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Cronton Road, Knowsley

Hatfields

Air Quality Assessment
October 2024





Document Control

Job No.	240798	
Project Name	Cronton Road, Knowsley	
Document Title	Air Quality Assessment	
Status	Issue	
Client	Hatfields	
	Name	Date
Prepared By	Freya Hoyle	October 2024
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Approved By	Brendan Quinn	October 2024

Record of Revisions

Revision	Date	Details	Made By

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Executive Summary

Rappor Consultants Limited was appointed by Hatfields to undertake an air quality assessment for the proposed car showroom development at land south of Cronton Road in Knowsley. The proposed development Site is located within the administrative area of Knowsley 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.



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1 Introduction

General

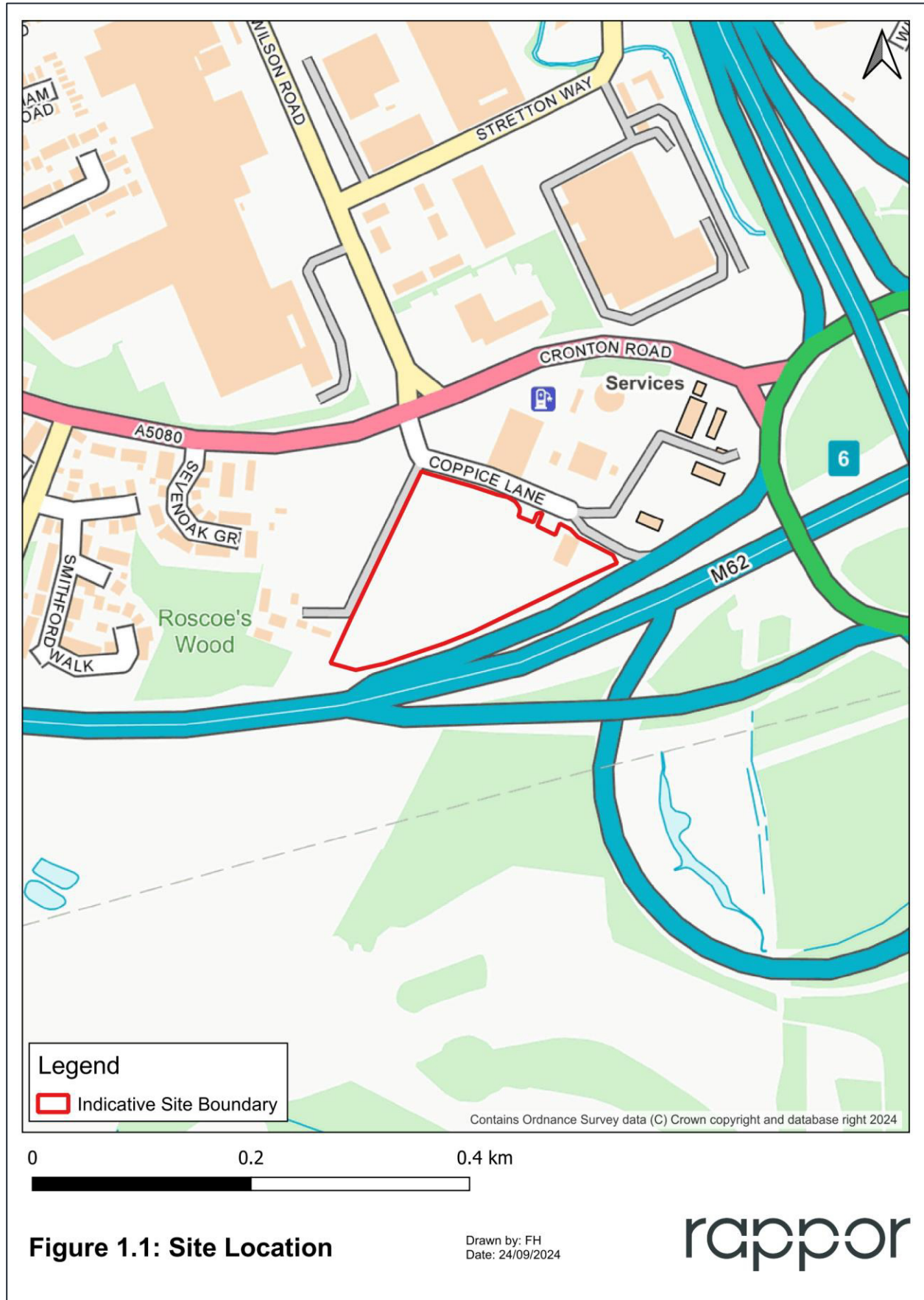
- 1.1 Rappor Consultants Limited was instructed by Hatfields to undertake an air quality assessment for a proposed car showroom at land off Cronton Road in Knowsley ('the Site'). The Site forms part of the wider Beacon 62 development which was granted planning consent in 2018 for mixed-use commercial, retail and leisure uses. A Reserved Matters application was submitted for the Site for a car showroom in 2019, and was granted planning permission in 2020, however this permission was never initiated. A new application is therefore being prepared for the Site.
- 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.
- 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 Cronton Road, off Coppice Lane and lies west of the M62 / M57 motorway junction. The Site is located within the administrative area of Knowsley Council and currently comprises grassed land. Coppice Lane forms the northern boundary of the Site with retail and commercial premises and Cronton Road beyond. To the east of the Site lies the M62 / M57 motorway junction 6. The M62 motorway forms the southern boundary of the Site whilst grassed land and residential properties are located to the west.
- 1.5 The Site is not located in an Air Quality Management Area (AQMA) however the neighbouring local authority, Liverpool City Council, has declared an AQMA for exceedances of the annual mean nitrogen dioxide (NO₂) air quality objective. The AQMA is located 1.1km west of the Site at its closest point.
- 1.6 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 Levelling Up, Housing and Communities, National Planning Policy Framework (NPPF) (2023)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**:

- Knowsley Council, Knowsley Local Plan Core Strategy (2016)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) 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 (2023) National Planning Policy Framework, HMSO London

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

¹³ Knowsley Council (2016) Knowsley Local Plan Core Strategy 2016



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) (2022)¹⁴;
- Institute of Air Quality Management (IAQM), Guidance on the assessment of dust from demolition and construction (2024)¹⁵; and
- IAQM and Environmental Protection UK (EPUK), Land-Use Planning and Development Control: Planning for Air Quality (2017)¹⁶.

