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Wythenshawe Park Sports Hub

Arbtech

Air Quality Assessment
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Executive Summary

Rappor Consultants Limited was appointed by Arbtech to undertake an air quality assessment for the proposed mixed-use development on land south of Wythenshawe Road, Manchester. The Site forms part of the wider Wythenshawe Park and comprises a number of sports facilities and a car park. The existing sporting facilities will be retained on Site as part of the proposed development, with the exception of the weightlifting facility. The proposed development will include the addition of a GP surgery, changing rooms and ancillary facilities for the sports clubs operating on site, a small gym facility, a meeting room/café, artificial grass pitches, a Multi-Use Games Area, informal grass pitch and potential skatepark. The proposed development Site is located within the administrative area of Manchester City Council.

A qualitative construction phase dust assessment was undertaken in accordance with Institute of Air Quality Management guidance and measures were recommended 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.

Concentrations of NO₂, PM₁₀ and PM_{2.5} were also predicted across the proposed development Site and the suitability of the Site for the proposed uses considered with regard to air quality. Pollutant concentrations were predicted to be below the relevant air quality objectives and the Site was therefore considered suitable for the proposed use.



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1 Introduction

General

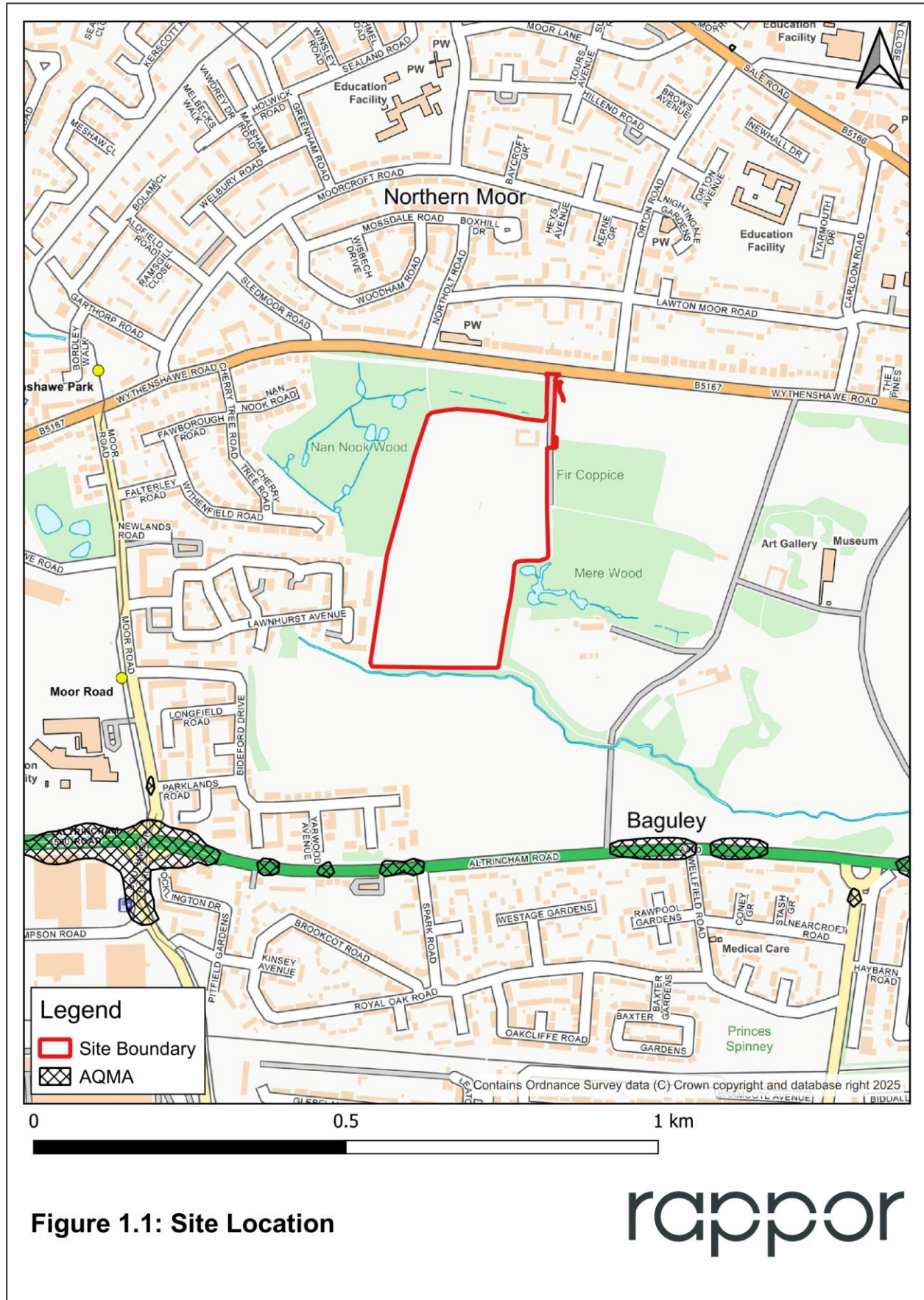
- 1.1 Rappor Consultants Limited was instructed by Arbtech to undertake an air quality assessment for a proposed mixed-use development at on land south of Wythenshawe Road, Manchester ('the Site'). The Site forms part of the wider Wythenshawe Park and comprises a number of sports facilities and a car park. The existing sporting facilities will be retained on Site as part of the proposed development, with the exception of the weightlifting facility. The proposed development will include the addition of a GP surgery, changing rooms and ancillary facilities for the sports clubs operating on site, a small gym facility, a meeting room/café, artificial grass pitches, a Multi-Use Games Area, informal grass pitch and potential skatepark.
- 1.2 The assessment considers the potential impacts of the proposed development during both the construction and operational phases. A qualitative construction phase assessment was undertaken in accordance with relevant guidance. A detailed operational phase road traffic emissions impact assessment was undertaken to determine the impact of development-generated road traffic on local air quality. Pollutant concentrations were predicted across the Site and compared to the relevant air quality objectives to consider the suitability of the Site for the proposed uses.
- 1.3 The assessment takes account of relevant local and national policy and guidance. A glossary of terms utilised in this report is provided in **Appendix A**.

Site Location

- 1.4 The Site is located south of Wythenshawe Road within the wider Wythenshawe Park area and lies within the administrative area of Manchester City Council (MCC). The Site is located in the vicinity of the Greater Manchester Air Quality Management Area (AQMA) which was declared for exceedance of the annual mean nitrogen dioxide (NO₂) air quality objective and covers arterial roads around Greater Manchester. The AQMA lies 300m south of the Site at its closest point. The Site currently comprises existing sporting facilities which will be redeveloped and reprovided within the Site as part of the development proposals.
- 1.5 The Site location is illustrated in **Figure 1.1**.



Figure 1.1 Site Location



2 Relevant Policy and Guidance

National Legislation and Planning Policy

2.1 The following national legislation and planning policy is relevant to air quality and was considered throughout this air quality assessment:

- 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 (DEFRA), 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;
- Department for the Environment, Food and Rural Affairs, Air Quality Strategy: Framework for Local Authority Delivery (2023)⁹;
- Department for the Environment, Food and Rural Affairs, Environmental Improvement Plan 2023 (2023)¹⁰;
- Ministry of Housing, Communities and Local Government, National Planning Policy Framework (NPPF) (2025)¹¹; and
- Ministry for Housing, Communities and Local Government, Planning Practice Guidance (PPG) for air quality (2019)¹².

Local Planning Policy

2.2 The following local planning policy was reviewed with regards to air quality and a summary of any relevant policies is provided in **Appendix B**:

- Manchester City Council, Places for Everyone Joint Development Plan Document¹³; and

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) The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023

⁹ Defra (2023) Air Quality Strategy: Framework for Local Authority Delivery

¹⁰ Defra (2023) Environmental Improvement Plan 2023, First revision of the 25 Year Environment Plan

¹¹ Ministry of Levelling Up, Communities and Local Government (2025) National Planning Policy Framework, HMSO London

¹² Ministry for Housing, Communities and Local Government (2019) Planning Practice Guidance Air Quality

¹³ Manchester City Council (2024) Places for Everyone Joint Development Plan Document 2022 - 2039



- Manchester City Council, Core Strategy Development Plan Document (2012)¹⁴.

