Air Quality Assessment

Swallowfield Way, Hayes

528457.0002.0001

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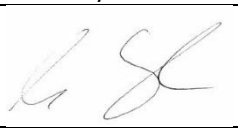
Approved By				
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Table of Abbreviations

AADT	Annual Average Daily Traffic
AMS	Automatic Monitoring Site
AQAL	Air Quality Assessment Level
AQAP	Air Quality Action Plan
AQMA	Air Quality Management Area
BAT	Best Available Technology
CAZ	Clean Air Zone
CHP	Combined Heat and Power
CMP	Construction Management Plan
Defra	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
DT	Diffusion Tube
EFT	Emissions Factor Toolkit
ER	Existing Receptor
GEA	Gross External Area
GIA	Gross Internal Area
HDV	Heavy Duty Vehicle
IAQM	Institute of Air Quality Management
LAQM	Local Air Quality Management
LAQM.TG(22)	Local Air Quality Management: Technical Guidance (22)
LLAQM.TG(19)	London Local Air Quality Management: Technical Guidance (2019)
LBH	London Borough of Hillingdon
LDV	Light Duty Vehicle
LPA	Local Planning Authority
NAQO	National Air Quality Objective
NO_2	Nitrogen dioxide
NOx	Oxides of Nitrogen
NPPF	National Planning Policy Framework
NRMM	Non-road mobile machinery
OS	Ordinance Survey
PM_{10} and $PM_{2.5}$	Particulate matter with an aerodynamic diameter of less than 10 microns (µm) (PM_{10}) or less than 2.5µm ($PM_{2.5}$), expressed in units of µg/m^3.
PPG	Planning Practice Guidance
ULSD	Ultra-Low Sulphur Diesel

1.0 Introduction

TRC Companies Ltd (TRC), was commissioned by Wrenbridge (FRELD Hayes) LLP (the 'Client') to undertake an Air Quality Assessment in order to support the full planning application for a proposed industrial development at 84 Swallowfield Way, Hayes, Middlesex, UB3 1DQ (the 'Site').

1.1 Current Site Description and Surrounding Area

The Site is located within the Greater London Area under the local planning authority (LPA) of London Borough of Hillingdon (LBH). The Site is located approximately 3.1km north of London Heathrow Airport (LHA). The current site comprises a single plot, approximately 2.92 acres. The Site is currently used as a crane hire depot with associated maintenance workshop, tackle store, offices, refuelling area and crane laydown areas.

The surrounding area is predominantly industrial in nature with residential properties located approx. 100m south of the Site.

The Site is bound by:

- Rigby Lane / Swallowfield Way and industrial structures to its north,
- Residential properties on Stormount Drive and the following rail lines to the south:
    - Heathrow Link Line,
    - Elizabeth Line; and,
    - Great Western Main Line.
- Commercial structures to its east; and,
- Light industrial buildings to the west.

The closest significant source of pollution to the Site are the A437 Dawley Road. The rail lines to the south are electrified and do not have any stops located near (within 1km) the Site – therefore, it is unlikely that diesel trains would remain for greater than 15minutes adjacent to the Site, as such railway emissions are unlikely to be significant. The Site is located approx. 3.1km north of LHA, which may provide a source of increased background emission levels.

The Site benefits from some existing sustainable transport options with bus stops located on Dawley Road approximately 0.45km east of the Site and Hayes and Harlington Station located 1.4km to the east.

The location of the Site is shown in Figure 1.

1.2 Proposed Development

The proposed development will comprise the redevelopment of the land with the demolition of the existing buildings and the redevelopment of the site to provide 4no. commercial/storage units for use within Use Class E(g)(iii), B2 and B8 (applied flexibly). The development also includes all associated parking, loading bays, office facilities and access points. The total Gross Indoor Area (GIA) for the Proposed Development will be 7,439m^2.

1.3 Assessment Scope

This assessment considers the air quality impacts associated with both the construction and operation of the development. Likely changes to air quality in the area, as a result of the proposed development have been considered in relation to the national air quality objectives (NAQOs) to determine their

significance. Also, where required, the air quality assessment considers mitigation measures to reduce the effect of the proposed development upon local air quality.

In terms of the construction impacts, the proposed development will have the potential to generate dust, particulate matter (PM_{10}), and nitrogen oxides (NOx) emissions during the construction phase. These impacts are assessed in accordance with the Institute of Air Quality Management (IAQM) best practice guidance (Holman et al., 2016) and the Greater London Authorities (GLAs) supplementary planning guidance 'The control of dust and emissions during demolition and construction' (Mayor of London, 2014).

Traffic movements, generated by the proposed development during its operation, will give rise to NOx and PM_{10} emissions. The impact of these emissions on local air quality will be assessed in accordance with IAQM Guidance on Land-Use Planning & Development Control: Planning for Air Quality (Moorcroft et al., 2017).

The development plans do not include any centralised combustion plants (such as boilers and combined heat and power units). Accordingly, this assessment does not consider plant emissions.

This air quality assessment report covers the following sections:

- Legislation, Planning Policy and Standards;
- Baseline Conditions;
- Construction Impact Assessment;
- Operational Impact Assessment;
- Air Quality Neutral Assessment;
- Mitigation Measures; and
- Summary, Conclusions and Recommendations.

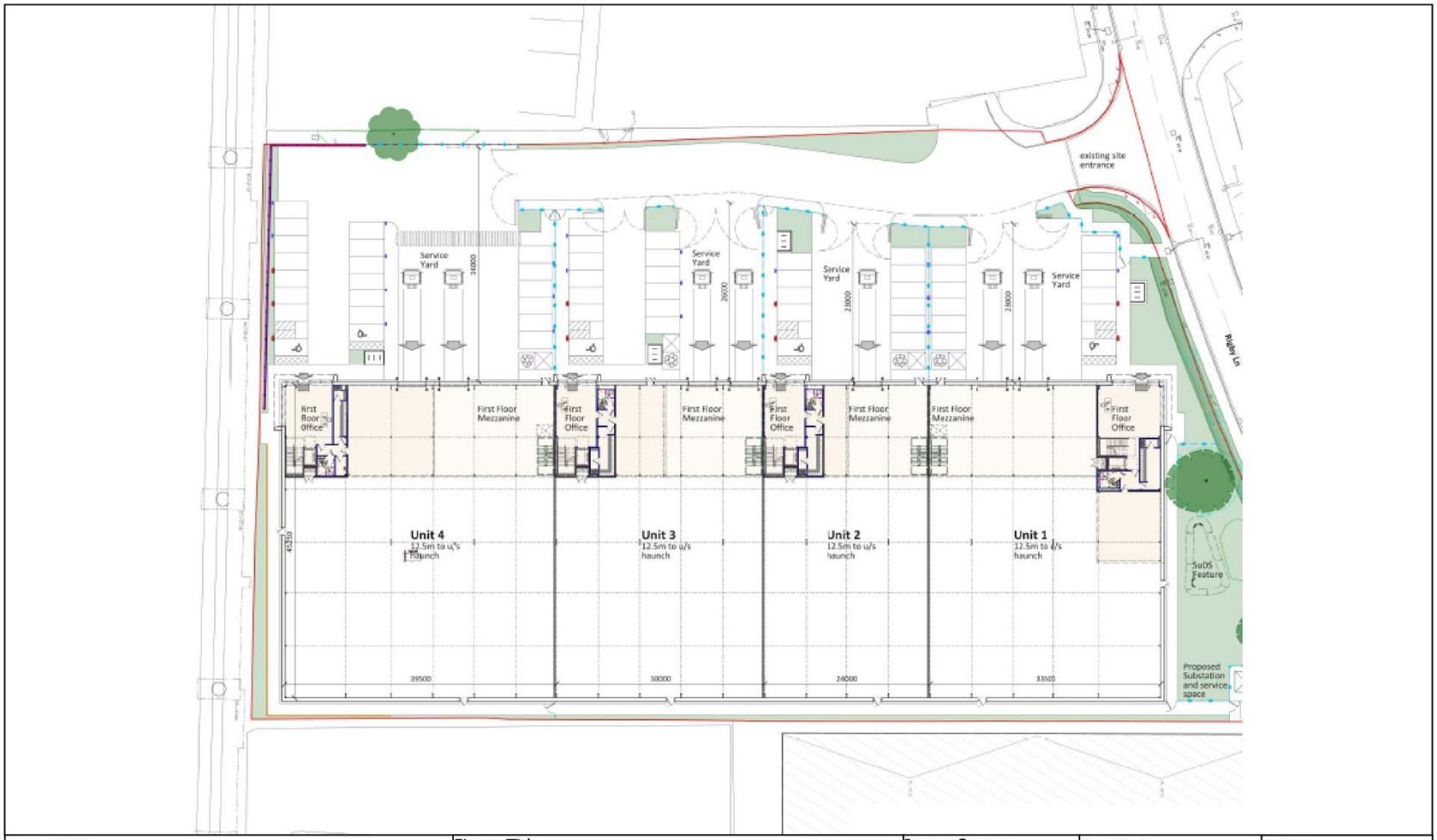
1.4 Significant Assumptions

This report presents TRCs observations, findings, and conclusions as they existed on the date that this report was issued. This report is subject to modification if TRC becomes aware of additional information after the date of this report that is material to its findings and conclusions.

The report has been prepared in line with the policy and guidance which is discussed within Section 2 of this report.

The reliability of information provided by others to TRC cannot be guaranteed to be accurate or complete. Performance of this assessment is intended to reduce, but not eliminate, uncertainty regarding environmental conditions associated with the subject site; therefore, the findings and conclusions made in this report should not be construed to warrant or guarantee the subject site, or express or imply, including without limitation, warranties as to its marketability for a particular use. TRC found no reason to question the validity of information received unless explicitly noted elsewhere in this report.

Project Title	Figure Title	Image Source	Map Scale	Author
Swallowfield Way, Hayes	Site Location	OSM Standard, Google Satellite	1:3000	
Client	**Figure Reference**	**Date**	**Version No.**	**Approver**
Wrenbridge (FRELD Hayes) LLP	Figure 1	08/05/2023	01	



Project Title	Figure Title	Image Source	Map Scale	Author
Swallowfield Way, Hayes	Proposed Site Layout	N/A	N/A	
Client	**Figure Reference**	**Date**	**Version No.**	**Approver**
Wrenbridge (FRELD Hayes) LLP	Figure 2	08/05/2023	01	

2.0 Legislation, Planning Policy & Guidance

This assessment takes account of the following national, regional and local planning guidance.

2.1 National Legislation

Part IV of the Environment Act 1995 as amended by the Environment Act 2021 requires local authorities to review and assess the air quality within their boundaries. As a result, the first Air Quality Strategy was adopted in 1997, with national health-based standards and objectives set out for the then, key eight air pollutants of benzene, 1-3 butadiene, carbon monoxide, lead, nitrogen dioxide, ozone, particulate matter and sulphur dioxide.

The purpose of the Air Quality Strategy was to identify areas where air quality was unlikely to meet the National Air Quality Objectives (NAQOs) prescribed in the regulations. The strategy was reviewed in 2000 and the amended Air Quality Strategy for England, Scotland, Wales and Northern Ireland (2000) was published. This was followed by an Addendum in February 2003 and in July 2007, an updated Air Quality Strategy was published (Defra, 2007).

The pollutant standards relate to ambient pollutant concentrations in air, set on the basis of medical and scientific evidence based on how each pollutant affects human health.

The air quality objectives applicable in LAQM in England are set out in the Air Quality (England) Regulations 2000, (SI 928), The Air Quality (England) (Amendment) Regulations 2002, (SI 3043) and are shown in Table 2.1 below.

The main air quality pollutants of concern with regards to the development Site, are operational related pollutants namely NO_2 and PM_{10}.

Table 2.1: National Air Quality Objectives and Standards

Pollutant	Concentrations	Measured as	Date to be achieved by and maintained thereafter
Nitrogen Dioxide (NO_2)	200 µg/m^3	1-hour mean not to be exceeded more than 18 times per year	31.12.2005
	40 µg/m^3	Annual mean	31.12.2005
Particulate Matter (PM_{10})	50 µg/m^3	24-hour mean not to be exceeded more than 35 times per year	31.12.2004
	40 µg/m^3	Annual mean	31.12.2004

Air Quality Standards Regulations, 2010

The air quality limit values set out in EU Directive (2008/50/EC, 2008) are transposed in law by the Air Quality Standards Regulations (2010) as amended by the Air Quality Standards (Amendment) Regulations 2016. This imposes duties on the Secretary of State relating to achieving the limit values.

In most cases the air quality limit values and air quality objectives have the same pollutant concentration threshold. The key difference is that the Secretary of State for the Environment is required under European Law to ensure the air quality limit values are complied with whereas local authorities are only obliged under national legislation to undertake best efforts to comply with the air quality objectives.

Schedule 3 of the Air Quality Regulations (2010) provides a target value for $PM_{2.5}$ concentrations, as detailed in Table 2.2. The EU introduced the value initially as a target value to be met by 2010, with a limit value to be met by 2015.

Table 2.2: $PM_{2.5}$ Limit Value

Pollutant	Concentrations	Measured as	Date to be achieved by and maintained thereafter
Particulate Matter ($PM_{2.5}$)	25 µg/m^3	Annual Mean	01.01.2015

The Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020

Stage 2 $PM_{2.5}$ limit values were introduced by the European Union as a limit value to be met by 2020. These are transposed into English law through the The Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020 as detailed in Table 2.3.

Table 2.3: $PM_{2.5}$ Stage 2 Limit Value

Pollutant	Concentrations	Measured as	Date to be achieved by and maintained thereafter
Particulate Matter ($PM_{2.5}$)	20 µg/m^3	Annual Mean	01.01.2020

Hillingdon Air Quality Annual Status Report 2022

Hillingdon's latest air quality annual status report states the following with respect to PM_{10} and $PM_{2.5}$ concentrations:

> '*The Council, in line with the requirements of the London Plan, will scrutinise planning applications regarding emissions of particulate matter with an increasing focus on the more stringent limits being discussed for the annual mean values for PM10 and PM2.5 of 20 µg.m^3 and 10 µg.m^3 respectively.*
>
> *Exceedance of the air quality guideline (AQG) levels is associated with important risks to public health. These guidelines provide an evidence-informed tool to inform legislation and policy, having been adopted by the Mayor of London in its London Plan for the pollutant particulate matter (20 µg.m^3 for PM10 and 10 µg.m^3 for PM2.5). Ultimately, these guidelines provide guidance to focus effort on reducing the significant health burden resulting from exposure to air pollution'*

Dust Nuisance

Under provisions in the Environmental Protection Act 1990, dust nuisance is defined as a statutory nuisance:

> *"Any dust or effluvia arising from an industrial, trade or business premises and being prejudicial to health or a nuisance"*

There are currently no standards or guidelines for the nuisance of dust in the UK, nor are formal dust deposition standards specified.

2.2 National Planning Policy

National Planning Policy Framework (2021)

The aim of this document is to set out the Government's requirements for the planning system. It also aims to enable local people and councils to produce their own distinctive local and neighbourhood plans.