¹⁴ Defra (2022) Local Air Quality Management Technical Guidance LAQM.TG(22)

¹⁵ Institute of Air Quality Management (2024) Guidance on the assessment of dust from demolition and construction, Institute of Air Quality Management, London

¹⁶ Institute of Air Quality Management and Environmental Protection UK (2017) Land-Use Planning and Development Control: Planning for Air Quality



3 Assessment Methodology

Consultation

- 3.1 Consultation was undertaken with Environmental Health department at Knowsley Council detailing the proposed scope of works and assessment methodology to be utilised within the air quality assessment. A response was received in which the assessment methodology was agreed. Details of the consultation with Knowsley Council is provided in **Appendix C**.
- 3.2 The assessment methodology is detailed below.

Construction Phase - Dust Assessment

- 3.3 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 guidance¹⁵. 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 500m 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

- 3.4 Air dispersion modelling software ADMS-Roads, version 5.0.1.3, was utilised to predict concentrations of NO_x 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) guidance¹⁴ and the IAQM and EPUK guidance¹⁶.

Assessment, Scenarios, Study Area and Sensitive Receptors

- 3.5 The following assessment scenarios were considered in the assessment:
- Scenario 1: 2023 Model Verification;
 - Scenario 2: 2024 Base Year;
 - Scenario 3: 2025 Opening Year without Development; and
 - Scenario 4: 2025 with Development.

