Weston Halls and Pendulum Hotel

Air Quality Assessment

12873.2001

9th December 2025

Revision E

ANC ACOUSTICS & NOISE CONSULTANTS

Institute of Acoustics sponsoring organisation

Weston Halls and Pendulum Hotel

Air Quality Assessment

12873.2001E

Revision	Description	Issued by	Date
A	First issue	CP	4th Nov 2025
B	Combining Assessment and Modelling Addendum	CP	19th Nov 2025
C	Updates from comments	CP	28th Nov 2025
D	Updated Red Line boundary and comments	CP	9th Dec 2025
E	Development description amended	CP	9th Dec 2025

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2 Summary

2.1 This report has been prepared in support of a planning application for a purpose built student accommodation development at the site of the existing Weston Halls and Pendulum Hotel, Sackville Street, Manchester.

2.2 The development consists of a total of 2,511 student bedrooms and associated amenity and ancillary spaces. The site will be developed in two phases, Phase A and Phase B.

2.3 An Air Quality Assessment is required to ensure that the proposed development will not result in the exposure of future occupants to poor air quality, nor cause adverse impacts on existing sensitive locations during the construction phase. The assessment will establish baseline air quality conditions at the site, evaluate the suitability of the location for the proposed end-use, and assess any potential impacts arising from the development.

2.4 Potential air quality impacts during the construction phase, arising from fugitive dust emissions associated with demolition, earthworks, construction, and trackout activities, have been assessed. Appropriate mitigation measures have been identified and are recommended for inclusion in a Construction Environmental Management Plan (CEMP), or where necessary, a dedicated Dust Management Plan (DMP). The implementation of these good practice control measures is expected to effectively minimise dust emissions and ensure that air quality impacts are controlled to an acceptable level throughout the construction period.

2.5 During the operational phase of the development, the assessment has determined that traffic exhaust emissions associated with vehicle movements generated by future occupants would result in a **negligible impact** on local air quality.

2.6 Based on the assessment results, air quality is not considered to pose a constraint to granting planning consent for the development.

3 Introduction

3.1 **Background**

3.2 This report has been prepared to accompany a planning application for a purpose built student accommodation development is proposed at the existing Weston Halls and Pendulum Hotel site, Sackville Street, Manchester. The development consists of a total of 2,511 bedrooms, amenity spaces and ancillary spaces, along with landscaped external areas.

3.3 An air quality assessment is necessary to ensure that the development does not expose future occupants to poor air quality or cause adverse impacts to existing sensitive location during both construction and operational phases. This assessment will:

- Establish baseline air quality conditions at and around the site by reviewing existing monitoring data and conducting site-specific measurements or modelling if required.
- Evaluate the suitability of the site location for the proposed end use, considering factors such as proximity to pollution sources (e.g., busy roads, industrial sites) and local air quality standards.
- Assess potential air quality impacts during construction, including emissions from machinery, dust generation, and traffic movements, and identify mitigation measures to minimise adverse effects.
- Assess potential operational phase impacts, primarily from increased traffic emissions and other relevant pollutant sources associated with the development.
- Provide recommendations for mitigation measures or design considerations to ensure that any impacts are reduced to acceptable levels, thereby protecting the health and wellbeing of future occupants and nearby sensitive location.

3.4 The assessment will be carried out in accordance with relevant national and local policies and guidance, such as the National Planning Policy Framework (NPPF), Environment Act requirements, and local air quality management strategies.

3.5 **Site Location and Context**

3.6 The site is located in the south of Manchester City Centre, approximately 350m south-west of Manchester Piccadilly Station, at approximate National Grid Reference (NGR): 384464, 397519. Reference should be made to Figure 1 for a map of the site and surrounding area.

3.7 Phase A involves:

- “Partial removal of existing structures and erection of two buildings comprising purpose-built student accommodation (sui generis), one of 50 storeys and one of 17 storeys with an 8-storey link, together with associated amenity space, external landscaping, highways

works, and change of use of the Pendulum Hotel to purpose-built student accommodation"; and

3.8 Phase B involves:

- "Removal of remaining existing structures and erection of two buildings comprising purpose-built student accommodation (sui generis), one of 33 storeys and one of part-24 and part-8 storeys with a 1-storey link, together with associated amenity space, external landscaping, and highways works"

3.9 The site is bounded by Charles Street to the north, Sackville Street to the east, an existing raised terrace associated with university buildings to the south, and a hotel and university car park to the east.

3.10 The future occupants may increase exposure to any pre-existing air quality issues at the site, as the site is located within an AQMA. To address these concerns, an Air Quality Assessment has been undertaken to establish baseline conditions and evaluate potential impacts arising from the proposed development. The findings are presented in the following report.

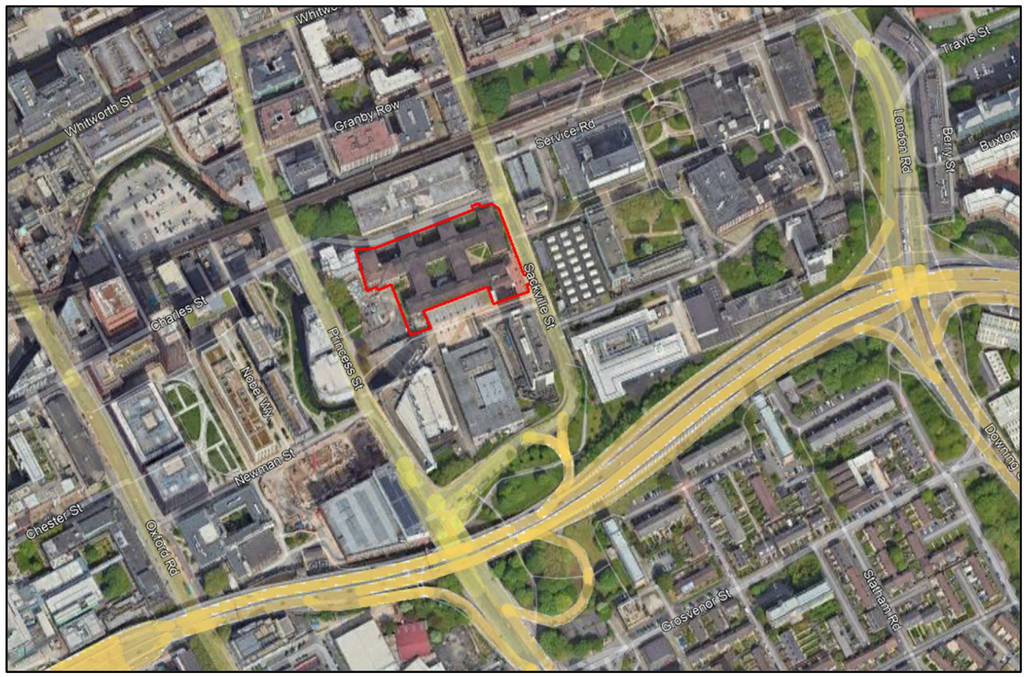


Figure 1: Site Location Plan (Site Boundary In Red)

4 Legislation and Policy

4.1 **Legislation and Guidance**

4.2 The air quality assessment has been undertaken in accordance with the following legislation and guidance, further details of which can be found in Appendix A:

- The Air Quality Standards Regulations 2010;
- Institute of Air Quality Management (IAQM) Guidance on the Assessment of Dust from Demolition and Construction, January 2024;
- Environmental Protection UK (EPUK) & Institute of Air Quality Management (IAQM) Land-Use Planning & Development Control: Planning for Air Quality, January 2017;
- The Environment Act 2021;
- Ministry of Housing, Communities and Local Government, National Planning Policy Framework, December 2023;
- Department for Communities and Local Government, Planning Practice Guidance, November 2023;
- Department for Environment, Food and Rural Affairs (DEFRA), Local Air Quality Management Technical Guidance LAQM.TG (22), August 2022;
- Department of Environment, Food and Rural Affairs, The Air Quality Strategy for England, April 2023;
- Manchester City Council, Air Quality & Planning Technical Guidance, August 2022;
- Manchester City Council, Manchester Core Strategy 2012-2027, July 2012;
- Clean Air Greater Manchester, Greater Manchester Clean Air Plan, January 2021.

4.3 **Assessment Criteria**

4.4 Table 1 presents the Air Quality Objectives (AQOs) and Interim Target for pollutants considered within this assessment.

Pollutant	Air Quality Objective/Interim Target/Concentration Target	
	Concentration (µg/m³)	Averaging Period
NO_2	40	Annual mean
	200	1-hour mean, not to be exceeded on more than 18 occasions per annum
PM_{10}	40	Annual mean
	50	24-hour mean, not to be exceeded on more than 35 occasions per annum
$PM_{2.5}$	12	Annual mean, Interim Target to be achieved by end of 2028
	10	Annual mean, Concentration Target to be achieved by 2040

Table 1: Air Quality Objectives/Interim Target

5 Methodology

5.1 Construction Phase Assessment

5.2 To assess the impacts associated with dust and fine particulate matter released during construction activities, the IAQM guidance, has been followed. Further details of the assessment, and the criteria to assess the impact, are provided in Appendix B of this report.

