

10. AIR QUALITY

Introduction

- 10.1 This chapter of the ES assesses the likely significant effects of the Development on the environment in respect of air quality in the context of the Site and surrounding area. In particular, it considers the likely significant effects on both the construction and operational phases of the Development on local air quality and amenity.
- 10.2 This chapter should be read in combination with the Air Quality Assessment (AQA) provided at Appendix 10.1.

Policy Context

National Planning Policy Framework

National Planning Policy Framework (NPPF), 2021ⁱ

- 10.3 Section 15 of the NPPF deals with conserving and enhancing the natural environment, and states that the intention is that the planning system should prevent “*development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability*” and goes on to state that “*new development [should be] appropriate for its location*” and “*the effects (including cumulative effects) of pollution on health, the natural environment or general amenity, and the potential sensitivity of the area or proposed development to adverse effects from pollution, should be taken into account.*”
- 10.4 With specific regard to air quality, the NPPF states that: “*Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan.*”

Planning Practice Guidance

Planning Practice Guidance (PPG), 2019ⁱⁱ

- 10.5 The PPG sets out how planning should take account of potential impacts of new development on air quality.
- 10.6 It provides guidance on whether air quality is relevant to a planning decision depending on the development and its location. The guidance states that:

"Concerns could arise if the development is likely to have an adverse effect on air quality in areas where it is already known to be poor, particularly if it could affect the implementation of air quality strategies and action plans and/or breach legal obligations (including those relating to the conservation of habitats and species). Air quality may also be a material consideration if the development would be particularly sensitive to poor air quality in its vicinity.

Where air quality is a relevant consideration the local planning authority may need to establish:

- the 'baseline' local air quality, including what would happen to air quality in the absence of the development;*
- whether the proposed development could significantly change air quality during the construction and operational phases (and the consequences of this for public health and biodiversity); and*
- whether occupiers or users of the development could experience poor living conditions or health due to poor air quality."*

Local Planning Policy

Rochdale Adopted Core Strategy (October 2016)ⁱⁱⁱ

- 10.7 Policy G9 Reducing the Impact of Pollution, Contamination and Land Instability states that:

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

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

- e. *Requiring that any risks arising from contaminated land or land instability, and appropriate actions to address these risks, are identified prior to any development taking place on that land and the identified actions taken;*
- f. *Requiring that any risk to surface water and ground water resources from the disturbance of contaminated land be ascertained and preventative measures devised and carried out; and*
- g. *Using planning conditions or obligations to control pollution from new development, or the impact of pollution on new development."*

10.8 In addition, Policy DM1 General Development Requirements states that:

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

....

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

....

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

...."

Legislative Context

10.9 The applicable legislative framework is summarised as follow:

- The Air Quality Strategy (AQS) for England, Scotland, Wales and Northern Ireland, 2007 (Volume 1)^{iv}, (Volume 2)^v;
- The Clean Air Strategy 2019^{vi};
- Directive 2008/50/EC of the European Parliament and of the Council of 21st May 2008 on Ambient Air Quality and Cleaner Air for Europe^{vii};
- Air Quality (England) Regulations, 2000^{viii};
- Air Quality (England) (Amendment) Regulations, 2002^{ix};
- Air Quality Standards Regulations, 2010^x;
- Air Quality Standards (Amendment) Regulations, 2016^{xi};
- The Environment Act, 1995^{xii}; and
- The Environment Act, 2021^{xiii}.

10.10 UK air quality policy is published under the umbrella of the Environment Act 1995, Part IV and specifically Section 80, the National Air Quality Strategy (NAQS). The latest *Air Quality Strategy for England, Scotland, Wales and Northern Ireland – Working Together for Clean Air*, published in July 2007 sets air quality standards and objectives for ten key air pollutants to be achieved between 2003 and 2020.

10.11 The Air Quality Standards (AQSS) in the United Kingdom are derived from European Commission (EC) directives and are adopted into English law via the Air Quality (England) Regulations 2000 and Air Quality (England) Amendment Regulations 2002. The Air Quality Limit Values Regulations 2003 and subsequent amendments implement the Air Quality Framework Directive into English Law. Directive 2008/50/EC was translated into UK law in 2010 via the Air Quality Standards Regulations 2010.

Air Quality Objectives and Standards

10.12 The relevant AQSS derived from the NAQS for England and Wales and the Air Quality Standards Regulations 2010 are summarised in Table 10.1 below.

Table 10.1: Air Quality Objective and Standards relevant to this assessment

Substance	Averaging Period	Exceedances allowed per year	Ground level concentration limit ($\mu\text{g}/\text{m}^3$)
Oxides of nitrogen (NO_x)	1 calendar year	-	30
Nitrogen dioxide (NO_2)			40
Fine particles (PM_{10})	1 calendar year	-	40
	24 hours	35	50
Fine particles ($\text{PM}_{2.5}$)	1 year	N/A	20

Notes: The NO_x objective is only relevant at designated ecologically sensitive sites.

Guidance

10.13 The applicable guidance used or referred to in the assessment is summarised as follows:

- Institute of Air Quality Management (IAQM), Guidance on the Assessment of Dust from Demolition and Construction, 2014^{xiv};
- Environmental Protection UK (EPUK) and IAQM, Land-Use Planning and Development Control: Planning for Air Quality, 2017^{xv}; and
- Department for Environment, Food and Rural Affairs (Defra), Local Air Quality Management (LAQM) Technical Guidance (TG.22), 2022^{xvi}.

