

Hydrock now Stantec

Plot 9b First Street

Air Quality Technical Appendix 7.1

For *Vita Meadow Ltd*

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1. Introduction

Hydrock have been commissioned by Vita Meadow Ltd (the 'Applicant') to prepare an Air Quality Assessment (AQA) to support the planning application for the student development (the 'Proposed Development') known as Plot 9b First Street (the 'Site'). The Site is within the administrative boundary of Manchester City Council (MCC) and is centred on the National Grid Reference (NGR); x383730, y397240, as shown in Figure 1.

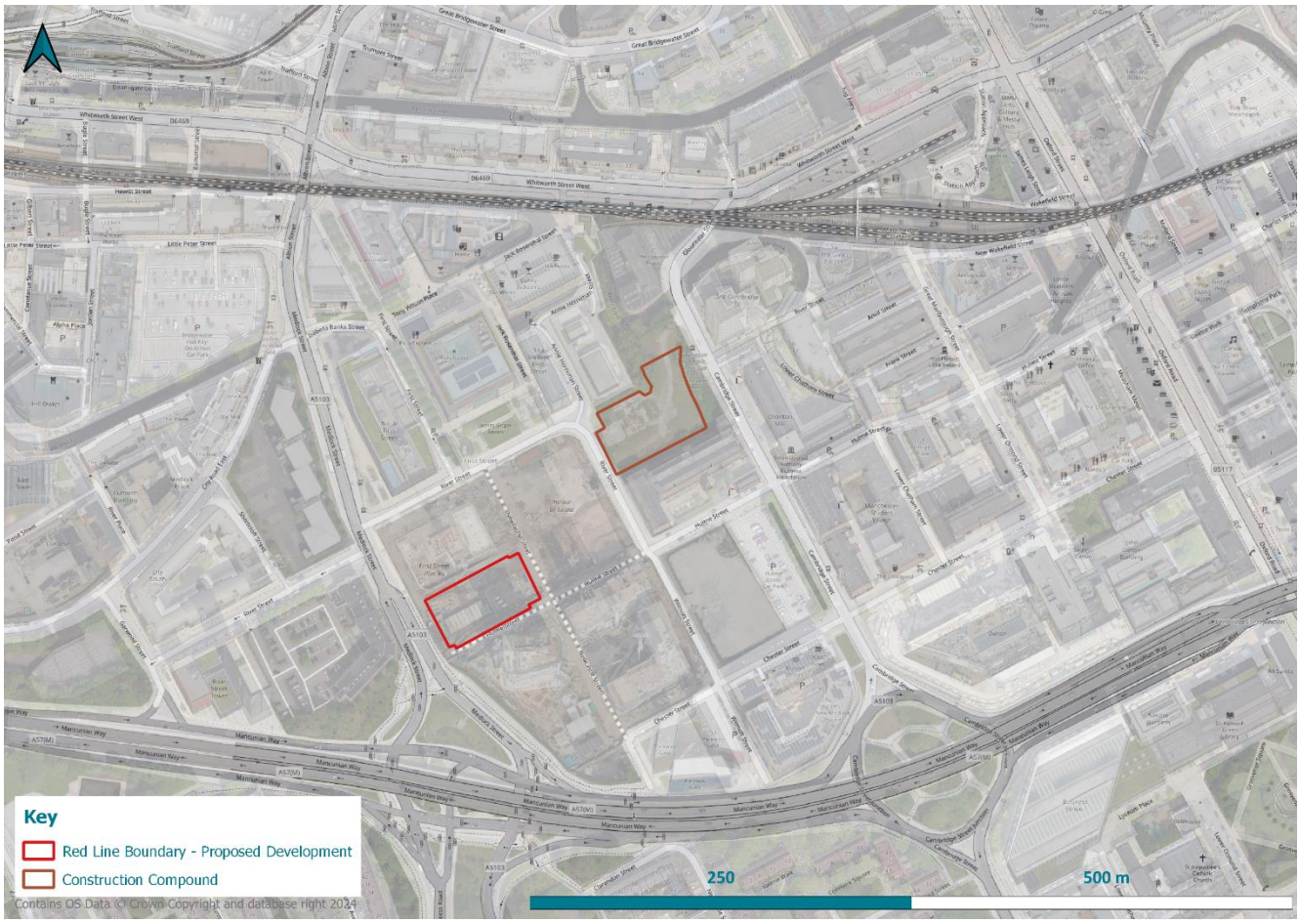


Figure 1: Site Location

The Site is located in the centre of Manchester. The closest main road links to the Site are Medlock Street immediately to the west, Princess Parkway (A57(M)) approximately 90m south and Whitworth Street West approximately 250m north. The Site is existing brownfield land which has been allocated for the proposed site use.

There are two redline boundaries shown above. These relate to the following:

> *"The Site comprises two areas. The Proposed Development will be located entirely on 'Plot 9B', bound to the west by Medlock Street; to the north by land at Plot 9A of the FSDF area 5 (currently being redeveloped into an office block of up to 9 storeys (pursuant to Planning Permission 132600/FO/2021)); to the east by land at Plot 10A (currently being redeveloped into an office block of up to 13 storeys (pursuant to Planning Permission 136043/FO/2023)); and to the south east by Hulme Street and land at Plot 11 of the FSDF area (currently being redeveloped to deliver three co-living buildings of up to 45 storeys (pursuant to Planning Permission 125573/FO/2019 (as amended)). Plot 9B measures approximately 0.25ha.*

The area bound by the River Irvell to the north; Cambridge Street to the east; Machintosh Mills to the south and river street and Annie Hornian Street to the west will be used as a site compound for the construction phase of works (the 'Construction Compound'). The Construction Compound, and comprises an area of vacant, brownfield land.

1.1 Proposed Development

The Proposed Development seeks Full Planning Permission for:

"Erection of a purpose-built student accommodation (PBSA) building (Sui Generis), alongside ancillary amenity space, landscaping, secure cycle parking and other associated works; and use of Land east of River Street as a construction compound".

1.2 Purpose of Air Quality Assessment

The purpose of this assessment is to provide:

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

2. Relevant Legislation

2.1 Air Quality Regulations and Objectives

There are two sets of air quality legislation which include ambient air quality thresholds for the protection of public health that apply in England, these include legally binding limit values originally set by the European Union (EU) Directive 2008/50/EC[1] on ambient air quality and cleaner air for Europe; and regulations implementing national air quality objectives as set out in the 2023 Air Quality Strategy for England (AQS)[2] which local authorities are required to work towards achieving. In Northern Ireland and Scotland, the AQS (Volume 1)[3] remains in force.

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

- Air Quality Regulations (SI 2010 No.1001)[4] and amended (SI 2016 No.1184)[5];
- The Air Quality (Amendment of Domestic Regulations) (EU Exit) Regulations 2019 (SI 2019 74)[6];
- The Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020 (SI 2020 1313)[7] amend the Air Quality Regulations (SI 2010 No.1001) to account for EU withdrawal; and
- The AQS objectives are implemented in the Air Quality (England) Regulations 2000 (SI 2000/928)[8] and Air Quality (England) (Amendment) Regulations 2002 (SI 2002/3043)[9].

The 2023 AQS sets out the government's policies and framework for improving air quality in England with the aim of meeting the requirements of above legislation The AQS also outlines the Limit Values, Target Values, Standards, Objectives, Critical Levels and Exposure Reduction Targets for the protection of human health and the environment (collectively termed AQALs throughout this report). The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023[10] also brought forward a new target level for $PM_{2.5}$. Those relevant to this assessment is provided below, in Table 1:

Table 1: National AQALs

Pollutant	Averaging Period	AQALs	
NO_2	1 Hour Mean	200µg/m^3	Not to be exceeded more than 18 times in a year.
	Annual Mean	40µg/m^3	
PM_{10}	24 Hour Mean	50µg/m^3	Not to be exceeded more than 35 times in a year.

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

2 Defra. "The Air Quality Strategy for England, Scotland, Wales and Northern Ireland". Available at: https://www.gov.uk/government/publications/the-air-quality-strategy-for-england

3 The air quality strategy for England, Scotland, Wales and Northern Ireland: Volume 1, Available at: https://www.gov.uk/government/publications/the-air-quality-strategy-for-england-scotland-wales-and-northern-ireland-volume-1

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

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

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

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

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

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

10 https://www.legislation.gov.uk/uksi/2023/96/contents/made

Pollutant	Averaging Period	AQALs	
	Annual Mean	40µg/m^3	
$PM_{2.5}$	Annual Mean	20µg/m^3	
	Annual Mean Concentration Target (AMCT)	10µg/m^3	To be met across England by 2040
	-	Population Exposure Reduction Target ('exposure target')	35% reduction in population exposure by 2040 (compared to a base year of 2018).

With reference to the Annual Mean Concentration Target (AMCT) for $PM_{2.5}$, it should be noted that that the date for compliance is 2040. The applicable $PM_{2.5}$ AQAL for the purposes of this assessment is therefore the current AQAL of 20µg/m^3.

Defra's Local Air Quality Management Technical Guidance 2022 (LAQM.TG(22))[11] provides guidance on where the above AQAL's should apply. This is summarised below, in Table 2.

Table 2: Summary of where AQALs should apply

Averaging Period	Objectives should apply at:	Objectives should generally NOT apply at:
Annual Mean	All locations where members of the public might be regularly exposed. Building facades of residential properties, schools, hospitals, care homes etc.	Building facades of offices or other places of work where members of the public do not have regular access. Hotels, unless people live there as their permanent residence. Gardens of residential properties. Kerbside sites (as opposed to other locations at the building façade) or any other location where public exposure is expected to be short term.
24 Hour Mean and 8 Hour Mean	All locations where the annual mean objective would apply, together with hotels. Gardens of residential properties	Kerbside sites (as opposed to other locations at the building façade) or any other location where public exposure is expected to be short term.

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

Averaging Period	Objectives should apply at:	Objectives should generally NOT apply at:
1 Hour Mean	All locations where the annual Mean and: 24 and 8-hour mean objectives apply. Kerbside site (for example, pavements of busy shopping streets). Those parts of car parks, bus stations and railways stations etc. which are not fully enclosed, where members of the public might be expected to spend one hour or more. Any outdoor locations where members of the public might reasonably expect to spend one hour or longer.	Kerbside sites where the public would not be expected to have regular access.
15 Minute Mean	All locations where member of the public might reasonably be exposed for a period of 15 minutes	

2.2 Local Air Quality Management

Obligations under the Environment Act 2021[12] (which provides an amendment to the Environment Act 1995[13]) requires local authorities to review and assess air quality in their administrative boundaries. Where AQALs are predicted to be exceeded, the local authority must declare an Air Quality Management Area (AQMA) at sensitive receptor locations and formulate an Air Quality Action Plan (AQAP) to reduce pollution concentrations to values below AQALs.

MCC's declared AQMAs and AQAP are discussed in Section 4.1.

2.3 National Planning Policy Framework

The National Planning Policy Framework (NPPF)[14] sets out the Government's planning policy for England. It requires planning decisions for any new development to prevent new and existing development from contributing to, or being put at risk from, unacceptable levels of air pollution (paragraph 180). It also states that planning decisions should sustain and contribute towards compliance with relevant limit values or national objectives for air pollutants, taking into account the presence of AQMAs and Clean Air Zones (CAZ)s (paragraph 192), and the cumulative impacts from other sites (paragraph 191).

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

12 https://bills.parliament.uk/bills/2593/publications

13 Environment Agency, "Environment Act 1995" (The Environment Agency, 2002),http://www.legislation.gov.uk/ukpga/1995/25/contents.

14 Ministry of Housing, Communities and Local Government, "National Planning Policy Framework," December 2023, National Planning Policy Framework - GOV.UK (www.gov.uk)

Also, to help reduce congestion and emissions, to improve air quality and public health, significant development should be focused on locations which are / can be made sustainable through limiting the need to travel (paragraph 109).

2.4 Planning Practice Guidance

Reference ID 32 (Air Quality) of the National Planning Practice Guidance (NPPG)[15], which was updated in November 2019, provides guiding principles on how planning can take account of the impact of new development on air quality. The NPPG summarises the importance of air quality in planning and the key legislation relating to it.

2.5 Local Planning Policy

The Manchester Local Plan guides development within Manchester. The Core Strategy[16] was adopted on 11th July 2012 and is the key document in the Manchester Local Plan. It sets out the long-term strategic policies for future development in Manchester. Within the Core Strategy Policy EN16 relates to air quality as follows:

> *"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 development the Council will consider the impacts on air quality, alongside other plan objectives. This includes cumulative impacts, particularly in Air Quality Management Areas"*

The Core Strategy goes further in stating that:

> *"Whilst this policy seeks to improve air quality within Manchester's AQMA it also applies across the District in order to assist air quality across Manchester remaining at acceptable levels. It should be noted that other policies within the Core Strategy will guide the location of development in order to reduce the need for private transport and encourage the use of decentralised and renewable energy and green infrastructure to reduce both emissions and their impact still further."*

Policy DM 1 'Development Management' also includes a reference to air quality, stating that:

> *"all development should have regard to effects on amenity, including air quality".*

The GMCA adopted their Places for Everyone Plan[17] on 21st March 2024. Places for Everyone is a long-term plan of nine Greater Manchester districts for jobs, new homes, and sustainable growth up to 2039. The following policy relates to air quality:

> *"Policy JP-S5*
>
> *Clean Air*

15 Ministry of Housing, Communities & Local Government, "Reference ID (32) Air Quality" (Ministry of Housing, Communities & Local Government, 2023), https://www.gov.uk/guidance/air-quality--3.

