AIR QUALITY ASSESSMENT
SHARSTON RECYCLING CENTRE, SHARSTON ROAD

REC REFERENCE: AQ105976 R1

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EXECUTIVE SUMMARY

Resource and Environmental Consultants Ltd (REC) was commissioned by PP O'Connor Limited to undertake an Air Quality Assessment in support of the proposed development at Sharston Recycling Centre, off Sharston Road, Manchester.

The proposals comprise the development of the site to provide for the creation of a new access point off Sharston Road to existing waste transfer station together with installation of waste processing equipment, site cabins, weigh bridges and storage bins.

The site is located within an area identified by Manchester City Council as experiencing elevated pollutant concentrations and subsequently there is the potential for the proposals to cause impacts to existing sensitive receptors due to additional vehicle movements during the operational phase and fugitive dust impacts during the construction phase of the development. As such, an Air Quality Assessment was required to assess potential impacts as a result of the development.

A separate report has been produced to assess the potential impact from fugitive dust emissions during the operational phase.

Potential construction phase air quality impacts from fugitive dust emissions were assessed as a result of demolition, earthworks, construction and trackout activities. It is considered that the use of good practice control measures would provide suitable mitigation for a development of this size and nature and reduce potential impacts to an acceptable level.

Dispersion modelling was undertaken in order to predict air quality impacts as a result of road vehicle exhaust emissions associated with traffic generated by the development. Results were subsequently verified using monitoring results obtained from Manchester City Council.

The impacts at all other representative receptors potentially affected by the proposals was predicted to be negligible or slight, although it is recommended that there should be a consideration of best practice measures to minimise the potential impacts.

Therefore the overall significance of the potential impacts was determined to be **not significant**. Based on the assessment results, air quality is not considered a constraint to planning consent for the proposed development.

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1. INTRODUCTION

1.1 Background

Resource and Environmental Consultants Ltd (REC) was commissioned by PP O'Connor Limited to undertake an Air Quality Assessment in support of the proposed development at Sharston Recycling Centre, Off Sharston Road, Manchester.

The proposals comprise the development of the site to provide for the creation of a new access point off Sharston Road to existing waste transfer station together with installation of waste processing equipment, site cabins, weigh bridges and storage bins.

1.2 Site Location and Context

The site is located at Sharston Road at approximate National Grid Reference (NGR): 383250, 389140. Reference should be made to Figure 1 within Appendix I for a location plan.

The development site is located within the Greater Manchester Air Quality Management Area (AQMA) which has been declared for exceedances of the annual mean Air Quality Objective (AQO) for nitrogen dioxide (NO_2). As such, there is the potential for the proposals to cause impacts to existing sensitive receptors within the AQMA due to additional vehicle movements during the operational phase and fugitive dust impacts during the construction phase of the development. As such, an Air Quality Assessment was required to assess potential impacts as a result of the development. This is detailed in the following report.

A separate report has been produced to assess the potential impact from fugitive dust emissions during the operational phase.

1.3 Limitations

This report has been produced in accordance with REC's standard terms of engagement. REC has prepared this report solely for the use of the Client and those parties with whom a warranty agreement has been executed, or with whom an assignment has been agreed. Should any third party wish to use or rely upon the contents of the report, written approval must be sought from REC; a charge may be levied against such approval.

2. LEGISLATION AND POLICY

2.1 European Legislation

European Union (EU) air quality legislation is provided within Directive 2008/50/EC, which came into force on 11th June 2008. This Directive consolidated previous legislation which was designed to deal with specific pollutants in a consistent manner and provided new air quality objectives for particulate matter with an aerodynamic diameter of less than 2.5µm ($PM_{2.5}$). The consolidated Directives include:

- Directive 99/30/EC - the First Air Quality "Daughter" Directive - sets ambient Air Quality Limit Values (AQLVs) NO_2, oxides of nitrogen (NO_x), sulphur dioxide, lead and particulate matter with an aerodynamic diameter of less than 10µm (PM_{10});
- Directive 2000/69/EC - the Second Air Quality "Daughter" Directive - sets ambient AQLVs for benzene and carbon monoxide; and
- Directive 2002/3/EC - the Third Air Quality "Daughter" Directive - seeks to establish long-term objectives, target values, an alert threshold and an information threshold for concentrations of ozone in ambient air.

