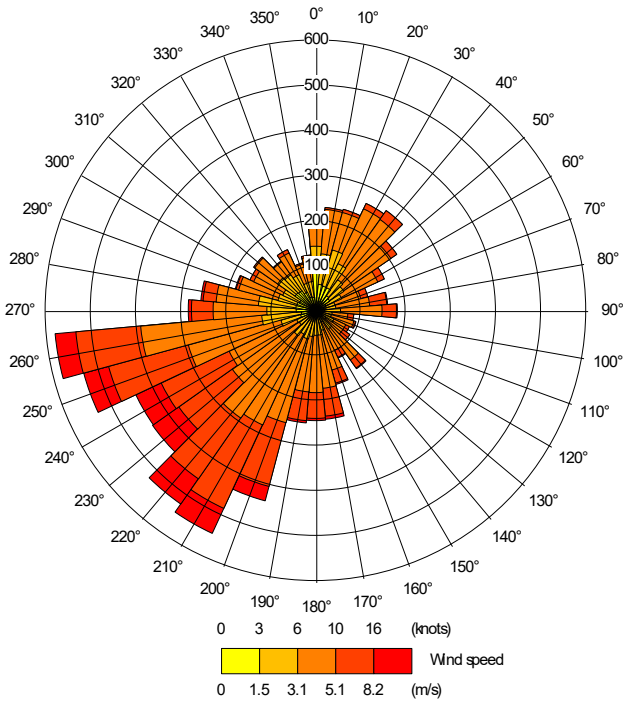


Figure 6.1: Windrose from Heathrow Airport Meteorological Station (2023)

A windrose from the Heathrow Airport Meteorological Station is provided above in Figure 6.1, which shows that the prevailing wind is predominately from the south-west. Areas most consistently affected by dust are those located downwind of an emission source. Therefore, the highest risk of impacts would occur to the north-east of any construction activities. The main land-uses to the north-east of the Site are residential properties which would be of high sensitivity to dust effects, although areas of short-term car parking are considered to be of medium sensitivity.

6.3 Risk Assessment of Dust Impacts

6.3.1 Potential Dust Emission Magnitude

With reference to the criteria detailed in Appendix B, the dust emission magnitude for each of the category's demolition, earthworks, construction and trackout have been determined. These have been summarised in Table 6.1.

Table 6.1: Dust Emission Magnitudes		
Activity	**Criteria**	**Dust Emission Magnitude**
Demolition	Total building volume for demolition is between 15,000-17,000 m^3, the main construction material is brick and concrete and the building height is between 4-6m above ground	**Medium**
Earthworks	Building site area approximately 9,300 m^2, expected 2-3 HDV on site.	**Small**
Construction	Building volume estimated to be 28-30,000 m^3, main construction material concrete and steel,	**Medium**
Trackout	Anticipated to be <20 HDV (>3.5t) movements per day	**Small**

6.3.2 Sensitivity of Area

The sensitivity of the surrounding area takes account of the following factors:

- the specific sensitivities of receptors in the area;
- the proximity and number of those receptors;
- in the case of PM_{10}, the local background concentrations; and
- site-specific factors i.e. whether there are natural shelters such as trees, to reduce the risk of wind-blown dust.

The nearest high sensitivity receptors are residential properties to the north on Aspen Close, approximately 20-30 m from the Site boundary. Based on the number of adjacent receptors and associated separation distances between the construction activities and the nearest receptors, the sensitivity of the surrounding area to dust effects is considered to be 'medium'.

As previously discussed, annual mean PM_{10} concentrations in the vicinity of the Site are not expected to exceed 24 µg/m^3. Based on the proximity of sensitive receptors to the site boundary and the local concentrations of PM_{10} the sensitivity of the surrounding area is considered to be 'low' with regards human health impacts.

In relation to trackout, vehicles travelling to and from the Site will travel along Horton Road either to the east or west of the Site. There are high sensitivity receptors within 250m of the Site access point within 20m of the roadside. The sensitivity of the area to trackout is considered to be 'high'.

A summary of the sensitivity of the area surrounding the Site in relation to each activity is provided below in Table 6.2.

Table 6.2: Summary of Sensitivity of Surrounding Area				
Potential Impact	**Sensitivity of Surrounding Area**			
	Demolition	**Earthworks**	**Construction**	**Trackout**
Dust Soiling	Medium	Medium	Medium	High
Human Health	Low	Low	Low	Low

6.3.3 Defining the Risk of Impacts

The dust emission magnitude as set out in Table 6.1 is combined with the sensitivity of the area (Table 6.2) to determine the risk of both dust soiling and human health impacts, assuming no mitigation measures applied at site. The risk of impacts associated with each activity is provided in Table 6.3 below and shows a medium to high risk of effects on adjacent receptors as a result of the proposals. It is recommended that best practice measures, in line with the IAQM and Mayor of London SPG guidance, are implemented during the construction period to ensure emissions are kept to a minimum and to prevent any significant effects at neighbouring properties. Details of these measures are set out in Appendix I.

Table 6.3: Summary of Risk Effects to Define Site-Specific Mitigation				
Potential Impact	**Sensitivity of Surrounding Area**			
	Demolition	**Earthworks**	**Construction**	**Trackout**
Dust Soiling	Medium Risk	Low Risk	Medium Risk	Low Risk
Human Health	Low Risk	Negligible Risk	Low Risk	Negligible Risk

7 Operational Impacts

7.1 On-site Emissions

The developments heat demand will be entirely met by non-combustible sources such as air source heat pumps (ASHP) and Photo Voltaic (PV) cells. There will be no combustion plant provided on the Site. Emissions associated with the proposed energy strategy will therefore be negligible. The impact of building emissions on local air quality will be 'not significant'.

7.2 Operational Traffic Impacts

7.2.1 Nitrogen Dioxide

Annual mean NO_2 concentrations predicted at the selected existing receptor locations are presented below in Table 7.1 for the 2030 DM and DS scenarios.

The modelling assessment is predicting annual mean NO_2 concentrations below the annual mean AQLV of 40 µg/m^3 at all the selected receptors in the DM and DS scenarios but above the WGL of 10 µg/m^3 at all locations (Table 7.1).

Traffic generated by the operational development is change annual mean NO_2 concentrations by less than 0.1 µg/m^3 at all receptor locations. This equates to a change of less than 0.1 % of the AQLV and less than 0.1% of the WGL. The impact is concluded as being of negligible significance based on the criteria set out in Tables 4.2 and 4.3.

With predicted annual mean concentrations being less than 60 µg/m^3, it is expected that the hourly objective of 200 µg/m^3 will be met at all locations and impacts in terms of short-term NO_2 would be negligible.

Overall, the impact of the operational development on NO_2 is concluded as being **not significant**.

Table 7.2: Predicted Annual Mean NO_2 Concentrations at Existing Receptor (µg/m^3)

Receptor	2030 Do Minimum Base	2030 Do Something	Change due to Proposed Development as a % of AQLV	Change due to Proposed Development as a % of WGL	Significance of Impact
R1	23.8	23.8	0	0	Negligible
R2	22.9	22.9	0	0	Negligible
R3	24.0	24.0	0	0	Negligible
R4	23.7	23.7	0	0	Negligible
R5	23.9	23.9	0	0	Negligible
R6	23.8	23.8	0	0	Negligible
R7	24.0	24.0	0	0	Negligible
R8	24.5	24.5	0	0	Negligible

Table 7.2: Predicted Annual Mean NO_2 Concentrations at Existing Receptor (µg/m^3)					
Receptor	**2030 Do Minimum Base**	**2030 Do Something**	**Change due to Proposed Development as a % of AQLV**	**Change due to Proposed Development as a % of WGL**	**Significance of Impact**
R9	24.9	24.9	0	0	Negligible
R10	24.4	24.4	0	0	Negligible
R11	24.7	24.7	0	0	Negligible
R12	24.4	24.4	0	0	Negligible
R13	24.2	24.2	0	0	Negligible
R14	24.1	24.1	0	0	Negligible
R15	23.9	23.9	0	0	Negligible
R16	24.3	24.3	0	0	Negligible
R17	23.3	23.3	0	0	Negligible
R18	24.6	24.6	0	0	Negligible
R19	24.9	24.9	0	0	Negligible
R20	24.5	24.5	0	0	Negligible
AQLV – 40 µg/m^3, WGL – 10 µg/m^3					

7.2.2 PM_{10} Concentrations

Predicted annual mean PM_{10} concentrations at the selected receptor locations are presented below in Table 7.3 comparing the 2030 DM and DS scenarios.