Air Quality Guidance

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

- DEFRA, Local Air Quality Management Technical Guidance (LAQM.TG)22)v2 (2025)¹⁵;
- Institute of Air Quality Management (IAQM), Guidance on the assessment of dust from demolition and construction (2024)¹⁶;
- IAQM and Environmental Protection UK (EPUK), Land-Use Planning and Development Control: Planning for Air Quality (2017)¹⁷; and
- Manchester City Council, Air Quality and Planning Technical Guidance (2022)¹⁸.

¹⁴ Manchester City Council (2012) Core Strategy Development Plan Document

¹⁵ Defra (2025) Local Air Quality Management Technical Guidance LAQM.TG(22)v2

¹⁶ Institute of Air Quality Management (2024) Guidance on the assessment of dust from demolition and construction, Institute of Air Quality Management, London

¹⁷ Institute of Air Quality Management and Environmental Protection UK (2017) Land-Use Planning and Development Control: Planning for Air Quality

¹⁸ Manchester City Council (2022) Air Quality and Planning Technical Guidance

3 Assessment Methodology

Construction Phase - Dust Assessment

- 3.1 A qualitative assessment of the potential for construction phase activities to influence local air quality through dust soiling, human health and ecological effects was undertaken utilising the methodology set out in IAQM guidance¹⁶. The IAQM guidance provides a four-step approach, summarised below:
- Step 1: Screen the need for a detailed assessment. Where relevant sensitive receptors are located within 250m of the Site boundary, or within 50m of roads used by construction vehicles up to 250m from the Site, the assessment should progress to Step 2. No further assessment is required if there are no receptors within the specified distances of the works.
 - Step 2: Assess the risk of dust impacts using the following steps:
 - a) Define the potential dust emission magnitude for demolition, earthworks, construction and trackout, as appropriate;
 - b) Define the sensitivity of the area to dust; and
 - c) Define the risk of impacts.
 - Step 3: Identify appropriate site-specific mitigation based on the identified dust risk;
 - Step 4: Determine the significance of residual effects.

Operational Phase – Impact Assessment

Air Dispersion Modelling

- 3.2 Air dispersion modelling software ADMS-Roads, version 5.1, was utilised to predict concentrations of NOx and particulate matter (PM₁₀ and PM_{2.5}) at identified sensitive receptor locations. The assessment was undertaken in accordance with the principles set out in Defra LAQM.TG(22) guidance¹⁵ and the IAQM and EPUK guidance¹⁷.

Assessment, Scenarios, Study Area and Sensitive Receptors

- 3.3 The following assessment scenarios were considered in the assessment:
- Scenario 1: 2024 Model Verification;
 - Scenario 2: 2025 Base Year;
 - Scenario 3: 2026 Opening Year without Development; and
 - Scenario 4: 2026 Opening Year with Development.
- 3.4 Traffic data were obtained for the above scenarios from Local Transport Projects, the Project Transport Consultants, for the study area listed below:
- M60 motorway;
 - M56 motorway;
 - A560 Altrincham Road;
 - A5103 Princess Parkway;
 - B5167 Palatine Road;



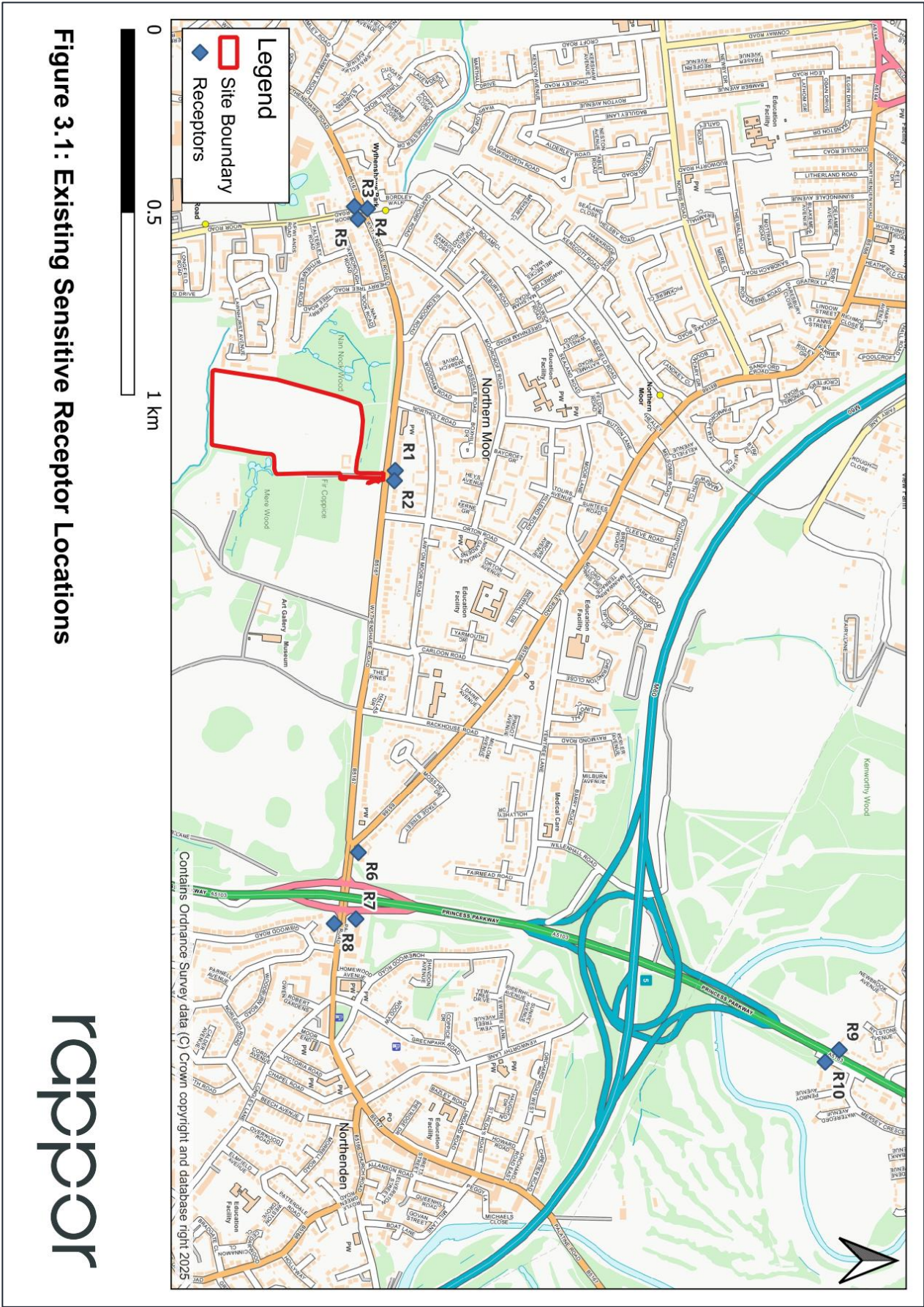
- Moor Road; and
 - Wythenshawe Road.
- 3.5 The study area was determined based on the proposed development trip generation and distribution provided by Local Transport Projects, taking into consideration the screening criteria set out in IAQM and EPUK guidance¹⁷, and the proximity of sensitive receptor locations. Traffic data used in the assessment are detailed in **Appendix C**.
- 3.6 Receptors were chosen based on their relative proximity to roads forecast to experience the greatest change in traffic as a result of the proposed development. Receptors were modelled at a height of 1.5m to represent average breathing height at ground floor.
- 3.7 **Table 3.1** and **Figure 3.1** detail the locations of existing sensitive receptors considered in the air quality assessment.

Table 3.1: Existing Sensitive Receptor Locations

Receptor ID	Receptor Name	X	Y	Height (m)
R1	Wythenshawe Road	381146	390170	1.5
R2	Wythenshawe Road	381174	390167	1.5
R3	Wythenshawe Road	380424	390058	1.5
R4	Wythenshawe Road	380430	390093	1.5
R5	Wythenshawe Road	380458	390067	1.5
R6	Whitehouse Residential Home	382191	390069	1.5
R7	Britannia Hotel	382374	390062	1.5
R8	Palatine Road	382386	390003	1.5
R9	Princess Parkway	382732	391385	1.5
R10	Mersey Crescent	382765	391347	1.5



Figure 3.1: Existing Receptor Locations





- 3.8 Additionally, as the proposed development will introduce new sensitive uses to the Site, consideration was given to the suitability of the Site for the proposed use with regard to air quality. Pollutant concentrations were predicted across the Site using a Cartesian grid from co-ordinates X 380119, Y 390657 to X 382304, Y 388810 at a height of 0m.

