AIR QUALITY ASSESSMENT

Trout Road

Produced by XCO2 for Troutbourne LLP

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EXECUTIVE SUMMARY

This Air Quality Assessment has been prepared by XCO2 on behalf of Client in support of the Planning Application for a Proposed Development at Rainbow and Kirby Industrial Estates, Trout Road, Yiewsley, UB7 7XT.

This application has been submitted to the London Borough of Hillingdon, who will be responsible for determining the application.

The Description of the Proposed Development for the full planning application is as follows:

"*Demolition of existing structures and phased redevelopment of the site to provide nine plots ranging between 3 storeys and 11 storeys in height (including ground level) to include residential units (Use Class C3), flexible retail/café/restaurant floorspace (Class E (a,b,c)), light industrial floorspace (Class E (g)(iii)), associated hard and soft landscaping, car parking, cycle parking, servicing, refuse and plant areas, public realm improvements, highways works and other works associated with the development.*"

During the construction phase, the site has the potential to generate dust nuisance beyond the application boundary. However, through the implementation of a Dust Management Plan, the impacts will be effectively minimised and not significant.

The Proposed Development will reduce traffic on the local road network, compared with the existing Site uses, however a small increase in HDV movements is expected. The significance of the impact on local air quality has been assessed as negligible for particulate matter, but 'moderate' at one location for NO_2, primarily due to the existing background, which exceeds LBH's adopted WHO air quality guideline. The change in concentration is less than 0.1 $\mu g/m^3$ and negligible compared with the statutory air quality standards.

Detailed dispersion modelling of emissions from traffic on the local road network indicates that concentrations of NO_2, PM_{10} and $PM_{2.5}$ will be well within the statutory air quality standards in the earliest year of occupation, however the predicted concentrations on Site exceed LBH's adopted WHO guidelines for NO_2 and $PM_{2.5}$. Mechanical ventilation (MVHR) with suitable filtration is proposed for all dwellings to minimise exposure.

The energy strategy is 100% electric and emissions from the proposed emergency life-saving generator will not significantly affect local air quality.

The Proposed Development is air quality neutral with respect to both building and transport-related emissions.

Based on the results of the assessment, air quality is not a constraint to the re-development of the Site, as proposed.

INTRODUCTION

This report presents an assessment of the potential impact on local air quality of the construction and operation of a Proposed Development at Trout Road, in the London Borough of Hillingdon (LBH). The site location is presented in Figure 1.

The Applicant seeks planning permission for the following description of development (hereafter referred to as the 'Proposed Development'):

"*Demolition of existing structures and phased redevelopment of the site to provide nine plots ranging between 3 storeys and 11 storeys in height (including ground level) to include residential units (Use Class C3), flexible retail/café/restaurant floorspace (Class E (a,b,c)), light industrial floorspace (Class E (g)(iii)), associated hard and soft landscaping, car parking, cycle parking, servicing, refuse and plant areas, public realm improvements, highways works and other works associated with the development.*"

The proposed Site layout is presented in Figure 2.

The Site falls within the LBH Air Quality Management Area (AQMA) which was declared in 2003 due to measured and modelled exceedances of the annual mean air quality objective for nitrogen dioxide (NO_2).

An assessment has been undertaken to determine the potential impact on local air quality during both the construction and operational phases of the development, with recommendations made for mitigation where appropriate.

Figure 1: Indicative Site Location

Figure 2: Proposed Site Layout

POLICY CONTEXT

An overview of the relevant policy drivers for the assessment is provided in the following section.

NATIONAL LEGISLATION

THE NATIONAL PLANNING POLICY FRAMEWORK (2024)

The National Planning Policy Framework (NPPF)[1] serves as the key planning document in England, providing guidance for local authorities and developers on how to achieve sustainable development.

Paragraph 187 sets out the overall aim of environmental protection policies and states that "*planning policies and decisions should contribute to and enhance the natural and local environment by preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans.*"

Paragraph 198 concerns site suitability and states that "*planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development."*

Paragraph 199 relates to existing local measures that are in place to improve air quality and states that "*Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan.*"

Paragraph 200 ensures that operations at existing businesses and facilities are not adversely affected by a proposed development and states that "*Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed.*"

[1] Department for Communities and Local Government, National Planning Policy Framework, December 2024

NATIONAL AIR QUALITY STANDARDS AND OBJECTIVES

The assessment of potential air quality impacts associated with the Proposed Development has been evaluated with respect to the current air quality standards and objectives for the protection of human health, as set out in the Air Quality Regulations 2010[2] and The Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020[3].

In the context of the Proposed Development, the key pollutants of concern are nitrogen dioxide (NO_2) and particulate matter (PM_{10} and $PM_{2.5}$), which, in the LBB, are primarily associated with road traffic emissions and construction works.

It is widely accepted that there is no safe level for $PM_{2.5}$ and on 31st January 2023, the Government published an Environmental Improvement Plan[4], which includes an Annual Mean Concentration Target (AMCT) of 10 µg/m^3, to be achieved by the end of 2040. The Plan also includes an interim target of 12 µg/m^3, to be achieved by the end of January 2028. The 10 µg/m^3 target for $PM_{2.5}$ has been adopted into UK law via the Environmental Targets (Fine Particulate Matter) (England) Regulations 2023[5].

The Air Quality Standards and Objectives for NO_2, PM_{10} and $PM_{2.5}$ that are applicable in England, are presented in Table 1.

Table 1: National Air Quality Standards and Objectives

Pollutant	Averaging Period	Objective	To be achieved by and maintained thereafter
NO_2	1-hour	200 µg/m^3, not to be exceeded more than 18 times per calendar year (a)	31 December 2005
	Annual	40 µg/m^3	
PM_{10}	24-hour	50 µg/m^3, not to be exceeded more than 35 times per calendar year (b)	31 December 2004
	Annual	40 µg/m^3	
$PM_{2.5}$	Annual	20 µg/m^3	2020
	Annual	12 µg/m^3 (interim target)	31 January 2028
	Annual	10 µg/m^3 (target)	31 December 2040
(a) Equivalent to the 99.8th percentile of 1-hour means. (b) Equivalent to the 90.4th percentile of 24-hour means.			

LOCAL AIR QUALITY MANAGEMENT

The framework for Local Air Quality Management (LAQM) in the UK was introduced by the Environment Act 1995[6]. Local Authorities are required to regularly review and assess air quality to establish whether there are any locations where pollutant concentrations exceed the relevant air quality objectives or EU limit values. Where an exceedance is identified, the local authority is obliged to declare an Air Quality Management Area (AQMA) and prepare an Action

[2] The Air Quality Standards Regulations 2010, Statutory Instrument 2010 No. 1001
[3] The Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020, Statutory Instrument 2020 No. 000
[4] Environmental Improvement Plan 2023, Defra, January 2023
[5] Environmental Targets (Fine Particulate Matter) (England) Regulations 2023, Statutory Instrument 2023 No. 96
[6] Part IV of the Environment Act 1995

Plan setting out measures to improve air quality and achieve compliance with the objective(s). The LAQM delivery framework for local authorities in England is set out in Defra's 2023 Air Quality Strategy[7].

The core guidance document for use by persons involved in LAQM or considering the impacts of a development with the potential to affect air quality as covered by LAQM, is the LAQM Technical Guidance (TG22)[8] .

REGIONAL POLICY

THE LONDON PLAN (2021)

Policy SI1 (Improving Air Quality) of the London Plan[9] sets out the Greater London Authority's (GLA) commitment to improving air quality and public health and states:

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

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

1. Development proposals should not:

a) lead to further deterioration of existing poor air quality.
b) create any new areas that exceed air quality limits, or delay the date at which compliance will be achieved in areas that are currently in exceedance of legal limits.
c) create unacceptable risk of high levels of exposure to poor air quality.

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

a) Development proposals must be at least air quality neutral.
b) Development proposals should use design solutions to prevent or minimise increased exposure to existing air pollution and make provision to address local problems of air quality in preference to post-design or retro-fitted mitigation measures.
c) Major development proposals must be submitted with an Air Quality Assessment. Air quality assessments should show how the development will meet the requirements of B1.
d) Development proposals in Air Quality Focus Areas or that are likely to be used by large numbers of people particularly vulnerable to poor air quality, such as children or older people, which do not demonstrate that design measures have been used to minimise exposure should be refused.

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

a) How proposals have considered ways to maximise benefits to local air quality, and
What measures or design features will be put in place to reduce exposure to pollution, and how they will achieve this.

[7] Air Quality Strategy Framework for local authority delivery, Defra, April 2023
[8] Local Air Quality Management Technical Guidance (TG22), Defra, 2022
[9] The London Plan 2021, The Spatial Development Strategy for Greater London, Greater London Authority, March 2021.

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.

LONDON ENVIRONMENT STRATEGY (2018)

Chapter 4 of the London Environment Strategy[10] outlines the Mayor's commitment to improving air quality in London. The strategy aims plan to significantly reduce NO_2 and particulate (PM_{10}, $PM_{2.5}$ and black carbon) concentrations through a number of key objectives and policies:

Objective 4.1 support and empower London and its communities, particularly the most disadvantaged and those in priority locations, to reduce their exposure to poor air quality.

- Policy 4.1.1 Make sure that London and its communities, particularly the most disadvantaged and those in priority locations, are empowered to reduce their exposure to poor air quality.
- Policy 4.1.2 Improve the understanding of air quality health impacts to better target policies and action.

Objective 4.2 achieve legal compliance with UK and EU limits as soon as possible, including by mobilising action from London boroughs, government and other partners.

- Policy 4.2.1 Reduce emissions from London's road transport network by phasing out fossil fuelled vehicles, prioritising action on diesel, and enabling Londoners to switch to more sustainable forms of transport.
- Policy 4.2.2 Reduce emissions from non-road transport sources, including by phasing out fossil fuels.
- Policy 4.2.3 Reduce emissions from non-transport sources, including by phasing out fossil fuels.
- Policy 4.2.4 The Mayor will work with the government, the London boroughs and other partners to accelerate the achievement of legal limits in Greater London and improve air quality.
- Policy 4.2.5 The Mayor will work with other cities (here and internationally), global city and industry networks to share best practice, lead action and support evidence based steps to improve air quality.

Objective 4.3 establish and achieve new, tighter air quality targets for a cleaner London by transitioning to a zero emission London by 2050, meeting World Health Organization health-based guidelines for air quality.

- Policy 4.3.1 The Mayor will establish new targets for $PM_{2.5}$ and other pollutants where needed. The Mayor will seek to meet these targets as soon as possible, working with government and other partners.
- Policy 4.3.2 The Mayor will encourage the take up of ultra-low and zero emission technologies to make sure London's entire transport system is zero emission by 2050 to further reduce levels of pollution and achieve WHO air quality guidelines.
- Policy 4.3.3 Phase out the use of fossil fuels to heat, cool and maintain London's buildings, homes and urban spaces, and reduce the impact of building emissions on air quality.

[10] London Environment Strategy, The Mayor of London, May 2018

- Policy 4.3.4 Work to reduce exposure to indoor air pollutants in the home, schools, workplace and other enclosed spaces.

With regard to Policy 4.3.1, the Mayor of London has set a target for compliance with the now superseded WHO guideline value[11] for $PM_{2.5}$ of 10 µg/m^3 by 2030. However, recent modelling[12] suggests that due to the transboundary nature of $PM_{2.5}$, compliance in London is unlikely to be achieved without additional measures at national, European and international level.

GREATER LONDON AUTHORITY AIR QUALITY FOCUS AREAS

Air Quality Focus Areas (AQFAs) have been identified by the Greater London Authority (GLA) where there is high human exposure in locations where the annual mean air quality objective for NO_2 is exceeded. The purpose of the Focus Areas is to allow local authorities to target actions to improve air quality where it is most needed and to inform the planning process with regard to the air quality impact of new developments.