Assessment Methodology

Consultation

10.14 An EIA Scoping Report (Appendix 2.1) including proposed air quality assessment scope and methodology was prepared and submitted to RBC in October 2022 (refer to Appendix 2.1).

- 10.15 RBC provided their EIA Scoping Opinion (Appendix 2.2) on 15th February 2023. Table 10.2 below sets out the comments relating to Air Quality in the Scoping Opinion and how and where these have been addressed in the chapter.

Table 10.2: Comments Provided in Scoping Opinion

Scoping Comments	How to Address in ES Chapter
It is likely that RBC will require a financial contribution to install NO _x monitoring tubes and/or Pollution Monitoring Equipment at agreed locations as an integral part of the development. This equipment would be installed pre-commencement and operate for at least five years after the development has been completed.	Sufficient air quality baseline data is available in the local area and has been used in the air quality assessment. Should any further monitoring work be required, it will be discussed and agreed with RBC via planning conditions.

Scope of the Assessment

- 10.16 Current air quality in the area of the Site and air quality under the 'do-nothing' scenario in appropriate future years has been characterised using publicly available data (local authority and Defra).
- 10.17 A qualitative assessment of construction phase impacts has been undertaken.
- 10.18 Detailed air quality impact assessment of the operational phase traffic has been carried out using the dispersion modelling software package ADMS-Roads.

Effects Not Considered within the Scope

- 10.19 No significant combustion sources such as combined heat and power (CHP) plant or biomass boilers are proposed as part of the Development. Therefore, emissions to air from operational phase combustion plant has been screened out of the assessment and are not considered further in this chapter.

Assessment Methodology

Dust and Particulate Matter Generated by Construction Phase Activities

- 10.20 Construction works for the Development have the potential to lead to the release of fugitive dust and particulate matter. Three separate dust impacts were considered:
- Disamenity to dust soiling;
 - The risk of health effects due to an increase in exposure to PM₁₀; and

- Harm to ecological receptors.

10.21 An assessment of the likely significant effects of construction phase dust and particulate matter at sensitive receptors has therefore been undertaken following the IAQM's construction dust guidance, the available information for this phase of the Development provided by the project team and professional judgement.

10.22 The assessment considers the risk of potential dust and particulate matter effects from the following three sources: earthworks; general construction activities; and trackout. It takes into account the nature and scale of the activities undertaken for each source and the sensitivity of the area to increases in dust and particulate matter levels to assign a level of risk. Risks are described in terms of there being a low, medium or high risk of dust effects. Once the level of risk has been ascertained, then site specific mitigation proportionate to the level of risk is identified, and the significance of residual effects determined. Further details on the IAQM methodology can be found in Annex A of the Air Quality Assessment (AQA) in Appendix 10.1.

Increase in Pollutant Concentrations as a Result of Exhaust Emissions arising from Construction Phase Traffic and Plant

10.23 Exhaust emissions from construction vehicles and plant may have an effect on local air quality at sensitive human or ecological receptors adjacent to the routes used by these vehicles to access the Site and in the vicinity of the Site itself. As detailed information on the number of vehicles and plant associated with each part of the construction phase was not available at the time of assessment, a qualitative assessment of their effect on local air quality has been undertaken using professional judgement and by considering the following, where available:

- The number and type of construction traffic and plant likely to be generated by this phase of the Development;
- The number and proximity of sensitive receptors to the Site and along the likely routes to be used by construction vehicles; and
- The likely duration of the construction phase and the nature of the construction activities undertaken.

Increase in Pollutant Concentrations as a Result of Additional Traffic Emissions Arising from Operational Phase

- 10.24 Once operational, the Development will generate additional traffic on the surrounding road network; the emissions to air associated with this traffic have the potential to impact on nearby sensitive human or ecological receptors.
- 10.25 A detailed dispersion modelling assessment of the potential operational phase traffic effects has been undertaken, with full model setup details provided in the AQA in Appendix 10.1.
- 10.26 The EPUK-IAQM 2017 guidance provides an approach for determining the significance of air quality impacts associated with a development in relation to emissions from traffic. To assess the impacts of a development on the surrounding area, the guidance recommends that the degree of an impact is described by expressing the magnitude of incremental change as a proportion of the relevant assessment level and examining this change in the context of the new total concentration and its relationship with the assessment criterion. The approach is presented in Table 10.6 and also further described in section 3 and Annex C of the AQA in Appendix 10.1, including the descriptors for the impact significance.
- 10.27 The following scenarios have modelled and assessed in this ES chapter:
- S1: 2019 'Verification Baseline' scenario – for model verification purpose;
 - S2: 2033 'Without Development' scenario – for the future year of opening of the completed development, without Development; and
 - S3: 2033 'With Development' scenario – for the future year of opening of the completed development, with Development.
- 10.28 2019 is used as the 'verification baseline' year in this assessment, for the purpose of model verification (i.e. S1) as the most recent year in which a full year of bias-adjusted and ratified local monitoring data is available. 2033 has been considered as the Development opening year based on the year the Transport Assessment (TA) considered (submitted separately as part of the planning application).

Study Area

Construction Phase

- 10.29 Based on the IAQM construction dust guidance, the study area for sensitive receptors for earthworks and general construction activities is considered to be up to 350m from the Site

boundary. For trackout activities, the study area is considered up to 50m from the edge of the roads likely to be affected by trackout, as per the IAQM guidance. For human receptors, nearby dwellings have been considered in the assessment. Designated ecological receptors (i.e. Rochdale Canal Site of Special Scientific Interest (SSSI)/Special Area of Conservation (SAC)) have been identified within 50m of the trackout route.

