



Sovereign Business Park, Huyton

Air Quality Assessment

For Network Space Land Limited

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1. Introduction

Hydrock have been commissioned by Network Space Land Limited, to prepare an Air Quality Assessment (AQA) to support the submission of a full planning application for the remodelling and extension to existing industrial building, demolition of buildings and formation of seven new industrial units (the 'Proposed Development') on land to the west of Wilson Road, Huyton (the 'Site'). The Site is located within the administrative boundary of Knowsley Metropolitan Borough Council (KMBC).

The Site is located within an existing industrial estate to the south of Huyton. To the north, east and south of the Site are industrial / commercial units. Immediately to the west of the Site are residential dwellings. The M57 is located approximately 400m to the east of the Site, and the M62 is located approximately 450m to the south of the Site.

The Site is centred on the National Grid Reference (NGR); x345645, y389760 and shown below in Figure 1.



Figure 1: Site Location

1.1 Proposed Development

The proposals seek full planning permission for;

"Full planning application for remodelling and extension to existing industrial building, demolition of buildings and formation of seven new industrial units to create e (g)(iii) (iii), b2 and b8 employment space, with ancillary e(g)(i) office use, remodelling of car parking, service, vehicular circulation areas, landscaping and infrastructure works".

1.2 Purpose of Air Quality Assessment

The purpose of this AQA is to provide the following:

- » Review of baseline air quality to assess the risk of exceedance of Air Quality Assessment Levels (AQALs) at the Site and surrounding area;
- » Construction Phase Assessment to conclude on the requirements for mitigation to reduce the significance of impacts to negligible during this phase; and,
- » Consideration of potential impacts during the operational phase, both in terms of vehicle and plant emissions.

2. Relevant Legislation

2.1 Air Quality Regulations and Objectives

There are two sets of air quality legislation which include ambient air quality thresholds for the protection of public health that apply in England, these include legally binding limit values originally set by the European Union (EU) Directive 2008/50/EC¹ on ambient air quality and cleaner air for Europe; and regulations implementing national air quality objectives as set out in the Air Quality Strategy for England, Scotland, Wales and Northern Ireland (AQS)² which local authorities are required to work towards achieving.

The EU (Withdrawal Agreement) Act 2020 sets out arrangement for implementing air quality limit values that are included in the EU Directive on ambient air quality and cleaner air for Europe (2008/50/EC) included in the following:

- » Air Quality Regulations (SI 2010 No.1001)³ and amended (SI 2016 No.1184)⁴ ;
- » The Air Quality (Amendment of Domestic Regulations) (EU Exit) Regulations 2019 (SI 2019 74)⁵ ;
- » The Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020 (SI 2020 1313)⁶ amend the Air Quality Regulations (SI 2010 No.1001) to account for EU withdrawal; and
- » The AQS objectives are implemented in the Air Quality (England) Regulations 2000 (SI 2000/928)⁷ and Air Quality (England) (Amendment) Regulations 2002 (SI 2002/3043)⁸.

The AQS 2007 Volume 12 sets out the government's policies and framework for improving air quality in the UK with the aim of meeting the requirements of above legislation. The AQS also outlines the Limit Values, Target Values, Standards, Objectives, Critical Levels and Exposure Reduction Targets for the protection of human health and the environment (collectively termed AQALs throughout this report). Those relevant to this assessment is provided below, in Table 1:

Table 1: National AQALs

Pollutant	Averaging Period	AQALs	
NO ₂	1 Hour Mean	200 µg/m ³	Not to be exceeded more than 18 times in a year.
	Annual Mean	40 µg/m ³	
PM ₁₀	24 Hour Mean	50 µg/m ³	

¹ Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe Available at: <https://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX%3A32008L0050>

² Defra. "The Air Quality Strategy for England, Scotland, Wales and Northern Ireland". Available at: <https://www.gov.uk/government/publications/2010-to-2015-government-policy-environmental-quality/2010-to-2015-government-policy-environmental-quality#appendix-5-international-european-and-national-standards-for-air-quality>

³ The National Archives. "The Air Quality Standards Regulations 2010". Available at: <http://www.legislation.gov.uk/uksi/2010/1001/contents/made>

⁴ The National Archives (2016). "The Air Quality Standards (Amendment) Regulations 2016". Available at: <https://www.legislation.gov.uk/uksi/2016/1184/contents/made>

⁵ The Air Quality (Amendment of Domestic Regulations) (EU Exit) Regulations 2019 (legislation.gov.uk). Available at: <https://www.legislation.gov.uk/uksi/2019/74/contents/made>

⁶ The Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020 (legislation.gov.uk). Available at: <https://www.legislation.gov.uk/uksi/2020/1313/contents/made>

⁷ The National Archives. "The Air Quality (England) Regulations 2000". Available at: <http://www.legislation.gov.uk/uksi/2000/928/contents/made>

⁸ The National Archives. "The Air Quality (England) (Amended) Regulations 2002". Available at: <http://www.legislation.gov.uk/uksi/2002/3043/contents>

Pollutant	Averaging Period	AQALs	
PM _{2.5}	Annual Mean	40 µg/m ³	
	Annual Mean	20 µg/m ³	

Defra's Local Air Quality Management Technical Guidance 2022 (LAQM.TG(22))⁹ provides guidance on where the above AQAL's should apply. This is summarised below, in Table 2.

Table 2: Summary of where AQALs should apply

Averaging Period	Objectives should apply at:	Objectives should generally NOT apply at:
Annual Mean	All locations where members of the public might be regularly exposed. Building facades of residential properties, schools, hospitals, care homes etc.	Building facades of offices or other places of work where members of the public do not have regular access. Hotels, unless people live there as their permanent residence. Gardens of residential properties. Kerbside sites (as opposed to other 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. Gardens of residential properties	Kerbside sites (as opposed to other 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 site (for example, pavements of busy shopping streets). Those parts of car parks, bus stations and railways stations etc. which are not fully enclosed, where members of the public might be expected to spend one hour or more. Any outdoor locations where members of the public might	Kerbside sites where the public would not be expected to have regular access.

⁹ Defra, "LAQM Technical Guidance (TG22)" (Department for Food, Environment and Rural Affairs (Defra), August 2022), <https://laqm.defra.gov.uk/wp-content/uploads/2022/08/LAQM-TG22-August-22-v1.0.pdf>

Averaging Period	Objectives should apply at:	Objectives should generally NOT apply at:
	reasonably expect to spend one hour or longer.	
15 Minute Mean	All locations where member of the public might reasonably be exposed for a period of 15 minutes	

2.2 Local Air Quality Management

Obligations under the Environment Act 2021¹⁰ requires local authorities to review and assess air quality in their administrative boundaries. Where AQALs are predicted to be exceeded, the local authority must declare an Air Quality Management Area (AQMA) at sensitive receptor locations and formulate an Air Quality Action Plan (AQAP) to reduce pollution concentrations to values below AQALs.

KMBC currently have no declared AQMAs.

2.3 National Planning Policy Framework

The National Planning Policy Framework (NPPF)¹¹ sets out the Government's planning policy for England. It requires planning decisions for any new development to prevent new and existing development from contributing to, or being put at risk from, unacceptable levels of air pollution (paragraph 174). It also states that planning decisions should sustain and contribute towards compliance with relevant limit values or national objectives for air pollutants, taking into account the presence of AQMAs and Clean Air Zones (CAZ)s (paragraph 186), and the cumulative impacts from other sites (paragraph 185).

Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. Furthermore, planning decisions should ensure that any new development in AQMAs and CAZs is consistent with the local air quality action plan.

Also, to help reduce congestion and emissions, to improve air quality and public health, significant development should be focused on locations which are / can be made sustainable through limiting the need to travel (paragraph 105).

2.4 Planning Practice Guidance

Reference ID 32 (Air Quality) of the National Planning Practice Guidance (NPPG)¹², which was updated in November 2019, provides guiding principles on how planning can take account of the impact of new development on air quality. The NPPG summarises the importance of air quality in planning and the key legislation relating to it.

¹⁰ <https://bills.parliament.uk/bills/2593/publications>

¹¹ Ministry of Housing, Communities and Local Government, "National Planning Policy Framework," July 2021, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1004408/NPPF_JULY_2021.pdf.

¹² Ministry of Housing, Communities & Local Government, "Reference ID (32) Air Quality" (Ministry of Housing, Communities & Local Government, 2019), <https://www.gov.uk/guidance/air-quality--3>.

2.5 Local Planning Policy

KMBC adopted the Knowsley Local Plan Core Strategy in January 2016¹³. This sets out the strategic framework for the growth and development in Knowsley up to 2028 and beyond. It sets out how and where new development and regeneration should take place and will therefore promote, guide and manage the future development of the borough. The policies that are relevant to air quality within the Core Strategy 2016 are presented below.

Policy CS2 Development Principles, is relevant to air quality and states:

"1) New development in Knowsley and the preparation of subsequent stages of the Local Plan will be expected to support the following development principles:

[...] Principle 4: Recognise environmental limits, protect and enhance environmental assets, enhance local character and promote quality of place by:

[...]

*Minimising negative impact upon flood risk, **air quality**, water quality, land quality, soil quality, and noise or vibration levels and ensuring any negative impacts are appropriately mitigated.*

Development that will have an unacceptable impact upon any of the above will only be permitted where the benefits of the proposal clearly outweigh the harm.

Policy CS7 Transport Networks states:

"2) New development will be required to be:

*[...] Inclusive of measures that will mitigate carbon emissions and improve **air quality** where appropriate;"*

Policy CS23 Renewable and Low Carbon Infrastructure states:

"1) The Council will support proposals that will produce and distribute decentralised, low carbon and renewable energy, provided that they do not cause significant harm (in terms of their number, scale, siting or cumulative impacts) to:

*a) Natural resources, biodiversity, geodiversity, water and **air quality** and, landscape character;"*

¹³ KMBC, "Knowsley Local Plan Core Strategy", January 2016, <https://localplanmaps.knowsley.gov.uk/documents/knowsley-local-plan-adopted-core-strategy.pdf>

3. Methodology

3.1 Consultation

Full details of the AQA approach were sent via email to the Environmental Health Officer (EHO) at KMBC in October 2022 with a request for further comment / guidance. The following response was received on 21st October 2022:

"Thank you for the information in relation to the proposed Air Quality Assessment, we are in agreement with the proposals and would like you to add into the assessment the developments that have been granted through planning within the area that could add additional pressures on to air quality in the area."

The above comments have been taken into consideration and the approved methodology is outlined below.

3.2 Guidance

The following guidance has been used to undertake this AQA:

- » Defra's LAQM.TG(22)⁹;
- » EPUK & IAQM Land-use Planning & Development Control: Planning for Air Quality¹⁴; and
- » The IAQM's guidance on assessing impacts from construction¹⁵.

3.3 Baseline Air Quality

The baseline air quality conditions in the vicinity of the Site are shown in Section 4 and have been established through the compilation and review of the following sources.

- » Data from the National Atmospheric Emissions Inventory (NAEI) ¹⁶, Environment Agency (EA)¹⁷ and Defra's Pollutant Release and Transfer Register (PRTR) data¹⁸;
- » Defra's modelled background concentrations of AQS pollutants (UK-AIR)¹⁹. These estimates are produced using detailed modelling tools and are available as concentrations at central 1km² National Grid square locations across the UK. Mapped background concentrations have been obtained based upon the 2018 base year Defra update (August 2020 publication);
- » Defra's predicted roadside concentrations of NO₂ produced from their pollution climate model (PCM)²⁰;
- » Multi Agency Geographic Information for the Countryside (MAGIC)²¹ and;
- » KMBC's latest available air quality monitoring data, derived from the latest available air quality annual status report published in 2021²². At the time of writing, these data were from 2020.

¹⁴ EPUK & IAQM, "Land-Use Planning & Development Control: Planning for Air Quality" (Institute for Air Quality Management (IAQM), January 2017), <http://www.iaqm.co.uk/text/guidance/air-quality-planning-guidance.pdf>.

¹⁵ IAQM, "Guidance on the Assessment of Dust from Demolition and Construction" (Institute of Air Quality Management (IAQM), February 2014), <http://www.iaqm.co.uk/text/guidance/construction-dust-2014.pdf>.

¹⁶ National Atmospheric Emissions Inventory, UK Emissions Interactive Map (beis.gov.uk).

¹⁷ <https://data.gov.uk/dataset/cfd94301-a2f2-48a2-9915-e477ca6d8b7e/pollution-inventory>

¹⁸ UK Pollutant Release and Transfer Register (PRTR) <https://prtr.defra.gov.uk/map-search>

¹⁹ UK-AIR, "Background Mapping Data for Local Authorities - 2018," n.d., <https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2018>.

²⁰ <https://uk-air.defra.gov.uk/data/gis-mapping/>

²¹ <https://magic.defra.gov.uk/MagicMap.aspx>

²² Knowsley Metropolitan Borough Council, 2021 Air Quality Annual Status Report, December 2021.