Chapter 9, paragraph 105 of the NPPF "Promoting sustainable transport" states:

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

Chapter 15, paragraph 186 of the NPPF "Conserving and enhancing the natural environment" states:

> *"Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan."*

Planning Practice Guidance (PPG) – Air Quality 2019

The guidance on air quality was originally published in 2014 and updated in November 2019. The PPG provides various principles on how planning can take account of the impact of new development on air quality. Specifically the PPG states that:

> *'Assessments need to be proportionate to the nature and scale of development proposed and the potential impacts (taking into account existing air quality conditions), and because of this are likely to be locationally specific.*
>
> *The following could form part of assessments:*
>
> - *a description of baseline conditions and any air quality concerns affecting the area, and how these could change both with and without the proposed development;*
> - *sensitive habitats (including designated sites of importance for biodiversity);*
> - *the assessment methods to be adopted and any requirements for the verification of modelling air quality;*
> - *the basis for assessing impacts and determining the significance of an impact;*
> - *where relevant, the cumulative or in-combination effects arising from several developments;*
> - *construction phase impacts;*
> - *acceptable mitigation measures to reduce or remove adverse effects; and*
> - *measures that could deliver improved air quality even when legally binding limits for concentrations of major air pollutants are not being breached.*

2.3 Regional Planning Policy

The London Plan (2021)

As the overall strategic plan for London, this document sets out an integrated economic, environmental, transport and social framework for the development of London over the next 20-25 years. With regards to air quality the plan states the following:

'Policy SI 1 Improving Air Quality

A) Development Plans, through relevant strategic, site-specific and area-based policies, should seek opportunities to identify and deliver further improvements to air quality and should not reduce air quality benefits that result from the Mayor's or boroughs' activities to improve air quality.

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

1) Development proposals should not:

a) lead to further deterioration of existing poor air quality

b) create any new areas that exceed air quality limits, or delay the date at which compliance will be achieved in areas that are currently in exceedance of legal limits

c) create unacceptable risk of high levels of exposure to poor air quality.

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

a) development proposals must be at least Air Quality Neutral

b) development proposals should use design solutions to prevent or minimise increased exposure to existing air pollution and make provision to address local problems of air quality in preference to post-design or retro-fitted mitigation measures.

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

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

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

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

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

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

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

2.4 Local Planning Policy

Hillingdon Local Plan Part 1 – Strategic Policies (2012-2026)
Hillingdon's Local Plan: Part 1 was adopted in November 2012, and contains the planning vision and strategy for the Borough – including air quality strategy and objectives. The strategies outlined within the Local Plan have been shaped by a series of evidence based studies and ongoing consultation and engagement of local residents, businesses, service providers and others. We regards to air quality the plan states:

> ***'Policy E2: Location of Employment Growth***
> *The Council will accommodate 9,000 new jobs during the plan period. Most of this employment growth will be directed towards suitable sites in the Heathrow Opportunity Area, Strategic Industrial Locations (SILs), Locally Significant Employment Locations (LSEL), Locally Significant Industrial Sites (LSIS), Uxbridge Town Centre and Hayes Town Centre with a particular focus around transport nodes.*
>
> *The Council will promote development in highly accessible locations that delivers sustainable travel patterns and contributes to the improvement of existing networks to reduce emissions and impacts on air quality. The Council will accommodate a minimum of 3,800 additional hotel bedrooms, and new hotels and visitor facilities will be encouraged in Uxbridge, Hayes, on sites outside of designated employment land on the Heathrow perimeter and in other sustainable locations.'*
>
> ***'Strategy for the Heathrow Opportunity Area***
> ***Strategic Objectives***
> *SO23: Develop and implement a strategy for the Heathrow Opportunity Area, in order to ensure that local people benefit from economic and employment growth and social and environmental improvements including reductions in noise and poor air quality'*
>
> ***'Policy E3: Strategy for Heathrow Opportunity Area***
> *The Council will prepare a Local Development Document (LDD) for the Heathrow area to achieve the future growth set out in Table 5.3, in consultation with the GLA and London Borough of Hounslow. This LDD will help manage development and protect land within the Heathrow Airport boundaries for airport-related activities. It will seek to ensure that local people benefit from sustainable economic growth located both within the Airport boundaries and in the Perimeter areas. The LDD will also set requirements for climate change mitigation and adaptation through a low carbon emission strategy and measures to improve local air quality.'*
>
> ***'Climate Change Adaptation and Mitigation***
> ***Strategic Objectives***
> *SO11: Address the impacts of climate change and minimise emissions of carbon and local air quality pollutants from new development and transport.'*
>
> ***'Policy EM1: Climate Change Adaptation and Mitigation***
> *The Council will ensure that climate change mitigation is addressed at every stage of the development process by:*
>
> - *Promoting the use of decentralised energy within large scale development whilst improving local air quality levels.*
> - *Targeting areas with high carbon emissions for additional reductions through low carbon strategies. These strategies will also have an objective to minimise other*

pollutants that impact on local air quality. Targeting areas of poor air quality for additional emissions reductions.'

Policy EM8: Land, Water, Air and Noise
Air Quality
All development should not cause deterioration in the local air quality levels and should ensure the protection of both existing and new sensitive receptors.

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

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

The Council has a network of Air Quality Monitoring stations but recognizes 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.'

Hillingdon Local Plan Part 2: Development Management Policies
The Local Plan Part 2 Development Management Policies and Site Allocations and Designations were adopted as part of the borough's development plan at Full Council on 16 January 2020. This replaces the Local Plan Part 2 Saved UDP Policies (2012). With regards to air quality the plan states:

'Policy DMEI 1: Living Walls and Roofs and on-site Vegetation
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: Air Quality
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; and
iii) actively contribute towards the improvement of air quality, especially within the Air Quality Management Area'

2.5 Assessment Guidance

Local Air Quality Management Technical Guidance (LAQM TG22)

The LAQM TG22 guidance document supersedes all previous version. It is designed to support local authorities in carrying out their duties under the Environment Act 1995 as amended by the Environment Act 2021, the Environment (Northern Ireland) Order 2002, and subsequent regulations. LAQM is the statutory process by which local authorities monitor, assess and take action to improve local air quality. The document provides guidance on the suitability of monitoring sites, application of model verification for dispersion modelling and the key relationships between annual and hourly NO_2 objectives and annual and daily PM_{10} objectives.

London Local Air Quality Management Technical Guidance (LLAQM TG19)

Air quality in the capital is devolved to the Mayor of London, who has a supervisory role, with powers to intervene and direct local authorities in Greater London under Part IV of the Environment Act 1995. In support of these devolved powers, the Mayor has established a London-specific LAQM system (LLAQM) for the effective and coordinated discharge of their respective responsibilities under Part IV of the Act. Box 1.1 of the LLAQM TG19 states the locations where the various air quality objective limits should apply and is detailed in Table 2.4.

Table 2.4 - Examples of Where the Air Quality Objectives Should Apply

Averaging Period	Objectives Should Apply At:	Objectives should generally not apply at:
Annual Average	All locations where members of the public might be regularly exposed. Building façades and gardens of residential properties, schools (including all of playgrounds), hospitals (and their grounds), care homes (and their grounds) etc.	Building façades of offices or other places of work where members of the public do not have regular access. Hotels, unless people live there as their permanent residence. Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term.
24-hour mean and 8-hour mean	All locations where the annual mean objective would apply, together with hotels.	Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term.
1-hour mean	All locations where the annual mean and: 24 and 8-hour mean objectives apply. Kerbside sites (for example, pavements of busy shopping streets) Those parts of car parks, bus stations and railway stations etc. which are not fully enclosed, where members of the public might reasonably be expected to spend one hour or more. Any outdoor locations where members of the public might reasonably expected to spend one hour or longer.	Kerbside sites where the public would not be expected to have regular access.

IAQM Guidance on the Assessment of Dust from Demolition and Construction (2014)

The document (Holman et al, 2014) provides guidance on how to undertake a construction impact assessment. The impacts of dust depend on the mitigation measures adopted. The emphasis in this document is on classifying the risk of dust impacts from a site, which will then allow appropriate mitigation measures to be identified.

The assessment procedure follows the following four-step framework:

- Step 1: Need for Detailed Assessment;
- Step 2: Assess the Risk of Dust Effect;
- Step 3: Identify the Need for Site-Specific Mitigation; and
- Step 4: Define Effects and their Significance.

Details of this assessment framework are discussed in Section 4.0 of this report. The GLA Supplementary Planning Guidance builds upon the IAQM guidance document with measures specific to Greater London and the air quality challenges faced within Greater London.

IAQM Guidance on Land-Use Planning & Development Control: Planning for Air Quality (2017)

This guidance document (Moorcroft et al, 2017) from the IAQM focuses on consideration of air quality within the land-use planning and development control processes.

It provides a two-stage approach for assessing the impacts of a development on local air quality. Stage 1 is intended to screen out smaller development and/or developments where impacts can be considered to have insignificant effects.

Stage 1:

- If any of the following apply:
    - 10 or more residential units or a site area of more than 0.5ha; or
    - More than 1,000 m^2 of floor space for all other uses or a site area greater than 1ha.
- Coupled with any of the following:
    - the development has more than 10 parking spaces; or
    - the development will have a centralised energy facility or other centralised combustion process.

Stage 2 relates to specific details regarding the proposed development and the likelihood of air quality impacts. These criteria are detailed in Table 2.5.

If none of the criteria are met then there should be no requirement to carry out an air quality assessment for the impact of the proposed development on the local area, and the impacts can be considered to have insignificant effects.

The guidance states that exceeding a screening criterion in Table 2.5 does not automatically lead to the requirement for a Detailed Assessment. A Simple Assessment may be appropriate, if it can be proven that the Site will not have a significant effect on local air quality.

This guidance also includes a suggested framework for describing the impacts. This framework is set out in Table 2.6. The assessment framework allows for a practical way of assigning a meaningful description to the degree of an impact from a development. Impact is described by expressing the

magnitude of incremental change as a proportion of a relevant assessment level and then to examine this change in the context of the new total concentration and its relationship with the assessment criterion (or Air Quality Assessment Level (AQAL)).

The IAQM impact significance criteria focuses on the long-term impacts. The guidance suggests that assessment of impact severity for a proposed development will be governed by the long-term exposure experienced by receptors and it will not be a necessity to define the significance of effects by reference to short-term impacts. The severity of the impact will be substantial when there is a risk that the relevant AQAL for short-term concentrations is approached through the presence of the new source, taking into account the contribution of other prominent local sources.

Table 2.5: Indicative criteria for requiring an air quality assessment

The development will:	Indicative Criteria to Proceed to an Air Quality Assessment
1. Cause a significant change in Light Duty Vehicle (LDV) traffic flows on local roads with relevant receptors. (LDV = cars and small vans <3.5t gross vehicle weight).	A change of LDV flows of: - more than 100 AADT within or adjacent to an AQMA - more than 500 AADT elsewhere.
2. Cause a significant change in Heavy Duty Vehicle (HDV) flows on local roads with relevant receptors. (HDV = goods vehicles + buses >3.5t gross vehicle weight).	A change of HDV flows of: - more than 25 AADT within or adjacent to an AQMA - more than 100 AADT elsewhere.
3. Realign roads, i.e. changing the proximity of receptors to traffic lanes.	Where the change is 5m or more and the road is within an AQMA.
4. Introduce a new junction or remove an existing junction near to relevant receptors.	Applies to junctions that cause traffic to significantly change vehicle accelerate/decelerate, e.g. traffic lights, or roundabouts.
5. Introduce or change a bus station.	Where bus flows will change by: - more than 25 AADT within or adjacent to an AQMA - more than 100 AADT elsewhere.
6. Have an underground car park with extraction system	The ventilation extract for the car park will be within 20 m of a relevant receptor. Coupled with the car park having more than 100 movements per day (total in and out).
7. Have one or more substantial combustion processes, where there is a risk of impacts at relevant receptors. NB. this includes combustion plant associated with standby emergency generators (typically associated with centralised energy centres) and shipping.	Typically, any combustion plant where the single or combined NOx emission rate is less than 5 mg/sec* is unlikely to give rise to impacts, provided that the emissions are released from a vent or stack in a location and at a height that provides adequate dispersion. In situations where the emissions are released close to buildings with relevant receptors, or where the dispersion of the plume may be adversely affected by the size and/or height of adjacent buildings (including situations where the stack height is lower than the receptor) then consideration will need to be given to potential impacts at much lower emission rates. Conversely, where existing NO_2 concentrations are low, and where the dispersion conditions are favourable, a much higher emission rate may be acceptable.

*As a guide, the 5 mg/s criterion equates to a 450 kW ultra-low NOx gas boiler or a 30kW CHP unit operating at <95mg/Nm3. Users of this guidance should quantify the NOx mass emission rate from the proposed plant, based on manufacturers' specifications and operational conditions.

Table 2.6: Long-term Impact Descriptors for Individual Receptors

Long term average concentration at receptor in assessment year	% Change in concentration relative to Air Quality Assessment Level (AQAL)			
	1	2-5	6-10	>10
75% or less of AQAL	Negligible	Negligible	Slight	Moderate
76-94% of AQAL	Negligible	Slight	Moderate	Moderate
95-102% of AQAL	Slight	Moderate	Moderate	Substantial
103-109% of AQAL	Moderate	Moderate	Substantial	Substantial
110% or more of AQAL	Moderate	Substantial	Substantial	Substantial

London Plan Guidance – Air Quality Neutral (February 2023)

Improving London's air quality is one of the major challenges facing the capital and as a result, Policy SI 1 of the London Plan includes requirements for new development to be Air Quality Neutral. To assist developers, boroughs and others involved in designing and planning new development, draft London Plan Guidance on Air Quality Neutral has been prepared. The Air Quality Neutral LPG sets air quality benchmarks for all development, in order to ensure that their transport and building emissions do not worsen air quality in London. The guidance also outlines a simplified approach for minor developments.

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

- Building Emissions Benchmark (BEB) - emissions from equipment used to supply heat and energy to the buildings
- Transport Emissions Benchmark (TEB) - emissions from private vehicles travelling to and from the development.

A development must meet both benchmarks separately in order to be Air Quality Neutral. If one or both benchmarks are not met, appropriate mitigation or offsetting will be required (see Section 4.2.4). As the benchmarks are based on evidence and are designed to be challenging but achievable, mitigation or offsetting provisions should be the exception.

Calculations against the benchmarks should inform the design process. However, the final Air Quality Neutral assessment itself can only be prepared once the energy and transport strategies for a development are suitably finalised or, where these strategies are not part of the application, development details are finalised for planning submission.

3.0 Baseline Air Quality Conditions

Baseline air quality information was gathered from the following sources:

- Defra UK Air Information Resource (UK AIR) website: Air Quality Management Areas (AQMAs);
- Defra UK AIR: Background Mapping data for local authorities;
- London Atmospheric Emissions Inventory (LAEI) 2019 dataset;
- London Borough of Hillingdon, Air Quality Annual Status Report (ASR) (2022)

3.1 Local Air Quality Management

The Environment Act 1995 introduced the Local Air Quality Management (LAQM) regime which places responsibility on local authorities to review and assess air quality in their areas of jurisdiction. Where national air quality objectives are not likely to be met, local authorities are required to and designate AQMAs and produce an air quality action plans describing the air pollution reduction measures they will put in place.

LBH have declared an AQMA for exceedances of the annual mean NO_2 National Air Quality Objectives (NAQO). The AQMA covers the area from the southern boundary north to the border defined by, the A40 corridor from the western borough boundary, east to the intersection with the Yeading Brook north until its intersection with the Chiltern-Marylebone railway line. The Proposed Development is located within the AQMA.

Insert 1 is taken from LBHs latest ASR and shows the area the AQMA covers.

Insert 1 – LBH AQMA

Blue star denotes location of Proposed Development.

3.2 Air Quality Focus Areas

The LAEI is the key tool for air quality analysis and policy development in London. It is a regularly updated database of pollutant emissions and sources including geographically referenced data and maps, including the location of Air Quality Focus Areas (AQFAs). The AQFAs are locations that not only exceed the annual mean NAQO for NO_2 but are also locations with high human exposure. They were defined to address concerns raised by boroughs within the LAQM review process and forecasted air pollution trends. There are currently 160 declared AQFAs of which, 4no. are located within the proximity of the Site.

The details of the closest AQFAs are detailed in Table 3.1. The AQFAs are displayed in Figure 3.