The Proposed Development is located within the West Drayton/ Yiewsley AQFA. Within AQFA's, LBH expect a full detailed air quality assessment for all developments.

LOCAL POLICY

THE LONDON BOROUGH OF BARNET LOCAL AIR QUALITY MANAGEMENT

LBH carries out frequent review and assessments of air quality within the area and produces annual reports in accordance with the requirements of Defra.

Historically, routine monitoring of NO_2 concentrations within the Borough identified many areas where the air quality objectives were exceeded. Consequently, in 2003 the Council declared an AQMA and produced an AQAP outlining their commitment to improving local air quality.

The current Hillingdon Air Quality Action Plan[13] outlines the Council's commitment to improving air quality in the Borough. Borough-wide actions include:

- Leading by example by reducing emissions from the Council's vehicle fleet and buildings.
- Reducing public exposure and improving air quality around schools.
- Implementation of improvement strategies in the AQ Focus Areas.
- Ensure the integration of the 'Health Streets' approach in relevant council work programmes.
- Ensure the planning system supports the achievement of air quality improvements in relation to new developments.
- Raise awareness via targeted campaigns.

[11] World Health Organisation (2005), Air Quality Guidelines Global Update 2005,
[12] $PM_{2.5}$ in London: Roadmap to meeting World Health Organization guidelines by 2030, GLA, October 2019
[13] London Borough of Hillingdon (2019), Air Quality Action Plan 2019–2024. Adopted 2019

LBH have recently published a draft new Action Plan[14] (LHB, 2025), which is currently under consultation. The core aims of the plan are as follows:

'*1) To reduce pollutant emissions within our Borough to the maximum possible extent, with all emissions being mitigated.*

2) To reduce pollution concentrations, striving to achieve the World Health organization (WHO) guidelines in the shortest time possible.

3) Remove inequalities in exposure to poor air quality and protect the vulnerable.

4) Continue to use the planning system to ensure:

a. new development does not contribute additional air pollution; and
b. new development in our Focus Areas contribute improvements in air quality.

5) Raise awareness on the health impacts and preventive measures to be taken to safeguard health.

6) Influence change and lead by example.'

HILLINGDON LOCAL PLAN

The Hillingdon Local Plan: Part 2 (LBH, 2020) [15]sets out strategic objectives and policies for development in the Borough. Policy DMEI 14 relates specifically to air quality and states that:

'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 continued improvement of air quality, especially within the Air Quality Management Area.'

In addition, policy DMEI 1 (Living Walls and Roofs and on-site Vegetation) states that: '*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'*.

[14] London Borough of Hillingdon (2025) Draft Air Quality Action Plan 2025–2030, Published 2025
[15] London Borough of Hillingdon. (2020), Hillingdon Local Plan Part 2: Development Management Policies. Adopted 16 January 2020

WORLD HEALTH ORGANIZATION (WHO) AIR QUALITY GUIDELINES

The WHO's 2021 Air Quality Guidelines[16] (AQG's) provide evidence-based thresholds for key air pollutants to protect human health. The guidelines are considerably more stringent than the current UK statutory air quality standards and objectives. The AQG's for NO_2, PM_{10} and $PM_{2.5}$ are set out in Table 2. Interim targets are also included to support gradual progress, acknowledging that the Air Quality Guidelines are currently significantly exceeded in many parts of the world.

LBH require air quality impacts to be assessed with respect to the 2021 annual mean AQG's for NO_2 and $PM_{2.5}$ (highlighted in bold).

Table 2: WHO Air Quality Guidelines

Pollutant	Averaging Period	Interim Target (µg/m^3)				AQG Level (µg/m^3)
		1	2	3	4	
NO_2	24-hour (a)	120	50	-	-	25
	Annual	40	30	20	-	**10**
PM_{10}	24-hour (a)	150	100	75	50	45
	Annual	70	50	30	20	15
$PM_{2.5}$	24-hour (a)	75	50	37.5	25	15
	Annual	35	25	15	10	**5**
(a) 99th percentile (3-4 exceedances per year)						

[16] World Health Organization (2021), WHO global air quality guidelines: particulate matter ($PM_{2.5}$ and PM_{10}), ozone, nitrogen dioxide, sulfur dioxide and carbon monoxide. Geneva: World Health Organization. ISBN 9789240034228.

METHODOLOGY

This section outlines the assessment methodology, taking into account all relevant national and local policies and technical guidance relating to air quality.

CONSTRUCTION PHASE IMPACTS

DUST EMISSIONS

The potential impact of dust generated during the construction phase has been assessed in accordance with the latest Institute of Air Quality Management (IAQM) construction dust guidance[17], which was released in January 2024. A full description of the construction dust methodology is provided in Appendix A.

A detailed assessment of dust impacts is required where there are human receptors within:

- 250m of the site boundary; or
- 50m of the route(s) used by construction vehicles on public roads, up to 250m from the site entrance(s).

For ecological impacts, a detailed assessment is required if there are dust sensitive habitat sites within

- 50m of the site boundary; or
- 50m of the route(s) used by construction vehicles on public roads, up to 250m from the site entrance(s).

The methodology allows the potential risk of dust soiling and human health effects, prior to mitigation, to be determined, based primarily on the sensitivity of nearby receptors and the anticipated magnitude of the dust emission due to:

- Demolition;
- Earthworks;
- Construction; and
- Track-out (re-suspended dust from vehicle movements).

The assessment of dust risk is also based on professional judgement, taking into account factors such as the prevailing wind direction, the proposed construction phasing, the likely duration of dust raising activities, local topography and existing air quality.

A range of best practice mitigation measures are provided within the guidance, which are dependent on the level of dust risk attributed to the Site. It is recommended that these measures are incorporated into a Dust Management Plan (DMP) of the Construction Environmental Management Plan (CEMP) for the Proposed Development.

The significance of the residual impacts following appropriate mitigation is determined by professional judgement.

[17] Guidance on the assessment of dust from demolition and construction, IAQM, v2.2, January 2024

TRAFFIC AND NON-ROAD MOBILE MACHINERY EMISSIONS

The construction phase trip generation will fluctuate throughout the programme and detailed information will not be available until the Construction Logistics Plan (CLP) is finalised following contractor appointment. However, the Site will be developed in phases and therefore the temporary impact of the additional vehicle emissions is unlikely to significantly affect local air quality.

From January 2025, all Non-Road Mobile Machinery (NRMM) are required to meet the emissions standards specified in Table 3.

Table 3: NRMM Minimum Emissions Standards

NRMM	Emission Standards
Engines with a power rating between 37 kW and 560 kW	Stage IV of the 97/68/EC Directive
Machines with constant speed engines e.g., generators	Stage V of the 97/68/EC Directive
Variable speed engines below 56 kW	Stage V of the 97/68/EC Directive

OPERATIONAL IMPACTS

ENERGY STRATEGY

The energy strategy for the Proposed Development is 100% electric (air source heat pumps (ASHP) and variable refrigerant flow (VRF)). There will be no combustion emissions to air during normal operation.

EMERGENCY LIFE SAVING GENERATOR EMISSIONS

An emergency life-saving diesel generator will be installed at the Site to provide electricity in the event of a simultaneous fire and loss of mains power. The generator plant room will be located on the eastern boundary of the Site, as shown in Figure 3. Emissions to air will be via a vertical flue exhausting at least 1m above the height of the adjacent buildings to optimise dispersion.

The proposed testing and maintenance strategy is presented in Table 4. The generator will operate for fewer than 18 hours per year and on this basis, the impact on local air quality will be negligible.

Table 4: Emergency Generator Testing and Maintenance

Frequency	Duration	On/Off Load
Weekly	5 – 10 mins	Off
Monthly	30 mins	On
6 Monthly	30 mins	15 mins On, 15 mins Off
Annually	120 mins (maximum)	Load Bank Testing

Figure 3: Emergency Generator Location

TRAFFIC EMISSIONS

A summary of the existing and proposed trip generation associated with the Site is presented in Table 5.

Table 5: Existing and Proposed Trip Generation

Road Link	LDV	HDV	Total
Existing AADT	250	8	258
Proposed AADT	210	27	237
Net Change	**-40**	**+19**	**-21**

The Proposed Development will result in an overall net reduction in trips of 21 AADT, compared with the existing Site uses, however due to the increase in industrial/makerspace units and servicing for commercial units, there will be an increase in HDV's of 19 AADT.

The distribution of the proposed trips on the local road network is presented in Table 6. The majority of the residential traffic will access the Site via Trout Road, whereas the servicing bay for the industrial/makerspace is accessed from St Stephen's Road.

Table 6: Distribution of Trips

	Existing		Proposed		Net Change	
	LDV	HDV	LDV	HDV	LDV	HDV
Trout Road	125	4	125	8	0	+4
St Stephen's Road	125	4	85	19	-40	+15
Total					**-40**	**+19**

Detailed dispersion modelling has been undertaken using the ADMS-Roads dispersion model, to predict concentrations of NO_2, PM_{10} and $PM_{2.5}$ at sensitive receptor locations in the earliest year of occupation (2027), with and without the traffic associated with the Proposed Development. Hourly sequential meteorological data from Heathrow Airport for 2023 has been used.

The following scenarios have been modelled:

- 2027 Baseline; and
- 2027 Baseline + Development.

The future baseline flows are derived from 2022 Department for Transport automatic traffic counts and 2022 London Atmospheric Emission Inventory (LAEI) traffic data with a TEMPro growth factor applied to account for the cumulative impact of traffic associated with other committed/ proposed developments in the area. A summary of the model input parameters is presented in Appendix C.

Concentrations of NOx, PM_{10} and $PM_{2.5}$ have been predicted using 2027 vehicle emission factors from the latest version of the Emissions Factor Toolkit (EFTv13.1) [18] in conjunction 2022 (assessment baseline) background concentrations. The predicted NOx concentrations have been converted to NO_2 using version 9.1 of the NOx to NO_2 calculator, available from the Defra air quality website[19].

There is an inherent level of uncertainty associated with any assessment process; however, the methodology presented has been developed to minimise errors where possible. Potential errors in predicted concentrations due to uncertainties in the assessment source activity data (e.g., traffic flows and emission factors) and the estimated background concentration are minimised by the verification of modelled concentrations using local monitoring data.

The Local Air Quality Management Technical Guidance (TG22)[20] recommends that modelled concentrations should be within 25% of monitored concentrations, ideally within 10%. Where there is a large discrepancy between modelled and measured concentrations, it is considered necessary to adjust the model results to reflect local air quality more accurately.

The modelled concentrations have been verified using 2022 data from roadside diffusion tubes on Fairfield Road (HILL19), Pield Heath Road (HILL05) and Uxbridge Road (HILL04). Full details of the model verification process are presented in Appendix D.

Impacts on air quality have been evaluated at worst-case locations on the affected road links, as shown in Figure 4. A summary of the sensitive receptors is presented in Table 7.

[18] http://laqm.defra.gov.uk/review-and-assessment/tools/emissions-factors-toolkit.html
[19] https://laqm.defra.gov.uk/air-quality/air-quality-assessment/nox-to-no2-calculator/
[20] Local Air Quality Management Technical Guidance (TG22), Defra, August 2022

Concentrations have been predicted at 1.5m above road level, representing the typical ground-floor level exposure zone. Where there are commercial uses at ground-floor level with residential above, concentrations have also been predicted at 4.5m above road level (first-floor level exposure zone).