3.4 Construction Phase Assessment

3.4.1 Dust Risk Assessment

The construction dust risk assessment is provided in Section 5 and has been undertaken in line with IAQM guidance. This considers the risk of impacts during the construction phase in terms of nuisance dust, human health (PM₁₀ exposure) and ecological impacts.

With regard to ecological receptors, risk assessment should be taken where high-sensitivity receptors are located within 50m of a Site boundary. The MAGIC website, which incorporates Natural England's interactive maps²³, has been reviewed to identify whether any statutory ecological sensitive receptors are situated within 50m of the Site boundary or within 50m of any routes used by construction vehicles on the public highway, up to 500m from the Site entrance. *No receptors were identified within 50m of the Site boundary or Trackout route and therefore no further consideration of ecological receptors is required.*

Sensitive receptors were identified within 350m of the site boundary. Based on the IAQM guidance residential dwellings, museums, car parks and car show room are indicative examples of high sensitivity receptors in relation to both dust soiling and health effects of PM₁₀. Indicative examples of medium sensitivity receptors include places of work, such as offices.

The IAQM guidance states that the potential dust emission magnitude from Demolition, Earthworks, Construction and Trackout should all be assessed individually. In addition, the sensitivity of the area to adverse dust impacts should also be defined.

The overall significance of the risk of adverse impacts during the construction phase can then be defined using the 'risk of impacts matrix' for each stage of the construction phase described above.

3.4.2 Construction Traffic Emissions

The IAQM guidance states that from experience of assessing exhaust emissions from site traffic, it is unlikely that any significant adverse impacts on local air quality would be caused and in the vast majority of cases, quantitative assessment is not needed. As such, short term effects of construction traffic emissions have not been assessed, as they are also likely to be well below the EPUK & IAQM traffic criteria outlined in Table 3.

3.5 Operational Phase Assessment

3.5.1 Scope of Impact Assessment

The scope of assessment has been determined against the EPUK & IAQM's two stage checklist criteria. The Proposed Development meets the Stage 1 Criteria for requiring an AQA and accordingly, has been considered against the relevant Stage 2 checklist criteria shown in Table 3 which identifies whether a detailed assessment of potential air quality impacts is required.

Stage 2 includes some criteria which are not directly relevant to the Proposed Development, such as those related to the realignment of roads within an AQMA, introduction of a new bus station, new road junctions and underground car parks. These have been excluded from this assessment and only relevant screening criteria have been included. The relevant checklist criteria shown in Table 3 identifies whether a detailed assessment of potential air quality impacts is required.

²³ Natural England and MAGIC partnership organisations., "Multi Agency Geographic Information for the Countryside,," 2020, <https://magic.defra.gov.uk/MagicMap.aspx>.

Table 3: EPUK & IAQM Assessment Criteria

Criteria	The Development Will:	Indicative Criteria to Proceed to a Detailed AQA:
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 (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	Have one of 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 NO_x emission rate is less than 5mg/sec is unlikely to give rise to impacts, provided that the emissions are released from a vent 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 situation where the stack height is lower than the receptor) then consideration will need to be given to potential impacts at much lower emissions rates. Conversely, where existing nitrogen dioxide concentrations are low, and where the dispersion conditions are favourable, a much higher emission rate may be acceptable.

With regard to screening criteria 1 and 2, Hydrock, the Transport Consultants, have confirmed that the traffic flows associated with the Proposed Development are above the thresholds stated above. Traffic data for the Proposed Development is detailed within Appendix A.

With regard to screening criteria 3, the client has confirmed that the Proposed Development will be heated via Air Source Heat Pumps (ASHP). As such, no combustion plant is proposed as part of the Proposed Development and therefore further assessment of combustion plant is not required.

Based on the above, a detailed assessment of air quality impacts from scheme-generated traffic has been undertaken, in accordance with EPUK & IAQM guidance, according to the methodology outlined below.

3.5.2 ADMS-Urban Dispersion Model

A detailed AQA has been undertaken using the air dispersion model ADMS-Urban v5.1 to establish the current and future air quality conditions in the area. The software is commercially available, has been validated for this type of assessment by Defra and is used extensively for AQA's.

ADMS-Urban is able to provide an estimate of air quality both before and after development, considering important input data such as background pollutant concentrations, variable emissions, meteorological data, and traffic flows.

3.5.3 Assessment Scenarios

The following scenarios have been modelled:

- » Baseline/verification 2019;
- » 2023 Do Minimum (2023 DM) – Proposed development opening year traffic flows, including committed developments; and
- » 2023 Do Something (2023 DS) – 2023 DM scenario flows in addition to proposed development traffic.

3.5.4 Model Inputs

3.5.4.1 Traffic Data

The traffic data comprises Annual Average Daily Traffic (AADT) flows based on Automatic Traffic Counts (ATC) which surveyed traffic flows for the local road network in 2022. Data for the M62 and M57 was supplemented with Department for Transport (DfT) data. TEMPro factors were applied to the data, which accounts for local growth. The modelled road links are shown in Figure 2 below, with full details provided in Appendix A.

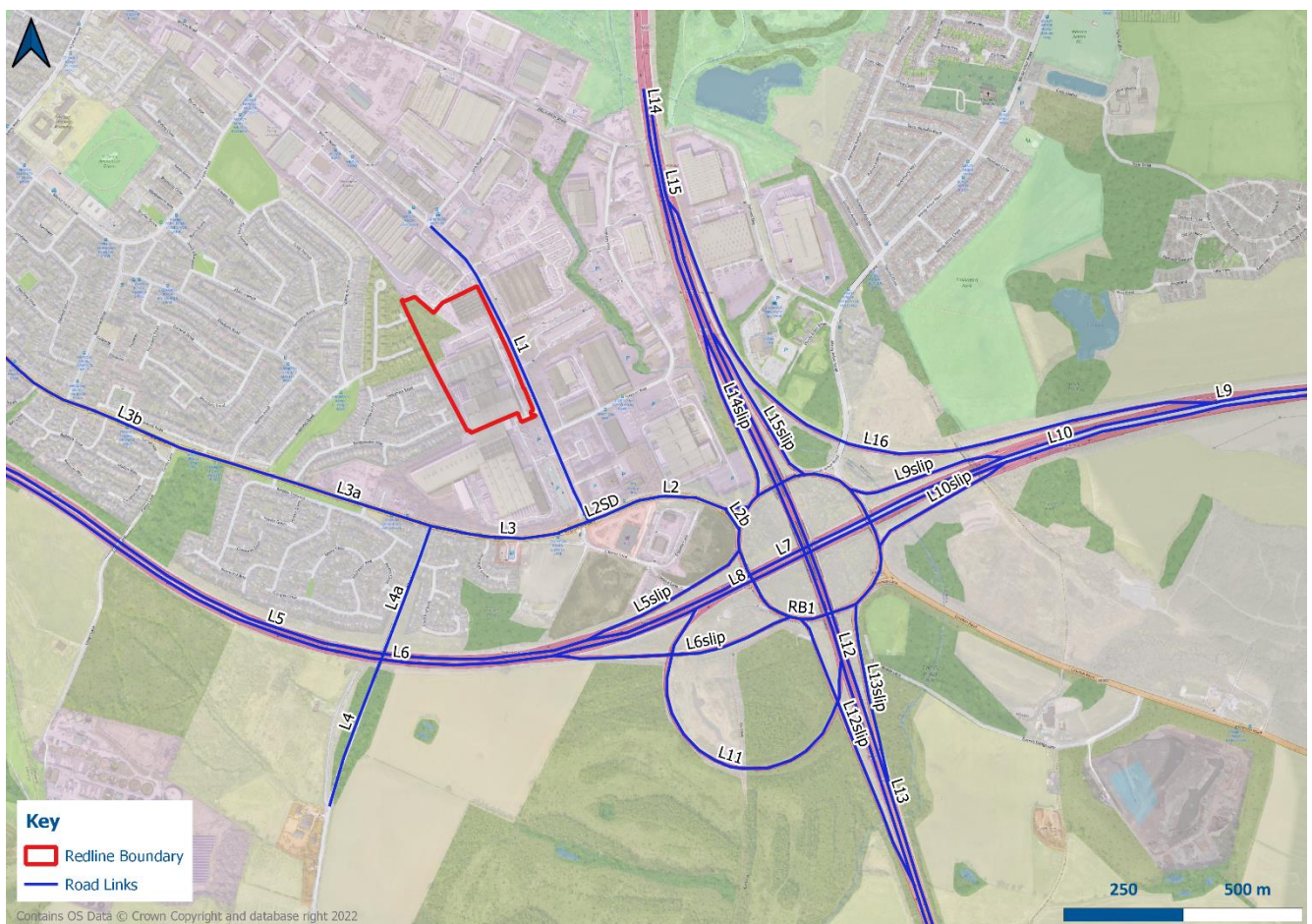


Figure 2: Links Modelled

For each road link, vehicle speeds were obtained from the speed limit for each road derived from the OpenStreet Browser v4.10²⁴, which has been used as a proxy for average speeds on the network. Vehicle speeds were reduced within 50m of junctions relative to the speed limit to account for queuing and congestion in the average speed profile, in accordance with LAQM.TG (22). Google typical traffic was used to assist with determining appropriate slow down speeds across the study area.

3.5.4.2 Emission Factors

Emission rates for NO_x, PM₁₀ and PM_{2.5} used for the dispersion modelling assessment were calculated from the latest Emissions Factor Toolkit (EFT)(v.11).

Most modern vehicles on the road in the UK meet a particular Euro emissions standard from 1 – 6, with 6 being the newest. Different parts of the country have newer or older vehicles than others. This is defined as the “fleet”. The EFT estimates this primarily based on whether the location is within or outside London or in England, Wales or Scotland. In the case of this model the vehicle fleets used were “England (urban) and Motorway”.

When predicting future year emissions, the toolkit includes forecasts such as anticipated advances in vehicle technology and changes in vehicle fleet composition, which assumes that vehicle emissions will reduce over time. However, there is some uncertainty over the accuracy of the future predictions.

3.5.4.3 Temporal Variation (Diurnal Traffic Profile)

Temporal variation in traffic flows along roads have been included in the dispersion model to account for the realistic differences that would occur between weekdays and weekends. Accordingly, a time varying profile was included in the model.

The diurnal profile used in the model has been calculated based on DfT Road traffic statistics (TRA) dataset. TRA0307 provides 'Motor vehicle traffic distribution by time of day and day of the week on all roads, Great Britain: 2019'²⁵, which shows the average hourly traffic flow in each combination of weekday and hour, relative to the average hour across the whole year for main roads in England. Figure 3 shows the diurnal traffic profile included in the model.

²⁴ https://www.openstreetbrowser.org/#map=15/53.7033/-1.2698&categories=car_maxspeed

²⁵ DfT, “Average Annual Daily Flow and Temporal Traffic Distributions (TRA03) - Statistical Data Sets - GOV.UK,” 2015, <https://www.gov.uk/government/statistical-data-sets/tra03-motor-vehicle-flow>.

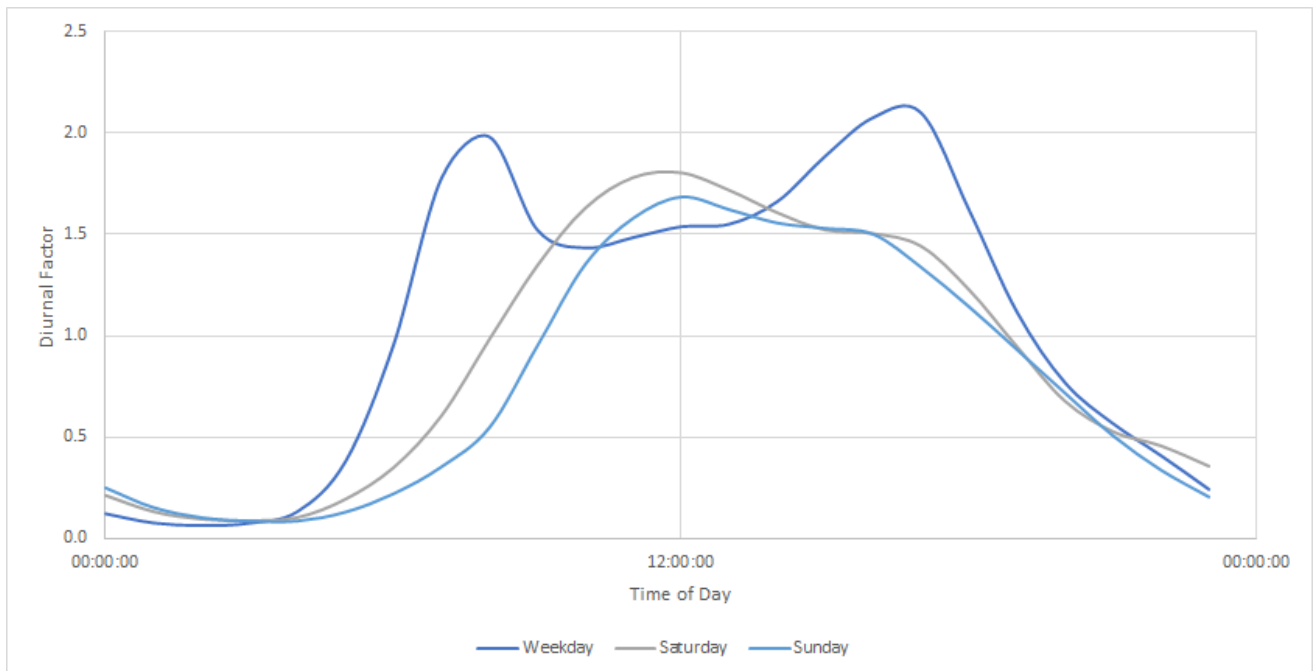


Figure 3: Diurnal traffic profile included in the dispersion model

1.1.1.1. Background data

Defra provides annual mean modelled background pollutant concentration data on a 1km x 1km spatial resolution across the UK that is routinely used to support LAQM and Air Quality Assessments¹⁹. Background pollutant concentrations are based upon the 2018 base year (the year in which comparisons between modelled and monitoring are made) and projected forward. Mapped background concentrations for NO₂, PM₁₀ and PM_{2.5} were obtained for the grid squares containing the Site, reflective of the assessment scenario years. These are presented within Section 4.3.

