

ENVIRONMENT

Trammell Crow Company Logistics (Heywood) Limited
Heywood Stores
Manchester Road, Rochdale
Air Quality Assessment

ENVIRONMENT

Trammell Crow Company Logistics (Heywood) Limited
Heywood Stores Heywood Stores
Manchester Road, Rochdale
Air Quality Assessment

Birmingham
Livery Place, 35 Livery Street, Colmore Business District
Birmingham, B3 2PB
T: 0121 233 3322

Leeds
Whitehall Waterfront, 2 Riverside Way
Leeds, LS1 4EH
T: 0113 233 8000

London
11 Borough High Street
London, SE1 9SE
T: 0207 407 3879

Manchester
11 Portland Street
Manchester, M1 3HU
T: 0161 233 4260

Nottingham
5th Floor, Waterfront House, Station Street
Nottingham, NG2 3DQ
T: 0115 924 1100

March 2023

DOCUMENT ISSUE RECORD

Document Number:	MRR-XX-ZZ-LA-RP-0004-AQA
BWB Reference:	220785_AQA

Revision	Date of Issue	Status	Author:	Checked:	Approved:
1.0	21/07/2022	Issue	C. Smith BSc (Hons), MIAQM, AMIEEnvSc	F. Hoyle MSc, BSc, MIAQM, MIEEnvSc	C. Meddings MSc, BSc, CSci, MIAQM, MIEEnvSc
2.0	08/09/2022	Issue	C. Smith BSc (Hons), MIAQM, AMIEEnvSc	F. Hoyle MSc, BSc, MIAQM, MIEEnvSc	C. Meddings MSc, BSc, CSci, MIAQM, MIEEnvSc
3.0	19/10/2022	Issue	C. Smith BSc (Hons), MIAQM, AMIEEnvSc	F. Hoyle MSc, BSc, MIAQM, MIEEnvSc	F. Hoyle MSc, BSc, MIAQM, MIEEnvSc
4.0	13/03/2023	Issue	C. Smith BSc (Hons), MIAQM, AMIEEnvSc	F. Hoyle MSc, BSc, MIAQM, MIEEnvSc	F. Hoyle MSc, BSc, MIAQM, MIEEnvSc

Notice

This document has been prepared for the sole use of the Client in accordance with the terms of the appointment under which it was produced. BWB Consulting Limited accepts no responsibility for any use of or reliance on the contents of this document by any third party. No part of this document shall be copied or reproduced in any form without the prior written permission of BWB.

EXECUTIVE SUMMARY

BWB Consulting Limited was appointed by Trammell Crow Company Logistics (Heywood) Limited to undertake an air quality assessment for the proposed redevelopment of the Site at the A6045 Manchester Road, Heywood, Rochdale. The development proposals include three B8 storage and distribution units, with associated parking and landscaping. Vehicular access to the Site will be retained from Manchester Road with improvements made to accommodate two-way movements.

The proposed development Site is located within the administrative area of Rochdale Borough Council. The Site is not located within Air Quality Management Area; however sections of the Greater Manchester Combined Authority Air Quality Management Area are located within the study area.

A qualitative construction phase dust assessment was undertaken in accordance with Institute of Air Quality Management guidance and measures were recommended for inclusion in a Dust Management Plan to minimise emissions during construction activities. With the implementation of these mitigation measures the impact of construction phase dust emissions was considered to be 'not significant' in accordance with Institute of Air Quality Management guidance.

A detailed operational phase road traffic emissions assessment was undertaken to consider the impact of development-generated road traffic on local air quality at identified existing receptor locations. Road traffic emissions were modelled using the dispersion model ADMS-Roads and concentrations of nitrogen dioxide and particulate matter (PM₁₀ and PM_{2.5}) were predicted at identified sensitive receptor locations. The modelling assessment was undertaken in accordance with Defra Local Air Quality Management Technical Guidance and Institute of Air Quality Management & Environmental Protection UK guidance. The development was not predicted to result in any new exceedances of the relevant air quality objectives and the impact of the development on local air quality was predicted to be 'negligible' in accordance with guidance.

CONTENTS

EXECUTIVE SUMMARY	iii
1. INTRODUCTION.....	1-6
Site Setting	1-6
Proposed Development	1-7
2. LEGISLATION, PLANNING POLICY & GUIDANCE	2-9
National Legislation and Planning Policy	2-9
Local Planning Policy	2-9
Air Quality Assessment Guidance	2-9
3. METHODOLOGY	3-11
Consultation with Rochdale Borough Council	3-11
Construction Phase Dust Assessment	3-11
Operational Phase Road Traffic Emissions	3-12
4. BASELINE CONDITIONS	4-19
Local Air Quality Management	4-19
Local Air Quality Monitoring	4-19
Background Pollutant Concentrations	4-20
5. CONSTRUCTION PHASE DUST ASSESSMENT.....	5-22
Step 1: Screen the Need for a Detailed Assessment.....	5-22
Step 2: Assess the Risk of Dust Impacts.....	5-23
Step 3: Site-Specific Mitigation.....	5-27
Step 4: Determine Significant Effects	5-31
6. OPERATIONAL PHASE ROAD TRAFFIC EMISSIONS ASSESSMENT.....	6-32
Baseline Assessment	6-32
Impact Assessment.....	6-33
Measures to Minimise Emissions.....	6-38
7. CONCLUSION	7-39

FIGURES

Figure 1.1: Site Location Plan

Figure 3.1: Construction Phase Dust Assessment Distance Buffers

Figure 3.2: Operational Phase Road Traffic Emissions Assessment - Existing Receptor Locations

TABLES

Table 3.1: Existing and Consented Sensitive Receptor Locations

Table 3.2: Air Quality Standards and Objectives (England)
Table 3.3: Impact Descriptors for Individual Receptors
Table 4.1: RBC NO₂ Monitoring Data in 2016 – 2020
Table 4.2: Background Pollutant Concentrations used in the Assessment
Table 5.1: Dust Emission Magnitude Criteria and Definition
Table 5.2: Summary of Project Defined Dust Emissions Magnitudes
Table 5.3: Determination of the Sensitivity of the Area
Table 5.4: Summary Dust Risk Table to Define Site Specific Risk
Table 5.5: Mitigation Measures for a High Risk Site
Table 5.6: Mitigation Measures Specific to Demolition, Earthworks, Construction and Trackout
Table 6.1: Predicted Annual Mean Pollutant Concentrations for Scenario 2: 2022 Base Year
and Scenario 3: 2024 Opening Year Without Development at Existing and Consented
Receptor Locations
Table 6.2: Predicted Annual Mean NO₂ Concentrations and Development Impact at Existing
and Consented Receptor Locations
Table 6.3: Predicted Annual Mean PM₁₀ Concentrations and Development Impact at Existing
and Consented Receptor Locations
Table 6.4: Predicted Annual Mean PM_{2.5} Concentrations and Development Impact at Existing
and Consented Receptor Locations

APPENDICES

APPENDIX A: Glossary of Terms
APPENDIX B: Proposed Development Masterplan
APPENDIX C: Planning Policy and Legislation
APPENDIX D: Traffic Data Utilised in the Air Quality Assessment
APPENDIX E: Wind Rose
APPENDIX F: Model Verification

1. INTRODUCTION

- 1.1 BWB Consulting Limited (BWB) was instructed by Trammell Crow Company Logistics (Heywood) Limited (the Client) to undertake an air quality assessment for a proposed commercial development at land off the A6045 Manchester Road, Heywood, Rochdale ('the Site').
- 1.2 The assessment considers construction phase dust impacts and operational phase road traffic emissions. A qualitative construction phase dust assessment was undertaken in accordance with relevant guidance. A detailed road traffic emissions assessment was undertaken to consider the impact of development-generated road traffic on local air quality at identified receptor locations.
- 1.3 This report is necessarily technical in nature so to assist the reader a glossary of air quality terminology can be found in **Appendix A**.

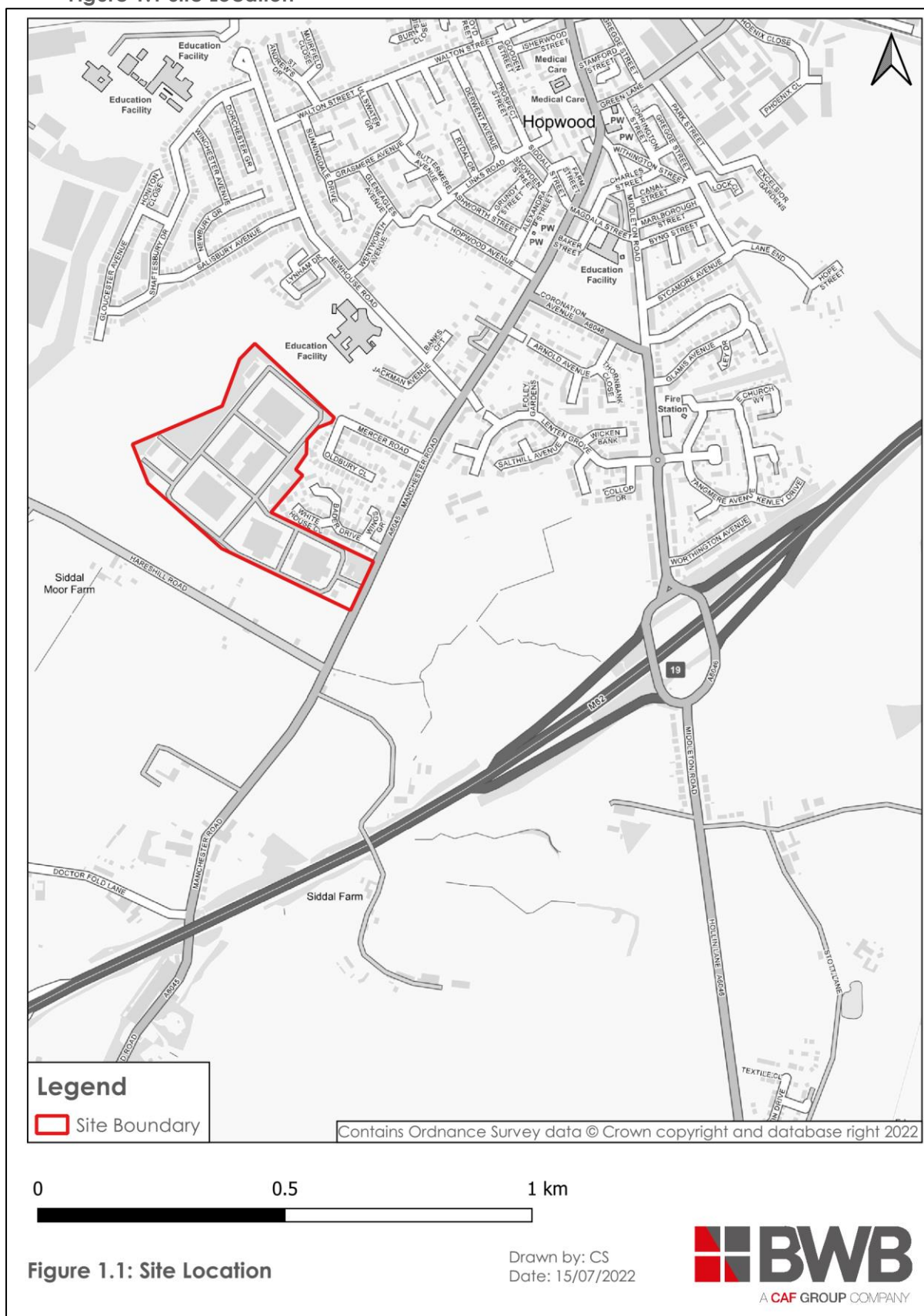
Site Setting

- 1.4 The Site is located to the west of the A6045 Manchester Road in Rochdale and is located within the administrative area of Rochdale Borough Council (RBC).
- 1.5 The Site currently comprises a number of disused B8 units. To the north of the Site are existing residential properties and Newhouse Academy. The Site is located to the immediate north of the consented South Heywood wider development scheme (RBC ref: 16/01399/HYBR) which was granted planning permission in March 2020. To the east of the Site is the A6045 Manchester Road, with land associated with the consented South Heywood wider development scheme beyond. To the south of the Site is open grassland associated with the consented South Heywood wider development scheme, with the A6045 Manchester Road and Hareshill Road beyond. To the west of the Site, is open grassland with existing industrial and commercial units beyond. The M62 motorway is located approximately 500m south of the Site at the closest point and Junction 19 Heywood Interchange is located approximately 500m east of the Site.
- 1.6 The South Heywood wider development scheme includes the construction of a new link road between Junction 19 of the M62 motorway and Pilsworth Road, to the north west of the Site. Up to 1,000 residential dwellings are also consented as part of the scheme along with employment use, a new primary school and retail and commercial uses. At the time of assessment, the link road was under construction and will be operational prior to the proposed development.
- 1.7 **Figure 1.1** details the location of the proposed development.
- 1.8 Principal air pollution sources in the vicinity of the Site are likely to comprise road traffic emissions. The Site is not located within an Air Quality Management Area (AQMA); however there are sections of the Greater Manchester Combined Authority (GMCA) AQMA within the study area, with the closest located approximately 400m south of the Site covering the M62 motorway.