5.3 The closest sensitive locations to where construction activities would occur are detailed in Table 2.

Sensitive Location	Sensitivity	Direction from Site	Distance from Site Boundary
Existing Student Residential	High	N/A	On Phase B Site
Existing Nursery	High	N/A	On Phase B Site
Ibis Hotel	Medium	West	Adjacent
Princess Street Residential Buildings	High	West	Approximately 42m at closest point
Granby Road Residential Buildings	High	North	Approximately 65m at closest point
Paper Science (University of Manchester)	Low	East	Approximately 14m at closest point
Pariser Building (University of Manchester)	Low	East	Approximately 14m at closest point
Manchester Interdisciplinary Biocentre (under construction) (University of Manchester)	Low	South	Approximately 6m at closest point
George Begg Building (University of Manchester)	Low	South	Approximately 24m at closest point
Faraday Tower (University of Manchester)	Low	South	Approximately 20m at closest point
Faraday Building (University of Manchester)	Low	South-east	Approximately 50m at closest point

Table 2: Existing Sensitive Locations Considered in the Construction Phase Assessment

5.4 Operational Phase Assessment

5.5 Vehicle movements associated with the operation of the proposal will generate exhaust emissions on the local and regional road networks.

5.6 To assess the impacts associated with exhaust emissions the air dispersion model ADMS-Roads (CERC, Version 5.0.1) has been used. Pollutant concentrations have been predicted at both existing and proposed sensitive receptors subject to a change in traffic flows as a result of the proposed development.

5.7 The following scenarios have been modelled:

- 2023 base year and verification
- Opening year (2028) – earliest possible occupation date.

5.8 Based on the information provided, demolition, site preparation, and construction of the Proposed Development are expected to commence in 2027. Phase A construction is scheduled to be completed in time for the 2031/32 academic year, while Phase B is anticipated to begin in 2031, with completion and opening planned for the 2034/35 academic year. Therefore, the modelling represents a worst-case scenario, as local air quality is expected to improve over time.

5.9 NO_2, PM_{10} and $PM_{2.5}$ concentrations have been predicted at the sensitive receptor and the details are provided in Appendix C.

6 Baseline

6.1 Existing air quality conditions in the vicinity of the proposed development site have been identified in order to provide a baseline for assessment. These are detailed in the following Sections.

6.2 **Local Air Quality Management**

6.3 In compliance with the Environment Act 2021, MCC has conducted a Review and Assessment of air quality within its jurisdiction. This process found exceedances in the NO_2 annual mean and the PM_{10} 24-hour mean, and an Air Quality Management Areas (AQMAs) was declared in 2001. This was amended in 2007 and amalgamated into the Greater Manchester Combined Authority AQMA in 2016.

6.4 **Air Quality Monitoring**

6.5 Monitoring of pollutant concentrations is undertaken by MCC throughout their area of jurisdiction. The most recent results available publicly, recorded in the vicinity of the development, are shown in Table 3, with their locations shown on Figure 2.

Monitoring Site	Monitored NO_2 Concentration (µg/m^3)			
ID	2021	2022	2023	2024
MA72NO	27.5	26.3	24.3	24.0

Table 3: Monitoring Results

6.6 As shown in Table 3, annual mean NO_2 concentrations are below the relevant AQO at the nearest monitor to the proposed development. MA72NO is the closest and most representative of site conditions as it is a similar distance from the road network, including the A57(M) Mancunian Way. Pollutant concentrations are expected to be similar in this location.

6.7 It is important to note that monitoring data from 2020, 2021, and 2022 were collected during the COVID-19 pandemic, a period characterized by reduced traffic and industrial activity. Therefore, air pollutant concentrations recorded in 2023 onwards are considered to provide a more realistic representation of typical current conditions.

6.8 MCC do not undertake PM_{10} or $PM_{2.5}$ monitoring within the vicinity of the site.

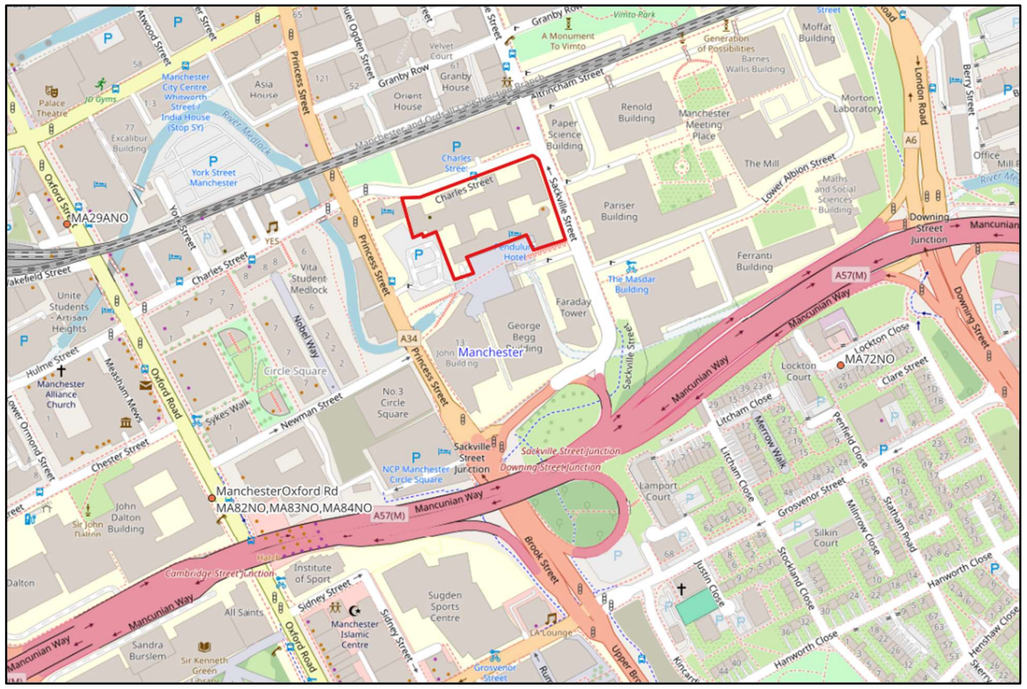


Figure 2: Monitoring Locations

6.9 **Background Pollutant Concentrations**

6.10 Predictions of background pollutant concentrations on a 1 km by 1 km grid basis have been produced by DEFRA to support local authorities in their Review and Assessment of air quality across the UK. The proposed development site is located within grid square: 384500, 397500. Relevant data for this location was obtained from the DEFRA website [4] and is summarised in Table 4 for the purposes of this assessment.

Pollutant	Predicted Background Concentration (µg/m^3)
	2024
NO_2	22.5
PM_{10}	15.1
$PM_{2.5}$	8.1

Table 4: Background Pollutant Concentrations

6.11 As shown in Table 4, predicted background NO_2, PM_{10} and $PM_{2.5}$ concentrations are below the relevant AQOs at the development site.

7 Assessment

7.1 **Introduction**

7.2 There is the potential for air quality impacts as a result of the construction and operation of the proposed development. These are assessed in the following Sections.

7.3 **Construction Phase Fugitive Dust Emissions**

7.4 **Step 1 - Screening the Need for a Detailed Assessment**

7.5 The purpose of this step is to determine if there are any sensitive human or ecological locations close enough to the proposed development to potentially be impacted by dust emissions, which would then require a more detailed assessment.

7.6 An assessment would normally be required if:

7.7 A human receptor is located within:

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

7.8 An ecological receptor is located within:

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

7.9 If no locations are present within these distance criteria, the risk is considered Negligible, and no further detailed assessment is required. If locations are present, the assessment proceeds to Step 2.

7.10 **Step 2- Assess the Risk of Dust Impacts**

7.11 In accordance with the IAQM guidance, the main activities to be considered during the construction phase of the proposed development are demolition, earthworks, construction and trackout.

7.12 Demolition involves the removal of existing structures. Earthworks encompass soil stripping, ground levelling, excavation, and landscaping activities. Construction works will focus on the development of proposed buildings and associated car parking areas.

7.13 Trackout refers to the transfer of dust and dirt from the construction site onto public roads by vehicles. This can occur through spillage of dusty materials onto road surfaces or by vehicles carrying mud and dirt from site onto roads. Deposited dust and dirt may subsequently be resuspended by passing traffic, contributing to local air quality impacts.

7.14 **Step 2A - Define the Potential Dust Emission Magnitude**

7.15 Step 2A of the assessment defines the potential dust emission magnitude from demolition, earthworks, construction and trackout in the absence of site-specific mitigation.

7.16 Examples of the criteria for the dust emission classes are detailed in Appendix B. The results of this step are detailed in Table 5.

	Activity			
	Demolition	**Earthworks**	**Construction**	**Trackout**
Dust Emission Magnitude	Medium [a]	Small [b]	Large [c]	Medium [d]

a. Total building volume 12,000 – 75,000m³
b. Total site area estimated <18,000m²
c. Total building volume > 75,000m³
d. Number of construction phase vehicles estimated to be between 20 and 50 HDV outward movements per day

Table 5: Dust Emission Magnitude Classifications

7.17 **Step 2B - Define the Sensitivity of the Area**

7.18 Step 2B of the construction phase dust assessment defines the sensitivity of the area, taking into account the significance criteria detailed in Appendix B, for demolition, earthworks, construction and trackout. The sensitivity of the area to each activity is assessed for potential dust soiling, human health effects and ecological effects (where applicable).

7.19 For demolition, earthworks and construction, there are currently >100 receptors within 100m of where these activities may take place, which is assumed to be the site boundary for the purposes of this assessment.