The ADMS model is predicting annual mean PM_{10} concentrations at less than 75% of the AQLV of 40 µg/m^3 at all receptor locations.

Table 7.3: Predicted Annual Mean PM_{10} Concentrations at Existing Receptor (µg/m^3)				
Receptor	**2030 Do Minimum Base**	**2030 Do Something**	**Change due to Proposed Development as a % of AQLV**	**Significance of Impact**
R1	14.0	14.0	0	Negligible
R2	13.8	13.8	0	Negligible
R3	14.2	14.2	0	Negligible
R4	13.8	13.8	0	Negligible
R5	14.1	14.1	0	Negligible
R6	14.0	14.0	0	Negligible
R7	14.2	14.2	0	Negligible

Table 7.3: Predicted Annual Mean PM_{10} Concentrations at Existing Receptor (µg/m³)				
Receptor	**2030 Do Minimum Base**	**2030 Do Something**	**Change due to Proposed Development as a % of AQLV**	**Significance of Impact**
R8	14.7	14.7	0	Negligible
R9	15.3	15.3	0	Negligible
R10	14.6	14.6	0	Negligible
R11	15.1	15.1	0	Negligible
R12	14.7	14.7	0	Negligible
R13	14.4	14.4	0	Negligible
R14	14.4	14.4	0	Negligible
R15	14.2	14.2	0	Negligible
R16	14.7	14.7	0	Negligible
R17	15.0	15.0	0	Negligible
R18	14.9	14.9	0	Negligible
R19	15.4	15.4	0	Negligible
R20	14.8	14.8	0	Negligible
AQLV – 40 µg/m³				

Traffic generated by the operational development is predicted to change annual mean PM_{10} concentrations by less than 0.1 µg/m³, which equates to less than 0.1% of the AQAL and is classed as a negligible impact based on criteria set out in Table 4.2.

As discussed in section 4.3.2, where annual mean PM_{10} concentrations fall below 32 µg/m³, exceedance of the 24-hour objective is considered unlikely. As annual mean concentrations are below this threshold at all the selected receptors, concentrations are predicted to be meeting the 24-hour objective limit of 50 µg/m³. Impacts on short-term PM_{10} are therefore predicted to be negligible.

Overall, the impact of the operational development scenario on PM_{10} is concluded as being **not significant**.

7.2.3 $PM_{2.5}$ Concentrations

Predicted annual mean $PM_{2.5}$ concentrations at the selected receptor locations are presented below in Table 7.4 for the 2030 DM and DS scenarios.

The ADMS model is predicting annual mean $PM_{2.5}$ concentrations below the annual mean AQLV of 20 µg/m³ and MO of 10 µg/m³ at all receptor locations in both the DM and DS scenarios. However, concentrations are predicted to exceed the WGL of 5 µg/m³ at all locations.

The operational development is predicting a change in annual mean $PM_{2.5}$ concentrations less than 0.1 µg/m^3, which is less than 0.1% of the AQLV, MO and WGL.

Overall, the impact of the operational development is concluded as being **not significant** in relation to $PM_{2.5}$.

Table 7.3: Predicted Annual Mean $PM_{2.5}$ Concentrations at Existing Receptor (µg/m^3)

Receptor	2030 Do Minimum Base	2030 Do Something	Change due to Proposed Development as a % of AQLV	Change due to Proposed Development as a % of MO	Change due to Proposed Development as a % of WGL	Significance of Impact
R1	8.3	8.3	0	0	0	Negligible
R2	8.2	8.2	0	0	0	Negligible
R3	8.4	8.4	0	0	0	Negligible
R4	8.3	8.3	0	0	0	Negligible
R5	8.4	8.4	0	0	0	Negligible
R6	8.4	8.4	0	0	0	Negligible
R7	8.5	8.5	0	0	0	Negligible
R8	8.7	8.7	0	0	0	Negligible
R9	9.0	9.0	0	0	0	Negligible
R10	8.7	8.7	0	0	0	Negligible
R11	8.9	8.9	0	0	0	Negligible
R12	8.7	8.7	0	0	0	Negligible
R13	8.6	8.6	0	0	0	Negligible
R14	8.5	8.5	0	0	0	Negligible
R15	8.4	8.4	0	0	0	Negligible
R16	8.7	8.7	0	0	0	Negligible
R17	8.7	8.7	0	0	0	Negligible
R18	8.8	8.8	0	0	0	Negligible
R19	9.0	9.0	0	0	0	Negligible
R20	8.7	8.7	0	0	0	Negligible
AQLV – 20 µg/m^3, MO – 10 µg/m^3, WGL – 5 µg/m^3						

7.3 Impacts in Terms of Exposure

The proposed development would not introduce any sensitive receptors (i.e. residential, educational or health receptors) to the Site. Due to the transient nature of users of the Site,

the annual mean and 24-hour objective limits do not apply. However, the short-term objective limits such as the 1-hour NO_2 objective are considered relevant to the Site.

The baseline assessment, as set out in Section 5, has shown that annual mean NO_2 concentrations within the study area are currently meeting the annual mean limit of 40 µg/m^3, therefore concentrations are also below the 1-hour limit value of 200 µg/m^3.

The ADMS Roads model was also used to predict NO_2 concentrations at the northern boundary of the Site where concentrations are expected to be highest. The results of the modelling predicted an annual mean concentration in 2030 of 24.2 µg/m^3. As the annual mean is less than 60 µg/m^3 concentrations at the Site are concluded as meeting the 1-hour NO_2 AQLV.

The development would not introduce new employment use to a location of poor air quality, the impact of the proposals in terms of new exposure is therefore negligible.

7.4 Air Quality Neutral

The development proposals have been assessed in accordance with the GLA AQN guidance. The guidance requires developments to be assessed for both transport and building emissions.

Under Policy S1 of the London Plan 2021 all developments in London should be at least AQN.

7.4.1 Building Emissions

The developments heat demand will be entirely met by non-combustible sources such as ASHP and PV. In accordance with the AQN guidance, the development can be excluded from the AQN assessment process and is considered to be AQN in relation to building emissions.

7.4.2 Traffic Emissions

Trip generation data set out in Appendix D shows that the operational development will result in an overall decline in vehicle movements compared to the existing site use. However, the AQN guidance requires the trip generation from a development to be assessed in isolation from any existing trips associated with the Site, taking account of total trips not the 'net' change in trips.

The non-operational annual trips associated with the development have been provided by SLR.

A comparison of the developments annual trip generation for operational staff and visitors is set out in table 7.1 along with the calculated TEB, based on leisure use, which represents a worst-case trip generation from the Site relating to operational trips.

Table 7.4: Comparison of Operational Trip Rate with AQN TEB

Gross Internal Area of Development (m^2)	Proposed Use Class	TEB (trips per annum)	Development no-operational Annual Trip Rate	Difference between TEB and Development Trips
3151	Industrial	20,475	44165	23,690

The total development trip rate exceeds the TEB for industrial use, therefore the development is not considered to be AQN.