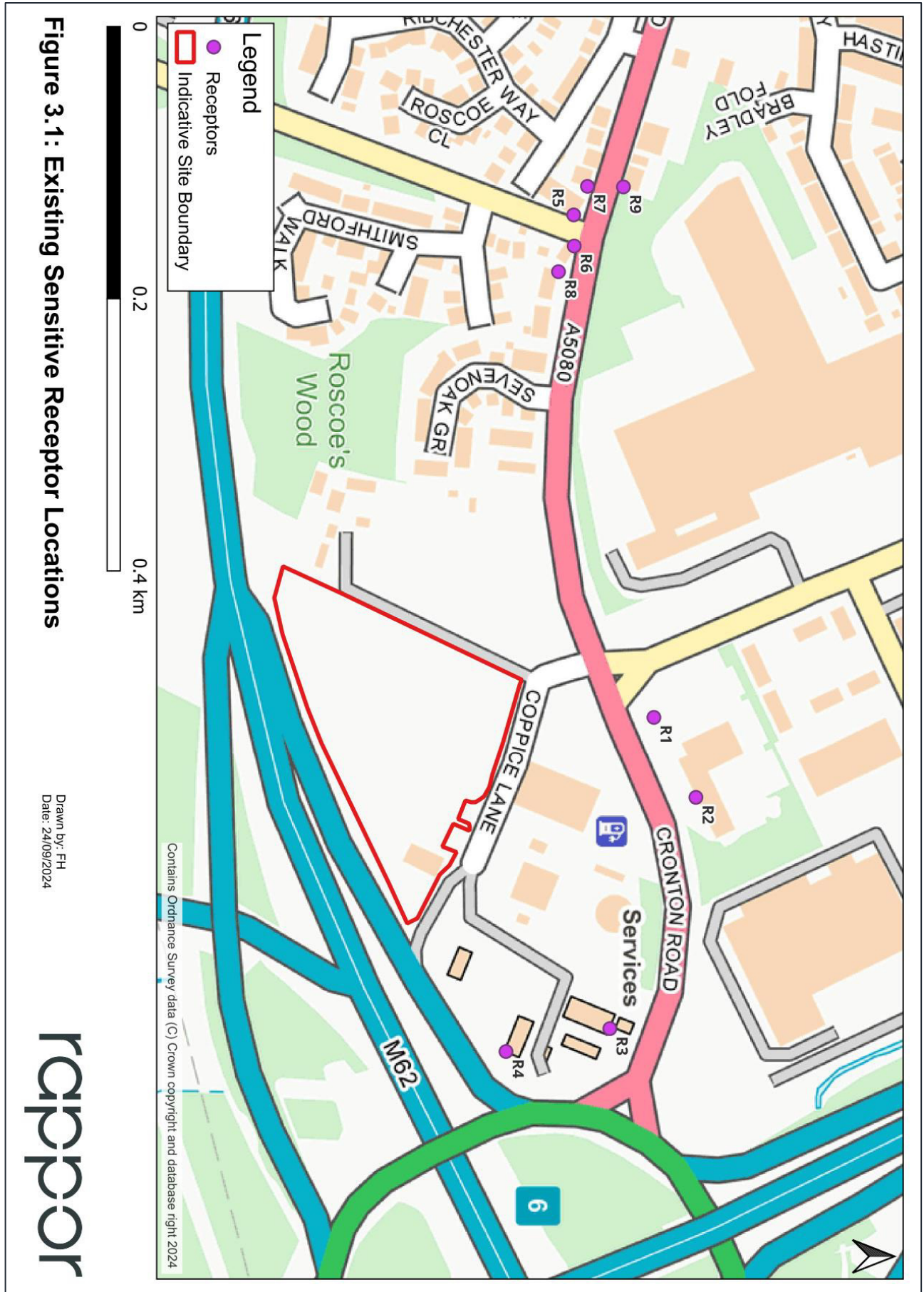


- 3.6 Traffic data were obtained for the above scenarios from Mode Transport Planning, the Project Transport Consultants, for the study area listed below:
- M62 motorway;
 - M57 motorway;
 - Coppice Lane;
 - Cronton Road;
 - Whitefield Lane; and
 - Wilson Road.
- 3.7 The study area was determined based on the proposed development trip generation and distribution provided by Mode Transport Planning, taking into consideration the screening criteria set out in IAQM and EPUK guidance¹⁶, and the proximity of sensitive receptor locations. Traffic data used in the assessment are detailed in **Appendix D**.
- 3.8 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. The exception to this was receptor R1 which represents a children's play area at the Brewer's Fayre public House on Wilson Road. This receptor was modelled at a height of 0.8m to account for the lower-than-average breathing height of children. **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	Children's Play Area	345908	389452	0.8
R2	Premier Inn Hotel	345967	389483	1.5
R3	Greggs	346136	389420	1.5
R4	Starbucks	346153	389344	1.5
R5	Whitefield Lane	345539	389394	1.5
R6	Whitefield Lane	345562	389394	1.5
R7	Cronton Road	345518	389404	1.5
R8	Cronton Road	345580	389382	1.5
R9	Cronton Road	345518	389430	1.5

Figure 3.1: Existing Receptor Locations





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 E**, alongside all relevant assumptions and limitations.

- Emission Factors Toolkit version 12.0¹⁷ was utilised to obtain traffic data emissions for the years of assessment;
- NO_x – NO₂ Calculator version 8.1¹⁸ was utilised to convert oxides of nitrogen to NO₂;
- Background concentrations were obtained from the Defra background maps¹⁹ for the years of assessment, in the absence of any representative background monitoring data in the study area;
- Meteorological data from the Liverpool Airport recording station was utilised in the assessment for the 2019 year, to align with the model verification year. The windrose is presented in **Appendix F**;
- Model verification was undertaken utilising local representative monitoring data from monitoring locations operated by Knowsley Council. Full details of the model verification process are detailed in **Appendix G**.

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.

3.11 The IAQM and EPUK guidance¹⁶ provides criteria to determine the significance of air quality impacts associated with development-generated road traffic emissions. **Table 3.3** details

¹⁷ Defra (2023) Emission Factor Toolkit [<https://laqm.defra.gov.uk/review-and-assessment/tools/emissions-factors-toolkit.html>]

¹⁸ Defra (2020) NO_x to NO₂ Calculator [<https://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html#NOxNO2calc>]

¹⁹ Defra (2020) background pollutant concentration maps [<https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2018>]



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;
- Knowsley Council's Local Air Quality Management reports²⁰ and monitoring data; and
- Aerial imagery, maps and plans of the Site and study area.

Local Air Quality Management

4.2 The Site is not located within an AQMA, however the Liverpool city-wide AQMA is located 1.1km west of the Site. This AQMA was declared by the neighbouring local authority of Liverpool City Council for the exceedance of the annual mean NO₂ objective.

Local Air Quality Monitoring

Nitrogen Dioxide (NO₂)

4.3 Knowsley Council undertakes monitoring of NO₂ within its administrative area using a network of automatic monitors and passive diffusion tubes. 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 is considered the last year of 'pre-pandemic baseline conditions' whilst monitoring data for 2022 onwards is considered to represent the 'post-pandemic monitoring baseline' the IAQM position statement²¹. Monitoring data recorded in 2020 and 2021 is considered to be affected by COVID-19 restrictions and therefore outlier data.

Table 4.1: NO₂ Monitoring Data (µg.m⁻³)

Site ID	X	Y	Site Type	Monitored Concentration				
				2019	2020	2021	2022	2023
Huyton	345552	389413	Roadside	37.6	29.5	36	-	-
H1a, H1b	345552	389413	Roadside	37.4	29.5	34.4	28.4	24.9
H2a, H2b	345537	389407	Roadside	40.8	35.1	38.2	30.1	29
H3a, H3b	345563	389399	Kerbside	48.0	42.2	46.7	39.3	33.6
H4a, H4b	345517	389329	Roadside	31.4	25.3	30.1	25	21.5
H5Aa, H5Ab	345563	389397	Roadside	-	-	38.1	31.4	28.1
H6Aa, H6Ab	345543	389390	Kerbside	-	-	45.4	36.7	32.4
H7Aa, H7Ab	345503	389429	Roadside	-	-	33.1	25.7	24

²⁰ Knowsley Council (2024) Annual Status Report 2024

²¹ Institute of Air Quality Management (2022) The Use of 2020 and 2021 Monitoring Datasets



Site ID	X	Y	Site Type	Monitored Concentration				
				2019	2020	2021	2022	2023
H8Aa, H8Ab	345577	389394	Roadside	-	-	46.9	34.4	30.1
H9Aa, H9Ab	345555	389392	Suburban	-	-	36.5	30.3	26.7
H10Aa, 10Ab	345424	389325	Suburban	23.9	19.1	22.2	18.5	15.3

Bold indicates exceedances of the relevant air quality objective. – indicates that monitoring was not undertaken in this year.