Dispersion Model Inputs

- 3.9 A summary of the model inputs utilised in the air dispersion modelling is provided below, with full details provided in **Appendix D**, alongside all relevant assumptions and limitations.
- Emission Factors Toolkit version 13.1¹⁹ was utilised to obtain traffic data emissions for the years of assessment;
 - NO_x – NO₂ Calculator version 9.1²⁰ was utilised to convert oxides of nitrogen to NO₂;
 - Background concentrations were obtained from the Defra background maps²¹ for the years of assessment, in the absence of any representative background monitoring data in the study area;
 - Meteorological data from the Manchester Airport recording station was utilised in the assessment for the 2024 year, to align with the model verification year. The windrose is presented in **Appendix E**;
 - Model verification was undertaken utilising local representative monitoring data from monitoring locations operated by MCC. Full details of the model verification process are detailed in **Appendix F**.

Assessment Criteria

- 3.10 Predicted pollutant concentrations were compared to the current relevant air quality objectives detailed in **Table 3.2**.

Table 3.2: Relevant Air Quality Standards and Objectives utilised in the Assessment

Pollutant	Averaging Period	Air Quality Objective (µg.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	20	1 January 2020
	<i>Annual Mean</i>	<i>10</i>	<i>31 December 2040</i>
	<i>Annual Mean Interim Target*</i>	<i>12</i>	<i>31 January 2028</i>

*Detailed within the Environmental Improvement Plan 2023.

Italics denotes future air quality objectives that will come into force in the future.

¹⁹ Defra (2025) Emission Factor Toolkit [<https://laqm.defra.gov.uk/review-and-assessment/tools/emissions-factors-toolkit.html>]

²⁰ Defra (2024) NO_x to NO₂ Calculator [<https://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html#NOxNO2calc>]

²¹ Defra (2024) background pollutant concentration maps [<https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2021>]



- 3.11 The IAQM and EPUK guidance¹⁷ provides criteria to determine the significance of air quality impacts associated with development-generated road traffic emissions. **Table 3.3** details the impact descriptors utilised in the assessment, with an impact assigned to each individual receptor considered in the assessment, for each pollutant modelled.

Table 3.3: Impact Descriptors for Individual Receptors

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

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

The table is only to be used with annual mean concentrations.

4 Baseline Conditions

Introduction

4.1 Baseline air quality conditions in the study area were defined based on a review of the following sources of data:

- Defra's Local Air Quality Management support pages;
- MCC's Local Air Quality Management reports²² and monitoring data; and
- Aerial imagery, maps and plans of the Site and study area.

Local Air Quality Management and Monitoring

4.2 The Site is not located within an AQMA, however the Greater Manchester AQMA is located approximately 500m south of the Site at its closest point. The AQMA was declared for the exceedance of the annual mean NO₂ air quality objective and covers the arterial road network in Greater Manchester.

4.3 MCC undertakes monitoring of NO₂ within its administrative area. The closest, most representative monitoring locations to the Site are detailed in **Table 4.1** below. Due to the influence of the COVID-19 pandemic and subsequent lockdowns, 2019 monitoring data are considered the last year of 'pre-pandemic baseline' monitoring whilst data from 2022 onwards are considered the 'post-pandemic baseline'. Monitoring data for 2020 and 2021 are considered outlier data due to the impact of COVID-19 lockdowns on road traffic and subsequent impact on road traffic emissions and air quality in accordance with the IAQM position statement²³.

Table 4.1: Local Air Quality Monitoring Data (µg.m⁻³)

Site ID	X	Y	Site Type	Monitored Concentration				
				2020	2021	2022	2023	2024
CAP_MANC_033	382853	391601	Roadside	34.0	35.7	41.9	38.4	34.0
CAP_MANC_035	382797	391425	Roadside	28.5	31.2	33.7	31.2	29.8
CAP_MANC_172	382317	389166	Roadside	-	-	38.9	37.5	35.6
CAP_MANC_173	382492	389126	Roadside	-	-	38.9	39.1	31.5

4.4 Monitored annual mean NO₂ concentrations at the monitoring locations detailed in **Table 4.1** were below the objective of 40µg.m⁻³ at all locations in the most recent five years of monitoring data with the exception of CAP_MANC_033. This location recorded one exceeded of the objective in 2022 however concentrations have since dropped significantly in recent years. Concentrations at the monitoring locations in **Table 4.1** have fluctuated with no clear trend evident.

4.5 The monitoring locations are situated close to the major arterial roads in the area, including the M60 and M56 motorways and the A5103 Princess Parkway. These roads carry

²² Manchester City Council (2025) 2025 Annual Status Report

²³ Institute of Air Quality Management (2022) The Use of 2020 and 2021 Monitoring Datasets



significant levels of traffic which are considered to give rise to the elevated pollutant concentrations identified. Conversely, the Site is set back from these roads and the roads surrounding the Site carry much lower road traffic levels. It is therefore expected that the Site would experience lower concentration compared to those detailed in **Table 4.1**.

- 4.6 Monitoring locations detailed in **Table 4.1** were utilised in model verification as they are located in the study area and therefore representative of conditions at sensitive receptor locations. The full model verification process is detailed in **Appendix F**.

Background Concentrations

- 4.7 As no background monitoring of NO₂ or particulate matter (PM₁₀ or PM_{2.5}) is undertaken in the area, background concentrations were obtained from Defra background maps. **Table 4.2** details the background pollutant concentrations utilised in the assessment.

Table 4.2: Background Pollutant Concentrations (µg.m⁻³)

Grid Square	Receptors	NO ₂			PM ₁₀		PM _{2.5}	
		2024	2025	2026	2025	2026	2025	2026
381500, 390500	R1, R2	13.9	13.3	12.7	12.7	12.7	7.3	7.2
380500, 390500	R3 – R5	12.5	12.1	11.6	11.9	11.9	7.2	7.2
382500, 390500	R6 – R8	15.4	14.7	14.0	13.3	13.3	7.4	7.3
383500, 391500	R9, R10	13.6	13.0	12.4	12.2	12.1	7.1	7.1

5 Construction Phase Dust Assessment

- 5.1 Construction phase activities associated with demolition, earthworks, construction and trackout have the potential to generate dust and particulate matter which may influence local air quality at sensitive receptor locations.
- 5.2 As there are existing sensitive receptors within the distances set out in IAQM guidance¹⁶, a construction phase dust assessment was undertaken. The assessment includes determining the dust emission magnitude for construction phase activities and identifying the sensitivity of the area to determine the overall risk of construction phase dust impacts. Mitigation measures proportionate to the level of dust impacts identified are then recommended to minimise the impact of construction phase activities on local air quality.

Assessing Risk of Dust Impacts

Defining the Dust Emission Magnitude

- 5.3 The scale and nature of construction phase activities were compared to the criteria set out in IAQM guidance¹⁶ to define the initial dust emission magnitude for each activity. **Table 5.1** summarises the dust emission magnitude for each activity and provides the justification for each assigned magnitude.

Table 5.1: Dust Emission Magnitude

Activity	Dust Emission Magnitude	Justification
Demolition	Small	Less than 12,000m ³ of buildings will be demolished as part of the development proposals.
Earthworks	Medium	The total Site area is between 18,000 and 110,000m ² .
Construction	Medium	The total volume of buildings to be constructed is likely to be greater than 12,000m ³ but less than 75,000m ³ .
Trackout	Small	Based on the scale of the proposals it is anticipated that less than 20 outward HDV movements will occur in any one day at the height of construction phase activity.

Defining the Sensitivity of the Area

- 5.4 The proximity of receptors to construction phase activities was reviewed alongside meteorological conditions and receptor use classes to define the sensitivity of the area. In accordance with IAQM guidance¹⁶, different use classes can be more or less sensitive to dust and particulate matter emissions during the construction phase based on parameters such as the level of amenity typically expected and the duration of time spent at the location. **Table 5.2** details the sensitivity of the area to dust soiling and human health effects for the different phases of construction activities. **Figure 5.1** was utilised to identify the number of sensitive receptors within the distances set out in IAQM guidance¹⁶.