7.4.3 Damage Cost Calculation

Due to the non-operational trips associated with the development exceeding the TEB, in accordance with the requirements of the LBH air quality action plan a damage cost calculation has been carried out. LBH require the damage cost to be calculated using total trips as opposed to just non-occupational trips, as is stipulated in the AQN guidance.

The assessment is based on an operational daily trip rate of 229 vehicles, which equates to an annual trip generation of 83,585, of which 25% would be HGVs. The assessment has therefore used the following input data within the EFT_v13 to calculate the emissions for the site:

- Emission Assessment year – 2030 - 2059
- Trip rate - 229 AADT;
- 16.6% HGV;
- 56kph speed;
- trip length - 10 km (NTS UK average taken from National Travel Survey).

EFT_v13 only provides emissions data up to 2025. Therefore, calculated emissions for the years 2051 to 2059 are based on the 2050 emissions data.

The emissions of both NO_x and $PM_{2.5}$ have been used within the Defra Damage Cost Appraisal Toolkit to calculate the damage cost for the operational development. The outputs from the EFT and Damage Cost Appraisal Toolkit are set out in Table 7.5and a copy of the Damage Cost spreadsheets are provided in Appendix J.

A number of mitigation measures will be incorporated within the scheme design aimed at reducing emissions and operational trips which will include a site specific Travel Plan (TP).

LBH apply discounts to the damage costs based on mitigation measures being proposed over and above policy requirements. In terms of the application of a TP, a 5-10% discount can be applied. An updated damage cost has been provided in Table 7.5 applying a 5% reduction based on the provision of the TP.

Any further reductions would need to be discussed and agreed with LBH as part of any planning conditions.

Table 7.5: Calculate Damage Costs for Operational Development

Pollutant	Assessment year	Emissions (tonnes per year) between 2025 and 2054	Damage Cost over 10 Years	Total Damage Cost without Mitigation	Total Damage Cost with 10% Reduction Applied for TP
NO_x	2030	0.00018 – 0.06189	£11,759	£114,654	£108,922
$PM_{2.5}$	2030	0.0172 – 0.0187	£102,895		

8 Mitigation Statement

8.1 Construction Phase

The control of dust emissions from construction site activities relies upon management provisions and mitigation techniques to reduce emissions of dust and limit dispersion. Where dust emission controls have been used effectively, large-scale operations have been successfully undertaken without impacts to nearby properties.

The proposed development has been identified as a medium risk for dust soiling effects during all phases of construction. For human health, the impact is considered to be medium risk during demolition and low risk during the remaining phases, as set out in Table 6.3.

To ensure that emissions are kept to a minimum and no adverse effects are experienced by nearby sensitive receptors it is recommended that best practice measures in accordance with the IAQM and Mayor of London's SPG, as detailed in Appendix I, are implemented at the Site by way of a dust management plan (DMP).

Following implementation of an appropriate DMP emissions will be sufficiently reduced and impacts will be negligible.

8.2 Operational Phase

The assessment of operational impacts has shown that traffic generated by the operational development will have a negligible impact on local air quality. However, the development has been shown to exceed the AQN benchmarks for vehicle emissions. To mitigation transport emissions the following measures will be included within the scheme design:

- Site Specific Travel Plan setting out measures to encourage more sustainable travel and reduce single occupancy trips.
- 7no. Electric Vehicle (EV) charging points (22% of parking spaces based on total parking provision of 32 spaces) – this is above policy requirements which require a minimum of 20% of spaces with EV charging.
- 16.no secure and covered cycle parking spaces.
- Dedicated pedestrian route linking both units to Horton Road.

In addition to the above the following measures are also being considered for inclusion in the scheme which would contribute to a reduction in traffic-related emissions:

- E-bike charging.
- Cargo bike parking.
- Encourage the use of e-cargo bikes, specifically for deliveries during the network peak hours.
- Encourage the use of electric delivery vehicles for last mile deliveries.
- Liaise with neighbouring land users on abnormal delivery schedules to reduce potential conflict during peak delivery times.
- Require all suppliers to be FORS accredited.
- Provide loading/unloading procedure to suppliers ahead of arrival to reduce dwell times on arrival and departure.
- Consolidate deliveries where possible to reduce overall number of deliveries.

As detailed in Section 7.4.3, a damage cost of £108,922 has been calculated which represents the potential off-setting payment that would need to be paid to LBH towards implementation of the LBH Air Quality Action Plan. However, further discounts may be applied to this following discussions with LBH based on the proposed mitigation measures being provided.

9 Conclusion

It is inevitable that with any development, demolition and construction activities will 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. 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 μgm^{-3}.

The IAQM guidance on assessing impacts on air quality from construction activities and determining the likely significance has been used to determine the risk of impacts occurring during the construction of the development and to identify appropriate mitigation measures to be implemented on site to reduce dust emissions and associated impacts.

The Site is considered to have a medium risk of impacts with regards to dust soiling and PM_{10} concentrations. However, following the implementation of best practice mitigation measures in accordance with the IAQM and Mayor of London's SPG, emissions will be adequately controlled, and overall impacts will be negligible.

A review of local monitoring data and predicted baseline air quality has found that concentrations of NO_2, PM_{10} and $PM_{2.5}$ are below the relevant short-term UK AQLV across the Site. The Site is therefore considered suitable for employment use and impacts in terms of new exposure would be negligible.

The baseline assessment has shown that although NO_2, PM_{10} and $PM_{2.5}$ concentrations within the study area are meeting the UK AQLV, they are exceeding the annual mean WHO Guideline levels for NO_2 and $PM_{2.5}$ and Mayoral Objective for $PM_{2.5}$. However, the assessment of operational traffic has predicted a negligible impact on local air quality as a result of operational vehicle emissions.

The Air Quality Neutral assessment has concluded that although the proposed development will be air quality neutral in terms of building emissions, operational trips will exceed the AQN Transport Benchmark. In accordance with the LBH Air Quality Action Plan, a damage cost of £114, 654 has been calculated. A 5% discount has been applied due to the provision of a site specific Travel Plan giving a total damage cost of £108,922 which represents the maximum off-setting payment to be paid to LBH towards implementing the LBH Air Quality Action Plan and mitigate the impact of the development on local air quality. However, the following additional mitigation measures will also be incorporated into the scheme:

- Site Specific Travel Plan setting out measures to encourage more sustainable travel and reduce single occupancy trips.
- 7no. Electric Vehicle (EV) charging points (22% of parking spaces based on total parking provision of 32 spaces) – this is above policy requirements which require a minimum of 20% of spaces with EV charging.
- 16.no secure and covered cycle parking spaces.
- Dedicated pedestrian route linking both units to Horton Road.

In addition to the above the following measures are also being considered for inclusion in the scheme which would contribute to a reduction in traffic-related emissions:

- E-bike charging.

- Cargo bike parking.
- Encourage the use of e-cargo bikes, specifically for deliveries during the network peak hours.
- Encourage the use of electric delivery vehicles for last mile deliveries.
- Liaise with neighbouring land users on abnormal delivery schedules to reduce potential conflict during peak delivery times.
- Require all suppliers to be FORS accredited.
- Provide loading/unloading procedure to suppliers ahead of arrival to reduce dwell times on arrival and departure.
- Consolidate deliveries where possible to reduce overall number of deliveries.

Further discounts to the damage cost may be applied following discussion with LBH based on the proposed mitigation measures.