16 Manchester City Council, "Manchester's Local Development Framework, Core Strategy Development Plan Document, July 2012, Core Strategy | Manchester City Council

17 https://www.greatermanchester-ca.gov.uk/media/9578/places-for-everyone-joint-development-plan-document.pdf

A comprehensive range of measures will be taken to support improvements in air quality, focusing particularly on locations where people live, where children learn and play, where there are impacts on the green infrastructure network and where air quality targets are not being met, including:

1. Locating and designing development, and focusing transport investment, so as to reduce reliance on forms of transport that generate air pollution;

2. Determining planning applications in accordance with the most recent development and planning control guidance published jointly by the Institute of Air Quality Management (IAQM) and Environmental Protection UK (EPUK), and the most recent IAQM Guidance on the Assessment of Dust from Demolition and Construction, or relevant successor guidance, including the requirement for developers to submit construction management plans as appropriate;

3. Requiring applications for developments that could have an adverse impact on air quality to submit relevant air pollution data so that adverse impacts on air quality can be fully assessed and development only permitted where they are acceptable and/or suitable mitigation can be provided;

4. Restricting and carefully regulating developments that would generate significant point source pollution such as some types of industrial activity and energy generation;

5. Significantly expanding the network of electric vehicle charging points, both for public and private use, including as part of new developments;

6. Implementing the Clean Air Plan and associated measures;

7. Facilitating the more sustainable distribution of goods within the urban area, including through accommodating urban consolidation centres and urban distribution centres that use ultra-low-emission vehicles, and local delivery facilities to reduce repeat delivery attempts;

8. Designing streets to avoid trapping air pollution at ground level, including through the appropriate location and scale of buildings and trees;

9. Controlling traffic and parking within and around schools, early years sites and other locations that are particularly sensitive to air quality;

10. Promoting actions that help remove pollutants from the air, such as enhancing the green infrastructure network and using innovative building materials that capture air pollutants; and

11. Development should be located in areas that maximise the use of sustainable travel modes and be designed to minimise exposure to high levels of air pollution, particularly for vulnerable users."

3. Methodology

3.1 Consultation

Full details of the AQA approach were sent to MCC Environmental Health Officer (EHO) in June 2024. The following response was received:

> *"Your proposals seem reasonable to me.*
>
> *Not withstanding the outcome of the assessment best practice principles from the IAQM will still need to be applied (i.e. charging points)."*

3.2 Guidance

The following guidance has been used to undertake this AQA:

- Defra's LAQM.TG(22)[11];
- Environmental Protection UK (EPUK) & IAQM Land-use Planning & Development Control: Planning for Air Quality[18]; and,
- The IAQM's guidance on assessing impacts from construction[19]; and
- MCC's Air Quality & Planning Technical Guidance[20].

3.3 Baseline Air Quality

The baseline air quality conditions in the vicinity of the Site have been established through the compilation and review of the following sources. The baseline assessment can be found in Section 4.

- Data from the National Atmospheric Emissions Inventory (NAEI)[21], Environment Agency (EA)[22] and Defra's Pollutant Release and Transfer Register (PRTR) data[23];
- Defra's modelled background concentrations of AQS pollutants (UK-AIR)[24]. These estimates are produced using detailed modelling tools and are available as concentrations at central 1km^2 National Grid square locations across the UK. Mapped background concentrations have been obtained based upon the 2018 base year Defra update (August 2020 publication);
- Defra's predicted roadside concentrations of NO_2 produced from their pollution climate mapping (PCM)[25] model;
- Multi Agency Geographic Information for the Countryside (MAGIC)[26], which incorporates Natural England's interactive maps and;
- MCC's latest available air quality monitoring data, derived from the latest available air quality annual status report published in 2023[27] and Clean Air Manchester Data Hub[28].

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

19 IAQM, "Guidance on the Assessment of Dust from Demolition and Construction" (Institute of Air Quality Management (IAQM)), January 2024 version 2.2), https://iaqm.co.uk/wp-content/uploads/2013/02/Construction-Dust-Guidance-Jan-2024.pdf.

20 Manchester City Council, Air Quality & Planning Technical Guidance, August 2022, https://www.manchester.gov.uk/downloads/download/5199/information_for_developers.

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

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

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

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

25 https://uk-air.defra.gov.uk/data/gis-mapping/

26 https://magic.defra.gov.uk/MagicMap.aspx

27 Greater Manchester Combined Authority, 2023 Air Quality Annual Status Report (ASR), In fulfilment of Part IV of the Environment Act 1995 Local Air Quality Management, June 2023.

28 https://cleanairgm.com/data-hub/

3.4 Construction Phase Assessment

3.4.1 Dust Risk Assessment

The construction dust risk assessment is provided in Section 5 and has been undertaken in line with IAQM guidance[19]. This considers the risk of impacts during the construction phase in terms of nuisance dust, human health (PM_{10} exposure) and ecological impacts.

With regard to ecological receptors, risk assessment should be taken where high-sensitivity receptors are located within 50m of a Site boundary, or within 50m of any routes used by construction vehicles on the public highway, up to 250m from the Site entrance. The MAGIC website[26] has been reviewed to identify whether any statutory ecological sensitive receptors present in the area. *No receptors were identified within 50m of the Site boundary or expected Trackout route and therefore no further consideration of ecological receptors is required.*

Sensitive receptors were identified within 250m of the Site boundary. Based on the IAQM guidance residential dwellings, museums, car parks and car show room are indicative examples of high sensitivity receptors in relation to both dust soiling and health effects of PM_{10}. Indicative examples of medium sensitivity receptors include places of work, such as offices.

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

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

3.4.2 Construction Traffic Emissions

The IAQM guidance[19] states that from experience of assessing exhaust emissions from site traffic, it is unlikely that any significant adverse impacts on local air quality would be caused and in the vast majority of cases, quantitative assessment is not needed. Construction traffic data is not currently available and as such, short term effects of construction traffic emissions have not been assessed. It is considered that they are likely to be well below the EPUK & IAQM guidance[18] traffic criteria outlined in Table 3.

3.5 Operational Phase Assessment

3.5.1 Scope of Impact Assessment

The scope of assessment has been determined against the EPUK and IAQM's two stage checklist criteria[18] which is also stated within the MCC Air Quality & Planning Technical Guidance[20]. The Proposed Development meets the Stage 1 Criteria for requiring an AQA and accordingly, has been considered against the relevant Stage 2 checklist criteria shown in Table 3 which identifies whether a detailed assessment of potential air quality impacts is required.

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

Table 3: EPUK & IAQM Assessment Criteria

Criteria	The Development Will:	Indicative Criteria to Proceed to a Detailed AQA:
1	Cause a significant change in Light Duty Vehicle (LDV) traffic flows on local roads with relevant receptors. (LDV - cars and small vans <3.5t gross vehicle weight)	A change of LDV flows of: » more than 100 AADT within or adjacent to an AQMA » more than 500 AADT elsewhere
2	Cause a significant change in Heavy Duty (HDV) flows on local roads with relevant receptors (HDV = goods vehicles + buses >3.5t gross vehicle weight).	A change of HDV flows of: » more than 25 AADT within or adjacent to an AQMA » more than 100 AADT elsewhere.
3	Have one of more substantial combustion processes, where there is a risk of impacts at relevant receptors. NB. This includes combustion plant associated with standby emergency generators (typically associated with centralised energy centres) and shipping.	Typically, any combustion plant where the single or combined NOx emission rate is less than 5mg/sec is unlikely to give rise to impacts, provided that the emissions are released from a vent stack in a location and at a height that provides adequate dispersion. In situations where the emissions are released close to buildings with relevant receptors, or where the dispersion of the plume may be adversely affected by the size and/or height of adjacent buildings (including situation where the stack height is lower than the receptor) then consideration will need to be given to potential impacts at much lower emissions rates. Conversely, where existing nitrogen dioxide concentrations are low, and where the dispersion conditions are favourable, a much higher emission rate may be acceptable.

As the Site is located within the Greater Manchester Combined Authority (GMCA) AQMA the more stringent criteria from Table 3 apply. SLR Consulting, have confirmed the Proposed Development is anticipated to generate vehicle trips below the threshold and therefore detailed assessment of air quality impacts from generated traffic is not required. Further detail on trip generation can be found in Section 6.1.

The proposed energy strategy for the Proposed Development is to utilise air source heat pumps (ASHP) for the domestic hot water, these will be located on the roof. All homes and corridors will utilise electric panel heaters. A variable refrigerant flow (VRF) system with fan coils will supply all amenity areas for heating and cooling. Mechanical Ventilation and Heat Recovery (MVHR) systems will supply all areas of the building, apart from bike stores, bin stores etc, which will be extract only. As such, no combustion is proposed as part of the Proposed Development and no further assessment is required.

However, the Proposed Development comprises high sensitivity use (residential) and therefore a detailed dispersion modelling assessment of Site suitability has been undertaken, according to the methodology outlined below.

3.6 ADMS-Urban Dispersion Model

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

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

3.6.1 Assessment Scenarios

The following scenarios have been modelled:

- Baseline/verification 2022; and
- 2028 Do Something (2028 DS) – baseline traffic in addition to proposed development traffic.

3.6.2 Model Inputs

3.6.2.1 Traffic Data

The traffic data for the dispersion modelling has been provided by the appointed Trasport Consultants on the project, SLR. Additionally, the 2022 baseline traffic data comprises AADT flows sourced from the Department for Transport (DfT)[29], which contains traffic flows for all motorways and major A-roads throughout the UK. The following count points have been used within this AQA:

- Medlock Street, DfT count point 57700;
- A57(M) West of A5103 DfT count point 46068;
- A57(M) East of A5103, DfT count point 75244; and
- Princess Street, South of A57(M), DfT count point 80941and 75245.

The Transport Consultants, SLR Consulting, have produced a Technical Memorandum with regards to the application of Traffic growth in Manchester. The Technical Memorandum can be viewed in Appendix A. The Technical Memorandum concludes:

> *"[…] over 20 years traffic has been falling by around 10,000 vehicles coming into the City Centre. For this reason, it is not appropriate to apply future year growth to traffic flows within the city centre and that it is reasonable to assume that existing flows will not increase in the future."*

As such, 2022 base traffic has not had an opening year growth factor applied and is considered a robust traffic count for 2028.

The traffic data comprises Annual Average Daily Traffic (AADT) flows with traffic split by Heavy Duty Vehicles (HDVs) and Light Duty Vehicles (LDVs). The modelled road links are shown in Figure 2 below, with full details provided in Appendix A.

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

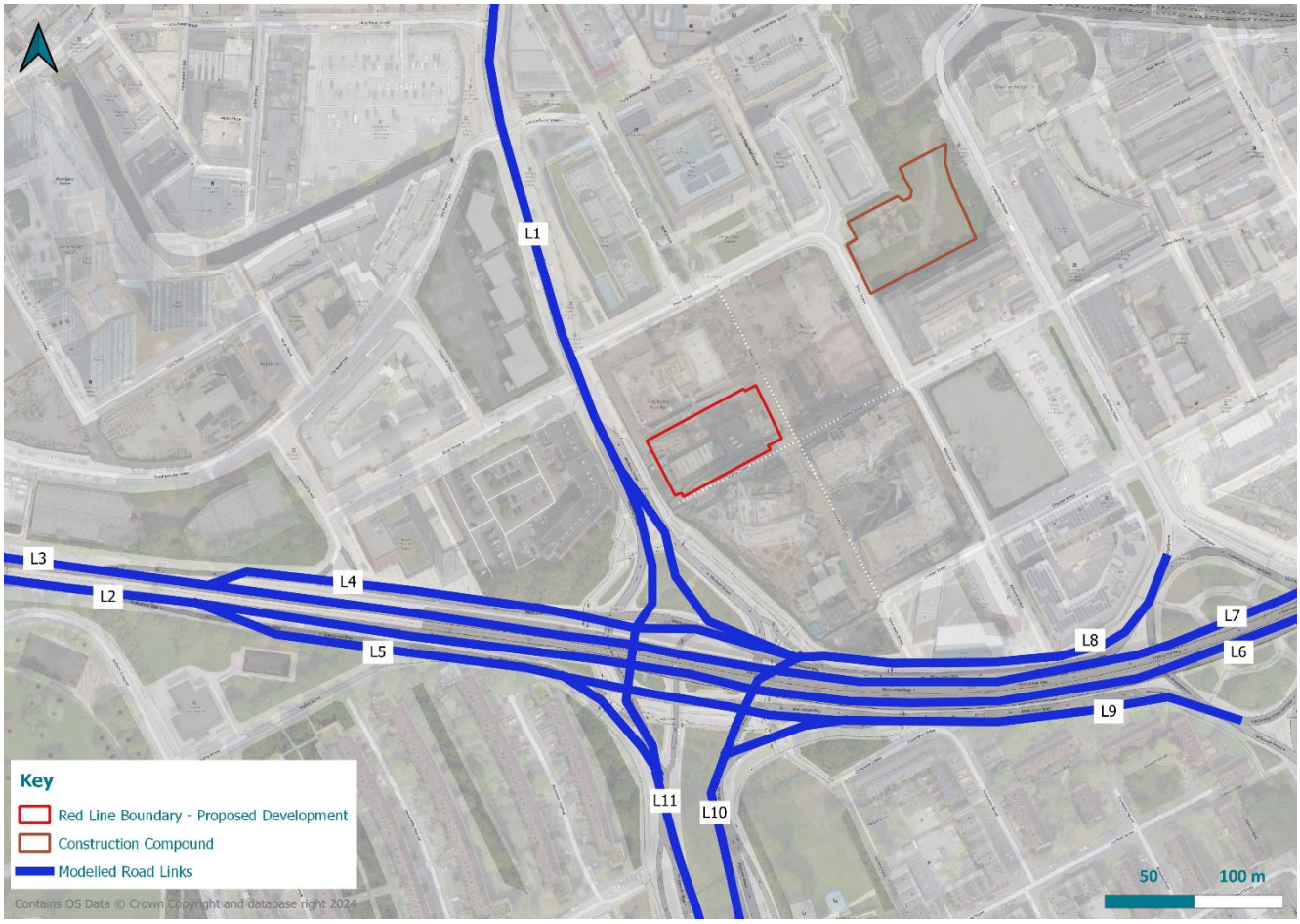


Figure 2: Links Modelled

For each road link, vehicle speeds were obtained from the speed limit for each road derived from the OpenStreet Browser v4.10[30], which has been used as a proxy for average speeds on the network. Vehicle speeds were reduced within approximately 50m of junctions relative to the speed limit to account for queuing and congestion in the average speed profile, in accordance with LAQM.TG (22), and based on professional judgement.

3.6.2.2 Emission Factors

Emission rates for NO_x, PM_{10} and $PM_{2.5}$ used for the dispersion modelling assessment were calculated from the latest Emissions Factor Toolkit (EFT)(v.12.1).