Table 5.2: Sensitivity of Study Area

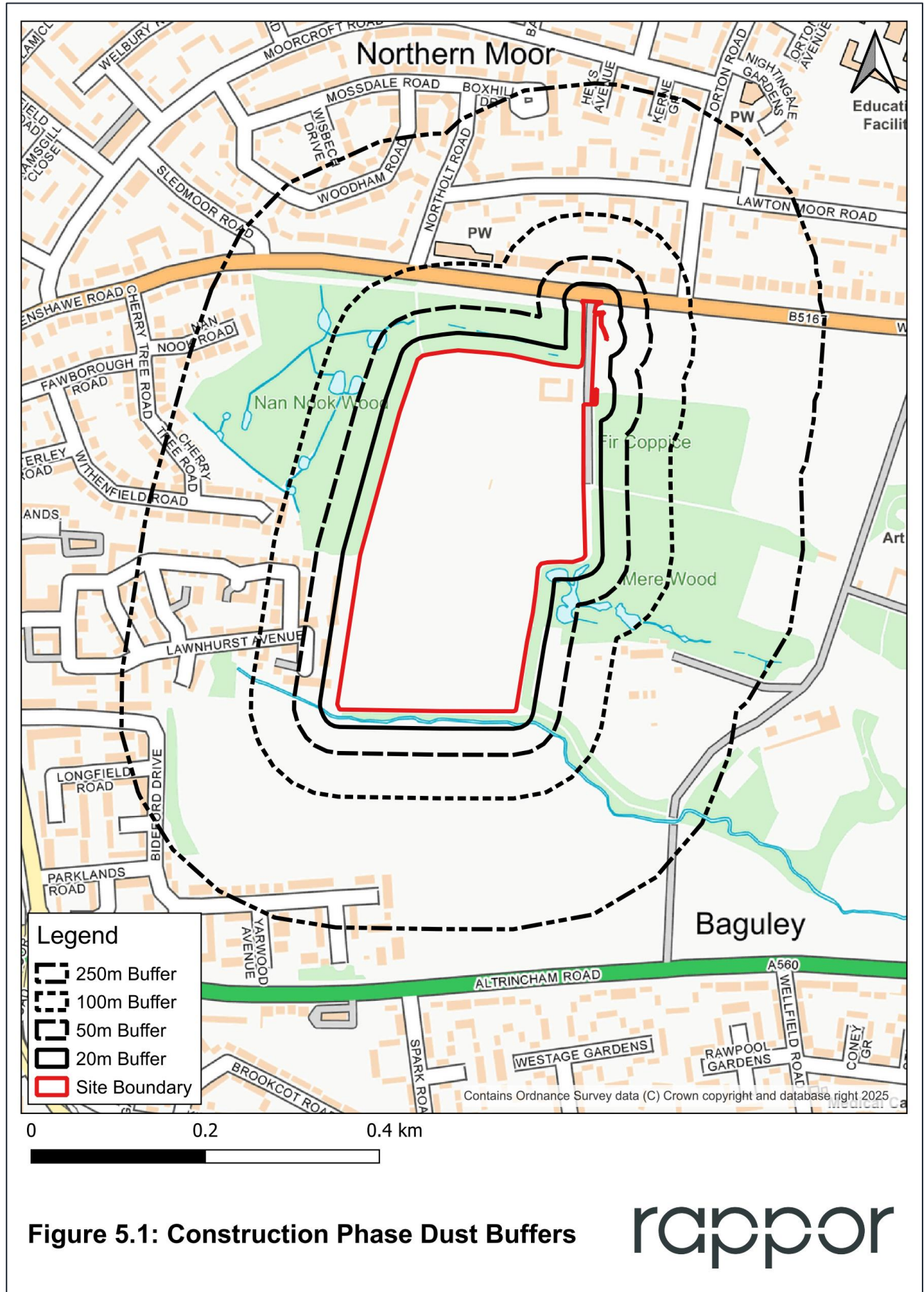
Activity	Sensitivity to Dust Soiling	Sensitivity to Human Health
Demolition	Low – there are between 10 and 100 highly sensitive residential properties within 100 – 250m of buildings to be demolished.	Low – there are between 10 and 100 highly sensitive residential properties within 100 – 250m of buildings to be demolished. Background PM ₁₀ concentrations are less than 24µg.m ⁻³ .



Activity	Sensitivity to Dust Soiling	Sensitivity to Human Health
Earthworks	High – there are between 10 and 100 highly sensitive residential properties within 20m of areas where earthworks will take place.	Low – there are between 10 and 100 highly sensitive residential properties within 20m of areas where earthworks will take place. Background PM ₁₀ concentrations are less than 24µg.m ⁻³ .
Construction	High – there are between 10 and 100 highly sensitive residential properties within 20m of areas where construction activities will take place.	Low – there are between 10 and 100 highly sensitive residential properties within 20m of areas where construction activities will take place. Background PM ₁₀ concentrations are less than 24µg.m ⁻³ .
Trackout	High – there are between 10 and 100 highly sensitive residential receptors within 20m of roads to be used by construction vehicles up to 250m from the Site access.	Low – there are between 10 and 100 highly sensitive residential receptors within 20m of roads to be used by construction vehicles up to 250m from the Site access. Background PM ₁₀ concentrations are less than 24µg.m ⁻³ .



Figure 5.1: Construction Phase Dust Buffers





Defining the Risk of Impacts

- 5.5 The dust emission magnitude and sensitivity of the area for demolition, earthworks, construction and trackout are then combined to determine the overall risk of impacts associated with each activity. **Table 5.3** below summarises the risk of dust impacts for each activity.

Table 5.3: Summary of Risk of Dust Impacts

Activity	Dust Emission Magnitude	Highest Sensitivity of Area	Risk of Dust Impact
Demolition	Small	Low	Negligible Risk
Earthworks	Medium	High	Medium Risk
Construction	Medium	High	Medium Risk
Trackout	Small	High	Low Risk

Mitigation

- 5.6 IAQM guidance¹⁶ provides a list of dust mitigation measures that should be implemented on site during the construction phase, where practicable. Mitigation measures proportionate to the level of dust risk identified in **Table 5.3** are detailed in **Appendix G**. With the implementation of these measures, the residual impacts associated with construction phase activities are considered to be 'not significant'.

6 Operational Phase Impact Assessment

Baseline Assessment

- 6.1 Predicted concentrations of NO₂, PM₁₀ and PM_{2.5} at existing sensitive receptor locations in the 2025 Base Year and 2026 Opening Year with development are detailed in **Table 6.1**.

Table 6.1: 2025 Base Year and 2026 Opening Year without development Annual Mean Concentrations (µg.m⁻³)

Receptor	2025 Base Year			2026 Opening Year without development		
	NO ₂	PM ₁₀	PM _{2.5}	NO ₂	PM ₁₀	PM _{2.5}
R1	15.9	13.7	7.8	15.1	13.6	7.8
R2	15.9	13.7	7.8	15.1	13.6	7.7
R3	16.5	13.6	8.2	15.6	13.6	8.1
R4	17.9	14.2	8.5	16.9	14.2	8.4
R5	16.1	13.5	8.1	15.2	13.4	8.0
R6	20.3	15.2	8.4	19.2	15.1	8.3
R7	23.7	16.3	9.0	22.2	16.3	9.0
R8	21.5	15.5	8.6	20.2	15.4	8.5
R9	31.2	19.5	11.0	29.2	19.4	10.9
R10	22.8	15.8	9.1	21.4	15.7	9.0

- 6.2 Predicted concentrations of NO₂, PM₁₀ and PM_{2.5} were below the current relevant annual mean air quality objectives in both the base year and opening year without development. Annual mean NO₂ concentrations at all receptors were below 60µg.m⁻³ and therefore, based on the relationship between hourly and annual mean NO₂ concentrations as detailed in Defra guidance, exceedances of the hourly mean NO₂ objective are unlikely. The number of days where PM₁₀ concentrations were predicted to exceed 50µg.m⁻³ was less than 35 and therefore, no exceedances of the short term PM₁₀ air quality objective were predicted.