Appendix A – Air Quality Terminology

Term	Definition
Accuracy	A measure of how well a set of data fits the true value.
Air quality objective	Policy target generally expressed as a maximum ambient concentration to be achieved, either without exception or with a permitted number of exceedances within a specific timescale (see also air quality standard).
Air quality standard	The concentrations of pollutants in the atmosphere which can broadly be taken to achieve a certain level of environmental quality. The standards are based on the assessment of the effects of each pollutant on human health including the effects on sensitive sub groups (see also air quality objective).
Ambient air	Outdoor air in the troposphere, excluding workplace air.
Annual mean	The average (mean) of the concentrations measured for each pollutant for one year. Usually this is for a calendar year, but some species are reported for the period April to March, known as a pollution year. This period avoids splitting winter season between 2 years, which is useful for pollutants that have higher concentrations during the winter months.
AQMA	Air Quality Management Area.
DEFRA	Department for Environment, Food and Rural Affairs.
Exceedance	A period of time where the concentrations of a pollutant is greater than, or equal to, the appropriate air quality standard.
Fugitive emissions	Emissions arising from the passage of vehicles that do not arise from the exhaust system.
LAQM	Local Air Quality Management.
NO	Nitrogen monoxide, a.k.a. nitric oxide.
NO_2	Nitrogen dioxide.
NO_x	Nitrogen oxides.
O_3	Ozone.
Percentile	The percentage of results below a given value.
PM_{10}	Particulate matter with an aerodynamic diameter of less than 10 micrometres.
Ratification (Monitoring)	Involves a critical review of all information relating to a data set, in order to amend or reject the data. When the data have been ratified they represent the final data to be used (see also validation).
μgm^{-3} micrograms per cubic metre	A measure of concentration in terms of mass per unit volume. A concentration of 1ug/m^3 means that one cubic metre of air contains one microgram (millionth of a gram) of pollutant.
UKAS	United Kingdom Accreditation Service.
Uncertainty	A measure, associated with the result of a measurement, which characterizes the range of values within which the true value is expected to lie. Uncertainty is usually expressed as the range within which the true value is expected to lie with a 95% probability, where standard statistical and other procedures have been used to evaluate this figure. Uncertainty is more clearly defined than the closely related parameter 'accuracy', and has replaced it on recent European legislation.
USA	Updating and Screening Assessment.
Validation (modelling)	Refers to the general comparison of modelled results against monitoring data carried out by model developers.
Validation (monitoring)	Screening monitoring data by visual examination to check for spurious and unusual measurements (see also ratification).
Verification (modelling)	Comparison of modelled results versus any local monitoring data at relevant locations.

Appendix B – Construction Impact Assessment Procedure

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-leveling, 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

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 >75,000m^3, potentially dusty construction material (e.g. concrete), on site crushing and screening, demolition activities >12m above ground level;
- Medium: Total building volume 12,000-75,000m^3, potentially dusty construction material demolition activities 6-12m above ground level;
- Small: Total building volume <12,000m^3, construction material with low potential for dust release (e.g. metal cladding or timber), demolition activities <6m 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 >110,000m^2, potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size), >10 heavy earth moving vehicles active at any one time, formation of bunds >6m in height;
- Medium: Total site area 18,000-110,000m^2, moderately dusty soil (e.g. silt)< 5-10 heavy earth moving vehicles active at any one time, formation of bunds 3m-6m in height; and
- Small: Total site area <18,000m^2, soil type with large grain size (e.g. sand), <5 heavy earth moving vehicles active at any one time, formation of bunds <4m in height, earthworks during wetter months.

Construction: The important issues here 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 >75,000m^2, on site concrete batching, sandblasting;
- Medium: Total site area 18,000-110,000m^2, moderately dusty soil (e.g. silt)< 5-10 heavy earth moving vehicles active at any one time, formation of bunds 3m-6m in height; and

- Small: Total site area <18,000m^2, soil type with large grain size (e.g. sand), <5 heavy earth moving vehicles active at any one time, formation of bunds <4m in height, earthworks during wetter months.

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 trackout. The categories are:

- Large:>50 HDV (>3.5t) outward movements in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length >100;
- Medium: 20-50 HDV (>3.5t) outward movements in any one day, moderately dusty surface material (e.g. high clay content, unpaved road length 50-100m;
- Small: <20 HDV (>3.5t) outward movements in any one day, surface material with low potential for dust release, unpaved road length >50.

Step 2B: Defining the Sensitivity of the Area

The sensitivity of the area is defined for dust soiling, human health (PM_{10}) 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 PM_{10}, 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 B1 is used to define the sensitivity of different types of receptors to dust soiling, health effects and ecological effects.

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 B2 to B4 indicate the criteria used to determine the sensitivity of the area to dust soiling, human health and ecological impacts.

Table B1: 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 20 m of site. Local PM_{10} concentrations close to the objective (e.g. annual mean 36 -40 µg/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 20 m. Local PM_{10} concentrations below the objective (e.g. annual mean 30-36 µg/m^3). E.g. office and shop workers but will 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.
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 20 m. Local PM_{10} 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.

Table B2: Sensitivity of the Area to Dust Soiling on People and Property					
Receptor Sensitivity	**Number of Receptors**	**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 B3: Sensitivity of the Area to Human Health Impacts							
Receptor Sensitivity	**Annual Mean PM_{10} Concentration**	**Number of Receptors**	**Distance from Source (m)**				
			<20	**<50**	**<100**	**<200**	**<350**
High	>32 µg/m^3	>100	High	High	High	Medium	Low
		10-100	High	High	Medium	Low	Low
		1-10	High	Medium	Low	Low	Low
	28-32 µg/m^3	>100	High	High	Medium	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	High	Medium	Low	Low	Low
	24-28 µg/m^3	>100	High	Medium	Low	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	<24 µg/m^3	>100	Medium	Low	Low	Low	Low
		10-100	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Medium	>32 µg/m^3	>10	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	28-32 µg/m^3	>10	Medium	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	24-28 µg/m^3	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	<24 µg/m^3	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Low	-	>1	Low	Low	Low	Low	Low

Table B4: 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

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 B5 to B7 indicate the method used to assign the level of risk for each construction activity. The identified level of risk is then used to determine measures for inclusion within a site-specific Construction Management Plan (CMP) aimed at reducing dust emissions and hence reducing the impact of the construction phase on nearby receptors. The mitigation measures are drawn from detailed mitigation set out within the IAQM guidance document.

Table B5: 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	Medium Risk	Low Risk	Negligible

Table B6: 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 B7: 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 C – Calibration of Defra Background Data

To ensure that annual mean background concentrations used in the assessment reflect real-world concentrations as accurately as possible a calibration exercise has been carried out. 2023 monitored data measured at local background monitoring sites HILL19, HILL20 and HIL London Hillingdon has been compared against predicted Defra background data at the same locations to provide a calibration factor.

The calculation of the calibration factor is shown in Table C1.

Table C1: Calibration of Background NO_2 Concentrations

Parameter	HILL19	HILL21	HIL
Measured Concentration (µg/m^3)	26.2	24.2	25.0
Data Capture (%)	75	93	93
Mapped Concentration (µg/m^3)	16.7	17.8	18.7
Calibration Factor	1.57	1.38	1.34
Average Factor	**1.43**		

Comparison of the measures and mapped data shows that the monitored concentrations are on average higher than the Defra data suggests. The adjusted Defra mapped background concentrations for the study area have therefore been used within the assessment.

Comparison of PM_{10} and $PM_{2.5}$ measured at the HIL London Hillingdon site shows that the mapped Defra data is higher. No adjustment has therefore been applied to the Defra background data used in the assessment.