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

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

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

3.6.2.3 Temporal Variation (Diurnal Traffic Profile)

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

The diurnal profile used in the model has been calculated based on DfT Road traffic statistics (TRA) dataset. TRA0307 provides 'Motor vehicle traffic distribution by time of day and day of the week on all roads, Great Britain: 2022[31], which shows the average hourly traffic flow in each combination of weekday and hour, relative to the average hour across the whole year for main roads in England. Figure 3 shows the diurnal traffic profile included in the model.

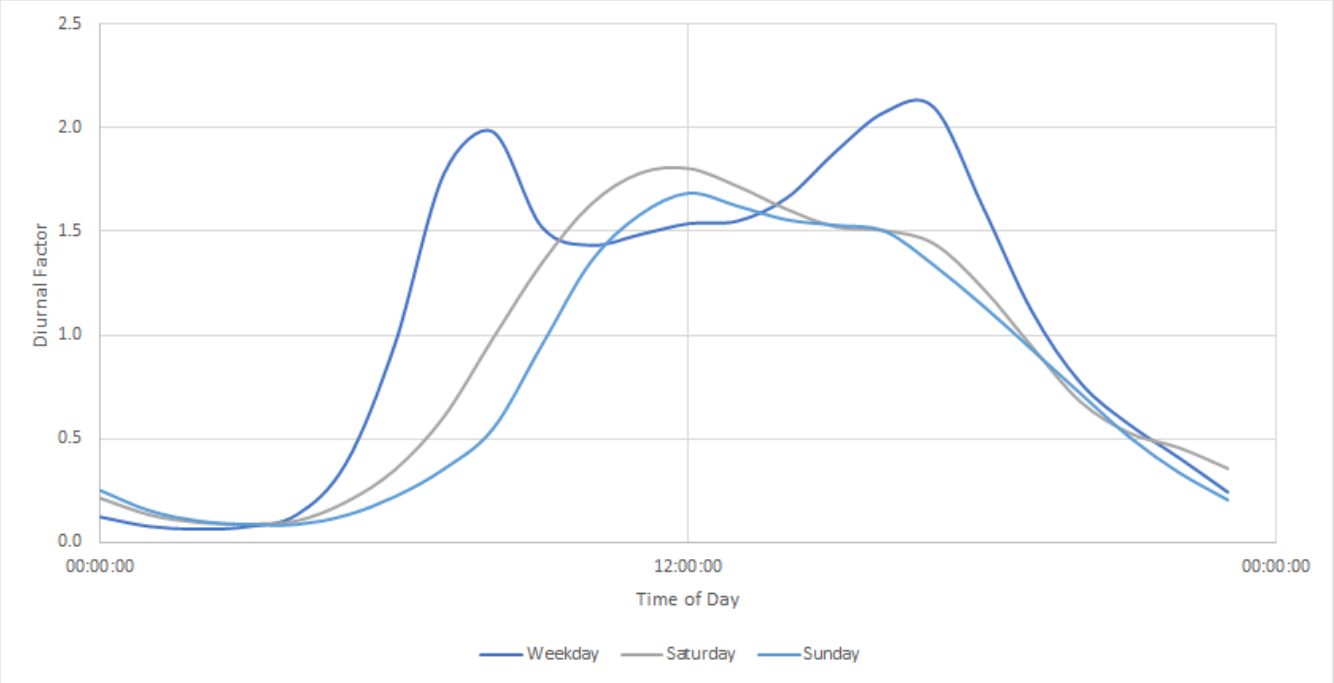


Figure 3: Diurnal traffic profile included in the dispersion model

3.6.2.4 Meteorological Parameters

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

The dispersion modelling has been undertaken using 2022 data from Manchester Meteorological station. This site is located approximately 12.3km south of the Proposed Development. It is the most relevant meteorological station that records all of the parameters necessary for dispersion modelling. Missing data has been infilled using Rostherne No2 Meteorological station. A wind rose is presented in Appendix B.

3.6.2.5 Surface Characteristics

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

- Dispersion site surface roughness = 1m (ADMS pre-set 'cities, woodland);
- Met site surface roughness = 0.02m (ADMS pre-set 'open grassland');

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

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

- Dispersion site = 30m (ADMS pre-set 'cities and large towns');
- Met site = 20m (ADMS pre-set between 'cities and large towns' and 'small towns <50,000).

3.6.3 Receptors Included in the Dispersion Model

3.6.3.1 Human Receptors

Sensitive receptor locations included in the dispersion model are shown below in Figure 4 and Table 4.These are worst-case locations within the Site based upon their proximity to the local road network. Locations have been determined using design drawings[32].

The height of each floor (Z) has been calculated using design drawings[33]. An additional 1.5m has been added to each floor to account for the breathing height of the proposed occupant.

Residential dwellings start at first floor and then continue at each floor. First, Second, Third and Fourth floor locations have been included within the model, with concentrations expected to decrease at additional heights (building is ground plus 33 floors of residential accommodation). In line with the London City Air Quality[34] document, air quality improves with height (at roadside locations) up to the fourth floor of typical buildings. Beyond this a further reduction is minimal. As such, the heights modelled are considered worst-case.

Table 4: Receptor Locations

Receptor ID	NGR (m)		Z (m)
	X	Y	
PR1	383706	397224	6.0, 9.5, 12.4, 15.3
PR2	383708	397219	6.0, 9.5, 12.4, 15.3
PR3	383711	397213	6.0, 9.5, 12.4, 15.3
PR4	383715	397205	6.0, 9.5, 12.4, 15.3
PR5	383728	397203	6.0, 9.5, 12.4, 15.3
PR6	383739	397209	6.0, 9.5, 12.4, 15.3
PR7	383748	397214	6.0, 9.5, 12.4, 15.3
PR8	383759	397219	6.0, 9.5, 12.4, 15.3
PR9	383764	397233	6.0, 9.5, 12.4, 15.3
PR10	383761	397239	6.0, 9.5, 12.4, 15.3
PR11	383757	397247	6.0, 9.5, 12.4, 15.3
PR12	383744	397246	6.0, 9.5, 12.4, 15.3
PR13	383708	397228	6.0, 9.5, 12.4, 15.3

32 Tim Groom Architects, Drawing No: 1207-TGA-XX-01-DR-A-10301, revision P10, General Arrangement – Level 01 Sketch.

33 Tim Groom Architects, Drawing No: 1207-TGA-XX-ZZ-DR-A-10500, revision P01.

34 CITY AIR QUALITY AT HEIGHT – Lessons for Developers & Planners, WSP and Parsons Brinkerhoff.



Figure 4: Receptor Locations

A grid of discrete receptor points was modelled across the Site and surrounding locale. The grid was made up of 101 x 101 modelled receptor points, at a representative 6m breathing height, originating at NGR 383622(x), 397109(y), with a spacing of 2.2m between the grid points.

As modelled concentrations decrease, the modelled 6m grid height, which is considered to be representative of first floor exposure, represents the worst case.

3.6.4 Model Adjustment

A verification study has been undertaken in accordance with LAQM.TG(22) using MCC monitoring data. An adjustment factor of **2.897** was applied to modelled road NO_x concentrations.

Due to insufficient PM monitoring in the study area, the modelled road-PM_{10} and road-$PM_{2.5}$ components have been adjusted by the NO_x verification factor obtained before adding to the appropriate background concentration, in accordance with LAQM.TG(22). This approach is considered likely to provide a conservative estimate of the contribution of modelled roads to ambient PM_{10} and $PM_{2.5}$ concentrations.

Root Mean Square Error (RMSE) is used to define the average error or uncertainty of the model. LAQM.TG(22) states that the RMSE is acceptable where it is within 25% and ideal within 10%. The model verification process calculated a post-adjusted RMSE of **2.0µg/m³**, which equates to **4.9%** of the annual mean AQAL for NO_2 and is therefore considered to be acceptable.

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

3.6.5 NO_x to NO_2 Conversion

Ambient NO_x concentrations have been predicted through dispersion modelling. Annual NO_x concentrations have been converted using Defra's NO_x to NO_2 conversion tool[35] version 8.1

3.7 Background Concentrations

Background concentrations used in the assessment are discussed further in Section 4.4.

3.8 Comparison with AQALs

3.8.1 Nitrogen Dioxide

Annual mean road NO_x predicted by the model was converted to annual mean NO_2 using the Defra NO_x to NO_2 calculator[35]. To determine short term (1 hour mean) concentrations, reference was made to LAQM.TG(22)[11], which states if annual mean concentrations of NO_2 do not exceed 60µg/m^3, it is unlikely hourly mean concentrations would exceed the relevant AQAL, which allows for 18 exceedances of the hourly standard (200µg/m^3) in a calendar year.

3.8.2 Particulate Matter

To determine total annual mean concentrations of PM_{10} and $PM_{2.5}$, the modelled road contribution was added to the background concentration to give the total concentration for comparison with the AQALs.

Annual mean PM_{10} concentrations were used to derive the potential number of exceedances of the 24-hour mean PM_{10} AQAL, of which 35 are allowed per year. The method described in LAQM.TG(22) was applied, which is based on the relationship between the number of 24-hour exceedances of 50µg/m^3 and the annual mean concentration. This relationship is described in Equation 1 below:

Equation 1:

Number of exceedances of 24-hour mean of 50µg/m^3 = -18.5 + 0.00145 * a^3 + (206/a)

where 'a' = total annual mean PM_{10} concentration.

3.9 Assessment of Significance

Professional judgement has been applied to determine whether exposure to air pollution is significant or not, based on the following criteria:

- Annual mean concentrations within 10% below or exceeding relevant AQAL = significant exposure; and
- Annual mean concentrations more than 10% below relevant AQAL = not significant.

The 10% threshold around an AQAL is generally considered to be the range at which a 'risk of exceedance' is present, according to LAQM.TG(22).

3.10 Model Limitations

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

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

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

- Emission Factors held at 2022 (no future improvements assumed);
- Background pollutant concentrations held at 2022 (no future improvements assumed); and
- Traffic data for the opening year has been utilised.

The above assumptions ensure a conservative approach in the assessment.

4. Baseline Air Quality Conditions

4.1 Local Air Quality Management

The Greater Manchester AQMA has been declared by the GMCA of which MCC is one of the included Local Authorities. The Greater Manchester AQMA has been declared for exceedances of the annual mean NO_2 AQAL and covers "*An Area covering the 10 districts of Greater Manchester, including arterial routes, district centres, and airport*." The Proposed Development is located within the AQMA.

The GMCA have an AQAP[36] to help reduce pollutants within this designated area. Actions include, promoting sustainable transport including buses, cycling and increased Electric Vehicle charging provision. In additional to providing resources to help raise awareness and educate.

4.2 Clean Air Zone

The Proposed Development is located within the proposed Greater Manchester CAZ which is currently 'in review'. The Greater Manchester Air Quality Administration Committee are currently deciding whether to approve the Mayor of Greater Manchester proposals for an investment-led Clean Air Plan.

In relation to the GM Air Quality Plan, there are 'at-risk' and 'over the legal limit' road links in the vicinity of the Site including Mancunian Way to the south[37].

4.3 Local Emission Sources

The main source of air pollution in the surrounding Site locale is considered to be emissions from vehicles using the local road network, predominantly Medlock Street to the west and Mancunian Way to the south.

There are no railway lines within close proximity to the Site. The closest line is the Manchester Piccadilly to Manchester Deansgate line is listed in Defra's table of 'Rail Lines with a Heavy Traffic of Diesel Passenger Trains'. However, the closest point of the track to the Site is approximately 230m north, which is well beyond the 30m screening distance. In addition, lines closer to the track are understood to be associated with the Manchester Metrolink, which is electrified. Therefore, railway emissions are not considered to be a significant source of local pollution and do not require further assessment.

A review of the NAEI[21], EA[22] and Defra's PRTR[23] data indicates 1 industrial point source within 500m of the Site. Details are shown in the table below.

Table 5: NAEI Large Point Sources within 500m of the Proposed Development

Plant ID and Operator	Authorisation / Permit Number	Sector	NGR (m)		Distance / Direction from Proposed Development
			X	Y	
8705 Manchester Metropolitan University	NW/EPRUB3936AX/001 NW/EPRDP3526GN/001	Public administration	384200	397200	435m east

36 GREATER MANCHESTER AIR QUALITY ACTION PLAN 2016–2021, https://www.bing.com/search?q=GMCA+air+quality+action+plan&FORM=AWRE