Opening Year Impact Assessment

- 6.3 Predicted annual mean NO₂, PM₁₀ and PM_{2.5} for the 2026 Opening Year with development were compared to concentrations for the 2026 Opening Year without development scenario to consider the impact of development-generated road traffic emissions on local air quality.

Nitrogen Dioxide Concentrations

- 6.4 Predicted annual mean NO₂ concentrations in the Opening Year scenarios are detailed in **Table 6.2** below.

Table 6.2: Annual Mean NO₂ Concentrations and Development Impact (µg.m⁻³)

Receptors	2026 Opening Year Without Development Concentration	2026 Opening Year With Development Concentration	Change*	% Change Relative to Objective	Significance
R1	15.1	15.2	0.1	0	Negligible
R2	15.1	15.2	0.1	0	Negligible
R3	15.6	15.6	0.0	0	Negligible
R4	16.9	16.9	0.0	0	Negligible
R5	15.2	15.3	0.0	0	Negligible
R6	19.2	19.3	0.1	0	Negligible
R7	22.2	22.2	0.0	0	Negligible
R8	20.2	20.2	0.0	0	Negligible
R9	29.2	29.2	0.0	0	Negligible
R10	21.4	21.4	0.0	0	Negligible

*Change presented to 1 decimal place. Discrepancies in changes due to rounding effects.

6.5 Predicted annual mean NO₂ concentrations were below the current annual mean NO₂ objective of 40µg.m⁻³ at all existing sensitive receptors considered in the assessment, both without and with the proposed development in operation. All changes in annual mean NO₂ concentrations as a result of the proposed development were less than 0.5% of the objective and total NO₂ concentrations were less than 75% of the objective; therefore in accordance with IAQM and EPUK guidance¹⁷, the impact of the proposed development on annual mean NO₂ concentrations is **negligible**.

6.6 In accordance with Defra guidance¹⁵, where annual mean NO₂ concentrations do not exceed 60µg.m⁻³), exceedances of the hourly NO₂ objective are unlikely to occur. All predicted annual mean NO₂ concentrations were below 60µg.m⁻³ and therefore, no exceedances of the short term NO₂ objective are anticipated.

Particulate Matter (PM₁₀) Concentrations

6.7 Predicted annual mean PM₁₀ concentrations in the Opening Year scenarios are detailed in **Table 6.3** below.

Table 6.3: Annual Mean PM₁₀ Concentrations and Development Impact (µg.m⁻³)

Receptors	2026 Opening Year Without Development Concentration	2026 Opening Year With Development Concentration	Change*	% Change Relative to Objective	Significance
R1	13.6	13.7	0.0	0	Negligible
R2	13.6	13.7	0.1	0	Negligible
R3	13.6	13.6	0.0	0	Negligible
R4	14.2	14.2	0.0	0	Negligible
R5	13.4	13.4	0.0	0	Negligible
R6	15.1	15.1	0.0	0	Negligible
R7	16.3	16.3	0.0	0	Negligible
R8	15.4	15.4	0.0	0	Negligible



Receptors	2026 Opening Year Without Development Concentration	2026 Opening Year With Development Concentration	Change*	% Change Relative to Objective	Significance
R9	19.4	19.4	0.0	0	Negligible
R10	15.7	15.7	0.0	0	Negligible

*Change presented to 1 decimal place. Discrepancies in changes due to rounding effects.

- 6.8 Predicted annual mean PM₁₀ concentrations were below the current annual mean PM₁₀ objective of 40µg.m⁻³ at all existing sensitive receptors considered in the assessment, both without and with the proposed development in operation. All changes in annual mean PM₁₀ concentrations as a result of the proposed development were less than 0.5% of the objective and total PM₁₀ concentrations were less than 75% of the objective; therefore in accordance with IAQM and EPUK guidance¹⁷, the impact of the proposed development on annual mean PM₁₀ concentrations is **negligible**.
- 6.9 The greatest number of days where predicted PM₁₀ concentrations exceed 50µg.m⁻³ was 3 days in both the without and with development scenarios. This is well below the 35 days set out in the daily mean PM₁₀ objective and therefore, it is considered that the daily mean PM₁₀ objective will not be exceeded with the proposed development in place.

Particulate Matter (PM_{2.5}) Concentrations

- 6.10 Predicted annual mean PM_{2.5} concentrations in the Opening Year scenarios are detailed in **Table 6.4** below.

Table 6.4: Annual Mean PM_{2.5} Concentrations and Development Impact (µg.m⁻³)

Receptors	2026 Opening Year Without Development Concentration	2026 Opening Year With Development Concentration	Change*	% Change Relative to Objective	Significance
R1	7.8	7.8	0.0	0	Negligible
R2	7.7	7.8	0.0	0	Negligible
R3	8.1	8.1	0.0	0	Negligible
R4	8.4	8.4	0.0	0	Negligible
R5	8.0	8.0	0.0	0	Negligible
R6	8.3	8.3	0.0	0	Negligible
R7	9.0	9.0	0.0	0	Negligible
R8	8.5	8.5	0.0	0	Negligible
R9	10.9	10.9	0.0	0	Negligible
R10	9.0	9.0	0.0	0	Negligible

* Change presented to 1 decimal place. Discrepancies in changes due to rounding effects.

- 6.11 Predicted annual mean PM_{2.5} concentrations were below the current annual mean PM_{2.5} objective of 20µg.m⁻³ at all existing sensitive receptors considered in the assessment, both without and with the proposed development in operation. All changes in annual mean PM_{2.5} concentrations as a result of the proposed development were less than 0.5% of the objective and total PM_{2.5} concentrations were less than 75% of the objective; therefore in accordance with IAQM and EPUK guidance¹⁷, the impact of the proposed development on annual mean PM_{2.5} concentrations is **negligible**.
- 6.12 With regard to the interim annual mean PM_{2.5} objective of 12µg.m⁻³ to be achieved by 31st January 2028, predicted annual mean PM_{2.5} concentrations in the Opening Year were below



the interim objective both without and with the development in place. Furthermore, with regard to the future annual mean PM_{2.5} objective of 10µg.m⁻³ to be achieved by 2040, all predicted annual mean PM_{2.5} concentrations were below the future objective.

Opening Year Site Suitability Assessment

- 6.13 In addition to considering the impact of development-generated road traffic on local air quality at existing sensitive receptors, consideration was given to the suitability of the Site for the proposed sensitive use with regard to the current relevant air quality objectives.
- 6.14 **Table 6.5** details the highest predicted annual mean NO₂, PM₁₀ and PM_{2.5} concentration within the Site and **Figures 6.1, 6.2** and **6.3** illustrate annual mean NO₂, PM₁₀ and PM_{2.5} concentrations across the Site respectively.

Table 6.5: Highest Predicted Annual Mean NO₂, PM₁₀ and PM_{2.5} Concentration across the Site (µg.m⁻³)