Appendix D– Traffic Data used in Modelling Assessment

Table D1: AADT traffic Flows used in ADMS Modelling Assessment									
Link No.	Road Link	Source of Data	Speed (kph)	2023 Base		2030 DM		2030 DS	
				AADT	%HDV	AADT	%HDV	AADT	%HDV
1	Horton Road west of Site Access	SLR Transport Consultants	35 (25 at junctions)	6725	14.2	7144	14.2	7105	14.3
2	Horton Road East of Site Access	SLR Transport Consultants	35 (25 at junctions)	6725	14.2	7144	14.2	7041	14.5
3	High Street – North of Horton Road	SLR Transport Consultants	35 (25 at junctions)	15614	11.0	16587	11.0	16569	11.0
4	High Street – South of Horton Road	SLR Transport Consultants	35 (25 at junctions)	20625	5.5	21910	5.5	21894	5.5
5	Station Road – south of Potters Way	SLR Transport Consultants	35 (25 at junctions)	17527	10.4	18854	10.4	18849	10.4
6	Uxbridge Road/Hillingdon Road – A4020	DfT 28118	Range 25-56	20754	3.3	-	-	-	-
7	A437 Harlington Road	DfT 37193	48 (35 at junction)	16923	3.7	-	-	-	-
8	Hillingdon Road – west of St Andrews Underpass	DfT 27092	48 (35 at junction)	22430	8.4	-	-	-	-
9	B483 Park Road	DfT 942661	48 (35 at junction)	27610	3.2	-	-	-	-
10	Potters Way/Kingston Lane	DfT TRA0302 – minor road London	35 (25 at junction)	3000	1.0	-	-	-	-

Appendix E– Verification and Adjustment of Modelled Concentrations

Most nitrogen dioxide (NO_2) is produced in the atmosphere by reaction of nitric oxide (NO) with ozone. It is therefore most appropriate to verify the model in terms of primary pollutant emissions.

Verification of concentrations predicted by the ADMS model has followed the methodology presented in LAQM.TG(22).

Verification of the model results has been carried out against local monitoring sites HILL04 (Uxbridge Road), HILL20 (Potters Way) and HILL24 (Hillingdon Road).

The model has predicted NO_x concentrations at the three monitoring sites during 2023.

The model output of road-NO_x (i.e. the component of total NO_x coming from road traffic) has been compared with the 'measured' road-NO_x (Figure E1). The 'measured' road NO_x has been calculated from the measured NO_2 concentrations by using the DEFRA NO_x from NO_2 calculator available on the UK-AIR website.

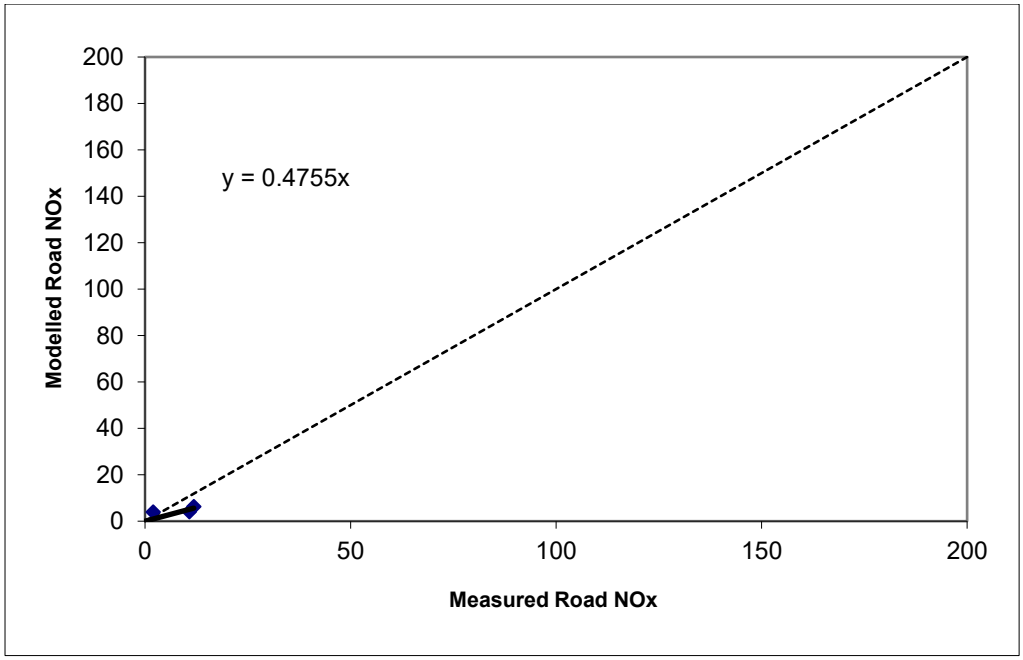


Figure E1: Comparison of Modelled Road NO_x with Measured Road NO_x

Figure E1 shows that the ADMS model is under-predicting the road-NO_x concentrations at sites HILL20 and HILL24 but over predicting at site HIL04. An adjustment factor has been determined to reduce the level of under/over prediction at the sites, bringing the predicted concentrations to within 15% of monitored concentrations with a bias towards over predicting to ensure a cautious prediction of pollution concentrations.

The adjustment factor has been determined as the ratio between the measured road-NO_x contribution and the modelled road-NO_x contribution, forced through zero (1/0.4755 = 2.10). This factor has been applied to the modelled road-NO_x concentration for each location to provide an adjusted modelled road-NO_x concentration.

The annual mean road-NO_2 concentration was determined using the DEFRA NO_x:NO_2 spread sheet calculation tool and added to the background NO_2 concentration to produce a total adjusted NO_2 concentration.

Figure E2 shows the adjusted modelled total NO_2 vs monitored NO_2. There is good agreement, but the best fit line forced through zero still has a slight departure from a 1:1 line, thus a secondary adjustment factor, to be applied to the adjusted modelled total NO_2, was calculated (1/1.0221=0.978).

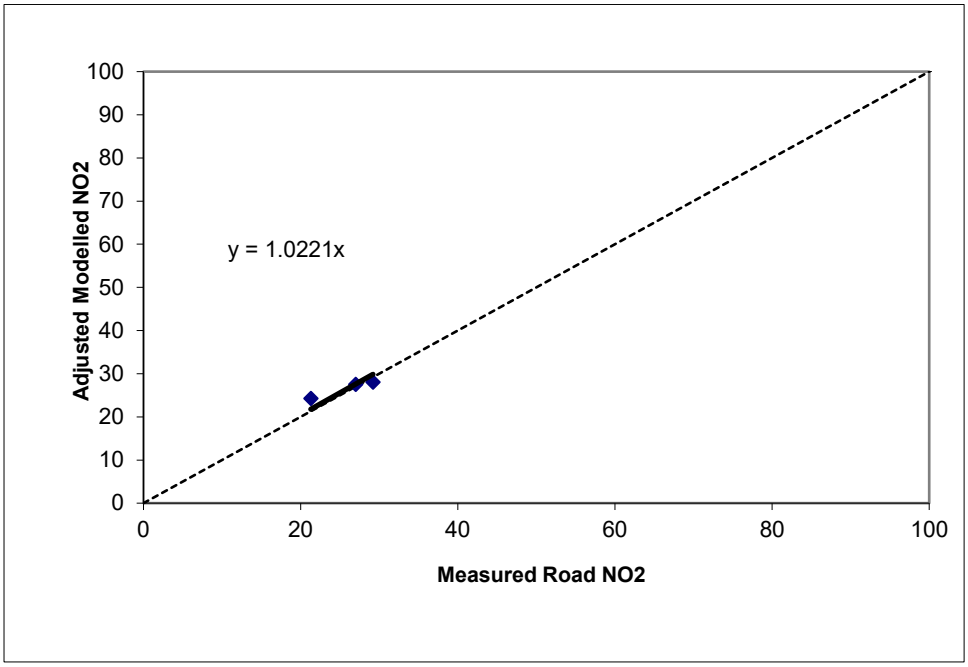


Figure E2: Comparison of Modelled NO_2 with Measured NO_x

After carrying out an initial adjustment there was a need for only a very small secondary adjustment of NO_2. The final adjustment modelled values are shown in Figure E3 and are within 15% of monitored concentrations.