7.20 For Phase A **(Blue Route)**, the traffic will be heading East on A57(M) take the A34 exit towards Wilmslow/Universities, take the slip road to The University of Manchester Merge onto Sackville St, the site entrance will be to the left. When leaving the site (**Orange Route**), traffic will turn Left at the traffic lights on to Charles Street, then turn left heading back towards the A57(M), follow signs to access wider strategic network. The proposed route is identified in Figure 3.

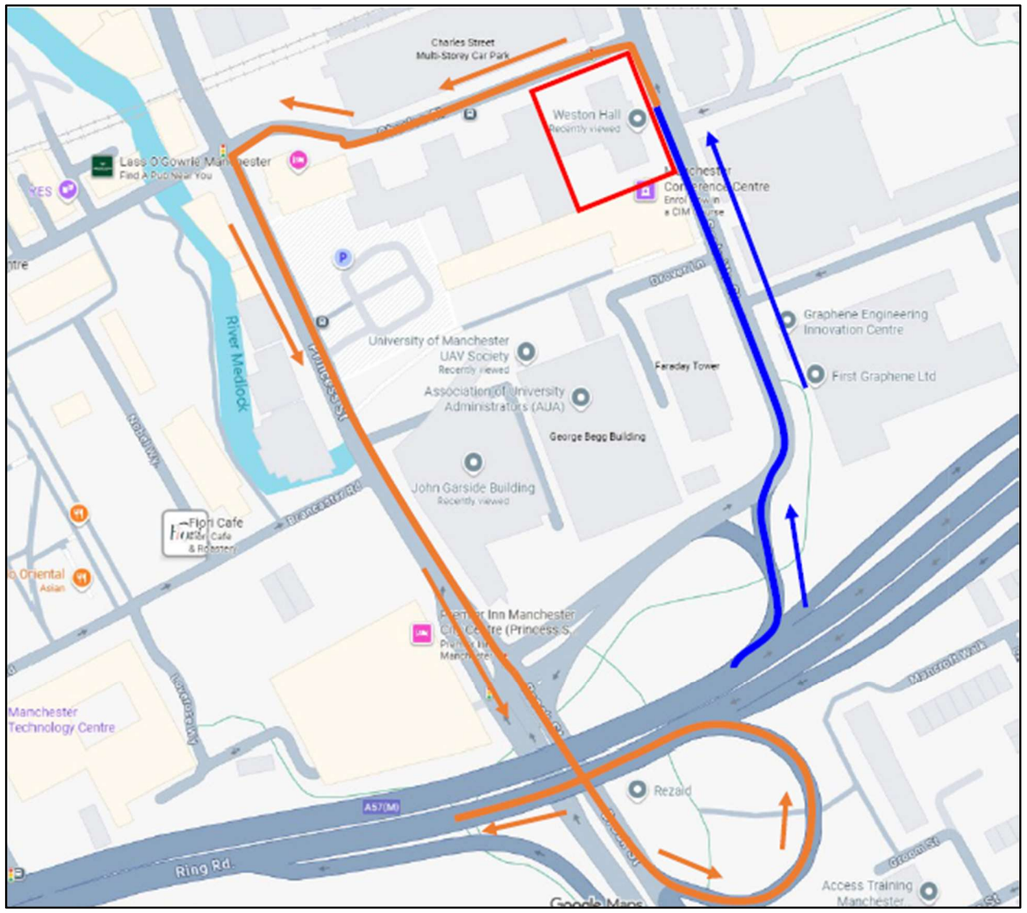


Figure 3: Phase A Construction Traffic Route

7.21 For Phase B **(Blue Route),** while to the site traffic will head east on A57(M) take the A34 exit towards Wilmslow/Universities, take the slip road to The University of Manchester Merge onto Sackville St , turn left into Charles Street, the site entrance will be on the left. When leaving the site (**Orange Route**), traffic will turn Left at the traffic lights heading back towards the A57(M), follow signs to access wider strategic network. The proposed route is identified in Figure 4.

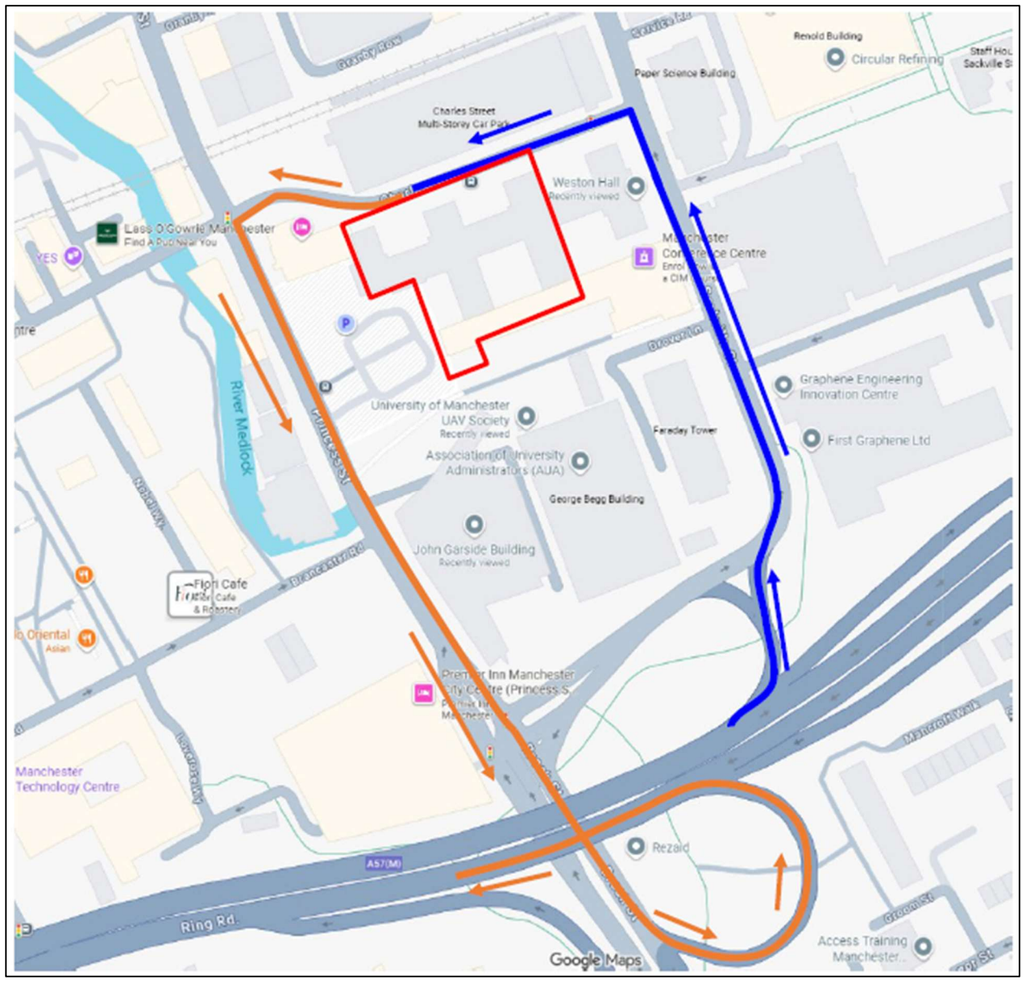


Figure 4: Phase B Construction Traffic Route

7.22 There are no ecological receptors within 50m of the development boundary or the access route within 200m of the site entrance. As such, ecological impacts have not been assessed further within this report.

7.23 A number of additional factors have been considered when determining the sensitivity of the surrounding area; these are summarised in Table 6.

Guidance	Comment
Whether there is any history of dust generating activities in the area	The baseline study indicated there are no potentially dust generating sites within 250m of the proposed development, dust generation is not seen as a concern.
The likelihood of concurrent dust generating activity on nearby sites	A review of the Planning Portal indicates there are 3 no. potentially dust generating sites within 250m of the proposed development, where the construction periods could overlap with the proposed development. These are: • **143741/FO/2025** -Demolition of existing multi-storey car park and associated commercial units (retail and sui generis bar uses) to prepare site for future development. Approximately 20m north of the northern boundary. • **143769/FO/2025**|Demolition of Faraday Tower to ground floor slab level and works to remediate/make safe the retained structure (including the erection of a perimeter hoarding) to prepare site for future development. Approximately 20m south of the southern boundary. • **143024/FO/2025**|Phased development comprising: Phase A - demolition of existing buildings and structures, erection of a basement (C1 Building and C2 Building) comprising flexible commercial space (Class E and/or Sui Generis drinking establishment), erection of a building (C1 Building) to form offices (Class E); Phase B: erection of a podium across lower ground and upper ground floors and a new building (C2 Building) to form offices (Class E) and flexible commercial and community uses (Class E, F2 and/ or Sui Generis drinking establishment), alterations to the existing Sculptural Wall (Hollaway Wall),; Phase C - change of use and associated works to railway Viaduct arches to form flexible commercial units (Class E, and/ or Sui Generis - drinking establishment). Approximately 150m east of the proposed development site.
Pre-existing screening between the source and the sensitive locations	No screening to sensitive locations.
Conclusions drawn from analysing local meteorological data which accurately represent the area: and if relevant the season during which works will take place	Winds are predominantly west and south westerly. As such, receptors to the east and north east of the development are most likely to be affected by dust releases
Conclusions drawn from local topography	There are no significant topographical constraints to dust dispersion

Guidance	Comment
Duration of the potential impact, as a receptor may become more sensitive over time	The Proposed Development is expected to begin in 2027, with Phase A completing for the 2031/32 academic year and Phase B completing for 2034/35.
Any known specific receptor sensitivities which go beyond the classifications given in the document	No specific receptor sensitivities identified during the baseline assessment

Table 6: Additional Area Sensitivity Factors to Potential Dust Impacts

7.24 **Step 2C - Define the Risk of Impacts**

7.25 Step 2C of the construction phase dust assessment defines the risk of impacts from each activity, by combining the dust emission magnitude with the sensitivity of the surrounding area.