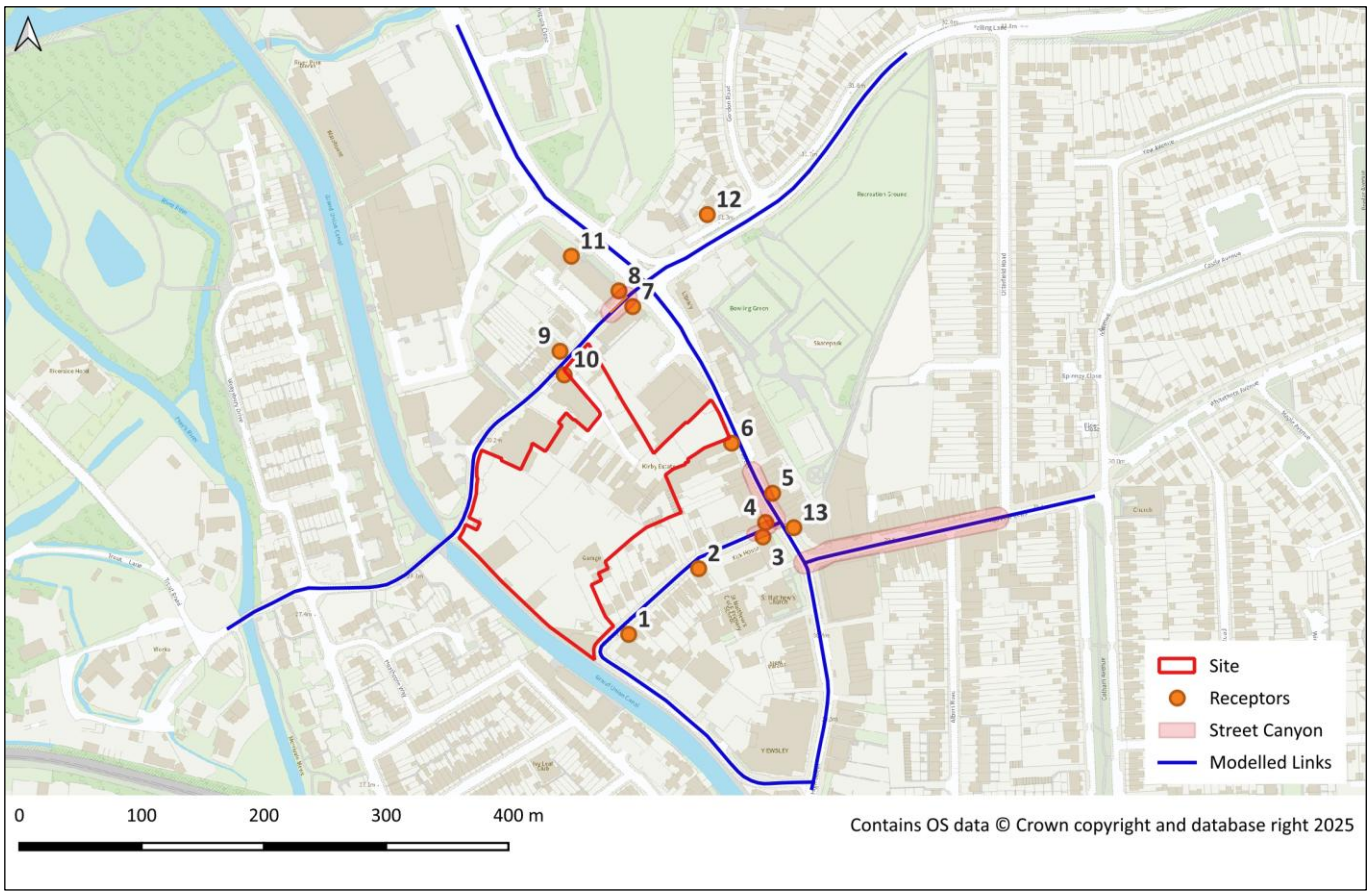

Figure 4: Sensitive Receptors (Operational Traffic Impacts)

Table 7: Sensitive Receptors

ID	Location	Type	Easting	Northing
1	19 St Stephen's Road	Residential	505928	180420
2	1 St Stephen's Road	Residential	505985	180473
3	Kirk House	Residential	506038	180499
4	Chiltern House	Residential	506040	180511
5	126 High St	Commercial (ground-floor) Residential (first floor)	506046	180535
6	131 High Street	Commercial (ground-floor) Residential (first floor)	506012	180576
7	163 High Street	Residential	505931	180688
8	191 High Street (Continental House)	Commercial	505910	180690
9	Magic Steps	Nursery	505872	180651
10	Onslow Court	Residential	505875	180632
11	Gurnard Close	Residential	505881	180729
12	17 Falling Lane	Residential	505992	180763
13	112 High Street	Commercial (ground-floor) Residential (first floor)	506063	180507

The LBH significance criteria for NO_2 and $PM_{2.5}$, which evaluate the change in concentration relative to the 2021 WHO AQG's, are set out in Table 8 and Table 9, respectively. The significance of the PM_{10} impacts has been evaluated in line with the Institute of Air Quality Management (IAQM)/ Environmental Protection UK (EPUK) Planning Guidance with respect to the current Air Quality Assessment Level (AQAL) of 40 $\mu g/m^3$, as set out in Table 10.

Table 8: LBH Significance of Impacts Matrix for NO_2

Annual mean at receptor in assessment year	Change in Concentration				
	<0.05 $\mu g/m^3$	≤0.05 – 0.15 $\mu g/m^3$	≤0.15 – 0.55	>0.55 - <0.95 $\mu g/m^3$	≥ 0.95 $\mu g/m^3$
≤7.5 $\mu g/m^3$	Negligible	Negligible	Negligible	Slight	Moderate
7.6 – 9.4 $\mu g/m^3$	Negligible	Negligible	Slight	Moderate	Moderate
9.5 – 10.2 $\mu g/m^3$	Negligible	Slight	Moderate	Moderate	Substantial
10.3 – 10.9 $\mu g/m^3$	Negligible	Moderate	Moderate	Substantial	Substantial
≥11 $\mu g/m^3$	Negligible	Moderate	Substantial	Substantial	Substantial

Table 9: LBH Significance of Impacts Matrix for $PM_{2.5}$

Annual mean at receptor in assessment year	Change in Concentration				
	<0.05 µg/m³	≤0.05 – 0.15 µg/m³	≤0.15 – 0.55	>0.55 - <0.95 µg/m³	≥ 0.95 µg/m³
<5 µg/m³	Negligible	Negligible	Slight	Moderate	Moderate
5 - 7 µg/m³	Negligible	Slight	Moderate	Substantial	Substantial
8 - 10 µg/m³	Slight	Moderate	Substantial	Substantial	Substantial
>10 µg/m³	Moderate	Substantial	Substantial	Substantial	Substantial

Table 10: EPUK/ IAQM Significance Criteria for PM_{10}

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
(a) The guidance states that percentage changes in concentration (relative to the AQAL) should be rounded up or down to the nearest whole number to determine the significance of an impact. Changes of less than 0.5% are rounded down to 0% and described as 'negligible'.				

SITE SUITABLITY/ EXPOSURE

A review of the National Atmospheric Emissions Inventory (NAEI) point source database[21] and UK Pollutant Release and Transfer Register[22] has not identified any significant commercial or industrial sources in the area that are likely to significantly affect air quality at the Proposed Development. Pollutant concentrations at the Site will therefore be primarily influenced by emissions from traffic on the local road network.

Detailed dispersion modelling of emissions from traffic has been undertaken to predict concentrations of NO_2, PM_{10} and $PM_{2.5}$ at worst-case locations on Site in the year of earliest occupation (2027). The on-Site receptors are shown in Figure 5. Concentrations have been predicted at 1.5m above road level representing the ground-floor level exposure zone and a worst-case for exposure at upper levels.

The predicted concentrations have been assessed with respect to the current air quality standards and objectives for the protection of health in addition to the WHO 2021 AQGs for NO_2 and $PM_{2.5}$.

[21] https://naei.energysecurity.gov.uk/data/maps/emissions-point-sources
[22] https://prtr.defra.gov.uk/pollutant-releases

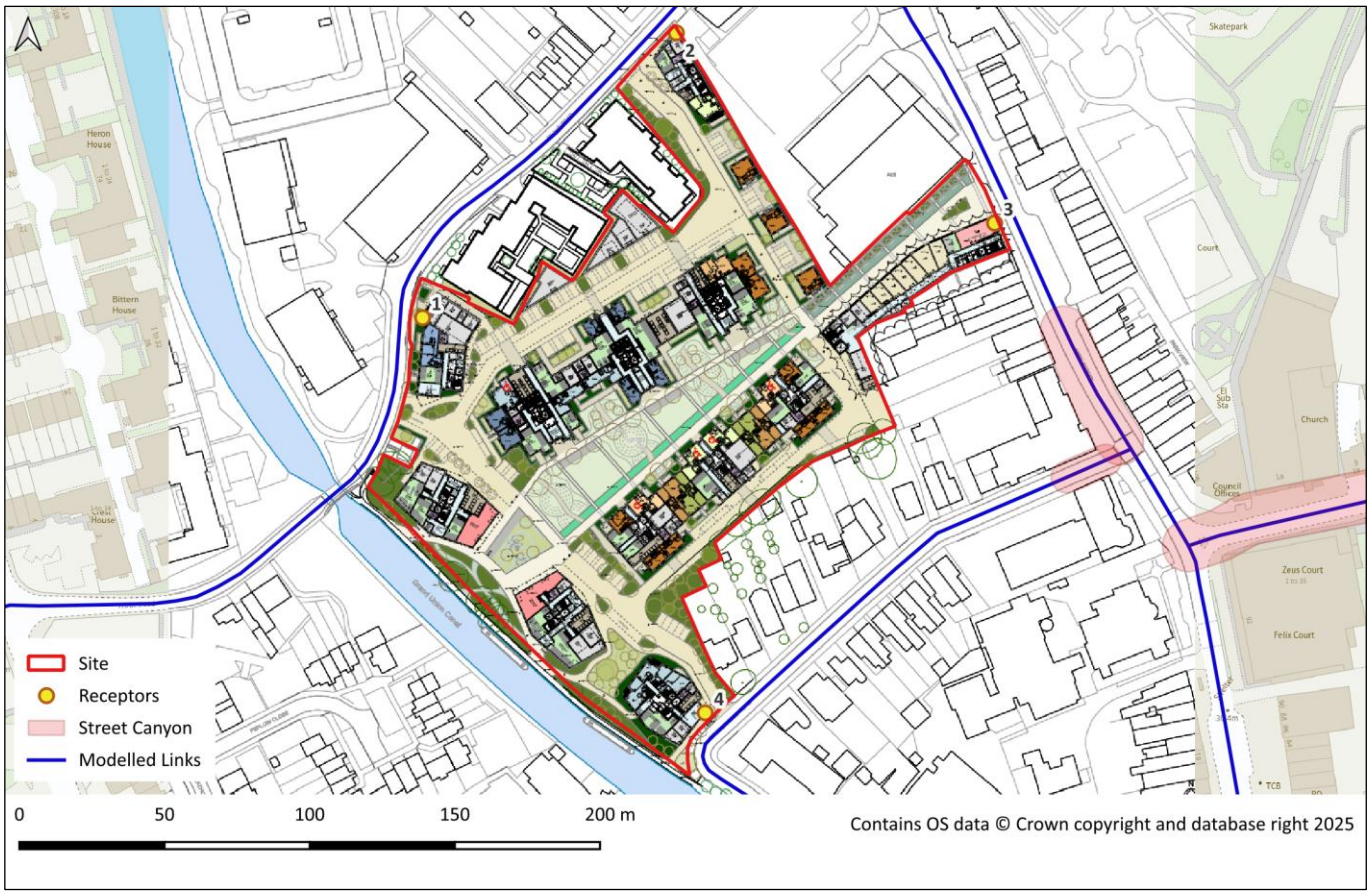

Figure 5: On Site Sensitive Receptors (Exposure Assessment)

AIR QUALITY NEUTRAL

To assess whether a development is air quality neutral, annual building and transport-related emissions are compared with 'air quality neutral' benchmarks provided within the London Plan Air Quality Neutral Guidance[23]. Where these benchmarks are exceeded, following appropriate mitigation measures, the developer is required to off-set the impacts off-site or make a financial contribution (e.g., through a section 106 agreement).