37 GM Clean Air Plan Map | MappingGM, https://mappinggm.org.uk/clean-air-plan/#os_maps_light/10/53.5069/-2.3201

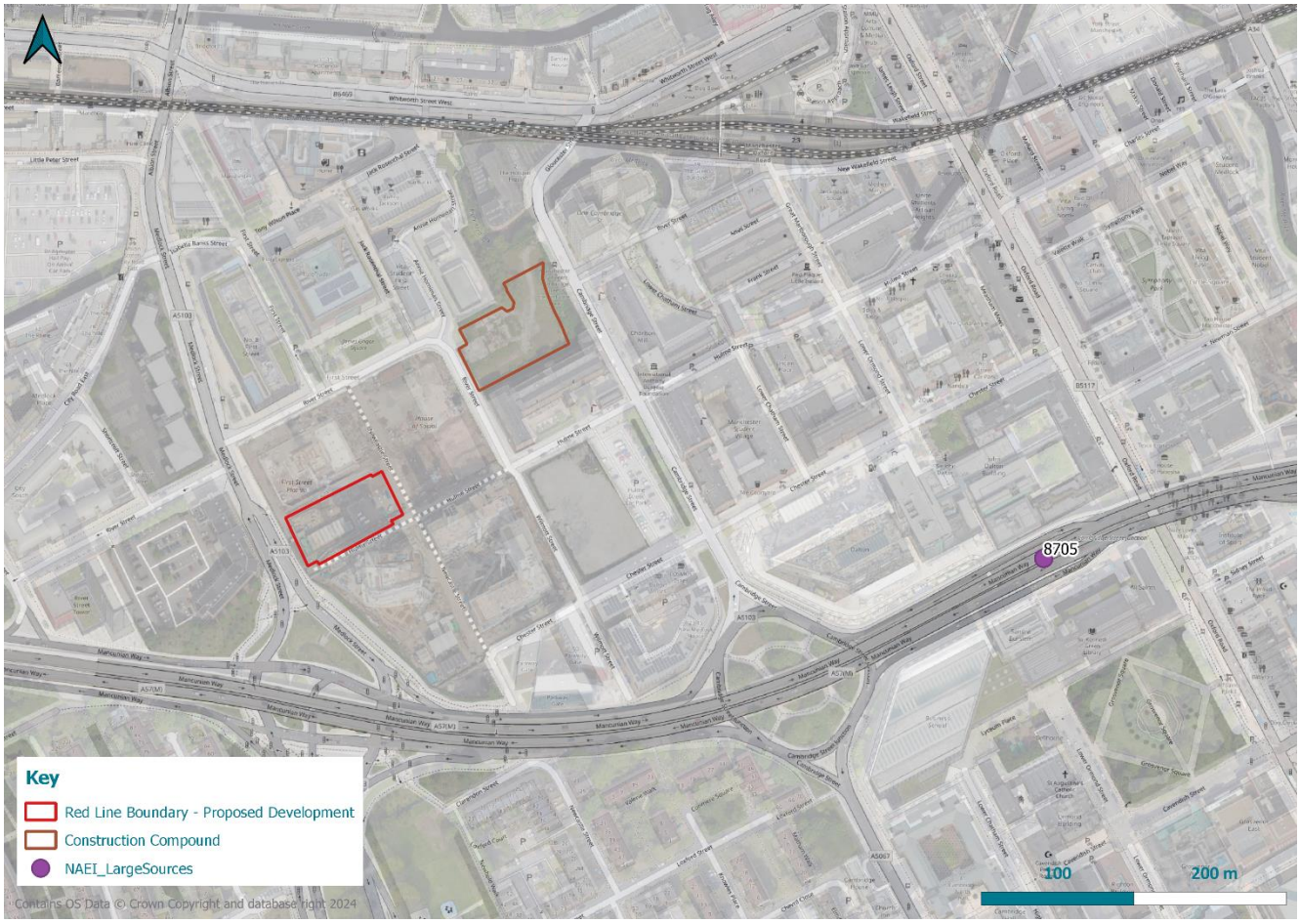


Figure 5: Local Emission Point Sources

It is understood that the above facility has the necessary Environmental Permits for potentially polluting activities (emissions to Air) which include provisions to reduce emissions to air. It has been reasonably assumed that emissions from the facilities contribute to background concentrations, as detailed below. Therefore, the contribution from these sources will be taken into account within the background concentrations within this AQA.

4.4 UK-AIR Background Concentrations

Background pollutant concentrations for 2022 (the base year) and 2024 (the assessment year) and 2028 (the proposed opening year) are displayed in Table 6.

Table 6: Defra Mapped Background Concentrations

Grid Square (x,y)	Pollutant	AQAL (µg/m³)	Annual Mean Concentration (µg/m³)		
			2022	2024	2028
383500, 397500	NO_2	40	22.8	21.3	19.1
	PM_{10}	40	12.9	12.7	12.5
	$PM_{2.5}$	20	8.3	8.1	8.0

The data show that annual mean background concentrations of NO_2, PM_{10} and $PM_{2.5}$ at the grid squares within which the Site is located are below the AQALs in all years.

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

4.5 Pollution Climate Mapping

Defra's PCM model provides estimates of roadside concentrations of annual mean NO_2, which are used in reporting compliance with limit values. The model provides projected roadside concentrations of pollutants, for the years 2018-2030 inclusive, based on a 2018 base year.

All main road links, surrounding the Site have been included as PCM model links as illustrated in Figure 6. The 2023 roadside annual mean NO_2 concentrations are projected to be between 25.6µg/m^3 and 37.5µg/m^3 and therefore comply with annual mean AQAL. However, concentrations along Mancunian Way are within 10% of the AQAL. Roadside concentrations are predicted to decline incrementally year on year.

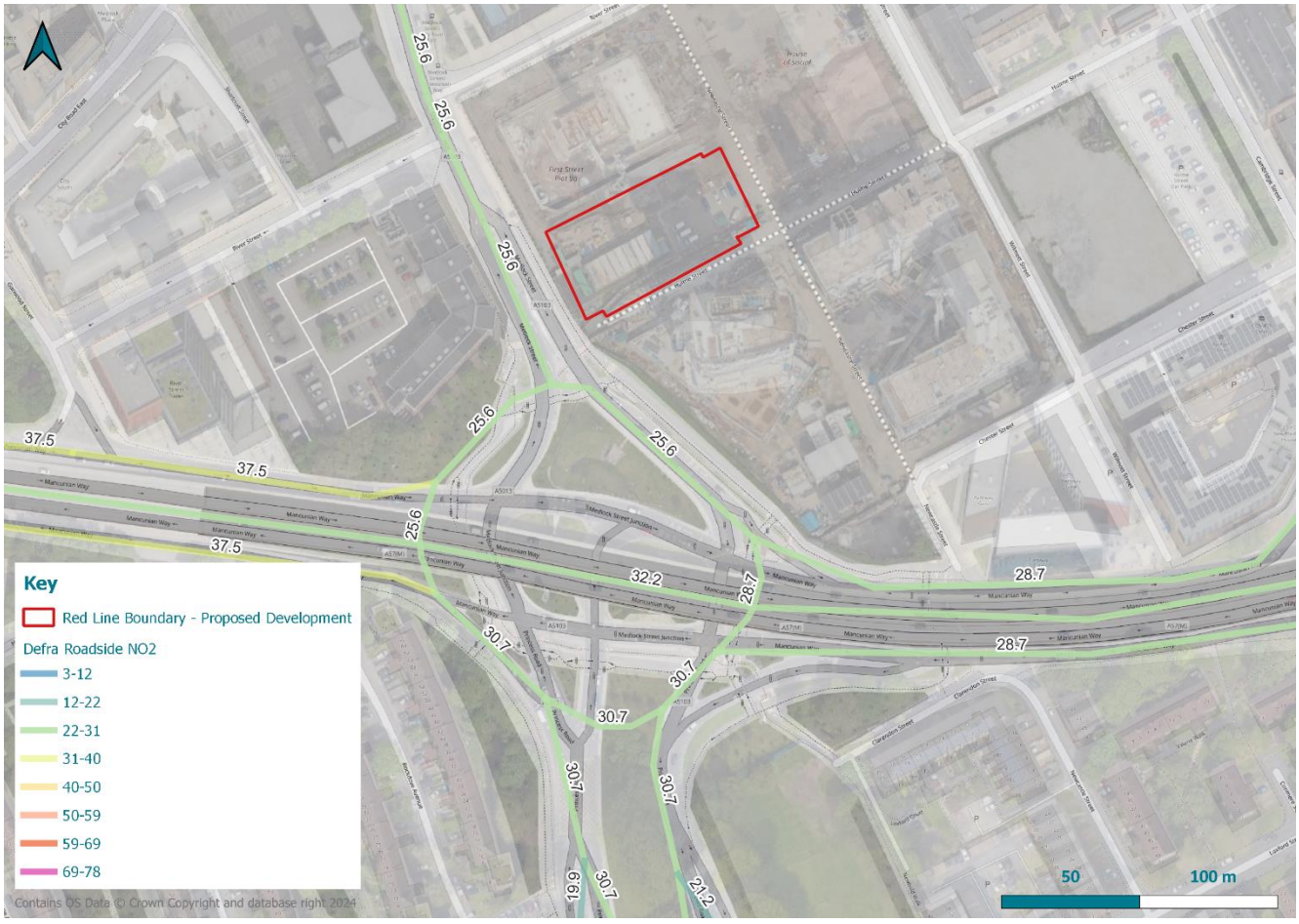


Figure 6: Defra Modelled PCM Roadside Annual Mean NO_2 Concentrations for 2023

4.6 Air Quality Monitoring Data

MCC monitor air quality at key locations across the City through a network of automatic (continuous) and non-automatic sites (passive diffusion tubes). The latest Annual Status Report[27] states that the monitoring network within Manchester consisted of 4 automatic monitors and 40 passive sites.

4.6.1 Automatic Monitoring

Two of MCC's automatic monitoring stations are considered representative of the Proposed Development.

Recent results from the automatic monitors MAN1 (x384233, y397287) and MAN3 (x384310, y398337) are shown in Table 7 and the location of MAN1 is shown on Figure 7.

Table 7 – Automatic Monitoring Results

Monitor	Pollutant	AQAL	AQAL (µg/m³)	Concentration (µg/m³)					
				2018	2019	2020	2021	2022	2023
MAN1 Manchester Oxford Road (Kerbside)	NO_2	Annual Mean	40	**62**	**59**	36	**44**	**43**	**45.7**
		1-hour Mean	200 (A)	2	1	0	0	3	0
	PM_{10}	Annual Mean	40	30	26	18	18	18	16.4
		24-Hour Mean	50 (B)	15	18	5	2	8	4
MAN3 Manchester Piccadilly (Urban Centre/Background)	NO_2	Annual Mean	40	35	36	27	30	29	26.8
		1-hour Mean	200 (A)	0	0	0	0	0	0
	PM_{10}	Annual Mean	40	21	20	15	15	17	15.1
		24-Hour Mean	50 (B)	2	7	1	2	4	1
	$PM_{2.5}$	Annual Mean	20	11	12	8	9	10	8.5

Notes:
(A) 200µg/m³ not to be exceeded more than 18 times/year
(B) 50µg/m³ not to be exceeded more than 35 times/year

The data in Table 7 shows there have been exceedances of the NO_2 annual mean AQAL at automatic monitor MAN1, located on Manchester Oxford Road. Exceedances have occurred each year, with the exception of 2020, likely due to the COVID-19 pandemic. The highest recorded concentration of NO_2 was 62µg/m³ in 2018. However, the monitor is located at a 'kerbside' location along one of the busiest roads in Manchester and therefore concentrations are expected to be higher.

There have been no exceedances of the NO_2 annual mean AQAL at automatic monitor MAN3, situated at an 'urban centre' location. However, concentrations are higher than the UK-AIR urban background concentrations, which suggests some influence of road traffic at this location.

There was one recorded exceedance of an annual mean greater than 60µg/m³ at MAN1, which indicates that an exceedance of the 1-hour mean objective is potentially likely. However, there is a general downward trend in concentrations between 2028 – 2023 and no other exceedances of 60µg/m³ have been measured.

There are no exceedances of the annual mean PM_{10} or $PM_{2.5}$ AQAL. Since 2020 concentrations monitored have been fairly consistent.

2020 and 2021 data should be treated with caution due to the impacts of the COVID-19 pandemic and 'lockdowns' on local traffic flows.

4.6.2 Passive Monitoring

Monitoring locations within 1km of the Site are shown in Figure 7 and the data presented in Table 8.

Additional monitoring is being undertaken as part of the Clean Air Plan (CAP). Recent monitoring data for locations closest to the Site (within <1km) are presented in the table below.

All tubes are classified as 'roadside' apart from MA77NO which is classified as 'urban background'.

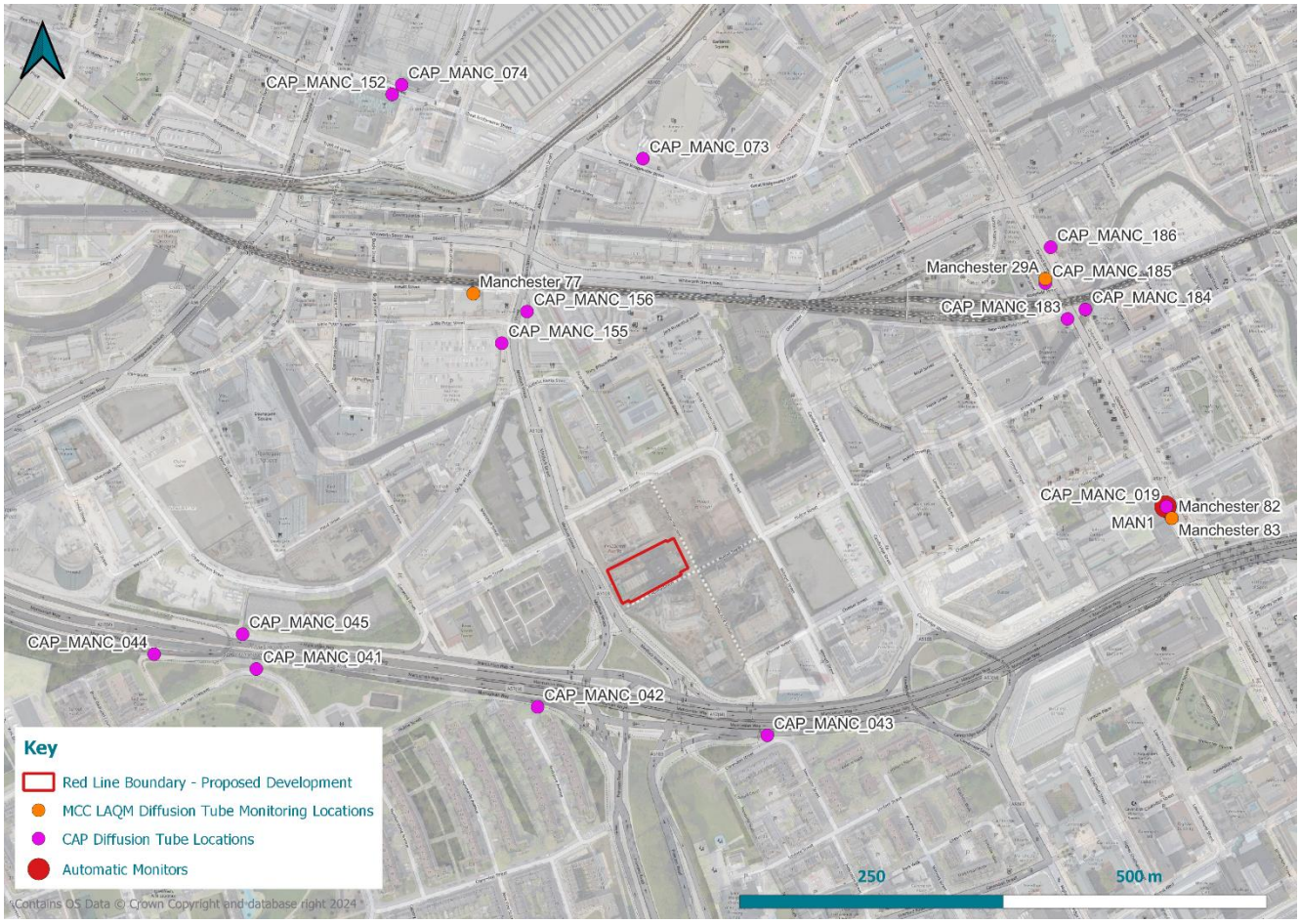


Figure 7: Local Authority Monitoring

Table 8: Passive Diffusion Tube Monitoring Concentrations

Site ID	X (m)	Y (m)	Distance from Site (km)	Annual Mean NO_2 Concentration (µg/m³)					
				2018	2019	2020	2021	2022	2023
LAQM									
MA77NO – Hewitt Street	383576	397489	0.29 N	**41.0**	**43.7**	26.9	30.8	33.1	31.6
MA29ANO – Oxford Street	384119	397503	0.44 NE	**58.8**	**55.4**	39.0	**44.8**	**49.8**	**49.6**
MA82,83,84NO – Oxford Road (average)	384239	397276	0.48 E	**52.8**	**51.3**	33.9	**40.7**	**42.6**	**41.4**
CAP									