Proposed Development

- 1.9 The proposals comprise the redevelopment of the Site to provide three B8 storage and distribution units, with ancillary office space and associated parking and landscaping. Vehicular access to the Site will be retained, with improvements made to accommodate two-way movements. The proposed development masterplan is detailed in **Appendix B**.

Figure 1.1 Site Location



2. LEGISLATION, PLANNING POLICY & GUIDANCE

National Legislation and Planning Policy

2.1 The following national legislation and planning policy is relevant to air quality and was considered in the undertaking of the assessment. A summary of the relevant national legislation and planning policy is provided in **Appendix C**:

- European Parliament, EU 2008 ambient Air Quality Directive (2008)¹;
- HMSO, Air Quality (England) Regulations (2000)²;
- HMSO, Environment Act (1995)³;
- HMSO, Environment Act (2021)⁴;
- Department for Environment, Air Quality Strategy (1997)⁵;
- Department for the Environment, Food and Rural Affairs, Air Quality Strategy (2007)⁶;
- Department for the Environment, Food and Rural Affairs, The Environment (Miscellaneous Amendments) (EU Exit) Regulations (2020)⁷;
- HMSO, The Environmental Targets (Fine Particulate Matter) (England) Regulations (2023)⁸;
- Ministry of Housing, Communities and Local Government, National Planning Policy Framework (NPPF) (2021)⁹; and
- Ministry for Housing, Communities and Local Government, Planning Practice Guidance (PPG) for air quality (2019)¹⁰.

Local Planning Policy

2.2 The following local and regional planning policy was considered in the undertaking of the assessment and a summary is provided in **Appendix C**:

- Rochdale Borough Council, Core Strategy (2016)¹¹.

Air Quality Assessment Guidance

2.3 The following guidance was utilised in the air quality assessment:

- Defra, Local Air Quality Management Technical Guidance (LAQM.TG(22)) (2022)¹²;
- World Health Organisation, Global Air Quality Guidelines (2021)¹³;

¹ European Parliament (2008) Council Directive 2008/50/EC on Ambient Air Quality and Cleaner Air for Europe

² HMSO (2000) Statutory Instrument 2000 No. 928, The Air Quality (England) Regulations 2000 (as amended), London: HMSO

³ HMSO (1995) The Environment Act 1995, London: TSO

⁴ HMSO (2021) The Environment Act 2021, London: TSO

⁵ Department of the Environment (DoE) (1997) The UK National Air Quality Strategy, London: HMSO

⁶ Department of the Environment, Food and Rural Affairs (Defra) (2007) The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, London: HMSO

⁷ Department of the Environment, Food and Rural Affairs (Defra) (2020) The Environment (Miscellaneous Amendments) (EU Exit) Regulations, London: HMSO

⁸ HMSO (2023) Statutory Instruments 2023 No. 96 The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023

⁹ Ministry of Housing, Communities & Local Government (2021) National Planning Policy Framework, HMSO London

¹⁰ Ministry for Housing, Communities and Local Government (2019) Planning Practice Guidance Air Quality

¹¹ Rochdale Borough Council (2016) Rochdale Core Strategy Adopted October 2016

¹² Defra (2022) Local Air Quality Management Technical Guidance LAQM.TG(22)

¹³ World Health Organisation (2021) WHO global air quality guidelines, Particulate matter (PM_{2.5} and PM₁₀), ozone, nitrogen dioxide, sulphur dioxide and carbon monoxide

- Institute of Air Quality Management, Guidance on the assessment of dust from demolition and construction (2014)¹⁴; and
- Institute of Air Quality Management and Environmental Protection UK, Land-Use Planning and Development Control: Planning for Air Quality (2017)¹⁵.

¹⁴ Institute of Air Quality Management (2014) Guidance on the assessment of dust from demolition and construction, Institute of Air Quality Management, London

¹⁵ Institute of Air Quality Management and Environmental Protection UK (2017) Land-Use Planning and Development Control: Planning for Air Quality

3. METHODOLOGY

Consultation with Rochdale Borough Council

- 3.1 Consultation was undertaken with the Environmental Health department at RBC via email on the 15th July 2022. Subsequent follow up emails were sent on the 20th July 2022 and the 8th September 2022. At the time of assessment a response was not received.
- 3.2 The methodology utilised in the air quality assessment is summarised below:
- Construction Phase - A construction phase dust assessment was undertaken and relevant measures to mitigate construction phase dust emissions were recommended. The assessment was undertaken in accordance with guidance provided by the Institute of Air Quality Management (IAQM)¹⁴.
 - Operational Phase – A detailed operational phase road traffic emissions assessment was undertaken to consider the impact of development-generated traffic on local air quality and predict pollutant concentrations at the proposed development Site. The dispersion model ADMS-Roads was used to model concentrations of oxides of nitrogen (NOx) and particulate matter (PM₁₀ and PM_{2.5}) at identified existing receptor locations for both without and with development scenarios. The change in pollutant concentrations as a result of development-generated traffic was then calculated. The assessment was undertaken in accordance with Defra Local Air Quality Management Technical Guidance (LAQM.TG22)¹² and IAQM and Environmental Protection UK (EPUK)¹⁵.
- 3.3 Full details of the methodology used in the assessment are provided below.

Construction Phase Dust Assessment

- 3.4 An assessment of the potential impacts arising from the construction of the proposed development was undertaken in accordance with IAQM Guidance¹⁴. The full assessment methodology is not reproduced within this report but a summary of the assessment steps are provided below:
- Step 1 – screen the requirement for a more detailed assessment. No assessment is required if there are no receptors within a certain distance of the works.
 - Step 2 – assess the risk of dust impacts separately for each of the four activities considered (demolition, earthworks, construction and trackout).
 - Step 2A – determine the potential dust emission magnitude for each of the four activities;
 - Step 2B – determine the sensitivity of the area;
 - Step 2C – determine the risk of dust impacts by combining the findings of steps 2A and 2B.
 - Step 3 – determine the site-specific mitigation for each of the four activities; and
 - Step 4 – examine the residual effects and determine significance.

Operational Phase Road Traffic Emissions

Air Dispersion Modelling

- 3.5 The air dispersion model ADMS-Roads, version 5.0.1.3 was utilised in the assessment to predict concentrations of NO_x, PM₁₀ and PM_{2.5} at existing and consented receptor locations.
- 3.6 The assessment was undertaken in accordance with Defra LAQM.TG22¹² and IAQM and EPUK guidance¹⁵.

Assessment Scenarios and Traffic Data

- 3.7 The following scenarios were considered in the air dispersion modelling:
- Scenario 1: 2019 Verification Year;
 - Scenario 2: 2022 Base Year;
 - Scenario 3: 2024 Opening Year without development; and
 - Scenario 4: 2024 Opening Year with development.
- 3.8 Traffic data were obtained from BWB, the Transport Consultants for the project. 24-hour Annual Average Daily Traffic Data (AADT) and Heavy Duty Vehicle (HDV) proportions were provided for the following roads for use in the assessment:
- M62 motorway main carriageway;
 - M62 motorway westbound and eastbound slip roads;
 - Heywood Interchange roundabout;
 - A4065 Manchester Road;
 - Middleton Road;
 - Coronation Avenue;
 - Hareshill Road; and
 - South Heywood Link Road (under construction).
- 3.9 As part of the wider South Heywood consented development, Hareshill Road will be realigned to accommodate the South Heywood Link Road, which was under construction at the time of assessment. As the South Heywood Link Road was not operational in 2019 or 2022, the existing road layout of Hareshill Road was utilised in these scenarios. In the opening year of the development, the South Heywood Link Road will be operational and Hareshill Road will be realigned. Therefore the opening year scenarios included the new road layout to account for the South Heywood Link Road and the realigned Hareshill Road.
- 3.10 Consideration was given to the speeds at which vehicles are likely to travel within the study area. Free flowing traffic conditions were modelled at speed limits, taking into account driving conditions in the study area. Queuing sections were modelled in accordance with Defra guidance¹². A section of the M62 motorway within the study

area and sections of Junction 19 Heywood Interchange are elevated compared to the surrounding road network. However, detailed information regarding the elevations was unavailable for use in the assessment. All roads were therefore modelled at 0m above ordnance datum (AOD), which assumed the M62 motorway was closer to receptor locations and therefore provides a conservative assessment.

- 3.11 The traffic data utilised in the assessment was based on a larger floor area than that currently proposed. As such, the assessment is considered to provide a conservative approach whereby road traffic emissions associated with the proposed development are greater due to a higher predicted trip generation for the Site. In reality, the trip generation associated with the proposed development will be lower than that utilised in the assessment and therefore the predicted impacts at existing sensitive receptor locations are considered to be conservative.
- 3.12 Traffic data used in the air dispersion modelling are provided in **Appendix D**.

ADMS-Roads Model Inputs

- 3.13 The following model inputs were utilised in the assessment:
- Emission Factors – emission factors were utilised from the Defra Emission Factor Toolkit¹⁶ (EFT), version 11.0, for the years of assessment (2019, 2022 and 2024).
 - Conversion of oxides of nitrogen – concentrations of NO_x were predicted using the ADMS-Roads dispersion model. These concentrations were converted to nitrogen dioxide (NO₂) using the Defra NO_x to NO₂ calculator¹⁷, version 8.1.
 - Meteorological Data – hourly sequential meteorological data for the verification year of assessment (2019) were obtained for the Manchester Airport recording station which is considered to be most representative due to the distance from the Site. The wind rose for 2019 is provided in **Appendix E**.
 - Surface roughness and Monin-Obukhov length (MO) – Site – a surface roughness of 0.5m was used for the 2019 Verification and 2022 Base Year scenarios, representative of parkland/open suburbia which is representative of the current land use in the area. However, for the 2024 Opening Year scenarios which assumes the consented South Heywood wider development scheme is built out, a surface roughness of 0.75m was used to represent an urban fringe environment. An MO length of 30m was utilised to represent conditions at the Site and within the study area, representative of a mixed urban/industrial environment.
 - Surface roughness and Monin-Obukhov length (MO) – Meteorological Station – a surface roughness of 0.5m was used, representative of the mixed urban rural conditions, and an MO length of 30m was utilised in the air dispersion model to represent conditions at the meteorological station, representative of a mixed urban/industrial environment.
 - Background pollutant concentrations – there is one urban background monitoring location within the study area; however this monitoring location is adjacent to an A road and was therefore considered to experience increased concentrations due to the proximity of a main road traffic source. Background concentrations of NO₂, PM₁₀ and PM_{2.5} for the study area were therefore obtained from the pollutant concentration

¹⁶ Defra (2021) Emission Factor Toolkit [<https://laqm.defra.gov.uk/review-and-assessment/tools/emissions-factors-toolkit.html>]

¹⁷ Defra (2020) NO_x to NO₂ Calculator [<https://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html#NOxNO2calc>]

maps¹⁸ provided by Defra as a 1km x 1km grid of the UK, for the years of assessment (2019, 2022 and 2024).