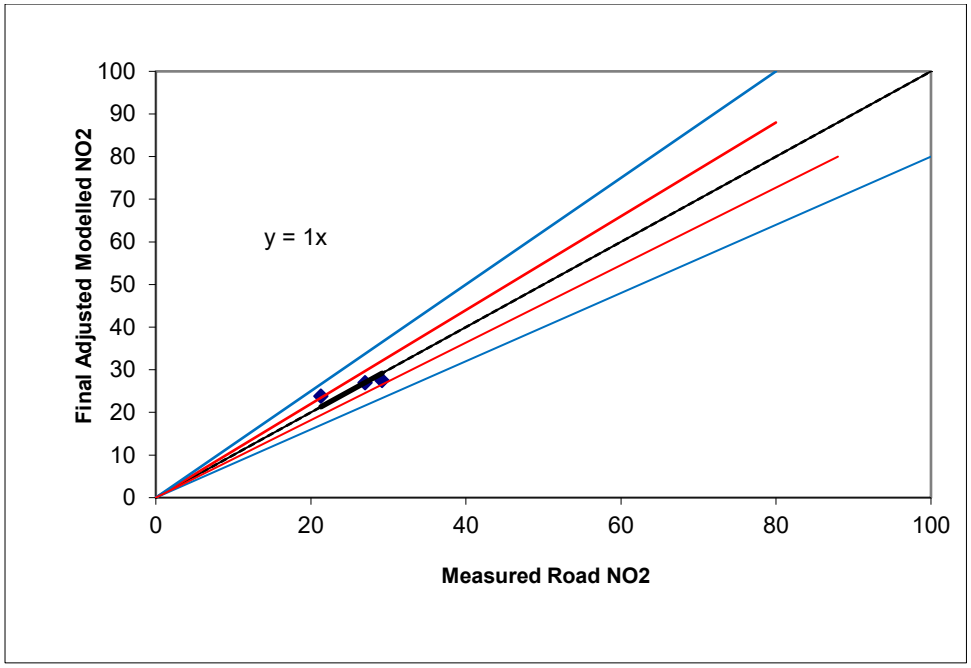


Figure E3: Comparison of Adjusted Modelled NO_2 with Measured NO_x

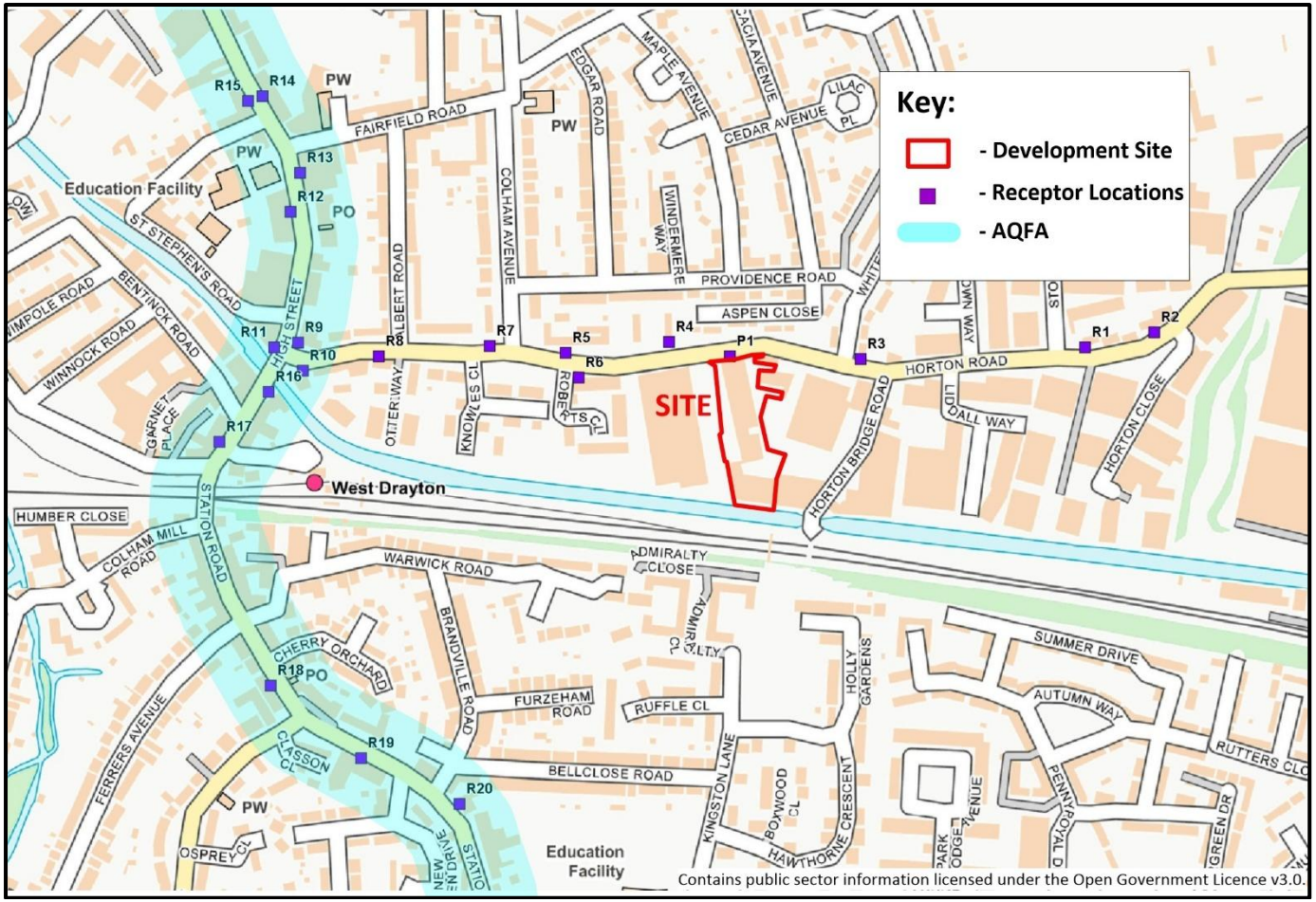
Further review of the verification process was undertaken to determine the uncertainty of the model results and subsequent adjusted model results. The Root Mean Square Error (RMSE) was calculated for both the unadjusted and adjusted model results. LAQM.TG(22) recommends that the RMSE should be within 10% of the air quality objective, which equates to 4 µg/m^3 for NO_2.

The RMSE of the unadjusted results was calculated as 2.5 µg/m^3 reducing to 1.7 µg/m^3 following adjustment of the results.

The adjustment factor of 2.10 has been applied to the modelled NO_x-road concentrations predicted at each receptor location. The predicted NO_2-road concentrations, calculated using the NO_x-NO_2 converter tool, have subsequently been added to background NO_2 and adjusted by 0.978 to provide the final predicted annual mean NO_2 concentrations at each receptor.

As there is no monitoring of PM data to allow verification of the PM results, these factors have also been used to adjust the predicted PM_{10} and $PM_{2.5}$ concentrations in accordance with guidance set out in LAQM.TG(22).

Appendix F – Receptors used in ADMS Modelling



Appendix G- Air Quality Neutral Assessment Methodology

Building Emissions Benchmark (BEB)

The BEB is defined in grams of NO_x emitted per m^2 of floor spaces per year ($gNOx/m^2/annum$).

The AQN guidance sets out benchmark NO_x emission rates for different land uses as detailed in Table G1.