The fourth daughter Directive was not included within the consolidation and is described as:

- Directive 2004/107/EC - sets health-based limits on polycyclic aromatic hydrocarbons, cadmium, arsenic, nickel and mercury, for which there is a requirement to reduce exposure to as low as reasonably achievable.

2.2 UK Legislation

The Air Quality Standards (Amendment) Regulations (2016) came into force on 31st December 2016. These Regulations amend the Air Quality Standards Regulations 2010 and transpose the EU Directive 2008/50/EC into UK law. AQLVs were published in these regulations for 7 pollutants, as well as Target Values for an additional 6 pollutants.

Part IV of the Environment Act (1995) requires UK government to produce a national Air Quality Strategy (AQS) which contains standards, objectives and measures for improving ambient air quality. The most recent AQS was produced by the Department for Environment, Food and Rural Affairs (DEFRA) and published in July 2007[1]. The AQS sets out AQOs that are maximum ambient pollutant concentrations that are not to be exceeded either without exception or with a permitted number of exceedances over a specified timescale. These are generally in line with the AQLVs, although the requirements for compliance vary slightly.

Table 1 presents the AQOs for pollutants considered within this assessment.

[1] The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, DEFRA, 2007.

Table 1 Air Quality Objectives

Pollutant	Air Quality Objective	
	Concentration (µg/m^3)	Averaging Period
NO_2	40	Annual mean
	200	1-hour mean; not to be exceeded more than 18 times a year
PM_{10}	40	Annual mean
	50	24-hour mean; not to be exceeded more than 35 times a year

Table 2 summarises the advice provided in DEFRA guidance LAQM (TG16)[2] on where the AQOs for pollutants considered within this report apply.

Table 2 Examples of Where the Air Quality Objectives Apply

Averaging Period	Objectives Should Apply At	Objectives Should Not Apply At
Annual mean	All locations where members of the public might be regularly exposed Building façades of residential properties, schools, hospitals, care homes etc.	Building façades of offices or other places of work where members of the public do not have regular access Hotels, unless people live there as their permanent residence Gardens of residential properties Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term
24-hour mean	All locations where the annual mean objective would apply, together with hotels. Gardens of residential properties	Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term
1-hour mean	All locations where the annual mean and 24-hour mean objectives apply. Kerbside sites (for example, pavements of busy shopping streets) Those parts of car parks, bus stations and railway stations etc. which are not fully enclosed, where members of the public might reasonably be expected to spend one hour or more Any outdoor locations where members of the public might reasonably be expected to spend one hour or longer	Kerbside sites where the public would not be expected to have regular access

[2] Local Air Quality Management Technical Guidance 2016 LAQM (TG16), DEFRA, 2016.

2.3 Local Air Quality Management

Under Section 82 of the Environment Act (1995) (Part IV) Local Authorities (LAs) are required to periodically review and assess air quality within their area of jurisdiction under the system of Local Air Quality Management (LAQM). This review and assessment of air quality involves considering present and likely future air quality against the AQOs. If it is predicted that levels at sensitive locations where members of the public are regularly present for the relevant averaging period are likely to be exceeded, the LA is required to declare an AQMA. For each AQMA the LA is required to produce an Air Quality Action Plan (AQAP), the objective of which is to reduce pollutant concentrations in pursuit of the AQOs.

2.4 Dust

The main requirements with respect to dust control from industrial or trade premises not regulated under the Environmental Permitting (England and Wales) Regulations (2016) and subsequent amendments, such as construction sites, is that provided in Section 79 of Part III of the Environmental Protection Act (1990). The Act defines nuisance as:

> *"Any dust, steam, smell or other effluvia arising on industrial, trade or business premises and being prejudicial to health or a nuisance."*

Enforcement of the Act, in regard to nuisance, is currently under the administration of the local Environmental Health Department, whose officers are deemed to provide an independent evaluation of nuisance. If the LA is satisfied that a statutory nuisance exists, or is likely to occur or happen again, it must serve an Abatement Notice under Part III of the Environmental Protection Act (1990). Enforcement can insist that there be no dust beyond the boundary of the works. The only defence is to show that the process to which the nuisance has been attributed and its operation are being controlled according to best practice measures.

