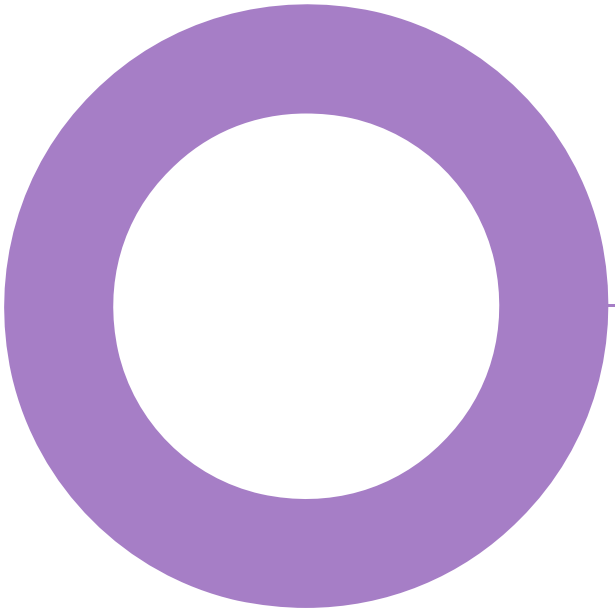
HOARE LEA

Grimshaw Lane. Manchester. Canmoor.

AIR QUALITY

AIR QUALITY ASSESSMENT – FIRST ISSUE

REVISION 01 – 12 FEBRUARY 2021



Audit sheet.

Rev.	Date	Description of change / purpose of issue	Prepared	Reviewed	Authorised
00	12/02/2021	First Draft – For Client Comment	BP	AD	KW
01	12/02/2021	First Issue – Updated with Client Comments	BP	AD	KW

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Contents.

Executive Summary.

Hoare Lea have been commissioned by Hale Architects on behalf of Canmoor to undertake an air quality assessment to support the planning application for the proposed flexible Class E(g)/B2/B8 industrial development at land off Grimshaw Lane, Manchester, postcode M40 2BA (the 'Application Site)'.

The proposals comprise of the demolition of the existing Mathers Foundry building and the construction of 12 industrial units totally approximately 460,500 sq. ft of flexible Class E(g)/B2/B8 industrial space and associated car parking.

The baseline assessment shows the Application Site is approximately 230 m south of the Manchester City Council (MCC) Air Quality Management Area (AQMA) declared for exceedances of the annual mean nitrogen dioxide (NO_2) air quality objective (AQO). Annual mean NO_2 concentrations have been in compliance with the annual mean NO_2 AQO at the nearest monitoring location. The Application Site is set back from major roads and therefore concentrations are likely to be closer to background levels. Defra background concentrations are predicted to be in compliance with the relevant objectives in the earliest anticipated opening year of the Proposed Development.

The unmitigated risk of impacts from construction work on dust soiling and ambient fine particulate matter concentrations have been assessed. This assessment has identified that there is a medium risk of dust soiling impacts and a medium risk of increases in particulate matter concentrations due to construction activities. The risk of dust causing a loss of local amenity and increased exposure to fine particulate matter concentrations has been used to identify appropriate mitigation measures. Provided these mitigation measures are implemented through good practice, the residual impacts are considered to be not significant.

The Proposed Development will meet its energy demand from a mixed approach incorporating small gas fired boilers, electric VRF systems and electric wall heaters for space and water heating. In addition, there are no on-site emissions associated with the electric systems. Consequently, it is unlikely the gas fired boilers will result in a significant impact to local air quality there will be no impact to local air quality from the electric systems. Therefore, no mitigation measures are required and a detailed assessment of the impact of emissions associated with the plant has been screened out of this assessment.

Potential impacts as a result of the additional vehicle trips associated with the Proposed Development on existing receptors has been assessed using detailed dispersion modelling. The results of the detailed dispersion modelling show the impact at existing receptors range from 'negligible beneficial' to 'substantial adverse' in accordance with the Environmental Protection United Kingdom (EPUK) and Institute of Air Quality Management (IAQM) guidance. Based on this, mitigation measures are required to offset the adverse impacts from the operational phase of the Proposed Development in relation to annual mean NO_2 concentrations only.

A list of recommended mitigation measures has been provided within Section 7.2 to reduce the impacts associated with the operational phase of the Proposed Development on local air quality.

Provided appropriate mitigation measures are implemented, it is considered that air quality should not be viewed as a constraint to planning and the Proposed Development conforms to the principles of the National Planning Policy Framework and the MCC Local Plan.

1. Introduction.

Hoare Lea have been commissioned by Hale Architects on behalf of Canmoor to undertake an Air Quality Assessment to support the planning application for the proposed flexible Class E(g)/B2/B8 industrial development at land off Grimshaw Lane, Manchester, postcode M40 2BA (hereafter referred to as the 'Application Site').

1.1 Proposed Development.

The Proposed Development will comprise 12 units totalling approximately 460,500 sq ft of flexible Class E(g)/B2/B8 industrial space. The Application Site is currently occupied by the Mathers Foundry, an existing building which is to be demolished. Current access to the Mathers Foundry is via Grimshaw Lane and this access road will remain with the Proposed Development in place.

The Proposed Development will also include up to 469 parking spaces. As the proposals are for flexible E(g)/B2/B8 Use which have different associated trip generations, vehicle trips have been provided for E(g)/B2 and B8 uses separately. The E(g)/B2 Use will generate the highest number of total vehicles whereas the B8 Use will generate the highest number of heavy duty vehicles (HDV) and result in a reduction in light duty vehicles (LDV) when compared to the existing use.

The proposed energy strategy for space and water heating will comprise of small gas fired boilers for the office space within units A-F. Exact size and specification of these boilers is currently unknown. Due to the quantum and likely heating requirement of the office space as well as the nearest sensitive receptor being 130 m west, it is unlikely that the gas fired boilers will result in a significant impact to local air quality. As such no detailed assessment of the impacts of emissions associated with these boilers has been considered.

For units 1-6, there will be variable refrigerant flow (VRF) units which form an all-electric approach with no on-site emissions associated with these systems. Electric wall heaters will also be provided to circulation areas in the cores and all toilet units. As there are no on-site emissions associated with these systems, there will be no impacts on air quality from this plant. Consequently, a detailed assessment of the impact of emissions associated with the plant is not required.

1.2 Application Site Description and Location.

The Application Site is located within MCC's administrative area at the approximate National Grid Reference (NGR): X 387066, Y 400018. Figure 1 shows the location of the Application Site within the wider context of Manchester.

The Application Site is currently occupied by the former Mathers Foundry building and associated car park. The Application Site is bound by the Rochdale Canal to the north with industrial units beyond. To the south and west are further industrial units. To the east is Ten Acres Lane with residential dwellings beyond.

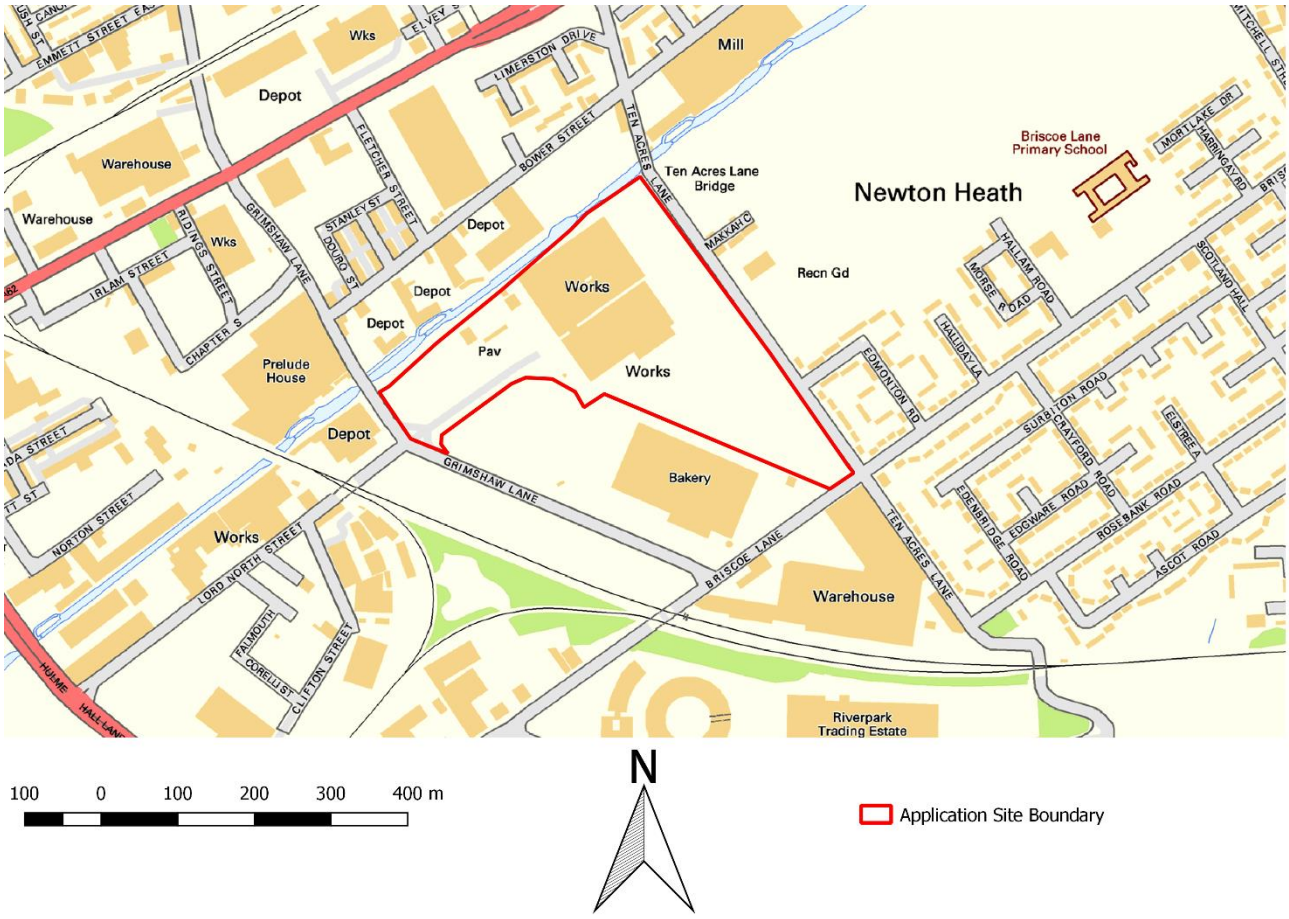

Figure 1 Location of the Application Site. Contains OS Data Crown Copyright and Database Rights 2021.

1.3 Scope of Assessment.

An email detailing the proposed methodology for the Air Quality Assessment was provided to MCC on the 11th February 2021 however at the time of writing the report, a response has not yet been received. A copy of the correspondence with MCC has been included in Appendix 1.

A summary of the scope of the assessment includes:

- Determination of baseline scenario, using monitoring data;
- Assessment of potential air quality impacts during the construction phase;
- Assessment of potential air quality impacts during the operational phase;
- Assessment of the suitability of the Application Site for the Proposed Development; and
- Identification of required mitigation measures.

2. Legislation, Policy and Guidance Documents.

2.1 Air Quality Strategy and Local Air Quality Management.

The Environment Act 1995 (Part IV)[1] requires the Secretary of State to publish an air quality strategy and local authorities to review and assess the quality of air within their boundaries. The latter has become known as Local Air Quality Management (LAQM).

The Air Quality Strategy[2] provides the policy framework for local air quality management and assessment in the UK. It sets out air quality standards and objectives for key air pollutants. These standards and objectives are designed to protect human health and the environment. The Strategy also sets out how the different sectors of industry, transport and local government, can contribute to achieving these air quality objectives.

Local authorities are required to identify whether the objectives have been, or will be, achieved at relevant locations. If the objectives are not achieved, the authority must declare an Air Quality Management Area (AQMA) and should prepare an Air Quality Action Plan (AQAP) within 12 months. The action plan must identify appropriate measures and policies that can be introduced to help achieve the objective(s).

The air quality objectives set out the extent to which the Government expects the standards to be achieved by a certain date. They take account of economic efficiency, practicability, technical feasibility and timescale. The objectives for use by local authorities are prescribed within the Air Quality (England) Regulations 2000[3], and the Air Quality (England) (Amendment) Regulations 2002[4].

The objectives for nitrogen dioxide (NO_2) and fine particulate matter (PM_{10} and $PM_{2.5}$) are given in Table 1. The target dates for meeting the NO_2 and PM_{10} objectives were 2005 and 2004, respectively. It should be noted that local authorities in England have a flexible role in working towards reducing emissions and concentrations of $PM_{2.5}$.

Table 1: Air Quality Objectives for NO_2, PM_{10} and $PM_{2.5}$

Pollutant	Time Period	Objective
Nitrogen Dioxide (NO_2)	1-hour Mean	200 µg/m^3 Not to be exceeded more than 18 times a year
	Annual Mean	40 µg/m^3
Fine Particulate Matter (PM_{10})†	24-hour Mean	50 µg/m^3 Not to be exceeded more than 35 times a year
	Annual Mean	40 µg/m^3
Fine Particulate Matter ($PM_{2.5}$) †	Annual Mean	25 µg/m^3
Notes: †Measured gravimetrically.		

The objectives apply at locations where members of the public are likely to be regularly present and exposed over the averaging period of the objective. Examples of where the annual mean objectives should apply are provided in LAQM.TG(16)[15] and include building facades of residential properties, schools, hospitals. The annual mean objectives are not relevant for the building facades of offices or other places of work where members of the public do not have regular access, nor kerbsides nor gardens.

The 24-hour objective for PM_{10} is considered to apply at the same locations as the annual mean objective, as well as in gardens of residential properties and at hotels.

The 1-hour objective for NO_2 also applies wherever members of the public might regularly spend 1-hour or more, including outdoor eating locations, pavements of busy shopping streets, carparks and bus stations which are not fully enclosed. The 1-hour objective does not apply at kerbside sites where the public do not have regular access.

2.2 EU Limit Values.

The European Union has also set limit values for NO_2, PM_{10} and $PM_{2.5}$; these are legally binding and have been implemented into English legislation by The Air Quality Standards Regulations 2010[5] and The Air Quality Standards (Amendment) Regulations 2016[6].

The limit values for NO_2, PM_{10} and $PM_{2.5}$ are the same as the English objectives (given in Table 1), but applied from 2010 for NO_2, 2005 for PM_{10} and 2015 for $PM_{2.5}$. The limit values apply at all locations (apart from where the public does not have access, where health and safety at work provisions apply and on the road carriageway).

2.3 General Nuisance Legislation.

Part III of the Environmental Protection Act (EPA) 1990 (as amended) contains the main legislation on Statutory Nuisance and allows local authorities and individuals to take action to prevent a statutory nuisance. Section 79 of the EPA defines, amongst other things, smoke, fumes, dust and smells emitted from industrial, trade or business premises so as to be prejudicial to health or a nuisance, as a potential Statutory Nuisance.