- Model verification – model verification was undertaken using RBC monitoring data available for the study area. Full details of the verification procedure are provided in **Appendix F**.
- The IAQM released a position statement¹⁹ in July 2018 regarding dealing with the uncertainty in vehicle NOx emissions within air quality assessments. This recommends that sensitivity analyses be undertaken and professional judgement be applied to consider the scenario where NOx emissions do not reduce as rapidly as shown by the EFT. The IAQM position statement was withdrawn in July 2021 following extensive research which identified that Emission Factor Toolkits v8.1 and onwards were considered to more accurately represent real world NOx emissions. No sensitivity analysis was therefore undertaken as part of the air quality assessment.

Receptor Locations

Existing and Consented Sensitive Receptors

3.14 Existing receptor locations, and consented receptor locations associated with the South Heywood wider development scheme, were identified within close proximity of the road links detailed in paragraph 3.8 and considered in the operational phase road traffic emissions assessment. Concentrations of NO₂, PM₁₀ and PM_{2.5} were predicted at the identified existing and consented receptor locations for the assessment scenarios detailed in paragraph 3.7. Where possible the closest receptors to those road links were considered, as these receptors are likely to experience the greatest change in pollutant concentrations as a result of the proposed development. Receptor heights were modelled at 1.5m to represent breathing height at ground floor for residential properties and care homes within the study area. The existing nursery and the consented primary school within the study area were modelled at 0.8m to represent the lower breathing height of children.

3.15 The existing and consented receptor locations are detailed in **Table 3.1** and **Figure 3.1**.

Table 3.1: Existing and Consented Sensitive Receptor Locations

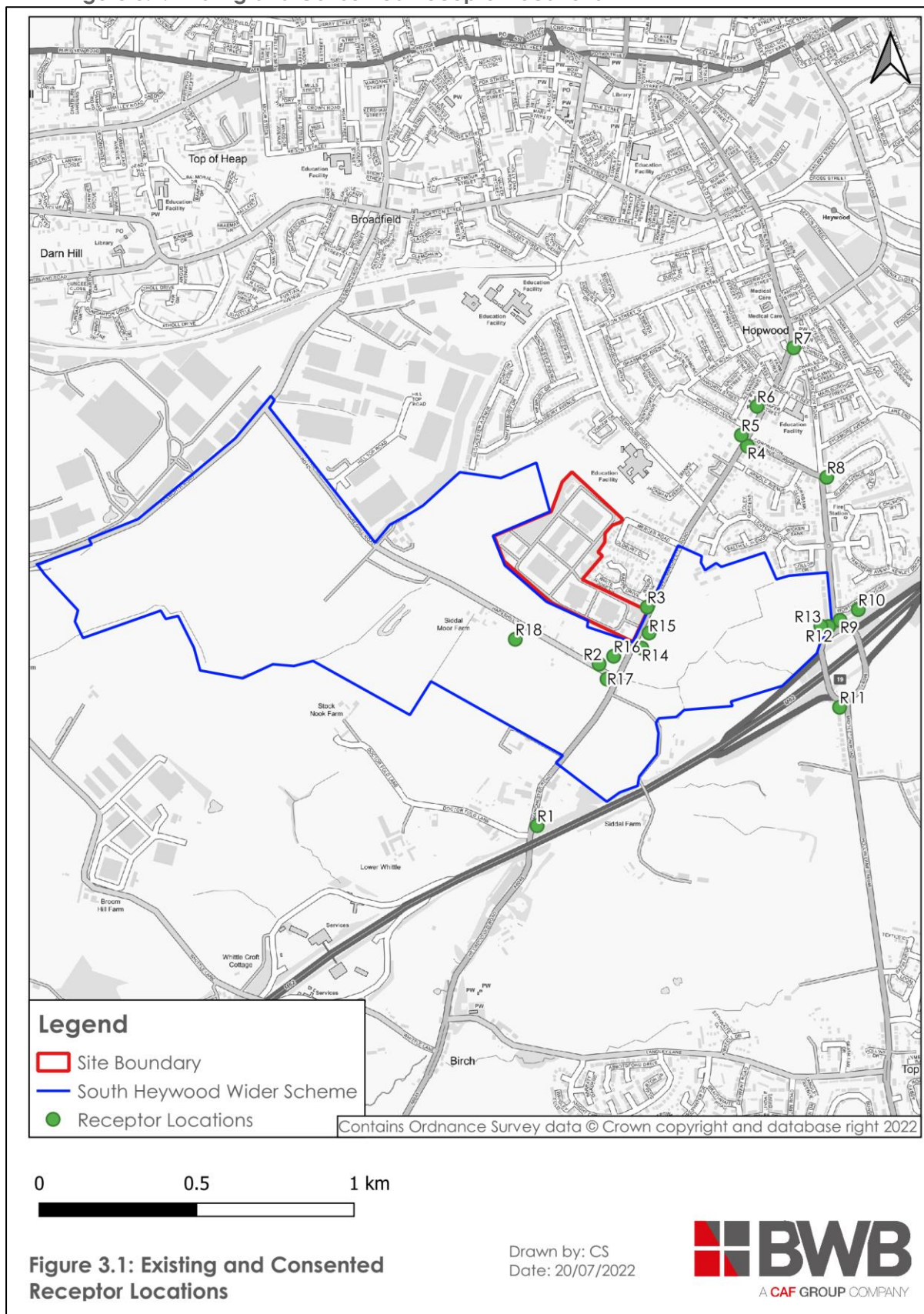
Receptor	Grid Reference		Details	Height Modelled
	X	Y		(m)
R1	385428	408345	Residential property along Manchester Road	1.5
R2	385625	408858	Residential property along Hareshill Road	1.5
R3	385778	409039	Residential property along Manchester Road	1.5
R4	386096	409550	Residential property along Coronation Avenue	1.5

¹⁸ Defra (2020) background pollutant concentration maps [<https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2018>]

¹⁹ Institute of Air Quality Management (2018) Position Statement: Dealing with Uncertainty in Vehicle NOx Emissions within Air Quality Assessments, Version 1.1

Receptor	Grid Reference		Details	Height Modelled
	X	Y		(m)
R5	386077	409585	Residential property along Manchester Road	1.5
R6	386126	409676	Hopwood House Day Nursery, Manchester Road	0.8
R7	386243	409862	Residential property along Manchester Road	1.5
R8	386348	409451	Residential property along Middleton Road	1.5
R9	386390	408997	Residential property along Middleton Road	1.5
R10	386448	409031	Residential property along Worthington Avenue	1.5
R11	386389	408721	Residential property along Middleton Road	1.5
R12	386354	408977	Residential property along Middleton Road	1.5
R13	386329	408978	Residential property within consented South Heywood wider development	1.5
R14	385761	408909	Residential property within consented South Heywood wider development	1.5
R15	385784	408957	Residential property within consented South Heywood wider development	1.5
R16	385671	408883	Residential property within consented South Heywood wider development	1.5
R17	385650	408810	Residential property within consented South Heywood wider development	1.5
R18	385359	408937	Proposed Primary School within consented South Heywood wider development	0.8

Figure 3.1: Existing and Consented Receptor Locations



Limitations and Assumptions

- 3.16 There are uncertainties associated with both measured and predicted pollutant concentrations. The model (ADMS-Roads) used in this assessment relies on input data, which are also subject to uncertainty. 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-Roads model will not take into account.
- 3.17 The assessment is based on traffic data provided by BWB, the transport consultants for the project. As such any assumptions made by the transport consultants will also influence the air quality assessment.
- 3.18 Elevation information for the M62 motorway was unavailable for use in the assessment and therefore all roads were modelled at height of 0m AOD. This assumes that receptor locations are closer to traffic emissions than in reality and therefore represents a conservative assessment where predicted concentrations are likely to be higher.
- 3.19 In future year scenarios, uncertainty relates to the projection of vehicle emissions and, in particular the rate at which emissions per vehicle will improve over time. This assessment utilised the most recent version of the Defra EFT¹⁶ to provide the most up to date estimate of current and future emission projections.
- 3.20 To reduce the uncertainty associated with predicted concentrations, model verification was carried out following guidance set out in Defra guidance¹². As the models were verified using local monitoring data and adjusted accordingly, there can be reasonable confidence in the predicted concentrations.

Assessment Criteria

- 3.21 Predicted pollutant concentrations were compared to the current relevant air quality objectives⁵. The current relevant air quality standards and objectives are detailed in **Table 3.2**.

Table 3.2: Air Quality Standards and Objectives (England)

Pollutant	Averaging Period	Air Quality Objective ($\mu\text{g.m}^{-3}$)	Date to Achieve by
NO ₂	Annual Mean	40	31 December 2005
	1-hour mean not to be exceeded more than 18 times per year	200	31 December 2005
PM ₁₀	Annual Mean	40	31 December 2004
	24-hour mean not to be exceeded more than 35 times per year	50	31 December 2004
PM _{2.5}	Annual mean target	20	1 January 2020

Pollutant	Averaging Period	Air Quality Objective ($\mu\text{g.m}^{-3}$)	Date to Achieve by
	<i>Annual mean interim target as detailed within the Environmental Improvement Plan²⁰</i>	12	31 January 2028
	Annual mean	10	31 December 2040

Italics denotes future air quality objectives published by the UK Government that will come into force in the future

IAQM and EPUK Guidance

- 3.22 Guidance is provided by the IAQM EPUK¹⁵ to determine the significance of the impact of development-generated road traffic emissions on local air quality. The impact descriptors at receptor locations are detailed in **Table 3.3**. These impact descriptors consider the predicted magnitude of change in pollutant concentrations and the concentration in relation to the current relevant air quality objectives.

Table 3.3: Impact Descriptors for Individual Receptors

Long Term Average Concentration at Receptor in Assessment Year	% Change in Concentration Relative to Air Quality Assessment Level (AQAL)			
	1%	2 – 5%	6 – 10%	>10%
75% or less of AQAL	Negligible	Negligible	Slight	Moderate
76 – 94% of AQAL	Negligible	Slight	Moderate	Moderate
95 – 102% of AQAL	Slight	Moderate	Moderate	Substantial
103 – 109% of AQAL	Moderate	Moderate	Substantial	Substantial
110% or more of AQAL	Moderate	Substantial	Substantial	Substantial

Note: Figures rounded up to the nearest whole number, therefore any value less than 1% after rounding (effectively less than 0.5%) will be described as negligible.

²⁰ Defra (2023) Environmental Improvement Plan 2023, First revision of the 25 Year Environment Plan

4. BASELINE CONDITIONS

Local Air Quality Management

- 4.1 The Site is not located within an existing AQMA. However, sections of the GMCA AQMA cover roads within the study area, with the closest section of the AQMA located approximately 400m south of the Site along the M62 motorway. The GMCA AQMA was declared for potential exceedances of the current annual mean objective for NO₂.