Annual Mean NO ₂	Annual Mean PM ₁₀	Annual Mean PM _{2.5}
14.7	13.4	7.6

Figure 6.1: Annual Mean NO₂ Concentrations across the Site

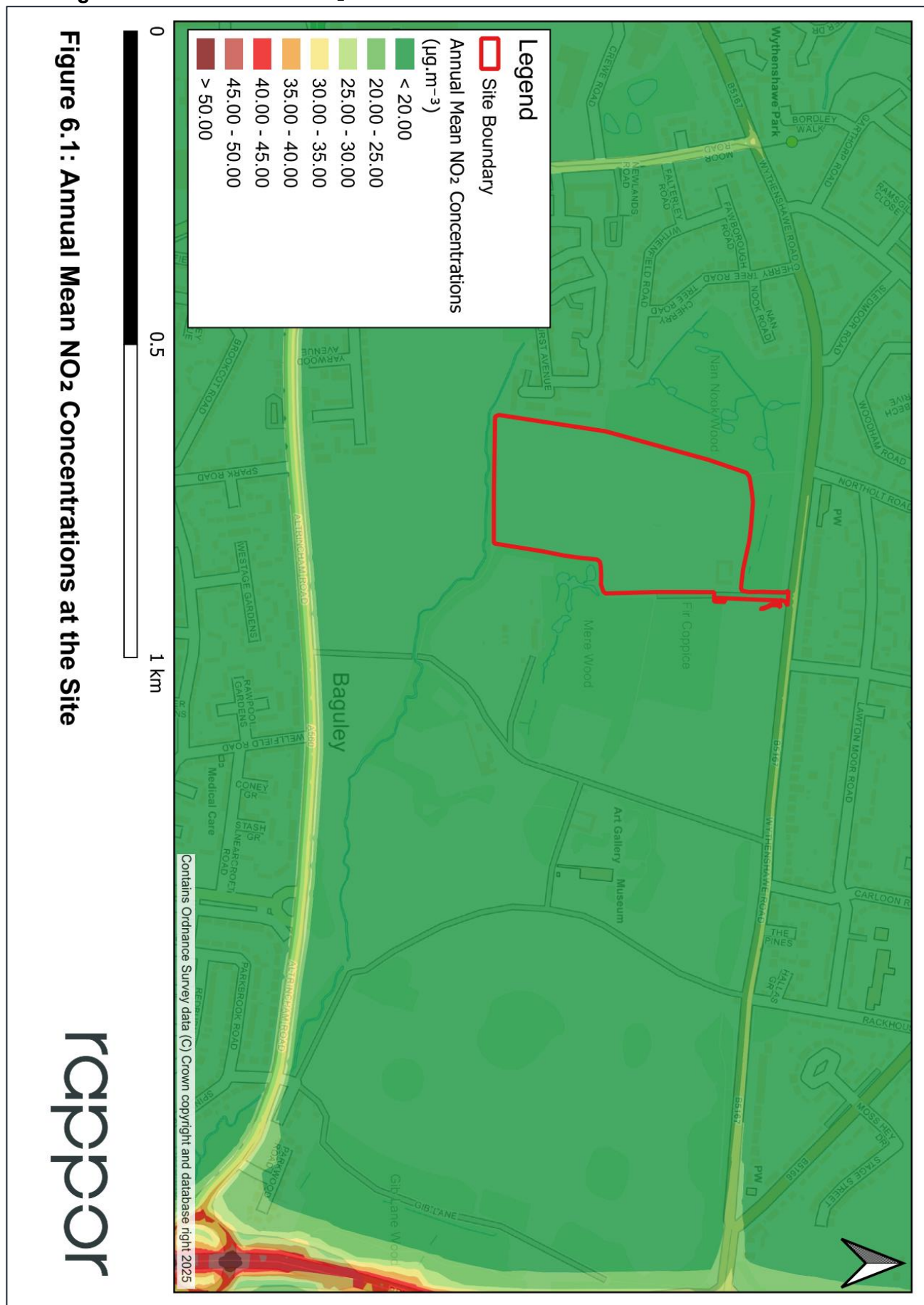


Figure 6.2: Annual Mean PM₁₀ Concentrations across the Site

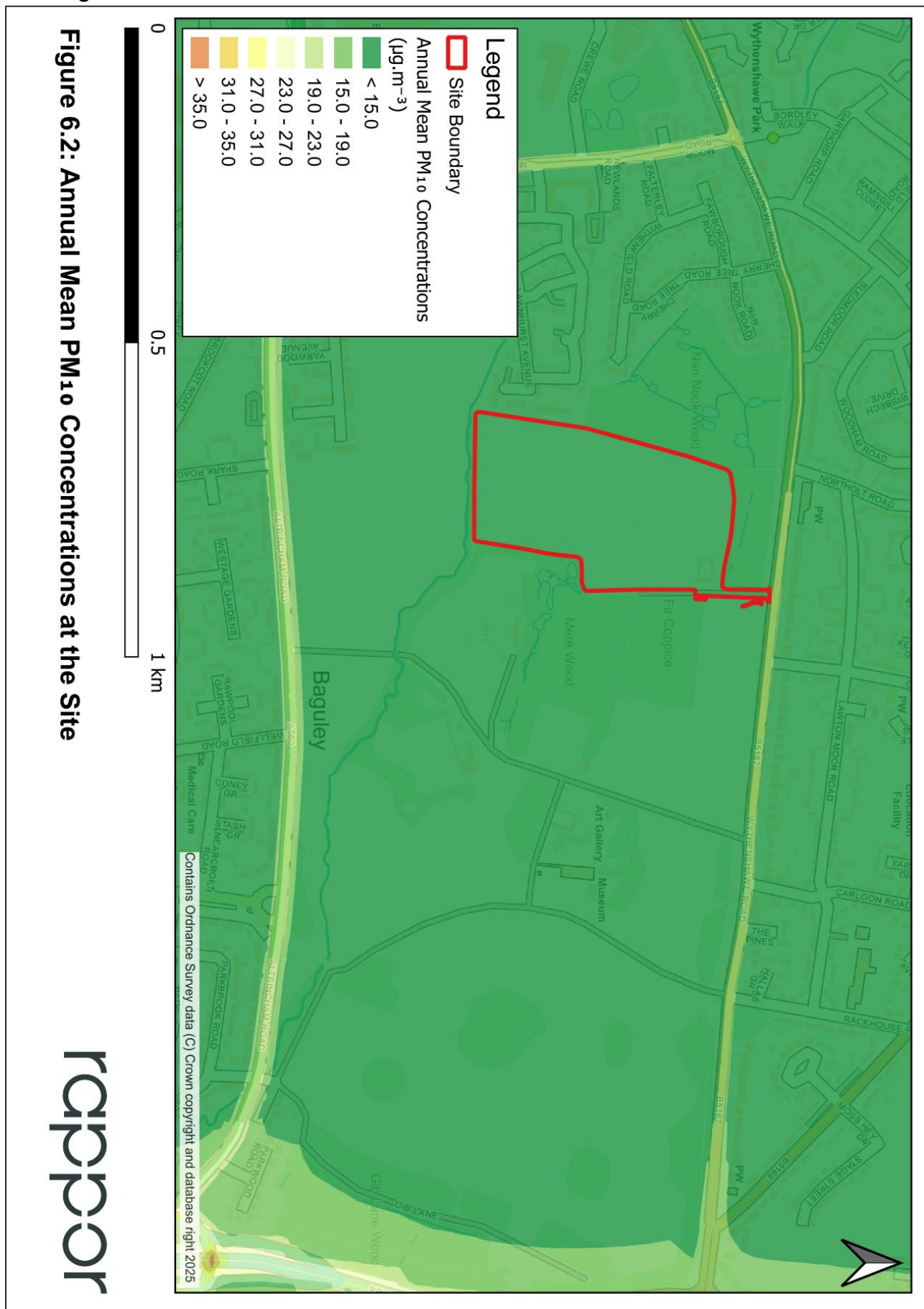
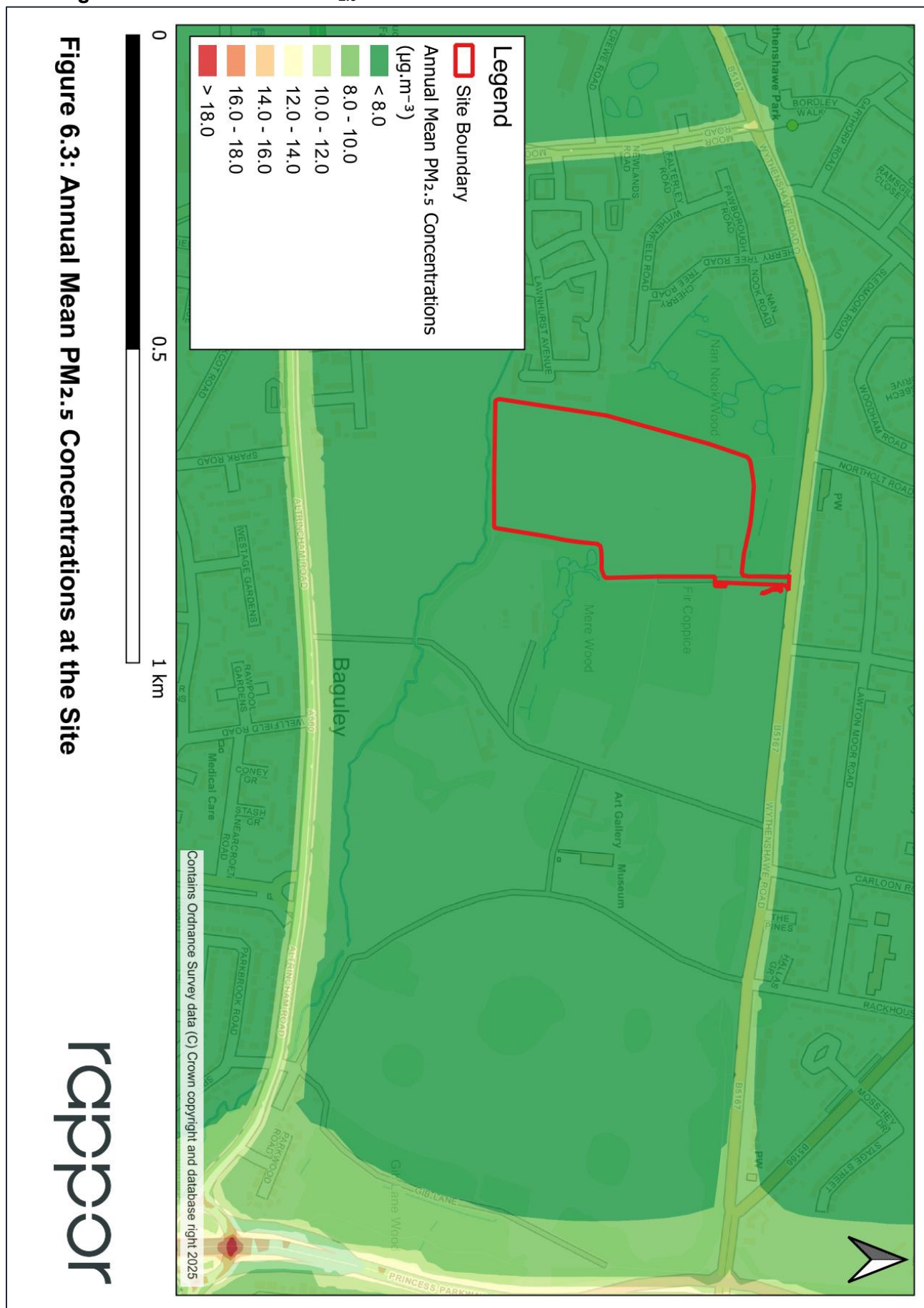