3.5.4.4 Meteorological Parameters

To calculate pollutant concentrations at identified sensitive receptor locations the dispersion model uses hourly sequential meteorological data, including wind direction, wind speed, temperature, cloud cover and stability, which exert significant influence over atmospheric dispersion.

The dispersion modelling has been undertaken using 2019 data from Liverpool John Lennon Airport. This site is located approximately 7.7km south of the Proposed Development. It is also the closest and most relevant meteorological station that records all of the parameters necessary for dispersion modelling. A wind rose is presented in Appendix B.

3.5.4.5 Surface Characteristics

The following surface roughness parameters have been applied in the model:

- » Dispersion site surface roughness = 0.75m;
- » Met site surface roughness = 0.02m (ADMS pre-set "open grassland");

The following Minimum Monin-Obukhov (MO) lengths were applied:

- » Dispersion site = 20m;
- » Met site = 10m (ADMS pre-set: "Small towns <50,000").

3.5.5 Receptors Included in the Dispersion Model

3.5.5.1 Human Receptors

Sensitive receptor locations included in the dispersion model are shown below in Figure 4 and Table 4. These are worst-case locations within the development locale based upon their proximity to the local road network.

Table 4: Receptor Locations

Receptor ID	Location	NGR		Z (m)
		X	Y	
R1	3 Sevenoaks Grove	345685	389368	1.5
R2	1 Whitefield Lane	345561	389400	1.5
R3	Cronton Road	345536	389407	1.5
R4	Cronton Road	345514	389433	1.5
R5	Natruscott Cottage - Cronton Road	345330	389485	1.5
R6	Bridgewater Way	345269	389516	1.5
R7	Bardley Crescent	345417	389513	1.5
R8	Cronton Road	344824	389674	1.5
R9	Cronton Road	344625	389772	1.5
R10	Whitefield Lane	345534	389389	1.5
R11	Bardley Crescent	345515	389335	1.5
R12	Richmond Way	345171	389259	1.5
R13	Campion Way	344869	389453	1.5

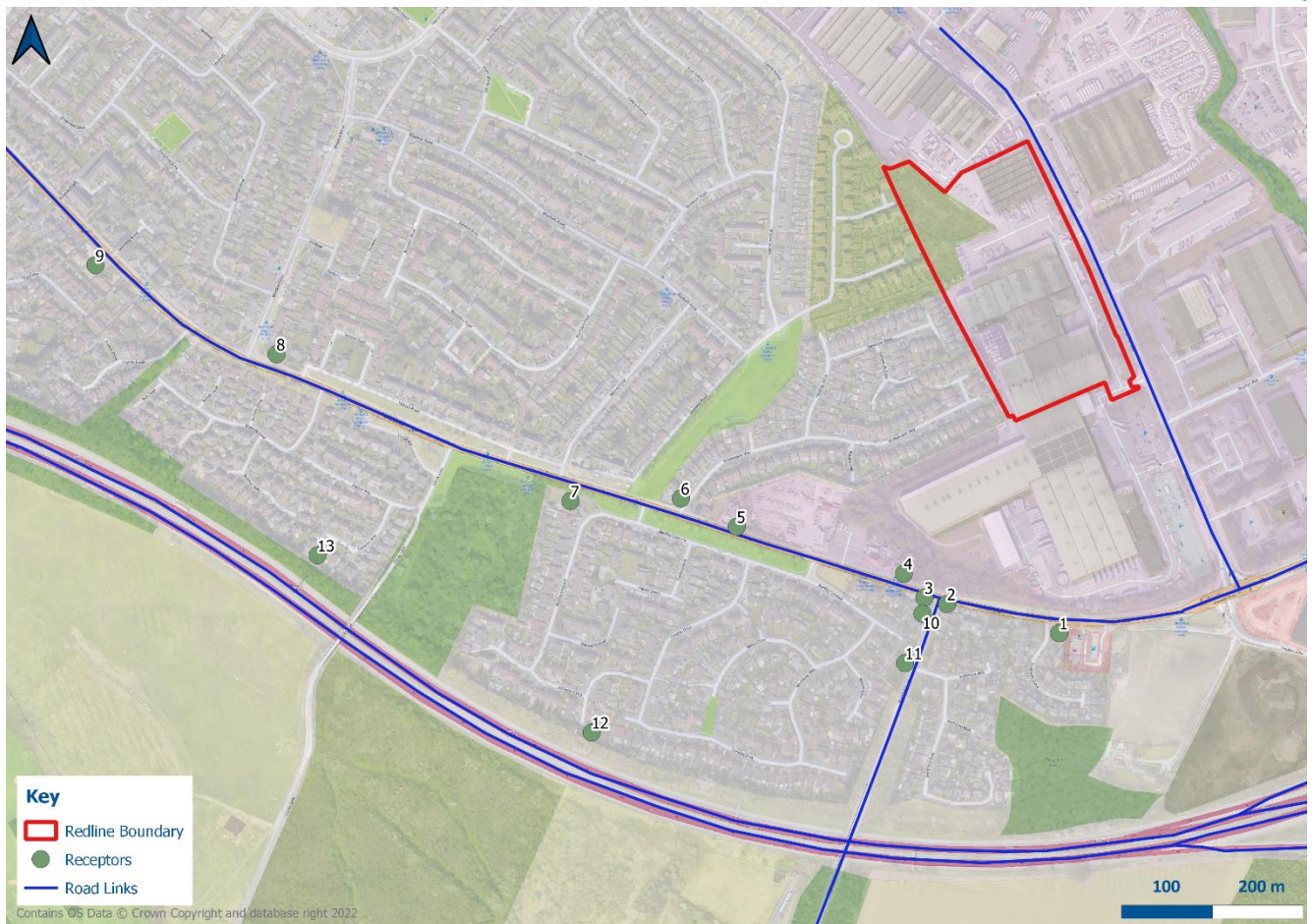


Figure 4: Receptor Locations

3.5.6 Model Verification

A verification study has been undertaken in accordance with LAQM.TG(22) using KMBC monitoring data. An adjustment factor of **2.311** was applied to modelled road NO_x concentrations.

Due to insufficient PM monitoring in the study area, the modelled road-PM₁₀ and road-PM_{2.5} components have been adjusted by the NO_x verification factor obtained before adding to the appropriate background concentration, in accordance with LAQM.TG(22). This approach is considered likely to provide a conservative estimate of the contribution of modelled roads to ambient PM₁₀ and PM_{2.5} concentrations.

Root Mean Square Error (RMSE) is used to define the average error or uncertainty of the model. LAQM.TG(22) states that the RMSE is acceptable where it is within 25%. The model verification process calculated a post-adjusted RMSE of **3.9µg/m³**, which equates to **9.8%** of the annual mean AQAL for NO₂ and is therefore considered to be acceptable.

Full details of the model verification procedure are included in Appendix C.

3.5.7 NO_x to NO₂ Conversion

Ambient NO_x concentrations have been predicted through dispersion modelling. Annual NO_x concentrations have been converted using Defra's NO_x to NO₂ conversion tool²⁶ version 8.1.

²⁶ Defra, "NO_x to NO₂ Calculator" (Defra, 2019), <https://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html#NOXNO2calc>.

3.6 Comparison with Air Quality Criteria

3.6.1 Nitrogen Dioxide

To assess the short-term AQAL for NO₂, reference was made to LAQM.TG(22)⁹, which states if annual mean concentrations of NO₂ do not exceed 60µg/m³, it is unlikely hourly mean concentrations would exceed the relevant objective, which allows for 18 exceedances of the hourly standard (200µg/m³) in a calendar year.

3.6.2 Particulate Matter

Annual mean PM₁₀ concentrations have been used to derive the number of exceedances of the 24-hour mean PM₁₀ AQAL, of which 35 are allowed per year. The method described in Defra's Technical Guidance LAQM.TG(22) was applied, which is based on the relationship between the number of 24-hour exceedances of 50µg/m³ and the annual mean concentration. This relationship is described in Equation 1 below:

Equation 1 - Calculation of PM₁₀ 24-hour Mean Exceedances:

$$\text{Number of exceedances of 24-hour mean of } 50\mu\text{g}/\text{m}^3 = -18.5 + 0.00145 \cdot a^3 + (206/a)$$

where 'a' = total annual mean PM₁₀ concentration.

3.7 Assessment of Significance

The long-term annual average for NO₂, PM₁₀ and PM_{2.5} have been compared against the applicable AQALs and the significance of impacts has been determined against the following threshold criteria, from the EPUK & IAQM guidance.

Table 5: Impact Significance Criteria

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

Notes:

In accordance with EPUK & IAQM planning guidance any change less than 0.5% will be considered as Negligible. The Table is intended to be used by rounding the change in percentage pollutant concentration to whole numbers, which then makes it clearer which cell the impact falls within. The user is encouraged to treat the numbers with recognition of their likely accuracy and not assume a false level of precision. Changes of 0%, i.e. less than 0.5%, will be described as Negligible.

For the purposes of this assessment, impacts >Slight Adverse are considered to potentially be significant, whereas impacts <Slight Adverse are considered not significant. Additional factors are also included in the assessment of significance, including the spatial extent of adverse impacts, in accordance with IAQM guidance, which states:

"An individual property exposed to a moderately adverse impact might not be considered a significant, but many hundreds of properties exposed to a slight adverse impact could be."

3.8 Model Limitations

There are inherent uncertainties associated with the model (ADMS Urban) used in this assessment, including the uncertainties associated with the input data such as predicted traffic flows. The model itself simplifies complex physical systems into a range of algorithms. In addition, local micro-climatic conditions may affect the concentrations of pollutants that the ADMS model will not take into account.

To account for uncertainty in future emission factors and pollutant concentrations, a precautionary principle has been undertaken in the additional sensitivity assessment, whereby:

- » Emission Factors held at 2019 (no future improvements assumed);
- » Background pollutant concentrations held at 2019 (no future improvements assumed); and
- » Traffic flow forecasts are based on 2023 development opening year and were obtained Hydrock, the Transport Consultants.

The above assumptions ensure a conservative approach has been considered in the assessment. The results of this sensitivity test are presented in Appendix E.

4. Baseline Air Quality Conditions

4.1 Air Quality Management Areas

KMBC have no AQMAs currently declared across the borough. However, the Liverpool City Council (LCC) Liverpool City AQMA is located approximately 1km to the south west of the Site as shown in Figure 5.

The LCC AQMA has been declared due to exceedences of the annual mean NO₂ AQAL and cover the entire city of Liverpool.