- 4.4 The monitored NO₂ concentrations detailed in **Table 4.1** indicate that there have been no exceedances of the annual mean NO₂ objective of 40µg.m⁻³ since 2021, with an overall downward trend in concentrations demonstrating that air quality in the area is improving. Exceedances of the NO₂ objective were recorded at four monitoring locations up to 2021. These monitoring locations are all situated at the junction of Cronton Road and Whitefield Lane.
- 4.5 Whilst these monitoring locations recorded elevated pollutant concentrations, other monitoring locations detailed in **Table 4.1** recorded much lower NO₂ concentrations despite being located close to the same junction. It is considered that localised factors such as proximity to buildings, and proximity to kerbs and queuing traffic has given rise to the elevated concentrations recorded at this junction in previous years.
- 4.6 As the majority of sensitive receptors in the study area are located at, or close to, this junction, the monitoring data detailed in **Table 4.1** is considered representative of conditions in the study area. The monitoring locations detailed in **Table 4.1** were used in the NO₂ model verification process. The full model verification process is detailed in **Appendix G**.

Particulate Matter (PM₁₀ and PM_{2.5})

- 4.7 Knowsley Council also undertakes PM₁₀ and PM_{2.5} monitoring at the Huyton automatic monitoring site within the study area for the air quality assessment. Monitoring at this location ceased in 2019 however, concentrations of both annual and daily mean PM₁₀ and annual mean PM_{2.5} were well below the relevant air quality objectives in all years in which monitoring was undertaken.

Background Concentrations

- 4.8 Knowsley Council does not undertake background monitoring within the study area and therefore, background concentrations for NO₂, PM₁₀ and PM_{2.5} were obtained from Defra background maps¹⁹. **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}		
		2023	2024	2025	2023	2024	2025	2023	2024	2025
34500, 389500	R1, R2, R5 – R9 Huyton, H1 – H10	16.2	15.5	14.9	12.9	12.8	12.7	8.3	8.3	8.2
346500, 389500	R3, R4	19.4	18.5	17.6	14.3	14.2	14.1	8.8	8.7	8.7

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 guidance¹⁵, 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 guidance¹⁵ 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	N/A	No buildings will be demolished as part of the development proposals.
Earthworks	Medium	Total Site area is greater than 18,000m ² but smaller than 110,000m ² .
Construction	Medium	Total volume of buildings to be constructed is greater than 12,000m ³ but smaller than 75,000m ³ .
Trackout	Small	Less than 20 outward HDV movements in any one day during height of construction activities.

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 guidance¹⁵, 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 guidance¹⁵.

Table 5.2: Sensitivity of Study Area

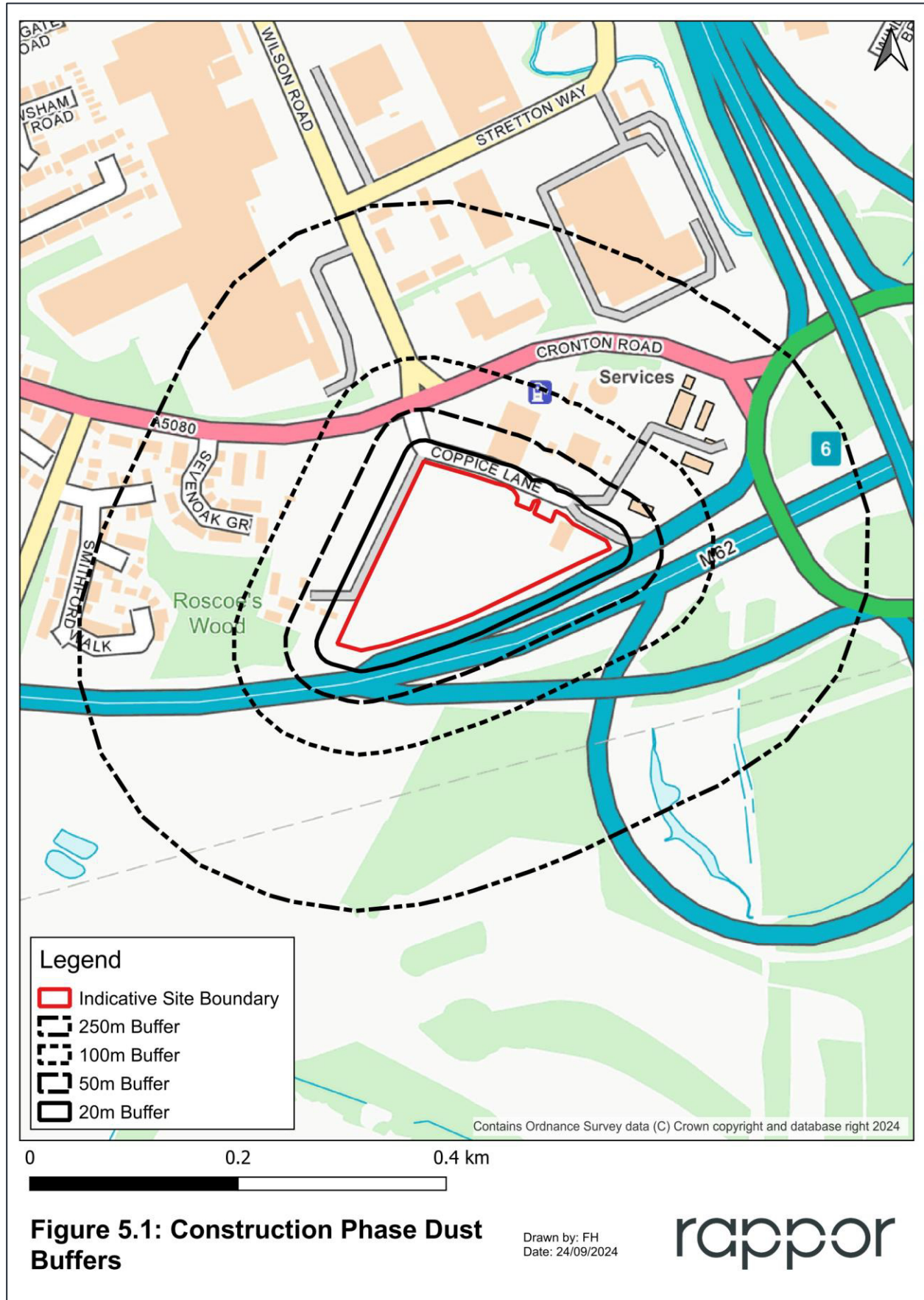
Activity	Sensitivity to Dust Soiling	Sensitivity to Human Health
Earthworks	Medium – there are between 10 and 100 highly sensitive receptors within 50m of the Site. Receptors include residential dwellings and car parking spaces.	Low – there are less than 10 highly sensitive receptors within 50m of the Site boundary. Receptors include residential properties. Background PM ₁₀ concentrations are less than 24µg.m ⁻³ .