The air quality neutral assessment for transport-related emissions does not take into account the existing site use, however the benchmarks are based on operational private car and light van trips only. Taxi, motorcycle, HDV, delivery and servicing trips associated with the Proposed Development have therefore been excluded, in accordance with the guidance.

[23] London Plan Guidance Air Quality Neutral, GLA, February 2023

BASELINE AIR QUALITY

LOCAL AIR QUALITY MONITORING DATA

Ambient air quality is measured in London using a combination of automatic air quality monitoring stations (AQMS) and passive NO_2 diffusion tubes. There are currently eleven operational AQMS's in the Borough, the majority of which are within 1-2km of Heathrow Airport. The nearest to the Proposed Development is London Hillingdon (HIL), which is approximately 2.1km to the southeast. London Hillingdon is described as an urban background location; however, the monitor is approximately 30m from the M40, which is a significant source of NO_2. Pollutant concentrations measured at this location are not considered representative of urban background concentrations at the Proposed Development.

Details of the diffusion tube monitoring sites in closest proximity to the Proposed Development are provided in Table 11. The location of the sites is presented in Figure 6.

Table 11: Monitoring Sites

Site ID	Site Name	Easting	Northing	Pollutants Monitored
HILL13	31 Tavistock Road (on lamp-post outside house)	505731	180288	NO_2
HILL19	Side of 104 Yiewsley High Street (front of 1A Fairfield Road) Lamp Post (2)	506108	180493	NO_2
HILL20	1 Porters Way (corner with Kingston Lane) Lamp Post (1)	506503	179510	NO_2
HILL21	5-7 Mulberry Crescent, West Drayton Lamp Post (18)	507141	179628	NO_2

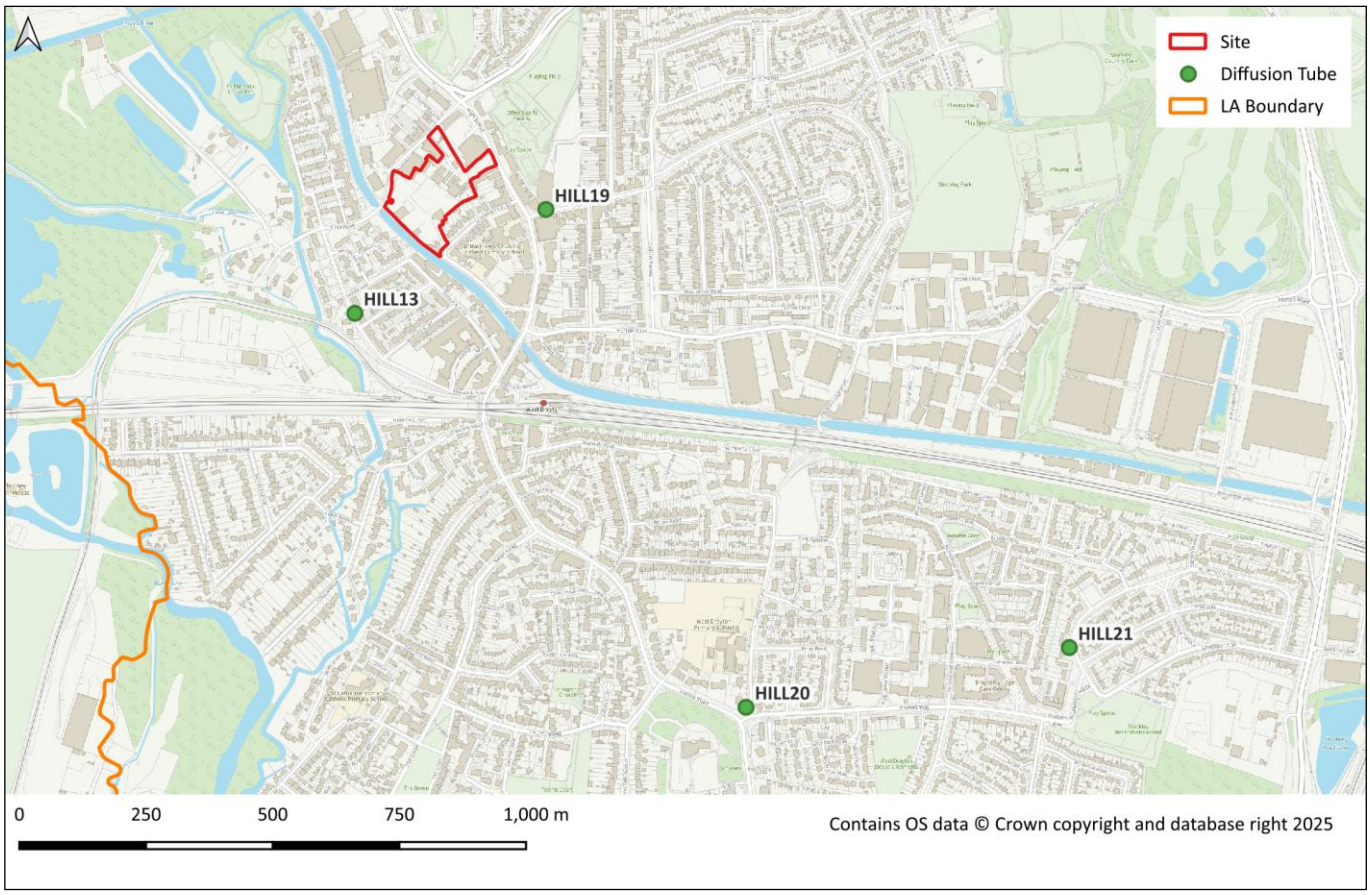

Figure 6: Location of Monitoring Sites

Annual mean NO_2 concentrations measured between 2019 and 2023 are summarised in Table 12. The data have been obtained from LBH's most recent annual air quality status report[24].

The data show a significant drop in NO_2 concentrations in 2020 due to the reduction in traffic associated with the Covid-19 pandemic lockdowns. Pollutant concentrations rose slightly in 2021 and 2022 with the recovery in traffic levels (see Figure 7), however a reduction from 2022 to 2023 is evident at 3 of the 4 monitoring sites in the vicinity of the Proposed Development, despite a further increase in traffic. The measured concentrations are well below the current annual mean air quality standard of 40 µg/m^3 but significantly exceed the 2022 WHO AQG adopted by LBH of 10 µg/m^3.

Diffusion tubes cannot measure short-term concentrations, however, measurements across the UK[25] have shown that an exceedance of the 1-hour mean AQO for NO_2 is unlikely where the annual mean concentration is less than 60 µg/m^3. The concentrations measured in the area are well below this threshold and on this basis exceedances of the short-term objective are unlikely.

[24] London Borough of Hillingdon (2024), Air Quality Annual Status Report for 2023, May 2024
[25] D Laxen and B Marner: Analysis of the relationship between 1-hour and annual mean nitrogen dioxide at UK roadside and kerbside monitoring sites, July 2003.

Table 12: Annual Mean NO_2 Concentrations (µg/m^3)

Site Name / Statistic	2019	2020	2021	2022	2023
HILL13	27.9	19.9	21.0	21.0	21.3
HILL19	34.6	27.1	27.6	28.7	26.2
HILL20	36.6	31.6	31.5	34.5	29.2
HILL21	32.3	23.4	24.1	27.9	24.5

(a) Provisional data
(b) Data capture < 90%

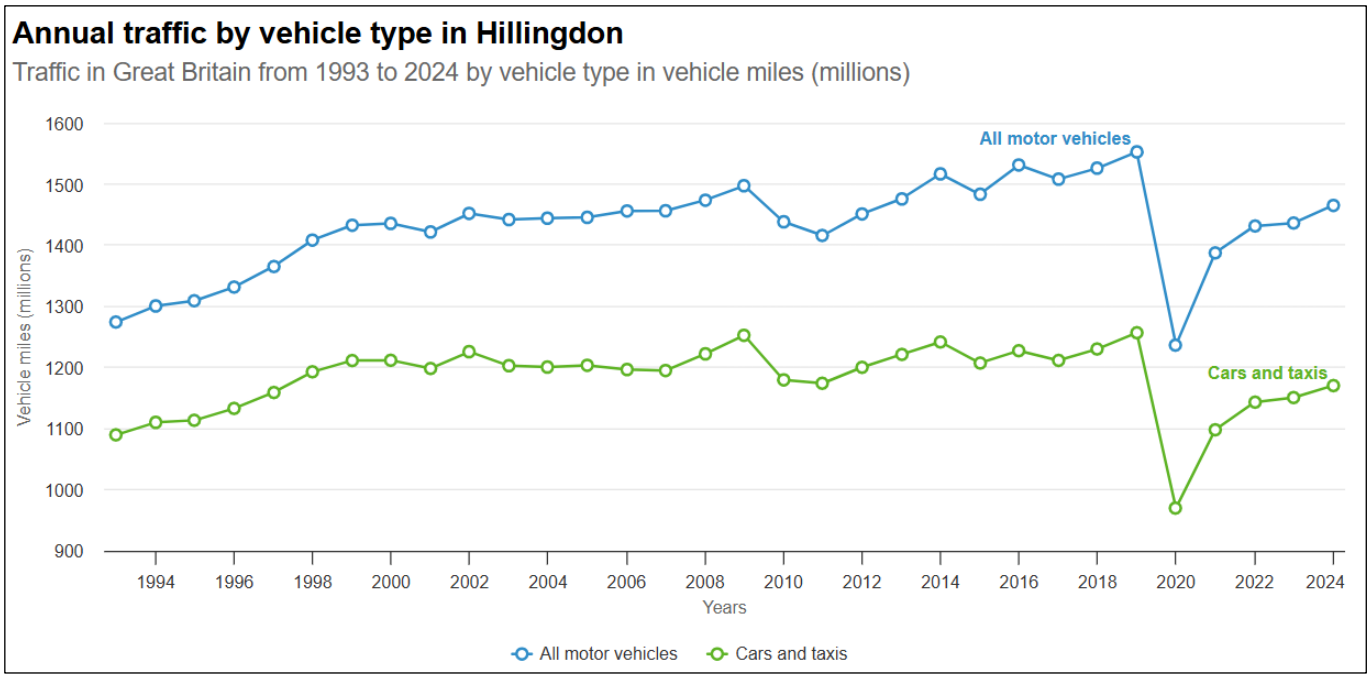

Figure 7: Traffic levels in the London Borough of Hillingdon[26]

MAPPED BACKGROUND CONCENTRATIONS

In the absence of a local particulate monitoring site and for comparison with the local NO_2 data, 2022 (assessment baseline) annual mean pollutant concentrations in the study area have been obtained from the Defra UK Background Air Pollution maps[27]. These 1km grid resolution maps are derived from a complex modelling exercise that takes into account emissions inventories and measurements of ambient air pollution from both automated and non-automated sites. The latest background maps were issued in November 2024 and are based on 2021 monitoring data, with projections for future years.

The maximum mapped background NO_2, PM_{10} and $PM_{2.5}$ concentrations are presented in Table 13 and have been used to predict concentrations at the Proposed Development and sensitive receptor locations in 2027. Since background

[26] https://roadtraffic.dft.gov.uk/local-authorities/66
[27] http://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html

air quality is expected to continue to improve due to the ongoing transition to a fully electric vehicle fleet, this approach is considered to provide a conservative assessment of potential impacts and exposure in 2027 and beyond.

Table 13: Mapped 2022 Annual Mean Background Concentrations (µg/m^3)

Pollutant	Study Area Mapped	Air Quality Standard	LBH Target
NO_2	17.5	40	10
PM_{10}	13.8	40	-
$PM_{2.5}$	8.2	20 / 12/ 10	5

CONSTRUCTION PHASE IMPACTS

DUST RISK ASSESSMENT

The precise behaviour of the dust, its residence time in the atmosphere and the distance it may travel before being deposited, will depend upon a number of 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.

A wind rose for Heathrow Airport (2022) is presented in Figure 8, which shows that the prevailing winds are from the south through to the west. Receptors to the north through to the east of the Site are therefore most likely to experience dust impacts during the construction phase.