Fractions of dust greater than 10µm in diameter (i.e. greater than PM_{10}) typically relate to nuisance effects as opposed to potential health effects and therefore are not covered within the AQS. In legislation there are currently no numerical limits in terms of what level of dust deposition constitutes a nuisance.

2.4 UK Plan for Tackling Roadside Nitrogen Dioxide Concentrations.

The UK Plan for Tackling Roadside Nitrogen Dioxide Concentrations[7] was published in 2017. This sets out roles and responsibilities and measures for bringing NO_2 levels within the mandatory limit values in the shortest possible time. Under the UK Plan, local authorities with roadside concentrations of NO_2 forecast by the Defra as exceeding legal limits are identified; MCC has been identified as one of these.

2.5 Clean Air Strategy.

The Clean Air Strategy (CAS)[8], published in 2019, sets out the Government's proposals aimed at delivering cleaner air in England, and also indicates how devolved administrations intend to make emissions reductions. It sets out the comprehensive action that is required from across all parts of government and society to deliver clean air to help meet EU limit values for the five most damaging air pollutants: NO_x (including NO_2), $PM_{2.5}$, NH_3, sulphur dioxide (SO_2), non-methane volatile organic compounds (NMVHC).

The immediate challenge is to reduce NO_x emissions due to non-compliance with the limit value for annual mean NO_2 (as given in Table 1). Targets for action include road traffic to reduce ambient NO_2 concentrations, and domestic coal and wood burning to improve ambient $PM_{2.5}$ concentrations.

2.6 Planning Policy.

2.6.1 National Planning Policy Framework

The National Planning Policy Framework (NPPF) 2019[9] sets out planning policy for England. It includes advice on when air quality should be a material consideration in development control decisions. Relevant sections are set out below:

> Paragraph 54: "Local planning authorities should consider whether otherwise unacceptable development could be made acceptable through the use of conditions or planning obligations. Planning obligations should only be used where it is not possible to address unacceptable impacts through a planning condition."
>
> Paragraph 102: "…c) opportunities to promote walking, cycling and public transport use are identified and pursued; d) the environmental impacts of traffic and transport infrastructure can be identified, assessed and taken into account - including appropriate opportunities for avoiding and mitigating any adverse effects, and for net environmental gains… ."
>
> Paragraph 103: "Significant development should be focused on locations which are or can be made sustainable, through limiting the need to travel and offering a genuine choice of transport modes. This can help to reduce congestion and emissions and improve air quality and public health."

Paragraph 170: "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."

Paragraph 180: "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 181: "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 183: "The focus of planning policies and decisions should be on whether proposed development is an acceptable use of land, rather than the control of processes or emissions (where these are subject to separate pollution control regimes). Planning decisions should assume that these regimes will operate effectively. Equally, where a planning decision has been made on a particular development, the planning issues should not be revisited through the permitting regimes operated by pollution control authorities."

The NPPF is supported by Planning Practice Guidance (PPG)[10].

The 2018 PPG states that:

Paragraph 001 (Reference ID: 32-001-20191101): "Defra carries out an annual national assessment of air quality using modelling and monitoring to determine compliance relevant Limit Values. It is important that the potential impact of new development on air quality is taken into account in planning where the national assessment indicates that relevant limits have been exceeded or are near the limit or where the need for emissions reductions has been identified."

Paragraph 002 (Reference ID: 32-002-20191101): Plans may need to consider ways in which the development could be made appropriate in locations where air quality is or is likely to be a concern, and not give rise to unacceptable risks from pollution. This could, for example entail identifying measures for offsetting the impact on air quality arising from new development including supporting measures in an air quality action plan or low emissions strategy where applicable".

Paragraph 005 (Reference ID: 32-005-20191101): "Whether air quality is relevant to a planning decision will depend on the proposed development and its location. Concerns could arise if the development is likely to have an adverse effect on air quality in areas where it is already known to be poor, particularly if it could affect the implementation of air quality strategies and action plans and / or breach legal obligations (including those relating to the conversation of habitats and species). Air quality may also be a material consideration if the proposed development would be particularly sensitive to poor air quality in its vicinity.

The PPG also sets out the information that may be required in an air quality assessment, stating that:

Paragraph 007 (Reference ID: 32-007-20191101): "Assessments need to be proportional to the nature and scale of development proposed and the potential impacts (taking into account existing air quality conditions), and because of this are likely to be locationally specific. The scope and content of supporting information is best discussed and agreed between the local planning authority and applicant before it is commissioned".

It also provides guidance on options for mitigating air quality impacts, and makes clear that:

Paragraph 008 (Reference ID: 32-008-20191101): "Mitigation options will need to be locationally specific, will depend on the proposed development and need to be proportionate to the likely impact."

2.7 Local Policy.

2.7.1 Manchester City Council Core Strategy Development Plan

The Manchester Core Strategy Development Plan, adopted in July 2012 and covering the years 2012-2027, states in Policy EN16 that:

"The Council will seek to improve the air quality within Manchester, and particularly within Air Quality Management Areas, located along Manchester's principal traffic routes and at Manchester Airport. Developers will be expected to take measures to minimise and mitigate the local impact of emissions from traffic generated by the development, as well as emissions created by the use of the development itself, including from Combined Heat and Power and biomass plant.

When assessing the appropriateness of locations for new developments the Council will consider the impacts on air quality, alongside other plan objectives. This includes cumulative impacts, particularly in Air Quality Management Areas"

2.8 Local Air Quality Management in Manchester.

An AQMA was declared in Greater Manchester in 2016 for exceedances of the annual mean NO_2 AQO. The AQMA covers the 10 districts of Greater Manchester, including arterial routes, district centres, and the airport. Consequently, an Air Quality Action Plan was published in 2016 to set out actions and measures to bring about an improvement in air quality, to benefit the health of the population[11]. The proposed actions cover three main themes:

- Reduce Traffic - for instance by encouraging modal shift from private vehicle use to public transport, cycling and walking.
- Increasing Efficiency - of traffic movement by reducing congestion and stop-start travel to achieve a smoother emission profile and overall lower emissions, which may be particularly significant at peak hours.
- Improve Fleet - by incentivising the replacement of older, more polluting vehicles with newer, smaller, cleaner, lower-emissions vehicles.

Alongside the Air Quality Action Plan, the Greater Manchester Low Emission Strategy[12] presents a long-term approach to carbon emissions and air quality in the period up to 2040. The key aims of the strategy are to:

- Support the UK Government in meeting all EU thresholds for key pollutants at the earliest date;
- Contribute to reducing Greater Manchester's carbon footprint, in line with the Greater Manchester Climate Change Strategy; and
- Reduce air pollution as a contributor to ill-health in Greater Manchester.

An outline business case for a Clean Air Zone (CAZ) covering Greater Manchester was also submitted to government in March 2019[13]. The CAZ would be introduced in two phases from 2021 and 2023, targeting the most polluting commercial vehicles including older Heavy Duty Vehicles (HDVs), buses, coaches, taxis and private hire vehicles from 2021, and older polluting Light Duty Vehicles (LDVs) from 2023.

Furthermore, Transport for Greater Manchester established the Greater Manchester Electric Vehicle (GMEV) Network in 2013. The network offers free electric vehicle charging for a nominal annual fee to help the mass adoption of electric vehicles across the region, playing a central role in improving air quality.[14]

2.9 Assessment Guidance.

The primary guidance documents consulted in undertaking this assessment are detailed below.

2.9.1 Defra Local Air Quality Management Technical Guidance

Defra Local Air Quality Management Technical Guidance (LAQM.TG(16))[15] was published for use by local authorities in their LAQM review and assessment work. The document provides key guidance in aspects of air

quality assessment, including screening, use of monitoring data, and use of background data that are applicable to all air quality assessments.

2.9.2 EPUK-IAQM 'Air Quality Guidance for Planning'

Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM) have published guidance[16] to help ensure that air quality is properly accounted for in the development control process. It clarifies when an air quality assessment should be undertaken, what it should contain, and how impacts should be described and assessed including guidelines for assessing the significance of impacts.

2.9.3 IAQM 'Construction and Demolition Dust Guidance'

Guidance on the assessment of dust from demolition and construction has been published by the IAQM[17]. The guidance provides a methodology to determine the dust emission magnitude and provides a series of matrices to determine the risk magnitude of potential dust sources associated with construction activities. This allows for the identification of appropriate mitigation measures that are defined within further IAQM guidance.

3. Assessment Methodology.

3.1 Consultation.

The approach to the assessment, as described in section 1.3, was provided to MCC for review.

3.2 Existing Air Quality in the Study Area.

A baseline air quality review was undertaken to determine the existing air quality in the vicinity of the Application Site. This desk-top study was undertaken using the following sources:

- Air quality data for MCC, including a review of the MCC air quality reports[18] and local monitoring data;
- The UK Pollutant Release and Transfer Register[19];
- Background pollution maps taken from Defra's Local Air Quality Management (LAQM) website[20];
- Pollution Inventory from the Environment Agency[21]
- The UK Ambient Air Quality Interactive Map[22];
- Ordnance Survey data and aerial photography from Google Maps.

3.3 Construction Phase Impacts.

3.3.1 Construction Dust Assessment

The assessment of construction dust impacts has been undertaken in line with the IAQM methodology. Activities on the proposed construction site have been divided into four types to reflect their different potential impacts. These are:

- Demolition;
- Earthworks;
- Construction; and
- Trackout

The risk of dust emissions was assessed for each activity with respect to:

- Potential loss of amenity due to dust soiling; and
- The risk of health effects due to a significant increase in exposure to PM_{10}.

The first stage of the assessment involves screening to determine whether there are any sensitive receptors within the threshold distances defined by the IAQM guidance. A detailed assessment of the impact of dust from construction sites will be required where:

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

The magnitude of dust emission for each activity is determined on the basis of the guidance, indicative thresholds, information available relating to the project and expert judgement. The risk of dust effects arising is based upon the relationship between the dust emission magnitude and the sensitivity of the area. The risk of impact is then used to determine the mitigation requirements.

Descriptors for magnitude of impact and impact significance used in this assessment of construction phase dust are given in the guidance[17] available online.

3.3.2 Construction Traffic

3.3.2.1 Construction Traffic Emissions Screening

A screening assessment has been undertaken with reference to the following EPUK and IAQM guidance indicative criteria:

- a change of Light Duty Vehicle (LDV) flows of more than 500 Annual Average Daily Traffic (AADT) (outside an AQMA);
- a change of Heavy Duty Vehicle (HDV) flows of more than 100 AADT (outside an AQMA);
- a change of LDV flows of more than 100 AADT (within an AQMA); and/or
- a change of HDV flows of more than 25 AADT (within an AQMA).

3.3.2.2 NRMM Emissions Screening

Non-Road Mobile Machinery (NRMM) refers to mobile machines, transportable industrial equipment or vehicles which are fitted with an internal combustion engine and not intended for transporting goods or passengers on roads. NRMM emissions have been screened following the guidance in Defra's LAQM.TG(16).

3.4 Operational Phase Impacts.

This section provides a summary of the modelling methodology with further information, including the traffic data and model verification provided in Appendix 4.

3.4.1 Operational Phase – Road Traffic Impacts

The Proposed Development will result in the release of emissions from increased vehicle trips associated with operational phase of the Proposed Development. The increase in emissions from road traffic trips may have an impact on the air quality in the surrounding area and this has been assessed by predicting pollutant concentrations at locations of relevant exposure using ADMS Roads (v5.0.0.1) dispersion model software.

The following scenarios have been assessed:

- Baseline – 2019 verification year, on the basis that this is the most recent year with complete datasets for traffic flows, diffusion tube monitoring and meteorological data with which to carry out model verification, in accordance with LAQM.TG(16).
- Do Minimum (DM) – as a precautionary assessment, baseline (2019) emission factors have been used with the anticipated opening year (2022) flows without the additional Proposed Development vehicle trips.
- Do Something (DS) – as a precautionary assessment baseline (2019) emission factors have been used with the anticipated opening year traffic, including the additional vehicle trips associated with the Proposed Development.

As the proposals are for flexible Class E(g)/B2/B8 Uses, which have different associated trip generations, road traffic data has been provided for E(g)/B2 and B8 uses separately. The future year DS scenario has been assessed assuming 100% of the Proposed Development will be for both E(g)/B2 and B8 uses. The different trip generations represent a reasonable best case for E(g)/B2 and a reasonable worst case the B8 use. In reality, the Proposed Development will comprise of a mix of these uses and an assessment of the vehicle trips associated with the B8 use provides a worst-case assessment.

Details of the dispersion model set-up and traffic data are provided in Appendix 4.

3.4.2 Traffic Emission Factors and Sensitivity Assessment

Defra provides an Emission Factor Toolkit (EFT) in order to calculate emissions from a given length of road based on the traffic composition (number of vehicles of each type) and speed data..

The Proposed Development is predicted to open in 2022, however, to provide a precautionary assessment, emission factors determined for each scenario using the latest EFT (v10.1) have been held in the baseline year 2019.

Predicted trip generation with traffic composition (Light Duty Vehicle (LDV <3.5t) and Heavy-Duty Vehicle (HDV >3.5t)) were provided by Vectos (the appointed Transport Consultants). Speeds used in the model were based on posted limits and adjusted for junctions following guidance in LAQM.TG(16)[23].

Modelled traffic exhaust concentrations of oxides of nitrogen (NO_x) have been subject to verification in accordance with LAQM.TG(16) (see Appendix 4) and annual mean NO_2 concentrations calculated using the latest DEFRA 'NO_x-NO_2 Calculator' (v8.1) for 2019.

There remains some uncertainty regarding future NO_x emissions from diesel vehicles. To address this, the future scenarios have been assessed in which it has been assumed there is no improvement in vehicle emissions from the verified 2019 baseline year or an improvement in background concentrations, which therefore represents a precautionary assessment. These modelling assumptions and sensitivity on the dispersion modelling inputs are in accordance with principles of the IAQM's Position Statement on Dealing with Uncertainty in Vehicle NO_x Emissions within Air Quality Assessments[24].

3.4.3 Meteorological Data

To calculate pollutant concentrations at identified receptor locations the model uses sequential hourly 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 data from Manchester Airport for the year 2019. This station records all of the parameters necessary for dispersion modelling.

The meteorological dataset used in this assessment has been provided by APS Ltd.

3.4.4 Defra Background Concentrations

Background NO_2, PM_{10} and $PM_{2.5}$ concentrations for the individual receptors as predicted by Defra have been used to estimate future concentrations. For all pollutants, in the 2019 Baseline scenario and the DM and DS scenarios, 2019 background concentrations were used to ensure a robust assessment in which background concentrations do not decrease in the future.

For model verification, Defra background NO_2 concentrations for 2019 were used as no representative MCC urban background monitoring sites were suitable. The nearest MCC urban background monitoring site is a passive diffusion tube site located approximately 2km north of the Application Site off Oldham Road. Concentrations at this location are higher than the Defra background concentrations for the grid square containing this monitoring site due to the likely influence of road traffic emissions from Oldham Road, located within 50 m of the monitoring site.