2.5 National Planning Policy

2.5.1 National Planning Policy Framework

The National Planning Policy Framework[3] (NPPF) was published on 24th July 2018 and sets out the Government's core policies and principles with respect to land use planning, including air quality. The document includes the following considerations which are relevant to this assessment:

> *"Planning policies and decisions should contribute to and enhance the natural and local environment by:*
>
> *[…]*
>
> *Preventing both new and existing 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. Development should, wherever possible, help to improve local environmental conditions such as air and water quality*
>
> *"Planning policies and decisions should sustain and contribute towards compliance with relevant*

[3] National Planning Policy Framework, Department for Communities and Local Government, 2018.

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."

The implications of the NPPF have been considered throughout this assessment.

2.5.2 National Planning Practice Guidance

The National Planning Practice Guidance[4] (NPPG) web-based resource was launched by the Department for Communities and Local Government on 6th March 2014 to support the NPPF and make it more accessible. The air quality pages are summarised under the following headings:

Paragraph 001 states that: "*Defra carries out an annual national assessment of air quality using modelling and monitoring to determine compliance with EU Limit Values" and "It is important that the potential impact of new development on air quality is taken into account, where the national assessment indicates that relevant limits have been exceeded or are near the limit". The role of Local Authorities under LAQM are stated and that Air Quality Action Plans should "identify measures that will be introduced in pursuit of the objectives".*

Paragraph 005 states that "*Whether or not air quality is relevant to a planning decision will depend on the proposed development and its location. Concerns could arise if the development is likely to generate air quality impact in an area where air quality is known to be poor. They could also arise where the development is likely to adversely impact upon the implementation of air quality strategies and action plans and/or, in particular, lead to a breach of EU legislation.*

Paragraph 007 states that *"Assessments should be proportional to the nature and scale of development proposed and the level of concern about air quality". In terms of mitigation, it states that "Mitigation options where necessary will be location specific, will depend on the proposed development and should be proportionate to the likely impact".*

Paragraph 009 shows a flow chart highlighting how the assessment of air quality impacts should fit into the development management process. It makes it clear that air quality impact risks, AQLVs and AQOs should be considered in the decision-making process.

These were reviewed and the relevant guidance considered as necessary throughout the undertaking of this assessment.

2.6 Local Planning Policy

The Manchester Local Development Framework (LDF) Core Strategy was formally adopted in 2012 and provides a framework for development within the city. The LDF comprises a number of documents which set out Manchester City Councils (MCC) spatial policy framework for delivering a number of

[4] http://planningguidance.planningportal.gov.uk/.

policies contained within the Core Strategy which have been saved in accordance with the Planning and Compulsory Purchase Act (2004) and therefore provide the basis for the determination of planning applications prior to the finalisation of the local development framework.

A review of the Core Strategy indicated the following policies in relation to air quality that are relevant to this Assessment:

> **"Policy EN 16 - Air Quality**
>
> *The Council will seek to improve the air quality within Manchester, and particularly within Air Quality Management Areas, located along Manchester's principal traffic routes and at Manchester Airport. Developers will be expected to take measures to minimise and mitigate the local impact of emissions from traffic generated by the development, as well as emissions created by the use of the development itself, including from Combined Heat and Power and biomass plant.*
>
> *When assessing the appropriateness of locations for new development the Council will consider the impacts on air quality, alongside other plan objectives. This includes cumulative impacts, particularly in Air Quality Management Areas."*
>
> **"Policy DM 1 - Development Management**
>
> *All development should have regard to the following specific issues for which more detailed guidance may be given within a supplementary planning document:*
>
> *Effects on amenity, including privacy, light, noise, vibration, air quality, odours, litter, vermin, birds, road safety and traffic generation. This could also include proposals which would be sensitive to existing environmental conditions, such as noise. "*

Reference has been made to these policies during the undertaking of this Air Quality Assessment by assessing pollutant concentrations across the proposed site.