Activity	Sensitivity to Dust Soiling	Sensitivity to Human Health
Construction	Medium – there are between 10 and 100 highly sensitive receptors within 50m of areas where construction will take place. Receptors include residential dwellings and car parking spaces.	Low – there are less than 10 highly sensitive receptors within 50m of areas where construction will take place. Receptors include residential properties. Background PM ₁₀ concentrations are less than 24µg.m ⁻³ .
Trackout	High – there are between 10 and 100 highly sensitive receptors within 20m of roads to be used by construction traffic, up to 100m from the Site access. Receptors include car parking spaces.	Low – there are less than 10 highly sensitive receptors within 20m of roads to be used by construction traffic up to 100m from the Site access. Receptors include residential properties. 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
Earthworks	Medium	Medium	Medium Risk
Construction	Medium	Medium	Medium Risk
Trackout	Small	High	Low Risk

Mitigation

- 5.6 IAQM guidance¹⁵ 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 H**. 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 2024 Base Year and 2025 Opening Year with development are detailed in **Table 6.1**.

Table 6.1: 2024 Base Year and 2025 Opening Year without development Annual Mean Concentrations (µg.m⁻³)

Receptor	2024 Base Year			2025 Opening Year without development		
	NO ₂	PM ₁₀	PM _{2.5}	NO ₂	PM ₁₀	PM _{2.5}
R1	25.4	15.4	9.7	24.1	15.4	9.6
R2	23.9	14.9	9.4	22.6	14.8	9.3
R3	27.7	16.0	9.8	26.2	16.0	9.7
R4	31.3	16.5	10.1	29.6	16.5	10.0
R5	24.1	14.9	9.4	22.9	14.9	9.3
R6	23.8	14.8	9.3	22.6	14.7	9.3
R7	22.2	14.4	9.1	21.1	14.3	9.0
R8	21.5	14.1	9.0	20.4	14.0	8.9
R9	24.7	15.2	9.6	23.4	15.2	9.5

- 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 2025 Opening Year with development were compared to concentrations for the 2025 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	2025 Opening Year Without Development Concentration	2025 Opening Year With Development Concentration	Change*	% Change Relative to Objective	Significance
R1	24.1	24.2	+0.1	0	Negligible



Receptors	2025 Opening Year Without Development Concentration	2025 Opening Year With Development Concentration	Change*	% Change Relative to Objective	Significance
R2	22.6	22.7	+0.1	0	Negligible
R3	26.2	26.2	+0.1	0	Negligible
R4	29.6	29.6	+0.1	0	Negligible
R5	22.9	22.9	0.0	0	Negligible
R6	22.6	22.6	0.0	0	Negligible
R7	21.1	21.1	0.0	0	Negligible
R8	20.4	20.4	0.0	0	Negligible
R9	23.4	23.5	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 guidance¹⁶, the impact of the proposed development on annual mean NO₂ concentrations is **negligible**.

6.6 In accordance with Defra guidance¹⁴, 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 PM₁₀ Concentrations and Development Impact (µg.m⁻³)

Receptors	2025 Opening Year Without Development Concentration	2025 Opening Year With Development Concentration	Change*	% Change Relative to Objective	Significance
R1	15.4	15.4	0.0	0	Negligible
R2	14.8	14.9	0.0	0	Negligible
R3	16.0	16.0	0.0	0	Negligible
R4	16.5	16.5	0.0	0	Negligible
R5	14.9	14.9	0.0	0	Negligible
R6	14.7	14.8	0.0	0	Negligible
R	14.3	14.3	0.0	0	Negligible
R8	14.0	14.0	0.0	0	Negligible
R9	15.2	15.2	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 guidance¹⁶, 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 one day 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	2025 Opening Year Without Development Concentration	2025 Opening Year With Development Concentration	Change*	% Change Relative to Objective	Significance
R1	9.6	9.6	0.0	0	Negligible
R2	9.3	9.4	0.0	0	Negligible
R3	9.7	9.7	0.0	0	Negligible
R4	10.0	10.1	0.0	0	Negligible
R5	9.3	9.3	0.0	0	Negligible
R6	9.3	9.3	0.0	0	Negligible
R7	9.0	9.1	0.0	0	Negligible
R8	8.9	8.9	0.0	0	Negligible
R9	9.5	9.5	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 guidance¹⁶, the impact of the proposed development on annual mean PM_{2.5} concentrations is **negligible**.