3.4.5 Existing Receptors

LAQM.TG(16) provides guidance on assessing air quality against the regulations, stating that the AQOs should be assessed at locations where members of the public are likely to be regularly present and are likely to be exposed for a period of time appropriate to the averaging period of the standard.

A desktop review of existing receptors identified receptor locations sensitive to the annual mean AQO, adjacent to roads that are likely to experience an increase in traffic flows as a result of the Proposed Development.

On this basis, concentrations have been determined at a number of existing receptors considered to represent potential worst-case exposure locations. A total of 11 existing receptors were modelled close to the affected road network at the ground floor of residential properties, hotels, offices or at commercial properties at first floor (4.5m) where there is the potential for residential use. The existing receptors are shown in Table 2.

Annual mean concentrations for NO_2, PM_{10} and $PM_{2.5}$were calculated at the receptor locations. The risk of exceeding the 1-hour mean AQO was assessed according to the guidance in LAQM.TG(16). This guidance states that:

'authorities may assume that exceedances of the 1-hour mean objective for NO_2 are only likely to occur where annual mean concentrations are 60µg/m^3 or above'.

Table 2 Existing Receptors.

Receptor ID	Receptor Address	Land Use Type	Relevant Objective	Coordinates		
				X	Y	Z
ER1	71 Grimshaw Lane	Residential	LT	386756	399973	1.5
ER2	63 Grimshaw Lane	Residential	LT	386741	400003	1.5
ER3	Tyco Fire South	Office	ST	386669	400139	1.5
ER4	Tyco Fire North	Office	ST	386643	400185	1.5
ER5	759 Oldham Road	Residential	LT	386927	400370	1.5
ER6	11 Limestone Drive	Residential	LT	387059	400352	1.5
ER7	888 Oldham Road Holiday Inn	Hotel	ST	386714	400229	1.5
ER8	2 Hulme Hall Lane	Residential*	LT	386141	399911	4.5
ER9	178 Brookhill Street	Residential	LT	386505	399405	1.5
ER10	2 Sawley Road, Alburn Court	Residential	LT	386050	399824	1.5
ER11	325 Oldham Road	Residential	LT	385732	399712	1.5

Notes
*- Potential residential use at first floor
LT = Long term
ST = Short term

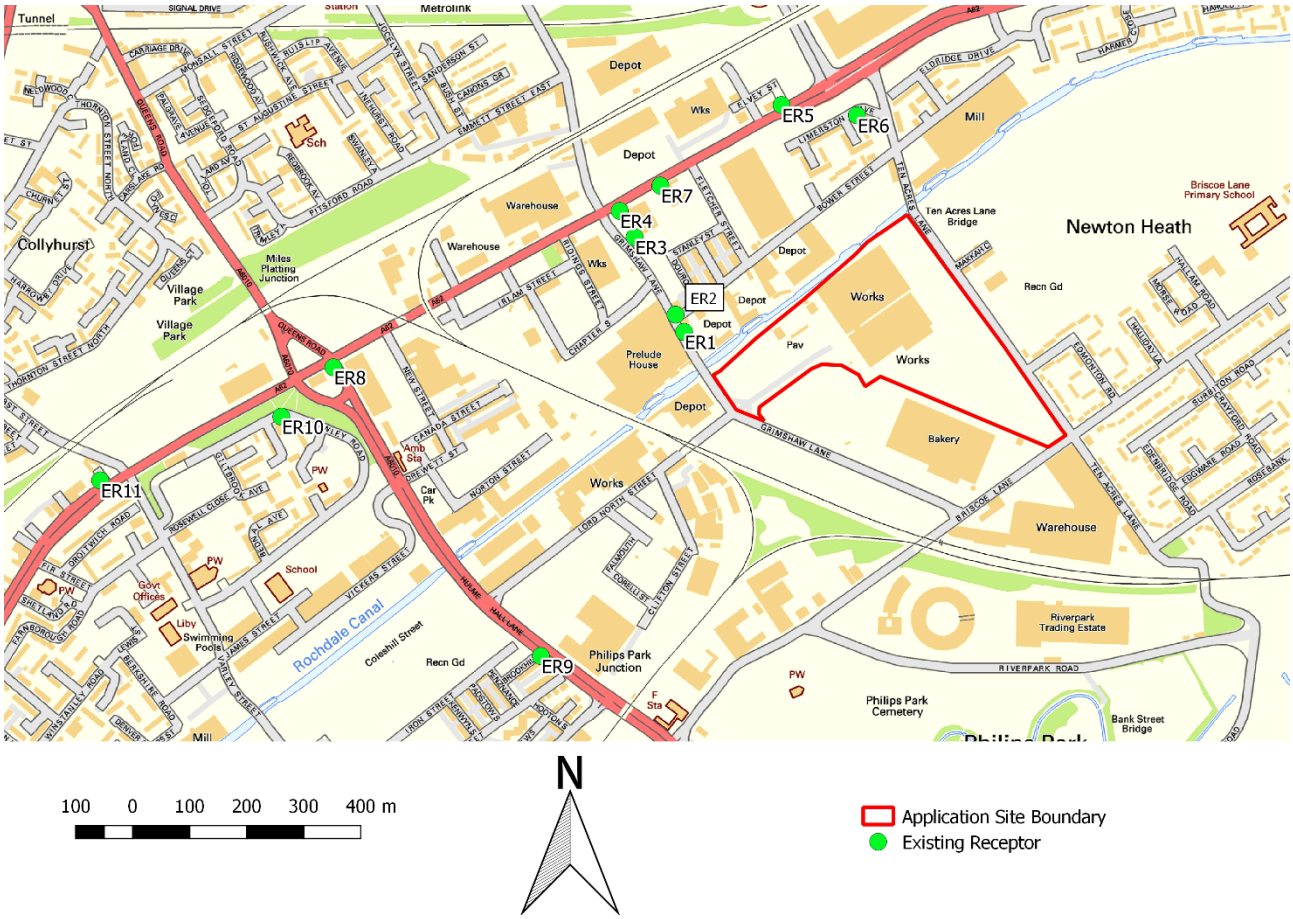

Figure 2 Location of existing receptors. Contains OS Data © Crown Copyright and Database rights 2021

3.4.6 Site Suitability Assessment

A qualitative 'Site Suitability' assessment has been undertaken to consider the exposure of future occupants, introduced by the Proposed Development, to existing poor air quality based on current monitoring data. As the Proposed Development is for flexible E(g)/B2/B8) use the 1-hour mean NO_2 AQO applies.

The assessment of Site Suitability will be assessed using MCC's most recent monitoring data available and predicted background concentrations, as modelled by Defra.

3.5 Assessment of Significance.

3.5.1 Construction Phase Impacts

The IAQM guidance[17] on the assessment of dust from demolition and construction states that the primary aim of the risk assessment is to identify site specific mitigation that, once implemented, should ensure that there will be no significant effect. Therefore, the assessment has been used to determine an appropriate level of mitigation for the construction phase.

The determination of which mitigation measures are recommended include elements of professional judgement and the professional experience of the consultants preparing this report is set out in Appendix 3.

3.5.2 Operational Phase Impacts

The approach suggested by EPUK and the IAQM in guidance on Land-Use Planning & Development Control: Planning for Air Quality[25] has been used to determine the significance of impacts from traffic associated with the Proposed Development on existing receptors.

The sensitivity impact significance of each receptor was defined in accordance with the criteria shown in Table 3.

Table 3: EPUK and IAQM impact descriptors for individual receptors

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

For the existing receptors, the air quality impacts at each location have been described by determining the percentage change in concentrations relative to the AQO and comparing this with the total long-term average concentration (background + road traffic).

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 impacts fall 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.

The determination of the significance of the effects includes elements of professional judgement and the professional experience of the consultant preparing the report is set out in Appendix 6.

The overall significance of the air quality effects are judged as either significant or not significant taking account of:

- The existing and future air quality in the absence of the development;
- The extent of current and future population exposure to the impacts; and
- The influence and validity of any assumptions adopted when undertaking the prediction of impacts.

The EPUK and IAQM guidance[16] has been used to assess the potential for significant impacts as a result of vehicle emissions from traffic associated with the Proposed Development. The focus of the guidance is to assess traffic emission impacts and advises on how to describe the air quality impacts and their significance.

4. Baseline Environment.

This section sets out the available information on air quality in the vicinity of the Application Site.

4.1 Application Site Setting.

The Application Site is located within MCC's area of administration at approximate NGR: X 384066, Y 400018. The Application Site is currently occupied by the former Mathers Foundry building and associated car park. The Application Site is bound by the Rochdale Canal to the north with industrial units beyond. To the south and west are further industrial units. To the east is Ten Acres Lane with residential dwellings beyond.

4.2 Local Air Quality Management Review and Assessment.

The Application Site is located approximately 220 m south of the MCC AQMA declared for exceedances of the annual mean NO_2 AQO. The extent of this AQMA covers the junction of Grimshaw Lane and Oldham Road.

According to the MCC Annual Status Report (ASR)[18] , long term trends have shown that there has been improvement in air quality in Manchester, but areas still remain above the annual mean NO_2 AQO.

4.3 Local Air Quality Monitoring.

The UK Automatic Urban and Rural Network (AURN) is a countrywide network of air quality monitoring stations operated on behalf of Defra. Monitoring data for AURN sites is available from the UK Air Information Resource website (UK-AIR). There is one AURN Site located approximately 2.9 km west in Manchester city centre (Piccadilly Gardens).

Additionally, MCC operate a further two automatic monitoring stations, with the nearest site being 3.6 km west of the Application Site on Oxford Road. Due to distance and site characteristics, these automatic monitoring sites are not likely to be representative of concentrations at the Application Site and have not been considered further.

Greater Manchester Combined Authorities (GMCA) utilise 400 passive diffusion tubes to monitor NO_2 concentrations across all 10 boroughs. A review of the most recent monitoring data available indicated that there are no passive diffusion tube locations within 1 km of the Application Site. The nearest passive diffusion tube location is on Rochdale Road (MA36NO), approximately 1.6 km west of the Application Site and is classified as a roadside site. Recent monitoring results are shown in Table 4 and the passive diffusion tube location is illustrated in Figure 3.

Table 4 details the monitoring results for all passive diffusion tube sites for the most recent years available.

Table 4: Passive Diffusion Tube Monitoring Results

Site ID	Site Type	Site Name	Distance (km) from site (approx.)	Annual Mean NO_2 Concentration (µg/m^3)				
				2015	2016	2017	2018	2019
MA36NO	Roadside	Rochdale Road	1.6	32.8	**40.1**	34.0	33.1	31.7
Notes Concentrations in **bold** indicate an exceedance of the annual mean NO_2 AQO								

As shown in Table 4 above, the annual mean NO_2 AQO has only been exceeded in 2016. NO_2 concentrations have been in compliance with the annual mean AQO in the last three years.

An annual mean NO_2 concentration of 60 µg/m^3 or above is used to indicate a possible exceedance of the 1-hour mean NO_2 objective. There have been no exceedances of 60 µg/m^3 at MA36NO in all years of available monitoring data.

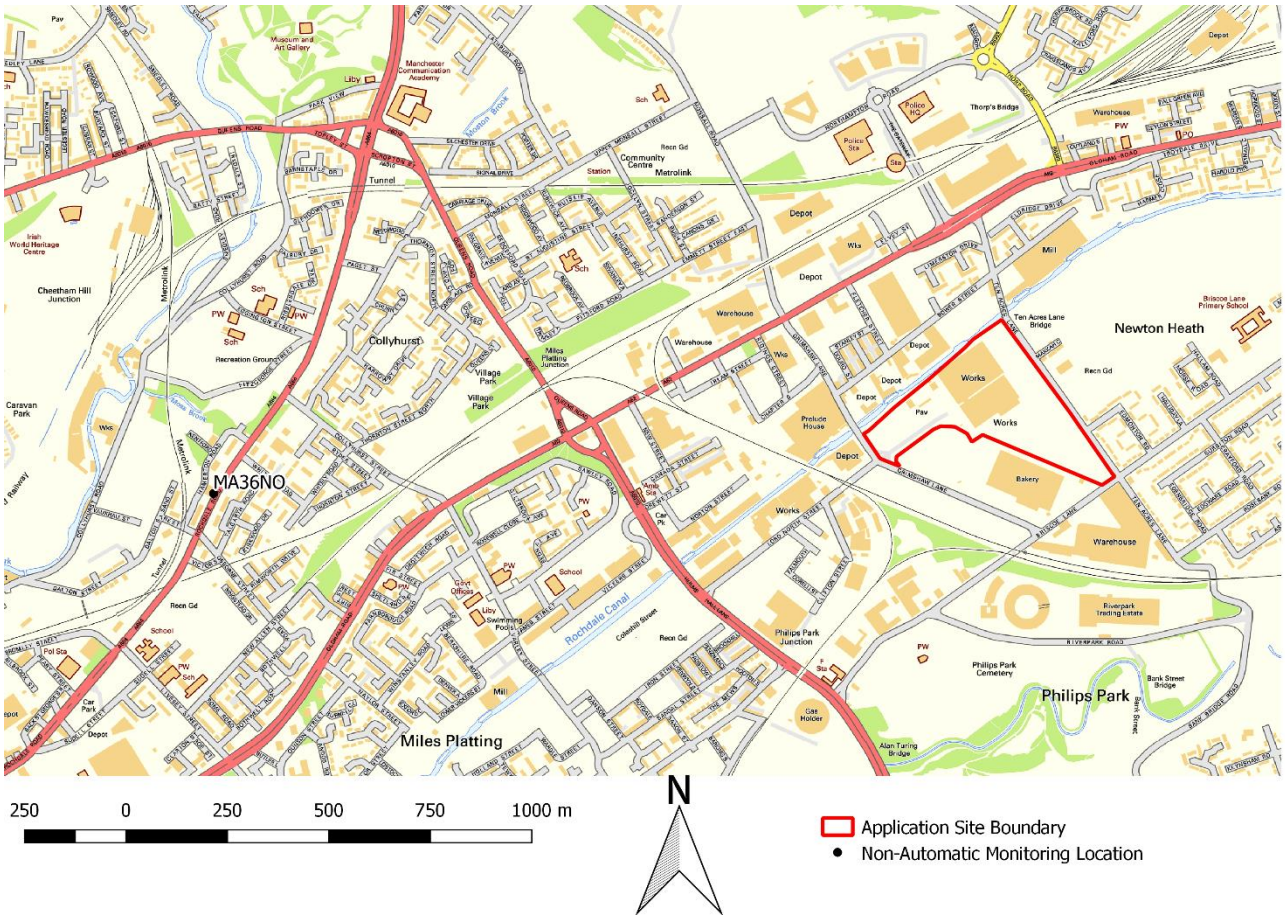

Figure 3 MCC Non-Automatic Monitoring Locations. Contains OS Data Crown Copyright and Database Rights 2021.