Local Air Quality Monitoring

Nitrogen Dioxide

- 4.2 RBC undertakes NO₂ monitoring within its administrative boundary using a network of diffusion tubes.
- 4.3 At the time of assessment 2020 monitoring data was available and was therefore included in the review of monitoring data. However, due to the influence of the COVID-19 pandemic lockdown restrictions, 2020 monitoring data is not considered representative of normal conditions. The IAQM released a position statement in August 2021²¹ with regard to 2020 and 2021 monitoring datasets which recommends that until the influence of the COVID-19 pandemic is fully understood, 2019 monitoring data should be treated as the last year of typical monitoring data.
- 4.4 Bias adjusted NO₂ monitoring results, for the locations in the vicinity of the proposed development Site, are detailed in **Table 4.1**. Exceedances of the annual mean air quality objective are highlighted in bold.

Table 4.1: RBC NO₂ Monitoring Data in 2016 – 2020

Location and Reference	Grid Reference		Site Monitoring Type	Distance from and direction to Site boundary	Monitored Annual Average Concentration (µg.m ⁻³)					
					2015	2016	2017	2018	2019	2020
RO20ANO	385748	408931	Roadside	15m south east	-	-	-	27.2	31.3	23.9
RO6ANO	385413	408320	Kerbside	680m south west	43.2	44.6	47.2	41.9	42.5	31.8
RO21ANO	385820	410776	Roadside	1.3km north	-	-	-	28.6	37.4	28.3
- data not available										

- 4.5 Annual mean NO₂ concentrations were below the air quality objective of 40µg.m⁻³ at monitoring location RO20ANO and RO21ANO between 2015 and 2020. However annual mean NO₂ concentrations exceeded the current air quality objective at monitoring location RO6ANO between 2015 – 2019. This diffusion tube is adjacent to the

²¹ IAQM (2021) The Use of 2020 and 2021 Monitoring Datasets

M62 motorway, which experiences high volumes of traffic, and therefore exceedances are expected.

- 4.6 Monitoring location RO20ANO is considered most representative of Site conditions. This diffusion tube is located in close proximity to the Site itself and adjacent to the A6045 Manchester Road; which is considered to be the primary source of emissions relative to the Site.

Particulate Matter (PM₁₀ and PM_{2.5})

- 4.7 RBC does not currently undertake monitoring of PM₁₀ or PM_{2.5} within its administrative area.

Background Pollutant Concentrations

- 4.8 No representative background air quality monitoring is undertaken by RBC within the study area. Background pollutant concentrations were therefore obtained from the latest Defra background concentration maps¹⁸, which are provided for the UK as a 1km x 1km grid network. The latest maps are based on 2018 monitoring and meteorological data. Background concentrations of NO₂, PM₁₀ and PM_{2.5} were obtained for the grid squares covering the study area for the years of assessment (2019, 2022 and 2024). The background concentrations used in the assessment are detailed in **Table 4.2**.

Table 4.2: Background Pollutant Concentrations used in the Assessment

Table A11: Long-term Annual Concentration Used in the Assessment					
Pollutant	Grid Square	Monitoring Locations / Receptors	Concentration (µg.m ⁻³)		
			2019	2022	2024
Monitoring Locations Used in Verification					
NO ₂	385500, 408500	RO20ANO, RO6ANO	20.4	Background concentrations not required for these assessment years for verification	
PM ₁₀			13.1		
PM _{2.5}			8.4		
Receptors					
NO ₂	385500, 408500	R1, R2, R12, R14, R15, R16, R17, R18	20.4	17.3	15.7
PM ₁₀			13.1	12.7	12.5
PM _{2.5}			8.4	8.1	7.9
NO ₂	385500 409500	R3, Site	15.4	13.5	12.5
PM ₁₀			11.9	11.5	11.3

Pollutant	Grid Square	Monitoring Locations / Receptors	Concentration ($\mu\text{g.m}^{-3}$)		
			2019	2022	2024
PM _{2.5}			7.9	7.6	7.4
NO ₂	386500, 409500	R4, R5, R6, R7, R8	19.4	16.6	15.2
PM ₁₀			13.3	12.8	12.6
PM _{2.5}			8.7	8.3	8.2
NO ₂	386500, 408500	R9, R10, R13	19.2	16.3	14.8
PM ₁₀			12.9	12.5	12.3
PM _{2.5}			8.3	8.0	7.9
NO ₂	386500, 408500	R12, R14, R15, R16, R17, R18	20.4	17.3	15.7
PM ₁₀			13.1	12.7	12.5
PM _{2.5}			8.4	8.1	7.9

- 4.9 Background pollutant concentrations at the Site are below the relevant air quality objectives for NO₂, PM₁₀ and PM_{2.5}. Furthermore, future year predicted PM_{2.5} background concentrations are below the interim annual mean air quality objective of 12 $\mu\text{g.m}^{-3}$ and the future annual mean air quality objective of 10 $\mu\text{g.m}^{-3}$, to be achieved by 2040.

5. CONSTRUCTION PHASE DUST ASSESSMENT

- 5.1 The construction phase of the proposed development will involve a number of activities which have the potential to impact on local air quality. These include emissions of dust generated through demolition, excavation, construction, earthworks and trackout activities, exhaust pollutant emissions from construction traffic on the local highways network, and exhaust emissions from non-road mobile machinery (NRMM) within the construction site itself.
- 5.2 The location of sensitive receptors in relation to construction activities will affect the potential for such construction activities to cause dust soiling, nuisance and local air quality impacts. Meteorological conditions and the use of control measures will also contribute to the effects experienced.

Step 1: Screen the Need for a Detailed Assessment

- 5.3 Step 1 of the IAQM guidance¹⁴ involves a screening assessment to consider whether a more detailed construction phase dust assessment is required.
- 5.4 In accordance with the guidance, a detailed assessment is required if:
- Human receptors are located within 350m of the boundary of the site or 50m of routes used by construction vehicles on the public highways, up to 500m from the site entrances; or
 - Ecological receptors are located within 50m of the boundary of the site or 50m of routes used by construction vehicles on the public highways, up to 500m from the site entrances.
- 5.5 From a review of the Multi Agency Geographic Information for the Countryside (MAGIC) website²², no ecological designations were identified within the above screening distance and therefore the impact on ecological designations was not considered further. However human receptors are located within the above screening distances, with the closest of these receptors located off Manchester Road. A construction phase assessment was therefore undertaken.
- 5.6 For the purpose of the assessment, it was considered that residential properties within the consented South Heywood wider development scheme, to the west, east and south of the Site, could be occupied during the construction phase of the proposed development. These receptor locations were therefore considered as sensitive receptors in the construction phase dust assessment, to provide a conservative and robust assessment of construction phase impacts.

²² Defra, Multi Agency Geographic Information for the Countryside (MAGIC) [<http://magic.defra.gov.uk/>]

Step 2: Assess the Risk of Dust Impacts

Step 2A: Define the Potential Dust Emission Magnitude

- 5.7 The dust emission magnitudes for the construction activities were defined using the criteria detailed in the IAQM guidance¹⁴ as detailed in **Table 5.1**.

Table 5.1: Dust Emission Magnitude Criteria and Definition

Activity	IAQM Dust Emission Magnitude	IAQM Dust Emission Magnitude Criteria
Demolition	Large	Total building volume >50,000m ³ , potentially dusty construction material (e.g. concrete), on-site crushing and screening, demolition activities >20m above ground level.
	Medium	Total building volume 20,000m ³ – 50,000m ³ , potentially dusty construction material, demolition activities 10 - 20m above ground level.
	Small	Total building volume <20,000m ³ , construction material with low potential for dust release (e.g. metal cladding or timber), demolition activities <10m above ground, demolition during wetter months.
Earthworks	Large	Total site area >10,000m ² , potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size), >10 heavy earth moving vehicles active at any one time, formation of bunds >8 m in height, total material moved >100,000 tonnes.
	Medium	Total site area 2,500m ² – 10,000m ² , moderately dusty soil type (e.g. silt), 5 - 10 heavy earth moving vehicles active at any one time, formation of bunds 4m - 8m in height, total material moved 20,000 tonnes – 100,000 tonnes.
	Small	Total site area <2,500m ² , soil type with large grain size (e.g. sand), <5 heavy earth moving vehicles active at any one time, formation of bunds <4m in height, total material moved <20,000 tonnes, earthworks during wetter months.
Construction	Large	Total building volume >100,000m ³ , on site concrete batching, sandblasting.
	Medium	Total building volume 25,000m ³ – 100,000m ³ , potentially dusty construction material (e.g. concrete), on site concrete batching.
	Small	Total building volume <25,000m ³ , construction material with low potential for dust release (e.g. metal cladding or timber).
Trackout	Large	>50 HDV (>3.5t) outward movements in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length >100m.
	Medium	10 - 50 HDV (>3.5t) outward movements in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length 50m – 100m.
	Small	<10 HDV (>3.5t) outward movements in any one day, surface material with low potential for dust release, unpaved road length <50m.

- 5.8 The following dust emissions magnitudes were defined for the proposed development:

- Demolition – the proposed development will require the demolition of all existing buildings within the Site. The total building volume to be demolished is more than 50,000m³. The dust emissions magnitude for demolition was therefore defined as **'Large'**.
- Earthworks – the total Site area is greater than 10,000m². The dust magnitude for earthworks was therefore defined as **'Large'**.
- Construction – the proposed development includes the construction of more than 100,000m³ of warehousing space. The dust emission magnitude for construction was therefore defined as **'Large'**.

- Trackout – the unpaved road length of the Site is estimated to be less than 50m, however, based on the size and scale of the proposed development, there are anticipated to be between 10 - 50 HDV movements in any one day during the construction period. The dust emission magnitude for trackout was therefore defined as '**Medium**'. A trackout distance of up to 200m from the Site Access was used in the assessment in accordance with the IAQM guidance¹⁴.

5.9 A summary of the defined dust emissions magnitudes for the development are provided in **Table 5.2**.

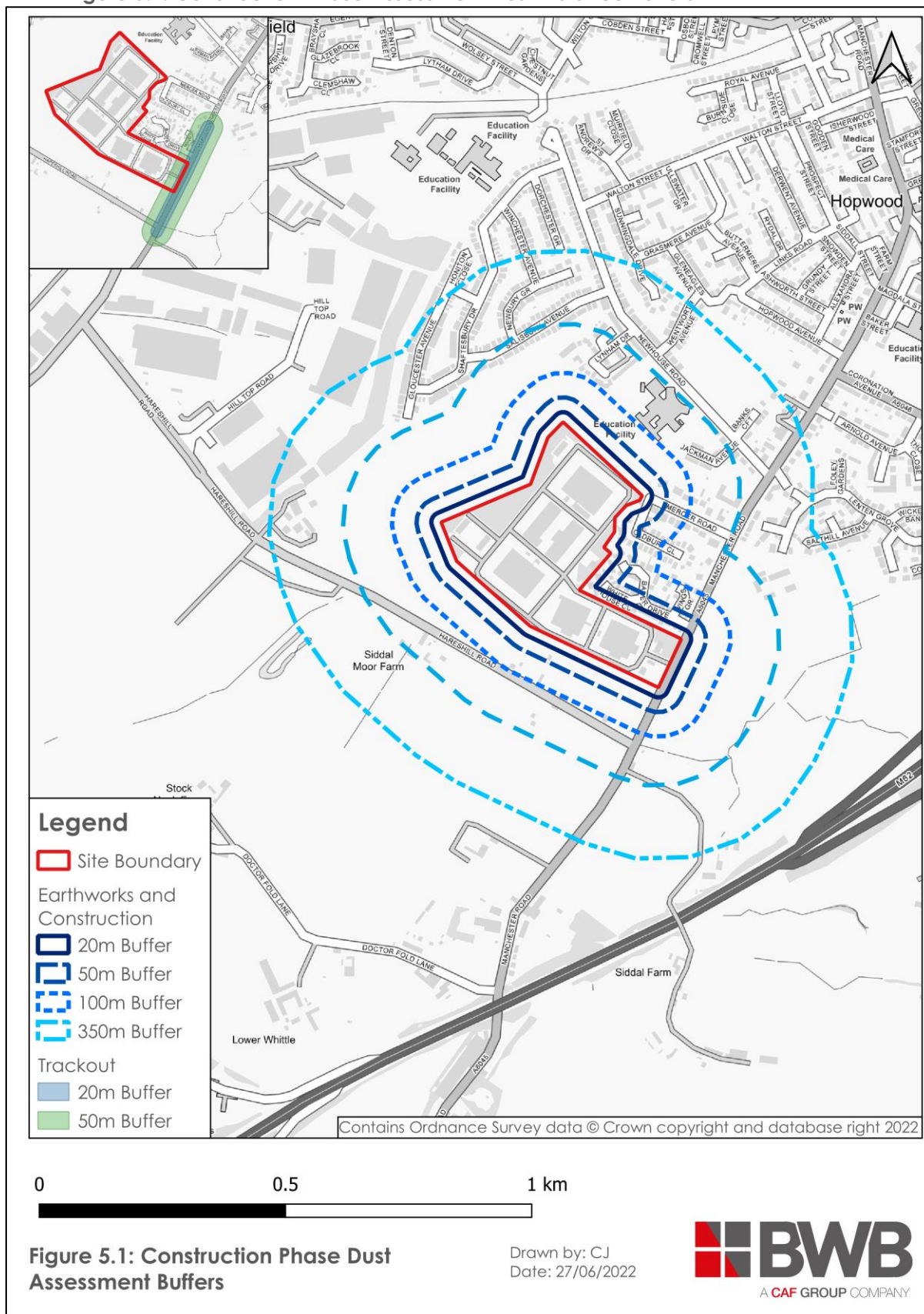
Table 5.2: Summary of Project Defined Dust Emissions Magnitudes