7 Summary and Conclusions

- 7.1 Rappor was instructed by Hatfields to undertake an air quality assessment for submission with a planning application for a proposed car showroom at land off Cronton Road in Knowsley.
- 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 would 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.



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



Knowsley Local Plan Core Strategy 2016

The Knowsley Local Plan Core Strategy 2016 sets out the vision, objectives and policies which will guide development within Knowsley up to 2028. Policy CS2 Development Principles sets out the Council's policies relating to air quality, stating:

"[...]

Principle 4: Recognise environmental limits, protect and enhance environmental assets, enhance local character and promote quality of place by:

[...]

j) minimising negative impact upon flood risk, air quality, water quality, land quality, soil quality, and noise and vibration levels and ensuring any negative impacts are appropriately mitigated.

Development that will have an unacceptable impact upon any of the above will only be permitted where the benefits of the proposal clearly outweigh the harm."



Appendix C – Consultation

Freya Hoyle

From: Bradshawe, Helen <Helen.Bradshawe@knowsley.gov.uk>
Sent: 18 September 2024 14:36
To: Freya Hoyle
Subject: RE: External Mail: Land off Coppice Lane - air quality assessment methodology

Hi,

The assessment for air quality is acceptable, please ensure new developments and proposed developments are included in the assessment.

Kind Regards

Helen Bradshawe
Senior Environmental Protection Officer
Environmental Health and Consumer Protection

Mobile: 07717888524

Knowsley Council, Huyton Municipal - Second Floor, Archway Road, Huyton, Knowsley, L36 9YU



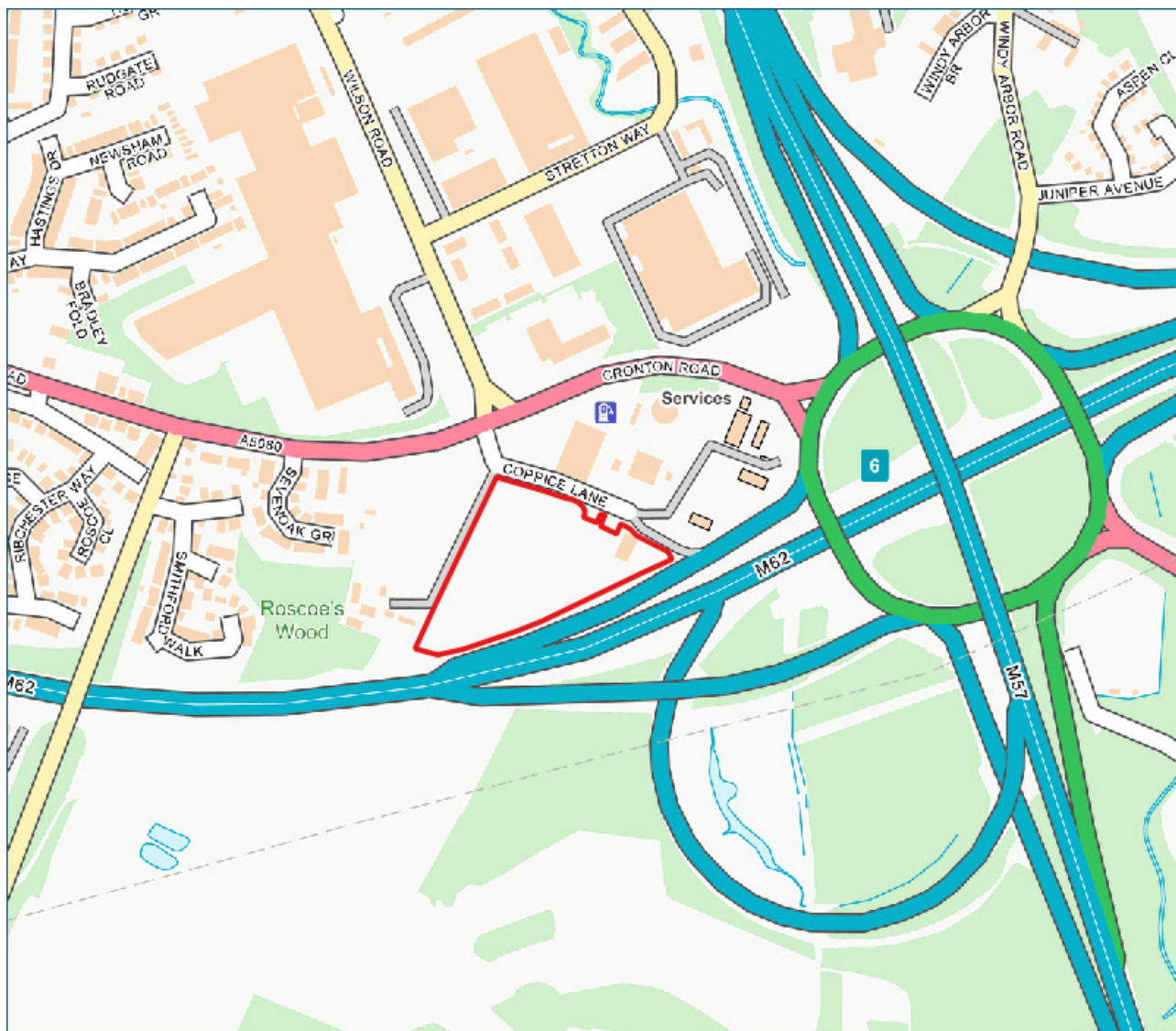
From: Freya Hoyle <Freya.Hoyle@rappor.co.uk>
Sent: Thursday, September 12, 2024 9:37 AM
To: Environmental Health <environmentalhealth@knowsley.gov.uk>
Subject: External Mail: Land off Coppice Lane - air quality assessment methodology

CAUTION: This email originated from an external source. If you suspect a potential phishing email, report it via the IT Self Service Portal which can be found within the Quick Links section on Bertha

Good morning,

I hope you're well?