4.4 Industrial Pollution.

A desk-based review of potential industrial sources using the UK Pollutant Release and Transfer Register and the Environment Agency's Pollution Inventory did not identify any significant industrial or waste management sources of air pollution that are likely to affect the Application Site with regard to air quality.

4.5 Defra Predicted Concentrations.

Background concentrations have been obtained from the national maps published by Defra[20]. These estimated concentrations are produced on a 1 km by 1 km grid basis for the whole of the UK. The Application Site falls into grid square X 387500 Y 400500 and the predicted concentrations for this grid square for NO_2, PM_{10} and $PM_{2.5}$ are provided in Table 5 for 2019, the most recent year with available monitoring data, 2021, the year of construction and for 2022, the anticipated opening year for the Proposed Development.

Table 5: Predicted Background Concentrations

Year	Predicted Background Concentration (µg/m^3)			
	NO_x	NO_2	PM_{10}	$PM_{2.5}$
2019	27.3	19.0	12.5	8.3
2021	24.1	17.1	12.0	8.1
2022	23.1	16.5	11.9	8.0

As shown in Table 5, background concentrations are well below the relevant air quality objectives for all pollutants in 2022, the earliest anticipated opening year of the Proposed Development.

4.6 Summary of Baseline Data.

The baseline assessment has shown that the Application Site is not within the MCC AQMA, located approximately 220 m north of the Application Site. There are no automatic monitoring locations in the vicinity of the Application Site. Concentrations at the nearest passive diffusion tube location to the Application Site on Rochdale Road have been in compliance with the annual mean NO_2 AQO for the past three years.

Defra predicted background concentrations are expected to be below the annual mean AQO for both PM_{10} and $PM_{2.5}$ at the Application Site in 2022, the earliest anticipated opening year.

5. Construction Phase Assessment.

The potential for air quality impacts during the construction of the Proposed Development are assessed in this section. As part of the proposals, the existing Mathers Foundry building is to be demolished and 12 industrial units are to be constructed, comprising of up to 460,500 sq ft.

5.1 Construction Phase Dust Assessment.

The risk of dust impacts is based on the potential dust emissions magnitude and the sensitivity of the area. These two factors are then combined to determine the risk of dust impacts with no mitigation applied. In the absence of any site-specific information, a higher risk category has been applied to represent a worst-case scenario.

5.1.1 Assessment Screening

There are 'human receptors' within 350 m of the Application Site but no designated habitat sites within 50 m of the Application Site boundary or within 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the Site entrance. The nearest ecological site to the Application Site is the Clayton Vale Local Nature Reserve, approximately 480 m to the south.

Therefore, an assessment of construction dust on ecological receptors can be screened out from this assessment but an assessment of construction dust at human receptors is required.

5.1.2 Potential Dust Emission Magnitude

The potential magnitude of dust emissions from demolition, earthworks, construction and trackout have been assessed, as identified in Table 6.

Table 6: Predicted Magnitude of Dust Emissions

Activity	Magnitude	Justification
Demolition	Large	The Application Site is currently occupied by the Mathers Foundry building and associated warehouses which are to be demolished. Total building volume to be demolished is approximately 230,000 m^3 of potentially dusty construction material (e.g. brick, concrete).
Earthworks	Large	The Application Site has been previously developed; however, the new buildings and structure may require new foundations to be excavated. There are also areas of trees and grass that are to be cleared and built upon. Total Application Site areas is approximately 98,000 m^2 that could be subject to earthworks.
Construction	Medium	It has been confirmed by Hale Architecture that as part of the proposals there are to be 460,500 sq ft (GIA) of industrial units to be constructed. Construction material is likely to be a combination of metal cladding, which has a low potential for dust release and concrete/brickwork which has a high potential for dust release.
Trackout	Large	The proposals are likely to result in between 10-50 outward HDV movements in any one day which will be transporting potentially dusty material away from the Application Site. There may be some unpaved roads of >100 m in length where the Application Site has not been previously developed.

5.1.3 Sensitivity of the Study Area

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

- The specific sensitivities of receptors in the area;
- The proximity and number of those receptors;
- In the case of PM_{10}, the local background concentration; and
- Site-specific factors, such as whether there are natural shelters, such as trees or other vegetation, to reduce the risk of wind-blown dust.

The sensitivity of the area and the factors considered are detailed in Table 7. Figure 4 shows the location of the Application Site within the wider context of Manchester and a series of distance bands used to inform the assessment as outlined in the EPUK and IAQM guidance[17].

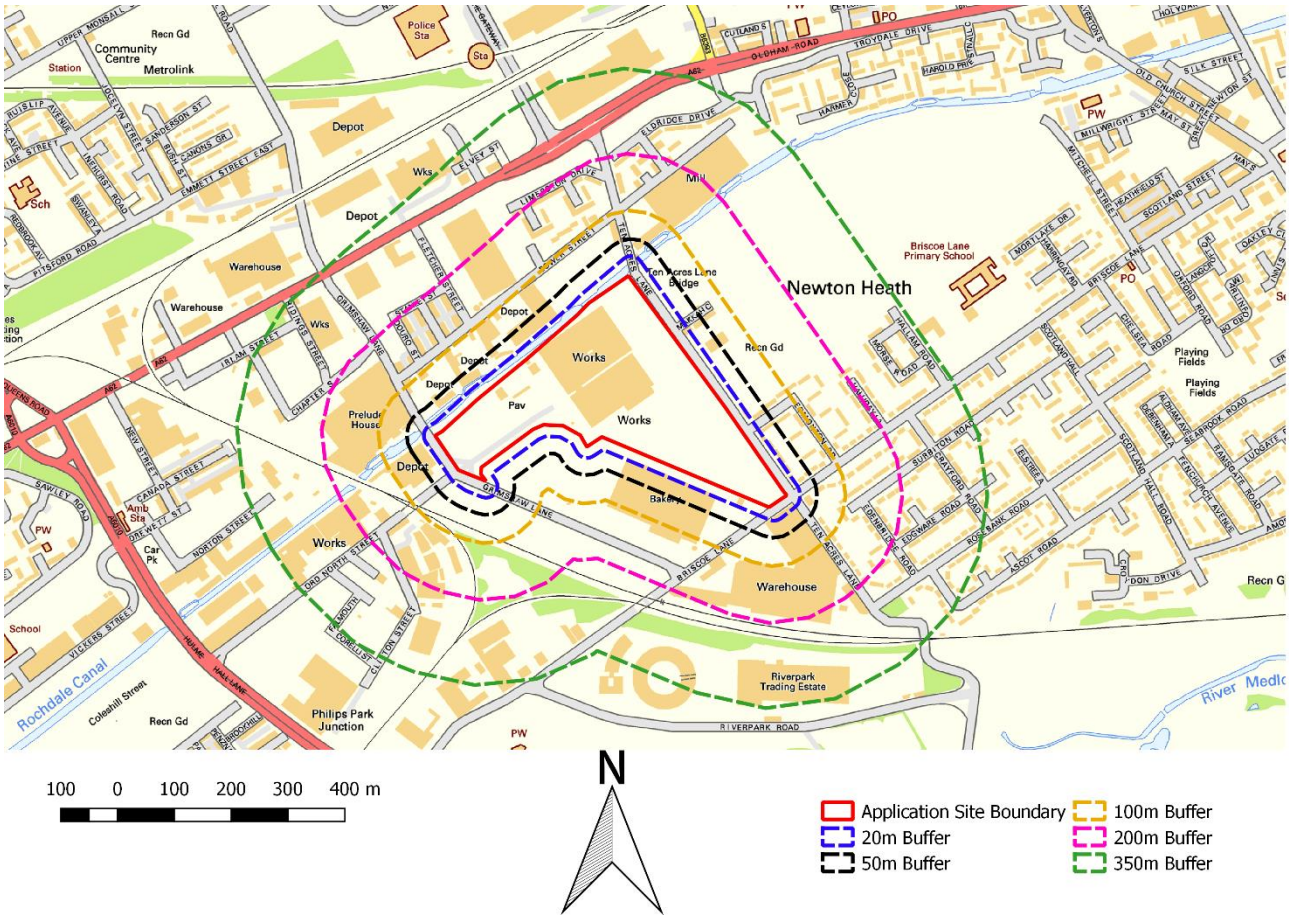

Figure 4 IAQM Demolition and Construction Distance Band Criteria from the Application Site Boundary. Contains OS Data © Crown Copyright and Database rights 2021

The sensitivity of the area and the factors considered are detailed in Table 7.

Table 7: Sensitivity of the Area

Sensitivity Type	Factors	Sensitivity of Area	
		On – Site Activity	Trackout
Dust Soiling	There are between 1-10 high sensitivity receptors within 20 m of the Application Site such as residential dwellings off Ten Acres Lane.	Medium	Low

Sensitivity Type	Factors	Sensitivity of Area	
		On – Site Activity	Trackout
	There are between 1-10 high sensitivity receptors, such as medium and long term car parks along Grimshaw Lane and Oldham Road within 50m of the routes likely to be used by construction traffic.		
Human Health	The background PM_{10} concentration for the location of the Application Site in 2021 is 12.0 µg/m^3, based upon Defra 2018-basedbackground estimates, as provided in Table 5. There are between 1-10 medium sensitivity receptors within 100m of the Application Site. There are between 1-10 medium sensitivity receptors such as places of work within 50m of Grimshaw Lane and Oldham Road where people could be exposed to PM_{10} for eight hours or more in one day.	Low	Low

5.1.4 Risk of Dust Impacts

The outcomes of the assessments of potential magnitude of dust emissions and the sensitivity of the area are combined to determine the risk of impact. This risk is then used to inform the selection of appropriate mitigation. Table 8 details the risk of dust impacts for demolition, earthworks, construction and trackout activities.

Table 8: Summary of Potential Unmitigated Dust Risks

Potential Impact	Sensitivity	Demolition	Earthworks	Construction	Trackout
		Magnitude			
		Large	Large	Medium	Large
Dust Soiling Impacts	Medium	Medium Risk	Low Risk	Medium Risk	Medium Risk
Human Health Impacts	Low	Medium Risk	Low Risk	Low Risk	Low Risk

5.2 Construction Phase – Vehicular Pollutants.

Information on traffic movements anticipated during construction works was unavailable for the completion of the Air Quality Assessment. However, the development quantum is not anticipated to result in a significant increase in movements above the EPUK and IAQM criterion. The duration of movements will be short-term in nature and are not considered further within the context of this assessment. Therefore, in accordance with the criterion presented within EPUK and IAQM guidance, additional road vehicle trips during the construction phase of the Proposed Development "can be considered to have insignificant effects" on air quality.

5.3 Construction Phase – Non-Road Mobile Machinery.

Exhaust emissions of NO_x and fine particulate matter (PM_{10} and $PM_{2.5}$) from Non-Road Mobile Machinery (NRMM), associated with construction sites, may have a significant effect on local air quality. Typically, NRMM is and, therefore there is a potential for NRMM emissions to adversely affect local air quality as a result of the Proposed Development.

LAQM.TG(16) guidance states that, with the application of suitable control measures and site management, exhaust emissions from on-site NRMM are "unlikely to make a significant impact on local air quality. In the vast majority of cases they will not need to be quantitatively assessed".

6. Operational Phase Assessment.

This section presents the potential air quality impacts associated with the operational phase of the Proposed Development. The Proposed Development is for the construction of 12 flexible Class E(g)/B2/B8 industrial units. As part of the proposals there will be parking provision for both LDVs and HDVs, resulting in a change in traffic associated with the proposed uses.

6.1 Operational Phase Road Traffic Emissions

As the proposals are for flexible Class E(g)/B2/B8 uses which have different associated trip generations, vehicle trips have been provided for E(g)/B2 and B8 uses separately. The E(g)/B2 use will generate the highest number of total vehicles whereas the B8 use will generate the highest number of HDVs and result in a reduction in LDVs when compared to the existing uses.

Annual NO_x, PM_{10} and $PM_{2.5}$ emissions associated with the predicted trip generation for the Proposed Development have been calculated using the 2020 Emission Factor Toolkit (EFT v10.1) for 2019. Table 9 presents the output of the EFT for trips associated with the different uses proposed.

Table 9 EFT Annual Emissions Associated with Proposed Development Traffic

Pollutant	LDVs Annual Emissions for B8 Use (kg/year)	HDVs Annual Emissions for B8 Use (kg/year)	LDVs Annual Emissions for E(g)/B2 Use (kg/year)	HDVs Annual Emissions for E(g)/B2 Use (kg/year)
NO_x	-384.6	4,719.6	1,351.2	1046.2
PM_{10}	-37.1	314.3	130.5	69.7
$PM_{2.5}$	-21.8	188.7	76.4	41.8

It is widely accepted that HDV emissions are greater than LDV emissions. Although the E(g)/B2 Use will generate the highest number of total vehicles, the B8 Use will generate the highest number of HDVs which will produce higher annual emissions, as presented in Table 9. As such, to provide a worst-case assessment the change in vehicle trips associated with the B8 use has been modelled and the results have been presented in the subsequent sections.

The exact mix of units is currently unknown and therefore cannot be modelled. The vehicle trips associated with the alternative E(g)/B2 use have also been modelled and the results have been provided in Appendix 5. In reality, the Proposed Development will comprise of a mix of E(g)/B2 and B8 uses and the impacts from the emissions associated with the operation of the Proposed Development will fall between the two scenarios assessed.

6.2 Road Traffic Impacts – NO_2 Annual Mean Results

Predicted annual mean NO_2 concentrations were assessed against the AQO of 40 µg/m^3 at locations of relevant exposure to the annual mean AQO e.g. residential properties. In addition, locations of relevant exposure to the short term AQO have also been included and assessed against the AQO of 200 µg/m^3. Table 10 shows the predicted impact of the Proposed Development traffic on NO_2 concentrations. Full details of the existing receptors are provided in Table 2 and shown in Figure 2.

Table 10 Predicted Annual Mean NO_2 Concentrations in the proposed Opening Year 2022 for B8 Use

Receptor	Receptor Type	DM Concentration (µg/m^3)	DS Concentration (µg/m^3)	Change (µg/m^3)	Change Expressed as % AQO	DS Total as a % of AQO	Impact Descriptor
ER1	LT	36.8	41.0	4.2	10.4%	102%	Substantial
ER2	LT	32.9	36.7	3.8	9.4%	92%	Moderate

Receptor	Receptor Type	DM Concentration (µg/m^3)	DS Concentration (µg/m^3)	Change (µg/m^3)	Change Expressed as % AQO	DS Total as a % of AQO	Impact Descriptor
ER3	ST	29.3	31.4	2.1	1.0%	16%	Negligible
ER4	ST	38.2	39.7	1.5	0.8%	20%	Negligible
ER5	LT	53.1	54.7	1.6	4.0%	137%	Substantial
ER6	LT	23.3	23.6	0.3	0.8%	59%	Negligible
ER7	ST	34.7	35.2	0.5	0.3%	18%	Negligible
ER8*	LT	38.4	38.7	0.3	0.8%	97%	Slight
ER9	LT	39.8	39.8	0.1	0.2%	100%	Negligible
ER10	LT	28.0	28.1	0.1	0.1%	70%	Negligible
ER11	LT	56.1	56.7	0.6	1.4%	142%	Moderate

Notes
*- Potential residential use at first floor
LT = Long term
ST = Short term

As shown in Table 10 there is one new exceedance of the annual mean NO_2 AQO at ER1, a residential receptor located on Grimshaw Lane.