Activity	Dust Emissions Magnitude
Demolition	Large
Earthworks	Large
Construction	Large
Trackout	Medium

Step 2B: Define the Sensitivity of the Area

5.10 The assessment requires the determination of the sensitivity of the area for the purposes of dust soiling and human health impacts. The sensitivity of the study area takes into account the specific receptors in the vicinity of the Site, the proximity and number of those receptors, the local background concentration of PM₁₀ and site-specific factors. **Figure 5.1** was utilised to determine the number of receptors located within the distance bands provided in the IAQM guidance¹⁴ for determining receptor sensitivity.

Figure 5.1: Construction Phase Assessment Dust Distance Buffers



5.11 The sensitivity of the area is defined below, in accordance with IAQM criteria¹⁴ and summarised in **Table 5.3**.

- Dust Soiling – there are between 10 and 100 highly sensitive receptors located within 20m of the proposed Site boundary for demolition, earthworks and construction and within 20m of trackout activities. Therefore, the sensitivity of the area to dust soiling is defined as '**High**'.
- Human Health – there are between 10 and 100 highly sensitive receptors located within 20m of the proposed Site boundary for demolition, earthworks and within 20m of trackout activities. As shown in **Table 4.2**, the background 2022 PM₁₀ concentration is less than 24µg.m⁻³ at the Site and therefore, the sensitivity of the area to human health effects associated with the earthworks, construction and trackout activities is defined as '**Low**'.

Table 5.3: Determination of the Sensitivity of the Area

Potential Impact	Sensitivity			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	High	High	High	High
Human Health	Low	Low	Low	Low

Step 2C: Define the Risk of Impacts

5.12 The dust emission magnitude determined in Step 2A is then combined with the sensitivity of the area determined in Step 2B to define the risk of dust impacts with no mitigation applied. The results of this assessment are detailed in **Table 5.4**.

Table 5.4: Summary Dust Risk Table to Define Site Specific Risk

Activity	Step 2A: Dust Emission Magnitude	Step 2B: Sensitivity of the Area	Step 2C: Risk of Dust Impacts
Dust Soiling Effects on People and Property			
Demolition	Large	High	High Risk
Earthworks	Large	High	High Risk
Construction	Large	High	High Risk
Trackout	Medium	High	Medium Risk
Human Health Impacts			
Demolition	Large	Low	Medium Risk
Earthworks	Large	Low	Low Risk

Activity	Step 2A: Dust Emission Magnitude	Step 2B: Sensitivity of the Area	Step 2C: Risk of Dust Impacts
Construction	Large	Low	Low Risk
Trackout	Medium	Low	Low Risk

Step 3: Site-Specific Mitigation

- 5.13 The risk of dust impacts, defined in Step 2C of the assessment, is used to determine the mitigation measures required to minimise the emission of dust during construction phase activities. The IAQM guidance¹⁴ provides details of highly recommended and desirable mitigation measures which are commensurate with the risk of dust impacts defined in Step 2C for demolition, construction, earthworks and trackout activities. Where the mitigation measures are general in nature, the highest risk category was applied in accordance with the guidance¹⁴. The highest risk category identified was 'High Risk' and the recommended mitigation taken from the IAQM guidance¹⁴ is detailed in **Table 5.5** and **Table 5.6**.

Table 5.5: Mitigation Measures for a High Risk Site

Category	Mitigation Measures for a High Risk Site	
	Highly Recommended	Desirable
Communication	Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.	None
	Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environmental 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 PM ₁₀ continuous monitoring and/or visual inspections.	
Site Management	Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner and record the measures taken.	None

Category	Mitigation Measures for a High Risk Site	
	Highly Recommended	Desirable
	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 500m 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 100m of the site boundary, with cleaning to be provided as necessary.	None
	Carry out regular site inspections to monitor compliance with the DMP, record inspections 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.	
Preparing and maintaining the site	Plan the site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.	None
	Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.	
	Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extended 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	

Category	Mitigation Measures for a High Risk Site	
	Highly Recommended	Desirable
	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 un-surfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable control measures provided, subject to the approval of the nominated undertaker 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). 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.	None
Operations	Ensure an adequate water supply on site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate. Used enclose 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 and dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods. Avoid bonfires and burning of waste materials.	None
Waste Management		None

Table 5.6: Mitigation Measures Specific to Demolition, Earthworks, Construction and Trackout

Category	Mitigation Measures	
	Highly Recommended	Desirable
Demolition (High Risk Site)	Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).	None
	Ensure effective water suppression is used during demolition operations. Hand held sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground.	
	Avoid explosive blasting, using appropriate manual or mechanical alternatives.	
	Bag and remove any biological debris or damp down such material before demolition.	
	Bag and remove any biological debris or damp down such material before demolition.	
Earthworks (High Risk Site)	Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.	None
	Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable.	
	Only remove the cover in small areas during work and not all at once.	
Construction (High Risk Site)	Avoid scabbling (roughening of concrete surfaces) if possible.	For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust.
	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.	
Trackout (Medium Risk Site)	Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any materials tracked out of the site. This may require the sweeper being continuously in use.	None
	Avoid dry sweeping of large areas.	
	Ensure vehicles entering and leaving the sites are covered to prevent escape of materials during transport.	
	Record all inspections of haul routes and any subsequent action in a site log book.	
	Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).	

Step 4: Determine Significant Effects

- 5.14 In accordance with IAQM guidance¹⁴, with the implementation of the mitigation measures detailed in Step 3, the residual impacts from the construction phase are considered to be 'not significant'.

6. OPERATIONAL PHASE ROAD TRAFFIC EMISSIONS ASSESSMENT

Baseline Assessment

- 6.1 Pollutant concentrations were predicted at the identified existing and consented sensitive receptor locations using the dispersion model ADMS-Roads. Predicted pollutant concentrations for Scenario 2: 2022 Base Year and Scenario 3: 2024 Opening Year without development are detailed in **Table 6.1**. Exceedances of the current relevant annual mean air quality objectives are highlighted in **bold**.

Table 6.1: Predicted Annual Mean Pollutant Concentrations for Scenario 2: 2022 Base Year and Scenario 3: 2024 Opening Year Without Development at Existing and Consented Receptor Locations

Receptor	Scenario 2: 2022 Base Year ($\mu\text{g.m}^{-3}$)			Scenario 3: 2024 Opening Year Without Development ($\mu\text{g.m}^{-3}$)		
	NO ₂	PM ₁₀	PM _{2.5}	NO ₂	PM ₁₀	PM _{2.5}
R1	46.0	17.6	11.2	35.4	17.0	10.7
R2	26.1	14.5	9.2	20.2	13.4	8.5
R3	20.7	13.0	8.5	18.5	12.7	8.3
R4	26.3	14.7	9.4	22.0	14.2	9.1
R5	24.9	14.4	9.3	21.0	13.9	9.0
R6	22.5	14.0	9.1	19.4	13.7	8.8
R7	30.0	16.2	10.3	24.6	15.5	9.8
R8	26.7	15.0	9.6	22.3	14.4	9.2
R9	35.2	15.8	10.0	31.0	15.8	10.0
R10	32.7	15.1	9.7	28.6	15.0	9.5
R11	22.5	12.4	8.2	20.2	12.4	8.1
R12	33.9	15.6	9.8	30.6	15.8	9.9
R13	29.9	14.7	9.4	27.5	15.1	9.5
R14	23.4	13.7	8.7	23.9	14.5	9.1
R15	23.1	13.7	8.7	21.2	13.7	8.7

Receptor	Scenario 2: 2022 Base Year ($\mu\text{g.m}^{-3}$)			Scenario 3: 2024 Opening Year Without Development ($\mu\text{g.m}^{-3}$)		
	NO ₂	PM ₁₀	PM _{2.5}	NO ₂	PM ₁₀	PM _{2.5}
R16	23.6	13.8	8.8	22.4	14.0	8.8
R17	25.7	14.3	9.0	21.3	13.7	8.6
R18	21.1	13.3	8.5	18.6	13.0	8.3

- 6.2 The baseline assessment for Scenario 2 and 3 indicates that predicted concentrations of NO₂, PM₁₀ and PM_{2.5} are all below the respective current annual mean air quality objectives at the majority of existing and consented receptor locations considered, including those located within sections of the AQMA (receptors R7 and R9).
- 6.3 There is a predicted exceedance of the current annual mean NO₂ air quality objective at receptor R1 in Scenario 2. This receptor is located adjacent to the M62 motorway where passive diffusion tube monitoring data shows exceedances of the annual mean NO₂ air quality objective in recent years. Additionally, the M62 motorway was modelled at an elevation of 0m to provide a conservative assessment; despite this section of motorway being elevated compared to the receptor in reality. It is therefore considered that concentrations predicted at this receptor will represent an element of overprediction of modelled concentrations at this location.

Impact Assessment

Detailed Operational Phase Road Traffic Emissions Assessment

- 6.4 Concentrations of NO₂, PM₁₀ and PM_{2.5} were predicted at identified existing receptor locations for Scenario 4: 2024 Opening Year with development, to consider the impact of development-generated vehicles on local air quality.
- 6.5 Predicted pollutant concentrations are detailed in **Table 6.2**, **Table 6.3** and **Table 6.4** for NO₂, PM₁₀ and PM_{2.5} respectively together with Scenario 3: 2024 Opening Year without development concentrations for comparison purposes. The predicted change in pollutant concentrations resulting from development-generated traffic, and the associated impact are also provided.