Operational Phase

- 10.30 Pollutant concentrations were predicted at a number of receptor locations at both existing locations and future properties within the Site. Details of all specific receptors included in the modelling study are summarised in Table 10.3 and shown in Figure 10.1. The existing receptors were selected to represent the sensitive receptors (e.g. residential dwellings) at locations near to the Site, and junctions and main roads in the vicinity, to ensure that 'worst-case' impacts were captured.

Table 10.3: Receptors Considered in the Dispersion Modelling Assessment

Receptor ID	Reception Location	Grid Reference		
		X	Y	Z
Existing Sensitive Receptors				
ER1	Existing receptor, A663/Broadway (south of Chadderton Roundabout)	390757.0 2	406506.04	1.5
ER2	Existing residential receptor, A627/Chadderton Way	391103.9 3	406427.93	1.5
ER3	Existing residential receptor, A663/Broadway (east of Chadderton Roundabout)	391163.2 9	406710.35	1.5
ER4	Existing residential receptor, A664/Rochdale Road (west of Slattocks Roundabout)	388278.8 8	408075.83	1.5
ER5	Existing residential receptor, A664/Rochdale Road (north of Slattocks Roundabout)	388498.3 8	408428.54	1.5
ER6	Existing residential receptor, A664/Rochdale Road (north of Thornham Lane)	388487.5 4	408669.74	1.5
ER7	Existing receptor, north of Thornham Lane	388706.3 2	408839.71	1.5
ER8	Existing receptor, A664/Manchester Road (south of proposed western site access)	388493.1 6	409101.14	1.5
ER9	Existing residential receptor, A664/Manchester Road (north of Sautridge Close)	388541.1 1	409215.97	1.5
ER10	Existing residential receptor, A664/Manchester Road (south of Earl Street)	388525.6 2	409593.82	1.5
ER11	Existing residential receptor, Thornham New Road (west of Fox Hill Road)	388569.2 1	409603.38	1.5
ER12	Existing residential receptor, Thornham New Road (west of Cherrington Drive)	388783.4 2	409732.24	1.5
ER13	Existing residential receptor, Thornham New Road (east of Cherrington Drive)	388837.2 1	409746.2	1.5
ER14	Existing residential receptor, Thornfields	389376.7 7	409423.85	1.5
ER15	Existing residential receptor, A627(M) (east of Stakehill Lane)	388939.5 6	408569.43	1.5
ER16	Existing residential receptor, A664/Manchester Road (north of Olive Street)	388461.8 6	410091.57	1.5

Receptor ID	Reception Location	Grid Reference		
		X	Y	Z
ER17	Existing residential receptor, A664/Manchester Road (south of Ark Royal)	388390.0 1	410340.75	1.5
ER18	Existing receptor, A664/Manchester Road	388357.9 1	410464.63	1.5
ER19	Existing receptor, A664/Queensway (south of Albion Street)	388386.2 5	410467.23	1.5
ER20	Existing residential receptor, A664/Manchester Road	388149.7 8	410724.52	1.5
ER21	Existing residential receptor, M62 (east of Thornham Interchange)	390160.8 5	410370.24	1.5
ER22	Existing receptor, M62 (west of Thornham Interchange)	389109.3 7	409963.6	1.5
ER23	Existing receptor, A627(M) (north of Thornham Interchange)	389163.7 5	410766.47	1.5
ER24	Existing residential receptor, A664/Queensway (between Hillcrest Road and Cross Street)	388467.1 6	410599.15	1.5
ER25	Existing residential receptor, Burnley Lane	390685.2 7	406600.84	1.5
ER26	Existing receptor, A664/Queensway (north of Hugo Street)	388491.0 4	410680.66	1.5
Proposed Sensitive Receptors				
PR1	Proposed receptor, on-site	388540.8 2	409155.89	1.5
PR2	Proposed receptor, on-site	388815.0 9	409702.87	1.5
PR3	Proposed receptor, on-site	388992.0 9	409781.3	1.5
PR4	Proposed receptor, on-site	389533.8 6	409822.47	1.5
PR5	Proposed receptor, on-site	389356.0 4	409039.99	1.5
PR6	Proposed receptor, on-site	388826.1	408894.77	1.5

Assessment Significance Criteria

- 10.31 The significance level attributed to each effect has been assessed based on the magnitude of change due to the Development and the sensitivity of the affected receptor.

Dust and Particulate Matter Generated by Construction Phase Activities

- 10.32 The IAQM 'Guidance on the Assessment of Dust from Demolition and Construction'^{xvii} criteria and methodology have been adopted to determine the sensitivity of the receptor and the magnitude of effect. Detailed information of the methodology can be found in Annex A of Appendix 10.1. A summary is presented as below.
- 10.33 Table 10.4 below sets out the general principals, along with professional judgement that have been considered to determine the scale of sensitivity that has been applied to receptors identified and considered within the construction phase assessment.