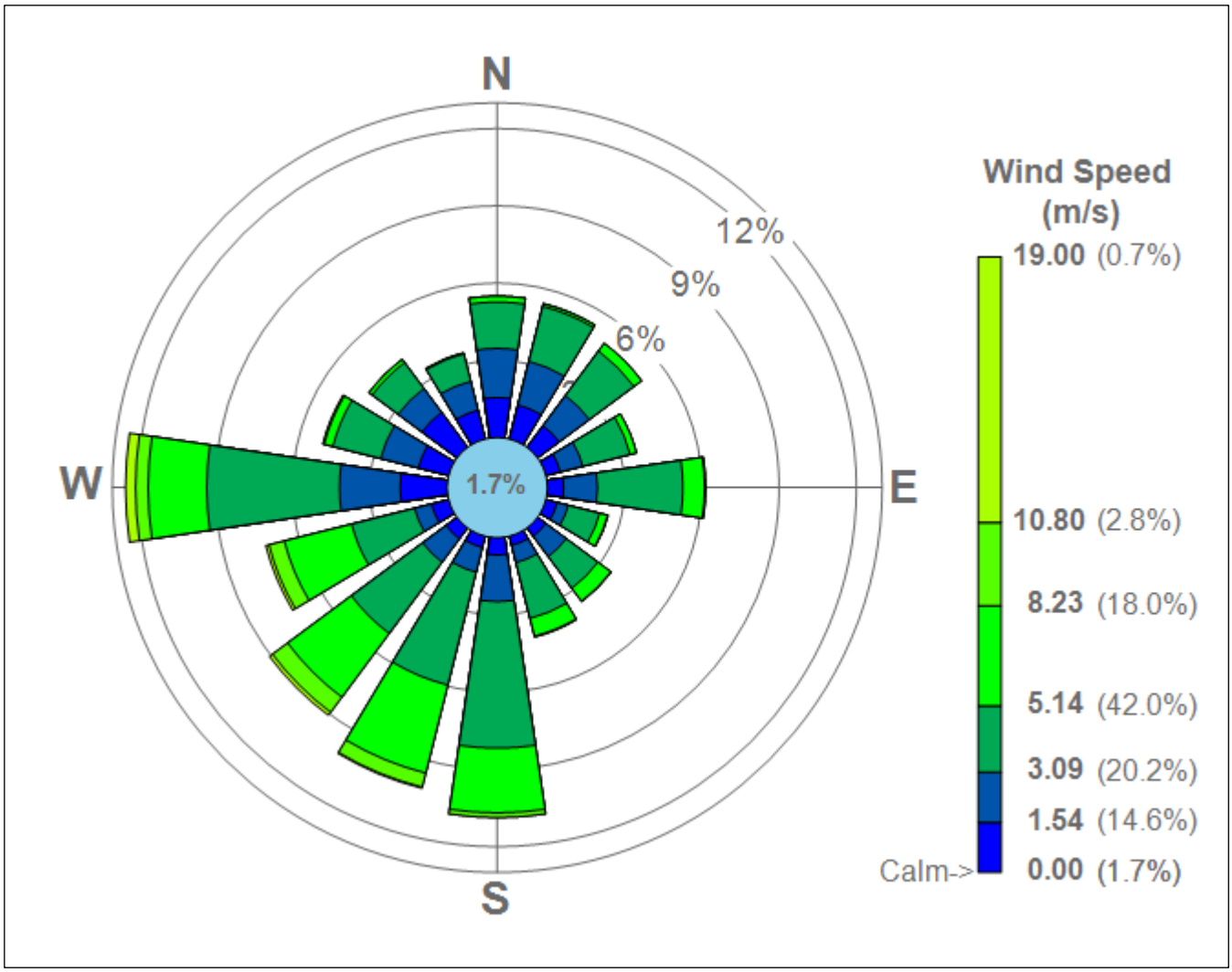

Figure 8: Wind Rose for Heathrow Airport (2022)

SENSITIVITY OF THE AREA TO DUST IMPACTS

The assessment of dust impacts is dependent on the proximity of the most sensitive receptors to the construction area and existing PM_{10} concentrations (i.e., the potential for additional dust to result in an exceedance of the short or long-term air quality objectives).

The area around the Proposed Development that has the potential to be affected by dust generated on-Site is presented in Figure 9. The surrounding area comprises a mix of industrial uses, commercial uses and residential properties. There are a small number of existing properties and a nursery within 20m of the Site boundary, however the construction works will be phased and therefore there is also the potential for early occupants of the Proposed Development to be affected by dust generated during later phases. On this basis the sensitivity of the area to dust soiling from demolition, earthworks and construction is 'high'.

Construction traffic will access the Proposed Development via Trout Road and St Stephen's Road where there are residential properties within 10m of the carriageway. The sensitivity of the area to dust soiling from trackout is therefore also 'high'.

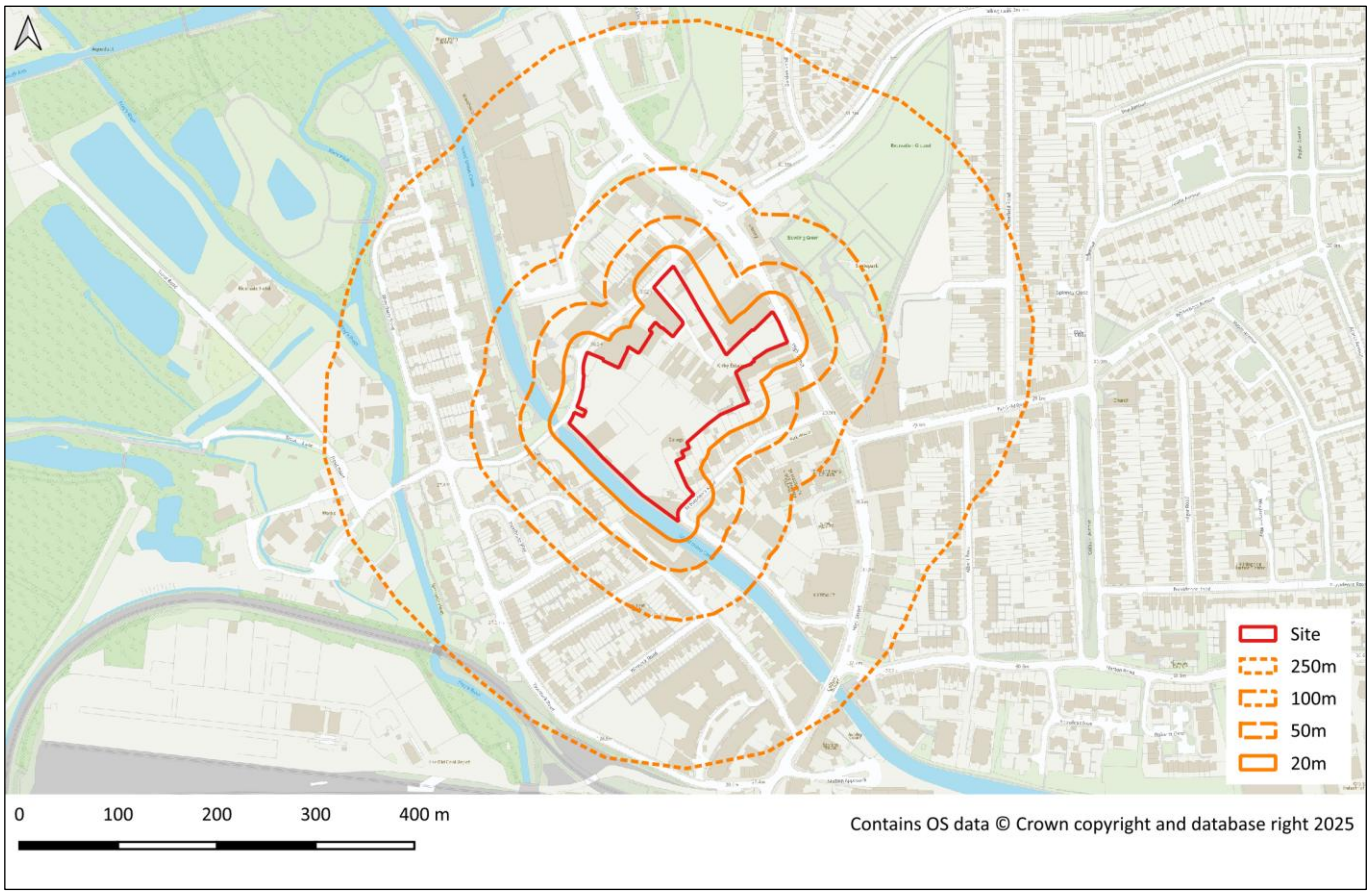

Figure 9: Dust Buffers

The Defra mapped data indicates that the existing annual mean background PM_{10} concentration in the study area is 13.8 µg/m^3 (see Table 13) therefore, even with the contribution from traffic and non-road sources, the existing PM_{10} concentration is unlikely to exceed 24 µg/m^3. However, based on the potential for eastly occupants of the Proposed Development to be affected by ongoing construction works, the sensitivity of the area to dust-related health impacts is 'medium'.

There are no dust sensitive habitat sites within 50m of the Proposed Development, therefore impacts on ecology have been screened out of the assessment.

A summary of the sensitivity of the area to dust impacts is presented in Table 14.

Table 14: Sensitivity of the Area to Dust Impacts

Potential Impact	Demolition	Earthworks	Construction	Trackout
Soiling	High	High	High	High
Human Health	**Medium**	**Medium**	**Medium**	**Medium**

DUST EMISSION MAGNITUDE

The magnitude of the potential dust emission from demolition, earthworks, construction and trackout, has been evaluated using the criteria in Table A5 of Appendix A and is presented in Table 15.

Table 15: Evaluation of Dust Emission Magnitude

Dust Source	Proposed Development	Dust Emission Magnitude
Demolition	There is a range of single-storey and two-storey industrial buildings on Site which will require demolition. The total building volume is estimated to be in the range 12,000 - 75,000m^3 and the maximum demolition height is approximately 6-8m. It is possible that crushing and screening will be undertaken to enable to re-use of material on Site.	Large
Earthworks	The Site area is 23,000m^{2,} however the works will be phased and there are unlikely to be more than 5 - 10 heavy earth moving vehicles on Site at any one time. Stockpiling of dusty materials of up to 6m in height is possible. British Geological Survey (BGS) mapping[28] indicates that the area is underlain by bedrock from the London Clay Formation (clay, silt, and sand) with superficial deposits of Langley silt member (clay and silt). The UK Soil Observatory (UKSO)[29] confirms a clay and silt-rich subsoil, therefore the soil type is moderately dusty.	**Medium**
Construction	The total build volume is approximately 145,000m^3. Building materials will include brick and concrete. On-Site concrete batching is possible.	Large
Trackout	Based on the scale of the proposed works, the maximum number of outward HDV trips on any one day is expected to be in the range 10 – 50. On-Site haul routes of up to 100m are possible. Based on the soil type, the surface material is expected to be moderately dusty.	**Medium**

ASSESSMENT OF DUST RISK PRIOR TO MITIGATION

A summary of the potential risk of dust impacts prior to mitigation is presented in Table 16.

[28] https://geologyviewer.bgs.ac.uk/
[29] https://mapapps2.bgs.ac.uk/ukso/home.html

Table 16: Risk of Dust Impacts Prior to Mitigation

Potential Impact	Demolition	Earthworks	Construction	Trackout
Soiling	High	Medium	High	Medium
Human Health	High	Medium	Medium	Medium

OPERATIONAL PHASE IMPACTS

NITROGEN DIOXIDE

Annual mean NO_2 concentrations predicted at the identified off-Site receptor locations in 2027 are presented in Table 17. The predicted concentrations are well below the current air quality objective of 40 µg/m^3 but significantly exceed the 2021 WHO AQG adopted by LBH of 10 µg/m^3 due to the existing background (17.5 µg/m^3)

The maximum increase in concentration due to the operational traffic is 0.090 µg/m^3 and occurs at receptors 3 and 4 on St Stephen's Close near the junction with High Street. The change in concentration is just 0.23% of the current air quality standard, but is of 'moderate' significance, in accordance with the LBH matrix (see Table 8). It should be noted that the change in concentration is insignificant compared with the inter-annual variability in locally measured NO_2 concentrations.