Table 3.1: Details of Air Quality Focus Areas in Proximity to Site

AQFA Name	Distance to Site	Location Description
No.96 Hayes	0.65km East	An area covering central Hayes, notably includes the A437 Dawley Road, A437 North Hyde Road to the A312 The Parkway
No.100 M4 Focus Area	0.85km South	An area covering approximately 300m north and south of the M4 between Junction 4B (M25) and Junction 3 (Cranford Parkway Interchange)
No.99 West Drayton, Yiewsley	2.00km West	Area covering town centres and connecting roads of West Drayton and Yiewsley
No.97 Uxbridge Road Corridor	2.00km North	An area covering approximately 300m north and south of Uxbridge Road

3.3 Local Air Quality Monitoring Data

Automatic Monitoring

LBH currently operates 12no. automatic monitoring stations (AMS) as per the latest Air Quality Annual Status Report (ASR) 2022. These provide monitoring for NO_2, PM_{10} and $PM_{2.5}$ within the district. There are 2no. AMSs located within 2km of the Site. Historical monitoring data for the years 2016 – 2021 for these locations is detailed in Table 3.2.

Table 3.2: Details of NO_2 Annual Mean Concentrations from Automatic Monitoring Stations

Tube ID	Site Type	Distance from Site (km)	Annual Mean Concentrations (µg/m³)					
			2016	2017	2018	2019	2020**	2021**
Nitrogen Dioxide NO_2								
HIL5	Roadside	2.0	**45.9**	**47**	**43**	**41**	31	34
HIL	Background	1.8	**51.2**	**53**	**46**	**45**	28	25
Particulate Matter (PM_{10})								
HIL5	Roadside	2.0	28	27	30	28	25	26

* Values in **bold** exceed that NAQO of 40µg/m³.

** Covid-19 Pandemic may have affected the results

Annual mean concentrations of NO_2 were above the NAQO in all years prior to the COVID-19 Pandemic at both monitoring locations, located within the Hayes and M4 Corridor AQFAs respectively. Long term trends show concentrations have been falling since 2016. Concentrations in 2020 and 2021 are not considered as being representative of 'typical conditions', with traffic and aviation volumes greatly reduced during the pandemic.

Annual mean PM_{10} concentrations recorded at the HIL5 monitor are below the UK NAQO, however it is noted that they are above the 20 µg/m^3 EU 2030 target levels.

The hourly mean NO_2 NAQO objective of 200 µg/m^3 not to be breached more that 18 times per year has not been exceeded at either location historically, with not a single breach of the 200 µg/m^3 since 2018.

The 24-hourly mean PM_{10} NAQO objective of 50 µg/m^3 not to be breached more than 35 times per year has not been exceeded at the HIL5 monitor historically, however there has typically been >20 breaches per year.

The HIL5 monitor is considered to be indicative of worst case concentrations on the primary A Roads in proximity to a busy junction. Whilst the HIL monitor is classified as a background location, it is located approximately 40m north of the M4 carriageway, a road with an annual average daily traffic (AADT) flow of >100,000 vehicles per day. As such it is largely influenced by road transport emissions and is indicative of concentrations at residential properties in the vicinity of the M4 Carriageway.

Non-Automatic Monitoring

LBH undertook non-automatic monitoring utilising passive diffusion tube samplers at 44no. locations within the LPA in 2022. Representative locations of the relevant NO_2 diffusion tubes within 2km of the Site are presented in Figure 3 and the relevant historic NO_2 monitoring results are presented in Table 3.3.

Table 3.3: Details of NO_2 Annual Mean Concentrations from Non-Automatic Monitoring near the Development

Tube ID	Site Type	Distance from Site (km)	NO_2 Annual Mean Concentrations (µg/m^3)*					
			2016	2017	2018	2019	2020**	2021**
HILL28	Roadside	0.8	32.3	35.7	31.7	31.7	23.0	23.5
HILL18	Roadside	1.2	**40.9**	**49**	38.5	37.4	29.9	27.6
HILL27	Roadside	1.3	30.8	33.8	32.5	33.2	24.5	25.3
HILL17	Background	1.8	26.1	32.7	31	31.6	24.7	24.2
HILL07	Roadside	1.6	34.7	**43.3**	37.7	36.9	28.1	28.8
HILL08	Roadside	1.7	32.1	33.4	33.9	33.9	24.1	25.3
HILL26	Roadside	1.7	**42.1**	**51.5**	**42**	**40.0**	28.2	26.8
HILL21	Background	1.2	29.6	34.7	34.9	32.3	23.4	24.1
HILL20	Background	1.8	35.9	37.9	36.6	36.6	31.6	31.5
HILL01	Roadside	1.6	34.3	**45.3**	**42**	38.6	25.6	25.7

* Values in **bold** exceed that NAQO of 40µg/m^3.
** Covid-19 Pandemic may have affected the results

The monitoring data shown in Table 3.3 shows there have been historic exceedances of the annual mean NO_2 NAQO at diffusion tubes HILL01 and HILL26, both are representative of locations within 40m of the M4 corridor. Further historic exceedances are noted at HILL18, however the exceedances at this location are considered to be localised, with diffusion tube HILL28 located on the same road with significantly lower concentrations. The historic exceedance at HIL07 is linked to those seen at the AMS HIL5, however it is located further from a major junction and as such concentrations are noted to be lower.

The annual mean NO_2 objective has not been exceeded at any location in 2019, the latest year of monitoring data available under 'typical conditions'. As per the latest LLAQM Guidance document, the hourly mean NO_2 NAQO is unlikely to be breached if annual mean concentrations are below 60 µg/m^3. All recorded concentrations within 2km are well below the indicative level.

3.4 Background Pollutant Concentrations

Defra's website includes estimated background air pollution data for NO_2, PM_{10} and $PM_{2.5}$ centred on 1x1km OS grid squares. Background pollutant concentrations are modelled on the most recent available data which is the base year of 2018 and this has been based on ambient monitoring and meteorological data from that year.

Table 3.3 shows the annual mean background concentrations for NO_2, PM_{10} and $PM_{2.5}$ for the years 2018, 2020, 2022 and 2024 based on the grid square centred on the co-ordinates 508500, 179500. The data shows that for all pollutants annual mean concentrations are within their respective annual mean NAQOs and are predicted to decrease in the long term.

Table 3.3 Background Pollutant Concentrations Within the Vicinity of the Site for 2018 - 2024

Pollutant	Annual Mean Concentration (µg/m^3)			
	2018	2020	2022	2024
NO_2	27.7	25.2	23.7	22.5
PM_{10}	17.4	16.6	16.2	15.8
$PM_{2.5}$	11.7	11.1	10.9	10.6
*__Bold__ denotes exceedance of annual mean national air quality objective: NO_2 / PM_{10} - 40µg/m^3 and $PM_{2.5}$ - 20µg/m^3				

3.5 Summary

The Site is located within the LPA of the London Borough of Hillingdon, who have declared a borough wide AQMA. The site is not located within any AQFAs, however all major routes from the Site lead to locations that are AQFAs, notably within Hayes Town Centre and the M4 Corridor.

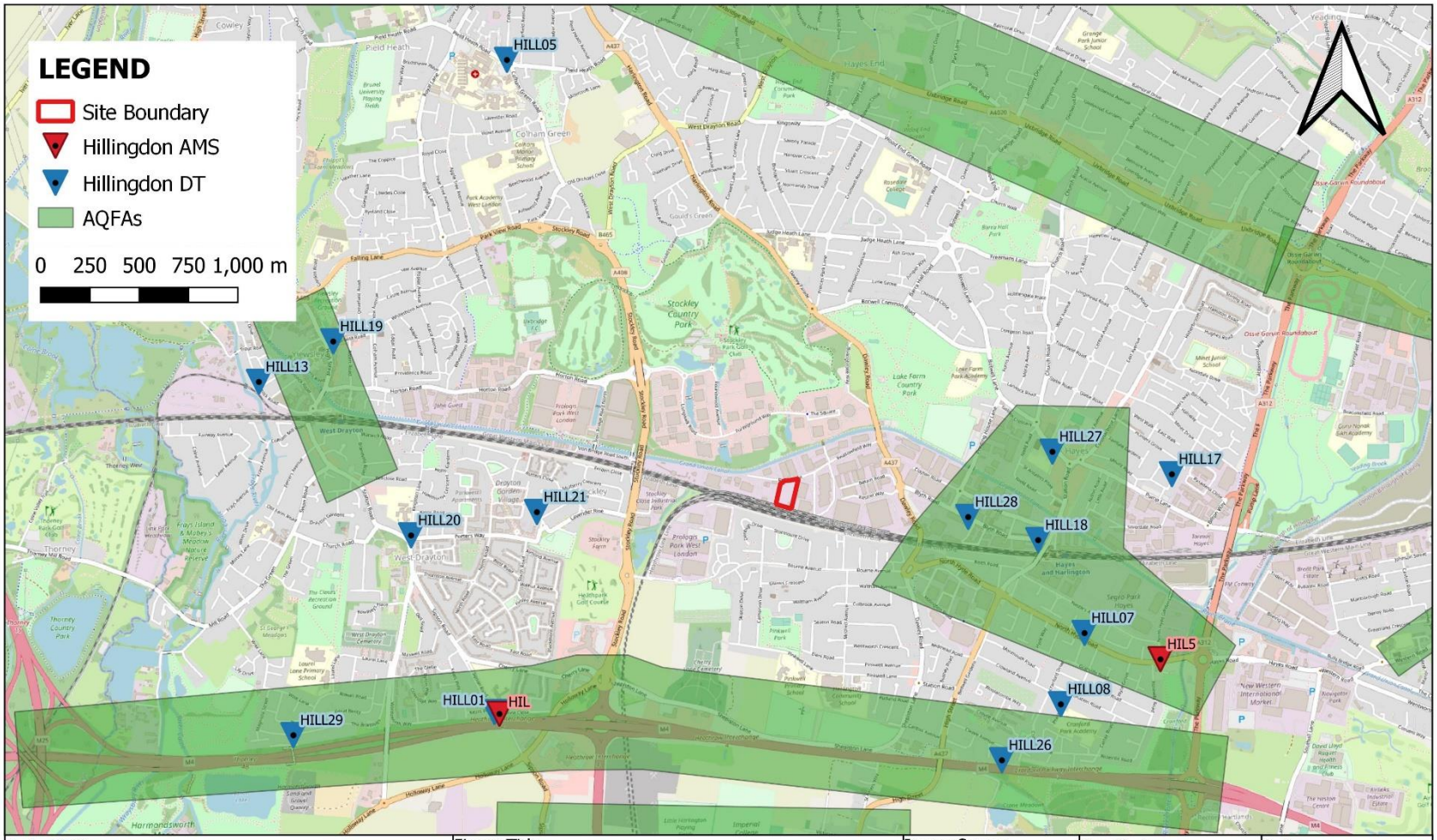
As per Box 1.1 of the London Local Air Quality Management Technical Guidance (LLAQM. TG(1916)) produced by Defra, the annual mean objective would not apply to the following areas:

> *"Building façades of offices or other places of work where members of the public do not have regular access. Hotels, unless people live there as their permanent residence. Gardens of residential properties. Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term."*

As such the hourly mean NO_2 NAQO is applicable to determine suitability of the Site. The indicative criteria for the exceedance of the short term NO_2 NAQO is an annual mean concentration of 60 µg/m^3. None of the indicative monitoring Sites in the vicinity of the Proposed Development exceed either the indicative value for an exceedance of the short term NAQO at a diffusion tube, and the closest automatic monitoring stations have not recorded an exceedance of the 1-hr mean NO_2 historically.

Annual mean PM_{10} concentrations at the closest AMS are below the annual mean NAQO and the 24-hr mean NAQO has not been exceeded.

The Site is located within an Industrial Estate with the nearest major road sources located over 400m to the east and west, as such the concentrations recorded at the AMSs are likely to be higher than those experienced at the Site. Therefore the Site is considered suitable for occupation and operation by future users of the Proposed Development without the need for mitigation.



Project Title	Figure Title	Image Source	Map Scale	Author
Swallowfield Way, Hayes	Local Authority Monitoring and AQFAs in Vicinity of the Site	OSM Standard	1:25000	
Client	**Figure Reference**	**Date**	**Version No.**	**Approver**
Wrenbridge (FRELD Hayes) LLP	Figure 3	08/05/2023	01	

4.0 Construction Impact Assessment

4.1 Methodology

The construction effects have been assessed using the qualitative approach described in the latest GLA SPG (Mayor of London, 2014). The guidance applies to the assessment of dust from construction activities.

The main impacts that may arise during construction of the proposed development are:

- Dust deposition, resulting in the soiling of surfaces;
- Visible dust plumes;
- Elevated PM_{10} concentrations as a result of dust generating activities on-Site; and
- An increase in NO_2 and PM_{10} concentrations due to exhaust emissions from NRMM and vehicles accessing the Site.

The IAQM guidance considers the potential for dust emissions from four dust generating activities:

- Demolition: Removal of an existing structure(s);
- Earthworks: Process of soil stripping, ground levelling, excavation and land capping;
- Construction of new structures; and
- Trackout: The transport of dust and dirt from the Site onto the public road network where it may be deposited and then re-suspended by vehicles using the network.

For each of these dust-generating activities, the guidance considers three separate effects:

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

The receptors can be human or ecological and are chosen based on their sensitivity to dust soiling and PM_{10} exposure.

The methodology takes into account the scale to which the above effects are likely to be generated (classed as small, medium or large), along with the levels of background PM_{10} concentrations and the distance to the closest receptor, in order to determine the sensitivity of the area. This is then taken into consideration when deriving the overall risk for the Site. Suitable mitigation measures are also proposed to reduce the risk of the Site.

The assessment steps are summarised below:

Step 1: Need for Assessment

The first step is the initial screening for the need for a detailed assessment. According to the IAQM guidance, an assessment is required where there are sensitive receptors within 350m of the Site boundary (for ecological receptors that is 50m) and/or within 50m of the route(s) used by the construction vehicles on the public highway and up to 500m from the Site entrance(s).

Step 2: Assess the Risk of Dust Impacts

This step is split into three sections as follows:

- 2a. Define the potential dust emission magnitude
- 2b. Define the sensitivity of the area

- 2c. Define the risk of impacts

Each of the dust-generating activities is given a dust emission magnitude depending on the scale and nature of the works (step 2a) based on the criteria shown in Table A1 (Appendix A).

The sensitivity of the surrounding area is then determined (step 2b) for each dust effect from the above dust-generating activities, based on the proximity and number of receptors, their sensitivity to dust, the local PM_{10} background concentrations and any other site-specific factors. Tables A2 to Table A5 (Appendix A) show the criteria for defining the sensitivity of the area to different dust effects.

The overall risk of the impacts for each activity is then determined (step 2c) prior to the application of any mitigation measures (Table A3, Appendix A) and an overall risk for the Site derived.

Step 3: Determine the Site-specific Mitigation

Once each of the activities is assigned a risk rating, appropriate mitigation measures are identified. Where the risk is negligible, no mitigation measures beyond those required by legislation are necessary.

Step 4: Determine any Significant Residual Effects

Once the risk of dust impacts has been determined and the appropriate dust mitigation measures identified, the final step is to determine whether there are any residual significant effects.

Step 5: Prepare a Dust Assessment Report

The last step of the assessment is the preparation of a Dust Assessment Report which is covered within this report.