The maximum predicted change in annual mean NO_2 concentrations associated with the DS scenario at existing receptors is 4.2 µg/m^3, which represents 10.4% of the annual mean AQO at ER1, a residential receptor located on Grimshaw Lane. The DS annual mean concentration at this receptor is 41.0 µg/m^3. In accordance with the EPUK and IAQM guidance, the impact at this receptor is considered to be 'substantial adverse'. This receptor represents a worst-case impact from the road traffic associated with the operation of the Proposed Development.

The impact at ER5, a residential property located on Oldham Road, is also considered to be 'substantial adverse' in accordance with the EPUK and IAQM guidance. A 'moderate adverse' impact has been predicted at ER2 and ER11; a residential receptor located on Grimshaw Lane and a residential receptor located on Oldham Road. A 'slight adverse' impact has been predicted at ER8, a residential receptor located at first floor level.

The maximum total DS annual mean concentration of 56.7 µg/m^3 has been predicted at ER11, which represents 142.0% of the annual mean AQO. Following the EPUK and IAQM guidance, the impact at this receptor is considered to be 'moderate adverse'.

The impact at all other existing receptors is predicted to be 'negligible' in accordance with the EPUK and IAQM guidance.

The impacts on existing receptors range from 'negligible' to 'substantial adverse' in the vicinity of the Proposed Development prior to the implementation of mitigation measures. As such, the overall significance of the operational phase of road traffic emission impacts on annual mean NO_2 concentrations has been determined to be significant without any mitigation in line with the EPUK and IAQM guidance.

6.3 Road Traffic Impacts - NO_2 1-Hour Mean Results

A methodology is presented within LAQM.TG(16) to determine compliance with the 1-hour mean NO_2 AQO. This Guidance states that:

'[…] exceedances of the NO_2 1-hour mean are unlikely to occur where the annual mean is below 60 µg/m^3'.

Based on the results of the dispersion modelling presented in Table 10, there are no existing receptor locations where the predicted annual mean concentration exceeds the annual mean NO_2 indicative concentration of 60 µg/m^3 used to inform compliance with the short term AQO.

6.4 Road Traffic Impacts – PM_{10} Annual Mean Results

Predicted annual mean PM_{10} concentrations were assessed against the PM_{10} AQO of 40 µg/m^3 at locations of relevant exposure. Table 11 shows the predicted impact of the Proposed Development traffic on PM_{10} concentrations. PM_{10} concentrations have also been compared against the more stringent $PM_{2.5.}$ AQO of 25 µg/m^3 . Full details of existing receptors are provided in Table 2 and shown in Figure 2.

Table 11 Predicted Annual Mean PM_{10} Concentrations in the Proposed Opening Year 2022 for B8 Use

Receptor	Receptor Type	DM Concentration (µg/m^3)	DS Concentration (µg/m^3)	Change (µg/m^3)	Difference Expressed as % AQO	DS Total as a % of AQO	DS Exceedance of $PM_{2.5}$ AQO?	Impact Descriptor
ER1	LT	15.4	16.0	0.6	1.4%	40%	NO	Negligible
ER2	LT	14.9	15.4	0.5	1.3%	38%	NO	Negligible
ER3	ST	14.2	14.4	0.3	0.7%	36%	NO	Negligible
ER4	ST	15.7	15.9	0.2	0.4%	40%	NO	Negligible
ER5	LT	18.8	19.0	0.2	0.5%	47%	NO	Negligible
ER6	LT	13.1	13.2	<0.1	0.1%	33%	NO	Negligible
ER7	ST	15.5	15.6	0.1	0.2%	39%	NO	Negligible
ER8	LT	15.6	15.6	<0.1	0.1%	39%	NO	Negligible
ER9	LT	16.5	16.5	<0.1	0.1%	41%	NO	Negligible
ER10	LT	13.8	13.8	<0.1	0.1%	35%	NO	Negligible
ER11	LT	18.8	18.9	0.1	0.2%	47%	NO	Negligible

Notes
LT = Long term
ST = Short term

As shown in Table 11 a maximum total DS scenario PM_{10} concentration of 19.0 µg/m^3 has been predicted ER5. A maximum predicted change in annual mean PM_{10} concentrations associated with the additional development trips is 0.6 µg/m^3 predicted at ER1, representing 1.4% of the annual mean AQO. Considering the maximum total DS scenario annual mean concentration of 19.0 µg/m^3 as predicted at ER5, representing 47% of the AQO, the impact following the EPUK and IAQM guidance can be considered 'negligible'.

There has also been no exceedances of the more stringent $PM_{2.5}$ annual mean AQO at all existing receptors.

At all existing receptors considered, the magnitude of impact is considered to be 'negligible'. As such, the overall significance of the operational phase of road traffic emission impacts on annual mean PM_{10} concentrations has been determined to be not significant in line with the EPUK and IAQM guidance.

A methodology is presented within LAQM.TG(16) to determine compliance with the 24-hour mean PM_{10} objective, using the following relationship:

No. 24-hour mean exceedances = -18.5 + 0.00145 × annual mean^3 + (206/annual mean)

6.5 $PM_{2.5}$ Annual Mean Modelling Results

Predicted annual mean $PM_{2.5}$ concentrations were assessed against the $PM_{2.5}$ AQO of 25 µg/m^3 at locations of relevant exposure. Table 12 shows the predicted impact of the Proposed Development traffic on $PM_{2.5}$ concentrations. Full details of the existing receptors are provided in Table 2 and shown in Figure 2.

Table 12 Predicted Annual Mean $PM_{2.5}$ Concentrations in the Proposed Opening Year 2022

Receptor	DM Concentration (µg/m^3)	DS Concentration (µg/m^3)	Change (µg/m^3)	Difference Expressed as % AQO	DS Total as a % of AQO	Impact Descriptor
ER1	10.0	10.4	0.4	1.4%	42%	Negligible
ER2	9.3	9.7	0.3	1.2%	39%	Negligible
ER3	8.9	9.1	0.2	0.6%	36%	Negligible
ER4	9.8	9.9	0.1	0.4%	40%	Negligible
ER5	11.6	11.8	0.1	0.5%	47%	Negligible
ER6	8.4	8.4	<0.1	0.1%	34%	Negligible
ER7	9.7	9.8	0.1	0.2%	39%	Negligible
ER8	10.1	10.2	0.1	0.2%	41%	Negligible
ER9	10.7	10.7	<0.1	0.1%	43%	Negligible
ER10	9.1	9.1	<0.1	0.0%	36%	Negligible
ER11	12.2	12.3	0.1	0.2%	49%	Negligible

A maximum $PM_{2.5}$ concentration of 12.3 µg/m^3 has been predicted at ER11. A maximum predicted change in annual mean $PM_{2.5}$ concentrations associated with additional development trips is 0.2 µg/m^3, representing 0.6 % of the AQO, as predicted at ER1. Considering a total 'DS' annual mean concentration of 12.3 µg/m^3 representing 49.1% of the AQO at ER11, the impact following the EPUK and IAQM guidance can be considered as 'negligible'.

The maximum predicted impact at existing receptors is 0.4 µg/m^3 which represents 1.4% of the AQO. Considering the total DS scenario annual mean concentration is 12.3 µg/m^3 which represents 49.0% of the annual mean AQO, the impact can therefore be classified as 'negligible' according to the EPUK and IAQM criteria.

At all existing receptors considered, the magnitude of impact is predicted to be negligible. As such, the overall significance of operational phase road traffic emission impacts on annual mean $PM_{2.5}$ was determined to be not significant in line with EPUK and IAQM guidance[16].

6.6 Site Suitability

This section presents a review of MCC monitoring data in the vicinity of the Application Site, for the purpose of identifying the suitability of the Application Site for flexible Class E(g)/B2/B8 uses.

As presented in section 2 and in line with LAQM.TG(16), the short-term AQOs apply to the Proposed Development due to its proposed use. As such, this section considers the predicted the NO_2 1-hour mean pollutant concentrations at the Application Site.

6.6.1 1-Hour Mean NO_2 Concentrations

A review of monitored MCC NO_2 concentrations has been completed as part of the baseline review with recent monitoring results presented in Table 4.

Monitored NO_2 concentrations at the nearest passive diffusion tube location, approximately 1.6m from the Application Site boundary, was 31.7 µg/m^3 in 2019. This passive diffusion tube is located on Rochdale Road, where higher NO_2 concentrations likely. The Application Site is set back from main roads and concentrations are likely to be closer to background levels than at this passive diffusion tube location. The 2019 Defra predicted background concentration at the location of the Application Site for NO_2 is 19.0 µg/m^3.

An annual mean concentration of 60 µg/m^3 or above is often used to indicate a possible exceedance of the hourly mean NO_2 objective. Therefore, NO_2 concentrations in the locale of the Application Site are considered to be below the 1-hour mean AQO and the Application Site is considered suitable for the proposed use without the inclusion of mitigation measures against NO_2 concentrations.

6.7 Significance of Air Quality Impacts

The unmitigated impact significance associated with the Proposed Development has been predicted in accordance with the stated assessment methodology. The following factors have been considered when providing justification.

- The maximum predicted change of annual mean NO_2 concentrations is 10.4% of the AQO. The DS total NO_2 concentration at this receptor is 102% of the AQO. Therefore, an unmitigated 'substantial adverse' impact is predicted at ER1 in accordance with the assessment methodology.
- A 'substantial adverse' impact has been predicted at ER5 with a total DS annual mean NO_2 concentration of 54.7 µg/m^3 which represents 137.0% of the annual mean NO_2 AQO. The predicted change is 1.6 µg/m^3 which represents 4.0% of the AQO.
- A 'moderate adverse' impact has been predicted at ER2 and ER11 with a total DS annual mean NO_2 concentration of 36.7 µg/m^3 and 56.7 µg/m^3 which represents 92% and 142% of the annual mean NO_2 AQO respectively.
- A 'slight adverse' impact has been predicted at ER8 with a total DS annual mean NO_2 concentration of 38.7 µg/m^3 which represents 97% of the annual mean NO_2 AQO.
- The maximum predicted percentage change of the annual mean PM_{10} concentrations at existing receptors is '1% of the AQO'. An unmitigated 'negligible' impact is predicted at all receptor locations in accordance with the assessment methodology.
- The maximum predicted percentage change of the annual mean $PM_{2.5}$ concentrations at existing receptors is '1% of the AQO'. An unmitigated 'negligible' impact is predicted at all receptor locations in accordance with the assessment methodology.
- The Proposed Development will not introduce any new receptor into an area of exceedance of the 1-hour mean NO_2 AQO based upon a review of the closest MCC NO_2 monitoring data to the Application Site.

Based on the above assessment results, the overall effect is considered to be 'significant' and mitigation measures are required for the operational phase of the Proposed Development in relation to annual mean NO_2 concentrations only.

The assessment of the impacts of emissions associated with the B8 use represents a worst-case assessment. In reality the Proposed Development will comprise of a mix of the proposed E(g)/B2/B8 uses and therefore the impacts would likely be less than those predicted above. The impacts of emissions associated with the operation of the Proposed Development would therefore lie somewhere between the above and those presented in Appendix 5.

7. Mitigation.

7.1 Construction Phase.

To mitigate the potential impacts during the construction phase it is recommended that mitigation measures as detailed in the IAQM guidance are implemented. These mitigation measures have been carefully selected for the Proposed Development and are based upon the dust risk categories outlined in the guidance[17].

It is recommended that the local authority approve a Dust Management Plan (DMP) prior to works commencing on site, and that this is implemented using an appropriately worded planning condition. Table 13 below details the measures that should be incorporated in the DMP. For general mitigation measures, which excludes those specifically targeted towards demolition, earthworks, construction and trackout (which are given towards the end of the table), 'medium risk' measures have been applied as these represent the highest risk category determined in Table 8. This approach is consistent with the IAQM guidance.

Table 13: Mitigation Measures

Issue	Mitigation Measure
Communications	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 stakeholder communications plan that includes community engagement before work commences.
Dust Management Plan	Develop and implement a DMP, which may include measures to control emissions, approved by the Local Authority. The DMP may include monitoring of dust deposition, dust flux, real-time PM_{10} 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
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 check of surfaces such as street furniture, cars, window sills within 100 m of the 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 and dust flux, or real time PM_{10} continuous monitoring locations within MCC. Where possible commence baseline monitoring at least three months before work commences on site.

Issue	Mitigation Measure
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 cover as described below
	Cover, seed or fence stockpiles to prevent wind whipping
Operating vehicles/machinery and sustainable travel	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 applicable)
	Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.
	Implement a Travel Plan that supports and encourages sustainable travel.
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
	Minimize drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate
	Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods
Waste management	Avoid bonfires and burning of waste materials
Demolition	Soft strip inside building before demolition
	Ensure effective water suppression is used during demolition activities
	Bag and remove any biological debris 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

Issue	Mitigation Measure
	Only remove the cover in small areas during work and not all at once
Construction	Avoid scrabbling (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 powder 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 in continuous use
	Avoid dry sweeping of large areas
	Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport
	Record all inspections of haul routes and any subsequent action in a site log book
	Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable)

Potential dust effects during the construction phase are considered to be both temporary and short-term in nature. The impacts are determined to be 'temporary' as they will only potentially occur throughout the construction phase and 'short term' because these will only arise at particular times when certain activities and meteorological conditions combine to create the predicted level. Notwithstanding this, with the application of the above dust control and mitigation measures, it is considered that residual effect at all receptors will be 'not significant' in accordance with the IAQM guidance.

7.1.1 Construction Phase Road Traffic Emissions

The need for further assessment of the potential air quality impacts associated with construction phase road traffic emissions, principally HDV movements, have been screened out as they are considered to have an insignificant effect on air quality and mitigation measures are not required.

7.1.2 Construction Phase NRMM Emissions

In accordance with Part 4 of the IAQM Control of Dust and Emissions guidance, all NRMM would need to adhere to the emissions standards for NO_2 and PM_{10} set out for NRMM. It is therefore considered the likely effects of construction plant on local air quality would be insignificant.

7.2 Operational Phase

7.2.1 Road Traffic Emissions

The detailed dispersion modelling of the impacts of additional road traffic associated with the operational phase of the Proposed Development has predicted significant impacts at existing receptors in the vicinity of the Application Site where there is relevant exposure. The assessment has assessed the impacts associated with the B8 use and the impacts predicted are considered to be worst case. As such, mitigation measures are required.