7.26 The risk of dust impacts from each activity, with no mitigation in place, has been assessed in accordance with the criteria detailed in Appendix B. The results of this step are detailed in Table 7.

	Activity			
	Demolition	**Earthworks**	**Construction**	**Trackout**
Step 2A				
Dust Emission Magnitude	Medium	Small	Large	Medium
Step 2B				
Sensitivity of Closest Receptors	High	High	High	High
Sensitivity of Area to Dust Soiling Effects	High	High	High	High
Sensitivity of Area to Human Health Effects	Low [a]	Low [a]	Low [a]	Low [a]
Step 2C				
Dust Risk: Dust Soiling	High	Medium Risk	Medium Risk	Medium Risk
Dust Risk: Human Health	Low Risk	Low Risk	Low Risk	Low Risk
a. Background annual mean PM_{10} concentration is taken from the LAQM Defra default concentration maps, for the appropriate grid square for 2024				

Table 7: Construction Phase Dust Assessment for Human Receptors

7.27 As indicated in Table 7, the potential risk of dust soiling is **high** from demolition and **medium** for earthworks, construction and trackout. The potential risk of human health impacts is **low** from demolition, earthworks, construction and trackout.

7.28 It should be noted that the potential for dust impacts is highly dependent on the distance between the dust-generating activities and sensitive receptor locations. The risk assessment was conducted using a worst-case scenario, assuming that construction works occur at the site boundary closest to each sensitive receptor. Consequently, the actual risk is likely to be lower than predicted for most of the construction period.

7.29 **Step 3 - Site-specific Mitigation**

7.30 The IAQM guidance outlines a range of potential mitigation measures to reduce fugitive dust emissions during the construction phase, which are summarised below.

7.31 Mitigation measures could include:

- Site management - 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;
- Monitor weather and amend work accordingly when wind is blowing towards sensitive locations;
- Ensure effective water suppression is used during demolition operations;
- Cover, seed or fence stockpiles to prevent wind whipping. Stockpiles to be 5m from the boundary and maximum 5m high;
- Ensure vehicles with loose product are sheeted when entering/leaving site;
- Ensure all vehicles switch off engines when stationary - no idling vehicles;
- Speed limit to be implemented on site;
- Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate;
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate;
- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place;
- Implement a wheel washing system; and
- Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site.

7.32 **Step 4 - Determine Significant Effects**

7.33 Assuming relevant mitigation measures (such as those outlined above) are implemented, the residual impact from all dust generating activities is predicted to be **not significant**, in accordance with the IAQM guidance.

7.34 **Step 5: Dust Assessment Report**

7.35 A Dust Assessment Report must clearly and transparently demonstrate the project's dust risk.

7.36 **Operational Phase**

7.37 Guidance prepared by EPUK/IAQM provides criteria for when a detailed air quality assessment may be required. The relevant criteria for a proposed development comprise:

- A change in Light Duty Vehicles (LDVs) of more than 500 AADT (or 100 AADT within/adjacent to an AQMA);
- A change in Heavy Duty Vehicles (HDVs) of more than 100 AADT (or 25 AADT within/adjacent to an AQMA);
- The realignment of existing roads near to sensitive locations, with a change of more than 5m when the road is within an AQMA; and
- The introduction of a new junction, or removal of an existing junction, leading to a significant change in vehicle acceleration/deceleration (e.g. through the introduction of traffic lights or a roundabout) near to sensitive locations.

7.38 The as this is student accommodation with limited parking, it is not anticipated that the development will cause a change of more than 100 AADT on any road local to the development. A detailed assessment is therefore screened out.

7.39 Furthermore, background pollutant concentrations at the site (as detailed in Table 4) are well below the relevant mean air quality objectives.

7.40 **Proposed Sensitive Human Receptors**

7.41 We have also reviewed the current land uses surrounding the proposed development site and other local planning proposals for student accommodation and due to the developments distance from major highly trafficked roads, It is considered that there will be no other significant air quality, dust or odour issues for future users of the development, associated with the land uses surrounding the site.

7.42 **Assessment of Significance for Human Receptors**

7.43 The significance of the overall effects of the proposed development has been assessed in accordance with the EPUK/IAQM guidance. This assessment is based on professional judgement and details of the assessors' experience is included in Appendix C**.**

7.44 In accordance with the EPUK/IAQM guidance, the air quality effect of the proposed development is considered to be **not significant.**

7.45 **Recommendations for Mitigation**

7.46 The impact of the proposed development on air quality is predicted to be not significant. Nevertheless, implementing mitigation measures can help further reduce any potential impacts. General best practice measures, such as promoting sustainable travel options, could also be adopted to support overall air quality improvements.

8 Conclusion

8.1 This report has been prepared in support of a planning application for a student residential development at the site of the existing Weston Halls and Pendulum Hotel, Sackville Street, Manchester.

8.2 The proposed development has the potential to expose future occupants to elevated pollution levels and may result in air quality impacts during both the construction and operational phases. Therefore, an Air Quality Assessment was conducted to establish baseline conditions at the site, evaluate its suitability for the proposed end use, and assess any potential air quality effects arising from the development.

8.3 During the construction phase, there is potential for air quality impacts due to fugitive dust emissions from the site. These impacts were assessed following the IAQM methodology. Provided that good practice dust control measures are implemented, the residual significance of air quality impacts from dust generated by construction and trackout activities is predicted to be **not significant**.

8.4 Following a review of local air quality, in accordance with guidance from EPUK/IAQM, the impact of the operational phase of the development can be described as ‘not significant’.

8.5 **Recommendations for Mitigation**

8.6 The impact of the proposed development is predicted to be not significant. However, mitigation measures will assist in reducing any potential impact and general best practice measures in relation to air quality could be implemented. This could include measures such as promotion of sustainable travel.

8.7 **Summary**

8.8 The assessment demonstrates that the proposed development will accord with national planning policy and will not lead to an unacceptable risk from air pollution. There are no material reasons in relation to air quality why the proposed scheme should not proceed, subject to appropriate planning conditions.

9 References

1 Institute of Air Quality Management (IAQM) Guidance on the Assessment of Dust from Demolition and Construction, January 2024

2 Environmental Protection UK (EPUK) & IAQM Land-Use Planning & Development Control: Planning for Air Quality, January 2017 Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022

3 Institute of Air Quality Management (IAQM) Guidance on the Assessment of Mineral Dust Impacts for Planning, May 2016

4 Defra Local Air Quality Management webpages (http://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html)

5 Department for Environment, Food and Rural Affairs, Local Air Quality Management Technical Guidance LAQM.TG (22), August 2022

6 Greater London Authority, The Control of Dust and Emissions from Construction and Demolition: Supplementary Planning Guidance, 2014

7 Manchester City Council, Air Quality & Planning Technical Guidance, 2022

Appendix A Air Quality Legislation and Guidance

A.1 National Air Quality Strategy

A.2 The Environment Act 2021 is the UK's latest framework of environmental protection, amending the Environment Act 1995. The Act requires the UK government to publish a national Air Quality Strategy (AQS).

A.3 The AQS published by DEFRA, most recently in April 2023, sets out a framework to enable local authorities to deliver to the air quality standards and Air Quality Objectives (AQOs), and includes measures for improving ambient air quality. Air quality standards and objectives are set out for eight pollutants which may potentially occur at levels that give cause for concern. The 2023 AQS provides the most ambitious targets for $PM_{2.5}$ to date. The AQS also provides details of the role that local authorities are required to take in working towards improvements in air quality, known as the Local Air Quality Management (LAQM) regime.

A.4 Air Quality Standards and Objectives

A.5 The Air Quality Standards Regulations (2010) and subsequent amendments include Air Quality Limit Values (AQLVs) for the following pollutants:

- Nitrogen dioxide (NO_2);
- Sulphur dioxide;
- Lead;
- Particulate matter with an aerodynamic diameter of less than 10µm (PM_{10});
- Particulate matter with an aerodynamic diameter of less than 2.5µm ($PM_{2.5}$);
- Benzene; and,
- Carbon monoxide.

A.6 Air Quality Target Values have also been provided for several additional pollutants. It should be noted that the AQLV for $PM_{2.5}$ stated in the Air Quality Standards Regulations (2010) is superseded by that within The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023.

A.7 Examples of where these objectives and limit values apply are detailed in the Defra LAQM Technical Guidance document LAQM.TG (22), Reference 5, and are included in Table 9.