Table 10.4: Scale of Receptor Sensitivity Used in the Construction Phase Assessment

Sensitivity of Area	Dust Soiling	Human Receptors	Ecological Receptors
High	Users can reasonably expect an enjoyment of a high level of amenity. The appearance, aesthetics or value of their property would be diminished by soiling. The people or property would reasonably be expected to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land. Examples include dwellings, museums and other culturally important collections, medium and long term car parks and car showrooms.	Locations where members of the public are exposed over a time period relevant to the air quality objective for PM10 (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day) Examples include residential properties, hospitals, schools and residential care homes should also be considered as having equal sensitivity to residential areas for the purposes of this assessment.	Locations with an international or national designation and the designated features may be affected by dust soiling. Locations where there is a community of a particularly dust sensitive species such as vascular species included in the Red Data List For Great Britain. Examples include a Special Area of Conservation (SAC) designated for acid heathlands or a local site designated for lichens adjacent to the demolition of a large site containing concrete (alkali) buildings.
Medium	Users would expect to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home. The appearance, aesthetics or value of their property could be diminished by soiling. The people or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land. Examples include parks and places of work.	Locations where the people exposed are workers and exposure is over a time period relevant to the air quality objective for PM10 (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day). Examples include office and shop workers, but will generally not include workers occupationally exposed to PM10, as protection is covered by Health and Safety at Work legislation.	Locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown. Locations with a national designation where the features may be affected by dust deposition. Example is a Site of Special Scientific Interest (SSSI) with dust sensitive features.
Low	The enjoyment of amenity would not reasonably be expected. Property would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling. There is transient exposure, where the people or property would reasonably be expected to be present only for limited periods of time as part of the	Locations where human exposure is transient. Indicative examples include public footpaths, playing fields, parks and shopping streets.	Locations with a local designation where the features may be affected by dust deposition. Example is a local Nature Reserve with dust sensitive features.

Sensitivity of Area	Dust Soiling	Human Receptors	Ecological Receptors
	normal pattern of use of the land. Examples include playing fields, farmland (unless commercially-sensitive horticultural), footpaths, short term car parks and roads.		

- 10.34 Table 10.5 below indicates the scale of impact magnitude that has been used in undertaking the construction phase assessment. The descriptors included in this section are based upon the IAQM 'Guidance on the Assessment of Dust from Demolition and Construction'. It is noted that no demolition work will be carried out as part of this planning application.

Table 10.5: Scale of Magnitude for Dust Emission Impacts Used in the Construction Phase Assessment

Activity	Magnitude	Description
Earthworks	Large	Total site area >10,000m ² , potentially dusty soil type (e.g. clay), >10 heavy earth moving vehicles active at any one time, formation of bunds >8m in height, total material moved >100,000 tonnes.
	Medium	Total site area 2,500 – 10,000m ² , moderately dusty soil type (e.g. silt), 5 – 10 heavy earth moving vehicles active at any one time, formation of bunds 4 – 8m in height, total material moved 20,000 – 100,000 tonnes.
	Small	Total site area < 2,500m ² , soil type with large grain size (e.g. sand), <5 heavy earth moving vehicles active at any one time, formation of bunds <4m in height, total material moved <10,000 tonnes, earthworks during wetter months.
Construction	Large	Total building volume >100,000m ³ , piling, on site concrete batching.
	Medium	Total building volume 25,000 – 100,000m ³ , potentially dusty construction material (e.g. concrete), piling, on site concrete batching.
	Small	Total building volume <25,000m ³ , construction material with low potential for dust release (e.g. metal cladding or timber).
Trackout	Large	>50 HDV (>3.5t) trips in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length >100m.
	Medium	10 – 50 HDV (>3.5t) trips in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length 50 – 100m.
	Small	<10 HDV (>3.5t) trips in any one day, surface material with low potential for dust release, unpaved road length <50m.

- 10.35 The sensitivity of receptor and magnitude of impact have then been combined using the ES significance matrix as detailed in Table 10.6 below to determine the significance of effects. The dust emission magnitudes determined have been used to recommend site-specific mitigation measures.

Table 10.6: Scale of Magnitude for Dust Emission Impacts Used in the Construction Phase Assessment

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

Increase in Pollutant Concentrations as a Result of Exhaust Emissions arising from Construction Phase Traffic and Plant

- 10.36 The significance of effects of exhaust emissions arising from construction phase vehicles and on-site plant have been evaluated qualitatively using professional judgement and the principles of the EPUK / IAQM 'Land-Use Planning & Development Control: Planning for Air Quality'. significance criteria described below for operational phase traffic effects.

Increase in Pollutant Concentrations as a Result of Additional Traffic Exhaust Emissions Arising from Operational Phase

- 10.37 The significance of emissions from the Development on human receptors has been determined using the criteria outline in the EPUK/IAQM 'Land-Use Planning & Development Control: Planning for Air Quality' guidance. The EPUK / IAQM guidance recommends that the degree of effect is described by expressing the magnitude of incremental change as a proportion of the relevant assessment level and examining this change in the context of the new total concentration and its relationship with the assessment criterion. Table 10.7 presents the suggested framework for describing the effects. For the purpose of this ES, the percentage change in concentration (relative to the assessment level) has been considered as the magnitude of change, and terminology has been adapted in keeping with the terminology used within the ES.