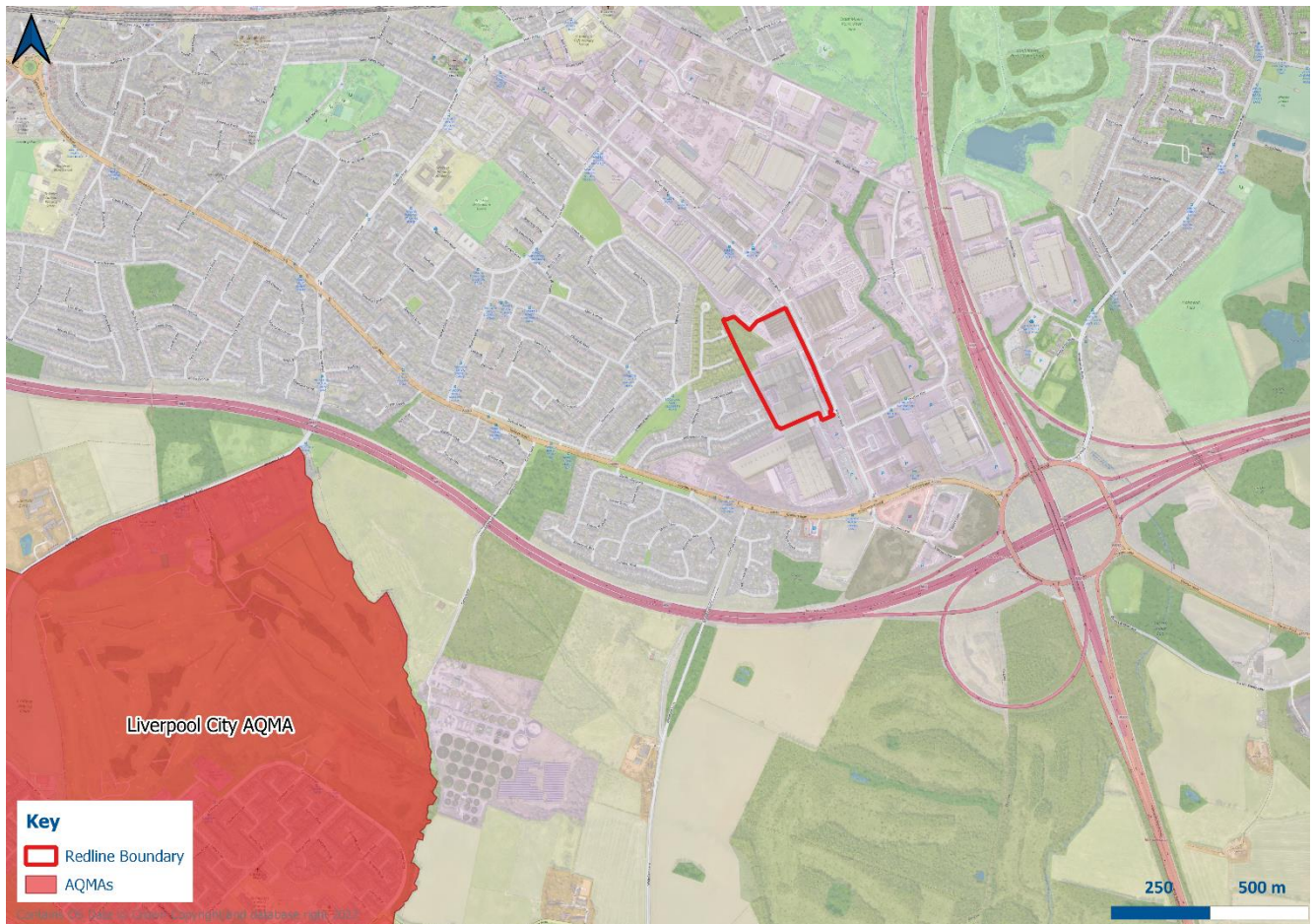


Figure 5 - AQMA

4.2 Local Emission Sources

The main source of air pollution in the surrounding Site locale is considered to be vehicles using the local road network, predominantly the strategic road network in the area, the M57, M62, and A5080.

A review of the NAEI¹⁶ data indicates there are two existing point sources within 1km of the Proposed Development at Huyton Waste Water Treatment Works (WwTW) and the Sovereign Distillery. As the Proposed Development is for non-sensitive use, in terms of air quality, these have not been considered further. Additionally, it is assumed that emissions of relevant pollutants from these point sources are captured within the background concentration reviewed in Section 4.3 below.

4.3 Defra Mapped Concentrations

4.3.1 Background Concentrations

Mapped background concentrations of NO₂, PM₁₀ and PM_{2.5} were downloaded for the grid squares containing the Site.

Background pollutant concentrations for 2019 (the base year), 2022 (the assessment year), 2023 (the opening year of the Proposed Development) are displayed in Table 6.

Table 6: Defra Mapped Background Concentrations

Grid Square (x,y)	Pollutant	AQAL (µg/m ³)	Annual Mean Concentration (µg/m ³)		
			2019	2022	2023
345500, 389500	NO ₂	40	19.4	16.9	16.2
	PM ₁₀	40	13.5	13.0	12.9
	PM _{2.5}	20	8.8	8.4	8.3

The data show that annual mean background concentrations of NO₂, PM₁₀ and PM_{2.5} at the grid squares within which the Site is located are below the AQALs in all years.

Concentrations of all pollutants are predicted to decline incrementally each year. These reductions are principally due to the forecast effect of the roll out of cleaner vehicles and strategies to reduce emissions across all sectors.

To avoid double counting of potential source contributions already contained within the ADMS-Roads dispersion model, 'Primary A Road in' and 'Motorway in' was removed from each grid square.

As the relationship between NO₂ and NO_x is not linear, the NO₂ Adjustment for NO_x Sector Removal Tool²⁷ has been used – in accordance with LAQM.TG(22).

Defra UK-AIR modelled background concentrations from 2019 and 2023 for relevant grid squares were considered to be the appropriate source of background concentrations in the dispersion model for the assessment of human health receptors. NO₂, PM₁₀ and PM_{2.5} backgrounds were derived from this data shown above.

Adjusted background concentrations for each modelled receptor location are shown in Appendix D.

4.3.2 Pollution Climate Mapping

Defra's PCM model provides estimates of roadside concentrations of annual mean NO₂, which are used in reporting compliance with limit values. The model provides projected roadside concentrations of pollutants, for the years 2018-2030 inclusive, based on a 2018 base year.

Figure 6 illustrates 2019 modelled roadside NO₂ concentrations along the A5080 (south of the Site) are approximately 26.5µg/m³. These concentrations are 33.8% below the NO₂ AQAL. It is recognised there are uncertainties associated with these modelled concentrations; therefore, further analysis of local air quality monitoring is provided below.

²⁷ Defra NO₂ Adjustment for NO_x Sector Removal Tool version 7.0 (2018), available at <https://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html#NOxsector>.

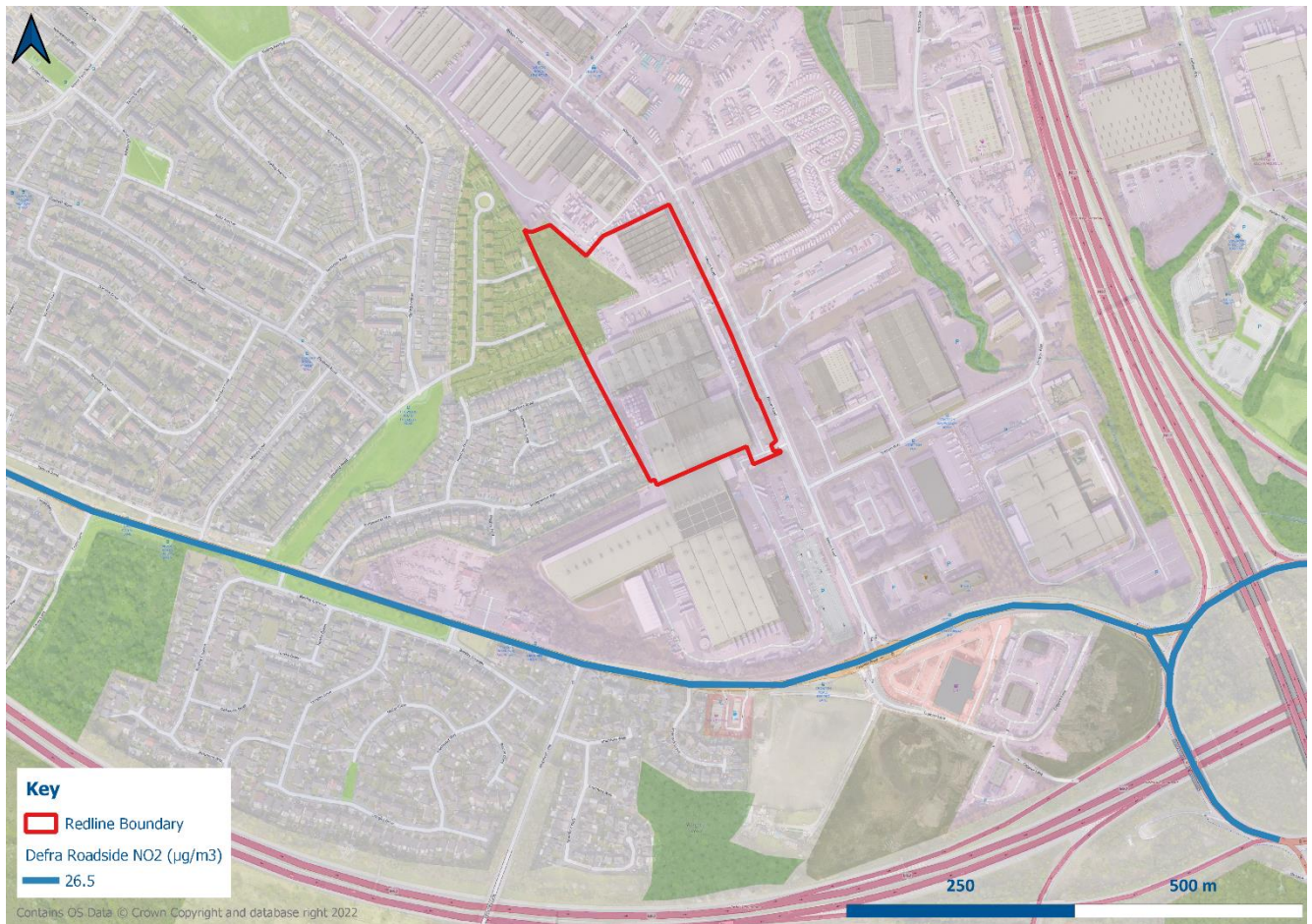


Figure 6 - Defra Modelled PCM Roadside NO₂ Concentrations for 2019

4.4 Air Quality Monitoring Data

KMBC undertook automatic (continuous) monitoring at three sites, and at 32 passive sites with diffusion tube monitoring during 2020. Air Quality monitoring sites within 1km of the Site are shown below in Figure 7. The concentrations from these sites are reported below.

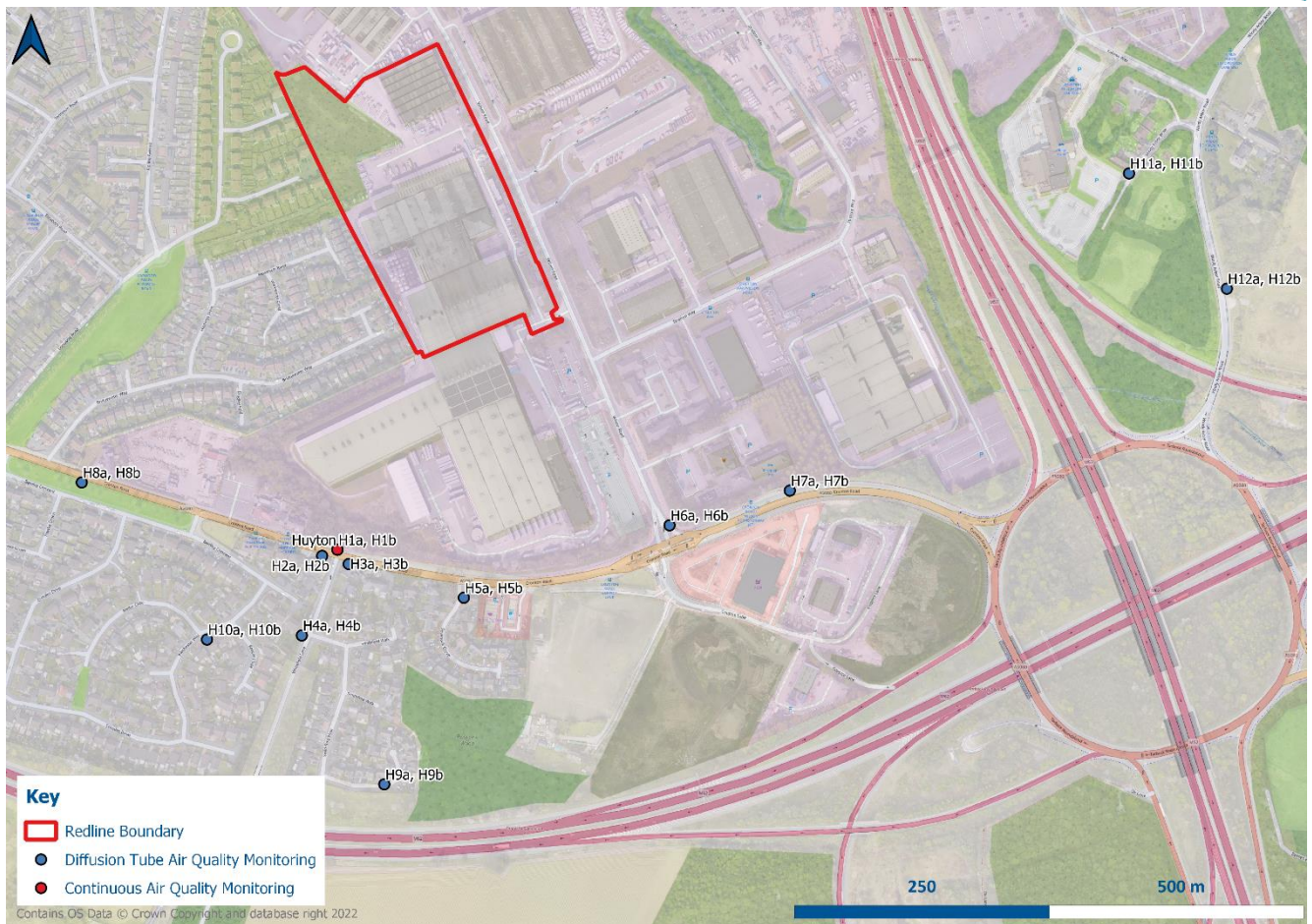


Figure 7 – Local Monitoring Locations

4.4.1 Automatic Monitoring

Recent monitoring data from the KMBC Huyton continuous air quality monitor are shown below in Table 7.