Averaging Period	Objectives Should Apply At	Objectives Should Not Apply At
Annual mean	All locations where members of the public might be regularly exposed.	Building facades of offices or other places of work where members of the public do not have regular access. Hotels, unless people live there as their permanent residence.
24-hour mean and 8-hour mean	All locations where the annual mean objectives would apply, together with hotels. Gardens of residential properties [a]	Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term
1-hour mean	All locations where the annual mean and 24 and 8-hour objectives apply. Kerbside sites (e.g. pavements of busy shopping streets). Those parts of car parks and railway stations etc. which are not fully enclosed, where members of the public might reasonably be expected to spend one hour or more. Any outdoor locations to which the public might reasonably be expected to spend one hour or longer	Kerbside sites where public would not be expected to have regular access
15-minute mean	All locations where members of the public might reasonably be exposed for a period of 15 minutes or longer	

[a] *Such locations should represent parts of the garden where relevant public exposure is likely, for example where there is seating or play areas. It is unlikely that relevant public exposure to pollutants would occur at the extremities of the garden boundary, or in front gardens, although local judgement should always be applied*

Table 8: Examples of Where the Air Quality Objectives Should Apply

A.8 Local Air Quality Management

A.9 LAQM legislation in the Environment Act 2021 requires local authorities (LA) to conduct the periodic review and assessments of air quality, comparing present and likely future pollutant concentrations against the AQOs. If it is predicted that levels at locations of relevant exposure are likely to be exceeded, the LA is required to declare an Air Quality Management Area (AQMA). For each AQMA the LA is required to produce an Air Quality Action Plan, the objective of which is to reduce pollutant concentrations in pursuit of the AQOs.

A.10 LAQM.TG(22) presents a streamlined approach for LAQM in England and Scotland; however, Northern Ireland is still considering changes to LAQM and therefore works according to the previous regime.

A.11 Local authorities in England are required to produce Annual Status Reports (ASRs), and in Scotland and Wales, Annual Progress Reports (APRs). These replace all other reports which previously had to be submitted including Updating and Screening Assessments, Progress Reports and Detailed Assessments (which would be produced to assist with an AQMA declaration).

A.12 Local authorities now have the option of a fast track AQMA declaration option. This allows more expert judgement to be used and removes the need for a Detailed Assessment where a local authority is confident of the outcome. Detailed Assessments should however still be used if there is any doubt.

A.13 As part of the UK Government's requirement to improve air quality, selected local authorities in England are also currently investigating the feasibility of setting up Clean Air Zones (CAZs). These are areas where targeted action and co-ordinated resources aim to improve air quality within an urban setting, in order to achieve compliance with the EU limit values within the shortest possible time. Charges apply to certain types of vehicles travelling within these areas, including buses, coaches, taxis, private hire vehicles and heavy-duty vehicles (HDVs).

A.14 CAZs are currently operational in Bath, Birmingham, Bradford, Bristol, Portsmouth, Sheffield and Tyneside (Newcastle and Gateshead). It was proposed to operate a CAZ in the Greater Manchester area, however this has now been revised, with the aim to implement a Clean Air Plan without the inclusion of a charging CAZ. In addition, in London a Ultra Low Emission Zone (ULEZ) is operated, covering all areas within the North and South Circular roads.

A.15 National Planning Policy Framework

A.16 The revised National Planning Policy Framework (NPPF) was published in December 2023 and sets out the Government's planning policies for England and how these are expected to be applied.

A.17 The purpose of the planning system is to contribute to the achievement of sustainable development. In order to ensure this, the NPPF recognises three overarching objectives including the following of relevance to air quality:

"c. An environmental objective - to protect and enhance our natural, built and historic environment; including making effective use of land, improving biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy."

A.18 Chapter 15 of the NPPF details objectives in relation to conserving and enhancing the natural environment. It states that:

"Planning policies and decisions should contribute to and enhance the natural and local environment by:

[…]

e) 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 […]"

A.19 The NPPF specifically recognises air quality as part of delivering sustainable development and states that:

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

A.20 The implications of the NPPF have been considered throughout this assessment.

A.21 Planning Practice Guidance

A.22 The National Planning Practice Guidance (NPPG) web-based resource was launched by the Department for Communities and Local Government on 6th March 2014 and most recently updated in November 2023 (November 2019 for air quality) to support the NPPF and make it more accessible. The air quality pages are summarised under the following headings:

1. What air quality considerations does planning need to address?
2. What is the role of plan-making with regard to air quality?
3. Are air quality concerns relevant to neighbourhood planning?
4. What information is available about air quality?
5. When could air quality considerations be relevant to the development management process?
6. What specific issues may need to be considered when assessing air quality impacts?
7. How detailed does an air quality assessment need to be?
8. How can an impact on air quality be mitigated?

A.23 These were reviewed and the relevant guidance considered as necessary throughout the undertaking of this assessment.

A.24 Dust

A.25 The main requirements with respect to dust control from industrial or trade premises not regulated under the Environmental Permitting (England and Wales) Regulations (2016) and subsequent amendments, such as construction sites, is that provided in Section 79 of Part III of the Environmental Protection Act (1990). The Act defines nuisance as:

"any dust, steam, smell or other effluvia arising on industrial, trade or business premises and being prejudicial to health or a nuisance."

A.26 Enforcement of the Act, in regard to nuisance, is currently under the jurisdiction of the local Environmental Health Department, whose officers are deemed to provide an independent evaluation of nuisance. If the LA is satisfied that a statutory nuisance exists, or is likely to occur or happen again, it must serve an Abatement Notice under Part III of the Environmental Protection Act (1990). The only defence is to show that the process to which the nuisance has been attributed and its operation are being controlled according to best practicable means.

A.27 Local Planning Policy

A.28 Manchester City Council addresses air quality in its planning policy primarily through the Core Strategy and detailed Air Quality & Planning Technical Guidance.

A.29 Core Planning Policy

- Core Strategy Policy: The Council's Core Strategy requires that new development considers its impact on air quality, including cumulative impacts, especially within Air Quality Management Areas (AQMAs).
- Development Management Policy (DM 1): This policy requires all development to have regard for effects on amenity, including air quality.
- Reducing the Need to Travel: Other policies in the Core Strategy guide the location of development to reduce the need for private transport and encourage sustainable travel, which helps to reduce emissions.

A.30 Air Quality & Planning Technical Guidance

A.31 Manchester City Council has produced specific Air Quality & Planning Technical Guidance to help developers and planning officers address air quality issues. This guidance:

- Outlines Background: Provides the context of air quality in Manchester, including the fact that Nitrogen Dioxide NO_2 is the main pollutant currently exceeding legal limits.
- Achieving Compliance: It is concerned with achieving and maintaining compliance with air quality objectives, with a particular focus on fine particulate matter (PM_{10} and $PM_{2.5}$) due to their significant health impacts.
- Expectations for Development: It outlines what is expected of new developments to ensure they do not create or are not adversely affected by unacceptable levels of air pollution. This is particularly important for developments:
  - Inside or adjacent to an area with a current action plan (i.e., the AQMA).
  - That could result in the need for a new action plan.
  - Where granting permission would conflict with an existing action plan.

A.32 Mitigation: Major developments are typically required to consider air quality impacts and mitigate where necessary. Mitigation measures often include:

- Developing Travel Plans.
- Providing Electric Vehicle charge points.
- Appropriate design to minimise public exposure to pollution.

A.33 Greater Manchester Context (Clean Air Plan)

A.34 Air quality planning is heavily influenced by the wider Greater Manchester (GM) strategy, as all ten GM local authorities, including Manchester, are part of the effort to meet legal limits for NO_2.

A.35 Greater Manchester Clean Air Plan: GM is developing an investment-led, non-charging Clean Air Plan to bring NO_2 levels within legal limits as soon as possible, which involves significant investment in clean transport initiatives.

Appendix B Methodology for Construction Phase Assessment

B.1 Institute of Air Quality Management Guidance

B.2 The methodology for the construction phase dust assessment is set out in guidance from the IAQM.

Step 1

B.3 Step 1 screens the requirement for a more detailed assessment. Should sensitive locations be identified within 250m of the boundary or 50m from the construction vehicle route up to 500m from the site entrance, then the assessment proceeds to Step 2. Additionally, should ecological receptors be identified within 50m of the site or the construction vehicle route, then the assessment also proceeds to Step 2.

Step 2

B.4 Step 2 determines the potential risk of dust arising in sufficient quantities to cause annoyance and/or health or ecological impacts. The risk is related to:

- The activities being undertaken (demolition, number of vehicles and plant etc);
- The duration of these activities;
- The size of the site;
- The meteorological conditions (wind speed, direction and rainfall);
- The proximity of sensitive locations to the activity;
- The adequacy of the mitigation measures applied to reduce or eliminate dust; and
- The sensitivity of receptors to dust.

B.5 **Step 2A** assesses the scale and nature of the works which determines the potential dust emission magnitude as small, medium or large. Examples of how the magnitude may be defined are included in Table 10.

Activity	Dust Emission Class		
	Large	Medium	Small
Demolition	Total building volume >75,000m^3, potentially dusty construction material (e.g. concrete), on-site crushing and screening, demolition activities >12m above ground level	Total building volume 12,000m^3 – 75,000m^3, potentially dusty construction material, demolition activities 6-12m above ground level	Total building volume <12,000m^3, construction material with low potential for dust release (e.g. metal cladding or timber), demolition activities <6 m above ground, demolition during wetter months
Earthworks	Total site area >110,000m^2, potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size), >10 heavy earth moving vehicles active at any one time, formation of bunds >6m in height	Total site area 18,000m^2 – 110,000m^2, moderately dusty soil type (e.g. silt), 5-10 heavy earth moving vehicles active at any one time, formation of bunds 3m - 6m in height	Total site area <18,000m^2, soil type with large grain size (e.g. sand), <5 heavy earth moving vehicles active at any one time, formation of bunds <3m in height
Construction	Total building volume >75,000m^3, on site concrete batching, sandblasting	Total building volume 12,000m^3 – 75,000m^3, potentially dusty construction material (e.g. concrete), on site concrete batching	Total building volume <12,000m^3, construction material with low potential for dust release (e.g. metal cladding or timber)
Trackout	>50 HDV (>3.5t) outward movements in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length >100m	20-50 HDV (>3.5t) outward movements in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length 50m – 100m	<20 HDV (>3.5t) outward movements in any one day, surface material with low potential for dust release, unpaved road length <50m
a. A vehicle movement is a one way journey i.e. from A to B, and excludes the return journey b. HDV movements during a construction project may vary over its lifetime, and the number of movements is the maximum not the average			

Table 9: Determining the Dust Emission Magnitude of Construction Phase Activities

B.6 **Step 2B** considers the sensitivity of the area to dust impacts which is defined as low, medium or high. The sensitivity categories for different types of sensitive locations are described in Table 11.