Table 6.2: Predicted Annual Mean NO₂ Concentrations and Development Impact at Existing and Consented Receptor Locations

Receptor	Predicted NO ₂ Concentration (µg.m ⁻³)				
	Scenario 3: 2024 Without Development (µg.m ⁻³)	Scenario 4: 2024 With Development (µg.m ⁻³)	Concentration Change* (µg.m ⁻³)	Change in Concentration Relative to Air Quality Assessment Level (%)	Impact
R1	35.4	35.5	+0.1	0	Negligible
R2	20.2	20.3	+0.1	0	Negligible
R3	18.5	19.6	+1.1	3	Negligible
R4	22.0	22.5	+0.5	1	Negligible
R5	21.0	21.3	+0.3	1	Negligible
R6	19.4	19.5	+0.1	0	Negligible
R7	24.6	24.8	+0.2	1	Negligible
R8	22.3	22.3	+0.1	0	Negligible
R9	31.0	31.1	+0.2	0	Negligible
R10	28.6	28.7	+0.1	0	Negligible
R11	20.2	20.3	+0.1	0	Negligible
R12	30.6	30.9	+0.2	1	Negligible
R13	27.5	27.7	+0.2	1	Negligible
R14	23.9	24.3	+0.4	1	Negligible
R15	21.2	21.5	+0.3	1	Negligible
R16	22.4	22.7	+0.3	1	Negligible
R17	21.3	21.3	+0.1	0	Negligible
R18	18.6	18.6	0.0	0	Negligible
* Discrepancies in changes due to rounding effects					

Table 6.3: Predicted Annual Mean PM₁₀ Concentrations and Development Impact at Existing and Consented Receptor Locations

Receptor	Predicted PM ₁₀ Concentration (µg.m ⁻³)				
	Scenario 3: 2024 Without Development (µg.m ⁻³)	Scenario 4: 2024 With Development (µg.m ⁻³)	Concentration Change* (µg.m ⁻³)	Change in Concentration Relative to Air Quality Assessment Level (%)	Impact
R1	17.0	17.0	0.0	0	Negligible
R2	13.4	13.4	0.0	0	Negligible
R3	12.7	13.0	+0.2	1	Negligible
R4	14.2	14.3	+0.1	0	Negligible
R5	13.9	14.0	+0.1	0	Negligible
R6	13.7	13.7	0.0	0	Negligible
R7	15.5	15.6	+0.1	0	Negligible
R8	14.4	14.5	0.0	0	Negligible
R9	15.8	15.9	+0.1	0	Negligible
R10	15.0	15.0	0.0	0	Negligible
R11	12.4	12.4	0.0	0	Negligible
R12	15.8	15.9	+0.1	0	Negligible
R13	15.1	15.2	+0.1	0	Negligible
R14	14.5	14.6	+0.1	0	Negligible
R15	13.7	13.8	+0.1	0	Negligible
R16	14.0	14.1	+0.1	0	Negligible
R17	13.7	13.7	0.0	0	Negligible
R18	13.0	13.0	0.0	0	Negligible
* Discrepancies in changes due to rounding effects					

Table 6.4: Predicted Annual Mean PM_{2.5} Concentrations and Development Impact at Existing and Consented Receptor Locations

Receptor	Predicted PM _{2.5} Concentration (µg.m ⁻³)				
	Scenario 3: 2024 Without Development (µg.m ⁻³)	Scenario 4: 2024 With Development (µg.m ⁻³)	Concentration Change* (µg.m ⁻³)	Change in Concentration Relative to Air Quality Assessment Level (%)	Impact
R1	10.7	10.7	0.0	0	Negligible
R2	8.5	8.5	0.0	0	Negligible
R3	8.3	8.4	+0.1	1	Negligible
R4	9.1	9.2	+0.1	0	Negligible
R5	9.0	9.0	0.0	0	Negligible
R6	8.8	8.8	0.0	0	Negligible
R7	9.8	9.9	0.0	0	Negligible
R8	9.2	9.3	0.0	0	Negligible
R9	10.0	10.0	0.0	0	Negligible
R10	9.5	9.5	0.0	0	Negligible
R11	8.1	8.1	0.0	0	Negligible
R12	9.9	10.0	0.0	0	Negligible
R13	9.5	9.6	0.0	0	Negligible
R14	9.1	9.2	+0.1	0	Negligible
R15	8.7	8.7	0.0	0	Negligible
R16	8.8	8.9	0.0	0	Negligible
R17	8.6	8.7	0.0	0	Negligible
R18	8.3	8.3	0.0	0	Negligible
* Discrepancies in changes due to rounding effects					

- 6.6 The proposed development does not lead to any exceedances of the current annual mean air quality objectives for NO₂, PM₁₀ or PM_{2.5} at any of the existing and consented sensitive receptor locations considered in the assessment. Furthermore, where exceedances were predicted in Scenario 2 at R1, no exceedances were predicted at this receptor location in Scenario 3 or Scenario 4. With regard to the interim and future PM_{2.5} air quality objectives, predicted concentrations were below the interim target of 12µg.m⁻³ in Scenario 4 at all sensitive receptor locations and below the future annual mean objective of 10 µg.m⁻³ at 17 of the 18 existing receptor locations considered within the assessment. The predicted annual mean PM_{2.5} concentrations were above the future annual mean objective at receptor location R1 however this exceedance occurs in both Scenario 3 and Scenario 4 and the proposed development does not lead to this exceedance.
- 6.7 The predicted change in NO₂ concentration is less than 1% of the annual mean air quality objective at all existing and consented sensitive receptor locations, except for R3 where a change of 3% was predicted. R3 is located adjacent to the Site access and to provide a conservative assessment, it was assumed that existing Site was not operational. As such, it is expected that R3 would experience the greatest change in NO₂ concentrations, with the development in place, as this location will experience the greatest change in traffic flows. No exceedances of the current NO₂ annual mean objective were predicted at R3 and the total predicted annual mean NO₂ concentration at R3 in Scenario 4 was 19.6µg.m⁻³, which is 49% of air quality objective. Therefore the impact at all existing and consented receptor locations was determined as 'negligible' in accordance with the IAQM and EPUK guidance¹⁵ with the proposed development in place.
- 6.8 For PM₁₀ and PM_{2.5}, all predicted changes in concentration, as a result of the development, are less than 1% of the current relevant air quality objectives at all receptor locations considered. As such, impacts at all existing and consented receptor locations were predicted to be 'negligible' in accordance with the IAQM and EPUK guidance¹⁵ with the proposed development in place.

Impact Significance Summary

- 6.9 Relevant guidance, legislation and professional judgement was utilised to determine the significance of the findings of the air quality assessment. The air quality assessment was undertaken by a full member of the Institute of Air Quality Management. A summary of the impact significance and justification of this are provided below.
- 6.10 The impact of the proposed development on air quality is considered to be 'negligible':
- Consideration was given to local planning policy¹¹ and the development proposals are considered to be in accordance with this policy with regard to air quality.
 - Existing concentrations of NO₂, PM₁₀ and PM_{2.5} at the majority of existing and consented receptor locations in the study area are predicted to be below the relevant air quality objectives. Exceedances of the annual mean objective for NO₂ were predicted in Scenario 2: Base Year at R1 however this is expected due to its location adjacent to the M62
 - The air quality assessment undertaken utilised robust model inputs including queuing traffic at junctions and appropriate meteorological input and surface roughness.

- The impact of development-generated road traffic on local air quality is defined as 'negligible' in accordance with IAQM and EPUK guidance¹⁵.

Measures to Minimise Emissions

- 6.11 The magnitude of impacts from road traffic emissions associated with the operational phase of the proposed development was determined to be negligible in accordance with guidance and therefore mitigation is not required.
- 6.12 However, a Travel Plan will be submitted with the application for the proposed development which includes measures to further minimise the influence of the development on local air quality. These measures include:
- Electric vehicle (EV) charging points;
 - The appointment of a site-wide Travel Plan Co-Ordinator who is responsible for managing and implementing the process of engaging with staff as part of the commitment to the Travel Plan process;
 - Travel Welcome Pack to all new employees which includes pedestrian and cycle route maps as well as information on the local bus routes
 - Travel information boards within each unit to allow information on Travel Plan events and walking and cycling information to be seen by all employees.
 - The provision of eight cycle parking spaces and secure cycle shelters;
 - Improved pedestrian access to encourage active travel; and
 - The promotion of car sharing.

7. CONCLUSION

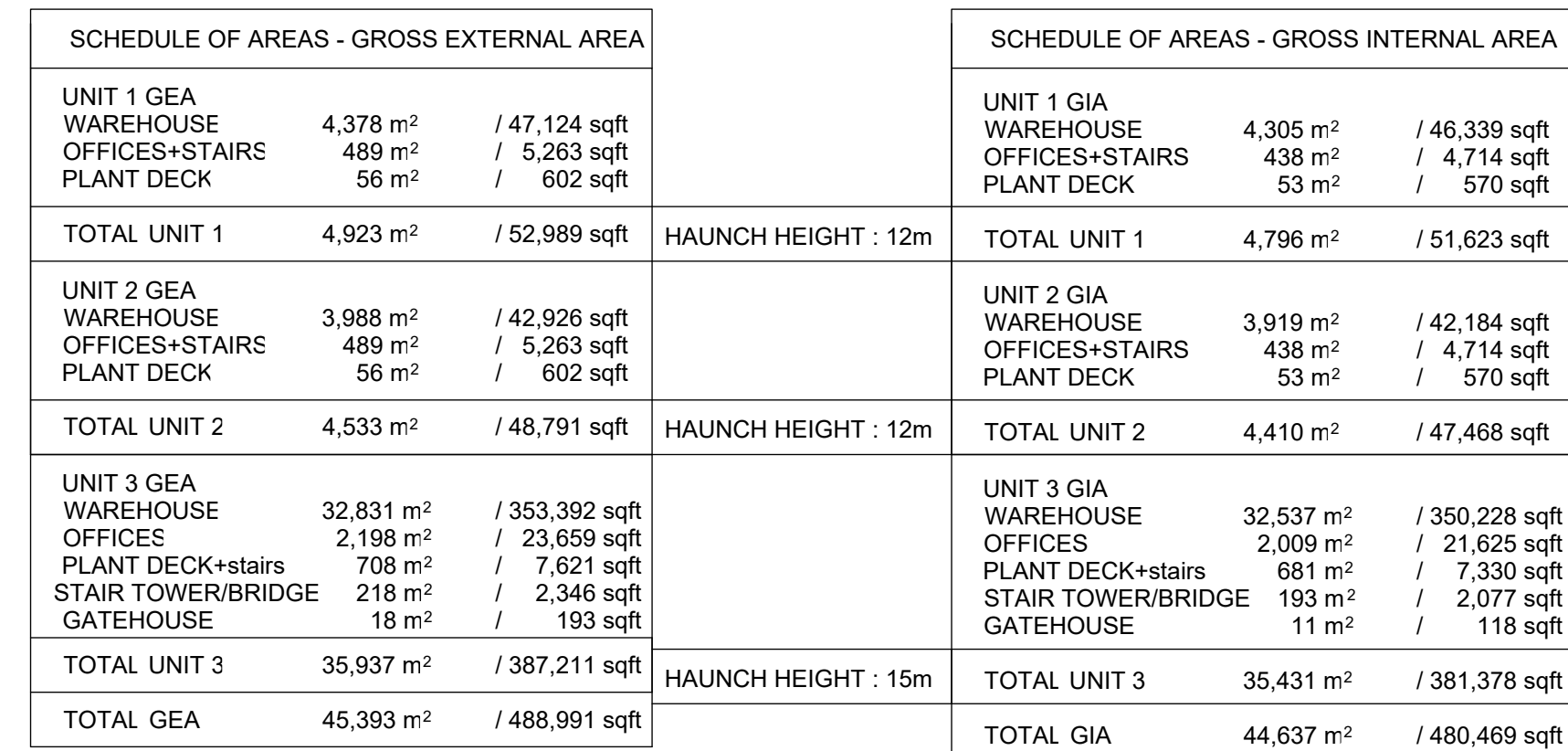
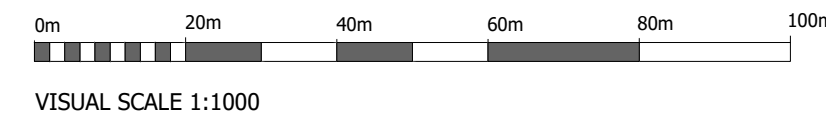
- 7.1 An air quality impact assessment was undertaken for the proposed commercial development at land off the A6045 Manchester Road, Heywood, Rochdale ('the Site').
- 7.2 A qualitative construction phase assessment was undertaken and measures were recommended for inclusion in a DMP to minimise emissions during construction activities. With the implementation of these mitigation measures the impact of construction phase dust emissions is considered to be 'not significant' in accordance with IAQM guidance¹⁴.
- 7.3 A detailed road traffic emissions assessment was undertaken to consider the impact of development-generated road traffic on local air quality at identified existing receptor locations. Road traffic emissions were modelled using the dispersion model ADMS-Roads and concentrations of NO₂, PM₁₀ and PM_{2.5} were predicted at identified sensitive receptor locations. The modelling assessment was undertaken in accordance with Defra Local Air Quality Management Technical Guidance¹². The development was not predicted to result in any new exceedances of the relevant air quality objectives and the impact of the development on local air quality was predicted to be 'negligible' in accordance with IAQM and EPUK guidance¹⁵.
- 7.4 Based on the assessment results, mitigation measures are not required however measures beneficial to local air quality have been incorporated into the Travel Plan to minimise emissions associated with the operation of the proposed development. Measures include the provision of EV charging, cycle parking and the promotion of active travel.