Table 7: Automatic Monitoring Results

Monitor	Pollutant	AQAL ($\mu\text{g}/\text{m}^3$)		Annual Mean Concentration ($\mu\text{g}/\text{m}^3$)				
				2016	2017	2018	2019	2020
Huyton (Roadside)	NO ₂	Annual Mean	40	38.8	36.2	37.4	37.6	29.5
		1-hour Mean	200 ^(A)	0 (130.4) ^(C)	0 ^(C)	0 ^(C)	0 ^(C)	0 ^(C)
	PM ₁₀	Annual Mean	40	20.0	22.5	21.8	22.9	-
		24-Hour Mean	50 ^(B)	2 (32.9) ^(D)	5 ^(D)	1 ^(D)	2 ^(D)	-
	PM _{2.5}	Annual Mean	20	10.1	9.5	9.1	10.8	-

Monitor	Pollutant	AQAL ($\mu\text{g}/\text{m}^3$)	Annual Mean Concentration ($\mu\text{g}/\text{m}^3$)				
			2016	2017	2018	2019	2020

Notes:

- (A) $200\mu\text{g}/\text{m}^3$ not to be exceeded more than 18 times/year.
- (B) $50\mu\text{g}/\text{m}^3$ not to be exceeded more than 35 times/year.
- (C) Number of 1-hour means $>200\mu\text{g}/\text{m}^3$ If the period of valid data is less than 85%, the 99.8th percentile of 1-hour means is provided in brackets.
- (D) Number of 24-hour means $>50\mu\text{g}/\text{m}^3$ If the period of valid data is less than 85%, the 90.4th percentile of 24-hour means is provided in brackets.

As shown above, the annual mean NO_2 AQAL have not been breached in recent years. The highest monitored concentration was during 2016, which was 97% of the annual mean AQAL. Note, concentrations $>36\mu\text{g}/\text{m}^3$ are considered to be at risk of exceeding the annual mean AQAL. Therefore, concentrations at Huyton have been at risk of exceedance of the NO_2 AQAL for 2016 to 2019.

No NO_2 concentrations of $>200\mu\text{g}/\text{m}^3$ have been monitored at Huyton. Therefore, the short-term NO_2 AQAL has not been exceeded in recent years.

No monitored concentrations for annual mean PM_{10} and $\text{PM}_{2.5}$ in recent year have exceeded the annual mean AQALs. The highest monitored concentration for PM_{10} and $\text{PM}_{2.5}$ were 57% and 54% of the relevant annual mean AQALs, respectively.

The short-term concentrations of PM_{10} were below the relevant AQAL during recent years. The maximum number of 24-hour concentrations over $50\mu\text{g}/\text{m}^3$ in recent years was 5 in 2017. This is well below the permitted 35 exceedances in a year.

The NO_2 annual mean data shown an overall reducing trend during recent years. However, the 2020 results should be treated with caution due to the effects of the COVID 19 pandemic and associated travel restrictions.

4.4.2 Passive Monitoring

Passive diffusion tube monitoring is currently undertaken by KMBC at numerous locations throughout the Council's area as part of their commitment to LAQM. The closest tubes to the Site are shown in Figure 7 and the data presented in Table 8.

Table 8: Passive Diffusion Tube Monitoring Concentrations

Site ID	Site Type	X (m)	Y (m)	Annual Mean Concentration ($\mu\text{g}/\text{m}^3$)			
				2017	2018	2019	2020
H1a, H1b	Roadside	345552	389413	40	37.5	37.4	29.5
H2a, H2b	Roadside	345537	389407	39.9	41	40.8	35.1
H3a, H3b	Kerbside	345563	389399	47.7	49.3	48	42.2
H4a, H4b	Roadside	345517	389329	26.7	29.8	31.4	25.3
H5a, H5b	Roadside	345676	389366	25.1	26.8	27.4	21.4
H6a, H6b	Roadside	345878	389437	29.2	30	32.1	28.6

Site ID	Site Type	X (m)	Y (m)	Annual Mean Concentration (µg/m ³)			
				2017	2018	2019	2020
H7a, H7b	Roadside	345996	389471	36.2	36.8	37.2	33.9
H8a, H8b	Roadside	345301	389479	26.7	26.6	29.3	22.7
H9a, H9b	Suburban	345598	389183	26.3	25	26.4	20.6
H10a, H10b	Suburban	345424	389325	22.9	23.3	23.9	19.1
H11a, H11b	Suburban	346329	389782	28.6	26.4	28.9	23.3
H12a, H12b	Roadside	346425	389669	35.5	33.5	32.8	27.2

Notes:

Exceedances of the annual mean AQAL are shown in bold.

The data in Table 8 shows that annual mean NO₂ concentrations have exceeded the annual mean NO₂ AQAL during recent years at locations 'H1a, H1b', 'H2a, H2b', and 'H3a, H3b'. The highest concentration was recorded at 'H3a, H3b' in 2018 along Cronton Road; the annual mean concentration was 49.3µg/m³ which is 23% over the AQAL. It is noted these exceedances are located at monitoring adjacent to residential receptors.

All other monitoring sites shown concentrations below the AQAL in recent years. In 2019 site 'H7a, H7b' monitored a concentration >36µg/m³ which suggests a risk of exceedance of the AQAL.

No location has monitored an annual mean NO₂ concentration of >60µg/m³ during recent years and therefore, there is no risk of an exceedance of the NO₂ 1-hour mean at any monitoring location in accordance with LAQM.TG(22).

There is no obvious trend in the data, with concentrations varying from year to year. However, there was a marked decrease in concentrations from 2019 to 2020. It is considered that 2020 results should be treated with caution due to the COVID-19 pandemic and associated travel restrictions, which are likely to have impacted NO₂ concentrations in Knowsley as stated in the KMBC 2021 ASR.

5. Construction Phase Assessment

5.1 Overview

The construction phase of the Proposed Development will involve a number of activities that will release polluting emissions to air. Predominantly, these will be emissions of dust. As such, a qualitative construction dust risk assessment has been carried out in accordance with IAQM guidance. Where detailed information was unknown, the dust emission magnitude has been calculated based on professional judgement.

Construction activities will include:

- » material export and import;
- » temporary stockpiling of materials;
- » groundwork for foundations and services;
- » construction of buildings;
- » landscaping works; and
- » vehicle movements (with the potential to track-out material from site).

The risks of impact and the significance of each stage of the construction phase is classified as Negligible, Low, Medium or High, determined against a matrix which considers the distance from source, receptor sensitivity, background pollution concentrations and the potential dust emission magnitude of the works.

5.2 Dust Emission Magnitude

5.2.1 Demolition

The total building volume proposed to be demolished is approximately 40,000m² and therefore within the IAQM 'Medium' Category (20,000m² – 100,000m²). The material to be demolished comprises, steel, aluminium, concrete, brick, plasterboard, metal sheeting, timber, plastics, glass, masonry and insulation.

Based on the above, the potential dust emission magnitude for demolition is considered to be '**Medium**'.

5.2.2 Earthworks

Earthworks will primarily involve excavating material, haulage, tipping and stockpiling. This may also involve levelling the Site and landscaping.

The total area of the Site is 9.54ha (95,400m²) and therefore falls within IAQM 'Large' category (>10,000m²). The underlying soil texture is 'base-rich loamy and clayey soils'²⁸. As such, there is a minor to moderate potential for dust release.

Total material moved during earthworks is unknown but estimated to be < 20,000 tonnes.

Based on the above, the potential dust emission magnitude for earthworks is considered to be '**Large**'.

5.2.3 Construction

The key issues when determining the potential dust emission magnitude during the construction phase include the size of the building(s)/infrastructure, method of construction, construction materials, and duration of build.

The total volume of buildings to be constructed is approximately 61,000m³ and therefore within IAQM's 'Medium' category (25,000m³ – 100,000m³).

²⁸ Cranfield University, "Cranfield Soil and Agrifood Institute," n.d., <http://www.landis.org.uk/soilscapes/>. accessed October 2022

The proposed construction materials include steel, aluminium, concrete, brick, plasterboard, metal sheeting, timber, plastics, glass, masonry and insulation.

Based on the above, the potential dust emission magnitude for construction is considered to be **'Medium'**.

5.2.4 Trackout

The risk of impacts occurring during Trackout is predominantly dependent on the number of vehicles accessing the Site on a daily basis. Vehicle size, speed and the duration of activities are also factors which are used to determine the risk of impacts.

It is expected that there would be between 5 – 10 HDVs outwards movements from the Site each day during the peak construction period. No unpaved surfaces over 50m would be utilised as Site traffic would be routed along the existing road network.

Based on the above, the potential dust emission magnitude during Trackout is considered to be **'Small'**.

5.2.5 Summary

Table 9 below shows a summary of the potential dust emission magnitudes from each activity.

Table 9: Dust Emission Magnitude Summary

Activity	Dust Emission Magnitude
Demolition	Medium
Earthworks	Large
Construction	Medium
Trackout	Small

5.3 Sensitivity of Area

The prevailing wind direction for the closest regionally representative meteorological measurement station to the Site, at Liverpool John Lennon Airport, is shown for 2019 in Appendix B. The wind rose shows that the prevailing winds are from the south-west and north-west. Sensitivity of the area is based on IAQM guidance.

Figure 8 shows the construction phase distance buffers (20m, 50m, 100m and 350m) around the Site boundary, as well as identified high sensitivity receptor locations within these buffers.

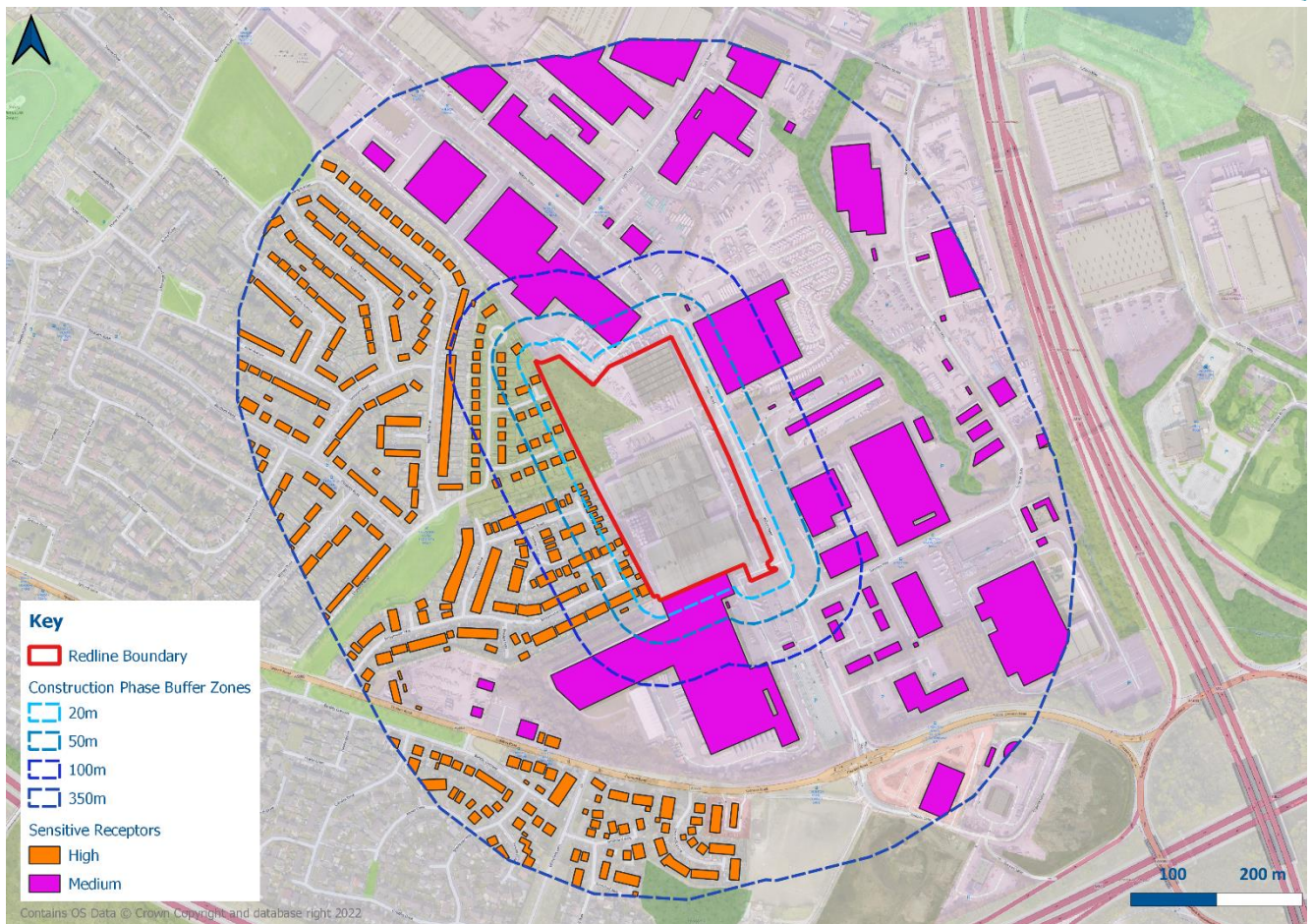


Figure 8: Construction Phase Receptors

5.3.1 Dust Soiling Impacts

As shown in Figure 8, there are between 10 - 100 high sensitivity receptors within 20m of the Site boundary. As such, the overall sensitivity of the surrounding area to nuisance dust soiling effects during Earthworks and Construction, according to IAQM guidance, is defined as 'High'.