Table 10.7: Operational Phase Effect Descriptors for Individual Receptors

Long term average concentration at receptors in assessment year	% Change in Concentration Relative to Air Quality Assessment Level (AQAL) – Magnitude of Impact			
	1% Very Slight	2-5% Slight	6-10% Moderate	>10% Substantial
75% or less of AQAL	Negligible	Negligible	Minor	Moderate
76-94% of AQAL	Negligible	Minor	Moderate	Moderate
95-102% of AQAL	Minor	Moderate	Moderate	Major
103-109% of AQAL	Moderate	Moderate	Major	Major
110% or more	Moderate	Major	Major	Major
Notes: AQAL = Air Quality Assessment Level, which for this assessment related to the UK Air Quality Strategy objectives. % change based on rounded values. Where the % change in concentrations is 0, i.e. <0.5%, the change is described as 'Negligible' regardless of the concentration. When defining the concentration as a percentage of the AQAL, the 'without scheme' concentration should be used where there is a decrease in pollutant concentration and the 'with scheme' concentration where there is an increase.				

10.38 For the assessment of exposure at sensitive receptors within the Development, air quality is judged to be acceptable and to have an insignificant effect on future users where predicted concentrations are found to be below the relevant air quality objectives. Where concentrations exceed the objectives, appropriate mitigation should be considered.

10.39 The EPUK/IAQM guidance notes that the criteria in Table 10.7 should be used to describe impacts at individual receptors and should only be considered as a starting point to make a judgement on significance of effects, as other influences may need to be accounted for. The EPUK/IAQM guidance states that the assessment of overall significance should be based on professional judgement, taking into account several factors, including:

- The existing and future air quality in the absence of the Development;
- The extent of current and future population exposure to the impacts; and
- The influence and validity of any assumptions adopted when undertaking the prediction of impacts.

10.40 Where significance of effects is determined as moderate or above, they will be considered to be significant.

Limitations and Assumptions

10.41 The following uncertainties and assumptions were made in the air quality assessment (further details can be found in the AQA in Appendix 10.1):

- Given the lack of local background monitoring data, background PM₁₀ and PM_{2.5} concentrations have been taken from the Defra LAQM background maps;
- Emissions from the average vehicle fleet using the local road network cannot be known, and therefore it is assumed those generated by the Emission Factor Toolkit (EFT) provide an accurate representation of emissions generated by vehicles which currently and which will use the modelled roads;
- There will be uncertainties introduced because the modelling has simplified real-world processes into a series of algorithms. For example, it has been assumed that wind conditions measured at Rostherne No.2 meteorological station in 2019 were representative of wind conditions at the Site. Furthermore, it has been assumed that the subsequent dispersion of emitted pollutants will conform to a Gaussian distribution over flat terrain in order to simplify the real-world dilution and dispersion conditions;
- An important step in the assessment is verifying the dispersion model against measured data. The model verification was based on the comparison of model results based on 2019 traffic data with 2019 monitored NO₂ concentrations. As no PM₁₀ or PM_{2.5} monitoring data were available near the Site, the adjustment factors used for the predicted roadside NO_x concentrations have been applied to the predicted PM₁₀ and PM_{2.5} concentrations, as per guidance provided in the LAQM.TG.22;
- The national diurnal profile published by the Department for Transport for 2019^{xviii}, has been assumed to be applicable for the roads assessed; and
- There is an element of uncertainty in all measured and modelled data. All values presented in this chapter are best possible estimates.

Baseline Conditions

Existing Baseline

- 10.42 Existing or baseline air quality refers to the concentrations of relevant substances that are already present in ambient air. These substances are emitted by various sources, including road traffic, industrial, domestic, agricultural and natural sources.
- 10.43 The Site lies within the administrative area of Rochdale Borough Council (RBC). It is noted that the Site is partially located within the Greater Manchester Combined Authority Air Quality Management Area (AQMA), declared for exceedances of the annual mean nitrogen dioxide (NO₂) objective.

Baseline Monitoring Data

- 10.44 A review of the Greater Manchester Combined Authority Air Quality Annual Status Report for 2021^{xix} showed that there was one automatic monitoring station and 27 passive NO₂ monitoring sites in the district in 2021.
- 10.45 Two of the NO₂ diffusion tubes were within 1km of the Site. Table 10.8 reproduces available monitoring results from these diffusion tubes sites. There were no exceedances of the annual mean NO₂ standard in 2020 or 2021.

Table 10.8: Monitoring Results

Site ID	Site Type	Approx. Distance from Site (km)	Annual Mean NO ₂ Concentration (µg/m ³)	
			2020	2021
RO2ANO	Urban Background	0.25	21.7	-
RO3ANO	Urban Background	0.35	16.0	16.4
AQS			40	

LAQM Background Data

- 10.46 In addition to local monitoring data, estimated background air quality data are available from the United Kingdom Air Information Resource (UK-AIR)^{xx} website operated by Defra. The UK-AIR website provides estimated annual average background concentrations of NO₂ and Particulate Matter (PM₁₀ and PM_{2.5}) on a 1 km² grid basis. Table 10.9 reproduces the estimated annual average background NO₂, PM₁₀ and PM_{2.5} concentrations at the Site for 2022-2024.

Future Baseline

- 10.47 No exceedances of the annual average NO₂, PM₁₀ or PM_{2.5} Air Quality Standard (AQS) are predicted for 2022-2024. Background concentrations are in general predicted to fall with time, therefore background concentrations in future years would not be expected to exceed their respective annual mean standards.

Table 10.9: Defra LAQM Estimated Background Annual Average NO₂, PM₁₀ and PM_{2.5} Concentrations at the Site (from 2018 base map)

Assessment Year	Estimated Annual Average Pollutant Concentrations Derived from the LAQM Support Website		
	Annual Average NO ₂ (µg/m ³)	Annual Average PM ₁₀ (µg/m ³)	Annual Average PM _{2.5} (µg/m ³)
2022	18.02	12.48	7.98
2023	17.18	12.38	7.90
2024	16.28	12.29	7.83
AQS	40	40	20

Note: Presented concentrations for 1km² grid centred on 389500, 409500; approximate centre of the Site is 389158, 409362.