Figure 6.2: Annual Mean PM₁₀ Concentrations at the Site

Figure 6.3: Annual Mean PM_{2.5} Concentrations across the Site





- 6.15 As detailed in **Table 6.5**, annual mean concentrations of NO₂, PM₁₀ and PM_{2.5} across the Site were below the current relevant annual mean objectives. With regard to the hourly mean NO₂ objective, as the highest predicted annual mean NO₂ concentration was significantly less than 60µg.m⁻³, in accordance with Defra guidance¹⁵, exceedances of the hourly mean NO₂ objective are unlikely. With regard to the daily mean PM₁₀ objective, the greatest number of days predicted to experience PM₁₀ concentrations above 50µg.m⁻³ was two, which is well below the 35 days set out in the objective.
- 6.16 It is therefore considered that the Site is suitable for the proposed use with regards to the current relevant air quality objectives.

Development Measures

- 6.17 Whilst the proposed development is not predicted to give rise to any significant air quality impacts as a result of development-generated traffic, measures are incorporated into the proposals to further minimise emissions associated with the operation of the proposed development.
- 6.18 Measures include:
- Preparation of a Travel Plan to be produced for the Site detailing local active and public travel options for staff and visitors.
 - Improvement of existing, and construction of new pedestrian and cycle routes through the Site to promote active travel.
 - Installation of Electric Vehicle charging points in accordance with Building Regulations to promote uptake of low emission vehicle technologies.



7 Summary and Conclusions

- 7.1 Rappor was instructed by Arbtech to undertake an air quality assessment for submission with a planning application for a proposed mixed-use development at Wythenshawe Park Sports Hub in Manchester.
- 7.2 A qualitative construction phase dust assessment was undertaken and mitigation measures proportionate to the level of dust risk identified are recommended. With the implementation of these measures, the impact of construction phase dust is negligible which is not significant.
- 7.3 A detailed operational phase road traffic emissions impact assessment was undertaken to predict pollutant concentrations at existing receptors and consider the impact of development-generated road traffic on local air quality. The assessment identified that the proposed development will have a negligible impact on local air quality in accordance with guidance, and all pollutant concentrations at identified existing receptor locations were below the current relevant air quality objectives.
- 7.4 Whilst the proposed development will not significantly impact local air quality once operational, measures are incorporated into the design to further minimise the impact of the development on local air quality. These measures include a Travel Plan to promote active and sustainable travel, and provision of Electric Vehicle charging points.
- 7.5 Consideration was given to pollutant concentrations across the Site and the suitability of the Site for the proposed sensitive uses. Concentrations of NO₂, PM₁₀ and PM_{2.5} were compared to the current relevant air quality objectives and identified to be well below relevant objectives. Furthermore, the interim and future PM_{2.5} objectives were considered and concentrations confirmed to be below these objectives. The Site was therefore considered to be suitable for the proposed uses.



Appendix A – Glossary



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 – Local Planning Policy



Greater Manchester Places for Everyone Joint Development Plan Document

The Places for Everyone Joint Development Plan Document sets out the vision and strategic planning policies for the Greater Manchester area. The document contains the following policies relating to air quality:

“Policy JP-S5: Clean Air

A comprehensive range of measures will be taken to support improvements in air quality, focussing 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 focussing transport investment so as to reduce reliance on forms of transport that generate air pollution;*
- 2) Determining planning applications having regard to the most recent development and planning control guidance published jointly by the IAQM and EOUC, and more recent IAQM guidance on construction dust, 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 developments that would generate significant point source pollution such as soon types of industrial activity and energy generation;*
- 5) Significantly expanding the existing commercial 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 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.”*



Manchester's Local Development Framework Core Strategy

The Manchester Core Strategy includes the following policies relevant to air quality:

"Policy EN 16 Air Quality

The Council will seek to improve the air quality within Manchester, and particularly within the AQMA, located along Manchester's principle 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 AQMAs."



Appendix C – Traffic Data



Wythenshawe Park Sports Hub
Air Quality Assessment

Table C1: Traffic Data used in Air Dispersion Modelling

Road	2024 Verification Year		2025 Base Year		2026 Opening Year Without Development		2026 Opening Year With Development	
	AADT	HDV	AADT	HDV	AADT	HDV	AADT	HDV
Wythenshawe Road west of Site	8173	79	8255	80	8340	81	8411	81
Wythenshawe Road east of Site	8173	79	8255	80	8340	81	8957	81
B5167 Palatine Road	14447	421	14591	425	14742	430	14780	430
A5103 Princess Parkway North of Wythenshawe Road junction	120839	4016	122047	4056	123304	4098	123445	4098
A5103 Princess Parkway north of M60 junction	61883	1113	62502	1124	63145	1136	63286	1136
A5103 Princess Road	75477	1478	76232	1493	77017	1508	77158	1508
M60 motorway	143694	6000	145131	6060	146625	6122	146625	6122
A560 Altrincham Road west of M56	28358	548	28642	553	28937	559	28976	559
Moor Road	16698	107	16865	108	17039	109	17078	109
M56 motorway	96671	3213	97638	3245	98643	3279	98994	3279
A560 Altrincham Road east of M56	30726	1210	31033	1222	31353	1235	31392	1235
Site Access	784	1	784	1	784	1	1461	2



Appendix D – Dispersion Model Inputs



The following inputs were utilised in the atmospheric dispersion modelling undertaken as part of the air quality assessment:

- The atmospheric dispersion modelling software AMDS-Roads version 5.1 was utilised in the assessment;
- Emission Factor Toolkit version 13.1 was utilised to obtain emission factors for the years of assessment (2024, 2025 and 2026);
- NO_x-NO₂ Calculator version 9.1 was utilised to derive NO₂ concentrations from modelled Road NO_x concentrations. The input parameter 'All other non-urban UK roads' was utilised to represent the roads included in the study area, which includes stretches of the M60 and M56 motorways;
- Meteorological data from the Manchester Airport recording station was utilised in the air dispersion model for the verification year of 2024. A surface roughness of 0.75m and a Monin-Obhukov length of 30m were utilised for the Site to represent the location of the Site and wider study area in an urban environment with open parkland; and
- Following the withdrawal of the LAQM position statement regarding sensitivity analyses, no sensitivity analysis scenario was included within the assessment.