4.2 Construction Dust Risk Assessment Results

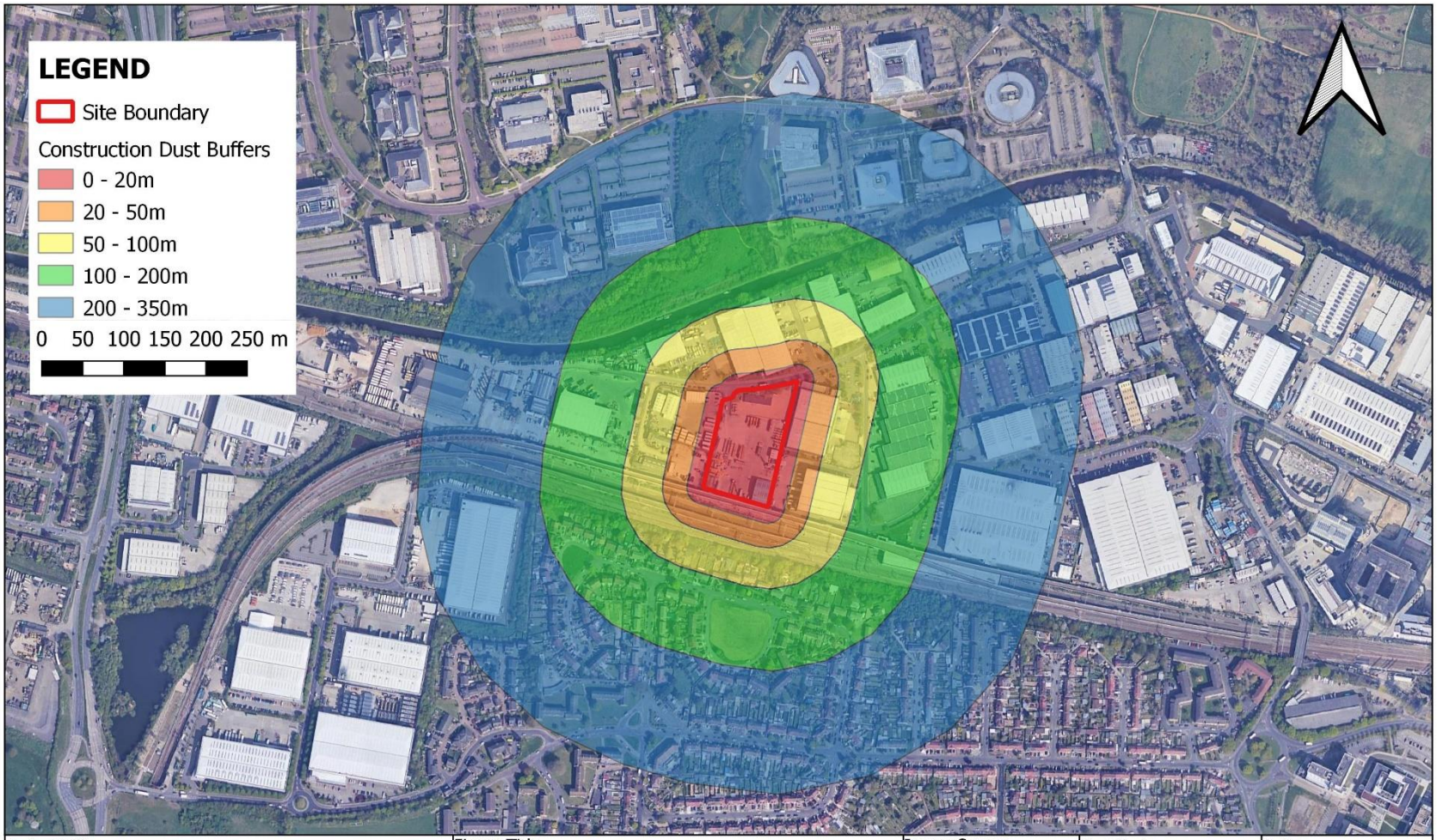
The Site is located within an industrial and commercial area that currently comprises of low density industrial and commercial buildings.

The closest properties are located adjacent to each of the north and east of the Site boundaries. There are no designated ecological sites in close proximity to the Site. As such they are not considered within the assessment.

Demolition, Earthworks and Construction Dust Sensitive Receptors

The precise behaviour of dust, its residence time in the atmosphere, and the distance it may travel before being deposited would depend upon several factors. These include wind direction and strength, local topography and the presence of intervening structures (buildings, etc.) that may intercept dust before it reaches sensitive locations. Furthermore, dust would be naturally suppressed by rainfall.

Figure 4 shows a graphical representation of the 20m, 50m, 100m, 200m and 350m demolition, earthworks and construction dust buffer zones around the Site while Table 4.1 summarises the receptors that may be affected during these phases.



Project Title	Figure Title	Image Source	Map Scale	Author
Swallowfield Way, Hayes	Demolition, Earthwork and Construction Activity Dust Buffers	Google Satellite	1:6000	
Client	**Figure Reference**	**Date**	**Version No.**	**Approver**
Wrenbridge (FRELD Hayes) LLP	Figure 4	08/05/2023	01	

Table 4.1: Earthworks and Construction Dust Sensitive Receptors

Distance from Site Boundary (m)	Approximate Number of High Sensitivity Receptors	Approximate Number of Med – Low Sensitivity Receptors
Less than 20	0	1 – 10
20 - 50	0	1 – 10
50 - 100	1 – 10	10 – 100
100 – 200	10 – 100	10 – 100
200 – 350	10 – 100	10 – 100

Trackout Dust Sensitive Receptors

Trackout can affect receptors up to 50m from the edge of the potentially affected roads, extending 200m from a medium construction Site. It is assumed HGVs will enter the Site and leave through the same route along Swallowfield Way. Table 4.2 summarises the receptors that may be affected during this phase.

Table 4.2: Trackout Dust Sensitive Receptors

Distance from Site Boundary (m)	Approximate Number of High Sensitivity Receptors	Approximate Number of Med – Low Sensitivity Receptors
Less than 20	0	>10
20 - 50	0	>10

Potential Dust Emission Magnitude

As outlined in the previous methodology section as well as in the criteria presented in Table A1 (see Appendix A), each dust-generating activity has been assigned a dust emission magnitude as shown in Table 4.3.

Table 4.3: Dust Emission Magnitude for Construction Activities

Activity	Dust Emission Magnitude	Justification
Demolition	Small	<20,000m^3 building volume to be demolished at less than 10m height. Buildings are predominantly steel frame and cladding and as such are of low dust potential.
Earthworks	Medium	Total site area approximately >10,000m^3. Likely <5 earthmoving vehicles at any one time. Stockpiles likely to be <4m in height.
Construction	Medium	Total building volume likely to be 25,000m^3 – 100,000m^3, with construction materials of a low dust potential owing to its industrial and warehousing nature. Furthermore, once the cladding is added to the steel frame this will prevent dust release.
Trackout	Small	Unpaved roads <50m, with a peak of 10 outward HGV movements likely.

Sensitivity of the Area

The immediate surrounding area to the Site is industrial in nature, with railway lines adjacent to the southern Site boundary. The closest high sensitivity receptors to the Site are located approximately 100m south of the Site. The predominant wind direction in the area is from the south west, as such these properties are unlikely to be affected dust deposition. As such the area is considered to have low sensitivity to dust soiling impacts.

There are no urban background monitors of Particulate Matter within 1km of the Site, as such concentrations from the Defra background maps, as per Table 3.4, have been utilised. Background

PM_{10} concentrations for the 1x1km grid square for 2022 are estimated to be 16.5 µg/m3. Given the low background values, the impact on human health is considered to be low.

Trackout impacts may occur up to 50m from the edge of a road utilised by construction traffic up to 200m from the exit of a medium Site, with construction traffic approaching and exiting the Site to the east along Swallowfield Way. There are no residential receptors and ~10 medium sensitivity receptors within 50m of the road. As such the sensitivity of nearby receptors to dust soiling impacts from trackout is considered to be low with respect to both dust soiling and human health.

There are no ecologically designated sites within 350m of the Site boundary, nor within 50m of a road to be utilised by construction traffic. As such, impacts on ecological sites are not considered further. The overall sensitivity of the area to dust soiling and human health is summarised in Table 4.4.

Table 4.4: The Sensitivity of the Area

Activity	Sensitivity of the Surrounding Area	
	Dust Soiling	Human Health
Demolition	Medium	Low
Earthworks	Medium	Low
Construction	Medium	Low
Trackout	Negligible	Negligible

Risk of Impacts

The risk of dust impacts for relevant construction activities are summarised in Table 4.4. These results consider both the potential dust emission magnitude and the sensitivity of the area. Results show that the impact is considered low in terms of dust soiling and low in terms of impact on human health. It is acknowledged these activities are temporary in nature and will be mitigated through implementation of good industry practices, appropriate to the level of risk.

Table 4.4: The Risk of Dust Impacts

Activity	Sensitivity of the Surrounding Area			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	Low	Low	Low	Negligible
Human Health	Low	Low	Low	Negligible

4.3 Construction Dust Risk Assessment Results

The greatest impact on air quality due to emissions from construction vehicles and plant associated with the construction phase will be in areas immediately adjacent to the Site. The exact route that construction traffic will take to the Site is unknown at the time of writing, however the volume of transport and short term nature of the works is unlikely to impact upon local air quality. A construction environmental management plan (CEMP) will be secured through planning condition to outline the transport measures.

Details of the plant to be utilised on Site and there specific location are not currently available, however they will meet the relevant emissions standards for London Non Road Mobile Machinery and detailed in the future CEMP to be secured via planning condition.

5.0 Operational Impact Assessment

5.1 Screening Assessment

Impacts from the operational phase of the Proposed Development have been assessed utilising the criteria with the IAQM's guidance document *'Land-Use Planning & Development Control: Planning for Air Quality (2017)'*.

Stage 1 is intended to screen out smaller development and/or developments whereby impacts can be considered to have insignificant effects as follows:

Stage 1:

- If any of the following apply:
  - 10 or more residential units or a site area of more than 0.5ha; or
  - More than 1,000 m^2 of floor space for all other uses or a site area greater than 1ha.
- Coupled with any of the following:
  - the development has more than 10 parking spaces; or
  - the development will have a centralised energy facility or other centralised combustion process.

The development proposals will provide 4no. industrial and warehousing units, with approx. 5,500m^2 of floor space, all of which with associated parking spaces with a total of 58no. vehicular spaces – and as such, the Stage 2 criteria should be considered. The results of the Stage 2 screening can be seen in Table 5.1.

Table 5.1 Stage 2 Operational Phase Screening Assessment

Indicative Criteria to Proceed to an Air Quality Assessment	Indicative Criteria to Proceed to an Air Quality Assessment
A change of LDV flows of: - more than 100 AADT within an AQMA.	Net Change = 1320 AADT
A change of HDV flows of: - more than 25 AADT within an AQMA.	Net Change = 71 AADT
Where the change is 5m or more and the road is within an AQMA.	N/A
Introduce a new junction or remove an existing junction near to relevant receptors. Applies to junctions that cause traffic to significantly change vehicle accelerate/decelerate, e.g. traffic lights, or roundabouts.	N/A
Introduce or change a bus station. Where bus flows will change by: - more than 100 AADT outside an AQMA.	N/A
Have an underground car park with extraction system	N/A
Have one or more substantial combustion processes, where there is a risk of impacts at relevant receptors.	The Proposed Development will not include any combustion processes as the fitout and plant for each unit will be determined by the tenants.

Traffic data for the Proposed Development has been provided by the Project Transport Consultants Vectos (Part of SLR). Worst case trip generations have been calculated based on the flexible uses available E(g)(iii)/B2/B8. As such private vehicle and LGV trips are based on 100% of the Site being E(g)(iii)/B2 and HGV trips calculated on the Site being 100% HGV use.

The criteria for an increase in LGV and HGV trips as detailed in Table 5.1 will be exceeded, as such further assessment of operational traffic related impacts is required.

No combustion plant is proposed as part of the design of the development, and as such have not been considered further within this assessment. It is understood that the Proposed Development will utilise Air Source Heat Pumps (ASHPs) supported by PV Cells.

6.0 Quantitative Impact Assessment

6.1 Dispersion Modelling Methodology

Traffic-related air pollutant concentrations (namely NOx and PM_{10}) were predicted at the nearest sensitive locations using the dispersion model ADMS-Roads (version 5.0.0.1). This model is a new generation dispersion modelling system developed by Cambridge Environmental Research Consultants (CERC) which can be used to assess the impact of road vehicle emissions on local air quality. The model is widely used by Local Authorities in the UK as part of their review and assessment obligations.

Traffic Data

Annual Average Daily Traffic (AADT) data for the Proposed Development and distribution onto the local road network was provided by the project transport consultants, Vectos (part of SLR). AADT flows were classified as Light Duty Vehicles (LDVs) (i.e. cars and vans) and Heavy-Duty Vehicles (HDVs). Figure 5 shows the location of the roads included within the dispersion model domain and Appendix B outlines the traffic data used in the modelling relating to the affected roads.

The traffic data utilised within the assessment presents the worst case potential increases in LGV and HGV movements based on the flexible land use classes applied for.

Three scenarios have been modelled as follows:

- Scenario 1 – Base Year 2019 Verification Model
- Scenario 2 – Future Year 2026 Without Development Model
- Scenario 3 – Future Year 2026 With Development Model.

It is deemed that 2019 is a more suitable year for model verification than 2020 or 2021 due to the impact of the Covid-19 Pandemic. The 'With Development' scenario accounts for the future base traffic flows, with the additional trips generated by the Proposed Development added.

Base traffic flow data was obtained from the LAEI 2019 transport dataset. TEMPro factors were utilised to uplift the Base 2019 data to Base 2026 data. The TEMPro factors account for the predicted growth and development in an area and thus provide scope for cumulative developments to be considered within the assessment. The factors applied assumed the average growth across the MSOA areas in the vicinity of the Site as follows:

- Hillingdon 027;
- Hillingdon 028;
- Hillingdon 030;
- Hillingdon 031; and
- Hillingdon 032.

The uplift factor was 1.06464, an increase of 6.464%.

Speed data were obtained from the LAEI transport dataset. Areas close to junctions or in known congestion areas were reduced to 20kph in line with the LAQM.TG(22) guidance document.

Road widths were determined utilising GIS and Satellite imagery. A national diurnal transport .fac file for 2019 was input into the model domain to account for variations in traffic volumes throughout the day. The diurnal profile utilised is shown in Figure 6.

Receptors

High sensitivity receptors to air quality include areas where the occupants are likely to be exposed to air quality over a long period or are areas where the most vulnerable in society to air quality, such as the young, old or medically susceptible to lung or cardiac issues reside over a long period. As such the receptors typically include residential properties, schools, care homes, medical centres and hospitals. The annual mean and short term air quality objectives as set out within Table 2.1 apply at these receptors.

Places of work, outdoor areas such as streets or parks and areas where users would not typically spend more than a couple of hours, such as a restaurant or physio, are considered to be medium or low sensitivity receptors and as such only the short term objectives apply to these receptors.

For this assessment, a selection of high sensitivity receptors have been selected to represent the worst case pollutant concentrations across the affected road network, such as the receptor in closest proximity to a road, junction or known congestion area, including within the nearby AQFAs.

The location of the receptors included within the model domain have been provided in Table 6.1 and are shown in Figure 5.