With respect to exposure, the predicted annual mean NO_2 concentrations at the worst-case on-Site receptors are well within the annual mean air quality standard but exceed the WHO AQG. The concentrations are less than 45% of the 60 µg/m^3 threshold for a potential short-term exceedance, therefore the risk of non-compliance with the 1-hour mean objective is negligible.

Table 17: Predicted 2027 Annual Mean NO_2 Concentrations (µg/m^3)

ID	Receptor	Without Development	With Development	Impact (µg/m^3)	Significance
Off-Site Receptors (Operational Traffic Impact)					
1	19 St Stephen's Road	19.1	19.1	0.030	Negligible
2	1 St Stephen's Road	19.7	19.8	0.040	Negligible
3	Kirk House	24.6	24.7	0.090	Moderate
4 (ground)	Chiltern House	27.6	27.7	0.090	Moderate
4 (first)	Chiltern House	23.8	23.8	0.070	Moderate
5 (ground)	126 High Street	27.7	27.8	0.030	Negligible
5 (first)	126 High Street	22.4	22.4	0.010	Negligible
6	131 High Street	26.2	26.2	0.020	Negligible
7	163 High Street	22.7	22.7	0.020	Negligible
8	191 High Street (Continental House)	23.2	23.2	0.030	Negligible
9	Magic Steps	19.2	19.2	0.010	Negligible
10	Onslow Court	19.5	19.5	0.010	Negligible
11	Gurnard Close	20.5	20.5	0.010	Negligible
12	17 Falling Lane	21.1	21.1	0.010	Negligible
13 (ground)	112 High Street	27.4	27.4	0.030	Negligible
13 (first)	112 High Street	22.6	22.6	0.020	Negligible
On-Site Receptors (Exposure)					
1	Proposed residential		19.0		Negligible

ID	Receptor	Without Development	With Development	Impact (µg/m³)	Significance
2	Proposed residential		20.0		Negligible
3	Proposed commercial		25.4		Negligible
4	Proposed residential		18.8		Negligible

PARTICULATE MATTER (AS PM_{10})

Annual mean PM_{10} concentrations predicted at the identified off-Site receptor locations in 2027 are presented in Table 18. The predicted concentrations are well below the air quality objective (AQAL) of 40 µg/m³.

The maximum increase in concentration is 0.05 µg/m³ (0.028% of the objective), therefore in accordance with the IAQM/ EPUK criteria, the impact of the operational traffic emissions on PM_{10} concentrations is negligible/ not significant.

The predicted concentrations on-Site are less than 50% of the annual mean objective. TG22 provides a relationship between predicted annual mean PM_{10} concentrations and the likely number of exceedances of the short-term (24-hour mean) PM_{10} objective of 50 µg/m³. The objective allows 35 exceedances per year, which is equivalent to an annual mean of 32 µg/m³. On this basis, the dispersion modelling indicates that compliance with the short-term PM_{10} objective will also be achieved at the Site.

Table 18: Predicted 2027 Annual Mean PM_{10} Concentrations (µg/m³)

ID	Receptor	Without Development	With Development	Impact (% of AQAL)	Significance
Off-Site Receptors (Operational Traffic Impact)					
1	19 St Stephen's Road	14.9	14.9	0%	Negligible
2	1 St Stephen's Road	15.3	15.3	0%	Negligible
3	Kirk House	18.7	18.7	0%	Negligible
4 (ground)	Chiltern House	20.8	20.8	0%	Negligible
4 (first)	Chiltern House	18.0	18.1	0%	Negligible
5 (ground)	126 High Street	20.7	20.7	0%	Negligible
5 (first)	126 High Street	17.0	17.0	0%	Negligible
6	131 High Street	19.6	19.6	0%	Negligible
7	163 High Street	17.4	17.4	0%	Negligible
8	191 High Street (Continental House)	17.9	17.9	0%	Negligible
9	Magic Steps	15.0	15.0	0%	Negligible
10	Onslow Court	15.1	15.1	0%	Negligible
11	Gurnard Close	16.0	16.0	0%	Negligible
12	17 Falling Lane	16.1	16.1	0%	Negligible
13 (ground)	112 High Street	20.5	20.5	0%	Negligible
13 (first)	112 High Street	17.1	17.1	0%	Negligible

ID	Receptor	Without Development	With Development	Impact (% of AQAL)	Significance
On-Site Receptors (Exposure)					
1	Proposed residential		14.8		Negligible
2	Proposed residential		15.5		Negligible
3	Proposed commercial		19.0		Negligible
4	Proposed residential		14.6		Negligible

PARTICULATE MATTER (AS $PM_{2.5}$)

Annual mean $PM_{2.5}$ concentrations predicted at the identified off-Site receptor locations in 2027 are presented in Table 19. The predicted concentrations are well below the current air quality standard of 20 µg/m^3 but exceed the Mayor of London's 2030 Target/ Government's 2040 AMCT of 10 µg/m^3 at locations on High Street. The 2021 WHO AQG of 5 µg/m^3 is exceeded at all locations due to the existing background (8.2 µg/m^3).

The maximum increase in concentration due to the operational traffic is 0.007 µg/m^3 and occurs at receptor 4 at the junction of St Stephen's Close with High Street. In accordance with the LBH matrix (see Table 9), since all predicted changes in concentration are <0.05 µg/m^3, the significance of the impact is 'negligible'.

The predicted $PM_{2.5}$ concentrations at the proposed on-Site residential receptors on Trout Road and St Stephen's Road are below 10 µg/m^3. At the proposed commercial unit, which abuts High Street, the predicted concentration exceeds 10 µg/m^3, however there will be no long-term exposure at this location.

Table 19: Predicted 2032 Annual Mean $PM_{2.5}$ Concentrations (µg/m^3)

ID	Receptor	Without Development	With Development	Impact (µg/m^3)	Significance
Off-Site Receptors (Operational Traffic Impact)					
1	19 St Stephen's Road	8.8	8.8	0.002	Negligible
2	1 St Stephen's Road	9.0	9.0	0.002	Negligible
3	Kirk House	10.8	10.8	0.006	Negligible
4 (ground)	Chiltern House	11.9	11.9	0.007	Negligible
4 (first)	Chiltern House	10.4	10.4	0.005	Negligible
5 (ground)	126 High Street	11.9	11.9	0.003	Negligible
5 (first)	126 High Street	9.9	9.9	0.001	Negligible
6	131 High Street	11.3	11.3	0.002	Negligible
7	163 High Street	10.1	10.1	0.003	Negligible
8	191 High Street (Continental House)	10.4	10.4	0.004	Negligible
9	Magic Steps	8.8	8.8	0.001	Negligible
10	Onslow Court	8.9	8.9	0.002	Negligible
11	Gurnard Close	9.4	9.4	0.001	Negligible
12	17 Falling Lane	9.4	9.4	0.001	Negligible

ID	Receptor	Without Development	With Development	Impact (µg/m^3)	Significance
13 (ground)	112 High Street	11.7	11.7	0.003	Negligible
13 (first)	112 High Street	9.9	9.9	0.001	Negligible
On-Site Receptors (Exposure)					
1	Proposed residential		8.7		Negligible
2	Proposed residential		9.1		Negligible
3	Proposed commercial		10.9		Negligible
4	Proposed residential		8.6		Negligible

AIR QUALITY NEUTRAL ASSESSMENT

TRAFFIC EMISSIONS

The air quality neutral assessment for transport-related emissions compares the trips generated by the Proposed Development with benchmark trip rates (TEB) for Outer London based on land-use, as specified by the guidance.

The benchmarked trip rates are compared with the expected trip generation (not including taxi's, HDV's, deliveries and servicing) in Table 20.

Table 20: Development and Benchmarked Trip Rates

Land Use	Number of dwellings or GIA (m^2)	TEB (trips/dwelling or m^2/yr)	Trips/yr
Residential (Class C3)	433	447	193,551
Flexible Retail/ Café/ Restaurant (Class E (a,b,c))	2,002	16	32,032
Light Industrial (Class E (g)(iii))	282	170	47,940
Total Benchmarked Trip Rate			**273,523**
Development Trip Generation			**50,735** (a)
(a) Based on a trip generation (not including taxi's, HDV's, deliveries and servicing) of 139 AADT			

The development trip generation is lower than the benchmarked trip rate and therefore the Proposed Development is Air Quality Neutral with respect to transport-related emissions.

BUILDING EMISSIONS

The energy strategy is 100% electric and is therefore air quality neutral with respect to building-related emissions.

MITIGATION

The following mitigation measures will be required during the construction and operational phases to minimise the air quality impacts arising from the development.

CONSTRUCTION PHASE

In accordance with the IAQM guidance, based on the risk of dust impacts during the construction phase (see Table 16), the 'Highly Recommended' measures detailed in Table 21 should be incorporated into the CEMP or DMP for the Proposed Development. The 'Desirable' measures should also be considered for inclusion, where appropriate

The significance of dust impacts on nearby receptors following the implementation of appropriate and best practice mitigation is expected to be negligible.

Table 21: Mitigation Measures to be Incorporated into the DMP/ CEMP for the Proposed Development

Mitigation Measure	Highly Recommended	Desirable
Communication		
Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.	✓	
Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager.	✓	
Display the head or regional office contact information.	✓	
Site management		
Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.	✓	
Make the complaints log available to the local authority when asked.	✓	
Record any exceptional incidents that cause dust and/or air emissions, either on- or off-site, and the action taken to resolve the situation in the log book.	✓	
Hold regular liaison meetings with other high risk construction sites within 250 m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/deliveries which might be using the same strategic road network routes.	✓	
Monitoring		
Undertake frequent on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100 m of site boundary, with cleaning to be provided if necessary.	✓	
Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked.	✓	
Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.	✓	

Mitigation Measure	Highly Recommended	Desirable
Agree dust deposition, dust flux, or real-time PM_{10} continuous monitoring locations with the Local Authority. Where possible commence baseline monitoring at least three months before work commences on site or, if it a large site, before work on a phase commences.	✓	
Preparing and maintaining the site		
Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.	✓	
Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.	✓	
Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period.	✓	
Avoid site runoff of water or mud.	✓	
Keep site fencing, barriers and scaffolding clean using wet methods.	✓	
Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below.	✓	
Cover, seed or fence stockpiles to prevent wind whipping.	✓	
Operating vehicle/machinery and sustainable travel		
Ensure all on-road vehicles comply with the requirements of the London Low Emission Zone and the London NRMM standards.	✓	
Ensure all vehicles switch off engines when stationary - no idling vehicles.	✓	
Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable.	✓	
Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate).	✓	
Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.	✓	
Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).	✓	
Operations		
Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g., suitable local exhaust ventilation systems.	✓	
Ensure an adequate water supply on the site for effective dust/particulate matter suppression/ mitigation, using non-potable water where possible and appropriate.	✓	
Use enclosed chutes and conveyors and covered skips.	✓	
Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.	✓	

Mitigation Measure	Highly Recommended	Desirable
Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.	✓	
Waste Management		
Avoid bonfires and burning of waste materials.	✓	
Demolition		
Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).	✓	
Ensure effective water suppression is used during demolition operations. Handheld sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition, high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground.	✓	
Avoid explosive blasting, using appropriate manual or mechanical alternatives.	✓	
Bag and remove any biological debris or damp down such material before demolition.	✓	
Earthworks		
Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.		✓
Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable.		✓
Only remove the cover in small areas during work and not all at once.		✓
Construction		
Avoid scabbling (roughening of concrete surfaces) if possible.	✓	
Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.	✓	
Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.	✓	
For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust.		✓
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.	✓	
Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.	✓	
Record all inspections of haul routes and any subsequent action in a site log book.	✓	

Mitigation Measure	Highly Recommended	Desirable
Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.	✓	
Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).	✓	
Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.	✓	
Access gates to be located at least 10 m from receptors where possible.	✓	

OPERATIONAL PHASE

Detailed dispersion modelling of traffic emissions on the local road network indicates that concentrations of NO_2, PM_{10} and $PM_{2.5}$ at the Site will be well within the statutory air quality standards and objectives in the year of earliest occupation (2027). However, the concentrations are predicted to be above the 2021 WHO AQG's for NO_2 and $PM_{2.5}$ adopted by LBH and therefore a ventilation system (MVHR) with suitable filtration will be installed in all dwellings to minimise exposure.