2.7 Greater Manchester Air Quality Action Plan

The Greater Manchester Air Quality Action Plan (AQAP) has involved a review of the strategies, policies and plans which tackle or are in some way related to air quality, to develop a clear, robust and meaningful set of actions which will deliver real changes in terms of air quality, whilst supporting the sustainable economic growth of the region.

The primary objectives of the AQAP are to improve air quality across Greater Manchester and to embed low-emission behaviours into the culture of our organisations and lifestyles by 2025, whilst supporting the UK Government in meeting all EU thresholds for key air pollutants. The Plan identifies 'Key Priority Areas' which are generally locations near to major roads and heavily trafficked areas in Manchester city centre, and other major urban centres across the other nine districts.

The AQAP comprises a single document including actions that will be ratified by Transport for Greater Manchester (TfGM) and district authorities to tackle air quality in Key Priority Areas, whilst supporting the sustainable economic growth of the region. This plan will allow councils to carry out their statutory

duties under Part IV of the Environment Act 1995, as its implementation will help mandatory EU limit values to be met. Consideration to the action plan has been made throughout the preparation assessment.

3. METHODOLOGY

The proposed development has the potential to cause air quality impacts during the construction and operational phases. These issues have been assessed in accordance with the following methodology.

3.1 Construction Phase

There is the potential for fugitive dust emissions to occur as a result of construction phase activities. These have been assessed in accordance with the methodology outlined within the Institute of Air Quality Management (IAQM) document 'Guidance on the Assessment of Dust from Demolition and Construction'[5].

Activities on the proposed construction site have been divided into four types to reflect their different potential impacts. These are:

- Demolition
- Earthworks;
- Construction; and
- Trackout.

The potential for dust emissions was assessed for each activity that is likely to take place and considered three separate dust effects:

- Annoyance due to dust soiling;
- Harm to ecological receptors; and
- The risk of health effects due to a significant increase in exposure to PM_{10}.

The assessment steps are detailed below.

3.1.1 Step 1

Step 1 screens the requirement for a more detailed assessment. Should human receptors be identified within 350m from the site boundary or 50m from the construction vehicle route up to 500m from the site entrance, then the assessment should proceed to Step 2. Additionally, should ecological receptors be identified within 50m of the boundary site or 50m from the construction vehicle route up to 500m from the site entrance, then the assessment should also proceed to Step 2.

Should sensitive receptors not be present within the relevant distances then negligible impacts would be expected and further assessment is not necessary.

3.1.2 Step 2

Step 2 assesses the risk of potential dust impacts. A site is allocated to a risk category based on two factors:

- The scale and nature of the works, which determines the magnitude of dust arising as: small, medium or large (Step 2A); and
- The sensitivity of the area to dust impacts, which can defined as low, medium or high sensitivity

[5] Guidance on the Assessment of Dust from Demolition and Construction, Institute of Air Quality Management, 2014.

(Step 2B).

The two factors are combined in Step 2C to determine the risk of dust impacts without mitigation applied.
Step 2A defines the potential magnitude of dust emission through the construction phase. The relevant criteria are summarised in Table 3.