Table 6.1 Selected Sensitive Receptors

ID	Receptor Address	OS Coordinates (m)		
		X	Y	Z
ER1	Education – Wood End Park Academy	508380.4	180926.6	1.5
ER2	Residential – A437 Dawley Road, Dawley Parade	508541.3	180685.8	1.5
ER3	Commercial – A437 Dawley Road, Swallowfield Way Roundabout	508900.2	179984.6	1.5
ER4	Residential – A437 Dawley Road, Blyth Road	508998.2	179712.8	1.5
ER5	Residential – A437 Dawley Road	508999.8	179705.6	1.5
ER6	Residential – A437 Dawley Road / A437 North Hyde Road Roundabout	509025.2	179401.3	1.5
ER7	Residential – A437 North Hyde Road Roundabout	509277.8	179368.6	1.5
ER8	Residential – A437 North Hyde Road Roundabout / Albert Road	509432.2	179263.6	1.5
ER9	Residential – A437 North Hyde Road Roundabout / Station Road	509490.7	179252.1	1.5
ER10	Residential – A437 North Hyde Road Roundabout / Old Station Road	509554.4	179191.1	1.5
ER11	Residential – A437 North Hyde Road Roundabout	510268.3	178876.1	1.5
ER12	Residential – A437 North Hyde Road Roundabout	510327.3	178861.7	1.5
ER13	Residential – Minet Drive / A312 The Parkway	510692.5	179857.6	1.5
ER14	Religious – St Dunstan's, Cranford House Stable	510129.1	178198.0	1.5
ER15	Residential – Cleave Avenue	509438.9	178372.7	1.5
ER16	Residential – A437 High Street	509214.0	178421.1	1.5
ER17	Residential – Roseville Road	510141.9	178341.8	1.5
ER18	Residential – A437 Dawley Road / A437 North Hyde Road Roundabout	508994.8	179295.8	1.5
ER19	Residential – A437 Dawley Road / A437 North Hyde Road Roundabout	509004.1	179279.8	1.5
ER20	Residential – Dawley Road, Station Road	509094.6	178772.5	1.5

ID	Receptor Address	OS Coordinates (m)		
		X	Y	Z
ER21	Residential – Shepiston Lane, Station Road	509085.3	178741.6	1.5
ER22	Hotel – Mercure Heathrow	509027.4	178420.6	1.5
ER23	Residential – Vine Close	507207.6	178631.6	1.5
ER24	Residential – Keats Way	506755.1	178577.8	1.5
ER25	Residential – The Brambles	506218.3	178504.0	1.5
ER26	Hotel – Holiday Inn	507317.3	178458.8	1.5
ER27	Hotel – Premier Inn	507785.0	178594.3	1.5
ER28	Residential – Cherry Lane	507223.3	178812.3	1.5
ER29	Residential – A408 Stockley Road / Lavender Rise	507590.8	179592.6	1.5

Emission Factors

Road transport emissions of NOx, PM_{10} and $PM_{2.5}$ were calculated using the latest UK vehicle emission factors toolkit (EFT) (version 11.0) provided by Defra, and then input into the ADMS-Roads model (version 5.0.0.1).

Emission factors for the year 2019 were utilised for the verification scenario. For a conservative assessment, emission factors for 2024 were utilised for the future year 2026, assuming that no improvement in vehicle emission technology or fleet turnover between 2024 – 2026. This is a cautious approach given the uptake in electric vehicles, national, regional and local policy drive to improve air quality and restrictions to vehicle emissions imposed on manufacturers and consumers within Clean Air Zones (CAZs) and the Ultra Low Emission Zone (ULEZ). However, Defra's future assumptions on fleet turnover have often led to overpredictions on the reduction of NO_x emissions from vehicles, as such, the approach is considered to be appropriate.

Meteorological Data

Hourly sequential 2019 meteorological data set from the station based at Heathrow Airport was used in the dispersion modelling. The station is located approximately 3.5km south of the Site. The data provides information on hourly wind speed and direction and the extent of cloud cover. A wind rose of meteorological data at this station is shown in Figure 7. The figure shows a prevailing south-westerly winds.

Surface Roughness and Monin-Obukhov Length

Surface roughness represents the extent of mechanical turbulence in the atmosphere caused by the roughness of the ground over which the air is passing. A surface roughness length of 1m (cities and woodland) was used at the study area and 0.5m (Parkland/Open Suburbia) at the meteorological measurement site. London Heathrow is a large open area with mainly Suburban homes in the vicinity, whereas the Site are reflects a more inner city dynamic.

The Monin-Obukhov length represents the stability of the atmosphere. In very stable conditions such as rural areas, the value is typically between 2-20m. For large urban areas, there is a significant amount of heat generated by buildings and traffic which warms the air above the city creating an effect called urban heat island. A Monin-Obukhov length of 30m was used for the study are and at the meteorological measurement site.

Background Concentrations and NOx Chemistry

The model was used to predict NOx road contribution concentrations at the selected receptor points. These values were then added to relevant ambient background concentrations to enable the comparison with air quality objectives. NOx, NO_2 and PM_{10} background concentrations were obtained from Defra's national background maps. Background concentrations for the year 2019 were used in

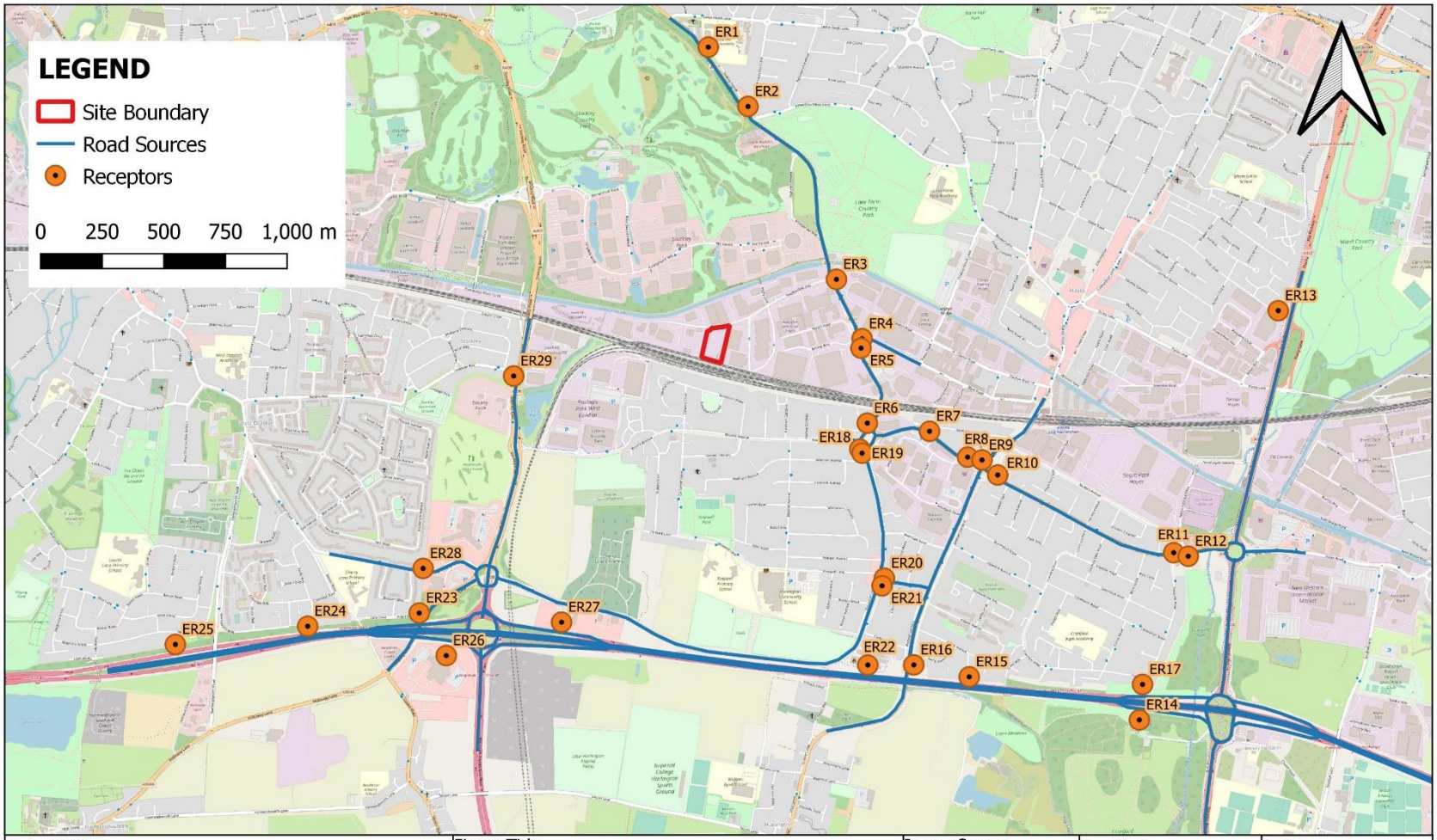
the verification assessment. Background values for the base year 2019 were used in all other assessment scenarios in order to provide a conservative assessment, predicting no improvement in background air quality between 2019 - 2024 reducing model uncertainty relating to future background pollution predictions.

Background concentrations were added to the predicted road increment to give the total pollutant concentrations at receptor points. The NOx to NO_2 conversion spreadsheet (version 8.1)[1], available from Defra's LAQM website, has been used to calculate NO_2 concentrations from established NOx concentrations.

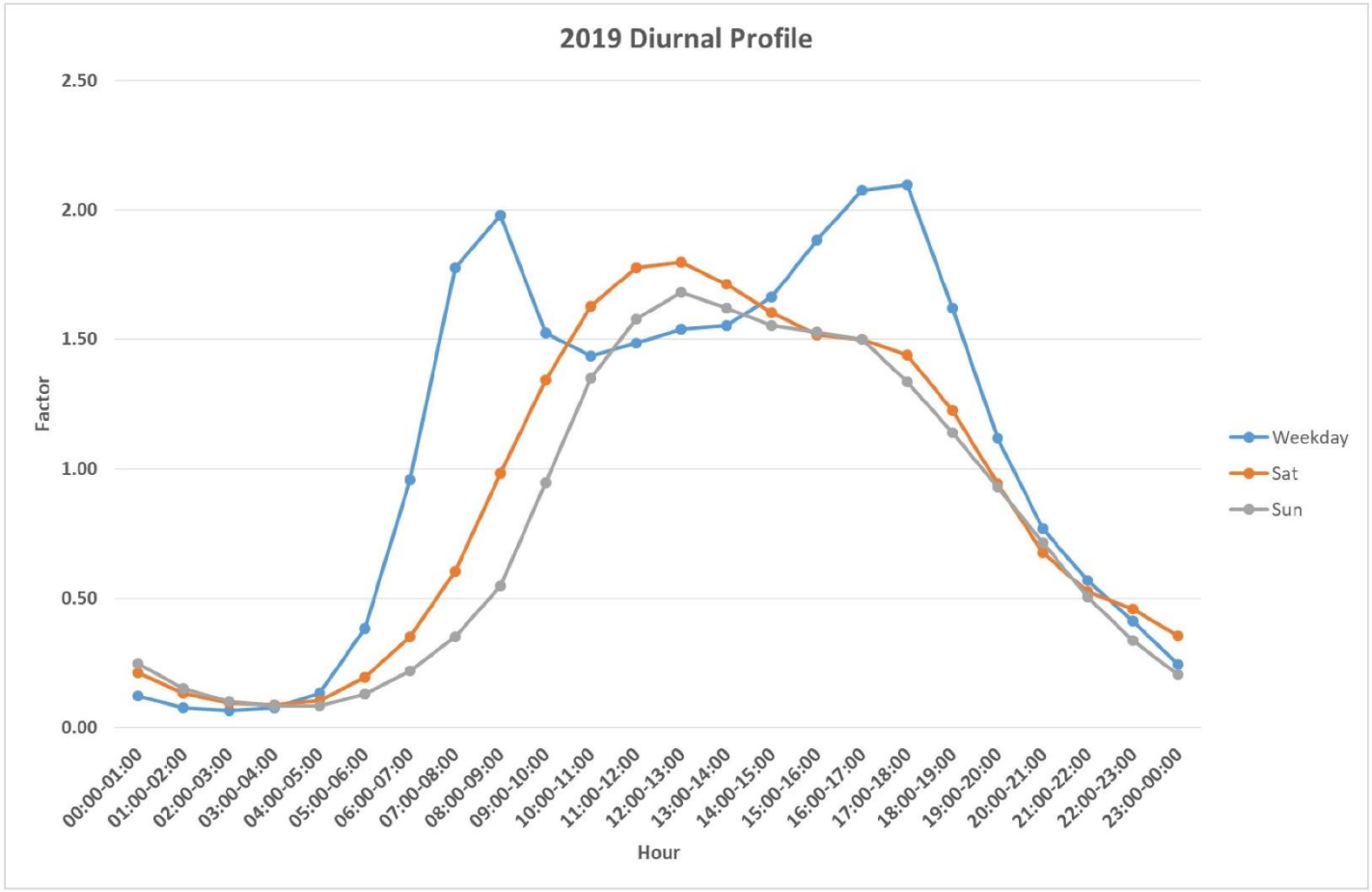
Model Output

This assessment has focused on the modelling of the long term annual mean pollutant concentrations. The reason being is that it is inherently more difficult to make satisfactory predictions for short-term behaviour of pollutants as these will be highly variable from year to year, and from site to site.

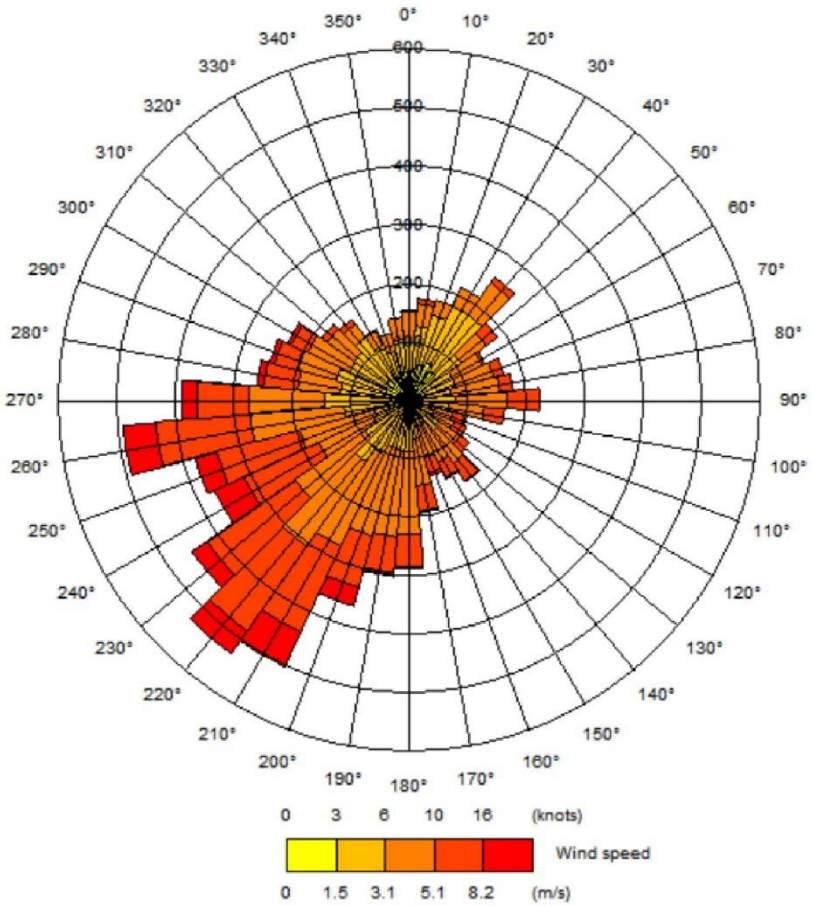
[1] https://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html#NOxNO2calc



Project Title	Figure Title	Image Source	Map Scale	Author
Swallowfield Way, Hayes	Road Sources and Receptors Included in Model Domain	OSM Standard	1:20000	
Client	**Figure Reference**	**Date**	**Version No.**	**Approver**
Wrenbridge (FRELD Hayes) LLP	Figure 5	08/05/2023	01	



Project Title	Figure Title	Image Source	Map Scale	Author
Swallowfield Way, Hayes	UK Road Transport Diurnal Profile 2019	N/A	N/A	
Client	**Figure Reference**	**Date**	**Version No.**	**Approver**
Wrenbridge (FRELD Hayes) LLP	Figure 6	08/05/2023	01	



Project Title	Figure Title	Image Source	Map Scale	Author
Swallowfield Way, Hayes	Heathrow Airport Meteorological Station Wind Rose 2019	N/A	N/A	
Client	**Figure Reference**	**Date**	**Version No.**	**Approver**
Wrenbridge (FRELD Hayes) LLP	Figure 7	08/05/2023	01	

6.2 Model Verification and Adjustment

It is necessary to compare the modelled results versus monitored results at relevant locations to enable the adjustment of model outputs and minimise the inherent uncertainties associated with dispersion modelling.