Rappor has been appointed to prepare the air quality assessment for the proposed car showroom and garage at the site off Coppice Lane near Junction 6 of the M62. The site location is illustrated below for reference.



The site is part of the wider Beacon 62 development which was granted outline planning permission in 2017. A further detailed planning application was submitted for the site for a car showroom which was granted permission in 2020 (planning ref 19/00481/FUL). This application was supported by the 2017 air quality assessment and therefore no specific air quality assessment was prepared for the 2019 application. The permission was never implemented and the design of the car showroom has changed slightly since permission was granted.

A new application is being prepared for the car showroom and we will be undertaking a new air quality assessment due to the amount of time that has passed since the original assessment was prepared, and the changes to air dispersion modelling software, guidance and legislation.

We have provided our methodology and scope of works below and would be grateful if you could confirm if you are happy with our approach or if you have any queries.

Construction phase:

The proposals will generate dust and emissions that have the potential to influence amenity and human health at existing sensitive receptors in the vicinity of the site. A qualitative construction phase dust assessment will therefore be undertaken in accordance with IQM guidance to determine the level of dust risk associated with the construction phase. Mitigation measures proportionate to the level of dust risk derived will be recommended.

Operational phase:

The proposals will generate additional vehicle movements on the local road network that have the potential to give rise to localised air quality impacts once operational. A detailed operational phase road traffic emissions

impact assessment will be undertaken in accordance with Defra LAQM.TG(22) using the latest version of the dispersion modelling software ADMS-Roads.

Concentrations of NO₂, PM₁₀ and PM_{2.5} will be predicted at existing sensitive receptor locations, with particular focus on properties at the Cronton Road / Whitefield Lane junction. Concentrations will be predicted without the development in operation, and with the development in operation, with the change in pollutant concentrations calculated. The significance of any change in pollutant concentrations will be determined using the significance criteria set out in IAQM and EPUK guidance.

The following model scenarios will be assessed:

- 2023 model verification (using the latest year of monitoring data available from the ASRS – It is noted that automatic monitoring at Whitefield Lane / Cronton Road ceased in 2019 and therefore model verification of PM₁₀ and PM_{2.5} cannot be undertaken using the automatic analyser; we will therefore utilise in the model NO_x verification factor to adjust modelled PM₁₀ and PM_{2.5} concentrations);
- 2024 existing baseline;
- Opening year without development; and
- Opening year with development.

Modelling parameters will be the same as those used in the original air quality assessment including the use of Liverpool Airport meteorological recording station, the latest version of Defra Emission Factor Toolkit (v12), NO_x-NO₂ Calculator (v8.1) and background maps (2018 base).

We trust that the above is of assistance however if you have any queries or wish to discuss anything, please do let me know.

Best regards,

Freya

Freya Hoyle MSc BSc MIAQM MIEEnvSc

Associate Director – Air Quality

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Appendix D – Traffic Data



Cronton Road, Knowsley
Air Quality Assessment

Table D1: Traffic Data used in Air Dispersion Modelling

Road	2023 Verification Year		2024 Base Year		2025 Opening Year Without Development		2025 Opening Year With Development	
	AADT	HDV%	AADT	HDV%	AADT	HDV%	AADT	HDV%
Cronton Road east of Coppice Lane	24440	2.6	24543	2.6	25689	2.6	26139	2.5
Cronton Road west of Coppice Lane	15279	1.6	15343	1.6	16060	1.6	16203	1.6
Cronton Road west of Whitefield Lane	14899	1.0	14962	1.0	15660	1.0	15760	1.0
Whitefield Lane	9685	0.7	9726	0.7	10180	0.7	10224	0.7
Coppice Lane	6317	2.2	6344	2.2	6640	2.2	7265	2.1
Wilson Road	11599	3.9	11648	3.9	12192	3.9	12223	3.9
M62 west of Junction 6	76615	3.0	76937	3.0	80530	3.0	80705	3.0
M57 north of Junction 6	90595	9.0	90975	9.0	95224	9.0	95337	9.0
M62 east of Junction 6	97871	8.6	98282	8.6	102872	8.6	102953	8.6
M57 south of Junction 6	57689	8.0	57931	8.0	60637	8.0	60680	8.0



Appendix E – 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 5.0.1.3 was utilised in the assessment;
- Emission Factor Toolkit version 12.0 was utilised to obtain emission factors for the years of assessment (2023, 2024 and 2025);
- NO_x-NO₂ Calculator version 8.1 was utilised to derive NO₂ concentrations from modelled Road NO_x concentrations. The input parameter 'All non-urban UK roads' was utilised to represent the roads included in the study area, which is located close to a major motorway junction;
- Meteorological data from the Liverpool Airport recording station was utilised in the air dispersion model for the verification year of 2023. A surface roughness of 0.5m and a Monin-Obhukov length of 30m were utilised for the Site to represent the conditions in the study area on the edge of the Knowsley urban area within a mixed urban and industrial area; and
- Following the withdrawal of the IAQM 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 2019 measured concentrations and has been adjusted to take account of the apparent under-prediction, there can be reasonable confidence in the predicted concentrations.



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 2023 annual mean road-NO_x contribution at the Knowsley Council-operated monitoring locations. The model output of road-NO_x was compared to the 2023 'measured' road-NO_x at each location, 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 concentrations.