A Travel Plan has been developed for the site to reduce private vehicle trips associated with the Site and encourage sustainable transport. The Proposed Development will also include electric vehicle charging points (EVCPs) and secure cycle spaces, in accordance with the requirements of the London Plan.

A number of air quality positive measures have been incorporated into the design of the Proposed Development to minimise the impact on local air quality and protect future occupants from unnecessary exposure. The measures are summarised in Table 22.

Table 22: Air Quality Positive Design Measures

Measure	Description	Reason for Undertaking Measure	Expected Benefit
Layout	Commercial uses proposed for the building fronting Yiewsley High Street	Residential uses avoided in areas of poorest air quality.	Exposure reduction
EV Charge Points	EVCP provision meets required standards	Encourage the uptake of electric/ hybrid vehicles	Emissions reduction.
Energy Strategy	100% electric	Sustainable, zero emission option.	Emissions reduction.
Cycle storage	Secure cycle storage	Encouraging cycling as a sustainable transport method.	Emissions reduction.

SUMMARY AND CONCLUSIONS

An assessment has been undertaken to assess the potential impacts on local air quality associated with the construction and operation of the Proposed Development.

Releases of dust and PM_{10} are likely to occur during the construction phase. However, through good site management and the implementation of best practice dust control the impact of dust and PM_{10} releases will be effectively mitigated. The resultant impacts are expected to be negligible.

Detailed dispersion modelling of traffic on the local road network has been undertaken to determine whether mitigation will be required to protect future occupants of the Proposed Development from poor air quality. The data indicate that NO_2, PM_{10} and $PM_{2.5}$ concentrations at the Site will be well below the current statutory air quality standards and objectives for the protection of health in the earliest opening year (2027). However, the concentrations exceed LBH's adopted WHO AQG's and a ventilation system (MVHR) with suitable filtration is proposed for the residential units to minimise exposure.

The Proposed Development will reduce the overall number vehicle trips on the local road network by 21 per day, compared with the extant use, however an increase in HDV trips of 19 AADT is expected. Detailed dispersion modelling has been undertaken to assess the potential impact of the additional HDV emissions on air quality at worst-case existing receptor locations. The significance of the impacts has been assessed in line with LBH guidance and is predicted to be 'negligible' for particulate matter. However, an impact of 'moderate' significance is predicted for NO_2 at the junction of St Stephen's Road with High Street, primarily due to the existing background, which exceeds LBH's adopted WHO air quality guideline. The predicted change in concentration is less than 0.1 $\mu g/m^3$, 0.25% of the statutory air quality standard. At all other locations the impact on NO_2 concentrations is predicted to be 'negligible'. The Proposed Development has minimal parking provision, and the transport-related emissions are air quality neutral.

The proposed energy strategy is 100% electric (ASHP and VRF); therefore, the Proposed Development is also air quality neutral with respect to building-related emissions. The minimal operation of the proposed emergency life-saving generator (testing and maintenance only) will not significantly affect local air quality.

Based on the results of the assessment and with the implementation of the recommended construction phase mitigation measures, it is considered that air quality does not pose a constraint to the redevelopment of the Site as proposed.

APPENDIX A – CONSTRUCTION DUST RISK ASSESSMENT METHODOLOGY

Factors defining the sensitivity of a receptor to dust impacts are presented in Table A1.

Table A1: Receptor Sensitivity

Receptor Sensitivity	Human Health	Dust Soiling	Ecological (f)
High	- locations where members of the public are exposed over a time period 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) (a) - 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.	- users can reasonably expect enjoyment of a high level of amenity; or - the appearance, aesthetics or value of their property would be diminished by soiling; and - the people or property would reasonably be expected to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land. - indicative examples include dwellings, museums and other culturally important collections, medium- and long-term car parks and car showrooms	- locations with an international or national designation and the designated features may be affected by dust soiling; or - locations where there is a community of a particularly dust sensitive species such as vascular species included in the Red Data List For Great Britain (g). - indicative examples include a Special Area of Conservation (SAC) designated for acid heathlands or a local site designated for lichens adjacent to the demolition of a large site containing concrete (alkali) buildings.
Medium	- locations where the people exposed are workers (b), and exposure is over a time period 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 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	- users would expect (d) to enjoy a reasonable level of amenity, but would not reasonably expect (d) to enjoy the same level of amenity as in their home; or - the appearance, aesthetics or value of their property could be diminished by soiling; or - the people or property wouldn't reasonably be expected (d) to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land.	- locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown; or - locations with a national designation where the features may be affected by dust deposition. - indicative example is a Site of Special Scientific Interest (SSSI) with dust sensitive features.

		- indicative examples include parks and places of work.	
Low	- locations where human exposure is transient (c) - indicative examples include public footpaths, playing fields, parks and shopping streets.	- the enjoyment of amenity would not reasonably be expected (d); or - property would not reasonably be expected (d) to be diminished in appearance, aesthetics or value by soiling; or • there is transient exposure, where the people or property would reasonably be expected (d) 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 (e) and roads.	- 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.

(a) This follows Defra guidance as set out in TG22.

(b) Notwithstanding the fact that the air quality objectives and limit values do not apply to people in the workplace, such people can be affected to exposure of PM_{10}. However, they are considered to be less sensitive than the general public as a whole because those most sensitive to the effects of air pollution, such as young children are not normally workers. For this reason, workers have been included in the medium sensitivity category.

(c) There are no standards that apply to short-term exposure, e.g., one or two hours, but there is still a risk of health impacts, albeit less certain.

(d) People's expectations will vary depending on the existing dust deposition in the area.

(e) Car parks can have a range of sensitivities depending on the duration and frequency that people would be expected to park their cars there, and the level of amenity they could reasonably expect whilst doing so. Car parks associated with workplace or residential parking might have a high level of sensitivity compared to car parks used less frequently and for shorter durations, such as those associated with shopping. Cases should be examined on their own merits.

(f) The advice of an ecologist should be sought to determine the need for an assessment of dust impacts on sensitive habitats and plants. A Habitat Regulation Assessment of the site may be required as part of the planning process, if the site lies close to an internationally designated site i.e., Special Conservation Areas (SACs), Special Protection Areas (SPAs) designated under the Habitats Directive (92/43/EEC) and RAMSAR sites.

(g) Cheffing C. M. & Farrell L. (Editors) (2005), The Vascular Plant. Red Data List for Great Britain, Joint Nature Conservation Committee.

The sensitivity of the area, as a whole, is dependent on the number of receptors within each sensitivity class and their distance from the source. Human health impacts are also dependent on the existing PM_{10} concentrations in the area.

Table A2 and Table A3 summarise the criteria for determining the overall sensitivity of the area to dust soiling and health impacts, respectively. The sensitivity of the area to ecological impacts is presented in Table A4.

Table A2: Sensitivity of the Area to Dust Soiling Effects on People and Property

Receptor Sensitivity	Number of Receptors	Distance from the Source (m)			
		<20	<50	<100	<250
High	>100	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

Table A3: Sensitivity of the Area to Health Impacts from Dust

Receptor Sensitivity	Annual Mean PM_{10} Concentration ($\mu g/m^3$)	Number of Receptors	Distance from the Source (m)			
			<20	<50	<100	<250
High	>32	>100	High	High	High	Medium
		10-100	High	High	Medium	Low
		1-10	High	Medium	Low	Low
	28-32	>100	High	High	Medium	Low
		10-100	High	Medium	Low	Low
		1-10	High	Medium	Low	Low
	24-28	>100	High	Medium	Low	Low
		10-100	High	Medium	Low	Low
		1-10	Medium	Low	Low	Low
	<24	>100	Medium	Low	Low	Low
		10-100	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
Medium	>32	>10	High	Medium	Low	Low
		1-10	Medium	Low	Low	Low
	28-32	>10	Medium	Low	Low	Low
		1-10	Low	Low	Low	Low
	24-28	>10	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
	<24	>10	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
Low	-	≥1	Low	Low	Low	Low

Table A4: Sensitivity of the Area to Ecological Impacts from Dust

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

The magnitude of the dust impacts for demolition, earthworks, construction and trackout is classified as 'Small', 'Medium' or 'Large' depending on the scale of the proposed works as detailed in Table A5.

Table A5: Dust Emission Magnitude

Source	Large	Medium	Small
Demolition	- Total building volume >75,000m^3 - Potentially dusty material (e.g., concrete) - Onsite crushing and screening - Demolition activities >12m above ground level.	- Total building volume 12,000 - 75,000m^3 - Potentially dusty material - Demolition activities 6 - 12m above ground level.	- Total building volume <12,000m^3 - Construction material with low potential for dust release (e.g., metal cladding or timber) - Demolition activities <6m above ground level - Demolition during wetter months
Earthworks	- Total site area >110,000m^2 - Potentially dusty soil type (e.g., clay) - >10 heavy earth moving vehicles active at any one time. - Formation of bunds >6m in height	- Total site area 18,000 - 110,000m^2 - Moderately dusty soil type (e.g., silt) - 5-10 heavy earth moving vehicles active at any one time. - Formation of bunds 3 - 6m in height	- Total site area <18,000m^2 - Soil type with large grain size (e.g., sand) - <5 heavy earth moving vehicles active at any one time. - Formation of bunds <3m in height
Construction	- Total building volume >75,000m^3 - On site concrete batching - Sandblasting	- Total building volume 12,000 - 75,000m^3 - Potentially dusty construction material (e.g., concrete) - On site concrete batching	- Total building volume <12,000m^3 - Material with low potential for dust release (e.g., metal cladding or timber)
Trackout	- >50 HDV movements in any one day (a) - Potentially dusty surface material (e.g., high clay content) - Unpaved road length >100m	- 20 - 50 HDV movements in any one day (a) - Moderately dusty surface material (e.g., silt) - Unpaved road length 50 - 100m	- <20 HDV movements in any one day (a) - Surface material with low potential for dust release - Unpaved road length <50m
(a) HDV movements refer to outward trips (leaving the site) by vehicles of over 3.5 tonnes			

For each dust emission source, the worst-case area sensitivity is used in combination with the dust emission magnitude to determine the risk of dust impacts prior to mitigation as illustrated in Tables A6 and A7.