Sensitivity Category	Dust Soiling Effects	Health effects of PM_{10}	Ecological Effects
High	Users can reasonably expect to enjoy a high level of amenity; Appearance, aesthetics or value of a property would be diminished; Examples include dwellings, museums and other culturally important collections, medium and long term car parks and car show rooms	Locations where members of the public are exposed over a period of time relevant to the air quality objective for PM_{10}; Examples include residential properties, hospitals, schools, and residential care homes	Locations with an international or national designation and the designated features may be affected by dust soiling; Locations where there is a community of a particularly dust sensitive species; Examples include a Special Area of Conservation with dust sensitive features
Medium	Users would expect to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home; The appearance, aesthetics or value of their property could be diminished; People or property wouldn't reasonably be expected to be continuously present or regularly for extended periods of time; Examples include parks and places of work	Locations where people are exposed as workers and exposure is over a period of time relevant to the air quality objective for PM_{10}; Examples include office and shop workers but will generally not include workers occupationally exposed to PM_{10}	Locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown; Locations with a national designation where the features may be affected by dust deposition; Examples include a Site of Special Scientific Interest with dust sensitive features
Low	Enjoyment of amenity would not reasonably be expected; Property would not be diminished in appearance, aesthetics or value; People or property would be expected to be present only for limited periods of time; Examples include playing fields, farmland (unless commercially-sensitive horticultural), footpaths, short term car parks and roads	Locations where human exposure is transient; Examples include public footpaths, playing fields, parks and shopping streets	Locations with a local designation where the features may be affected by dust deposition; Examples include a Local Nature Reserve with dust sensitive features

Table 10: Sensitivity Categories for Dust Soiling, Human Health and Ecological Effects

B.7 Based on the sensitivity of individual receptors, the overall sensitivity of the area to dust soiling, human health and ecological effects is then determined using the criteria detailed in Tables 12 to 14, respectively.

Receptor Sensitivity	Number of Receptors	Distance from Source (m)[c]			
		<20m	<50m	<100m	<250m
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

a. The sensitivity to the area should be derived for each of the four activities
b. Estimate the total number of receptors within the stated distance. Only the highest level of sensitivity from the table needs to be considered
c. For trackout, distances should be measured from the side of the roads used by construction traffic. Without site specific mitigation, trackout may occur for up to 500m from large sites, 200m from medium sites and 50m from small sites, measured from the site exit. The impact declines with distance from the site and it is only necessary to consider trackout impacts up to 50m from the edge of the road

Table 11: Sensitivity of the Area to Dust Soiling Effects on People and Property [ab]

Receptor Sensitivity	Annual Mean PM_{10} Concentration [c]	Number of Receptors [d]	Distance from Source (m)[e]			
			<20m	<50m	<100m	<250m
High	>32µg/m^3	>100	High	High	High	Medium
		10-100	High	High	Medium	Low
		1-10	High	Medium	Low	Low
	28-32µg/m^3	>100	High	High	Medium	Low
		10-100	High	Medium	Low	Low
		1-10	High	Medium	Low	Low
	24-28µg/m^3	>100	High	Medium	Low	Low
		10-100	High	Medium	Low	Low
		1-10	Medium	Low	Low	Low
	<24µg/m^3	>100	Medium	Low	Low	Low
		10-100	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
Medium	>32µg/m^3	>10	High	Medium	Low	Low
		1-10	Medium	Low	Low	Low
	28-32µg/m^3	>10	Medium	Low	Low	Low
		1-10	Low	Low	Low	Low
	24-28µg/m^3	>10	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
	<24µg/m^3	>10	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
Low	-	>1	Low	Low	Low	Low

Table 12: Sensitivity of the Area to Human Health Impacts [ab]

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

a. *The sensitivity to the area should be derived for each of the four activities*
b. Only the highest level of sensitivity from the table needs to be considered
c. For trackout, distances should be measured from the side of the roads used by construction traffic

Table 13: Sensitivity of the Area to Ecological Impacts [ab]

B.8 These two factors are combined in **Step 2C** to determine the risk of dust impacts with no mitigation applied.

B.9 The risk of dust effects is determined for four types of construction phase activities, with each activity being considered separately. If a construction phase activity is not taking place on the site, then it does not need to be assessed. The four types of activities to be considered are:

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

B.10 The risk of dust being generated by demolition activities at the site is determined using the criteria in Table 14.

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

Table 14: Risk of Dust Impacts for Demolition

B.11 The risk of dust being generated by earthworks, construction and trackout at the site is determined using the criteria in Table 15.

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 15: Risk of Dust Impacts for Earthworks, Construction and Trackout

Step 3

B.12 Step 3 of the assessment determines the site-specific mitigation required for each of the activities, based on the risk determined in Step 2. Mitigation measures are detailed in guidance published by the Greater London Authority, [6], recommended for use outside the capital by LAQM guidance, and the IAQM guidance document itself. A summary of the mitigation measure are provided in Table 16. Professional judgement should be used to determine the type and scale of mitigation measures required.

B.13 If the risk is classed as negligible, no mitigation measures beyond those required by legislation will be necessary.

Step 4

B.14 Once the risk of dust impacts has been determined and the appropriate mitigation measures identified, the final step is to determine the significance of any residual impacts. For almost all construction activity, the aim should be to control effects through the use of effective mitigation. Experience shows that this is normally possible. Hence the residual effect will normally be **not significant**.

Mitigation measure	High Risk
1. Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.	H
2. 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.	H
3. Display the head or regional office contact information.	H
4. Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk and should include as a minimum the highly recommended measures in this document. The desirable measures should be included as appropriate for the site. In London additional measures may be required to ensure compliance with the Mayor of London's guidance. The DMP may include monitoring of dust deposition, dust flux, real-time PM continuous monitoring and/or visual inspections.	H
5. 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.	H
6. Make the complaints log available to the local authority when asked.	H
7. 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.	H
8. Hold regular liaison meetings with other high risk construction sites within 250 m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/deliveries which might be using the same strategic road network routes.	H
9. Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100m of site boundary, with cleaning to be provided if necessary.	H
10. 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.	H
11. 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.	H
12. Agree dust deposition, dust flux, or real-time PM continuous monitoring locations 10 with the Local Authority. Where possible commence baseline monitoring at least three months before work commences on site or, if it a large site, before work on a phase commences. Further guidance is provided by IAQM on monitoring during demolition, earthworks and construction.	H
13. Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.	H
14. Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.	H
15. Fully enclose site or specific operations where there is a high potential for dust production and the site is actives for an extensive period.	H
16. Avoid site runoff of water or mud.	H
17. Keep site fencing, barriers and scaffolding clean using wet methods.	H
18. Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below.	H
19. Cover, seed or fence stockpiles to prevent wind whipping.	H
20. Ensure all on-road vehicles comply with the requirements of the London Low Emission Zone and the London NRMM standards, where applicable.	H
21. Ensure all vehicles switch off engines when stationary - no idling vehicles.	H
22. Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.	H
23. Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate).	H
24. Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.	H
25. Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).	H
26. 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.	H
27. Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate	H
28. Use enclosed chutes and conveyors and covered skips.	H
29. Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.	H
30. 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.	H
31. Avoid bonfires and burning of waste materials.	H
32. Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).	H
33. Ensure effective water suppression is used during demolition operations. Hand held sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground.	H
34. Avoid explosive blasting, using appropriate manual or mechanical alternatives.	H
35. Bag and remove any biological debris or damp down such material before demolition.	H
36. Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.	H
37. Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable.	H
38. Only remove the cover in small areas during work and not all at once.	H

Table 16: Summary of Mitigation Measures for a High Risk Site

Appendix C Detailed Modelling for the Assessment

C.1 Methodology for Operational Phase Assessment

C.2 Dispersion Model

C.3 Dispersion modelling was undertaken using ADMS-Roads (Version 5.0.1.3) developed by Cambridge Environmental Research Consultants (CERC). This dispersion model is widely used and accepted for the purpose of undertaking assessments to support both planning and Environmental Permit applications.

C.4 The model requires input data that details the following parameters:

- Assessment area;
- Traffic flow data;
- Vehicle emission factors;
- Spatial co-ordinates of emissions;
- Street width;
- Meteorological data;
- Roughness length (z_0); and,
- Monin-Obukhov length.

C.5 These are detailed in the following Sections.

C.6 Assessment Area

C.7 The study extent of the model is shown in Figure 5.