With regard to Trackout, the sensitivity for Small size sites is assessed where receptors are located within 50m from Trackout routes up to 50m from the Site. As there are between 1 - 10 high-sensitivity receptors within 20m of potential Trackout routes from the Site (along Wilson Road and onto Cronton Road), the sensitivity to dust soiling impacts from Trackout is defined as 'Medium'.

5.3.2 Human Health Impacts

Defra mapped background predictions (Table 6) show that annual mean concentrations of PM_{10} are not likely to exceed $24\mu g/m^3$ in the vicinity of the Site²⁹, based on 2019 estimates. According to IAQM guidance, where PM_{10} concentrations are $<24\mu g/m^3$ and there are less than 100 high sensitivity receptors within 50m of construction works, the overall sensitivity of the surrounding area to human health impacts is defined as 'Low' for all stages.

²⁹ the concentration at which exceedance of the 24-hour AQAL is likely

5.3.3 Summary

The sensitivity of the surrounding area for the potential impacts discussed above are shown in Table 10 below.

Table 10: Sensitivity of Local Area

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

5.4 Risk of Impacts

Using the methodology prescribed in the IAQM guidance, the overall risk of impacts can be defined by combining the sensitivity of the area with the potential dust emission magnitude of each stage of the construction phase as described above.

Table 11 provides a summary of the construction dust risk assessment. Overall, the development is considered to be **High Risk** for nuisance dust soiling effects and a **Low Risk** for PM₁₀ health effects, in the absence of mitigation.

Table 11: Risk of Adverse Impacts During Construction Phase

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

Appendix F provides site specific mitigation measures to be adopted. The IAQM guidance states that implementing these measures should effectively reduce the risk of impacts to *Negligible* during this phase. On this basis, the residual construction phase effects are considered to be 'not significant'.

6. Operational Phase Assessment

6.1 Impact Assessment

6.1.1 Annual Mean NO₂

Predicted annual mean NO₂ concentrations were assessed against the AQAL of 40µg/m³ as presented in Table 12.

Table 12: Modelled Annual Mean NO₂ Concentrations

Receptor	DM 2023 (µg/m ³)	DS 2023 (µg/m ³)	Concentration Change (µg/m ³)	% Change Relative to AQAL	EPUK & IAQM Impact Descriptor
R1	22.8	22.8	<0.1	0	Negligible
R2	35.6	35.7	0.1	0	Negligible
R3	33.6	33.7	0.1	0	Negligible
R4	27.4	27.5	<0.1	0	Negligible
R5	26.9	26.9	<0.1	0	Negligible
R6	22.9	22.9	<0.1	0	Negligible
R7	19.1	19.1	<0.1	0	Negligible
R8	23.0	23.0	<0.1	0	Negligible
R9	19.8	19.8	<0.1	0	Negligible
R10	26.5	26.6	<0.1	0	Negligible
R11	23.2	23.2	<0.1	0	Negligible
R12	31.1	31.1	<0.1	0	Negligible
R13	29.1	29.1	<0.1	0	Negligible

% Change rounded to nearest whole number as per EPUK & IAQM guidance

Table 12 shows no predicted exceedances of the annual mean NO₂ AQAL at any receptor in either the DM or DS scenarios associated with the 2023 opening year (using 2023 backgrounds and emission factors).

The maximum increase in annual mean NO₂ concentrations is 0.1µg/m³ at R2 and R3.

The predicted changes in annual mean NO₂ at all existing receptors are <0.5% of the relevant AQAL. As such, in accordance with the EPUK & IAQM guidance, the impact associated with the Proposed Development on annual mean NO₂ concentrations is considered to be negligible at all receptor locations.

6.1.2 1 Hour Mean NO₂

With regard to the 1-hour NO₂ objective, Defra's LAQM.TG(22) states where the annual means are below 60µg/m³, it is unlikely that exceedances of the 1-hour mean will occur. All modelled results are below this threshold, and therefore it is considered unlikely that the 1-hour NO₂ AQAL will be exceeded at any of the receptor locations modelled. The impact of the Proposed Development on short term NO₂ concentrations is considered to be negligible.

6.1.3 Annual Mean PM₁₀

Predicted annual mean PM₁₀ concentrations were assessed against the AQAL of 40µg/m³ as presented in Table 13.

Table 13: Modelled PM₁₀ Concentrations

Receptor	DM 2023 (µg/m ³)	DS 2023 (µg/m ³)	Concentration Change (µg/m ³)	% Change Relative to AQAL	EPUK & IAQM Impact Descriptor
R1	14.9	14.9	<0.1	0	Negligible
R2	17.6	17.6	<0.1	0	Negligible
R3	17.1	17.2	<0.1	0	Negligible
R4	16.0	16.0	<0.1	0	Negligible
R5	16.6	16.6	<0.1	0	Negligible
R6	15.1	15.1	<0.1	0	Negligible
R7	14.0	14.0	<0.1	0	Negligible
R8	14.7	14.7	<0.1	0	Negligible
R9	13.8	13.8	<0.1	0	Negligible
R10	15.5	15.5	<0.1	0	Negligible
R11	15.0	15.0	<0.1	0	Negligible
R12	15.1	15.1	<0.1	0	Negligible
R13	14.3	14.3	<0.1	0	Negligible

% Change rounded to nearest whole number as per EPUK & IAQM guidance

Table 13 shows that there are no predicted exceedances of the annual mean PM₁₀ AQAL at any receptor in either the DM or DS scenarios associated with the 2023 opening year (using 2023 backgrounds and emission factors). The maximum increase in annual mean PM₁₀ concentrations is <0.1µg/m³.

The predicted changes in annual mean PM₁₀ concentrations are all <0.5% of the relevant AQAL. Based on the EPUK & IAQM criteria, the impact of the Proposed Development on annual mean PM₁₀ concentrations is considered to be negligible.

6.1.4 24-hour Mean PM₁₀

The AQAL for 24-hour mean PM₁₀ concentrations is 50µg/m³ not be exceeded more than 35 times a year. There were no predicted exceedances of the 24-hour mean AQAL at any of the receptors included in the dispersion model; therefore, in accordance with the guidance there is no predicted risk of exceedances of the 24-hour mean PM₁₀ AQAL as a result of increased traffic generation associated with Proposed Development.

6.1.5 Annual Mean PM_{2.5}

Predicted annual mean PM_{2.5} concentrations were assessed against the AQAL of 20µg/m³ as presented in Table 14.

Table 14: Modelled Annual Mean PM_{2.5} Concentrations

Receptor	DM 2023 (µg/m ³)	DS 2023 (µg/m ³)	Concentration Change (µg/m ³)	% Change Relative to AQAL	EPUK & IAQM Impact Descriptor
R1	9.48	9.48	<0.1	0	Negligible
R2	11.0	11.0	<0.1	0	Negligible
R3	10.8	10.8	<0.1	0	Negligible
R4	10.1	10.1	<0.1	0	Negligible
R5	10.4	10.4	<0.1	0	Negligible
R6	9.60	9.60	<0.1	0	Negligible
R7	8.98	8.99	<0.1	0	Negligible
R8	9.49	9.49	<0.1	0	Negligible
R9	8.97	8.97	<0.1	0	Negligible
R10	9.82	9.83	<0.1	0	Negligible
R11	9.52	9.53	<0.1	0	Negligible
R12	9.75	9.75	<0.1	0	Negligible
R13	9.39	9.39	<0.1	0	Negligible

% Change rounded to nearest whole number as per EPUK & IAQM guidance

Table 14 shows that there are no predicted exceedances of the annual mean PM_{2.5} AQAL at any receptor in either the 2024 DM or DS scenarios associated with the opening year.

Predicted annual mean concentrations of PM_{2.5} are all below the AQAL of 20µg/m³ in all modelled scenarios.

The predicted changes in annual mean PM_{2.5} concentrations are all <0.5% of the relevant AQAL, with total concentrations below 75% of the objective. Based on the EPUK & IAQM criteria, the impact of the Proposed Development on annual mean PM_{2.5} concentrations is considered to be negligible.

6.2 Significance of Air Quality Impacts

The EPUK & IAQM guidance considers a number of factors for determining the significance of predicted air quality impacts. Such factors include:

- » the existing and future air quality in the absence of the development;
- » the extent of current and future population exposure to the impacts;
- » the worst-case assumptions adopted when undertaking the prediction of impacts; and
- » the extent to which the development has adopted best practice to eliminate and minimise emissions.

The unmitigated impact associated with the scheme has been predicted in accordance with the stated assessment methodology. The following factors have been taken into account:

- » there are no predicted exceedances of the annual mean NO₂, PM₁₀ or PM_{2.5} AQALs as a result of the Proposed Development;

- » a negligible impact on annual mean NO₂, PM₁₀ or PM_{2.5} concentrations has been predicted at all considered sensitive receptor locations;
- » exceedances of the 1-hour mean NO₂ and 24-hour mean PM₁₀ AQALs are considered unlikely, based upon the marginal change in concentrations and absolute concentrations predicted through the dispersion modelling study; and
- » all modelled concentrations have been verified against KMBC monitoring data.

A sensitivity assessment of the model input variables (emission factors and background concentrations) has been considered and is presented in Appendix E. However, the overall conclusion over the significance of the effect has been based upon the main body of the assessment, utilising 2023 as the development opening year. Notwithstanding, it is noted that the sensitivity assessment presented within Appendix E does not predict any new exceedances of the AQALs as a result of the Proposed Development.

On the basis of the above, the overall effect on air quality as a result of the additional development trips on sensitive receptors is considered to be 'not significant'.

7. Mitigation Measures

7.1 Construction Phase

The qualitative construction dust risk assessment shows that the works are **High Risk** for adverse impacts during construction, in the absence of mitigation.

To effectively reduce the risk of impacts to Negligible, appropriate mitigation measures should be adopted. The IAQM's highly recommended mitigation measures for High-Risk sites are provided at Appendix F of this report. Implementing these measures, such as within a Construction Environment Management Plan (CEMP), should effectively reduce the risk of impacts to negligible during the construction phase.

7.2 Operational Phase

7.2.1 Electric Vehicle Charging Infrastructure

From the 15th June onwards, Approved Document S 2021³⁰ came into force, which states;

"Where a new building which is not a residential building or a mixed-use building has more than 10 parking spaces—

(a) one of those parking spaces must have access to one electric vehicle charge point; and

(b) cable routes for electric vehicle charge points must be installed in a minimum of one fifth of the total number of remaining parking spaces."

7.2.2 Travel Plan Measures

As detailed in the Travel Plan (TP)³¹ prepared by Hydrock. The measures outlined in the TP will seek to encourage sustainable modes of transport and discourage the use of car travel, such as;

- » Travel notice board to provide information on public transport, walking and cycling routes, car sharing;
- » Welcome Packs with the above information;
- » Initiatives to promote walking and cycling;
- » Initiatives to promote public transport; and
- » Initiatives to reduce the need to travel.

These measures provide an opportunity to promote and establish sustainable modes of transport which will help to reduce potential air quality impacts.

³⁰ The Building Regulations 2010, Approved Document S: Infrastructure for the charging of electric vehicles, HM Government, 15 June 2022.

³¹ 26263-HYD-XX-XX-RP-TP-6001-P01.01

8. Discussion and Conclusion

Hydrock were commissioned by Network Space Land Limited to prepare an AQA for the proposed development on land to the west of Wilson Road, Hyuton.

A qualitative construction dust risk assessment has been undertaken in line with IAQM guidance. Through good practice and implementation of appropriate mitigation measures outlined, it is expected that the release of dust would be effectively controlled and mitigated, with resulting effects considered to be 'not significant'. All dust impacts are considered to be temporary and short-term in nature.