As noted, due to the Covid-19 pandemic, 2020 and 2021 monitoring data has been altered by transport affected by lockdowns and a general change in behaviour. As such, it is deemed that 2019 is a more suitable year for model verification.

As noted in Section 3, the study area has two different road source types. The predominant road links affected by the increase in traffic volumes are A Roads, however the M4 Corridor presents significantly higher traffic volumes. As such, two verification factors have been calculated, with each individual receptor assigned to one of each of the verification factors based on their geographical proximity.

Factor 1 has utilised the Automatic Monitoring Station HIL 5 and Diffusion Tube HILL07. This represents locations in proximity to the local road network.

Factor 2 has utilised the Automatic Monitoring Station HIL and Diffusion Tube HILL26. This represents the M4 Corridor.

Annual Mean NO_2 concentrations measured at these sites were compared against modelled concentrations predicted from traffic emissions modelling at the same points. The traffic data used in this modelling is presented in Appendix B and the following assumptions and inputs were included:

- 2019 monitoring data from LBH's Annual Status Report 2022;
- 2019 traffic data provided by LAEI 2019 (see Appendix B);
- 2019 meteorological data from Heathrow Airport;
- 2019 vehicle emission factors from EFT v11 (2VC); and
- 2019 annual mean NOx and NO_2 background concentrations from Defra's national background maps

For Factor 1, the results indicated (see Appendix C) that the model underpredicted annual mean NO_2 concentrations and therefore an adjustment factor of **2.781**. This factor was applied to the modelled NOx, PM_{10} and $PM_{2.5}$ road increments for all assessment scenarios at each receptor.

For Factor 2, the results indicated (see Appendix C) that the model underpredicted annual mean NO_2 concentrations and therefore an adjustment factor of **2.077**. This factor was applied to the modelled NOx, PM_{10} and $PM_{2.5}$ road increments for all assessment scenarios at each receptor.

Based on geographical location, the factors were applied to each individual receptor as follows:

Table 6.2 Verification Factor Assigned to each Individual Receptor

Receptor ID	Verification Factor	Receptor ID	Verification Factor
ER1	Factor 1	ER16	Factor 2
ER2	Factor 1	ER17	Factor 2
ER3	Factor 1	ER18	Factor 1
ER4	Factor 1	ER19	Factor 1
ER5	Factor 1	ER20	Factor 1
ER6	Factor 1	ER21	Factor 1

Receptor ID	Verification Factor	Receptor ID	Verification Factor
ER7	Factor 1	ER22	Factor 2
ER8	Factor 1	ER23	Factor 2
ER9	Factor 1	ER24	Factor 2
ER10	Factor 1	ER25	Factor 2
ER11	Factor 1	ER26	Factor 2
ER12	Factor 1	ER27	Factor 2
ER13	Factor 1	ER28	Factor 1
ER14	Factor 2	ER29	Factor 1
ER15	Factor 2		

6.3 Assessment Results

Annual mean NO_2, PM_{10} and $PM_{2.5}$ predicted concentrations, at the modelled high sensitivity receptors, are presented in Table 6.3. Concentrations are included for the 'Without Development' 2026 and 'With Development' 2026 scenarios.

Results are compared to the relevant NAQO (i.e. Air Quality Assessment Levels AQAL). Also, in accordance with the IAQM significance criteria detailed in Table 2.3 of this report, each receptor was assessed to determine the significance of impacts that the development would have on each of the modelled receptors. This impact is determined by comparing the change in concentration between the 'Without Development' scenario and 'With Development' scenario relative to the AQAL (i.e. the NAQO).

Long-term annual mean NO_2 concentrations

Long term annual mean NO_2 concentrations have been compared against the current UK annual mean NAQO of 40 µg/m^3. Three receptors are predicted to exceed the annual mean NAQO both with and without the Proposed Development. No new exceedances of the NAQO will occur as a result of the Proposed Development.

The maximum increase in NO_2 concentrations is predicted to be 0.4 µg/m^3 at receptor ER4 which is located at the junction of Blythe Road and the A437 Dawley Road. 75% of the additional trips produced by the Proposed Development will utilise the A437 Dawley Road south of Swallowfield Way, however beyond the roundabout with A437 North Hyde Road the traffic disperses further and the impact upon any one road link is lessened. The predicted impact at ER4 is considered to be negligible.

The maximum impact is 'Slight Adverse' at two receptors, located at the junction of Dawley Road, Station Road and Shepiston Lane. The increase in NO_2 concentrations represents 1% of the AQAL. The impact on local air quality is considered to be 'not significant'.

Long-term annual mean PM concentrations

Results is Table 6.3 indicate that annual mean PM_{10} and $PM_{2.5}$ concentrations are predicted to be well below the existing UK NAQOs of 40 µg/m^3 and 20 µg/m^3 respectively at all the modelled receptors. All impacts when considered against the existing UK NAQOs are negligible.

However, the assessment has further considered the results against the lower guidance levels of 20 µg/m^3 for PM_{10} and 10 µg/m^3 for $PM_{2.5}$ respectively.

2019 PM_{10} background concentrations are typically 80-90% of the 20 µg/m^3 AQAL. As such, many of the receptors located roadside to the main roads exceed both with and without the Proposed Development. The maximum impact is considered to be 'slight adverse' at receptors ER4, ER5 and ER21, located on the A437 Dawley Road.

The 2019 background $PM_{2.5}$ concentrations are above the 10 µg/m^3 and as such all receptors are already in exceedance of the NAQO. The maximum impact is considered to be 'slight adverse' at receptors ER4, ER5 and ER21, located on the A437 Dawley Road.

Given the conservative nature of the assessment and high existing background, the increases in PM_{10} and $PM_{2.5}$ concentrations are negligible. As such the impacts on local air quality are considered to be 'not significant'.

Short-term pollutant concentrations

LAQM.TG(22) guidance suggest that exceedances of the hourly mean NO_2 objective are unlikely to occur where the annual mean is below 60µg/m^3. Also, it suggests that 32µg/m^3 is the annual mean concentration above which an exceedance of the 24-hour mean PM_{10} concentration is possible.

Accordingly, the NO_2 hourly mean concentrations and PM_{10} 24-hour mean concentrations are predicted to be below their relevant objectives as their annual mean objectives are below 60µg/m^3 and 32 µg/m^3 respectively at all receptors. The impact on local air quality is considered to be 'not significant'.

Table 6.3: Predicted Annual Mean NO_2, PM_{10} and $PM_{2.5}$ Concentrations (µg/m^3) and Associated Impact

Receptor ID	Background 2019	Without Development 2026	With Development 2026	Change in Concentration	% Change in Concentration Relative to AQAL	Long term average Concentration at receptor in assessment year	Significance of Impact
NO_2 Impact							
ER1	22.6	25.5	25.6	0.1	<0.5%	75% or less of AQAL	Negligible
ER2	22.6	26.8	26.9	0.1	<0.5%	75% or less of AQAL	Negligible
ER3	26.5	31.9	32.1	0.2	1%	76-94% of AQAL	Negligible
ER4	26.5	35.4	35.8	0.4	1%	76-94% of AQAL	Negligible
ER5	26.5	34.8	35.1	0.3	1%	76-94% of AQAL	Negligible
ER6	26.8	32.5	32.7	0.2	1%	76-94% of AQAL	Negligible
ER7	26.8	32.3	32.5	0.2	1%	76-94% of AQAL	Negligible
ER8	26.8	32.0	32.1	0.2	1%	76-94% of AQAL	Negligible
ER9	26.8	33.9	34.1	0.2	1%	76-94% of AQAL	Negligible
ER10	26.8	34.9	35.0	0.1	<0.5%	76-94% of AQAL	Negligible
ER11	31.3	39.1	39.2	0.1	<0.5%	95-102% of AQAL	Negligible
ER12	31.3	39.6	39.7	0.1	<0.5%	95-102% of AQAL	Negligible
ER13	28.2	31.3	31.3	0.0	<0.5%	76-94% of AQAL	Negligible
ER14	31.3	39.4	39.4	0.0	<0.5%	95-102% of AQAL	Negligible
ER15	29.8	39.6	39.6	0.0	<0.5%	95-102% of AQAL	Negligible
ER16	29.8	38.8	38.8	0.0	<0.5%	95-102% of AQAL	Negligible
ER17	31.3	38.9	38.9	0.0	<0.5%	95-102% of AQAL	Negligible
ER18	26.5	31.2	31.3	0.1	<0.5%	76-94% of AQAL	Negligible
ER19	26.8	32.2	32.3	0.1	<0.5%	76-94% of AQAL	Negligible
ER20	29.8	**40.1**	**40.3**	0.2	<1%	95-102% of AQAL	Slight Adverse
ER21	29.8	39.0	39.3	0.3	1%	95-102% of AQAL	Slight Adverse
ER22	29.8	38.6	38.7	0.0	<0.5%	95-102% of AQAL	Negligible

Receptor ID	Background 2019	Without Development 2026	With Development 2026	Change in Concentration	% Change in Concentration Relative to AQAL	Long term average Concentration at receptor in assessment year	Significance of Impact
ER23	32.0	**40.2**	**40.2**	0.0	<0.5%	95-102% of AQAL	Negligible
ER24	28.9	37.1	37.1	0.0	<0.5%	76-94% of AQAL	Negligible
ER25	28.9	34.4	34.4	0.0	<0.5%	76-94% of AQAL	Negligible
ER26	32.0	39.6	39.6	0.0	<0.5%	95-102% of AQAL	Negligible
ER27	32.0	**40.5**	**40.5**	0.0	<0.5%	95-102% of AQAL	Negligible
ER28	32.0	36.7	36.7	0.0	<0.5%	76-94% of AQAL	Negligible
ER29	26.2	34.3	34.4	0.1	<0.5%	76-94% of AQAL	Negligible
PM_{10} Impact							
ER1	16.4	17.29	17.31	0.02	<0.5%	76-94% of AQAL	Negligible
ER2	16.4	17.60	17.62	0.02	<0.5%	76-94% of AQAL	Negligible
ER3	17.0	18.39	18.44	0.05	<0.5%	76-94% of AQAL	Negligible
ER4	17.0	19.48	19.60	0.11	1%	95-102% of AQAL	Slight Adverse
ER5	17.0	19.43	19.54	0.11	1%	95-102% of AQAL	Slight Adverse
ER6	16.9	18.48	18.55	0.06	<0.5%	76-94% of AQAL	Negligible
ER7	16.9	18.42	18.48	0.06	<0.5%	76-94% of AQAL	Negligible
ER8	16.9	18.29	18.34	0.05	<0.5%	76-94% of AQAL	Negligible
ER9	16.9	18.77	18.81	0.04	<0.5%	76-94% of AQAL	Negligible
ER10	16.9	19.07	19.10	0.03	<0.5%	95-102% of AQAL	Negligible
ER11	18.1	**20.27**	**20.30**	0.02	<0.5%	95-102% of AQAL	Negligible
ER12	18.1	**20.44**	**20.46**	0.02	<0.5%	95-102% of AQAL	Negligible
ER13	17.4	18.58	18.58	0.00	<0.5%	76-94% of AQAL	Negligible
ER14	18.1	19.77	19.77	0.00	<0.5%	95-102% of AQAL	Negligible
ER15	18.2	**20.18**	**20.18**	0.00	<0.5%	95-102% of AQAL	Negligible
ER16	18.2	**20.15**	**20.16**	0.01	<0.5%	95-102% of AQAL	Negligible

Receptor ID	Background 2019	Without Development 2026	With Development 2026	Change in Concentration	% Change in Concentration Relative to AQAL	Long term average Concentration at receptor in assessment year	Significance of Impact
ER17	18.1	19.69	19.69	0.00	<0.5%	95-102% of AQAL	Negligible
ER18	17.0	18.18	18.21	0.03	<0.5%	76-94% of AQAL	Negligible
ER19	16.9	18.34	18.37	0.02	<0.5%	76-94% of AQAL	Negligible
ER20	18.2	**20.90**	**20.94**	0.04	<0.5%	95-102% of AQAL	Negligible
ER21	18.2	**20.65**	**20.75**	0.10	<1%	95-102% of AQAL	Slight Adverse
ER22	18.2	**20.07**	**20.08**	0.02	<0.5%	95-102% of AQAL	Negligible
ER23	17.8	19.76	19.77	0.02	<0.5%	95-102% of AQAL	Negligible
ER24	17.6	19.41	19.42	0.01	<0.5%	95-102% of AQAL	Negligible
ER25	17.6	18.79	18.79	0.00	<0.5%	76-94% of AQAL	Negligible
ER26	17.8	19.42	19.43	0.01	<0.5%	95-102% of AQAL	Negligible
ER27	17.8	19.65	19.66	0.02	<0.5%	95-102% of AQAL	Negligible
ER28	17.8	19.06	19.06	0.01	<0.5%	95-102% of AQAL	Negligible
ER29	17.5	**20.60**	**20.67**	0.07	<0.5%	95-102% of AQAL	Negligible
$PM_{2.5}$ Impact							
ER1	**11.1**	**11.66**	**11.66**	0.01	<0.5%	>102% of AQAL	Negligible
ER2	**11.1**	**11.84**	**11.85**	0.01	<0.5%	>102% of AQAL	Negligible
ER3	**11.4**	**12.26**	**12.29**	0.03	<0.5%	>102% of AQAL	Negligible
ER4	**11.4**	**12.89**	**12.96**	0.06	1%	>102% of AQAL	Slight Adverse
ER5	**11.4**	**12.86**	**12.92**	0.06	1%	>102% of AQAL	Slight Adverse
ER6	**11.3**	**12.23**	**12.27**	0.04	<0.5%	>102% of AQAL	Negligible
ER7	**11.3**	**12.20**	**12.23**	0.03	<0.5%	>102% of AQAL	Negligible
ER8	**11.3**	**12.12**	**12.15**	0.03	<0.5%	>102% of AQAL	Negligible
ER9	**11.3**	**12.40**	**12.42**	0.02	<0.5%	>102% of AQAL	Negligible
ER10	**11.3**	**12.57**	**12.59**	0.02	<0.5%	>102% of AQAL	Negligible

Receptor ID	Background 2019	Without Development 2026	With Development 2026	Change in Concentration	% Change in Concentration Relative to AQAL	Long term average Concentration at receptor in assessment year	Significance of Impact
ER11	**12.1**	**13.31**	**13.32**	0.01	<0.5%	>102% of AQAL	Negligible
ER12	**12.1**	**13.41**	**13.42**	0.01	<0.5%	>102% of AQAL	Negligible
ER13	**11.6**	**12.22**	**12.22**	0.00	<0.5%	>102% of AQAL	Negligible
ER14	**12.1**	**13.09**	**13.09**	0.00	<0.5%	>102% of AQAL	Negligible
ER15	**12.2**	**13.39**	**13.39**	0.00	<0.5%	>102% of AQAL	Negligible
ER16	**12.2**	**13.33**	**13.34**	0.00	<0.5%	>102% of AQAL	Negligible
ER17	**12.1**	**13.04**	**13.04**	0.00	<0.5%	>102% of AQAL	Negligible
ER18	**11.4**	**12.14**	**12.16**	0.02	<0.5%	>102% of AQAL	Negligible
ER19	**11.3**	**12.16**	**12.17**	0.01	<0.5%	>102% of AQAL	Negligible
ER20	**12.2**	**13.72**	**13.75**	0.02	<0.5%	>102% of AQAL	Negligible
ER21	**12.2**	**13.58**	**13.63**	0.05	1%	>102% of AQAL	Slight Adverse
ER22	**12.2**	**13.31**	**13.32**	0.01	<0.5%	>102% of AQAL	Negligible
ER23	**11.8**	**13.04**	**13.05**	0.01	<0.5%	>102% of AQAL	Negligible
ER24	**11.7**	**12.82**	**12.82**	0.00	<0.5%	>102% of AQAL	Negligible
ER25	**11.7**	**12.43**	**12.43**	0.00	<0.5%	>102% of AQAL	Negligible
ER26	**11.8**	**12.85**	**12.85**	0.00	<0.5%	>102% of AQAL	Negligible
ER27	**11.8**	**12.98**	**12.99**	0.01	<0.5%	>102% of AQAL	Negligible
ER28	**11.8**	**12.58**	**12.59**	0.00	<0.5%	>102% of AQAL	Negligible
ER29	**12.0**	**13.76**	**13.79**	0.04	<0.5%	>102% of AQAL	Negligible

Values in **bold** exceed that NO_2 NAQO of 40µg/m^3 PM_{10} NAQO of 20µg/m^3 and $PM_{2.5}$ NAQO of 10µg/m^3.