Likely Significant Effects

Construction Phase

Dust and Particulate Matter Generated by Construction Phase Activities

- 10.48 Full details of the dust risks determined in the AQA before mitigation is considered and presented in Section 5.1 of the AQA in Appendix 10.1 and have been summarised below.
- 10.49 With reference to the IAQM criteria, the dust emission magnitudes for earthworks, construction and trackout activities are summarised in Table 10.10. There is no demolition proposed as part of the Development, hence the assessment for demolition is not included. Where information is not yet known, a conservative approach has been adopted and professional judgement has been used based on the scale of the Development and experience of working on similar schemes. Furthermore, where the criteria for each activity are from a range of magnitudes the more conservative magnitude has been selected.
- 10.50 The dust emission magnitudes from Table 10.10 have been combined with the sensitivity of the area from Table 10.11, to determine the risk of impacts of construction activities before mitigation, as summarised in Table 10.12.
- 10.51 Mitigation measures for construction activities are normally secured by planning conditions, or legal obligation within a section 106 agreement requiring a Dust Management Plan (DMP) or a Construction Environmental Management Plan (CEMP). Therefore, any adverse effects will be reduced through a DMP/CEMP, and thus the pre-mitigation impacts are not considered relevant. This chapter only reports the residual effects (after mitigation) for construction phase, which are detailed in the 'residual effect' section.

Table 10.10 Summary of Dust Emission Magnitudes (Before Mitigation)

Activity	Dust Emission Magnitude	
Demolition	N/A	N/A
Earthworks	- Total site area is >10,000m². - The soil at the Site is expected to be sand and gravel underlain by clay. Therefore, soil type is considered to be potentially dusty. - The number of heavy earthmoving vehicles active at any one time is estimated to be 5-10. - The height of stockpiled materials is estimated to be 4-8m.	Large

	- The total material to be moved is estimated to be >100,000 tonnes. - Earthworks are anticipated to take place all year round.	
Construction	- Total building volume is estimated to be >100,000m³. - It is unknown whether on-site concrete batching or sandblasting is proposed. - Construction materials are considered to be potentially dusty.	Large
Trackout	- The number of HDV outward movements in any one day is estimated to be 10-50. - Vehicles are estimated to travel on unpaved roads >100m in length. - The surface soil type is sand/gravel.	Medium-Large

Table 10.11 Sensitivity of the Area

Potential Impact		Sensitivity of the surrounding area		
		Demolition	Earthworks and Construction	Trackout
Dust soiling	Receptor Sensitivity	N/A	High	High
	Number of receptors		10-100	10-100
	Distance from source		<20m	<20m
	Overall Sensitivity of the Area		High	High
Human health	Receptor sensitivity		High	High
	Annual mean PM₁₀ concentration		<24· g/m ³	<24· g/m ³
	Number of receptors		10-100	10-100
	Distance from Source		<20m	<20m
	Overall Sensitivity of the Area		Low	Low
Ecological	Receptor sensitivity		N/A	Medium
	Distance from source		N/A	<20m
	Overall Sensitivity of the Area		N/A	Medium

Table 10.12 Summary of the Dust Risk from Construction Activities Prior to Mitigation

Potential Impact	Dust Risk Impact			
	Demolition	Earthworks	Construction	Trackout
Dust soiling	N/A	High Risk	High Risk	Medium-High Risk
Human health		Low Risk	Low Risk	Low Risk
Ecological		N/A	N/A	Low-Medium Risk

Exhaust Emissions from Construction Phase Traffic and Plant

- 10.52 The operation of vehicles and equipment powered by internal combustion engines results in the emission of exhaust gases containing pollutants including NO_x, PM₁₀, PM_{2.5}, volatile organic compounds, and carbon monoxide. The quantities emitted depend on factors such as engine type, service history, pattern of usage and fuel composition.
- 10.53 Construction traffic will comprise haulage/construction vehicles and vehicles used for workers' trips to and from the Site. The greatest impact on air quality due to emission from construction phase vehicles will be in areas adjacent to the Site access and nearby road network. It is

anticipated that construction traffic will access the Development via A664/Manchester Road and Thornham New Road. At this stage, detailed information regarding construction phase traffic flow is not available, however, according to the construction details provided, it is understood that there will be 10-50 HDV outward movements per day, which is considered unlikely to cause a significant impact on local air quality, in accordance with the IAQM guidance.

- 10.54 The operation of Site equipment and machinery and construction traffic will result in emissions to the atmosphere of exhaust gases, but with the implementation of the proposed construction phase mitigation measures (detailed in Table 10.13), the effect of exhaust emissions from construction phase traffic and plant is considered to be **Negligible**, as per LAQM.TG.22.
- Operational Phase

Increase in Pollutant Concentrations as a Result of Additional Traffic Exhaust Emissions Arising from Operational Phase

- 10.55 Based on the traffic data available, S2 '2033 without Development' and S3 '2033 with Development', have been assessed to consider the potential effects of the Development.
- 10.56 Full details of the results are presented in section 5 and Table 5.4, 5.5, 5.6, and 5.7 of the AQA in Appendix 10.1 and the findings are summarised below.
- 10.57 The AQSS for NO₂, PM₁₀ and PM_{2.5} are predicted to be met at all receptor locations considered in the assessment. In accordance with EPUK-IAQM guidance, the impacts of the Development on NO₂, PM₁₀ and PM_{2.5} concentrations, prior to mitigation, are predicted to be long term, local and of '**Negligible**' significance at all receptor locations. Overall, the effect of the Development on NO₂, PM₁₀ and PM_{2.5} concentrations, prior to mitigation, is considered to be not significant.
- 10.58 Predicted NO₂, PM₁₀ and PM_{2.5} concentrations at proposed receptors on the Site itself show that future occupants of the Development are not predicted to be exposed to air quality exceeding the UK AQSS.