C.8 Traffic Flow Data

C.9 Traffic flow data was obtained from the Department for Transport (DfT) Count Points website and factored to the future year (2028) using TEMPro (v8.1). Data included Annual Average Daily Traffic (AADT) flows, as well as HGV percentages. Road speeds were obtained from aerial imagery.

C.10 The traffic data used in the assessment is detailed in Table 17.

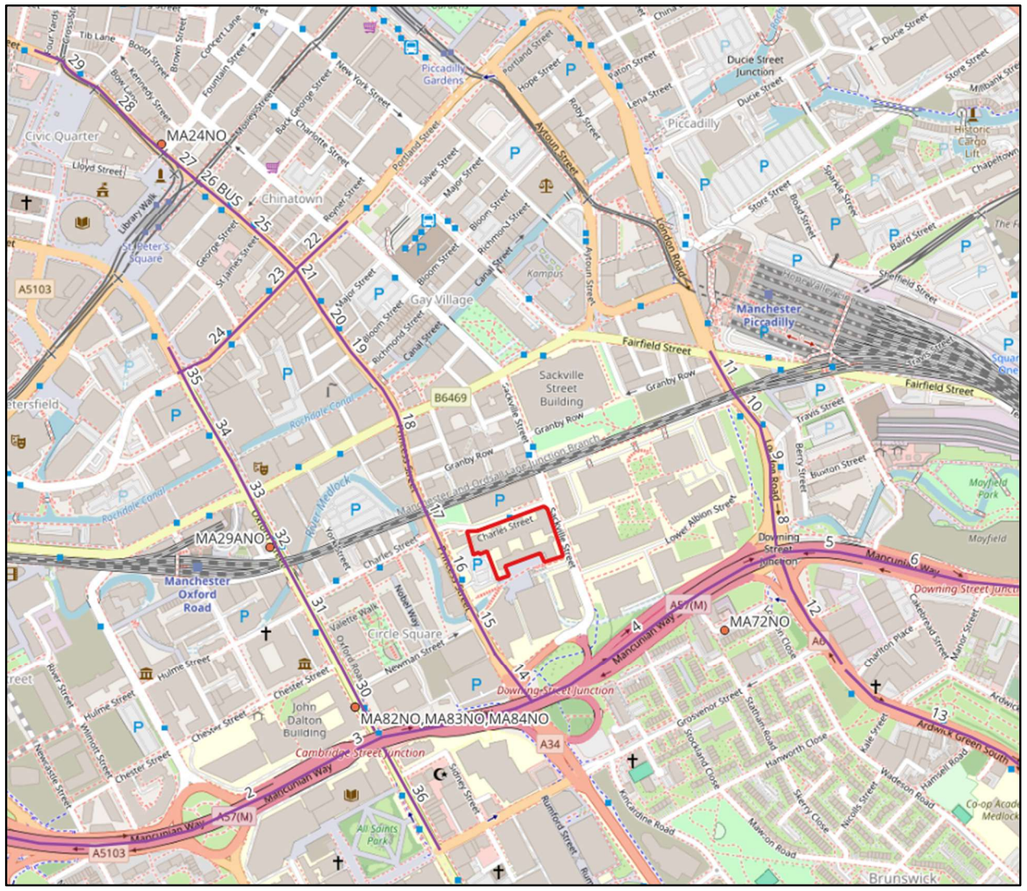


Figure 5 Model Extent

Link		24-hour AADT Flow		HDV Prop. of Fleet (%)	Mean Vehicle Speed (km/h)
		2023	2028		
1	A57(M)	95,717	101,556	2.5	90
2	A57(M)	95,717	101,556	2.5	90
3	A57(M)	95,717	101,556	2.5	90
4	A57(M)	95,717	101,556	2.5	90

Link		24-hour AADT Flow		HDV Prop. of Fleet (%)	Mean Vehicle Speed (km/h)
		2023	2028		
5	A57 (M)	44,129	46,821	4.1	90
6	A57 (M)	44,129	46,821	4.1	70
7	A57 (M)	44,129	46,821	4.1	50
8	A6 London Road	12,518	13,282	10.6	10
9	A6 London Road	12,518	13,282	10.6	30
10	A6 London Road	12,518	13,282	10.6	40
11	A6 London Road	12,518	13,282	10.6	30
12	A6 Downing Street	22,118	23,467	8.1	20
13	A6 Downing Street	22,118	23,467	8.1	50
14	A34 Princess St	6,858	7,276	2.8	10
15	A34 Princess St	6,858	7,276	2.8	25
16	A34 Princess St	6,858	7,276	2.8	25
17	A34 Princess St	6,858	7,276	2.8	25
18	A34 Princess St	6,858	7,276	2.8	10
19	A34 Princess St	6,858	7,276	2.8	40
20	A34 Princess St	6,858	7,276	2.8	40
21	A34 Princess St	6,858	7,276	2.8	10
22	Portland St E of Princess St	9,460	10,037	34.9	15
23	Portland St, Princess St to Oxford St	7,288	7,733	22.2	15
24	Portland St, Princess St to Oxford St	7,288	7,733	22.2	15
25	A34 Princess St N Portland St	2,596	2,754	37.9	20
26	A34 Princess St N Portland St BUS ONLY	944	1,002	100.0	20
27	A34 Princess N Mosley St	2,007	2,129	32.4	20
28	A34 Princess N Mosley St	2,007	2,129	32.4	35
29	A34 Princess N Mosley St	2,007	2,129	32.4	20
30	Oxford Road/St	4,552	4,830	37.4	25
31	Oxford Road /St	4,552	4,830	37.4	25
32	Oxford Road /St	4,552	4,830	37.4	25
33	Oxford Road /St	4,552	4,830	37.4	25
34	Oxford Road /St	4,552	4,830	37.4	15
35	Oxford Road /St	4,552	4,830	37.4	10
36	Oxford Road /St	4,552	4,830	37.4	15

Table 17: Traffic Data Utilised in the Assessment

C.11 Emission Factors

C.12 Emission factors for each link were calculated using the relevant traffic flows and the Emission Factor Toolkit (EFT) (version 13.1). This has been produced by DEFRA and incorporates COPERT 5.8 vehicles emission factors and fleet information.

C.13 Meteorological data used in the assessment was taken from Manchester Airport Meteorological Station over the period 1st January 2024 to 31st December 2024 (inclusive). Manchester Airport Meteorological Station is located at NGR: 384494, 397533, which is approximately 13.7km south of the development. It is anticipated that conditions would be reasonably similar over a distance of this magnitude. The data was therefore considered suitable for an assessment of this nature.

C.14 All meteorological records used in the assessment were provided by Atmospheric Dispersion Modelling (ADM) Ltd, which is an established distributor of data within the UK. Reference should be made to Figure 6 for a wind rose of the utilised meteorological data.

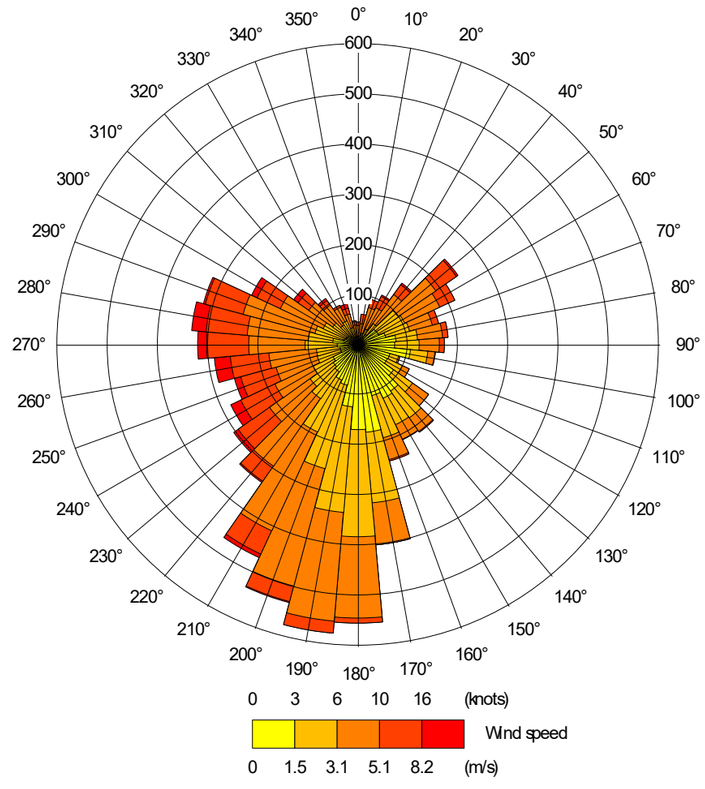


Figure 6: Windrose of Manchester Airport Meteorological Station

C.15 Roughness Length

C.16 The z_0 is a modelling parameter applied to allow consideration of surface height roughness elements. A z_0 of 1.5m was used to describe the modelling extents. This value is considered appropriate for the morphology of the area and is suggested within ADMS-Roads as being suitable for 'Large urban areas'.

C.17 A z_0 of 0.5m was used to describe the meteorological site. This value is considered appropriate for the morphology of the area due to the large expanse of flat land use, such as runways and surrounding grassland, and is suggested within ADMS-Roads as being suitable for 'parklands, open suburbia'.

C.18 Monin-Obukhov Length

C.19 The Monin-Obukhov length provides a measure of the stability of the atmosphere. A minimum Monin-Obukhov length of 100m was used to describe the modelling extents. This value is considered appropriate for the nature of the area and is suggested within ADMS-Roads as being suitable for 'Large conurbations >1 million'.