Table G1 details the model verification process.

Table G1: Model Verification Process (µg.m⁻³)

Verification Step	H1	H2	H3	H4	H5	H6	H7	H8	H9
2023 monitored NO ₂	24.9	29.0	33.6	21.5	28.1	32.4	24.0	30.1	26.7
2023 background NO ₂	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2	16.2
Monitored road NO _x	16.6	25.0	34.7	10.0	23.1	32.1	14.9	27.2	20.3
Modelled road NO _x	18.9	13.3	15.2	10.9	14.3	13.0	14.2	11.4	11.6
Ratio between monitored and modelled road NO _x	0.9	1.9	2.3	0.9	1.6	2.5	1.0	2.4	1.8
Adjustment factor	1.6158								
Adjusted modelled road NO _x	30.6	21.5	24.6	17.7	23.0	21.0	23.0	18.4	18.7
Modelled total NO ₂	31.7	27.3	28.8	25.4	28.1	27.1	28.0	25.8	25.9
% difference	27.3	-5.9	-14.2	18.3	-0.1	-16.4	16.8	-14.4	-2.9
% RMSE	10.2								

A road-NO_x adjustment factor of 1.6158 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 from the model verification process was just over 10% and significantly less than 25% and therefore provides statistical confidence in the results.

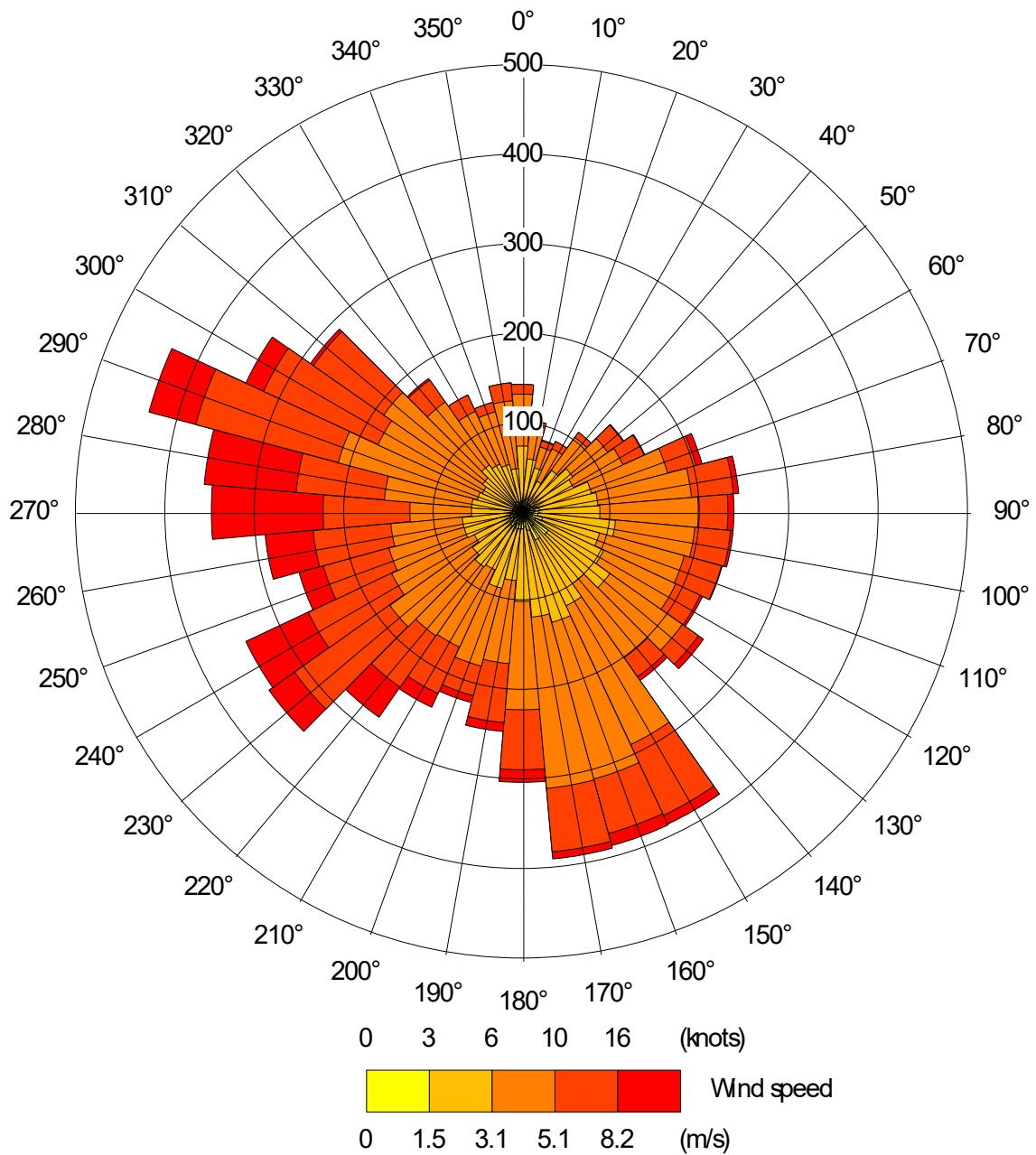
As there are no PM₁₀ or PM_{2.5} monitoring locations within the study area, the predicted road-PM₁₀ and road-PM_{2.5} components have been adjusted using the road-NO_x factor before adding the appropriate background concentration.



Appendix F – Wind Rose



The 2023 wind rose for the Liverpool Airport meteorological recording station is illustrated below. The prevailing wind direction is from the west with significant contributions from the south.





Appendix G – Model Verification



Appendix H – 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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