Mitigation Measures

Construction Phase

- 10.59 In accordance with the IAQM guidance, a construction phase dust assessment has been undertaken to define the pre-mitigation risk of dust impacts of the activities during

construction (as presented in the AQA in Appendix 10.1), and site-specific mitigation measures have been recommended based on the risk level determined. The following mitigation measures presented in Table 10.13 will be adopted and form part of the detailed CEMP which will be secured by planning condition. There are two categories of mitigation measure – ‘highly recommended’ and ‘desirable’, which are indicated according to the dust risk level identified in Table 10.12. Desirable measures are presented in italics.

Table 10.13 Construction Phase Mitigation Measures

Construction phase Mitigation Measures	
Communications	
- Develop and implement a stakeholder communications plan that includes community engagement before work commences on-site. - Display the name and contact details of people accountable for air quality and dust issues on the Site boundary. This may be the environment manager/engineer or the Site manager. - Display the head or regional office contact information.	
Dust Management	
Develop and implement a DMP, which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk, and should include as a minimum the highly recommended measures. The desirable measures should be included as appropriate for the Site. The DMP may include monitoring of dust deposition, dust flux, real-time PM10 continuous monitoring and/or visual inspections.	
Site Management	
- Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken. - Make the complaints log available to the local authority when asked. - Record any exceptional incidents that cause dust and/or air emissions, either on- or off-site or the action taken to resolve the situation in the log book. - Hold regular liaison meetings with other high risk construction sites within 500 m of the Site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/ deliveries which might be using the same strategic road network routes.	
Monitoring	
- Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority if asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100m of the Site boundary, with cleaning to be provided if necessary. - Carry out regular site inspections to monitor compliance with any dust management plan, record inspection results, and make an inspection log available to the local authority when asked. - Increase the frequency of site inspections by the person accountable for air quality and dust issues on-site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions. - Agree dust deposition, dust flux, or real-time PM10 continuous monitoring locations with the Council (if deemed appropriate upon consultation).	
Preparing and Maintaining the Site	
- Plan site layout so that machinery and dust causing activities are located away from receptors as far as possible. - Erect solid screens or barriers around dusty activities or the Site boundary that are at least as high as any stockpiles on-site. - Fully enclose site 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 using wet methods. - Remove materials that have a potential to produce dust from the 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 Vehicles/Machinery	
- Ensure all NRMM meet the required emission standards. - Ensure all vehicles switch off engines when stationary - no idling vehicles.	

• Avoid the use of diesel or petrol-powered generators and use mains electricity or battery powered equipment where practicable. • Impose and signpost a maximum-speed-limit of 15mph on surfaced and 10mph on unsurfaced haul roads and work areas. • Produce a Construction Logistics Plan (CLP) to manage the sustainable delivery of goods and materials. • Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking and car-sharing).
Operations
• Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems. • Ensure an adequate water supply on the Site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate. • Use enclosed chutes and covered skips. • Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate. • Ensure equipment is readily available on-site to clean any dry spillages and clean up as soon as reasonably practicable after the event using wet clean methods.
Waste Management
• Avoid bonfires or burning of waste materials.
Measures Specific to Demolition
No demolition work is proposed as part of the Development.
Measures Specific to Earthworks
• Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable. • Use Hessian, mulchers or trackifiers where it is not possible to re-vegetate to cover with topsoil, as soon as practicable. • Only remove the cover in small areas during work and not all at once.
Measures Specific to Construction
• Avoid scabbling (roughening of concrete surfaces) if possible. • Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place. • Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery. • <i>For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust.</i>
Measures Specific to Trackout
• Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the Site. This may require the sweeper being continuously in use. • Avoid dry sweeping of large areas. • Ensure vehicles entering and leaving sites are covered to prevent the escape of materials during transport. • Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable. • Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned. • Record any inspections of haul routes and subsequent action in site log book. • Implement wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the Site where reasonably practicable). • Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the Site exit, wherever site size and layout permits. • Access gates to be located at least 10 m from receptors where possible.

10.60 Prior to commencement of construction activities, it is anticipated that an agreement on the scope of dust management within the detailed CEMP for the construction phase will be reached with RBC to ensure that the potential for adverse environmental effects on local receptors is minimised.

Operational Phase

- 10.61 The assessment predicts that the operational phase of the Development will have a negligible impact on local air quality. Therefore, it is not considered that any specific mitigation measures will be required for operational phase. Nevertheless, best practice mitigation measures should be considered to further reduce any residual effects on air quality. A Travel Plan has been prepared (submitted separately as part of the planning application) and a Travel Plan Co-ordinator will be appointed to oversee the implementation of the Travel Plan. Mitigation measures have been proposed in the Travel Plan to promote and deliver sustainable modes of transport. This includes increasing travel awareness by issuing a welcome pack to all residents of the Development with information on public transport, promoting active travel and car sharing.