Table G1: BEB NOx Emission rates ($gNO_x/m^2/annum$)

Land Use	Individual Gas Boilers	Gas Boiler Network	CHP +Gas Boiler Network	Heat Pumps + gas Boiler Network
Residential	3.5	5.7	7.8	5.7
Retail	0.53	0.97	4.31	0.97
Restaurants and Bars	1.76	3.23	14.34	3.23
Offices	1.43	2.62	11.68	2.62
Industrial	1.07	1.95	8.73	1.95
Storage and distribution	0.55	1.01	4.50	1.01
Hotels	9.47	15.42	38.16	15.42
Care Homes and Hospitals	9.15	14.90	36.86	14.90
Schools, nurseries, doctors surgeries	0.90	1.66	7.39	1.66
Assembly and leisure	2.62	4.84	21.53	4.84

The BEB is calculated using the following calculation:

GIA (m^2) x benchmark NO_x emissions rate ($gNO_x/m^2/yr$) = total BEB (gNO_x/yr)

The building emissions associated with the proposed development are then calculated and compared with the BEB using the following formula:

Building energy use (kWh/yr) x NO_x emission rate (mg/kWh) = total NO_x building emissions (mg/yr)

Where it is not possible to identify a specific unit being installed and therefore the associated NO_x emission rate the generic emission rates set out in Table G2 can be used.

Table G2: Generic Emission rates for Combustion Technologies	
Technology Type	**NOx Emission Rate**
Gas Boiler	40 mg/kWh
Gas engine with SCR	25 mg/Nm^3
Heat pump	0

Transport Emissions Benchmark (TEB)

The TEB is calculated as the number of single trips per m^2 of floorspace (GIA) over a year (trips/m^2/year) for non-residential use, or the anticipated number of single trips per dwelling (trips/dwelling/year) for residential use.

An outward and return journey to and from a location therefore counts as two trips.

Trip rate benchmarks are based on data from the Trip Rate Information Computer System (TRICS) and are defined for different land uses and different areas of London. These are set out in Table G3.

Table G3: BEB NOx Emission rates (gNO$_x$/m^2/annum)				
Land Use	**Annual Trips per**	**Central Activities Zone (CAZ)**	**Inner London (excluding CAZ)**	**Outer London**
Residential	Dwelling	68	114	447
Offices/light industrial	m^3 (GIA)	2	1	16
Retail (superstore)	m^3 (GIA)	39	73	216
Retail (convenience)	m^3 (GIA)	18	139	274
Restaurants and Cafes	m^3 (GIA)	64	137	170
Drinking Establishments	m^3 (GIA)	0.8	8	N/A
Hot Food Takeaway	m^3 (GIA)	0	32.4	590
Industrial	m^3 (GIA)	0	5.6	6.5
Storage and distribution	m^3 (GIA)	0	5.5	6.5
Hotels	m^3 (GIA)	1.0	1.4	6.9

Table G3: BEB NOx Emission rates (gNO_x/m^2/annum)				
Land Use	**Annual Trips per**	**Central Activities Zone (CAZ)**	**Inner London (excluding CAZ)**	**Outer London**
Care Homes and Hospitals	m^3 (GIA)	0	1.1	19.5
Schools, nurseries, doctors surgeries	m^3 (GIA)	0.1	30.3	44.4
Assembly and leisure	m^3 (GIA)	3.6	10.5	47.2

The TEB is calculated based on car or light van trips undertaken directly by development occupiers (residents, businesses etc and staff/customers). The TEB does not include 'operational' trips generated by the development (i.e. taxi, deliveries, servicing and HGV movements from non-occupiers).

The TEB is calculated using the following formula:

GIA (m^2)/no. of dwellings x benchmark trip rate = total TEB (trips/yr)

The calculated trip rate is compared to the development annual trip rate calculated as part of the transport assessment for the development, but excluding operational trips.

Mitigation and Off-setting

The guidance states that '*the AQN benchmarks have been calculated to be achievable and designed to be consistent with the energy and transport policies of the London Plan'*.

Where the AQN assessment shows that the development fails to meet one or both of the benchmarks, details of the development should be amended to meet the benchmarks as a first step. This could include changes to the energy or transport strategies, or changes to the overall design of the development.

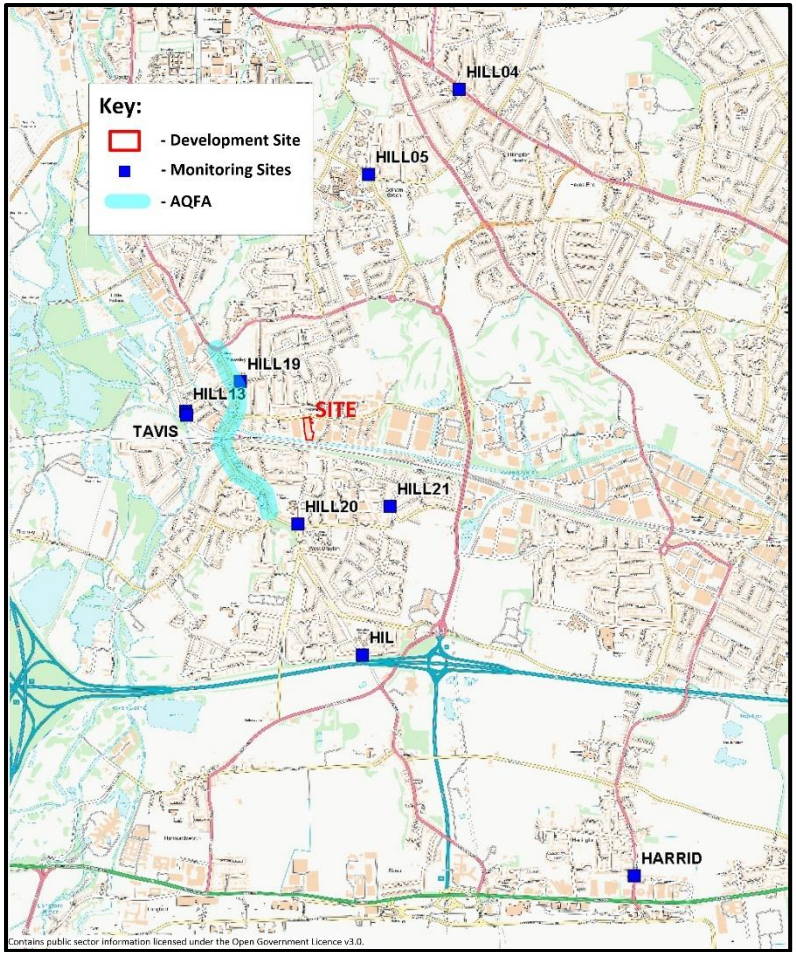
Where the development is still unable to meet the benchmarks, the next step is to agree with the Local Authority to secure on- or off-site measures. However, it is often the case that appropriate mitigation measures cannot be agreed with the Council until such time as planning permission has been granted and the impact of any measures discussed in detail with relevant LA officers to agree the extent by which they will reduce emissions and will be suitable for the site location.

If it is not possible to identify or agree appropriate mitigation measures then the guidance recommends the calculation of an off-setting payment, which can be used to contribute to implementing the Councils air quality action plan measures.

In some instances, the Council may request that an off-setting amount is calculated as part of the AQN assessment prior to agreeing mitigation, with the total amount being discounted in accordance with agreed specific measure. However, this often can not be agreed until planning permission has been granted and such discussions can be had with the relevant LA officers to agree the impact of any mitigation.

In accordance with the LBH Air Quality Action Plan an indicative off-setting amount has been calculated using the DEFRA Damage Cost approach.