A list of recommended mitigation measures has been summarised below

- Implementation of a Sustainable Travel Plan to encourage users of the Proposed Development to achieve a modal shift away from private car journeys and to encourage more environmentally sustainable forms of travel such as walking and cycling.
- Provision of Electric Vehicle (EV) charging points.
- Ensure the vehicle fleet of future tenants of the Proposed Development is compliant with the latest emissions standards.
- Ensure a proportion of the vehicle fleet of future tenants of the Proposed Development are EVs

The recommended measures will help to mitigate the impacts associated with the operational phase of the Proposed Development on local air quality.

7.2.2 Baseline Site Suitability Review

A review of MCC monitoring data in consideration of the Application Site, and mapped concentrations by Defra in the locale of the Application Site, indicates no likely exceedance of the 1-hour mean NO2 AQO.

As no exceedances of any considered AQO is predicted, this follows the 1st hierarchy principle of the IAQM guidance to 'prevent and avoid' exposure. Therefore, no embedded mitigation into the Proposed Development design (in the form of mechanical ventilation, for example) is required.

8. Summary and Conclusions.

This report details the potential air quality impacts associated with the construction and operation of a proposed industrial development at land off Grimshaw Lane, Manchester.

The findings of the assessment are as follows:

- A qualitative assessment of the potential dust impacts during the construction of the Proposed Development has been undertaken. Through good practice and implementation of appropriate mitigation measures, it is expected that the release of dust would be effectively controlled and mitigated, with resulting impacts considered to be 'not significant'. All dust impacts are considered to be temporary and short-term in nature;
- Detailed dispersion modelling has been undertaken to assess the impacts of the additional vehicle trips associated with the operational phase of the Proposed Development. An assessment of vehicle trips associated with both E(g)/B2 and B8 uses has been carried out due to the different trip generation associated with each land use.
- The results of the detailed dispersion modelling show the impacts of the additional development vehicle trips are predicted to range from 'negligible beneficial' to 'substantial adverse' in accordance with the EPUK and IAQM guidance and as such mitigation measures are required in relation to annual mean NO_2 concentrations only.
- A number of mitigation measures have been recommended to reduce the impact of operational phase vehicle trips on local air quality.
- A baseline site suitability review has been undertaken to assess the suitability of the Application Site for the proposed flexible Class E(g)/B2/B8 uses. NO_2 concentrations at the Application Site are not expected to exceed the 1-hour mean NO2 AQO. Therefore, the Application Site is considered suitable for the Proposed Development and mitigation measures are not required for future users of the Proposed Development.
- The Proposed Development will meet its energy demand from a mixed approach incorporating small gas fired boilers, electric VRF systems and electric wall heaters for space and water heating. It is unlikely the gas fired boilers will result in a significant impact to local air quality. In addition, there are no on-site emissions associated with the electric systems. Consequently, a detailed assessment of the impact of emissions associated with the plant is not required.

Provided appropriate mitigation measures are implemented, it is considered that air quality should not be viewed as a constraint to planning and the Proposed Development conforms to the principles of National Planning Policy Framework and the MCC Local Plan.

9. Glossary of Terms.

AADT	Annual Average Daily Traffic
AQMA	Air Quality Management Area
AQO	Air Quality Objective
Defra	Department for Environment, Food and Rural Affairs
DMP	Dust Management Plan
EPUK	Environmental Protection UK
HDV	Heavy Duty Vehicles (> 3.5 tonnes gross vehicle weight)
HGV	Heavy Goods Vehicle
IAQM	Institute of Air Quality Management
LAQM	Local Air Quality Management
LDV	Light Duty Vehicles ($\leq$3.5 tonnes gross vehicle weight)
µg/m^3	Micrograms per cubic metre
MCC	Manchester City Council
NO_2	Nitrogen dioxide
NO_x	Nitrogen oxides (taken to be NO_2 + NO)
NPPF	National Planning Policy Framework
NRMM	Non-Road Mobile Machinery
Objectives	A nationally defined set of health-based concentrations for nine pollutants, seven of which are incorporated in Regulations, setting out the extent to which the standards should be achieved by a defined date. There are also vegetation-based objectives for sulphur dioxide and nitrogen oxides
PM_{10}	Particulate matter with an aerodynamic diameter less than 10 micrometres
$PM_{2.5}$	Particulate matter with an aerodynamic diameter less than 2.5 micrometres
PPG	Planning Practice Guidance
SPG	Supplementary Planning Guidance
Standards	A nationally defined set of concentrations for nine pollutants below which health effects do not occur or are minimal
Trackout	The process involving the transport of dust and dirt from the construction / demolition site onto the public road network, where it may be deposited and then re-suspended by vehicles using the network. This arises when heavy duty vehicles (HDVs) leave the construction / demolition site with dusty materials, which may then spill onto the road, and/or when HDVs transfer dust and dirt onto the road having travelled over muddy ground on site

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Appendix 1 – Proposed Development Plans.

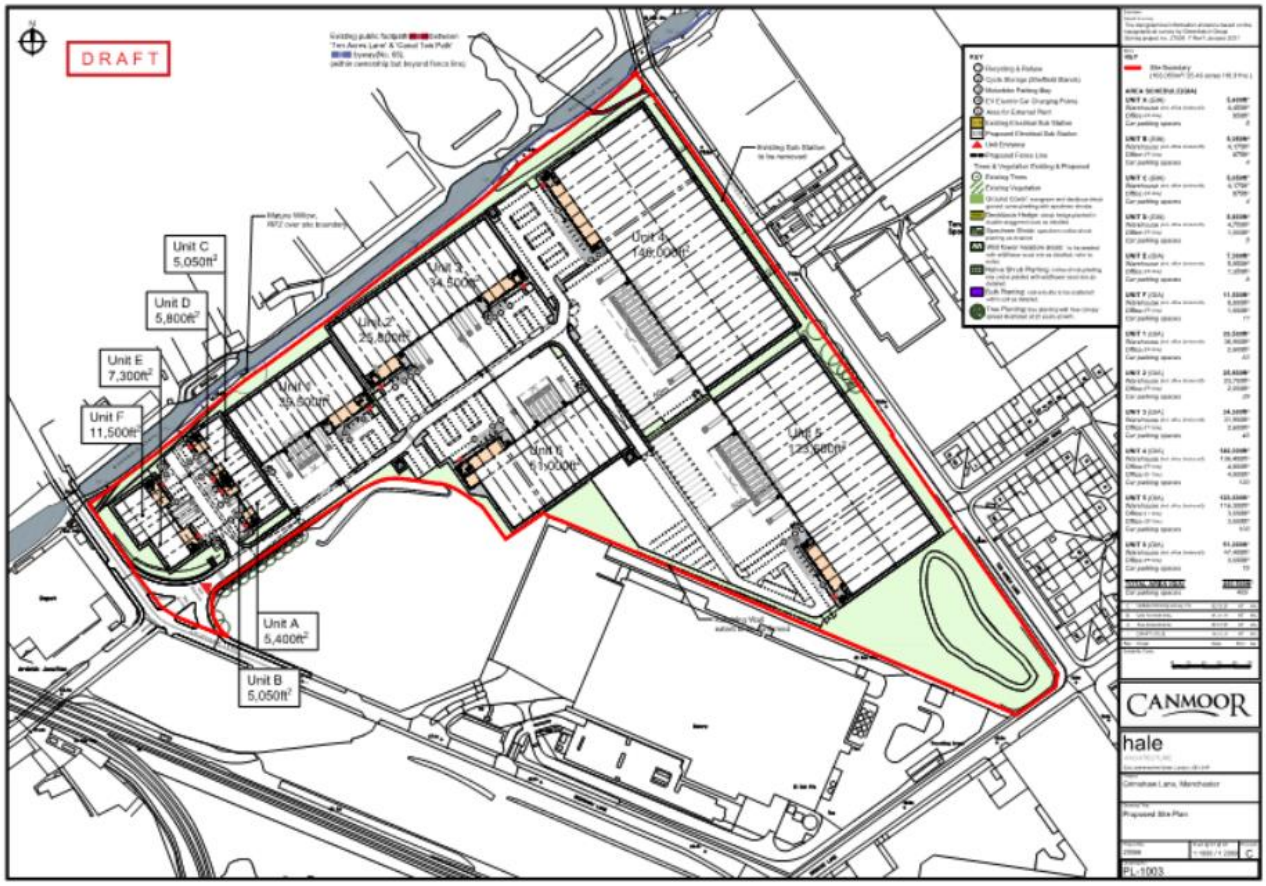


Figure 5 Proposed Development Site Plans. Drawing No. PL-1003. Source document Hale Architecture.

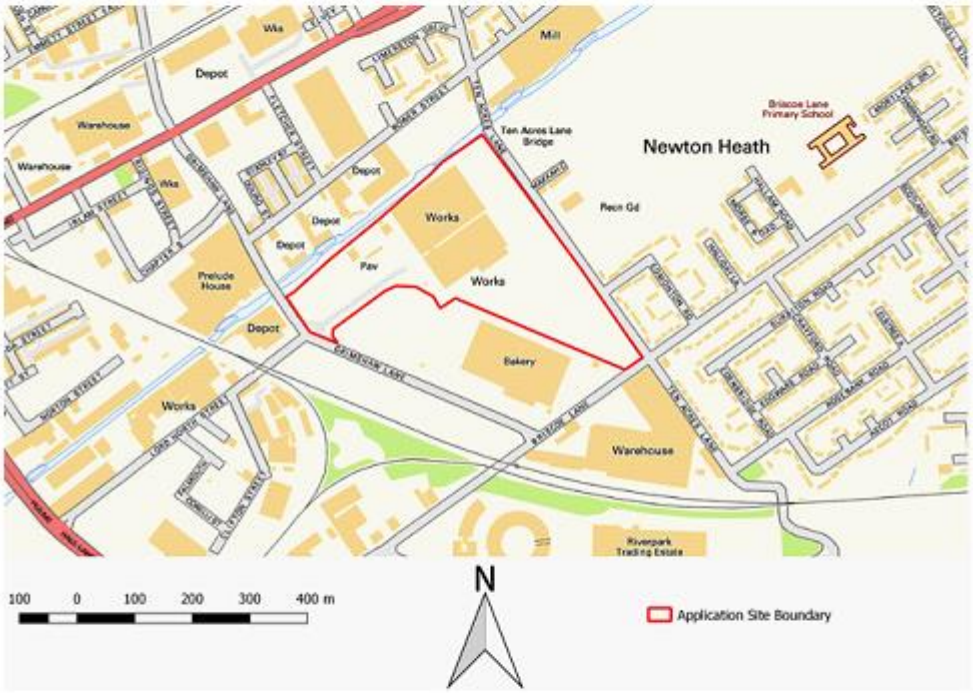
Appendix 2 - EHO Consultation.

Benny Pygott

From: Benny Pygott
Sent: 11 February 2021 17:33
To: karen.williamson@manchester.gov.uk
Subject: Grimshaw Lane, Manchester - Air Quality Scope of Assessment

Good afternoon Karen,

Hoare Lea have been instructed to undertake an air quality assessment for an industrial development at land off Grimshaw Lane, Manchester (former Mathers Foundry) postcode M40 2BA. See below site boundary for reference. The Proposed Development will consist of 12 industrial units totalling 460,000 ft².



Hoare Lea propose to undertake the assessment using the following methodology:

- A baseline assessment will be undertaken using data from the Greater Manchester Combined Authority's most recent Annual Status Report (June 2020).
- DEFRA's background pollution maps will be used to establish background concentrations in the area.
- As part of the proposals there are to be 489 car parking spaces. It has been confirmed by the project transport consultant that this will result in a net increase in traffic flows that will exceed the indicative criteria within the EPUK & IAQM guidance for roads within an AQMA as it is noted that sections of Oldham Road are within the wider Manchester AQMA. As such, a detailed assessment of the impacts of road traffic will be carried out using ADMS-Roads dispersion model software at nearby sensitive receptor locations.
- The dispersion model will be verified using MCC diffusion tubes located on Rochdale Road (MA36NO), Ashton Old Road (MA95BNO) and on Pottery Lane (MA86ANO) for 2019. We propose to use 2019 Defra background concentrations and Manchester Airport (2019) as the meteorological station. Please could you confirm this approach is acceptable?
- At this stage, the proposed energy strategy for hot water and space heating will comprise of a mixed approach including small gas fired boilers and variable refrigerant flow (VRF) heating and cooling for the office units. Exact size and specification is not currently known. However it has been assumed the emissions associated with these boilers will be below the indicative criteria outlined in the EPUK/IAQM document 'Land-

1

Use Planning & Development Control: Planning for Air Quality' January 2017. The VRF units form an electric approach with no onsite emissions associated with these systems. As such, a detailed assessment of the emissions associated with the proposed energy systems has been scoped out of further assessment.

- The assessment will consider impacts during the construction phase of the development, using the IAQM 'Guidance on the Assessment of Dust from Demolition and Construction' 2014.
- The assessment will be undertaken in line with the EPUK/IAQM document 'Land-Use Planning & Development Control: Planning for Air Quality' January 2017.

I would be grateful if you could please confirm your acceptance of the proposed methodology and provide me with any comments you may have.

Please do not hesitate to contact me if you would like to discuss anything further.

Best wishes

Benny Pygott
Graduate Air Quality Consultant

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HOARE LEA

Article 25

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This festive season, we're donating to Article 25's emergency appeal for temporary shelter across Beirut, in the aftermath of the country's recent disaster.
Find out more about this vital work

Appendix 3 – IAQM Construction Phase Methodology.

The following tables have been taken from the IAQM guidance document 'Guidance on the Assessment of Dust from Demolition and Construction'[17] and have been utilised to determine the sensitivity of the area and consider the risk of fugitive emissions as a result of construction activities.

A3-1 and A3-2 illustrate how the sensitivity of the area may be determined for dust soiling and human health, respectively. It should be noted that the highest level of sensitivity from each table should be considered, as recommended by the IAQM.

Table A3-1 Sensitivity of the Area to Dust Soiling Effects on People and Property

Receptor Sensitivity	Number of Receptors	Distance from Source (m)			
		<20	<50	<100	<350
High	>100	High	High	Medium	Low
	10 – 100	High	Medium	Low	Low
	1 – 10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

Table A3-2 Sensitivity of the Area to Human Health Effects

Receptor Sensitivity	Annual Mean PM_{10} Concentration	Number of Receptors	Distance from the Source (m)				
			<20	<50	<100	<200	<350
High	>32µg/m^3	>100	High	High	High	Medium	Low
		10 – 100	High	High	Medium	Low	Low
		1 – 10	High	Medium	Low	Low	Low
	28 – 32µg/m^3	>100	High	High	Medium	Low	Low
		10 – 100	High	Medium	Low	Low	Low
		1 – 10	High	Medium	Low	Low	Low
	24 – 28µg/m^3	>100	High	Medium	Low	Low	Low
		10 – 100	High	Medium	Low	Low	Low
		1 – 10	Medium	Low	Low	Low	Low
	<24µg/m^3	>100	Medium	Low	Low	Low	Low
		10 – 100	Low	Low	Low	Low	Low

		1 – 10	Low	Low	Low	Low	Low
Medium	>32µg/m^3	>10	High	Medium	Low	Low	Low
		1 – 10	Medium	Low	Low	Low	Low
	28 – 32µg/m^3	>10	Medium	Low	Low	Low	Low
		1 – 10	Low	Low	Low	Low	Low
	24 – 28µg/m^3	>10	Low	Low	Low	Low	Low
		1 – 10	Low	Low	Low	Low	Low
	<24µg/m^3	>10	Low	Low	Low	Low	Low
		1 – 10	Low	Low	Low	Low	Low
Low	-	1	Low	Low	Low	Low	Low

Table A3-3 and Table A3-4 illustrate how the dust emission magnitude should be combined with the sensitivity of the area to determine the risk of impacts with no mitigation measures applied.