Residual Effects

Construction Phase

- 10.62 With the implementation of the proposed construction phase mitigation measures (detailed in Table 10.13), the residual effects are considered to be temporary, local level and of **Negligible** significance.

Operational Phase

- 10.63 No significant impacts are anticipated once the Development is operational and therefore, operational phase residual effects are considered to remain long term, local level and of **Negligible** significance.

Cumulative Effects

- 10.64 Seven sites have been included within the cumulative assessment, as detailed in Chapter 2 of the ES.

Construction

- 10.65 The IAQM construction phase methodology states that beyond 350m from a site boundary, the risk of impact from activities carried out on-site during the construction phase can be considered to be negligible. The committed developments identified (as detailed in Chapter 2) are all >500m from the Site except for the development at Land South of Cowm Top Lane, Castleton (22/01190/FUL). The cumulative scheme could potentially cause concurrent fugitive

dust emissions should the construction phases overlap. However, given that negligible residual effects are anticipated for the Land at Stakehill, Rochdale scheme and the construction works for the committed development of 22/01190/FUL would similarly be expected to be undertaken in accordance with a CEMP/DMP/CMP (Construction Management Plan) that would mitigate dust effects, significant cumulative effects are not anticipated.

- 10.66 Therefore, with appropriate mitigation measures in place, the construction phase cumulative effect is considered to be **Negligible**.

Operation

- 10.67 The Cumulative schemes may cause an increase in traffic on the surrounding road network and therefore cause an increase in pollutant levels at sensitive receptors.
- 10.68 Traffic data used in the air quality assessment was provided by the appointed project transport consultant, which factors in committed development, and future year traffic growth factors have been applied for the proposed opening year traffic data used in the air quality assessment. Therefore, potential cumulative effects have been considered in the air quality assessment.
- 10.69 Based on above, the operational phase cumulative effects are considered to be **Negligible**.

Summary

- 10.70 An air quality assessment has been undertaken to consider the potential air quality impacts associated with the Development on Land at Stakehill, Rochdale.
- 10.71 An assessment of construction phase impacts has been undertaken following the IAQM guidance. The potential risk of construction phase impacts from dust soiling was predicted to be 'low' to 'high' risk, on human health was predicted to be 'negligible' to 'low' risk, and on ecological was predicted to be 'low' to 'medium' risk. Mitigation measures have been recommended to reduce the risk of dust and particulate matter being generated and re-suspended, and also to reduce emissions from vehicles and plant associated with construction related activities. With implementation of an appropriate selection of measures, such as those recommended in Annex B of the Air Quality Assessment report (Appendix 10.1), no significant impacts are anticipated during the construction phase.
- 10.72 The main potential air quality impact once the Development is complete and occupied is likely to be emissions from road traffic (i.e. changes in traffic flow volume and distribution)

associated with the Development. The key air pollutants of concern were NO₂, PM₁₀ and PM_{2.5}. Concentrations of these key pollutants were predicted at the most relevant receptor locations using ADMS-Roads dispersion model for the base year 2019, and for the proposed opening year 2033 with and without the Development in place.

10.73 The impact of the Development on NO₂, PM₁₀ and PM_{2.5} concentrations at existing sensitive human receptors, prior to mitigation, was Negligible at all locations. Therefore, it is not considered that any specific mitigation measures will be required for the operational phase. Nevertheless, transport related mitigation measures, such as implementation of a travel plan would further reduce any potential impact of the Development on local air quality. The Travel Plan has been prepared and includes mitigation measures to promote and deliver sustainable modes of transport.

10.74 Table 10.14 contains a summary of the likely significant effects of the Development.

Table 10.14: Table of Significance – Air Quality

Potential Effect	Nature of Effect (Permanent/ Temporary)	Significance (Major/Moderate /Minor) (Beneficial/Adverse/ Negligible)	Mitigation / Enhancement Measures	Geographical Importance*							Residual Effects (Major/Moderate/ Minor) (Beneficial/Adverse /Negligible)
				I	UK	E	R	C	B	L	
Construction											
Construction phase impacts of the Development on local air may potentially arise due to the generation and re-suspension of dust and particulate matter during the construction phase.	Temporary	N/A	As detailed in Table 10.13. These measures will be incorporated into a detailed CEMP (secured by planning condition).							X	Negligible
Increase in pollutant concentrations as a result of exhaust emissions arising from construction phase traffic and plant	Temporary	N/A	No specific mitigation measures will be required.							X	Negligible
Completed Development											
Increase in pollutant concentrations as a result of additional traffic exhaust emissions arising from operational phase	Permanent	Negligible	No specific mitigation measures will be required. A Travel Plan has been prepared and includes mitigation measures to promote and deliver sustainable modes of transport.							X	Negligible
Cumulative Effects - Construction											

Construction phase impacts of the Development on local air may potentially arise due to the generation and re-suspension of dust and particulate matter during the construction phase.	Temporary	Negligible	Committed developments assumed to implement a CEMP with measures included in Table 10.13.							X	Negligible
Cumulative Effects – Operation											
Increase in pollutant concentrations as a result of additional traffic exhaust emissions arising from operational phase	Permanent	Negligible	A Travel Plan has been prepared and mitigation measures have been proposed in the Travel Plan to promote and deliver sustainable modes of transport.							X	Negligible

*** Geographical Level of Importance**

I = International; UK = United Kingdom; E = England; R = Regional; C = County; B = Borough; L = Local

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