Site ID	X (m)	Y (m)	Distance from Site (km)	Annual Mean NO_2 Concentration (µg/m³)					
				2018	2019	2020	2021	2022	2023
CAP_MANC_042 – Mancunian Way	383637	397097	0.13 S	**41.3**	**40.1**	34.0	39.2	38.8	36.7
CAP_MANC_155 - A5103 Medlock St	383603	397442	0.23 N	-	-	-	-	33.5	-
CAP_MANC_156 - A5103 Medlock St	383627	397472	0.25 N	-	-	-	-	35.7	-
CAP_MANC_045 – Mancunian Way	383357	397166	0.35 SW	**70.5**	**64.1**	**50.0**	**56.4**	**64.7** (A)	**50.4**
CAP_MANC_041 – Mancunian Way	383370	397133	0.35 SW	**49.6**	**45.3**	36.2	**41.1**	**40.4**	39.3
CAP_MANC_073 – Lingfield Terrace	383737	397617	0.36 N	-	**43.6**	25.8	29.3	34.8	32.9
CAP_MANC_044 – Mancunian Way	383273	397147	0.43 SW	**62.8**	-	**43.7**	**52.2**	33.6 (A)	-
CAP_MANC_183 – Wakefield Street	384140	397465	0.44 NE	-	-	-	-	**54.4**	**54.1**
CAP_MANC_185 – Wakefield Street	384119	397499	0.44 NE	-	-	-	-	**49.7** (A)	**48.5**
CAP_MANC_186 – Wakefield Street	384124	397533	0.46 NE	-	-	-	-	**42.4**	**43.0**
CAP_MANC_184 – Wakefield Street	384157	397474	0.46 NE	-	-	-	-	**41.1**	39.5
CAP_MANC_019 – A34 (Oxford Road)	384234	397287	0.48 E	-	-	-	-	**44.4**	**41.3**
CAP_MANC_152 – Great Bridgewater Street	383499	397678	0.49 N	-	-	-	-	39.4	32.5
CAP_MANC_074 – Oakleigh Avenue	383508	397687	0.49 N		**49.4**	28.1	32.3	**40.0**	31.3
CAP_MANC_043 – Mancunian Way	383855	397070	0.81 S	**48.0**	**43.8**	31.2	33.2	35.7	-

Notes:

Exceedances of the annual mean AQAL are shown in **BOLD**.

All results taken from the 2023 ASR and Clean Air Data Hub, including level of accuracy and number of decimal places

Location CAP_MANC_155 and 156 are considered most representative of the Site due to their location along Medlock Street. Both sites only monitored during 2022 and concentrations are below the annual mean AQAL.

MAN77NO is also considered comparable to the Site and classified as 'urban background'. Pre-pandemic concentrations show exceedances of the relevant annual mean AQAL at this location. However, results have declined since 2019. MAN77NO is located within 45m of the A5013 and within close proximity to the railway line between Manchester Piccadilly and Manchester Deansgate. This section of railway is listed within LAQM.TG(22) as a 'Rail Lines with a Heavy Traffic of Diesel Passenger Trains'. As such, it is considered that NO_2 concentrations could be influenced by this section of railway.

Location CAP_MANC_042 is the closest location to the Site but located adjacent to the A57(M), Mancunian Way. Pre-pandemic results show exceedances of the annual mean AQAL and 2022 and 2023 concentrations are within 10% of the AQAL.

The data in Table 8 shows there have been exceedances of the NO_2 annual mean AQAL at monitoring sites close to the Site during all recent years (even during 2020 at locations along the A57(M)). The highest recorded concentration of NO_2 was 70.5µg/m^3 at CAP_MANC_045 in 2018. This location is along Mancunian Way, within the AQMA and on one of the busiest A-roads in Manchester, therefore exceedances are to be expected. Aside from this location, during 2018 and 2019, there were no recorded exceedances of an annual mean greater than 60µg/m^3, which indicates that an exceedance of the 1-hour mean objective is unlikely at these sites.

2020 and 2021 concentrations should be treated with caution as they would have been impacted by the COVID-19 pandemic and the associated decrease in traffic levels during lockdown periods in the UK.

5. Construction Phase Assessment

5.1 Overview

The construction phase of the Proposed Development will involve a number of activities that will release polluting emissions to air. Predominantly, these will be emissions of dust. As such, a qualitative construction dust risk assessment has been carried out in accordance with IAQM guidance[19]. Where detailed information was unknown, the dust emission magnitude has been estimated based on professional judgement.

Construction activities typically include:

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

It is noted that to ensure a worst-case assessment the Construction Compound (see Figure 1), where relevant, has been included within the assessment.

5.2 Potential Dust Emission Magnitude

5.2.1 Demolition

Any existing buildings on Site have already been demolished. As such, demolition has not been considered further within this assessment.

5.2.2 Earthworks

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

The total area of the Site (including all areas inside the red-line boundary) is <18,000m^2 and therefore within the 'small' IAQM category. It is noted that no earthworks will be undertaken within the construction compound. This area is for storage only.

The underlying soil texture is loamy and clayey soils [38] which have a medium potential for dust release due to the soil texture partly being comprised of small particles.

It should be noted that the construction compound for the development (highlighted in Figure 8) is located 100m north east of the Proposed Development. Materials will be stored at this location until needed on Site.

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

5.2.3 Construction

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

[38] Cranfield University, "Cranfield Soil and Agrifood Institute," n.d., http://www.landis.org.uk/soilscapes/.

The proposals comprise the erection a single block, with a maximum of 33 floors. Therefore, an estimation of the total volume of buildings to be constructed has been based on the pre-application information provided[39]. The total volume of buildings to be constructed was considered to be >75,000m^3.

It is not envisaged that concrete batching and sandblasting would be undertaken onsite.

The construction phase is estimated to start November 2025 with the Proposed Development becoming operational in September 2028.

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

5.2.4 Trackout

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

It is expected that there would be <20 HDVs outwards movements from the Site each day. No unpaved surfaces over 50m would be utilised as site traffic would be routed along the existing road network.

It should be noted that the construction compound for the development (highlighted in Figure 8) is located 100m north east of the Proposed Development. Construction trips are likely to be frequent between these two locations.

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

5.2.5 Summary

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

Table 9: Dust Emission Magnitude Summary

Activity	Dust Emission Magnitude
Earthworks	Small
Construction	Large
Trackout	Small

5.3 Sensitivity of Area

The prevailing wind direction for the closest regionally representative meteorological measurement station to the Site, at Manchester Meteorological Station, is shown for 2022 in Appendix B. The wind rose shows that the prevailing winds are from the south.

Figure 8 shows the construction phase distance buffers (20m, 50m, 100m and 250m) around the Site boundary, as well as identified high and medium sensitivity receptor locations within these buffers. Committed developments associated with the wider First Street development, have been included to ensure a robust assessment. Potential cumulative developments are listed in Appendix E.

39 Tim Groom Architects, Drawing No 1207-TGA-XX-ZZ-DR-A-10400, General Arrangement-Section WIP and Drawing No 1207-TGA-XX-ZZ-DR-A-10200, General Arrangement-Site Plan, dated 14 May 2024.

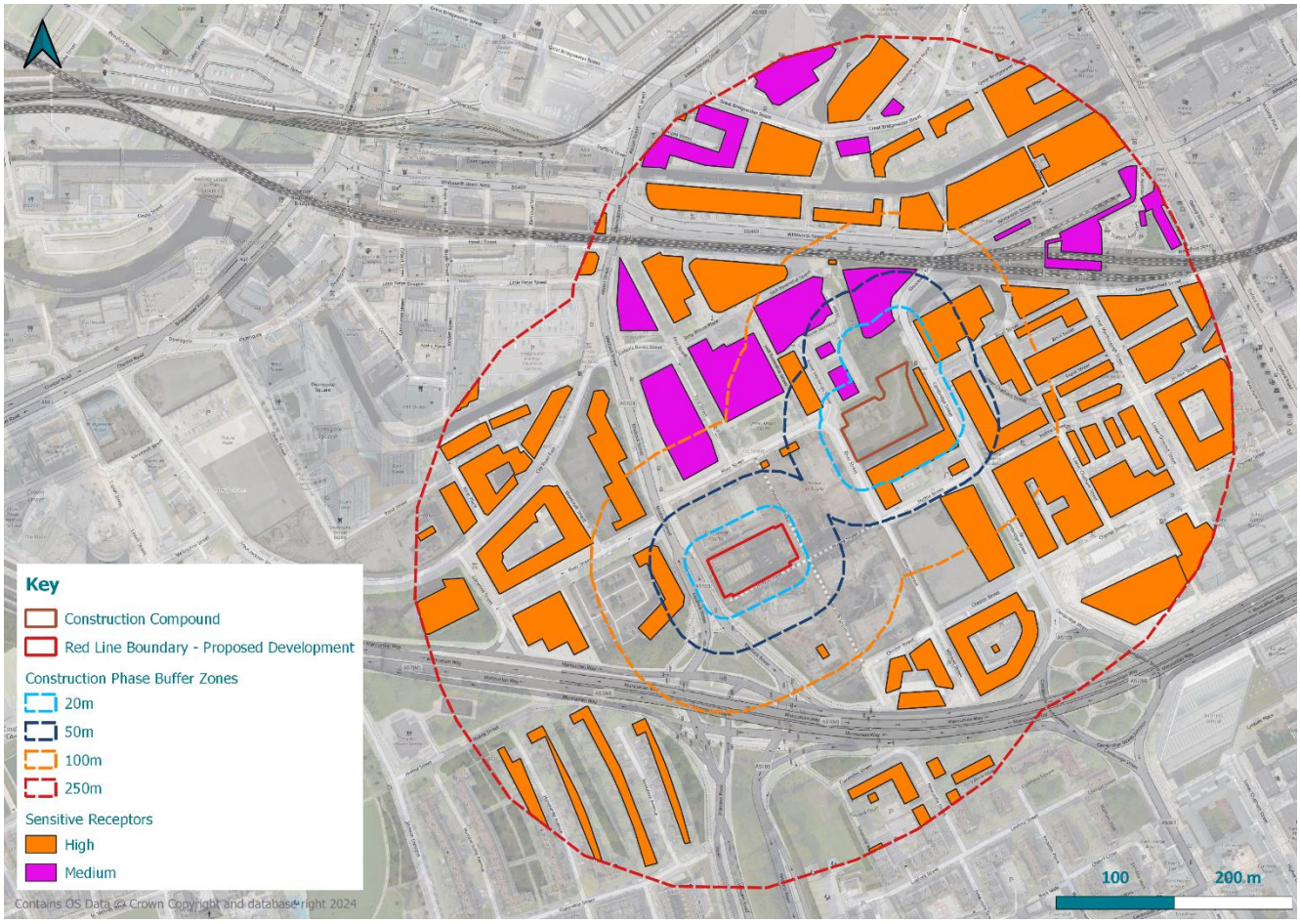


Figure 8: Construction Phase Receptors

5.3.1 Dust Soiling Impacts

Figure 8 illustrates there are considered to be >100 high sensitivity human receptors within 20m of the Site boundary associated with the residential development, Plot 9a First Street which is due for completion in 2024 (MCC planning ref: 132600/FO/2021). As such, the overall sensitivity of the surrounding area to nuisance dust soiling effects during, Earthworks and Construction, according to IAQM guidance, is defined as '**High'**.

With regard to Trackout, the sensitivity for Large size sites is assessed where receptors are located within 50m from Trackout routes up to 500m from the Site. All potential Trackout routes have been taken into account. As a worst case there are more than 100 high-sensitivity receptors within 20m of potential Trackout routes from the Site and as such, the sensitivity to dust soiling impacts from Trackout is defined as '**High**'.

5.3.2 Human Health Impacts

Defra mapped background predictions (Table 6) show that annual mean concentrations of PM_{10} are not likely to exceed 24µg/m^3 in the vicinity of the Site based on 2022 estimates. However, 2019 monitored concentrations at the MAN1 automatic monitor were 26µg/m^3 and LAQM.TG(22) does states that concentrations should take into account local sources. It should however be noted that since 2019 these monitored PM_{10} concentrations have dropped to 18µg/m^3.

As a conservative approach it has been assumed that there is potential for the annual mean PM_{10} concentrations to be greater than 24µg/m^3. According to IAQM guidance, where PM_{10} concentrations are 24-28µg/m^3 and there are more than 100 high sensitivity receptors within 20m of construction works, the

overall sensitivity of the surrounding area to human health impacts is defined as '**High**' for Earthworks, Construction and Trackout.

5.3.3 *Summary of Area Sensitivity*

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

Table 10: Sensitivity of Local Area

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

5.4 Risk of Impacts

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

Table 11 provides a summary of the construction dust risk assessment. Overall, the development is considered to be **High Risk** for nuisance dust soiling effects and a **High Risk** for PM_{10} health effects.

Table 11: Risk of Adverse Impacts During Construction Phase

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

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6. Operational Phase Assessment

6.1 Trip Generation and Distribution

The Proposed Development is 'car-free' and there are no car parking spaces proposed. All trips generated are for servicing, access or taxis. The Transport Consultants for the scheme, SLR Consulting, provided the net trip generation for the Proposed Development. This is shown in Table 12 below.