The following limitations and assumptions are applicable to the air quality assessment:

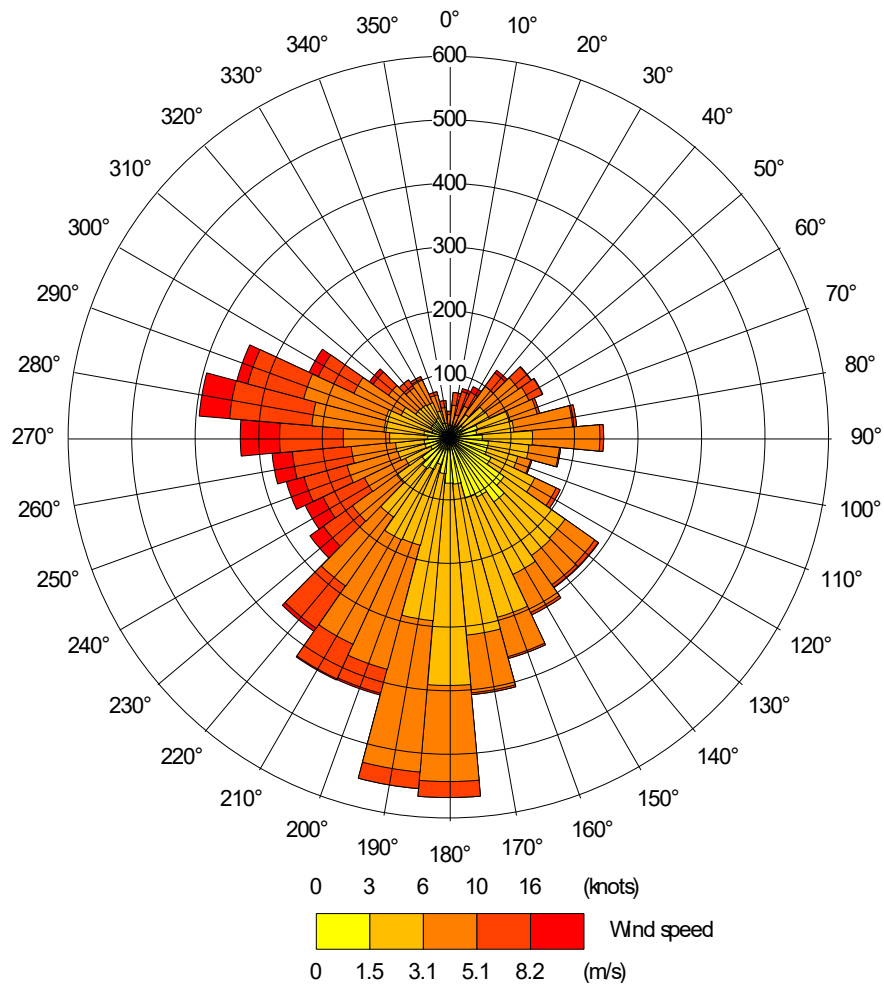
- There are uncertainties associated with both measured and predicted concentrations. The model relies on input data (including projected traffic flows), which also have uncertainties associated with them. The model itself simplifies complex physical systems into a range of algorithms. In addition, local micro-climatic conditions may affect the concentrations of pollutants that the ADMS Roads model will not take into account.
- To reduce the uncertainty associated with predicted concentrations, model verification has been carried out following guidance set out in LAQM.TG(22), which recommends the use of roadside monitoring for this process. As the model has been verified against 2024 measured concentrations and has been adjusted to take account of the apparent under-prediction, there can be reasonable confidence in the predicted concentrations.



Appendix E – Wind Rose



The 2024 wind rose for the Manchester Airport meteorological recording station is illustrated below. The prevailing wind direction is from the south-south-west with significant contributions from the west.





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 line with methodology specific in LAQM.TG(22). This process of verification aims to minimise modelling uncertainty by correcting modelled results by an adjustment factor to give greater confidence to the results.

The model was run to predict the 2024 annual mean road-NO_x contribution at the MCC-operated monitoring locations. The model outputs of road-NO_x were compared to the 2024 'measured' road-NO_x, which was determined from the nitrogen dioxide concentration measured at the monitoring locations, utilising the NO_x from NO₂ calculator provided by Defra and the NO₂ background concentration.

Table F1 details the model verification process.

Table F1: Model Verification Process ($\mu\text{g.m}^{-3}$)

Verification Step	CAP_MANC_033	CAP_MANC_035	CAP_MANC_172	CAP_MANC_173
2024 monitored NO ₂	34.0	29.8	35.6	31.5
2024 background NO ₂	13.6	13.6	15.0	15.0
Monitored road NO _x	51.0	38.9	52.2	40.2
Modelled road NO _x	35.6	16.9	14.7	18.3
Ratio between monitored and modelled road NO _x	1.4	2.3	3.6	2.2
Adjustment factor	1.8921			
Adjusted modelled road NO _x	67.3	32.0	27.8	34.6
Modelled total NO ₂	39.1	27.2	26.9	29.5
% difference	15.0	-8.6	-24.4	-6.3
% RMSE	13.2			

A road-NO_x adjustment factor of 1.8921 was determined as the ratio of the 'measured' road contribution and the model derived road contribution. This factor was then applied to the modelled road-NO_x concentration at each receptor, before conversion to NO₂ concentrations using the NO_x to NO₂ calculator provided by Defra, and the NO₂ background concentration.

The RMSE% derived through the model verification process was within the 25% ideal range identified in Defra((LAQM)TG)22 guidance and there can therefore be statistical confidence in the results of the dispersion modelling.

As there are no PM₁₀ or PM_{2.5} monitoring locations within the study area, the predicted road-PM₁₀ and road-PM_{2.5} components have been adjusted using the road-NO_x factor before adding the appropriate background concentration.



Appendix G – Construction Phase Dust Mitigation



Mitigation Measure	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) responsible 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 which may include measures to control other emissions, approved by the Local Authority.	
Site Management	Record all dust and air quality complaints, identify causes and take appropriate action to reduce emissions in a timely manner and record any measures taken.	None
	Make the complaints log available to the local authority when asked.	
	Record any exceptional incidents that cause dust or air emissions, either on or off site and the action taken to resolve the situation in the log book.	
Monitoring	Carry out regular inspections to monitor compliance with the Dust Management Plan, record inspection results and make an inspection log available to the local authority when asked.	Undertake daily on site and off site inspections where receptors including roads are nearby, to monitor dust. Record inspection results and make the log available to the local authority when asked.
	Increase the frequency of site inspections 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 dust monitoring locations with the local authority, where monitoring is required. Baseline monitoring should commence at least three months prior to works on site, where possible.	
Preparing and maintain the Site	Plan site layout so that machinery and dust causing activities are located away from receptors, as far as possible.	None
	Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as stockpiles on site.	
	Fully enclose the site or specific operations where there is a high potential for dust production and the site is active for an extensive period.	
	Avoid site runoff of water or mud.	
	Keep site fencing, barriers and scaffolding clean with wet methods.	
	Remove materials that have 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.	Impost and signpost a maximum 15 mph speed limit on surfaced and 10mph speed limited on unsurfaced haul roads and work areas.



Mitigation Measure	Highly Recommended	Desirable
	Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.	Implement a Travel Plan that supports and encourages sustainable travel.
Operations	Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction.	None
	Ensure an adequate water supply to the site for effective dust suppression 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 and handling equipment and use fine water sprays on such equipment wherever appropriate.	
	Ensure equipment is readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable.	
Waste management	Avoid bonfires and burning of waste materials.	None
Earthworks	None	Re-vegetate earthworks and exposed areas / soil stockpiles to stabilise surfaces as soon as practicable.
		Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable.
		Only remove the cover in small areas during work and not all at once.
Construction	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.	Avoid scabbling (roughening of concrete surfaces) if possible.
		Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.
		For smaller supplies of fine powder materials, ensure bags are sealed after use and stored appropriately to prevent dust.
Trackout	None	Use water-assisted dust sweepers on the access and local roads to remove, as necessary, any material tracked out of the site.
		Avoid dry sweeping of large areas.
		Ensure vehicles entering and leaving the site are covered to prevent any escape of materials during transportation.
		Record all inspections of haul routes and any subsequent action taking in site log book.
		Implement a wheel-washing system with rumble grids to dislodge mud prior to leaving the site, where practicable.

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