APPENDICES

APPENDIX A: GLOSSARY OF TERMS

Term	Definition
AADT	Annual Average Daily Traffic flow.
Air quality objective	Policy target generally expressed as a maximum ambient concentration to be achieved, either without exception or with a permitted number of exceedances within a specific timescale (see also air quality standard).
Air quality standard	The concentrations of pollutants in the atmosphere which can broadly be taken to achieve a certain level of environmental quality. The standards are based on the assessment of the effects of each pollutant on human health including the effects on sensitive sub groups (see also air quality objective).
Annual mean	The average (mean) of the concentrations measured for each pollutant for one year. Usually this is for a calendar year, but some species are reported for the period April to March, known as a pollution year. This period avoids splitting winter season between two years, which is useful for pollutants that have higher concentrations during the winter months.
AQAP	Air Quality Action Plan.
AQMA	Air Quality Management Area.
AQS	Air Quality Strategy.
Defra	Department for Environment, Food and Rural Affairs.
EPUK	Environmental Protection UK.
Exceedance	A period of time where the concentrations of a pollutant is greater than, or equal to, the appropriate air quality standard.
HDV	Heavy Duty Vehicles (HGVs + buses and coaches)
HGV	Heavy Goods Vehicles.
IAQM	Institute of Air Quality Management.
LAQM	Local Air Quality Management.
LDV	Light Duty Vehicles (motorbikes, cars, vans and small trucks)
NO	Nitrogen monoxide, a.k.a. nitric oxide.
NO ₂	Nitrogen dioxide.
NO _x	Nitrogen oxides.
Percentile	The percentage of results below a given value.
PM ₁₀	Particulate matter with an aerodynamic diameter of less than 10 micrometres.
PM _{2.5}	Particulate matter with an aerodynamic diameter of less than 2.5 micrometres.
micrograms per cubic metre (µg.m ⁻³)	A measure of concentration in terms of mass per unit volume. A concentration of 1µg.m ⁻³ means that one cubic metre of air contains one microgram (millionth of a gram) of pollutant.

APPENDIX B: PROPOSED DEVELOPMENT MASTERPLAN



 LANDSCAPING
 CONCRETE
 GRAVEL
 BLOCK PAVIORS
 ASPHALT
 GRASSCRETE
 BUILDINGS (WAREHOUSE+ANCILLARY)
 OFFICES
 2.4m HIGH PALADIN FENCE
 3m HIGH ACOUSTIC FENCE + GREEN WALL EXTERNALLY
 5m HIGH ACOUSTIC FENCE + GREEN WALL EXTERNALLY
 5m HIGH ACOUSTIC FENCE
 1m HIGH KNEE RAIL TIMBER FENCE
 1.8m VERTICAL CLOSE BOARDED TIMBER FENCE

1



- SITE BOUNDARY: 11.152 Ha / 27.46 Acres

REV	DATE	DESCRIPTION	DRAWN BY	CHECKED BY
REVISIONS				

CUENT

Trammell Crow Company

AshtonSmith
Beyond Design

Ashton Smith, Belvedere House, 2 Victoria Avenue, Harrogate, North Yorkshire, HG1 1EP
Tel: 01423 328821 Fax: 01423 366104
www.ashtonsmith.co.uk

21157

JOB NO. _____

APPENDIX C: PLANNING POLICY AND LEGISLATION

National Legislation and Planning Policy

The UK Air Quality Strategy

European Union (EU) legislation forms the basis of air quality policy and legislation in the UK. The EU 2008 ambient Air Quality Directive¹ sets limits for ambient concentrations of air pollutants including nitrogen dioxide (NO₂) and particulate matter (PM₁₀ and PM_{2.5}). The air quality standards and objectives are prescribed through the Air Quality (England) Regulations 2000², as amended, for the purpose of the Local Air Quality Management Framework.

The UK Government are required under the Environment Act 1995³ to produce a national Air Quality Strategy (AQS). The AQS was first published in 1997⁴ and was most recently reviewed and updated in 2007⁵ with miscellaneous amendments added in 2020⁷ and an updated PM_{2.5} objective being published in 2023⁸. The AQS provides an overview of the Government's ambient air quality policy and sets out the air quality standards and objectives to be achieved and measures to improve air quality.

The Environment Act 2021⁴ was granted Royal Assent in November 2021 and contains amendments to Part IV of the Environment Act 1995³ with regard to the Local Air Quality Management regime. Under the Environment Act 2021⁴, the Secretary of State must lay a statement before Parliament setting out progress made in meeting air quality objectives and standard in England and steps taken towards achieving the standards. The Environment Act 2021⁴ also places responsibility on local authorities to co-operate with air quality partners in the preparation of Air Quality Action Plans and identification of measures which should be monitored within the Plan and dates by which they should be implemented.

Part IV of the Environment Act³ requires local authorities in the UK to review local air quality within their administrative area and, if relevant air quality standards and objectives are likely to be exceeded, designate Air Quality Management Areas (AQMAs). Following the designation of an AQMA, local authorities are required to publish an Air Quality Action Plan (AQAP) detailing measures to be taken to improve local air quality and work towards meeting the relevant air quality standards and objectives.

National Planning Policy Framework

The National Planning Policy Framework (NPPF)⁹ was amended in July 2021 and sets out the Government's planning policies for England and how these are expected to be applied.

The NPPF⁹ recognises air quality within Section 15: Conserving and enhancing the natural environment, and states that:

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

[...]

e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by,

unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans;

[...]

Ground conditions and pollution

[...]

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

[...]

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

With regard to assessing cumulative effects the NPPF⁹ states:

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

[...]"

Planning Practice Guidance

The Planning Practice Guidance (PPG) for air quality¹⁰ was updated in November 2019 and provides guiding principles on how the planning process can take account of the impacts of new development on air quality.

The PPG¹⁰ sets out the following with regard to air quality and planning:

- *"What air quality considerations does planning need to address;*
- *What is the role of plan-making with regard to air quality;*
- *Air quality concerns relevant to neighbourhood planning;*
- *What information is available about air quality;*

- *When could air quality considerations be relevant to the development management process;*
- *What specific issues may need to be considered when assessing air quality impacts;*
- *How detailed does an air quality assessment need to be; and*
- *How can an impact on air quality be mitigated".*

The PPG¹⁰ sets out the pollutants for which there are legally binding limits for concentrations and those which the UK also has national emissions reduction commitments.

The PPG¹⁰ states that development plans may need to consider:

- *"what are the observed trends shown by recent air quality monitoring data and what would happen to these trends in light of proposed development and / or allocations;*
- *the impact of point sources of air pollution (pollution that originates from one place);*
- *the potential cumulative impact of a number of smaller developments on air quality as well as the effect of more substantial developments, including their implications for vehicle emissions;*
- *ways in which new development could be made appropriate in locations where air quality is or is likely to be a concern, and not give rise to unacceptable risks from pollution. This could, for example, entail identifying measures for offsetting the impact on air quality arising from new development including supporting measures in an air quality action plan or low emissions strategy where applicable; and*
- *opportunities to improve air quality or mitigate impacts, such as through traffic and travel management and green infrastructure provision and enhancement".*

The PPG¹⁰ also states what may be considered relevant to determining a planning application and these include whether a development would:

- *"Lead to changes (including any potential reductions) in vehicle-related emissions in the immediate vicinity of the proposed development or further afield. This could be through the provision of electric vehicle charging infrastructure; altering the level of traffic congestion; significantly changing traffic volumes, vehicle speeds or both; or significantly altering the traffic composition on local roads. Other matters to consider include whether the proposal involves the development of a bus station, coach or lorry park; could add to turnover in a large car park; or involve construction sites that would generate large Heavy Goods Vehicle flows over a period of a year or more;*
- *Introduce new point sources of air pollution. This could include furnaces which require prior notification to local authorities; biomass boilers or biomass-fuelled Combined Heat and Power plant; centralised boilers or plant burning other fuels within or close to an air quality management area or introduce relevant combustion within a Smoke Control Area; or*

extraction systems (including chimneys) which require approval or permits under pollution control legislation;

- *Expose people to harmful concentrations of air pollutants, including dust. This could be by building new homes, schools, workplaces or other development in places with poor air quality;*
- *Give rise to potentially unacceptable impacts (such as dust) during construction for nearby sensitive locations;*
- *Have a potential adverse effect on biodiversity, especially where it would affect sites designated for their biodiversity value".*

The PPG¹⁰ provides guidance regarding what should be included within an air quality assessment. Examples of potential air quality mitigation measures are also provided.

Local Planning Policy

Rochdale Core Strategy

The Rochdale Core Strategy was adopted by Rochdale Borough Council in October 2016 and sets out the long term special strategy for development in Rochdale. The Core Strategy includes the following policies related to air quality:

"G9 – Reducing the impact of pollution, contamination and land instability

We will reduce all forms of pollution, contamination and land instability in the borough, by:

- Focusing on measures that reduce air pollution in Air Quality Management Area, and other areas where pollution levels are unacceptable, particularly around motorways and main roads;*
- Requiring that development does not have impacts that lead to an unacceptable increase in air, water, noise, light or other pollution;*
- Ensuring sensitive new developments such as housing, schools and hospitals are not adversely affected by existing sources of pollution such as roads and certain types of industry;*
- Requiring a Low Emissions Strategy (LES) where development requires a Transport Assessment, and in other circumstances as appropriate;*

[...]

- Using planning conditions or obligations to control pollution from new development, or the impact of pollution on new development."*

And;

"DM1 – General development requirements

All development proposals, including changes of use of land and buildings, extensions and alterations, will be expected to demonstrate that they:

[...]

- Mitigate against any impacts due to noise, air, dust, light and odour pollution, traffic generation or inadequate access, where such mitigation is identified as being necessary;*

- e. *Do not have an adverse impact on health through its impact or the effect of existing problems e.g. land contamination or poor air quality; [...]*

And;

“DM2 – Delivering planning contributions and infrastructure

[...]

3. All types of development

For all types of development, including housing, we will seek contributions for any infrastructure or other measures necessary to mitigate any on site or off-site impacts from development.

These contributions may cover, dependant on need:

- e. *Mitigation or compensation against environmental impacts e.g. noise, air quality (particularly in Air Quality Management Areas);*

[...]

The above policies were taken into consideration throughout the undertaking of the assessment.