Table 12: Trip Generation (AADT)

	LDV	HDV	Total
Trip Generation (AADT)	59	3	**62**

These trips are generated on the Site access road and will disperse onto the wider road network as follows.

Table 13: Trip Distribution

Road Link	LDV (AADT)	HGV Trips (AADT)	Total Trips
Hulme Street (Site Access)	59	3	**62**
River Street	41	2	**43**
Medlock Street (south of River Street)	36	2	**34**
Medlock Street (north of River Street)	9	0	**9**
Hulme Street (east of River Street)	18	1	**19**

As shown, no road links within the vicinity of the Site will see an increase above the EPUK & IAQM thresholds. As such, trips are considered to be 'not significant' and detailed modelling of impacts is not required as trips would be below the threshold at locations of relevant exposure.

6.2 Impacts on Future Occupants – Site Suitability

Due to the location of the Site, within the GMCA AQMA and in close proximity to major road links, detailed modelling has been undertaken in order to ensure that the Site is suitable for residential use.

Maximum modelled annual mean NO_2, PM_{10} and $PM_{2.5}$ concentrations at each modelled floor height are shown in Table 14. As a worst-case, emission factors and background concentrations have been held at the 2022 base year. Modelled concentrations at each individual receptor are presented in Appendix D.

Table 14: Maximum Model Predicted Annual Mean Concentrations

Floor	NO_2 (µg/m^3)	% of AQAL	PM_{10} (µg/m^3)	% of AQAL	$PM_{2.5}$ (µg/m^3)	% of AQAL
First	39.1	97.8%	17.6	44.1%	10.8	54.2%
Second	34.6	86.6%	16.5	41.3%	10.2	51.2%

Floor	NO_2 (µg/m³)	% of AQAL	PM_{10} (µg/m³)	% of AQAL	$PM_{2.5}$ (µg/m³)	% of AQAL
Third	32.0	79.9%	15.9	39.7%	9.9	49.5%
Fourth	29.9	74.7%	15.4	38.4%	9.6	48.1%

As can be seen from Table 14, no exceedances of the AQALs are predicted for any pollutants across the Proposed Development. However, the maximum annual mean NO_2 concentration of 39.1µg/m³ is predicted on the first floor at PR4 which is 98% of the relevant AQAL. As concentrations at this level are within 10% of the annual mean NO_2 AQAL mitigation has been recommended.

The maximum annual mean PM_{10} concentration is 17.6µg/m³ which is 44% of the relevant AQAL and the maximum annual mean $PM_{2.5}$ concentration is 10.8µg/m³ which is 54% of the relevant AQAL.

With regard to the short-term 1-hour NO_2 AQAL, Defra's LAQM.TG(22) states where the annual means are below 60µg/m³, it is unlikely exceedances of the 1-hour mean will occur. As all modelled results are below this threshold, it is unlikely that the 1-hour NO_2 AQAL will be exceeded at any of the receptor locations.

Additionally, the predicted annual mean PM_{10} concentrations are well below 32µg/m³.Therefore, in accordance with relevant guidance 24-hour mean PM_{10} concentrations greater than 50µg/m³ are unlikely to occur more than 35 times a year.

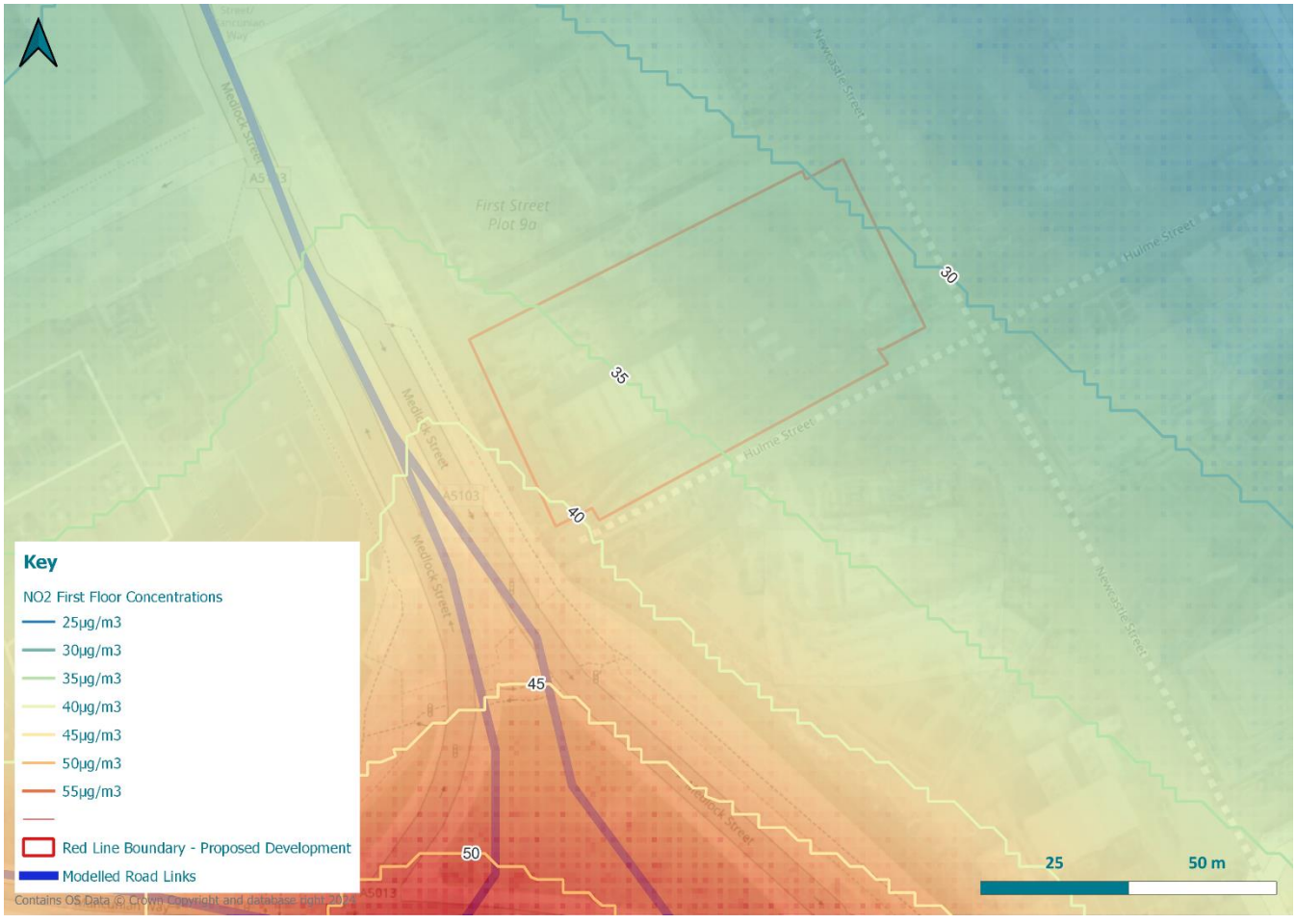


Figure 9: Modelled NO_2 Contour Plot – First Floor

The above figure demonstrates the highest concentration of NO_2 are at the road centre line and junction to the south. These disperse to approximately 39µg/m^3 before reaching the building façade.

6.3 Summary

The results of this assessment show that:

- The Site is not located within 20m from roads expected to experience pollutant concentrations at or above the relevant AQAL (determined by Defra's PCM model);
- The Proposed Development will not introduce any new receptors into an area of exceedance of any relevant AQAL. However, concentrations at first floor are within 10% of the annual mean NO_2 AQAL and therefore mitigation measures are recommended;
- Exceedances of the 1-hour mean NO_2 and 24-hour mean PM_{10} AQALs are considered unlikely, based upon absolute concentrations predicted through the dispersion modelling study;
- Modelling has been based on worst-case assumptions including holding background concentrations and emissions factors at a 2022 base year; and
- all modelled concentrations have been verified against 2022 MCC monitoring data.

Based on the above, the Proposed Development is not expected to introduce new receptors into an area likely to be exposed to exceedances of the relevant AQALs.

7. Damage Costs

While operational phase impacts have been screened in line with the EPUK & IAQM guidance and MCC guidance, due to the size of the Proposed Development, in line with the MCC guidance it is considered good practice that a Damage Cost Calculation is undertaken, otherwise known as an Emissions Mitigation Assessment.

Increases in pollutant emissions (NO_X and $PM_{2.5}$) caused by the development over a 5-year appraisal period are estimated, using development traffic data, Defra's EFT (v.12.1) and Damage Cost Appraisal Toolkit.

The latest version of Defra's Air Quality Appraisal: Damage Costs Toolkit[40] (last updated March 2023) is then used to apply the 'damage costs', which are a set of impact values, defined per tonne of emission by pollutant, to these development emissions. The result is an indicative value to be spent on mitigation measures to reduce incremental worsening in local ambient air quality from new development.

The central base damage costs for 'Road Transport Urban Large' are provided below in £/tonne:

NO_X: £11,013

$PM_{2.5}$: £78,835

The damage cost calculation applies inflationary uplift factors of 2% cumulatively per annum to the central damage cost from Defra's damage cost valuations (2022) and assumes a discount rate of 1.5%.

The calculation used in this assessment is summarised in the below general formula:

$$EFT\ output \times Damage\ costs \times 5\ years = 5\ year\ health\ exposure\ cost\ value\ (in\ £)$$

It is noted that emissions were calculated by assuming a reduction in emissions, in line with the EFT, for each year in the appraisal. This was accounted for as an input into Defra's EFT.

Table 15, below, shows the inputs used for the damage cost calculation for Plot 9b, First Street:

Table 15 – Damage Cost Inputs

Input	Value	Unit	Source / Explanation
Trip Length	10	km	EPUK& IAQM guidance & National Travel Survey UK Average.
Traffic Flow	62 (5% HDV)	AADT	Worst-case scheme generated traffic, provided by SLR Consulting
EFT Road Type	Urban (Not London)	-	-
Appraisal Years	2028 - 2032 (5 years)	-	Reductions in line with EFT as forecast by Defra from the five years following proposed first occupation.
Average Speed	48	kph	Average speed of surrounding road links

40 DEFRA, "Air Quality Damage Cost Appraisal Toolkit," March 2021, https://www.gov.uk/government/publications/assess-the-impact-of-air-quality.

Using the above inputs, the emissions caused by the development traffic are calculated for the years 2028 to 2032, which are the five years following the anticipated opening of the Proposed Development. The emissions per annum are shown below in Table 16.

Table 16 – Increase in Emissions (tonnes)

Pollutant	Development Emissions (tonnes/year)				
	2028	2029	2030	2031	2032
NO_x	0.030	0.026	0.022	0.019	0.017
$PM_{2.5}$	0.005	0.004	0.004	0.004	0.004

These emissions are then converted to the cost of 'damage' to human health using the Air Quality Appraisal Damage Costs Toolkit. For this the price base year of 2024 was used. The pollutant sector used was 'Road Transport Urban Large'. The results of this are shown below in Table 17:

Table 17 – Calculated Damage Cost Outputs

Pollutant	Low Sensitivity Present Value	Central Present Value	High Sensitivity Present Value
NOx	£221	**£1,302**	£4,982
$PM_{2.5}$	£712	**£1,796**	£5,147
TOTAL	£934	**£3,098**	£10,128

Based on the outputs in Table 17, the total emissions 'damage costs' (sum of NO_x and $PM_{2.5}$) = **£3,098**, which is the indicative value of a package of air quality mitigation measures to offset the real-world impact of emissions from the Proposed Development.

These damage costs do not take account of the effects of the Travel Plan prepared by SLR Consulting. The Travel Plan measures will have air quality benefits where they promote and encourage the use of sustainable transport and lead to a reduction in the number of polluting trips that the development generates. However, the aim is to go above and beyond with regard to damage costs and offsetting air quality impacts. Possible 'design in' options could be, improved cycle paths, improved pedestrian crossing in the surrounding locale and green walls.

8. Mitigation Measures

8.1 Construction Phase

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

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

8.2 Operational Phase

8.2.1 Design in Measures

Concentrations at first floor level are within 10% of the annual mean NO_2 AQAL and therefore it is recommended that MVHR with suitable NO_x filtration is utilised within these homes. The energy strategy does states that MVHR will supply all areas of the building. It should also be recommended to home occupiers that during peak traffic times windows should remain closed to avoid elevated pollutant concentrations entering the home.

8.2.2 MCC AQ Planning Guidance – Best Practice

MCC Air Quality Planning Guidance[20] provides best practice measures for Electric Vehicle charging points. However, it is understood that the Proposed Development is 'car free' and no allocated parking spaces are to be provided.

8.2.3 Travel Plan Measures

Measures detailed within the associated Travel Plan, such as encouraging sustainable transport and promoting car sharing, will also help to reduce potential air quality impacts.

9. Discussion and Conclusion

Hydrock were commissioned by Vita Meadow Ltd to prepare an AQA to support the planning application for the studemt led development known as Plot 9b First Street.

Modelled UK-AIR background concentrations, Defra PCM roadside concentrations, and local air quality monitoring data have been used to establish baseline air quality at the Site and surrounding locale. Predicted background concentrations of NO_2, PM_{10} and $PM_{2.5}$ at the Site and surrounding locale are below the relevant AQALs. Local air quality monitoring however has shown exceedances of the annual mean AQAL for NO_2 in recent years, along major roads.

A qualitative construction dust risk assessment has been undertaken in line with IAQM guidance[19] for the Construction Phase. Through good practice and implementation of appropriate mitigation measures outlined, it is expected that the release of dust would be effectively controlled and mitigated, with resulting effects considered to be 'not significant'. All dust impacts are considered to be temporary and short-term in nature.

An operational phase assessment has been undertaken by following screening criteria provided in EPUK & IAQM guidance. Vehicle movements generated by the Proposed Development are below the relevant EPUK & IAQM guidance criteria and as such, it is not anticipated that any significant adverse impacts on local air quality will occur and the Proposed Development is considered to be compliant with the NPPF and relevant local planning guidance.