C.20 A minimum Monin-Obukhov length of 10m was used to describe the meteorological site. This value is considered appropriate for the nature of the area and is suggested within ADMS-Roads as being suitable for 'Small towns <50,000'.

C.21 Limitations and Uncertainties

C.22 Air quality assessments make use of official sources of information (i.e., vehicle emission factors and background concentrations) which have historically been considered to be overly optimistic. Monitoring data collected by the UK Government and local authorities over the past few years has shown that annual mean NO_2 concentrations remained higher than previously expected (especially in roadside locations). This was widely thought to be due to the lower-than-expected decline in NO_x emissions from diesel vehicles (even as new Euro standards have been introduced), coupled with an overall increase in the number of diesel vehicles on the road.

C.23 The vehicle emission factors used in this assessment are from Defra's Emission Factor Toolkit (EFT v13.1), which is the most up-to-date version available.

C.24 NO_x to NO_2 Conversion

C.25 In accordance with the guidance within LAQM.TG (22), the ADMS-Roads model has been run to predict the road-contribution NOx concentrations for each receptor location. These have then been converted to NO_2 concentrations using the Defra NOx to NO_2 calculator.

C.26 Model Validation and Verification

C.27 LAQM.TG (22) refers to model validation as "the general comparison of modelled results against monitoring data carried out by model developers". ADMS-Roads is widely accepted by regulatory authorities for use in this type of assessment.

C.28 Model verification is used to check the performance of the model at a local level. The verification of the ADMS-Roads air dispersion model is achieved by modelling concentration(s) at existing monitoring location(s) in the vicinity of the proposed development and comparing the modelled concentration(s) with the measured concentration(s).

C.29 Following review of the 2024 Annual Status Report (ASR) for Greater Manchester Combined Authority, which includes monitoring data from Manchester City Council, it is understood there are three roadside air quality monitoring locations in close proximity to the proposed development site where traffic data was available.

C.30 The monitoring data that has been used in the model verification procedure is detailed in Table 18.

Monitoring Location Reference	Type	Grid reference		2023 Bias Adjusted NO_2 Annual Average Concentration (µg/m³)
		X	Y	
Manchester Oxford Road	Kerbside	384239	397276	**40.9 (35.6*)**
MA24NO	Kerbside	383968	398070	29.8
MA29ANO	Roadside	384119	397503	**49.6**
MA82NO MA83NO MA84NO	Roadside	384239	397276	**41.4**

*distance corrected, therefore not relevant

Table 18: NO_2 Monitoring Data Used for Verification Purposes

C.31 Manchester Oxford Road also monitors PM_{10}, however there are no suitable $PM_{2.5}$ monitoring locations are situated along roads where traffic flow data is available, it has not been possible to carry out model verification for modelled $PM_{2.5}$ concentrations. Based on this the PM_{10} verification is considered appropriate for the $PM_{2.5}$ modelling.

Monitoring Location Reference	2023 PM_{10} Annual Average Concentration (µg/m³)	24-Hour Mean PM_{10} Monitoring Results, Number of PM_{10} 24-Hour Means > 50µg/m³
Manchester Oxford Road	20.5	1

Table 19: PM_{10} Monitoring Data Used for Verification Purposes

C.32 NO_2

C.33 The modelled road-contribution NOx concentration for the diffusion tubes has been compared against the measured road-contribution NOx concentration for the same location. The measured concentrations have been derived using the Defra NOx to NO_2 calculator, taking into account the background NOx concentration for the local area.

C.34 The comparison is shown in the below graph. The equation of the trend line is based on linear regression through zero, which provides an overall adjustment factor of 2.2751, as shown in Figure 7.

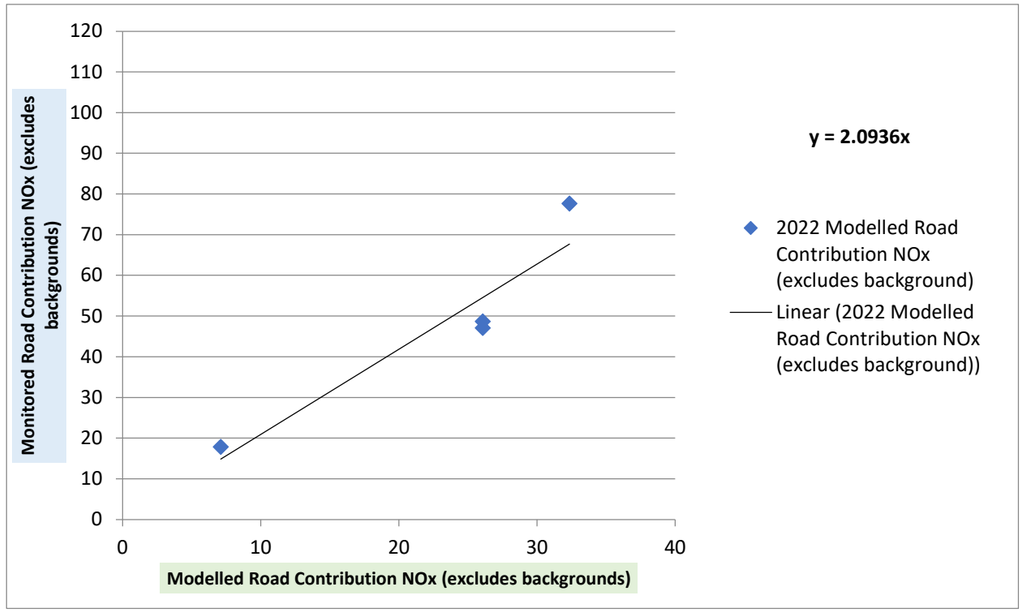


Figure 7: NO_2 Verification Factor

C.35 A final comparison has been made between the total measured NO_2 concentrations and total modelled NO_2 concentrations, as shown in Table 20. Following adjustment, modelled concentrations are within 5% of measured concentrations. A Root Mean Square Error (RMSE) calculation has been undertaken as part of the model verification for NO_2 concentrations. This has been carried out for the monitoring location included within the model verification, in accordance with the guidance detailed in LAQM.TG (22).

Monitoring Location Reference	Monitored Concentration (µg/m³)	Predicted Modelled Concentration (µg/m³)	Difference	Difference (%)	RMSE
Manchester Oxford Road	40.9	43.6	2.7	6.6	2.6
MA24NO	29.8	28.2	-1.6	-5.5	
MA29ANO	49.6	46.1	-3.5	-7.1	
MA82NO MA83NO MA84NO	41.4	43.6	2.2	5.3	

Table 20: Comparison between Monitored and Predicted NO_2 Concentrations and RMSE Calculation

C.36 LAQM.TG (22) states that "ideally an RMSE value within 10% of the objective would be derived", a value of within 25% is considered acceptable. The results of the calculation show that following model verification, the RMSE value is within 10% (i.e., 4µg/m³) of the objective (i.e., 40µg/m³). Therefore, the model is considered to be performing to an acceptable standard.

C.37 PM_{10}

C.38 The modelled road-contribution PM_{10} concentration from the automatic monitor has been compared against the measured road-contribution PM_{10} concentration for the same location, which provides an overall adjustment factor of 4.814.

C.39 Proposed Sensitive Receptors

C.40 Receptors for the development were modelled at ground (DR1 – DR9) and first-floor level (DR11 – DR20), since pollutant concentrations are generally greatest at lower elevations. The locations are identified in



Figure 8 : Development Receceptor Locations

C.41 The predicted pollutant concentrations at proposed sensitive receptors are detailed in Table 21.

Receptors	2028 Calculated Annual Mean Concentration (µg/m³)		
	NO_2	PM_{10}	$PM_{2.5}$
DR1	22.8	17.0	9.1
DR2	22.6	16.8	9.0
DR3	23.0	17.0	9.1
DR4	22.8	16.9	9.0
DR5	22.2	16.5	8.8
DR6	21.9	16.4	8.7
DR7	21.7	16.3	8.7
DR8	21.9	16.4	8.8
DR9	22.2	16.7	8.9
DR10	22.2	16.6	8.9
DR11	22.7	16.9	9.0
DR12	22.5	16.7	9.0
DR13	22.8	16.9	9.0
DR14	22.7	16.8	9.0
DR15	22.1	16.5	8.8
DR16	21.9	16.3	8.7
DR17	21.7	16.3	8.7
DR18	21.9	16.4	8.8
DR19	22.2	16.6	8.9
DR20	22.2	16.6	8.9

Table 21: Predicted Pollutant Concentrations at Proposed Sensitive Receptors

C.42 As shown in Table 21, pollutant concentrations at proposed receptors are below the relevant objectives and limit values, and therefore no mitigation is required.

Appendix D Professional Experience of Assessor

D.1 The assessment of air quality impacts, and the significance of the associated effects, takes into account the professional judgement of the assessor. Details of the experience of the personnel involved with the project are provided below:

Chrissie Park **Senior Consultant**
BSc, MIAQM, MIEnvSc, TechIOA

Chrissie has been working in consultancy for nearing thirteen years and joined Apex in March 2025. Over her career she has gained detailed knowledge of air quality assessments for a variety of developments, including residential, commercial, industrial and quarry applications. She is involved in all aspects of the assessment, from carrying out air quality monitoring studies to analysing data, modelling and writing technical reports or chapters as part of an Environmental Statement. Chrissie also carries out odour assessments, again being involved in all aspects of the assessment.