Table A3-3 Risk of Dust Impacts – Construction

Sensitivity of Area	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

Table A3-4 Risk of Dust Impacts – Trackout

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

Appendix 4 – Road Traffic Model Input Data

A4.1 Model Input Parameters

Table 14 Model Input Parameters

Parameter	Description	Input Variable
Surface Roughness	Surface roughness of the modelling domain as a function of land use	A roughness length z_0 of 0.5m was used within the assessment area of this dispersion modelling study. This value is for 'parkland, open suburbia' and therefore considered appropriate for the surface roughness of the dispersion modelling assessment area. For the meteorological site, a roughness length z_0 of 0.3m was used due to the more rural location of Manchester Airport
Road Source Emissions	Source of the emission factors used	EFT v.10.1
Emission Year	Modelling year used to factor the traffic emissions	2019 Verification year and future year traffic with 2019 as case sensitivity
NO_x to NO_2 Conversion	Conversion from NO_x concentrations to NO_2 concentrations	NO_x to NO_2 calculator v8.1. General inputs: 2019, Manchester District, All other urban UK traffic
Road Type	Road type within the EFT emission database	England (urban)
Elevation of Road	Height of the road link above ground level	0m no elevation – roads are at ground level
Road Width	Width of the road link	Road width obtained from Google Street View
Road Speed	Road speed in km/h	Variable based on posted limit and adjustment for road geometry in line with LAQM.TG(16)
Time Varied Emissions	Daily, weekly or monthly variations in emissions applied to road sources	None applied.
Meteorology	Representative hourly sequential meteorological data	Manchester Airport 2019
Background	Background pollutant concentration considered during the modelling	Defra background concentrations for verification grid square x 385500, y 399500 and x 386500, y 397500 and x 387500, y 396500

Output	Output as gridded or specified points	At specified points as detailed in Table 2
Pollutant Output	Pollutants modelled and averaging time	NO_2 and PM_{10} annual mean, derived 1-hour mean NO_2 and 24-hour mean PM_{10}.

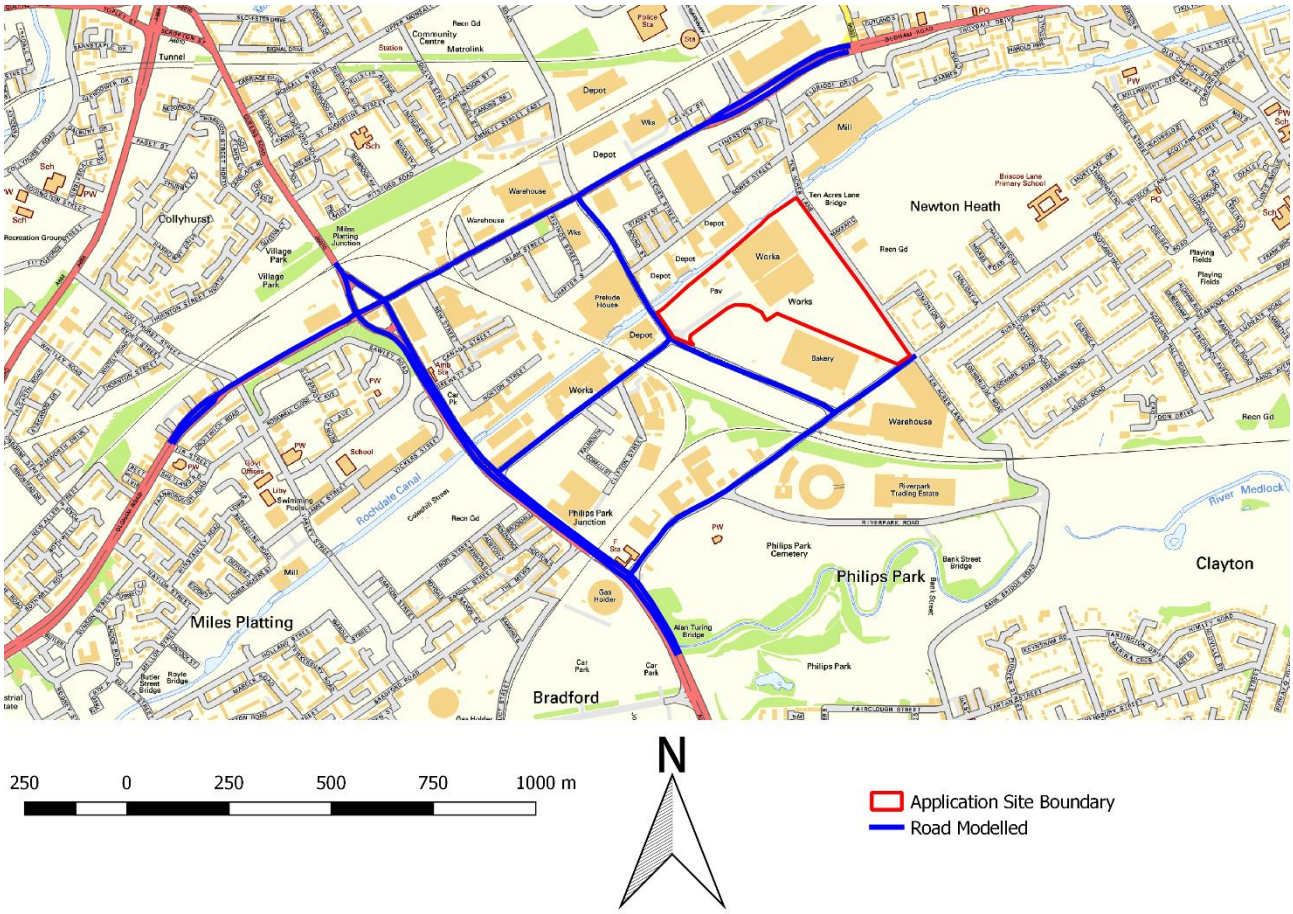

Figure 6 Roads Modelled. Contains Ordnance Survey data © Crown copyright and database right 2021

Table 15 Summary of Traffic Data used in the Assessment

Road Name	AADT				HDV %			Speed (km/h)
	2019	2022 DM	2022 DS (B8 Use)	2022 DS (E(g)/B2 Use)	2019	2022 (B8)	2022 (E(g)/B2)	
Rochdale Road*	13797	-	-	-	3.8%	-	-	48
Grimshaw Lane (north of access)	-	7819	8106	8948	-	11.5 %	5.4%	32
Grimshaw Lane (south of access)	-	8074	8093	8148	-	3.7%	3.4%	32
Lord North Street	-	5536	5572	5676	-	3.9%	3.8%	32
Briscoe Lane (north of Grimshaw Lane)	-	19992	20011	20066	-	5.0%	4.8%	32
Briscoe Lane (south of Grimshaw Lane)	-	0	0	0	-	0.0%	0.0%	32
Hulme Hall Lane (south of Briscoe Lane)	-	22223	22258	22363	-	7.7%	7.5%	32
Hulme Hall Lane (north of Briscoe Lane)	-	20391	20427	20531	-	6.7%	6.4%	48
Hulme Hall Lane (north of Lord North Street)	-	17907	17907	17907	-	7.1%	6.8%	48
Hulme Hall Lane NB		8586	8586	8586	-	7.7%	7.5%	48
Hulme Hall Lane SB	-	9950	9950	9950	-	8.4%	8.2%	48
Queens Road NB	-	9198	9198	9198	-	7.1%	6.8%	48
Queens Road SB	-	10439	10439	10439	-	9.2%	8.9%	48
Oldham Road (south of Hulme Hall Lane)	-	23173	23191	23244	-	8.2%	7.95	48
Oldham Road (north of Hulme Hall Lane)	-	24082	24100	24153	-	7.4%	7.1%	48
Oldham Road (north of Grimshaw Lane)	-	24847	25062	25694	-	9.9%	8.2%	48
Monsall Road	-	8120	8174	8332	-	2.3%	2.2%	48
Carisbrook Street	-	6587	6404	6799	-	3.6%	3.5%	48
	Department for Transport Traffic Data							
A6010 Pottery Lane*	26652	-	-		3.7%	-		48
Ashton Old Road*	27155	-	-		4.4%	-		48
	Notes *- road links used for verification purposes only							

A4.2 Verification

The verification process seeks to minimise uncertainties associated with the air quality model by comparing the model output with locally measured concentrations. The verification methodology is described in subsequent sections.

A4.3 Background Concentrations

Background concentrations at the monitoring sites in the verification year (2019) have been assumed to be the same as those published by Defra and are shown in Table 16.

Table 16 Defra Background Concentrations (µg/m^3)

Grid Square	NOx	NO_2
X 385500, Y 399500	30.3	20.8
X 386500 Y 397500	28.3	19.6
X 387500 Y 396500	26.5	18.6

Background concentrations for existing receptors have assumed to be the same as those published by Defra and are shown in Table 17.

Table 17 Defra Annual Mean Background Concentrations at Existing Receptors (µg/m^3)

Grid Square	NOx	NO_2	PM_{10}	$PM_{2.5}$
X 386500, Y 399500	31.8	21.5	12.6	8.3
X 386500, Y 400500	27.3	19.1	12.4	8.2
X 387500, Y 400500	27.3	23.1	12.5	8.4

A4.4 NO2

Most NO_2 is produced in the atmosphere by reaction of nitric oxide (NO) with ozone. It is therefore most appropriate to verify the model in terms of primary pollutant emissions of nitrogen oxides (NOx = NO + NO_2). The model has been run to predict the 2019 annual mean NO_x concentrations at the monitoring sites MA36NO, MA95BNO and MA86ANO.

The model output of road-NO_x has been compared with the 'measured' road-NO_x, calculated from the measured annual mean NO_2 concentrations and the background concentrations using the NO_x from NO_2 calculator v8.1 published by Defra.

The slope of the best-fit line between the 'measured' road-NO_x contribution and the model derived road-NO_x contribution, forced through zero, has been used to determine a primary adjustment factor). This factor has then been applied to the modelled road-NO_x concentration for each receptor to provide adjusted modelled road-NO_x concentrations. The NO_x to NO_2 calculator has then been used to determine total NO_2 concentrations from the adjusted modelled road-NOx concentrations and the background NO_2 concentrations. A secondary adjustment factor has then been calculated as the slope of the best-fit line between the measured NO_2 concentrations and the primary adjusted total NO_2 concentrations, forced through zero.

The following primary and secondary adjustment factors have been applied to all modelled nitrogen dioxide data:

Primary verification factor: 2.7662

The results imply that the model has both under and over-predicted the road-NO_x contribution. This is a common experience with this and most other models.

Table 18 includes the adjustment undertaken for NO_2 and also compares secondary adjusted total NO_2 at each of the monitoring sites, to measured NO_2, and shows a 1:1 relationship. Table 18 provides the inputs for the comparison of modelled road NO_x and monitored road NO_x, which are used to calculate the primary adjustment factor.

Table 18 Comparison of Modelled and Monitored NO_2 Concentrations.

Monitoring Location	Modelled NOx Road Contribution (µg/m³)	Monitored NOx Road Contribution (µg/m³)	Adjusted Modelled NOx Road Contribution (µg/m³)	Monitored Total NO_2 Concentration (µg/m³)	Adjusted Modelled Total NO_2 Concentration (µg/m³)	Difference (%)
MA36NO	8.0	21.5	22.1	31.7	32.0	0.9
MA95BNO	18.3	49.7	50.8	43.4	43.9	1.1
MA86ANO	9.9	29.9	27.4	33.6	32.4	-3.4
Adjustment Factor	2.7662					

In accordance with LAQM.TG(16), the ratio of 'Monitored Road Contribution' to 'Modelled Road Contribution NO_x' has been calculated and reviewed.

As stated in LAQM.TG(16), a graph of modelled versus calculated road NO_x contributions has been prepared, including a trend line which presents the following requirements:

"The equation of the trend line should be in the format of

y = mx (intercept at 0)

y is monitored road contribution NO_x and

x is modelled road contribution NO_x

m is the regression correction factor to apply to the modelled road contribution NO_x."

Reference should be made to Figure 7 for the relevant graph and trend line.

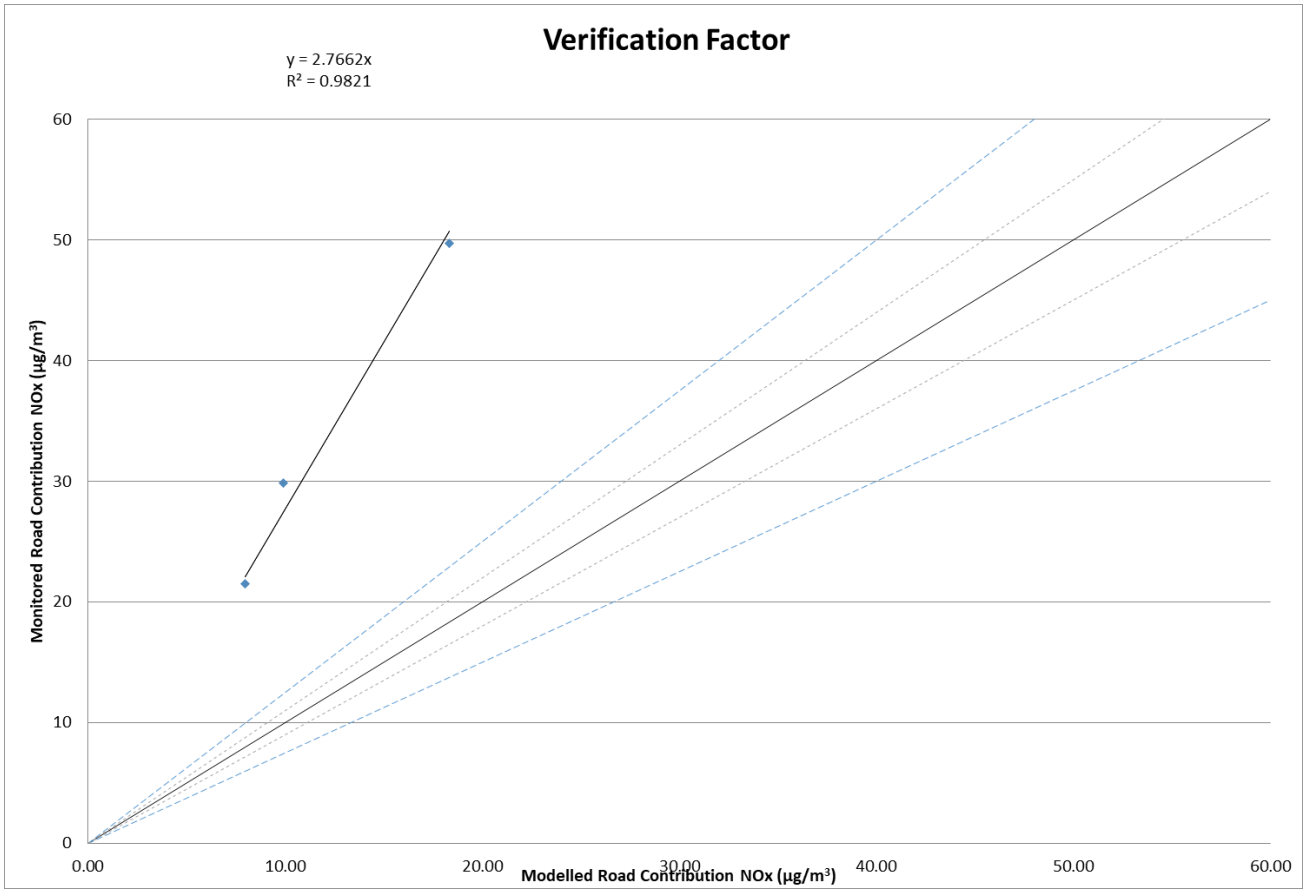

Figure 7 Comparison of Monitored to Modelled Road Contribution NOx

In accordance with LAQM.TG(16), this factor has been applied to predicted PM_{10} and $PM_{2.5}$ concentrations.