In line with EPUK & IAQM guidance detailed dispersion modelling, using ADMS-Urban, has been performed to assess the significance of potential impacts of the Proposed Development on local air quality. The modelling assessment has shown that the impact of the Proposed Development on local air quality is Negligible for NO₂, PM₁₀ and PM_{2.5}. No exceedances of the relevant AQALs were identified. As such, the overall effect arising from change in operational phase trips is considered to be 'not significant'.

The proposed heating strategy will be ASHPs. This strategy is beneficial in terms of air quality as does not introduce any new combustion sources.

From the evidence presented, and by following the guidance provided herein, the Proposed Development will comply with all relevant air quality policy. As such, air quality should not pose any significant obstacles to the planning process.

Appendix A Traffic Data

The traffic data, supplied by Hydrock is shown in below in Table 15. Additional traffic data used in the model was sourced from the Department for Transport (DfT) Matrix³², which contains traffic flows for all motorways and major A-roads throughout the UK. The following count points have been used within this AQA:

- » M62 (west of Junction), DfT count point 16049;
- » M62 (Junction 6), DfT count point 89166;
- » M62 to M57 link, DfT count point 92203;
- » M62 (east of Junction), DfT count point 73669;
- » A5300 (M57) (south of Junction), DfT count point 99256; and
- » M57, DfT count point 56046.

Data was provided for the following scenarios:

- » 2019 AADT;
- » 2023 DM AADT (this scenario includes committed development); and
- » 2023 DS (this scenario includes committed development and generated traffic associated with the Proposed Development).

The data includes the following committed developments:

- » 18/00283/HYB - 123 dwellings off Windy Arbor Road (full consent) and the associated reserved matters application 22/00213/REM - 237 dwellings (awaiting decision);
- » 20/00417/FUL - 350 dwellings known as Fox's bank (full consent);
- » 20/00399/OUT - 227 dwellings on Land south of Lickers Lane (awaiting decision);
- » 20/00494/HYB - 161,900 square feet of storage and distribution at Cronton Road (full Consent) and the associated reserved matters application 22/00162/REM (awaiting decision);
- » 17/00301/HYB - food store and B1/B2 use between Cronton Road and M62 (full consent); and
- » 19/00481/FUL - car dealership at former Daf Trucks Site (full consent).

³² Map Road traffic statistics - Road traffic statistics (dft.gov.uk).

Table 15: Traffic Data

Link ID	Road Link	Speed (kph) (LDV/HDV)	Model Verification		2023 DM		2023 DS	
			AADT	% HDV	AADT	% HDV	AADT	% HDV
L1	Wilson Road	48/48	9,155	14.9	9,538	14.7	10,254	14.4
L2	Cronton Road (between Wilson Rd and Motorway)	64/64	16,008	5.5	16,947	5.3	17,023	5.4
L3	Cronton Road	64/64	16,008	5.5	16,947	5.3	17,023	5.4
L4	Whitefield Lane	64, 48/64, 48	9,123	10.2	9,536	10.1	9,586	10.1
L5	M62 east of Junction (eastbound)	112/96	37,789	4.0	39,020	3.8	39,020	3.8
L6	M62 east of Junction (westbound)	112/96	37,604	4.4	38,828	4.1	38,828	4.1
L7	M62 Junction 6 (eastbound)	112/96	37,789	4.0	39,020	3.8	39,020	3.8
L8	M62 Junction 6 (westbound)	112/96	37,604	4.4	38,828	4.1	38,828	4.1
L9	M62 east of Junction (eastbound)	112/96	54,356	9.3	56,231	9.1	56,302	9.1
L10	M62 east of Junction (westbound)	112/96	53,794	9.3	55,645	9.1	55,716	9.1

Link ID	Road Link	Speed (kph) (LDV/HDV)	Model Verification		2023 DM		2023 DS	
			AADT	% HDV	AADT	% HDV	AADT	% HDV
L11	M62 to M57 Slip	112/96	14,102	18.1	14,561	18.1	14,561	18.1
L12	M5300 (M57) (northbound)	112/96	27,211	9.6	28,097	9.6	28,127	9.6
L13	M5300 (M57) (southbound)	112/96	37,920	11.4	39,240	11.3	39,270	11.3
L14	M57 northbound	112/96	43,317	9.3	44,728	9.3	44,728	9.3
L15	M57 southbound	112/96	41,989	10.1	43,356	10.1	43,356	10.1
L16	M57 to M62 Slip	112/96	11,008	10.1	11,366	10.1	11,366	10.1
RB1	Junction Roundabout	20	28,028	7.7	29,101	7.6	29,151	7.6

Appendix B Meteorological Data

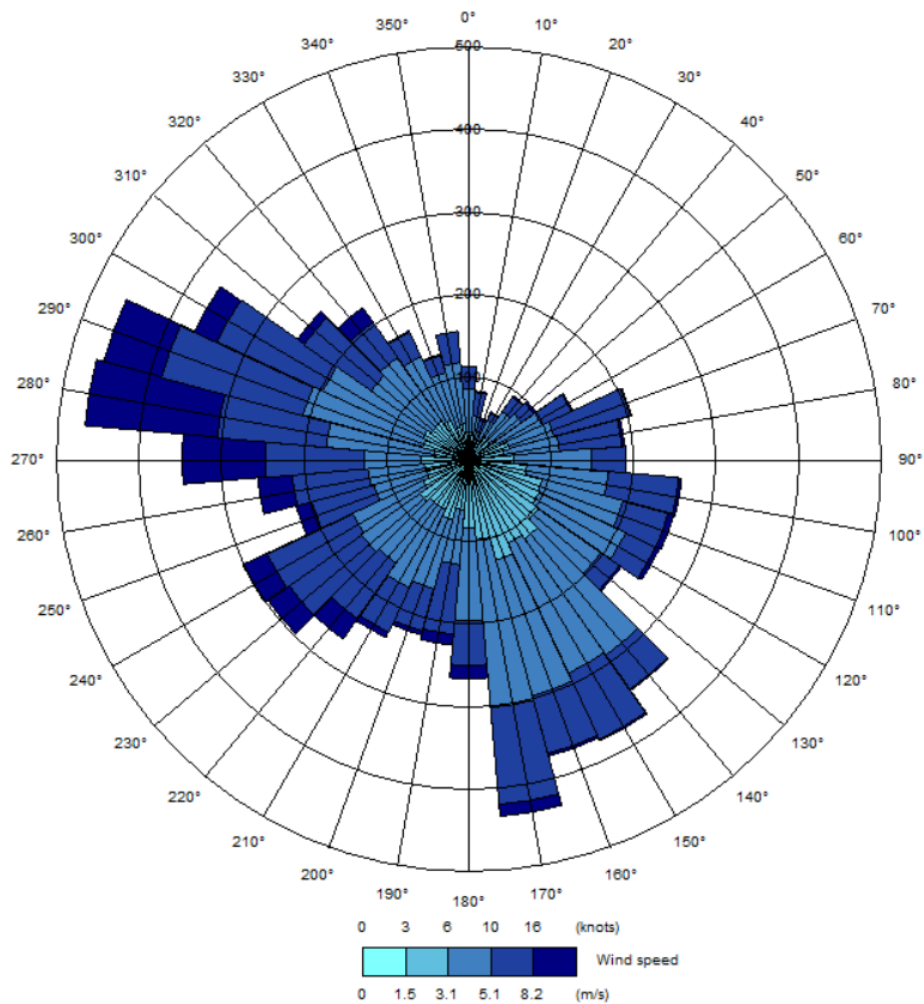


Figure 9: Wind rose Liverpool John Lennon Airport (2019)

- » Data capture for wind speed: 99.5 %
- » Data capture for wind direction: 98.6%
- » Data capture for temperature: 99%
- » Data capture for cloud cover: 81.2 %

Appendix C Model Verification

An important stage in the modelling process is model verification, which involves comparing the model output with measured concentrations in order to increase confidence in modelled predictions.

According to LAQM.TG (22), the difference between modelled results and monitored concentrations is acceptable where it is within 25%.

Monitoring Locations used for Verification

The following monitoring locations were selected for model verification due to being representative of the study area:

- » H1, H2, H3, H4, H5, H7 and H8.

Monitoring location H6 was removed from the verification study due to its assigned grid reference and associated location within the centre of the junction. The exact location was not able to be determined from Google Earth and satellite imagery and therefore it was discounted.

Model Verification

It is most appropriate to verify the model in terms of primary pollutant emissions of nitrogen oxides ($\text{NO}_x = \text{NO} + \text{NO}_2$). The model output of road- NO_x (i.e., the component of total NO_x coming from road traffic) has been compared with the 'measured' road- NO_x . Measured road- NO_x has been calculated from the measured NO_2 concentrations using the NO_x from NO_2 calculator (Version 8.1) available on the Defra LAQM Support website²⁶.

A comparison of modelled and monitored concentrations prior to adjustment are given in Table 16.

Table 16: 2019 Modelled and Monitored Concentrations Before Adjustment

Monitoring ID	Modelled Road NO_x ($\mu\text{g}/\text{m}^3$)	Monitored Road NO_x ($\mu\text{g}/\text{m}^3$)	Ratio Monitored/Modelled	Modelled Total NO_2 ($\mu\text{g}/\text{m}^3$)	Monitored Total NO_2 ($\mu\text{g}/\text{m}^3$)	Difference (%)
H1	25.9	44.3	1.7	28.8	37.4	-23.0
H2	22.2	52.0	2.3	27.0	40.8	-33.8
H3	21.9	69.1	3.2	26.9	48.0	-44.0
H4	13.3	31.3	2.3	22.5	31.4	-28.2
H5	10.8	23.0	2.1	21.2	27.4	-22.5
H7	19.1	43.8	2.3	25.5	37.2	-31.5
H8	11.8	26.9	2.3	21.8	29.3	-25.7

As shown, the model was underpredicting at all diffusion tubes. As such, an adjustment factor of **2.3109** has been determined, as the equation of the slope of the best-fit line between the 'measured' road contribution and the model derived road contribution of NO_x , as shown below:

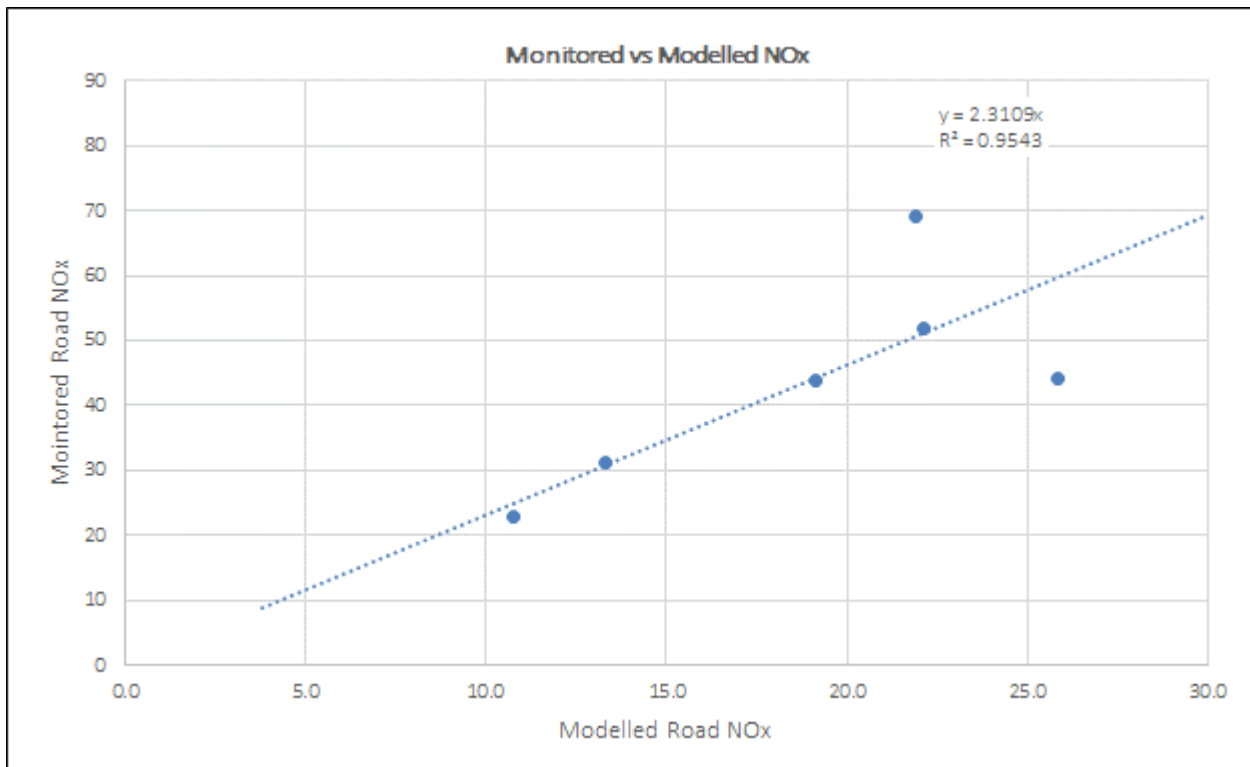


Figure 10: Model Adjustment Factor

Table 17 shows total monitored versus modelled NO₂ following the adjustment of the road contribution of NO_x by this factor. The total NO₂ concentration was determined by adding the calculated background NO₂ concentration to the modelled road contribution.