7.0 Mitigation Measures

7.1 Construction Phase

Construction Dust

The mitigation measures outlined below will be implemented to minimise the potential of adverse construction dust impacts throughout all the relevant construction stages.

Demolition

- Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).
- Ensure 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 or mechanical alternatives.
- Bag and remove any biological debris or damp down such material before demolition.

Earthworks and Construction

- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out unless required for a particular process;
- Mix large quantities of cement, grouts and other similar materials in enclosed areas remote from site boundaries and potential receptors;
- Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery; and
- For small supplies of fine powder ensure bags are sealed after use and are stored appropriately to prevent dust release.

Trackout

- Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use.
- Avoid dry sweeping of large areas.
- Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.

General Mitigation Measures

- Ensure regular cleaning of hard standing surfaces using wet sweeping methods;
- Display the head or regional office contact information, and the name and contact details of person(s) accountable for air quality on the site boundary;
- Log all air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record all measures taken. Make the complaints log available to the Local Authority when asked;
- Carry out regular on-site and off-site visual inspections to monitor dust soiling effects, with cleaning to be provided if necessary. Increase the frequency of inspections when activities with a high potential to produce dust are being carried out;
- Erect barriers around the site, any dusty activities and stockpiles (to be covered);

- Screen areas of the building, where dust producing activities are taking place, with debris screens or sheeting;
- Fully enclose site or specific operations where there is a high potential for dust production and the Site is active for an extensive period;
- Remove materials that have a potential to produce dust as soon as possible, unless being re-used. If they are to be re-used, on-site covers should be used;
- Ensure all vehicles switch off engines when stationary, no idling vehicles;
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine sprays on such equipment wherever possible; and
- Avoid bonfires and the burning of waste materials.

It is important that attention is paid to any construction/demolition activity that takes place near the site boundary, particularly at the location closest to sensitive receptors.

The implementation of the specific mitigation measures given above will ensure that the potential adverse impacts from construction dust during all construction stages are avoided. It is noted in the IAQM Guidance (Holman et al, 2014) that through the use of effective mitigation, the effects of dust associated with construction activity will not normally be significant.

Construction Traffic and Plant

As previously stated, there is potential for air pollutant impacts to arise from construction plant and vehicles associated with the scheme. Currently the number of construction vehicles and construction plant have not been confirmed, however BAT (Best Available Technology) should still be implemented during the construction phase.

The recommended construction traffic and plant mitigation measures are as follows:

- All vehicles should switch off engines when stationary, no idling vehicles;
- All non-road mobile machinery (NRMM) should use ultra-low sulphur diesel (ULSD) where available;
- Minimise the movement of construction traffic around the site;
- Maximise efficiency (this may include alternative modes of transport and maximising vehicle utilisation by ensuring full loading and efficient routing);
- Vehicles should be well maintained and kept in a high standard of working order;
- Avoid the use of diesel or petrol-powered generators by using mains electricity or battery powered equipment where possible; and
- Locate plant away from boundaries close to residential areas.

Following the implementation of the measures, the impact of emissions during construction of the proposed development would be **insignificant**.

Emissions standards for NRMM were first established in 2015, however stricter emissions standards were introduced in 2020. From 1st September 2020 NRMM of net power between 37kW and 560kW used within London are required to meet the standards as set out below. This applies to variable speed engines for both NO_x and Particulate Matter emissions. The standards are based upon engine emission standards set out within EU Directive 97/68/EC and its subsequent amendments. NRMM on any site within Greater London will be required to meet Stage IV of the Directive as a minimum.

As Stage IV does not define standards for stationary engines or constant speed engines such as generators, Stage V emission standards would apply.

7.2 Operational Phase

The operational phase assessment has shown that the impact of the Proposed Development on local air quality and existing sensitive receptors is considered to be 'negligible – slight adverse' and as such no further mitigation measures are required.

The operational phase assessment has shown that the impact of the Proposed Development on local air quality and existing sensitive receptors is considered to be 'negligible' and as such no further mitigation measures are required.

This assessment finds that the predicted impacts of the development during operation will be negligible and therefore no further mitigation measures should be required.

The development proposals include for a number of sustainable transport methods inherent within the design including:

- 20% Active / 80% Passive EVCP spaces;
- A total of 24 sheltered cycle parking spaces are proposed, with each unit to be provided with dedicated space for 6 cycle parking spaces. These spaces will be secure, accessible by staff only, and sheltered from the weather.
- Furthermore, there are provisions made for potential cargo bike parking spaces. These spaces are provided in the form of a flexible car parking space. Each unit will have one car parking space that when not in use can be used by up to two cargo bikes.

Furthermore, a Framework Travel Plan (FTP) has been prepared for the Site by Vectos (part of SLR). Measures included within the FTP include:

- Travel information packs to be made available to each Unit;
- Promoting Walking;
- Promoting Cycling;
- Promoting Public Transport;
- Car-Sharing;
- Monitoring and evaluation of car parking.

The overriding TP objectives are to:

- Engage with and encourage staff to use sustainable travel modes to travel to/from the site through effective promotion of sustainable transport; and
- Reduce the amount of single occupied vehicles arriving and departing the site.

A Travel Plan Co-ordinator (TPC) will be hired in order to implement and monitor the FTP. The residual impact of the Proposed Development is considered to be not significant.

8.0 Air Quality Neutral Assessment

The London Plan (2021) Policy 'SI 1 Improving air quality' requires development proposals within Greater London to be at least 'air quality neutral' and not lead to further deterioration of existing poor air quality (such as areas designated as AQMAs). The 'air quality neutral' (AQN) policy is designed to address the problem of multiple new developments that individually add only a small increment to pollution at the point of human exposure (i.e. ambient concentrations), but cumulatively lead to baseline pollution levels creeping up. A method for assessing this is outlined in the London Plan Guidance (LPG) 'Air Quality Neutral' published in February 2023.

The Guidance sets out Building Emissions Benchmarks (BEB) and Transport Emissions Benchmarks (TEB) based upon the Gross Floor Area (m^2) and on-site emissions of NOx and PM_{10}. Developments that do not exceed these benchmarks will be considered to avoid any increase in NOx and PM_{10} emissions.

8.1 Building Emissions Benchmark

With regards to building emissions, the Site does not currently have any combustion sources or boilers. The Proposed Development will be shell only, and as such any plant introduced to the Site will be undertaken by the future tenants. It is understood that electric instantaneous water heaters will be installed be installed in each unit and the preferred option for heating is Air Source Heat Pumps (ASHPs) supplied by PV Cells. Therefore no significant building/energy emissions will be created by the Proposed Development and the Site can be considered AQN with respect to the BEB.

8.2 Transport Emissions Benchmark

With regards to the Transport Benchmark Emissions, it is noted that paragraph 4.1.5 of the AQN guidance states:

> *'The TEB only estimates car or light van trips generated by the development occupiers. These trips are likely to be generated by residents, customers or employees. The TEB does not include trips generated by deliveries and servicing, taxis or heavy vehicle movements from non-occupiers. Assessment of these trips should be captured in the wider air quality impact assessment where one is required.'*

As such only the change in private vehicles accessing the Site are considered within the assessment.

Due to the flexible Land Use Classes the planning application is seeking, the transport benchmark cannot be accurately determined at this time, without the knowledge of the future land uses. For example based on the 'Outer London' trip rates and GEA of 7,780m^2, the following benchmarks could be derived:

- 100% B8 – 50,570 Annual Trips
- 100% B2/E(g)(iii) – 124,480 Annual Trips
- 50/50 E(g)(iii) / B8 – 87,525 Annual Trips

The trips generated for the Air Quality Assessment undertaken in Section 6 of this report were generated for a worst case scenario based on the land use classes available. Of the net increase of 1320 LGVs, approximately 56% of those vehicles would be private use under the worst case, representing 739 AADT. With the existing mitigation measures in place of a FTP, accounting for a 5% reduction in private trips, and an assumed initial 2% EV/Hybrid usage, the resultant daily trip rate for the Proposed Development would be 687 AADT. This would annually generate 250,755 vehicle trips, which exceeds the above noted benchmarks.

It is therefore considered likely that the Proposed Development will not be considered Air Quality Neutral with respect to transport emissions. However this is based on the 'worst case' vehicle trips. It is therefore proposed that TRC and the Applicant will engage with the LPA following submission of the planning application to determine proportionate offsetting measures..

9.0 Conclusions

TRC Companies Ltd, was commissioned by Wrenbridge (FRELD Hayes) LLP to undertake an Air Quality Assessment in order to support a full planning application for a proposed development at 84 Swallowfield Way, Hayes, Middlesex, UB3 1DQ. This assessment considers the air quality impacts associated with both the construction and operation of the development. Likely changes to air quality in the area, as a result of the proposed development have been considered in relation to the National Air Quality Objectives (NAQO). Where required, the air quality assessment considers mitigation measures to reduce the effect of the proposed development upon local air quality.

A desktop study of baseline air quality has been undertaken with a review of local authority monitoring data and Defra background concentrations. The Site is located within London Borough of Hillingdon's Air Quality Management Area and within close proximity to a number of Air Quality Focus Areas, notably Hayes Town Centre and the M4 Corridor. Historic monitoring data in the vicinity of Site has shown exceedances of the annual mean NO_2 NAQO.

As per the LAQM.TG(2216) guidance document, the annual mean NAQOs do not apply to places of work and therefore the hourly mean NO_2 NAQO would apply to the Site. Hourly NO_2 concentrations recorded at the HIL5 and HIL Automatic Monitors show that the 200µg/m^3 NAQO has not been exceeded during any hour in the last four years and neither the hourly mean NO_2 nor daily mean PM_{10} NAQOs has been exceeded in the last six years. The indicative criteria for an exceedances of the 1-hr mean NO_2 and 24-hr mean PM10 are not met at any monitoring location in the vicinity of the Site. Therefore the Site is deemed as suitable for the proposed uses and future occupants/users of the Site will not be exposed to unacceptable air quality.

A qualitative construction dust risk assessment has been undertaken in line with the relevant IAQM and GLA guidance documents. The impact of the construction phase without mitigation measures on dust soiling of local properties is 'negligible - low risk' and with respect to human health is 'negligible – low risk'. Best practice mitigation measures have been proposed formalised within the submitted Construction Environmental Management Plan. With the implementation of the mitigation measures, the overall impact is considered to be 'not significant'.

The impact of emissions associated with operational traffic movement on local air quality were assessed using the air dispersion model ADMS-Roads, focussing on high sensitivity receptors within or adjacent to the nearby roads affected by the operational phase of the Proposed Development. The assessment was undertaken in a conservative manner, assuming no improvement in vehicle emissions technology nor fleet turnover beyond 2024 and no improvement in background concentrations beyond 2019.

The impact significance was assessed in accordance with the relevant IAQM Guidance. Traffic-related pollutant concentrations (NO_2, PM_{10} and $PM_{2.5}$) were predicted at 29no. selected sensitive receptors located along the local road network affected by operational traffic. The predicted increases in NO_2, PM_{10} and $PM_{2.5}$ concentrations in the vicinity of the Site are predicted to be 'negligible – slight adverse'. The impact of the operational phase of the assessment is considered to be 'not significant'.

Furthermore, no energy combustion source is to be implemented as part of the proposals and therefore the operational impact is considered to be negligible. The overall impact of the operational phase on local air quality and sensitive receptors is considered to be 'not significant'.

An air quality neutral assessment has been undertaken. With regards to building emissions, no combustion process is included as part of the development proposals and as such the development is considered to be air quality neutral with respect to building emissions.

With regards to the Transport Benchmark Emissions, it is noted that paragraph 4.1.5 of the AQN guidance states:

'The TEB only estimates car or light van trips generated by the development occupiers. These trips are likely to be generated by residents, customers or employees. The TEB does not include trips generated by deliveries and servicing, taxis or heavy vehicle movements from non-occupiers. Assessment of these trips should be captured in the wider air quality impact assessment where one is required.'

As such only the change in private vehicles accessing the Site are considered within the assessment. Due to the flexible nature of the planning application, deriving a transport emissions benchmark at this time is not possible. A worst case assessment has shown that the Proposed Development is likely to not be Air Quality Neutral with respect to transport emissions, however further assessment is required. It is therefore proposed that TRC and the Applicant will engage with the LPA following submission of the planning application to determine proportionate offsetting measures.

In conclusion, the development will have insignificant impacts on local air quality during its respective construction and operation phases.

10.0 Limitations and Exclusions

10.1 Reliance

The recommendations contained in this report represent TRC's professional opinions, based upon the currently available information, and are arrived at in accordance with currently acceptable professional standards. This report is based upon a specific scope of work requested by the Client. The contract between TRC and its Client outlines the scope of work, and only those tasks specifically authorized by that contract or outlined in this report were performed. This report is intended only for the use of TRC's Client and anyone else specifically identified in writing by TRC as a user of this report. TRC will not and cannot be liable for unauthorized reliance by any other third party. Other than as contained in this paragraph, TRC makes no express or implied warranty as to the contents of this report.

10.2 Third Party Information

TRC has been provided with information from third parties for information purposes only and without representation or warranty, express or implied as to its accuracy or completeness and without any liability on such third parties part to revise or update the information. Where reliance has been provided by third parties to potential purchasers, this is noted in our report.

In performing the services to which this report relates, TRC has relied upon the information obtained from third parties. TRC makes no representation or warranty, express or implied as to the accuracy or completeness of any statement or advice contained within this report that is based upon the information obtained from third parties and to the fullest extent permissible by law we hereby exclude any and all liability we may have in respect of the same, provided that nothing shall be taken as limiting TRC's liability in respect of personal injury (including death) caused by its negligence.

10.3 Interpretation of Findings

TRC's report is based upon the information provided to TRC and TRC's observations made during the subject property reconnaissance. Given the inherent limitations of environmental assessment work, TRC does not guarantee that the subject property is free of additional air pollution sources or considerations, or that latent or undiscovered conditions will not become evident in the future. TRC's report is prepared in accordance with the proposal and the standard terms and conditions agreed between the Client and TRC, and no other warranties, representations, or certifications are made.

11.0 References

The following documents/website were consulted in preparing this report:

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

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

Air Quality Regulations 2010 - Statutory Instrument 2010 No. 1001

The Air Quality Standards (Amendment) Regulations 2016 – Statutory Instrument 2016 No. 1184

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

Defra (202216). Local Air Quality Management Technical Guidance LAQM.TG (2216). April 2016

Defra (2018). Background Maps. See: https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2018

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

Environment Act 1995. HMSO, London

Environment Act 2021. HMSO, London

Environment Protection Act 1990. HMSO, London

Greater London Authority (2019). Local Air Quality Management Technical Guidance LAQM.TG(19)

Greater London Authority (2014). Control of Dust and Emissions During Demolition and Construction Supplementary Planning Guide

Institute of Air Quality Management, (2014). Guidance on the assessment of dust from demolition and construction v1.1

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

Moorcroft and Barrowcliffe et al (2017). Land-Use Planning & Development Control: Planning For Air Quality. V.1.2. Institute of Air Quality Management, London.