A4.5 Model Performance

An evaluation of model performance has been undertaken to establish confidence levels in model results. LAQM.TG(16) identifies a number of statistical procedures that are appropriate to evaluate model performance and assess uncertainty. The statistical parameters used in this assessment are:

- Root mean square error (RMSE); and
- Fractional bias (FB).

A brief for explanation of each statistic is provided in Table 19 and further details can be found in LAQM.TG(16).

Table 19 Model Performance Parameters

Parameter	Comments	Value
Root Mean Square Error	RMSE is used to define the average error or uncertainty of the model. The units of RMSE are the same as the quantities compared	0.74

	If the RMSE values are higher than ±25% of the objective being assessed, it is recommended that the model inputs and verification should be revisited in order to make improvements. For example, if the model predictions are for the annual mean NO_2 objective of 40μg/m^3, if an RMSE of 10μg/m^3 or above is determined for a model, the local authority would be advised to revisit the model parameters and model verification. Ideally an RMSE within 10% of the air quality objective would be derived, which equates to 4μg/m^3 for the annual average NO_2 AQO.	
Fractional Bias	It is used to identify if the model shows a systematic tendency to over or under predict. FB values vary between +2 and -2 and has an ideal value of zero. Negative values suggest a model over-prediction and positive values suggest a model under-prediction.	0.004

Appendix 5 – Operational Phase Road Traffic Impacts.

As the proposals are for flexible E(g)/B2/B8 use which have different associated trip generations, the impacts of the emissions associated with the Proposed Development traffic for the E(g)/B2 use have also been assessed and the results provided in the subsequent sections.

Road Traffic Impacts - NO_2

Predicted annual mean NO_2 concentrations were assessed against the AQO of 40 µg/m^3 at locations of relevant exposure to the annual mean AQO e.g. residential properties. In addition, locations of relevant exposure to the short term AQO have also been included and assessed against the AQO of 200 µg/m^3. Table 20 shows the predicted impact of the Proposed Development traffic associated with the E(g)/B2 use on NO_2 concentrations. Full details of the existing receptors are provided in Table 2 and shown in Figure 2.

Table 20 Predicted Annual Mean NO_2 Concentrations in the Proposed Opening Year 2022 for E(g)/B2 Use

Receptor	Receptor Type	DM Concentration (µg/m^3)	DS Concentration (µg/m^3)	Change (µg/m^3)	Change Expressed as % AQO	DS Total as a % of AQO	Impact Descriptor
ER1	LT	36.8	39.2	2.4	6.1%	98.1%	Moderate
ER2	LT	32.9	35.1	2.2	5.5%	87.8%	Slight
ER3	ST	29.3	30.5	1.2	0.6%	15.2%	Negligible
ER4	ST	38.2	39.0	0.8	0.4%	19.5%	Negligible
ER5	LT	53.1	53.7	0.5	1.4%	134.2%	Moderate
ER6	LT	23.3	23.4	0.2	0.4%	58.5%	Negligible
ER7	ST	34.7	34.9	0.2	0.1%	17.5%	Negligible
ER8*	LT	38.4	38.5	0.1	0.3%	96.2%	Negligible
ER9	LT	39.8	39.7	-0.1	-0.2%	99.3%	Negligible
ER10	LT	28.0	28.0	<0.1	-0.1%	69.9%	Negligible
ER11	LT	56.1	56.2	0.1	0.2%	140.4%	Negligible

Notes
*- Potential residential use at first floor
LT = Long term
ST = Short term

As shown in Table 20 there are no new exceedances of the annual mean NO_2 AQO at existing receptors.

The maximum predicted change in annual mean NO_2 concentrations associated with the DS scenario at existing receptors is 2.4 µg/m^3, which represents 6.1% of the annual mean AQO at ER1, a residential receptor located on Grimshaw Lane. The DS annual mean concentration at this receptor is 39.2 µg/m^3. In accordance with the EPUK and IAQM guidance, the impact at this receptor is considered to be 'moderate adverse'. This receptor represents a worst-case impact from the road traffic associated with the operation of the Proposed Development. A 'moderate adverse' impact has also been predicted at ER5.

A 'slight adverse' impact has been predicted as ER2, a residential receptor along Grimshaw Lane, in accordance with the EPUK and IAQM guidance.

A 'negligible beneficial' impact has been predicted at ER9 and ER10, in accordance with the EPUK and IAQM guidance.

The impact at all other existing receptors is predicted to be 'negligible' in accordance with the EPUK and IAQM guidance.

The impacts on existing receptors range from 'negligible beneficial' to 'moderate adverse' in the vicinity of the Proposed Development prior to the implementation of mitigation measures for the E(g)/B2 use. As such, the overall significance of the operational phase of road traffic emission impacts on annual mean NO_2 concentrations has been determined to be significant without any mitigation in line with the EPUK and IAQM guidance.

Based on the results of the dispersion modelling presented in Table 20, there are no existing receptor locations where the predicted annual mean concentration exceeds the annual mean NO_2 indicative concentration of 60 µg/m^3 used to inform compliance with the short term AQO.

Road Traffic Impacts – PM_{10}

Predicted annual mean PM_{10} concentrations were assessed against the PM_{10} AQO of 40 µg/m^3 at locations of relevant exposure. Table 11 shows the predicted impact of the Proposed Development traffic on PM_{10} concentrations. As a more conservative assessment, the $PM_{2.5.}$ AQO of 25 µg/m^3 has also been considered accordance with the EPUK and IAQM guidance. Full details of existing receptors are provided in Table 2 and shown in Figure 2.

Table 21 Predicted Annual Mean PM_{10} Concentrations in the Proposed Opening Year 2022

Receptor	Receptor Type	DM Concentration (µg/m^3)	DS Concentration (µg/m^3)	Change (µg/m^3)	Difference Expressed as % AQO	DS Total as a % of AQO	DS Exceedance of $PM_{2.5}$ AQO?	Impact Descriptor
ER1	LT	15.2	15.8	0.7	1.7%	39.6%	NO	Negligible
ER2	LT	14.7	15.3	0.6	1.5%	38.2%	NO	Negligible
ER3	ST	14.0	14.4	0.3	0.9%	35.9%	NO	Negligible
ER4	ST	15.4	15.8	0.4	1.0%	39.5%	NO	Negligible
ER5	LT	18.3	18.9	0.6	1.5%	47.2%	NO	Negligible
ER6	LT	13.1	13.1	0.1	0.2%	32.9%	NO	Negligible
ER7	ST	15.3	15.6	0.3	0.7%	39.0%	NO	Negligible
ER8	LT	15.3	15.6	0.3	0.6%	39.0%	NO	Negligible
ER9	LT	16.2	16.5	0.3	0.7%	41.2%	NO	Negligible
ER10	LT	13.7	13.8	0.1	0.2%	34.5%	NO	Negligible
ER11	LT	18.3	18.8	0.5	1.3%	47.1%	NO	Negligible

Notes
LT = Long term
ST = Short term

As shown in Table 21 a maximum total DS scenario PM_{10} concentration of 18.9 µg/m^3 has been predicted ER5. A maximum predicted change in annual mean PM_{10} concentrations associated with the additional development trips is 0.7 µg/m^3 predicted at ER1, representing 1.7% of the annual mean AQO. Considering the maximum total DS scenario annual mean concentration of 18.9 µg/m^3 as predicted at ER5, representing 47.2% of the AQO, the impact following the EPUK and IAQM guidance can be considered 'negligible'.

There has also been no exceedances of the more stringent $PM_{2.5}$ annual mean AQO at all existing receptors.

At all existing receptors considered, the magnitude of impact is considered to be 'negligible'. As such, the overall significance of the operational phase of road traffic emission impacts on annual mean PM_{10} concentrations has been determined to be not significant in line with the EPUK and IAQM guidance.

Based upon the maximum predicted annual mean PM_{10} concentration of 18.9 µg/m^3 modelled at receptor ER5, this equates to 2 days where 24-hour mean PM_{10} concentrations are greater than 50 µg/m^3. A total of 35 24-hour periods where concentrations are in excess of 50µg/m^3 are permitted and, therefore, the number of maximum exceedances are in compliance with the 24-hour mean AQO.

Road Traffic Impacts - $PM_{2.5}$

Predicted annual mean $PM_{2.5}$ concentrations were assessed against the $PM_{2.5}$ AQO of 25 µg/m^3 at locations of relevant exposure. Table 12 shows the predicted impact of the Proposed Development traffic on $PM_{2.5}$ concentrations. Full details of the existing receptors are provided in Table 2 and shown in Figure 2.

Table 22 Predicted Annual Mean $PM_{2.5}$ Concentrations in the Proposed Opening Year 2022

Receptor	DM Concentration (µg/m^3)	DS Concentration (µg/m^3)	Change (µg/m^3)	Difference Expressed as % AQO	DS Total as a % of AQO	Impact Descriptor
ER1	9.9	10.3	0.4	1.6%	41.2%	Negligible
ER2	9.2	9.6	0.3	1.4%	38.3%	Negligible
ER3	8.9	9.1	0.2	0.8%	36.2%	Negligible
ER4	9.7	9.9	0.2	0.9%	39.6%	Negligible
ER5	11.4	11.7	0.4	1.5%	46.9%	Negligible
ER6	8.4	8.4	<0.1	0.1%	33.7%	Negligible
ER7	9.6	9.8	0.2	0.7%	39.0%	Negligible
ER8	10.0	10.2	0.2	0.6%	40.6%	Negligible
ER9	10.5	10.7	0.2	0.7%	42.6%	Negligible
ER10	9.0	9.1	0.1	0.2%	36.4%	Negligible
ER11	11.9	12.2	0.3	1.3%	49.0%	Negligible

A maximum $PM_{2.5}$ concentration of 12.2 µg/m^3 has been predicted at ER11. A maximum predicted change in annual mean $PM_{2.5}$ concentrations associated with additional development trips is 0.4 µg/m^3, representing 1.6 % of the AQO, as predicted at ER1. Considering a total 'DS' annual mean concentration of 12.2 µg/m^3 representing 49% of the AQO at ER11, the impact following the EPUK and IAQM guidance can be considered as 'negligible'.

The maximum predicted impact at existing receptors is 0.4 µg/m^3 which represents 1.6% of the AQO. Considering the total DS scenario annual mean concentration is 10.4 µg/m^3 which represents 41.2% of the annual mean AQO, the impact can therefore be classified as 'negligible' according to the EPUK and IAQM criteria.

At all existing receptors considered, the magnitude of impact is predicted to be negligible. As such, the overall significance of operational phase road traffic emission impacts on annual mean $PM_{2.5}$ was determined to be not significant in line with EPUK and IAQM guidance[16].

Appendix 6 - Professional Experience.

Kathryn Woolley (Hoare Lea), BSc (Hons), AMIEnvSc, MIAQM

Kathryn is a Principal Air Quality Consultant with Hoare Lea. She's is an associate Member of the Institution of Environmental Sciences and a Full Member of the Institute of Air Quality Management.

She has a diverse portfolio of experience and has worked on a range of projects from initial site feasibility, through planning and development to construction and operation. Kathryn's expertise covers planning, and air quality, specifically in relation to residential developments, industrial fixed installations such as district heating networks. Kathryn has completed over 30 EIA in the past 6 years throughout the UK and abroad including; St Johns Masterplan in Manchester (residential led), Leicester City Football club training facility north of Leister (sports use), 1-5 Grosvenor Place, Westminster (mixed use residential, retail and hotel site), and Chestnut Avenue in Eastleigh (residential and community use).

Andy Day (Hoare Lea), BSc (Hons), MSc, AMIEnvSc, AMIAQM

Andy is a Senior Air Quality Consultant with Hoare Lea. He is an Associate Member of the Institute of Environmental Sciences and an Associate Member of the Institute of Air Quality Management. He is a chemistry graduate with a Master's specialising in the catalysed removal of harmful volatile organic compounds (VOCs) often generated from the combustion of fuel in car engines.

Andy has worked on a range of projects of varying size across a number of different sectors. His experience focusses on work up to and through planning for air quality assessments and environmental impact assessments. Andy also has experience in detailed dispersion modelling of road traffic and energy combustion plant, emission mitigation statements, damage cost calculations, indoor and outdoor air quality monitoring and assessing the air quality impact at ecologically sensitive sites.

Andy has a particular interest in reducing emissions for the benefit of human health and the environment through the life cycle of a building.

Benny Pygott (Hoare Lea), BSc (Hons), MSc (Hons), AMIEnvSc, AMIAQM

Benny is a Graduate Air Quality Consultant with Hoare Lea. He is a Physical Geography Graduate with an MSc in Pollution and Environmental Control from the University of Manchester. Benny has worked on a range of projects across a number of industries including residential, educational, commercial and industrial developments from initial site suitability, master planning and operational phase impacts of new developments. Benny has experience in atmospheric dispersion modelling including plant emission impacts and road traffic impacts. Benny has also undertaken a number of air quality monitoring surveys.

Benny has also worked as part of an EIA team looking at air quality impacts of HDV movements during the construction phases. His interests lie in pollution mitigation, air pollution control and sustainable travel.

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