A site suitability assessment has been undertaken due to the location of the Site within the GM AQMA. Emissions of NO_2, PM_{10} and $PM_{2.5}$ from traffic travelling along local roads were modelled in ADMS-Urban (version 5.1). The dispersion modelling undertaken was conservative as it applied worst-case assumptions by holding background concentrations and emission factors at the 2022 base year. The results demonstrated that there while are not predicted to be any exceedances of the relevant AQALs at the Proposed Development, first floor annual mean NO_2 concentrations are within 10% of the relevant AQAL and therefore MVHR with suitable NO_x filtration is recommended within these homes.

The proposed energy strategy for the Proposed Development is ASHP. This strategy is beneficial in terms of air quality as it does not introduce any new combustion sources.

The total emission 'damage costs' of the Proposed Development (sum of NO_x and $PM_{2.5}$ emissions) have been calculated as based on the site generated traffic. Using Defra's Air Quality Appraisal Damage Costs Toolkit, the emissions generated have been applied to the damage costs spreadsheet resulting in the sums of £3,098. This is the indicative value of a package of air quality mitigation measures to offset the real-world impact of emissions from the Site.

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

Appendix A Traffic Data

The traffic data, comprising AADT flows sourced from the Department for Transport (DfT) Matrix[41] is shown in below in Table 18. Data was sourced for the following scenarios:

- 2022 AADT; and
- 2028 DS (this scenario includes generated traffic associated with the Proposed Development.

Within the 2028 DS scenario, only major road links within 200m of the Proposed Development have been included because these would have the most influence on pollutant concentrations at the Site.

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

Table 18: Traffic Data

Link ID	Road Link	Speed (kph)	2022 Model Verification		2028 DS	
			AADT	HDV	AADT	HDV
L1	Medlock Street	32.0	10,959	313	11,018	316
L2	A57 (M) West of Medlock Street -westbound	48.0	41,827	1,613	41,886	1,616
L3	A57 (M) West of Medlock Street - eastbound	48.0	41,413	1,521	41,472	1,524
L4	A57(M) West of Medlock Street slip - westbound	80.0	10,457	403	10,516	406
L5	A57(M) West of Medlock Street slip - eastbound	48.0	10,353	380	10,412	383
L6	A57 (M) East of Medlock Street -westbound	80.0	29,692	1,050	29,751	1,053
L7	A57 (M) East of Medlock Street -eastbound	48.0	29,358	1,091	29,417	1,094
L8	Princess Way (A5103) eastbound	48.0	6,825	288	6,884	291
L9	Princess Way (A5103) westbound	48.0	8,462	310	8,521	313
L10	Princess Way (A5103) southbound	48.0	18,520	515	18,579	518
L11	Princess Way (A5103) northbound	48.0	23,036	467	23,095	470

Technical Memorandum

SLR

To: Lauren Massingham

Company: Hydrock

From: Gareth Davis

SLR Consulting Limited

Date: 15 October 2024

Project No. 410.066238.00001

RE: Manchester City Centre Traffic Growth

Application of Traffic Growth in Manchester

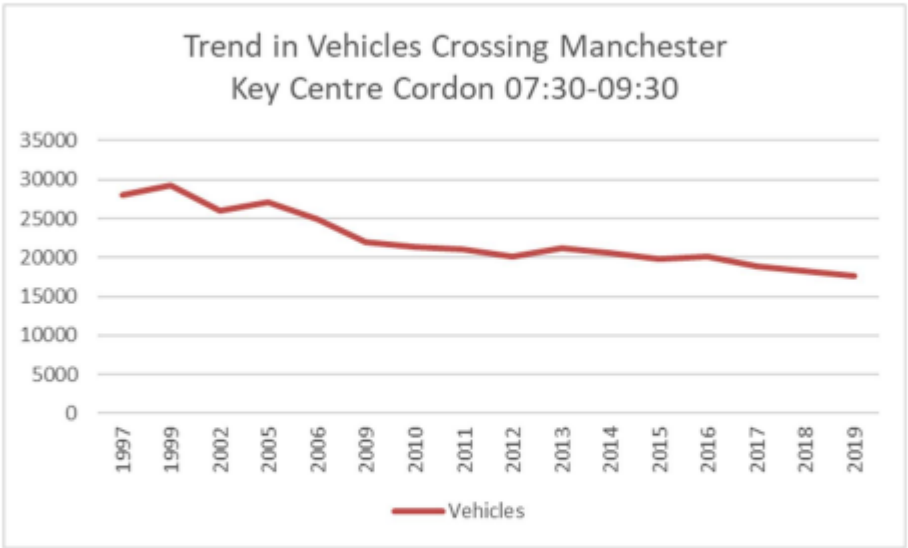
Typically to assess future traffic conditions, traffic growth is applied usually from the DfT TEMPRO programme which will apply a factor to take baseline traffic to a future year.

On development schemes in Manchester City Centre, within the Inner Relief Road (Ring Road) cordon it is notable from observation that traffic has not been growing despite the increases in population living in the city centre, possibly reflecting the loss of parking availability and highway changes limiting through routes within the city.

The Greater Manchester Transportation Unit, Highways Forecasting and Analytics team undertake annual surveys of traffic entering the city centre cordon (as defined by the Ring Road).

That data is presented in Figure 1 below and shows that over 20 years traffic has been falling by around 10,000 vehicles coming into the City Centre.

For this reason it is not appropriate to apply future year growth to traffic flows within the city centre and that it is reasonable to assume that existing flows will not increase in the future.



Source GMTU HFAS Manchester Key Centre Data

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Appendix B Windrose

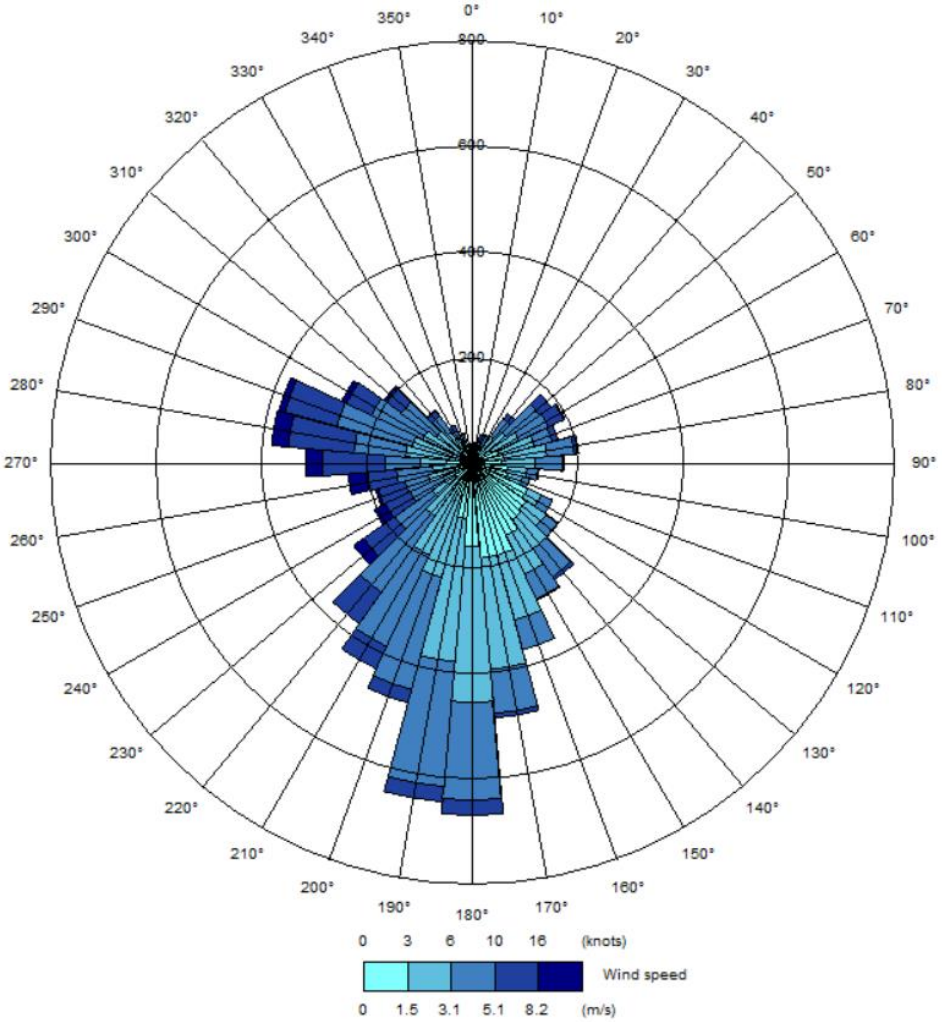


Figure 10: Wind rose Manchester Meteorological Station (2022)

Appendix C Model Verification

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

According to LAQM.TG (22), the difference between modelled results and monitored concentrations is acceptable where it is within 25% and ideal where it is within 10%.

Monitoring Locations used for Verification

Model verification was undertaken for both 2022 and 2023, in order to ensure a conservative and robust assessment. While 2023 data is the most up to date, only 1 of the 4 monitoring locations (CAP_042) within the immediate vicinity of the Site considered suitable for model verification were carried forward to monitor in 2023. The 2022 verification, provided a slightly higher factor and used multiple monitoring locations allowing for the calculation of RMSE. As such, professional judgement has been used and 2022 model verification has been taken forward within the operational phase site suitability assessment.

The following monitoring locations were selected for model verification due to being representative of the study area and having more than 75% data collection for 2022:

- CAP_042;
- CAP_155;
- CAP_156 and
- CAP-043.

Model Verification

It is most appropriate to verify the model in terms of primary pollutant emissions of nitrogen oxides (NO_x = NO + NO_2). The model output of road-NO_x (i.e., the component of total NO_x coming from road traffic) has been compared with the 'measured' road-NO_x. Measured road-NO_x has been calculated from the measured NO_2 concentrations using the NOx from NO_2 calculator (Version 8.1) available on the Defra LAQM Support website[35].

A comparison of modelled and monitored concentrations prior to adjustment are given in Table 19.

Table 19: 2022 Modelled and Monitored Concentrations Before Adjustment

Monitoring ID	Modelled Road NO_x ($\mu g/m^3$)	Monitored Road NO_x ($\mu g/m^3$)	Ratio Monitored/ Modelled	Modelled Total NO_2 ($\mu g/m^3$)	Monitored Total NO_2 ($\mu g/m^3$)	Difference (%)
CAP_042	15.3	38.6	2.5	27.8	39	-28
CAP_155	8.3	27.2	3.3	24.2	34	-28
CAP_156	10.6	31.9	3.0	25.4	36	-29
CAP_043	9.1	31.9	3.5	24.6	36	-31

As shown, the model was underpredicting concentrations of NO_x at all diffusion tubes. As such, an adjustment factor of **2.897** has been determined, as the equation of the slope of the best-fit line between the 'measured' road contribution and the model derived road contribution of NO_x, as shown below:

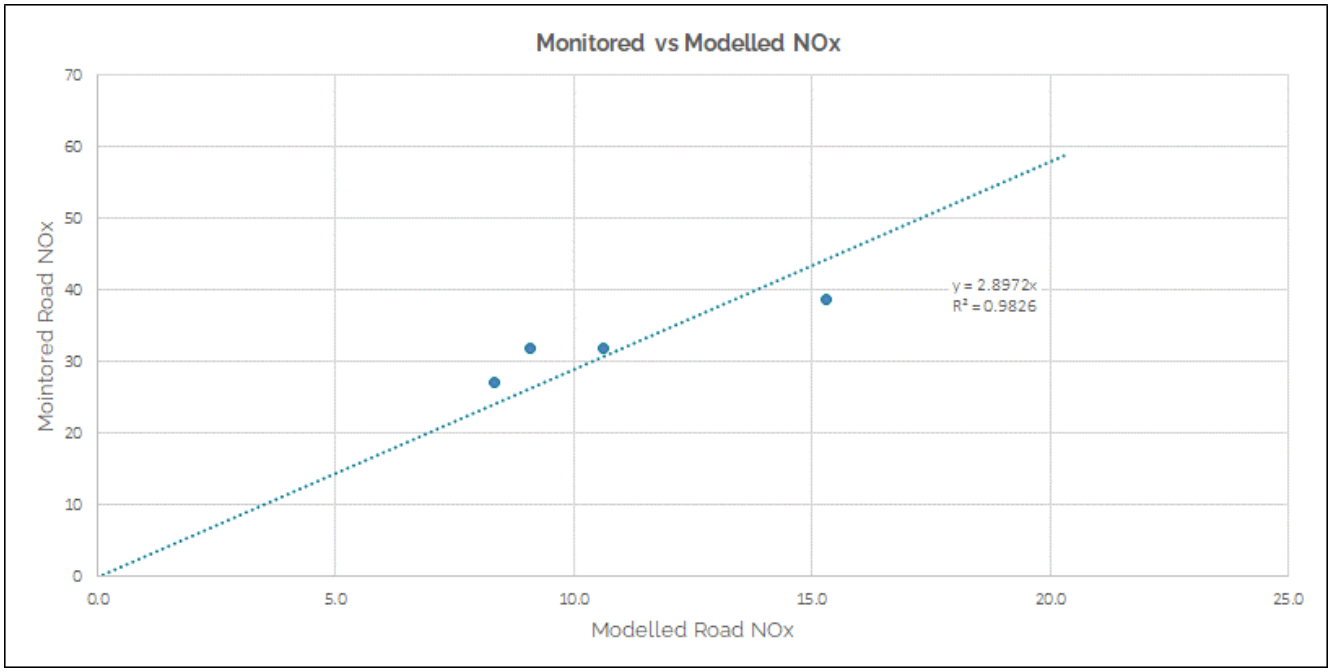


Figure 11: Model Adjustment Factor

Table 20 shows total monitored versus modelled NO_2 following the adjustment of the road contribution of NO_x by this factor. The total NO_2 concentration was determined by adding the calculated background NO_2 concentration to the modelled road contribution.