Appendix H – Local Monitoring Sites



Appendix I - Construction Mitigation Measures

It is recommended that the measures set out below are incorporated into a DMP and approved by LBE prior to commencement of any work on site:

Essential Measures

- develop and implement a stakeholder communications plan that includes community engagement before work commences on site.
- 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 details;
- develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the LA. The level of detail will depend on the risk and should include as a minimum the essential measures in this document;
- record all dust and air quality 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;
- 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;
- carry out regular site inspections to monitor compliance with the DMP, record inspection results and make inspection log available to LBTH when asked;
- increase frequency of site inspection by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged periods of dry or windy conditions;
- plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible;
- erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles;
- fully enclose site or specific operations where there is a high potential for dust production and the site is active 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 as detailed below;
- cover, seed or fence stockpiles to prevent wind whipping;
- ensure all on-road vehicles comply with the requirements of the London Low Emissions Zone and the London NRMM standards, where applicable;
- 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 batter powered equipment where practicable;

- 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 non-potable water where possible and appropriate;
- 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 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 equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonable practicable after the event using wet cleaning methods;
- avoid bonfires and burning of waste materials;
- ensure effective water suppression is used during demolition operations. Hand held sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground;
- avoid explosive blasting, using appropriate manual and mechanical alternatives;
- bag and remove any biological debris or damp down such material before demolition;
- use water-assisted dust sweepers on the access and local roads, to remove, as necessary, any material tracked out of the site;
- avoid dry sweeping of large areas;
- ensure vehicles entering and leaving the site are covered to prevent escape of materials during transport;
- inspect on-site haul routes for integrity and instigate necessary repairs to the surfaces as soon as reasonably practicable;
- record all inspections of haul routes, which are regularly damped down with fixed or mobile sprinklers, or mobile water bowsers and regularly cleaned.
- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable);
- Ensure there is an adequate area of hard surfaced road between the wheel washing facility and the site exit, where site size and layout permits.

Desirable Measures

- implement a Travel Plan that supports and encourages sustainable travel;
- undertake daily on-site and off-site inspection, where receptors (including roads_ are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100 m of the site boundary wit cleaning to be provided if necessary;
- soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust);

- re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable;
- Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable;
- avoid scabbling if possible;
- 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 materials and overfilling during delivery;
- for smaller supplies of fine powder materials ensure bags are sealed after use and stored appropriately to prevent dust.

Appendix J - Damage Cost Spreadsheets

NOx Road Transport Outer London

Year	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059
Reduction in emissions (tonnes)	0.06189	0.0532	0.0454	0.0369	0.0311	0.0254	0.0226	0.0198	0.0172	0.0148	0.0127	0.0109	0.0094	0.00787	0.00641	0.00495	0.00377	0.00287	0.00197	0.00108	0.00018	0.00018	0.00018	0.00018	0.00018	0.00018	0.00018	0.00018	0.00018	0.00018
Central Damage Costs (£)	32152	32152	32152	32152	32152	32152	32152	32152	32152	32152	32152	32152	32152	32152	32152	32152	32152	32152	32152	32152	32152	32152	32152	32152	32152	32152	32152	32152	32152	32152
Central Benefit (£)	1990	1710	1460	1186	1000	817	727	637	553	476	408	350	302	253	206	159	121	92	63	35	6	6	6	6	6	6	6	6	6	6
Discounted Central Benefit (£)	1990	1685	1417	1135	942	758	665	574	491	416	352	298	253	209	167	127	96	72	48	26	4	4	4	4	4	4	4	4	4	4
Central Present Value	**£11,759**																													
Low Sensitivity Damage Costs (£)	4113	4113	4113	4113	4113	4113	4113	4113	4113	4113	4113	4113	4113	4113	4113	4113	4113	4113	4113	4113	4113	4113	4113	4113	4113	4113	4113	4113	4113	4113
Low Sensitivity Benefit (£)	255	219	187	152	128	104	93	81	71	61	52	45	39	32	26	20	16	12	8	4	1	1	1	1	1	1	1	1	1	1
Discounted Low Sensitivity Benefit (£)	255	216	181	145	121	97	85	73	63	53	45	38	32	27	21	16	12	9	6	3	1	1	1	1	1	1	1	0	0	0
Low Sensitivity Present Value	**£1,504**																													
High Sensitivity Damage Costs (£)	129841	129841	129841	129841	129841	129841	129841	129841	129841	129841	129841	129841	129841	129841	129841	129841	129841	129841	129841	129841	129841	129841	129841	129841	129841	129841	129841	129841	129841	129841
High Sensitivity Benefit (£)	8036	6908	5895	4791	4038	3298	2934	2571	2233	1922	1649	1415	1221	1022	832	643	490	373	256	140	23	23	23	23	23	23	23	23	23	23
Discounted High Sensitivity Benefit (£)	8036	6805	5722	4582	3805	3061	2684	2316	1982	1681	1421	1201	1021	842	676	514	386	289	196	106	17	17	17	17	16	16	16	16	15	15
High Sensitivity Present Value	**£47,488**																													

PM2.5 Road Transport Outer London

Year	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059
Reduction in emissions (tonnes)	0.01870	0.01850	0.01836	0.01821	0.01810	0.01790	0.01780	0.01770	0.01760	0.01760	0.01750	0.01750	0.01740	0.01740	0.01730	0.01730	0.01730	0.01730	0.01720	0.01720	0.01720	0.01720	0.01720	0.01720	0.01720	0.01720	0.01720	0.01720	0.01720	0.01720
Central Damage Costs (£)	240126	240126	240126	240126	240126	240126	240126	240126	240126	240126	240126	240126	240126	240126	240126	240126	240126	240126	240126	240126	240126	240126	240126	240126	240126	240126	240126	240126	240126	240126
Central Benefit (£)	4490	4442	4409	4373	4346	4298	4274	4250	4226	4226	4202	4202	4178	4178	4154	4154	4154	4154	4130	4130	4130	4130	4130	4130	4130	4130	4130	4130	4130	4130
Discounted Central Benefit (£)	4490	4377	4279	4182	4095	3990	3909	3830	3752	3696	3621	3567	3495	3443	3373	3323	3274	3225	3159	3113	3067	3021	2977	2933	2889	2847	2804	2763	2722	2682
Central Present Value	**£102,895**																													
Low Sensitivity Damage Costs (£)	95233	95233	95233	95233	95233	95233	95233	95233	95233	95233	95233	95233	95233	95233	95233	95233	95233	95233	95233	95233	95233	95233	95233	95233	95233	95233	95233	95233	95233	95233
Low Sensitivity Benefit (£)	1781	1762	1748	1734	1724	1705	1695	1686	1676	1676	1667	1667	1657	1657	1648	1648	1648	1648	1638	1638	1638	1638	1638	1638	1638	1638	1638	1638	1638	1638
Discounted Low Sensitivity Benefit (£)	1781	1736	1697	1658	1624	1582	1550	1519	1488	1466	1436	1415	1386	1365	1338	1318	1298	1279	1253	1234	1216	1198	1180	1163	1146	1129	1112	1096	1080	1064
Low Sensitivity Present Value	**£40,808**																													
High Sensitivity Damage Costs (£)	689211	689211	689211	689211	689211	689211	689211	689211	689211	689211	689211	689211	689211	689211	689211	689211	689211	689211	689211	689211	689211	689211	689211	689211	689211	689211	689211	689211	689211	689211
High Sensitivity Benefit (£)	12888	12750	12654	12551	12475	12337	12268	12199	12130	12130	12061	12061	11992	11992	11923	11923	11923	11923	11854	11854	11854	11854	11854	11854	11854	11854	11854	11854	11854	11854
Discounted High Sensitivity Benefit (£)	12888	12562	12283	12002	11753	11452	11220	10992	10768	10609	10393	10239	10030	9882	9680	9537	9396	9257	9068	8934	8802	8671	8543	8417	8293	8170	8049	7930	7813	7698
High Sensitivity Present Value	**£295,331**																													

Outputs

Pollutant	Low Sensitivity Present Value	Central Present Value	High Sensitivity Present Value
NOx Road Transport Outer London	£1,504	£11,759	£47,488
PM2.5 Road Transport Outer London	£40,808	£102,895	£295,331
Total		£114,654	
5% Discount Applied for TP		£108,922	