Table A6: Risk of Dust Impacts from Demolition

Area Sensitivity	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Medium Risk
Medium	High Risk	Medium Risk	Low Risk
Low	Medium Risk	Low Risk	Negligible Risk

Table A7: Risk of Dust Impacts from Earthworks, Construction and Trackout

Area Sensitivity	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible Risk

APPENDIX B – ADMS-ROADS INPUT PARAMETERS

Table B1: Summary of ADMS-Roads Input Parameters

Parameter	2022 Verification	2027 Impact and Exposure
ADMS-Roads Model Version	5.0	5.0
Vehicle Emission Factors	EFTv13.1 for 2022	EFTv13.1 for 2027
Meteorological Data	Hourly sequential data from London Heathrow (2022)	Hourly sequential data from London Heathrow (2022)
Surface Roughness	1.0m	1.0m
Monin-Obukhov Length	75m	75m

Table B2: Summary of Traffic Data for Model Verification

Road Link	2022 AADT	HDV (%)	Average Speed (kph)	Source
Uxbridge Road	20,427	3.4%	24	DfT 28118 for 2022
Fairfield Road	2,600	5.0%	16	DfT 2022 average flow on a minor road in London (TRA0302)
St Stephen's Road	2,600	5.0%	16	
High St N of St Stephen's Road	19,966	7.8%	16	LAEI2022
High St S of St Stephen's Road	19,090	7.8%	16	
Pield Heath Road W of Colham Green Road	10,153	14.4%	16	
Pield Heath Road E of Colham Green Road	7,303	8.6%	16	
Colham Green Road	7,112	12.1%	16	

Table B3: Summary of 2027 Traffic Data for Impact and Exposure Assessment

Road Link (a)	Baseline AADT (b)		Development AADT		Baseline + Development AADT		Average Speed (kph)
	LDV	HDV	LDV (c)	HDV	LDV	HDV	
Fairfield Road	2,586	136	0	0	2,586	136	16
High St N of St Stephen's Road	19,262	1,640	-20	10	19,242	1,650	16
High St S of St Stephen's Road	18,423	1,562	-20	7	18,403	1,569	16
St Stephen's Road	2,586	136	-40	15	2,546	151	16
Trout Road	2,586	136	0	4	2,586	140	16
Falling Lane	14,190	1,487	-10	5	14,180	1,492	16

High St N of Falling Lane	23,196	557	-10	5	23,186	562	16

(a) The contribution of emissions from traffic on other minor road links within 200m of the Proposed Development/ identified sensitive receptors is assumed to be adequately captured by the background concentrations used in the assessment.
(b) LAEI2022 with TEMProv8.1 2022 to 2027 'high' growth factor applied (1.047)

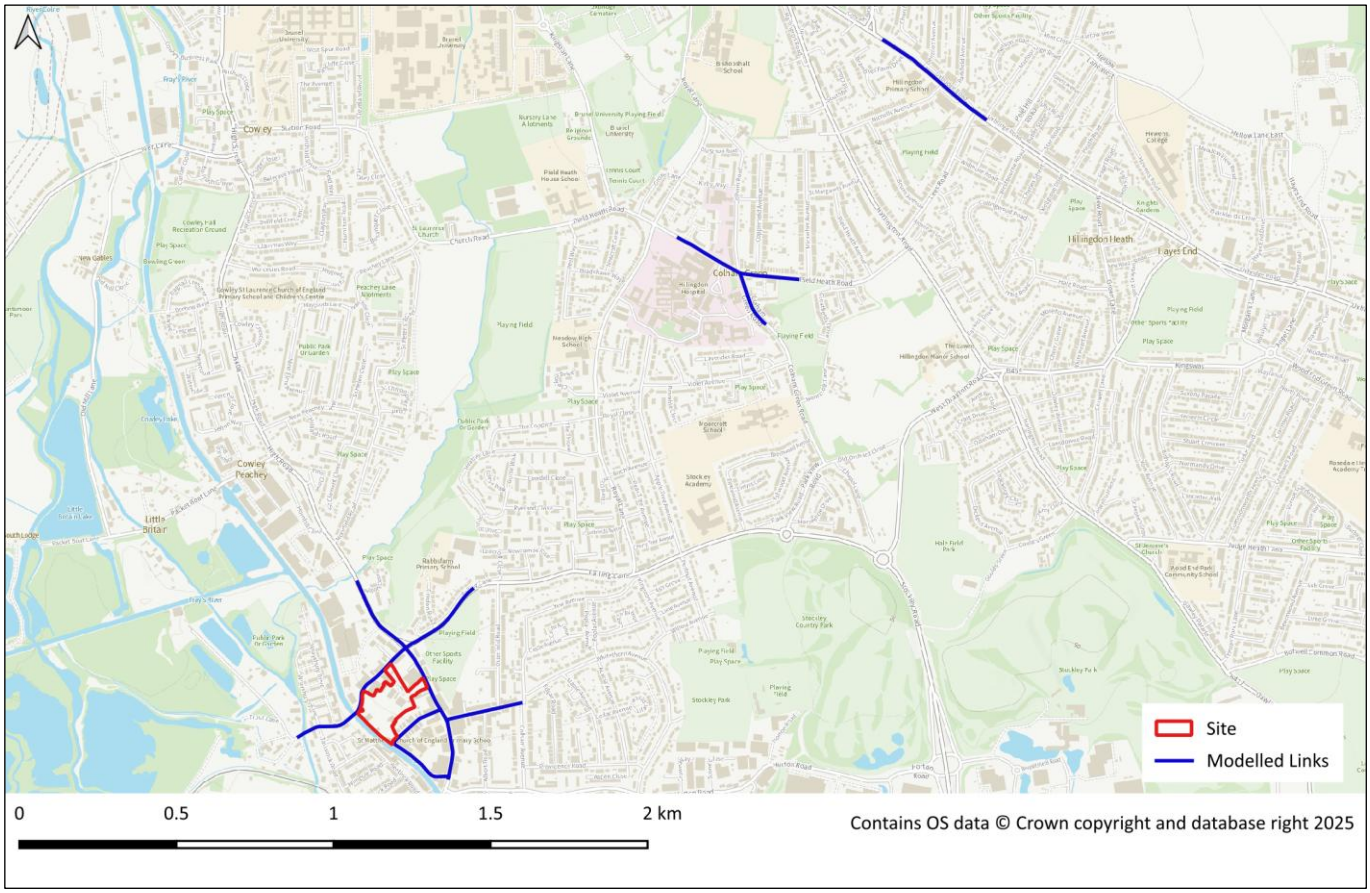

Figure B1: Modelled Road Links

APPENDIX D – MODEL VERIFICATION

NITROGEN DIOXIDE

Most nitrogen dioxide (NO_2) is produced in the atmosphere by the reaction of nitric oxide (NO) with ozone. It is therefore most appropriate to verify the model in terms of primary pollutant emissions. Verification of concentrations predicted by the ADMS-Roads model has followed the methodology presented in LAQM.TG22.

Modelled annual mean concentrations of NO_2 have been compared with the concentrations measured at the following diffusion tube monitoring locations in 2022:

- HILL04 – Hillingdon Primary School (24.7 µg/m^3)
- HILL05 – Colham Rd/Pield Heath Road opposite Hillingdon Hospital (27.8 µg/m^3)
- HILL19 – Yiewsley High Street (28.7 µg/m^3)

The Defra NOxtoNO$_2$ calculator (v9.1) has been used to determine the Road-NOx (i.e., the component of total NOx coming from road traffic) concentration using the mapped background NO_2 concentration at each location. The measured Road-NOx concentrations are compared with the modelled Road-NOx concentrations in Figure C1.

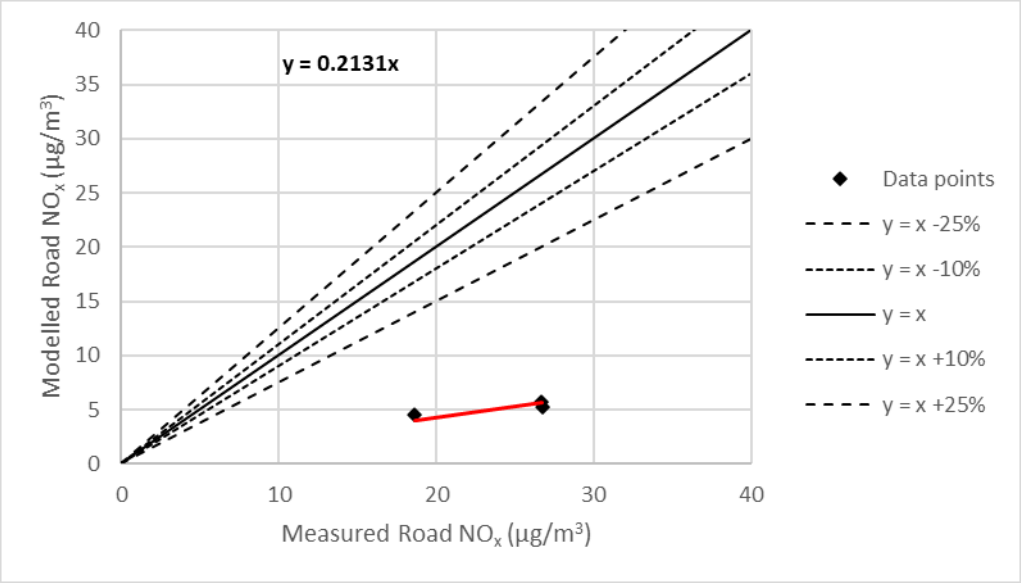

Figure C1: Comparison of Measured Road-NOx Concentrations with Modelled Road-NOx Concentrations.

A primary adjustment factor is determined as the ratio between the measured Road-NO_x contribution and the modelled Road-NOx contribution, forced through zero (1/0.2131 = 4.69). This factor was then applied to the modelled Road-NOx concentration for each monitoring location to provide an adjusted modelled Road-NOx concentration. The equivalent Road-NO_2 concentration is then determined using the Defra NOx from NO_2 calculator and added to the background NO_2 concentration, for comparison with the measured NO_2 concentration (see Figure C2).

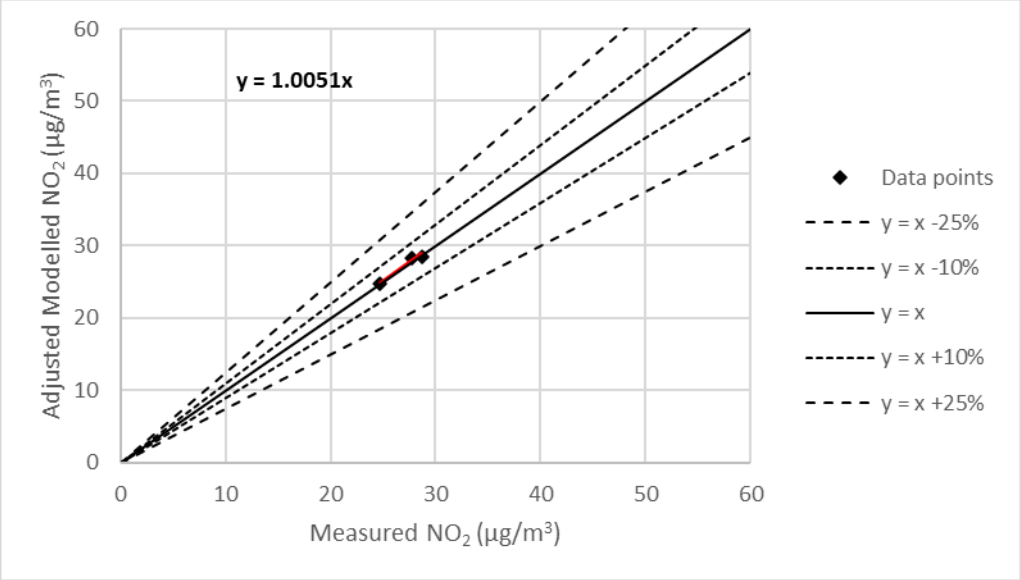

Figure C2: Comparison of Measured NO_2 Concentrations with the Adjusted Modelled NO_2 Concentrations.

The average performance of the model can be expressed as the Root Mean Square Error (RMSE), which in accordance with LAQM.TG22 should ideally be less than 10% and not more than 25% of the relevant air quality standard (in this case, the annual mean NO_2 objective of 40 µg/m^3). The RMSE for the comparison of the adjusted modelled and measured NO_2 concentrations is 0.35 µg/m^3, 0.88% of the air quality objective. Since the RMSE is below 10% of the objective, further adjustment is not required.

PARTICULATE MATTER

In the absence of a local monitoring site for the verification of the modelled particulate concentrations, the NOx adjustment factor has been applied to the modelled Road-PM_{10} and Road-$PM_{2.5}$ concentrations, in accordance with the guidance.

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