Table 20: Post-adjusted 2022 Modelled and monitored results

Monitoring ID	Adjusted Modelled NO_2 ($\mu g/m^3$)	Monitored NO_2 ($\mu g/m^3$)	Difference (%)
CAP_042	41.3	38.8	7%
CAP_155	32.1	33.5	-4%
CAP_156	35.2	35.7	-1%
CAP_043	33.1	35.7	-7%

Following adjustment of NO_x by a factor of **2.897**, modelled concentrations of NO_2 were within the ideal +/- 10% range of monitored concentrations:

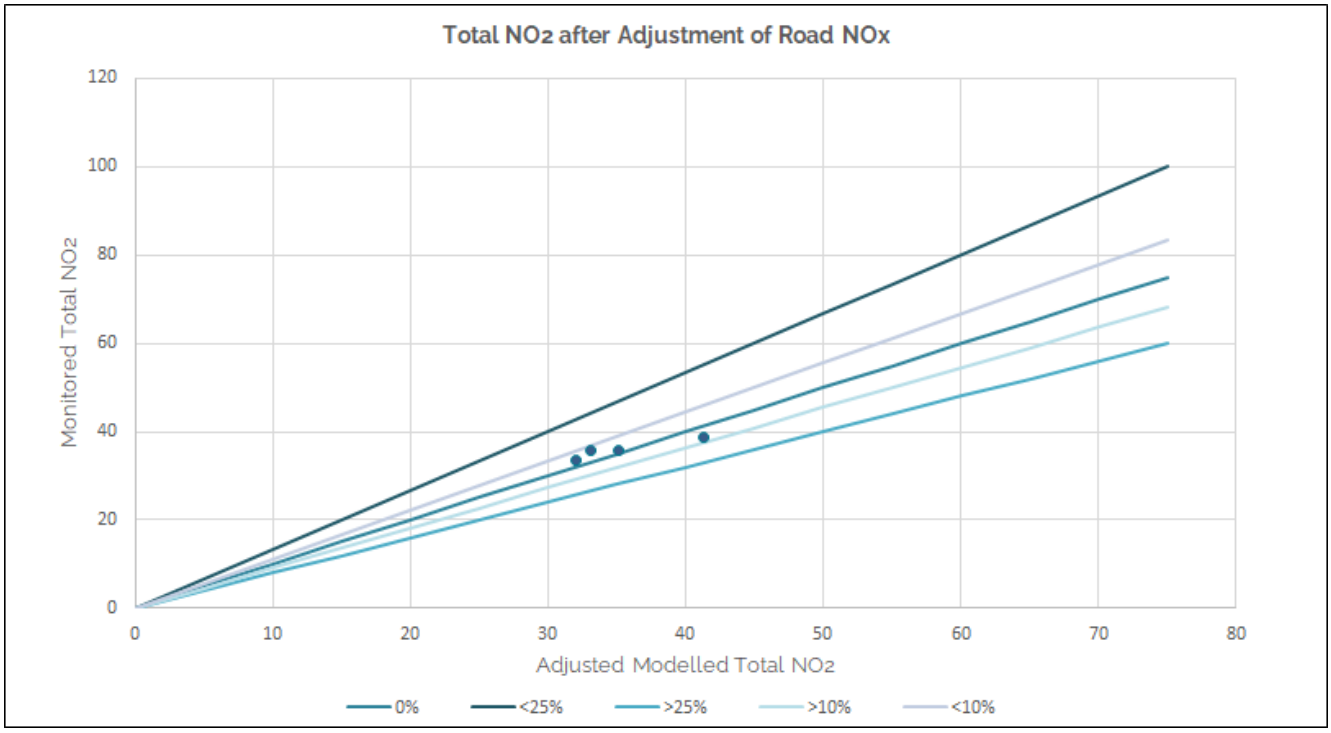


Figure 12: Post-adjusted Monitored vs Modelled NO_2

In addition, the overall post-adjusted uncertainty (RMSE) for annual mean NO_2 was 49%, which is within ideal 10% range of uncertainty. As such, the factor was considered to be acceptable.

As there is insufficient PM_{10} or $PM_{2.5}$ monitoring data in the study area, it was not possible to perform model verification for these pollutants. As such, the NO_2 adjustment factor has also been applied to PM_{10} and $PM_{2.5}$ model results, in accordance with LAQM.TG(22).

Appendix D Modelling Results

Modelling has utilised 2022 emission factors and 2022 background concentrations as a worst-case. Additionally, all trips associated with the proposals (62 AADT) have been added to each road link.

Table 21: Model Predicted Annual Mean Concentrations

Receptors	NO_2 (µg/m³)	PM_{10} (µg/m³)	$PM_{2.5}$ (µg/m³)
First Floor			
PR1	36.6	17.0	10.5
PR2	37.4	17.2	10.6
PR3	38.1	17.4	10.7
PR4	39.1	17.6	10.8
PR5	37.3	17.2	10.6
PR6	35.2	16.6	10.3
PR7	33.6	16.3	10.1
PR8	32.3	15.9	9.9
PR9	30.8	15.6	9.7
PR10	30.6	15.5	9.7
PR11	30.2	15.4	9.6
PR12	30.9	15.6	9.7
PR13	35.8	16.8	10.4
Second Floor			
PR14	33.2	16.2	10.0
PR15	33.6	16.3	10.1
PR16	34.0	16.4	10.2
PR17	34.6	16.5	10.2
PR18	34.2	16.4	10.2
PR19	33.0	16.1	10.0
PR20	32.0	15.9	9.9
PR21	31.1	15.6	9.8
PR22	29.8	15.3	9.6
PR23	29.6	15.3	9.6
PR24	29.3	15.2	9.5

Receptors	NO_2 (µg/m³)	PM_{10} (µg/m³)	$PM_{2.5}$ (µg/m³)
PR25	29.8	15.3	9.6
PR26	32.8	16.1	10.0
Third Floor			
PR27	30.9	15.6	9.7
PR28	31.2	15.7	9.8
PR29	31.5	15.8	9.8
PR30	32.0	15.9	9.9
PR31	31.8	15.8	9.9
PR32	31.1	15.7	9.8
PR33	30.5	15.5	9.7
PR34	29.8	15.3	9.6
PR35	28.8	15.1	9.5
PR36	28.6	15.0	9.4
PR37	28.4	15.0	9.4
PR38	28.8	15.1	9.4
PR39	30.7	15.6	9.7
Fourth Floor			
PR40	29.1	15.2	9.5
PR41	29.3	15.2	9.5
PR42	29.5	15.3	9.6
PR43	29.9	15.4	9.6
PR44	29.8	15.3	9.6
PR45	29.4	15.2	9.5
PR46	29.0	15.1	9.5
PR47	28.5	15.0	9.4
PR48	27.8	14.8	9.3
PR49	27.6	14.8	9.3
PR50	27.4	14.7	9.3
PR51	27.7	14.8	9.3
PR52	29.0	15.1	9.5

Appendix E Construction Dust Mitigation

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

Communications

- Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.
- Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager.
- Display the head or regional office contact information
- Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk, and should include as a minimum the highly recommended measures in this document. The desirable measures should be included as appropriate for the site. In London additional measures may be required to ensure compliance with the Mayor of London's guidance. The DMP may include monitoring of dust deposition, dust flux, real-time PM10 continuous monitoring and/or visual inspections.

Site Management

- Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.
- Make the complaints log available to the local authority when asked.
- Record any exceptional incidents that cause dust and/or air emissions, either on- or off-site, and the action taken to resolve the situation in the log book.
- Hold regular liaison meetings with other high risk construction sites within 500 m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/deliveries which might be using the same strategic road network routes.

Monitoring

- Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100 m of site boundary, with cleaning to be provided if necessary
- Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked.
- Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.
- Agree dust deposition, dust flux, or real-time PM_{10} continuous monitoring locations with the Local Authority. Where possible commence baseline monitoring at least three months before work commences on site or, if it a large site, before work on a phase commences. Further guidance is provided by IAQM on monitoring during demolition, earthworks and construction.

Preparing and Maintaining the Site

- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.
- Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.
- Fully enclose site or specific operations where there is a high potential for dust production and the site is actives for an extensive period
- Avoid site runoff of water or mud.
- Keep site fencing, barriers and scaffolding clean using wet methods.
- Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below.
- Cover, seed or fence stockpiles to prevent wind whipping.

Operating Vehicle / Machinery and Sustainable Travel

- Ensure all vehicles switch off engines when stationary - no idling vehicles.
- Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.
- Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate).
- Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.
- Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).

Operations

- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.
- Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.
- Use enclosed chutes and conveyors and covered skips.
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.
- Ensure equipment is readily available on site to clean any dry spillages, and clean up

Waste Management

- No bonfires and burning of waste materials.

Measures Specific to Earthworks (Medium Risk)

- 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.
- Avoid explosive blasting, using appropriate manual or mechanical techniques.
- Bag and remove any biological debris or damp down such material before demolition.

Measures Specific to Earthworks (High Risk)

- Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.
- Use hessian, mulches or trackifers where it is not possible to re-vegetate or cover with top soil, as soon as practicable.
- Only remove the cover in small areas during work and not all at once.

Measures Specific to Construction (High Risk)

- Avoid scabbling (roughening of concrete surfaces) if possible.
- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.
- Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.

Measures Specific to Trackout (Medium Risk)

- Use water assisted dust sweeper(s) on access and local roads, to remove, as necessary, any material tracked out of the Site.
- Avoid dry sweeping large areas.
- Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.
- Inspect on-site haul routs for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.
- Record all inspections of hail routes and subsequent action
- Install hard surfaced haul routes, which are generally damped down with fixed or mobile sprinklers.
- Implement wheel washing system.
- Ensure there is an adequate area of hard surfaces road between the wheel wash facility and the site exit.
- Access gates to be locations at least 10m from receptors where possible.

Appendix F Construction Phase Cumulative Development

Table 22: Existing Baseline and Committed Developments

Location	Planning Reference	Description of Development	Distance from Site (m)	Status
Baseline				
Plot 9a First Street	132600/FO/2021	Erection of a nine-storey building with rooftop plant and basement comprising office accommodation (Use Class E(c)) with ancillary facilities for occupiers including roof top terrace, winter gardens, gym/ yoga studio, basement car parking (26 spaces) and cycle parking (130 spaces) landscaping and other associated works.	6	Approved 14th April 2022 Construction commenced 11th October 2022 Estimated completion Q2 2024
Plot 10b First Street (House of Social)	136170/FO/2023	Erection of 14-storey building comprising purpose-built student accommodation (PBSA) (Sui Generis) and ground floor Food Hall (Sui Generis Use), and other associated works including external amenity spaces, public realm, secure cycle parking, access and servicing arrangements (Plot 10B).	50	Approved 1st June 2023 Construction commenced 14 August 2023 Estimated completion Q3 2026

Location	Planning Reference	Description of Development	Distance from Site (m)	Status
First Street South (Square Gardens)	125573/FO/2019	Construction of four buildings of heights varying from 10 storeys to 45 storeys together comprising Co-living bedspaces (use class sui generis) and associated amenity facilities, with ground floor commercial units (Use classes A3 (Café / Restaurant and D2 (Gym)), private amenity space and public realm comprising hard and soft landscaping, car parking and cycle facilities and other associated works.	10	Approved 9th March 2023 Under construction Estimated completion Q2 2025
Metropolitan University Science and Engineering Building	125799/FO/2019	Demolition of existing John Dalton West Building and associated structures, and erection of a new 7 storey education building (Use Class D1) for the Faculty of Science and Engineering (comprising teaching and research spaces, academic offices, social learning areas, catering/kitchen facilities and an energy centre), physical connections to and external refurbishment of the John Dalton Tower, hard and soft landscaping works,	223	Approved 12 March 2020 Project complete

Location	Planning Reference	Description of Development	Distance from Site (m)	Status
Great Jackson Plot F (Contour)	132199/FO/2021	Full planning permission for the demolition of existing structures and the erection of two 51-storey residential buildings (Use Class C3) across two phases, including residential amenity facilities, 01 July 2022 11. 310 Under construction Tower F1: Q4 2027 basement car parking, landscaping and public realm, servicing and access arrangements, highways alterations, and associated works.	220	Approved 1 July 2022 Under construction Estimated completion: Tower F1: Q4 2027 Tower F2: Q4 2028
Cumulative				
One City Road	128002/FO/2020	Full Planning Application for demolition of existing structures on site, erection of one 11-storey plus basement office building (Use Class E) and one 14-storey plus basement office building with ground floor commercial unit (Use Class E), landscaping, highways works, and associated works	66	Approved 26 January 2021 Demolition has taken place; however, details of physical construction are not yet known

Location	Planning Reference	Description of Development	Distance from Site (m)	Status
One Medlock Street	135419/FO/2022	Demolition of the existing hotel building and structures and redevelopment of the site to comprise two separate buildings: one 13 storey office building with commercial unit (Use Class E) at ground floor; a part 11, part 38 storey building comprising 1,014 purpose built student accommodation units (sui generis) with ground floor office/community uses (Use Class E, F1 or F2); and associated ancillary internal and external amenity space, hard and soft landscaping and associated highway works.	30	Approved 7 November 2023 Pre commencement conditions discharged. Conversations for a JV to forward fund the project currently underway
Plot 10a, First Street	136043/FO/2023	Erection of 13-storey office building (Use Class E) with associated public realm, external roof terraces (floors 11 and 12) and other associated works including external amenity spaces (Plot 10A).	9	Approved 13 May 2023 Consent granted, no works currently underway
Park Place (Plot G, Great Jackson Street)	129273/FO/2021	Demolition of existing structures and the construction of two residential buildings of 56 storeys (plus basement and roof plant) (Use class C3), with ground floor commercial uses (Use class E), car parking, cycle provision, landscaping, access and other associated	190	Resolution to grant secured at planning committee 29 July 2021. Decision Notice never issued.

Location	Planning Reference	Description of Development	Distance from Site (m)	Status
Plot 11 Block C First Street South	38831/FO/2023	Erection of a ground plus 28-storey building plus plant level, comprising purpose-built student accommodation (PBSA -Sui Generis) and other associated works including public realm, secure cycle parking and servicing arrangements	100	Application submitted – determination imminent
Hotspur House	138805/FO/2023	Partial demolition of the former Hotspur Press Complex (Medlock Mill) and redevelopment of the site to provide Purpose Built Student Accommodation (Sui Generis Use Class) above ground floor commercial or community uses (Use Classes F(e), F2(a)(b) and E(b)),within a part 4/5-storey and part 37-storey building plus roof parapet level above basement level, associated ancillary internal and external amenity space, public realm (including a new public square), hard and soft landscaping and associated highway works	186	Resolution to Grant secured at Planning Committee on 30 May 2024