APPENDIX D: TRAFFIC DATA UTILISED IN THE AIR QUALITY ASSESSMENT

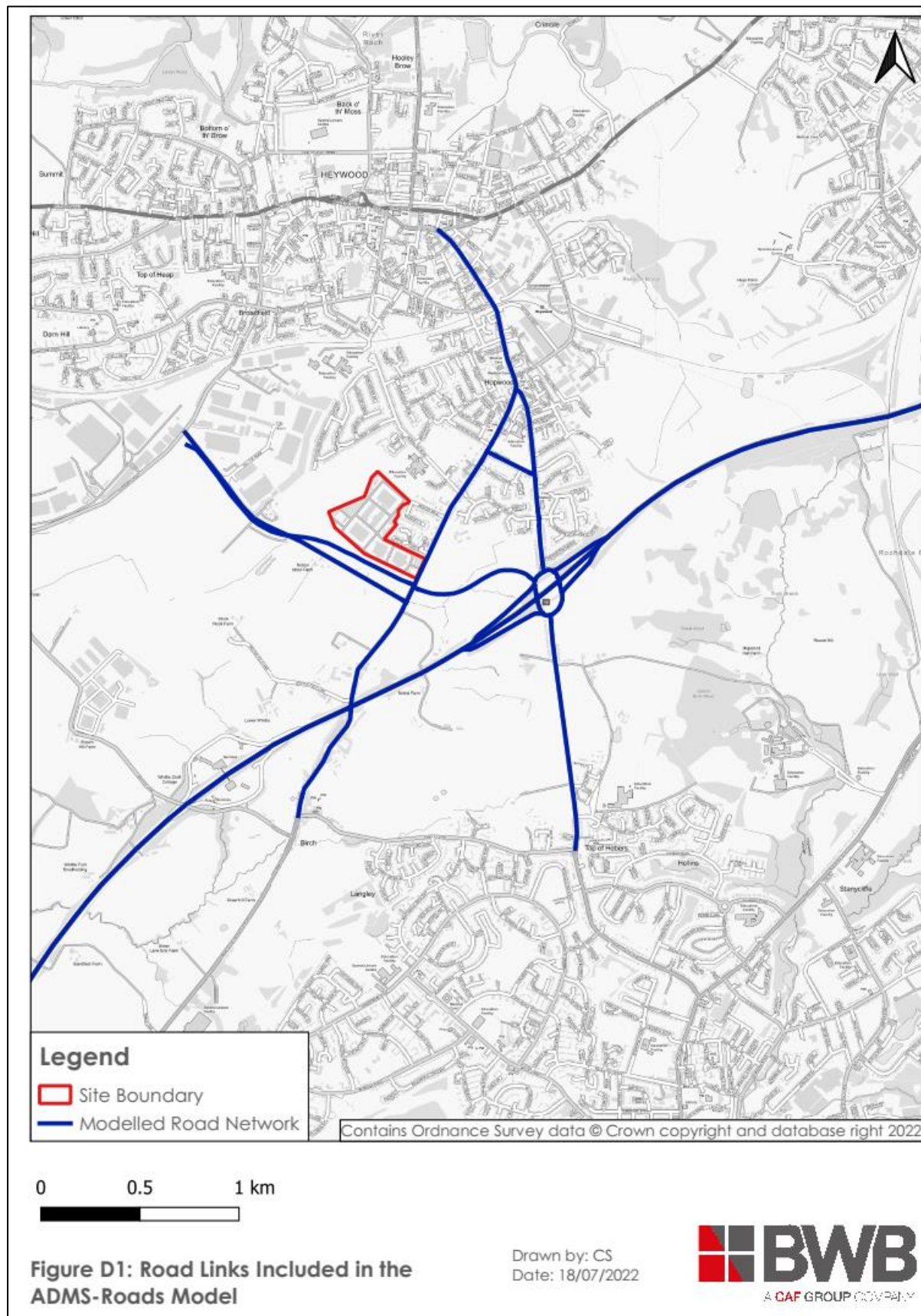
Table D1: Traffic Data Utilised in the Air Dispersion Modelling Assessment

Road Link	Speed	Scenario 1: 2019 Verification Year		Scenario 2: 2022 Base Year		Scenario 3: 2024 Opening Year Without Development		Scenario 4: 2024 Opening Year With Development	
	Km.hr ⁻¹	24 hour AADT Total Flow	HDV Flow	24 hour AADT Total Flow	HDV Flow	24 hour AADT Total Flow	HDV Flow	24 hour AADT Total Flow	HDV Flow
A6045 Manchester Road south of Hareshill Road	48	10,297	182	10,775	194	8,626	24	8,753	27
Hareshill Road (realigned in 2024)	48	7,745	744	8,116	779	15,063	1,046	15,403	1,188
A6045 Manchester Road north of Hareshill Road	48	8,679	240	9,097	254	7,604	116	7,959	231
A6045 Manchester Road north of Site Access	48	8,679	240	9,097	254	7,604	116	8,962	623
A6045 Manchester Road south of Coronation Avenue	48	8,679	240	9,097	254	7,604	116	7,959	231
A6045 Manchester Road north of Coronation Avenue	48	8,679	240	9,097	254	7,604	116	7,714	125
Coronation Avenue	48	16,579	627	17,353	653	12,716	842	13,016	953
Middleton Road north of Coronation Avenue	48	17,538	627	18,254	653	13,725	843	14,025	954
Middleton Road south of Coronation Avenue	48	17,538	627	18,254	653	13,725	843	13,725	843
M62 J19 eastbound slip road east of Heywood Interchange	40	4,428	98	4,702	106	7,323	689	7,498	773
M62 J19 westbound slip road east of Heywood Interchange	40	4,760	47	4,981	50	7,241	704	7,421	793
M62 main carriageway east of Heywood Interchange	112/96	136,233	19,457	142,526	20,329	146,556	20,632	146,910	20,805

Road Link	Speed	Scenario 1: 2019 Verification Year		Scenario 2: 2022 Base Year		Scenario 3: 2024 Opening Year Without Development		Scenario 4: 2024 Opening Year With Development	
	Km.hr ⁻¹	24 hour AADT Total Flow	HDV Flow	24 hour AADT Total Flow	HDV Flow	24 hour AADT Total Flow	HDV Flow	24 hour AADT Total Flow	HDV Flow
M62 J19 westbound slip road west of Heywood Interchange	40	4,377	345	4,568	361	5,615	628	5,756	698
M62 J19 eastbound slip road west of Heywood Interchange	40	4,615	312	4,834	320	5,918	674	6,062	749
M62 main carriageway west of Heywood Interchange	112/96	136,061	19,949	14,2276	20,828	143,548	20,521	143,834	20,667
Middleton Road south of Heywood Interchange	64	12,907	252	13,587	267	15,225	354	15,477	397
Heywood Interchange	48	6,947	240	7,275	251	10,234	821	10,480	921
Heywood Link Road	48	0	0	0	0	16,589	1,852	17,480	2,214

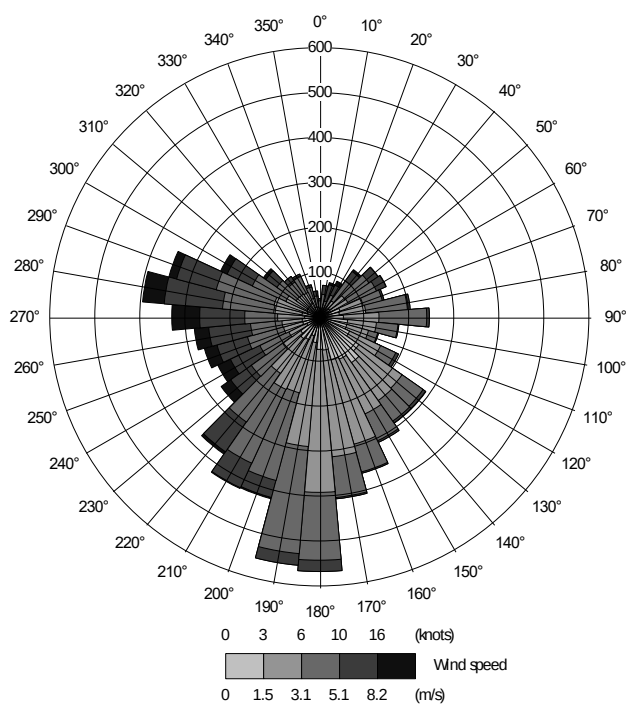
An illustration of the road links included in the ADMS-Roads model is provided in **Figure D1**.

Figure D1: Road Links Included in the ADMS-Roads Model



APPENDIX E: WIND ROSE FOR 2019 FOR MANCHESTER AIRPORT METEOROLOGICAL RECORDING STATION

Meteorological data for 2019 Verification Year scenario for the Manchester Airport recording station was obtained for use in the air dispersion modelling assessment. The wind rose for 2019 is detailed below and illustrates a predominant wind direction from the south.



APPENDIX F: MODEL VERIFICATION

Whilst ADMS-Roads is widely validated for use in this type of assessment, model verification for the area around the Site will not have been included. To determine model performance at a local level, a comparison of modelled results with monitored results in the study area was done in accordance with the methodology provided by Defra. This process of verification aims to minimise modelling uncertainty by correcting modelled results by an adjustment factor to give greater confidence to the results.

There are two passive diffusion tube monitoring locations within the study area; RO20ANO and RO6ANO. RO6ANO is located approximately 20m from the M62 motorway which, although elevated compared to the road the diffusion tube is located on, was modelled with an elevation of 0m. This assumes that road traffic emissions associated with M62 traffic are emitted closer to the diffusion tube than real-world conditions.

The model was run for Scenario 1: 2019 Verification Year to predict the 2019 annual mean road contributions of NO₂ at both the RO20ANO and RO6ANO monitoring locations in the study area. The model outputs at these locations were compared to the 2019 monitored concentrations to provide adjustment factors. The verification process showed that the model was overpredicting NO_x concentrations at RO6ANO resulting in an overall adjustment factor of 0.7399.

The overprediction of modelled concentrations at RO6ANO was considered to be a result of the modelling of the M62 motorway at 0m elevation, and therefore increasing the contribution of road traffic emissions at this location. To enable a conservative assessment, the verification factor derived for RO20ANO was used for all receptor points to enable a conservative assessment. It is noted that concentrations at receptors in the vicinity of the M62 motorway will include an element of overprediction of concentrations due to the influence of the modelled motorway height on local concentrations.

Tables F1 presents the verification process for NO_x for RO20ANO only. The model verification factor at RO6ANO is presented in **Table F2** for information. **Figure F1** details the monitoring locations utilised in the model verification.

Table F1: NO_x Verification Process for RO20ANO used in Assessment

Model Verification Steps	RO20ANO
2019 monitored total NO ₂ (µg.m ⁻³)	31.3
2019 background NO ₂ concentration (µg.m ⁻³)	20.4
Monitored road contribution NO _x (µg.m ⁻³)	21.4
Modelled road contribution NO _x (µg.m ⁻³)	11.9
Ratio of monitored road NO _x to modelled road NO _x	1.7936
Adjustment factor for modelled road contribution NO_x	1.7936
Adjusted modelled road contribution NO _x (µg.m ⁻³)	21.4
Modelled total NO ₂ concentration (µg.m ⁻³)	31.3
Monitored total NO ₂ concentration (µg.m ⁻³)	31.3
% difference between modelled and monitored total NO ₂ concentration	0.0

Model Verification Steps	RO20ANO
RMSE % (should be less than 25% and ideally less than 10%)	0.0

* Road-NO_x component, determined from NO_x to NO₂ calculator

Table F2: NO_x Verification Process for RO6ANO

Model Verification Steps	RO6ANO
2019 monitored total NO ₂ (µg.m ⁻³)	42.5
2019 background NO ₂ concentration (µg.m ⁻³)	20.4
Monitored road contribution NO _x (µg.m ⁻³)	45.6
Modelled road contribution NO _x (µg.m ⁻³)	64.8
Ratio of monitored road NO _x to modelled road NO _x	0.7042

Figure F1: Monitoring Locations Utilised in the ADMS-Roads Model Verification Process