London Borough of Hillingdon (2022). London Borough of Hillingdon Air Quality Annual Status Report

London Borough of Hillingdon (2012). Local Plan Part 1 - Strategic policies

London Borough of Hillingdon (2020). Hillingdon Local Plan Part 2: Development Management Policies

The Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020 – Statutory Instruments 2020 No. 1313

Appendix A: Construction Dust Tables

Table A1: Definition of Dust Emission Magnitude

Demolition		
Small	**Medium**	**Large**
Total building volume <20,000m^3 Construction material with low potential for dust release (e.g. Metal cladding or timber) Demolition activities <10m above ground Demolition during wetter months	Total building volume 20,000 - 50,000m^3 Potentially dusty construction material Demolition activities 10 - 20m above ground level	Total building volume >50,000m^3 Potentially dusty construction material (e.g. Concrete) On-site crushing and screening Demolition activities >20m above ground level
Earthworks		
Small	**Medium**	**Large**
Total site area <2,500m^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 Total material moved <10,000 tonnes Earthworks during wetter months	Total site area 2,500m^2 - 10,000m^2 Moderately dusty soil type (e.g. Silt) 5 – 10 heavy earth moving vehicles active at any one time Formation of bunds 4 - 8m in height Total material moved 20,000 - 100,000 tonnes	Total site area >10,000m^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 >8m in height Total material moved >100,000 tonnes
Construction		
Small	**Medium**	**Large**
Total building volume <25,000 m^3 Construction material with low potential for dust release (e.g. Metal cladding or timber)	Total building volume 25,000 - 100,000m^3 Potentially dusty construction material (e.g. Concrete) On-site concrete batching	Total building volume >100,000m^3 On-site concrete batching Sandblasting
Trackout		

Small	Medium	Large
<10 HDV (>3.5t) outward movements in any one day Surface material with low potential for dust release Unpaved road length <50m	10 – 50 HDV (>3.5t) outward movements in any one day Moderately dusty surface material (e.g. High clay content) Unpaved road length 50 – 100m	>50 HDV (>3.5t) outward movements in any one day Potentially dusty surface material (e.g. High clay content) Unpaved road length >100m

Table A2: Examples of receptor sensitivities for various construction effects

Receptor sensitivity	Effects		
	Dust soiling	Elevated PM_{10}	Ecological
High	Users can reasonably expect an enjoyment of a high level of amenity. The appearance, aesthetics or value of their property would be diminished by soiling; and the people or property would reasonably be expected a to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land. Indicative examples include dwellings, museum and other culturally important collections, medium- and long-term car parks and car showrooms.	Locations where members of the public are exposed over a period of time relevant to the air quality objective for PM_{10} (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day). Indicative examples include residential properties. Hospitals, schools and residential care homes should also be considered as having equal sensitivity to residential areas for the purposes of this assessment.	Locations with an international or national designation and the designated features may be affected by dust soiling; or Location where there is a community of a particularly dust sensitive species such as vascular species included in the Red Data List for Great Britain An indicative example is a Special Area of Conservation (SAC) designated for acid heathlands adjacent to the demolition of a large site containing concrete (alkali) buildings or for the presence of lichen.
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	Locations where the people exposed are workers, and exposure is over a period of time relevant to the air quality objective for PM_{10} (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day).	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.

Receptor sensitivity	Effects		
	Dust soiling	**Elevated PM_{10}**	**Ecological**
	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. Indicative examples include parks and places of work.	Indicative examples may include office and shop workers but will generally not include workers occupationally exposed to pm_{10}, as protection is covered by health and safety at work legislation.	Indicative examples include a site of special scientific interest (SSSI) with dust sensitive features.
Low	The enjoyment of amenity would not reasonably be expected There is property that 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. Indicative examples include playing fields, farmland (unless commercially-sensitive horticultural), footpaths, short term car parks and roads.	Locations where human exposure is transient. Indicative examples public footpaths, playing fields, parks and shopping streets.	Locations with a local designation where the features may be affected by dust deposition. Indicative example is a local nature reserve with dust sensitive features.

Table A3: Sensitivities of People to Dust Soiling Effects

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
	< 10	Medium	Low	Low	Low
Medium	> 1	Medium	Low	Low	Low
Low	> 1	Low	Low	Low	Low

Table A4: Sensitivities of People to the Health Effects of PM_{10}

Receptor sensitivity	Annual mean PM_{10} concentration	Number of receptors	Distance from the 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	-	>10	High	Medium	Low	Low	Low
	-	1-10	Medium	Low	Low	Low	Low
Low	-	>1	Low	Low	Low	Low	Low

Table A5: 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

Appendix B: Traffic Data

Table B1. Base 2019 Traffic Data – Verification Model

Road Description		Base 2019			
	Road Type	AADT	HGVs	%HGVS	Speed
A437 Dawley Road North of Swallowfield Road	London (Outer)	20939	486	2.32	46.8
A437 Dawley Road South of Swallowfield Road	London (Outer)	20939	486	2.32	39.4
A437 North Hyde Road West of Station Road	London (Outer)	11038	507	4.59	23.5
Station Road North	London (Outer)	12701	2150	16.93	18.1
Station Road South	London (Outer)	17668	1880	10.64	23.4
A437 North Hyde Road East of Station Road	London (Outer)	17982	885	4.92	23.7
A312 The Parkway North	London (Outer)	68994	3719	5.39	57.3
Hayes Road East of The Parkway	London (Outer)	34723	1937	5.58	32.8
A312 The Parkway South	London (Outer)	74329	5209	7.01	51.8
A312 The Parkway South of M4	London (Outer)	83189	4756	5.72	53.25
Heathrow Airport Spur Road	London (Outer)	63339	4321	6.82	79.15
A408 Holloway Lane	London (Outer)	17018	818	4.81	58.3
M4 South of Cherry Lane Roundabout	London (Outer)	38666	2820	7.29	48
Cherry Lane	London (Outer)	5212	573	10.99	38.5
A408 Stockley Road	London (Outer)	69326	1787	2.58	76.8
Shepiston Lane	London (Outer)	21049	981	4.66	48.3
Dawley Road	London (Outer)	12633	502	3.97	25.4
Station Road	London (Outer)	17994	852	4.73	18.3
Blythe Road West of Trevor Way	London (Outer)	9823	273	2.78	21.9
Blythe Road Trevor Way	London (Outer)	2032	93	4.58	24.9
M4 West J4 EB	London (Motorway)	82310	8050	9.78	76
M4 West J4 WB	London (Motorway)	79037	6240	7.90	81.8
M4 West J4 EB Off Slip	London (Motorway)	12739	1237	9.71	43
M4 West J4 WB On Slip	London (Motorway)	31627	2505	7.92	37.5
M4 J4 - J3 EB On Slip	London (Motorway)	21415	1228	5.73	56.3
M4 J4 - J3 WB Off Slip	London (Motorway)	22141	1776	8.02	72

Road Description		Base 2019			
	Road Type	AADT	HGVs	%HGVS	Speed
M4 J4 - J3 EB	London (Motorway)	71201	5787	8.13	54.6
M4 J4 - J3 WB	London (Motorway)	70173	5553	7.91	100.6
M4 J4 - J3 EB Off Slip	London (Motorway)	31941	2693	8.43	72.5
M4 J4 - J3 WB On Slip	London (Motorway)	27728	2409	8.69	48.6
M4 J3 East EB On Slip	London (Motorway)	7030	364	5.18	54.1
M4 J3 East WB Off Slip	London (Motorway)	7876	398	5.05	54.1
M4 J3 East EB	London (Motorway)	45614	3418	7.49	97.2
M4 J3 East WB	London (Motorway)	50507	3561	7.05	93.2
A437 Dawley Road/North Hyde Road Roundabout	London (Outer)	14870	498	3.35	20
North Hyde Road/The Parkway Roundabout	London (Outer)	49007	2938	5.99	20
M4 J3	London (Motorway)	38682	2638	6.82	20
A408/Shepiston Lane/Cherry Lane Roundabout	London (Outer)	30254	1396	4.61	20
M4 J4	London (Motorway)	31655	2315	7.31	20

Table B2. Future Year Traffic Data – Without and With Development Model

Road Description	Base 2026			With Development 2026			Net Change	
	AADT	HGVs	%HGVS	AADT	HGVs	%HGVS	AADT	HGVs
A437 Dawley Road North of Swallowfield Road	22292	517	2.3	22640	535	2.4	348	18
A437 Dawley Road South of Swallowfield Road	22292	517	2.3	23336	571	2.4	1043	53
A437 North Hyde Road West of Station Road	11751	540	4.6	12280	567	4.6	529	27
Station Road North	13522	2289	16.9	13578	2292	16.9	56	3
Station Road South	18810	2002	10.6	19339	2029	10.5	529	27
A437 North Hyde Road East of Station Road	19144	942	4.9	19395	955	4.9	250	13
A312 The Parkway North	73454	3959	5.4	73454	3959	5.4	0	0
Hayes Road East of The Parkway	36967	2062	5.6	37246	2076	5.6	278	14
A312 The Parkway South	79134	5546	7.0	79273	5553	7.0	139	7
A312 The Parkway South of M4	88566	5063	5.7	88566	5063	5.7	0	0
Heathrow Airport Spur Road	67433	4600	6.8	67433	4600	6.8	0	0
A408 Holloway Lane	18118	871	4.8	18535	892	4.8	417	21

Road Description	Base 2026			With Development 2026			Net Change	
	AADT	HGVs	%HGVS	AADT	HGVs	%HGVS	AADT	HGVs
M4 South of Cherry Lane Roundabout	41165	3002	7.3	41193	3004	7.3	28	1
Cherry Lane	5549	610	11.0	5563	611	11.0	14	1
A408 Stockley Road	73807	1903	2.6	74266	2362	3.2	459	459
Shepiston Lane	22410	1044	4.7	22924	1559	6.8	515	515
Dawley Road	13450	534	4.0	13505	537	4.0	56	3
Station Road	19157	907	4.7	19157	907	4.7	0	0
Blythe Road West of Trevor Way	10458	291	2.8	10458	291	2.8	0	0
Blythe Road Trevor Way	2163	99	4.6	2372	110	4.6	209	11
M4 West J4 EB	87631	8570	9.8	87839	8581	9.8	209	11
M4 West J4 WB	84146	6643	7.9	84355	6654	7.9	209	11
M4 West J4 EB Off Slip	13562	1317	9.7	13771	1328	9.6	209	11
M4 West J4 WB On Slip	33671	2667	7.9	33671	2667	7.9	0	0
M4 J4 - J3 EB On Slip	22799	1307	5.7	22799	1307	5.7	0	0
M4 J4 - J3 WB Off Slip	23572	1891	8.0	23572	1891	8.0	0	0
M4 J4 - J3 EB	75803	6161	8.1	75803	6161	8.1	0	0
M4 J4 - J3 WB	74709	5912	7.9	74709	5912	7.9	0	0
M4 J4 - J3 EB Off Slip	34006	2867	8.4	34006	2867	8.4	0	0
M4 J4 - J3 WB On Slip	29520	2565	8.7	29583	2568	8.7	63	3
M4 J3 East EB On Slip	7484	388	5.2	7547	391	5.2	63	3
M4 J3 East WB Off Slip	8385	424	5.1	8448	427	5.1	63	3
M4 J3 East EB	48562	3639	7.5	48625	3642	7.5	63	3
M4 J3 East WB	53772	3791	7.1	53772	3791	7.1	0	0
A437 Dawley Road/North Hyde Road Roundabout	15831	531	3.4	16374	558	3.4	542	28
North Hyde Road/The Parkway Roundabout	52175	3127	6.0	52342	3136	6.0	167	9
M4 J3	41183	2809	6.8	41237	2811	6.8	54	3
A408/Shepiston Lane/Cherry Lane Roundabout	32210	1486	4.6	32496	1685	5.2	287	199
M4 J4	33701	2464	7.3	33740	2466	7.3	39	2

Appendix C: Model Verification

Factor 1

Table C1: Results of Model Verification

Diffusion Tube Site ID	Modelled Annual Mean Road NOx Contribution (µg/m³)	Monitored Annual Mean Road NOx Contribution (µg/m³)*	Annual Mean Background NOx (µg/m³)	Annual Mean Background NO_2 (µg/m³)	Monitored Annual Mean NO_2 (µg/m³)	Modelled Annual Mean NO_2 (µg/m³)**	Difference %
HIL 5	9.45	21.85	50.39	31.31	41	35.65	-13.0
HILL07	4.97	22.27	41.93	26.77	36.9	29.14	-21.0

*Diffusion tube using NO2 to NOx Calculator (https://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html#NOxNO2calc)

** Using NOx to NO2 Calculator (https://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html#NOxNO2calc

Table C2: Results of Model Verification and Adjustment

Site ID	Modelled Annual Mean Road NOx Contribution (µg/m³)	Monitored Annual Mean Road NOx Contribution (µg/m³)*	Adjustment Factor	Adjusted Modelled Roads NOx Contribution (µg/m³)	Annual Mean Background NOx (µg/m³)	Annual Mean Background NO2 (µg/m³)	Monitored Annual Mean NO_2 (µg/m³)	Modelled Annual Mean NO_2 (µg/m³)**	Modelled vs Monitored NO_2 Total % Difference
HIL 5	9.45	21.85	2.3	26.3	50.39	31.31	41	42.8	4.5
HILL07	4.97	22.27	4.5	13.8	41.93	26.77	36.9	33.2	-10.0
			2.781	This is the regression correction factor (m) for the equation trend line Y=mX where					
				Y is monitored road contribution NOx and X is modelled road contribution NOx					

*Diffusion tube using NO2 to NOx Calculator (https://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html#NOxNO2calc)

** Using NOx to NO2 Calculator (https://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html#NOxNO2calc

Factor 2

Table C3: Results of Model Verification

Diffusion Tube Site ID	Modelled Annual Mean Road NOx Contribution (µg/m³)	Monitored Annual Mean Road NOx Contribution (µg/m³)*	Annual Mean Background NOx (µg/m³)	Annual Mean Background NO_2 (µg/m³)	Monitored Annual Mean NO_2 (µg/m³)	Modelled Annual Mean NO_2 (µg/m³)**	Difference %
HIL26	15.22	22.77	47.60	29.84	40	36.77	-8.1
HIL	12.97	37.31	45.38	28.89	45	34.87	-22.5

*Diffusion tube using NO2 to NOx Calculator (https://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html#NOxNO2calc)

** Using NOx to NO2 Calculator (https://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html#NOxNO2calc

Table C4: Results of Model Verification and Adjustment

Site ID	Modelled Annual Mean Road NOx Contribution (µg/m³)	Monitored Annual Mean Road NOx Contribution (µg/m³)*	Adjustment Factor	Adjusted Modelled Roads NOx Contribution (µg/m³)	Annual Mean Background NOx (µg/m³)	Annual Mean Background NO2 (µg/m³)	Monitored Annual Mean NO_2 (µg/m³)	Modelled Annual Mean NO_2 (µg/m³)**	Modelled vs Monitored NO_2 Total % Difference
42.8	15.22	22.77	1.5	31.6	47.60	29.84	40	43.6	9.0
33.2	12.97	37.31	2.9	26.9	45.38	28.89	45	40.8	-9.2
			2.077	This is the regression correction factor (m) for the equation trend line Y=mX where					
				Y is monitored road contribution NOx and X is modelled road contribution NOx					

*Diffusion tube using NO2 to NOx Calculator (https://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html#NOxNO2calc)

** Using NOx to NO2 Calculator (https://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html#NOxNO2calc