Table 17: Post-adjusted 2019 Modelled and monitored results

Monitoring ID	Adjusted Modelled NO ₂ (µg/m³)	Monitored NO ₂ (µg/m³)	Difference (%)
H1	44.1	37.4	18.0%
H2	40.5	40.8	-0.8%
H3	40.2	48.0	-16.3%
H4	31.2	31.4	-0.8%
H5	28.4	27.4	3.5%
H7	37.4	37.2	0.4%
H8	29.5	29.3	0.6%

Following adjustment of NO_x by a factor of **2.3109**, modelled concentrations of NO₂ were within the accepted +/-25% range of monitored concentrations:

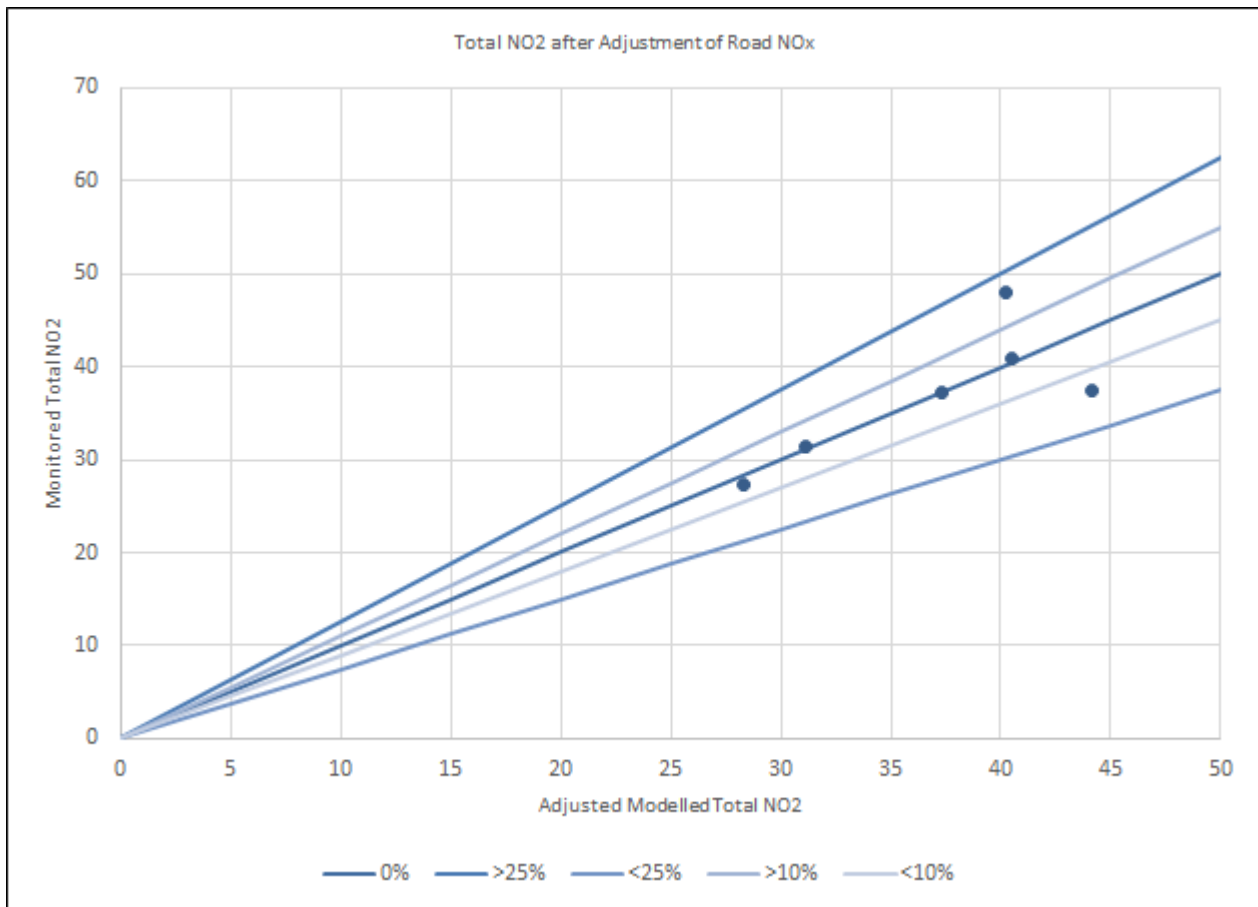


Figure 11: Post-adjusted Monitored vs Modelled NO₂

In addition, the overall post-adjusted uncertainty (RMSE) for annual mean NO₂ was 9.8%, which is within the ideal 10% range of uncertainty. As such, the factor was considered to be acceptable.

As there is insufficient PM₁₀ or PM_{2.5} monitoring data in the study area, it was not possible to perform model verification for these pollutants. As such, the NO₂ adjustment factor has also been applied to PM₁₀ and PM_{2.5} model results, in accordance with LAQM.TG(22).

Appendix D Background Concentrations

The background concentrations used in the modelling assessment are shown below.

Table 18: Background Concentrations

Receptor	X	Y	NO ₂ (µg/m ³)	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)
2023					
R1	345685	389368	13.3	12.9	8.3
R2	345561	389400	13.3	12.9	8.3
R3	345536	389407	13.3	12.9	8.3
R4	345514	389433	13.3	12.9	8.3
R5	345330	389485	13.3	12.9	8.3
R6	345269	389516	13.3	12.9	8.3
R7	345417	389513	13.3	12.9	8.3
R8	344824	389674	12.5	12.4	8.1
R9	344625	389772	12.5	12.4	8.1
R10	345534	389389	13.3	12.9	8.3
R11	345515	389335	13.3	12.9	8.3
R12	345171	389259	13.3	12.9	8.3
R13	344869	389453	12.5	12.4	8.1
2019					
R1	345685	389368	15.5	13.5	8.8
R2	345561	389400	15.5	13.5	8.8
R3	345536	389407	15.5	13.5	8.8
R4	345514	389433	15.5	13.5	8.8
R5	345330	389485	15.5	13.5	8.8
R6	345269	389516	15.5	13.5	8.8
R7	345417	389513	15.5	13.5	8.8
R8	344824	389674	14.5	12.9	8.6
R9	344625	389772	14.5	12.9	8.6
R10	345534	389389	15.5	13.5	8.8
R11	345515	389335	15.5	13.5	8.8
R12	345171	389259	15.5	13.5	8.8

Receptor	X	Y	NO ₂ (µg/m ³)	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)
R13	344869	389453	14.5	12.9	8.6

Appendix E Results of Sensitivity Assessment

The result of the sensitivity analysis performed of the ADSM-Urban modelling study are shown below. This used 2019 emission factors and 2019 UK-AIR background concentrations. Exceedances of the relevant AQAL are highlighted in bold. It should be noted that none of these exceedances occur as a result of the Proposed Development.

Table 19 – NO₂ Results of Sensitivity Analysis

Receptor	DM (µg/m ³)	DS (µg/m ³)	Concentration Change (µg/m ³)	% Change Relative to AQAL	EPUK & IAQM Impact Descriptor
R1	29.9	29.9	<0.1	0	Negligible
R2	49.2	49.3	0.1	0	Negligible
R3	46.2	46.3	0.1	0	Negligible
R4	36.9	37.0	0.1	0	Negligible
R5	35.8	35.8	0.1	0	Negligible
R6	30.1	30.1	<0.1	0	Negligible
R7	24.3	24.3	<0.1	0	Negligible
R8	30.1	30.2	<0.1	0	Negligible
R9	25.3	25.4	<0.1	0	Negligible
R10	36.0	36.0	<0.1	0	Negligible
R11	30.7	30.7	<0.1	0	Negligible
R12	41.7	41.7	<0.1	0	Negligible
R13	38.9	38.9	<0.1	0	Negligible

% Change rounded to nearest whole number as per EPUK & IAQM guidance

Table 20 – PM₁₀ Results of Sensitivity Analysis

Receptor	DM (µg/m ³)	DS (µg/m ³)	Concentration Change (µg/m ³)	% Change Relative to AQAL	EPUK & IAQM Impact Descriptor
R1	15.6	15.6	<0.1	0	Negligible
R2	18.5	18.5	<0.1	0	Negligible
R3	18.0	18.0	<0.1	0	Negligible
R4	16.8	16.8	<0.1	0	Negligible
R5	17.4	17.4	<0.1	0	Negligible
R6	15.8	15.8	<0.1	0	Negligible

Receptor	DM ($\mu\text{g}/\text{m}^3$)	DS ($\mu\text{g}/\text{m}^3$)	Concentration Change ($\mu\text{g}/\text{m}^3$)	% Change Relative to AQAL	EPUK & IAQM Impact Descriptor
R7	14.7	14.7	<0.1	0	Negligible
R8	15.4	15.5	<0.1	0	Negligible
R9	14.5	14.5	<0.1	0	Negligible
R10	16.2	16.3	<0.1	0	Negligible
R11	15.7	15.7	<0.1	0	Negligible
R12	16.0	16.0	<0.1	0	Negligible
R13	15.2	15.2	<0.1	0	Negligible

% Change rounded to nearest whole number as per EPUK & IAQM guidance

Table 21 - $\text{PM}_{2.5}$ Results of Sensitivity Analysis

Receptor	DM ($\mu\text{g}/\text{m}^3$)	DS ($\mu\text{g}/\text{m}^3$)	Concentration Change ($\mu\text{g}/\text{m}^3$)	% Change Relative to AQAL	EPUK & IAQM Impact Descriptor
R1	10.1	10.1	<0.1	0	Negligible
R2	11.8	11.8	<0.1	0	Negligible
R3	11.5	11.5	<0.1	0	Negligible
R4	10.8	10.8	<0.1	0	Negligible
R5	11.1	11.1	<0.1	0	Negligible
R6	10.2	10.2	<0.1	0	Negligible
R7	9.5	9.5	<0.1	0	Negligible
R8	10.1	10.1	<0.1	0	Negligible
R9	9.5	9.5	<0.1	0	Negligible
R10	10.5	10.5	<0.1	0	Negligible
R11	10.1	10.1	<0.1	0	Negligible
R12	10.5	10.5	<0.1	0	Negligible
R13	10.1	10.1	<0.1	0	Negligible

% Change rounded to nearest whole number as per EPUK & IAQM guidance

Appendix F Construction Dust Mitigation

In order to mitigate the worst-case dust impacts, the following general mitigation measures are highly recommended by the IAQM for High Risk construction sites. Highly recommended mitigation measures applicable specifically to Demolition, Earthworks, Construction and Trackout are provided based on the respective risk of adverse impact.

Communications

- » 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
- » Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk, and should include as a minimum the highly recommended measures in this document. The desirable measures should be included as appropriate for the site. In London additional measures may be required to ensure compliance with the Mayor of London's guidance. The DMP may include monitoring of dust deposition, dust flux, real-time PM10 continuous monitoring and/or visual inspections.

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 500 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 daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100 m of 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.
- » Agree dust deposition, dust flux, or real-time PM10 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. Further guidance is provided by IAQM on monitoring during demolition, earthworks and construction.

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, where applicable
- » Ensure all vehicles switch off engines when stationary - no idling vehicles.
- » Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.
- » Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.
- » 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)
- » 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.
- » Ensure equipment is readily available on site to clean any dry spillages, and clean up

Waste Management

- » No bonfires and burning of waste materials.

Measures specific to Demolition

- » Soft strip inside buildings before demolition (retaining walls and windows in the result of the building where possible to provide a screen against dust.
- » Ensure effective water suppression is used during demolition. Hand held sprays are more effective than hoses attached to equipment as the water can be directed to where needed. In addition high volume water suppression systems, manually controlled can produce fine water droplets that effectively bring dust particles to the ground.
- » Avoid explosive basting, use appropriate manual or mechanical alternatives.
- » Bag and remove any biological debris or damp down such material before demolition.

Measures Specific to Earthworks

- » Re-vegetate earthworks and exposed areas / soils 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.

Measures specific to Construction

- » Avoid scabbling (roughening of concrete surfaces)
- » Ensure sand and other aggregates are stored in bunded areas and 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 which suitable emission control systems to prevent escape of material and overfilling during delivery.
- » For smaller supplies of fine powder material ensure bags are sealed after use and stored appropriately to prevent dust.

Measures Specific to 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 all haul routes for integrity and instigate necessary repairs to the surface as soon as practicable.
- » Record all inspections of haul routes and any subsequent action in a site log book.
- » Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowzers 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.