Table 3 Construction Dust - Magnitude of Emission

Magnitude	Activity	Criteria
Large	Demolition	• Total building volume greater than 50,000m^3 • Potentially dusty construction material (e.g. concrete) • On-site crushing and screening • Demolition activities greater than 20m above ground level
	Earthworks	• Total site area greater than 10,000m^2 • Potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size) • More than 10 heavy earth moving vehicles active at any one time • Formation of bunds greater than 8m in height • More than 100,000 tonnes of material moved
	Construction	• Total building volume greater than 100,000m^3 • On site concrete batching • Sandblasting
	Trackout	• More than 50 Heavy Duty Vehicle (HDV) trips per day • Potentially dusty surface material (e.g. high clay content) • Unpaved road length greater than 100m
Medium	Demolition	• Total building volume 20,000m^3 to 50,000m^3 • Potentially dusty construction material • Demolition activities 10m to 20m above ground level
	Earthworks	• Total site area 2,500m^2 to 10,000m^2 • Moderately dusty soil type (e.g. silt) • 5 to 10 heavy earth moving vehicles active at any one time • Formation of bunds 4m to 8m in height • Total material moved 20,000 tonnes to 100,000 tonnes
	Construction	• Total building volume 25,000m^3 to 100,000m^3 • Potentially dusty construction material (e.g. concrete) • On site concrete batching
	Trackout	• 10 to 50 HDV trips per day • Moderately dusty surface material (e.g. high clay content) • Unpaved road length 50m to 100m

Magnitude	Activity	Criteria
Small	Demolition	• Total building volume under 20,000m^3 • Construction material with low potential for dust release (e.g. metal cladding or timber) • Demolition activities less than 10m above ground level • Demolition during wetter months
	Earthworks	• Total site area less than 2,500m^2 • Soil type with large grain size (e.g. sand) • Less than 5 heavy earth moving vehicles active at any one time • Formation of bunds less than 4m in height • Total material moved less than 20,000 tonnes • Earthworks during wetter months
	Construction	• Total building volume less than 25,000m^3 • Construction material with low potential for dust release (e.g. metal cladding or timber)
	Trackout	• Less than 10 HDV trips per day • Surface material with low potential for dust release • Unpaved road length less than 50m

Step 2B defines the sensitivity of the area around the development site for demolition, construction, earthworks and trackout. The factors influencing the sensitivity of the area are shown in Table 4.

Table 4 Examples of Factors Defining Sensitivity of an Area

Sensitivity	Examples	
	Human Receptors	Ecological Receptors
High	• Users expect of high levels of amenity • High aesthetic or value property • People expected to be present continuously for extended periods of time • Locations where members of the public are exposed over a time period relevant to the AQO for PM_{10} e.g. residential properties, hospitals, schools and residential care homes	• Internationally or nationally designated site e.g. Special Area of Conservation

Sensitivity	Examples	
	Human Receptors	Ecological Receptors
Medium	• Users would expect to enjoy a reasonable level of amenity • Aesthetics or value of their property could be diminished by soiling • 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 e.g. parks and places of work	• Nationally designated site e.g. Sites of Special Scientific Interest
Low	• Enjoyment of amenity would not reasonably be expected • Property would not be expected to be diminished in appearance • Transient exposure, where people would only be expected to be present for limited periods. e.g. public footpaths, playing fields, shopping streets, playing fields, farmland, footpaths, short term car park and roads	• Locally designated site e.g. Local Nature Reserve

The guidance also provides the following factors to consider when determining the sensitivity of an area to potential dust impacts during the construction phase:

- Any history of dust generating activities in the area;
- The likelihood of concurrent dust generating activity on nearby sites;
- Any pre-existing screening between the source and the receptors;
- Any conclusions drawn from analysing local meteorological data which accurately represent the area; and if relevant the season during which works will take place;
- Any conclusions drawn from local topography;
- Duration of the potential impact, as a receptor may become more sensitive over time; and
- Any known specific receptor sensitivities which go beyond the classifications given in the document.

These factors were considered in the undertaking of this assessment.

The sensitivity of the area to dust soiling effects on people and property is shown in Table 5.

Table 5 Sensitivity of the Area to Dust Soiling Effects on People and Property

Receptor Sensitivity	Number of Receptors	Distance from the Source (m)			
		Less than 20	Less than 50	Less than 100	Less than 350
High	More than 100	High	High	Medium	Low
	10 - 100	High	Medium	Low	Low
	1 - 10	Medium	Low	Low	Low

Receptor Sensitivity	Number of Receptors	Distance from the Source (m)			
		Less than 20	Less than 50	Less than 100	Less than 350
Medium	More than 1	Medium	Low	Low	Low
Low	More than 1	Low	Low	Low	Low

Table 6 outlines the sensitivity of the area to human health impacts.

Table 6 Sensitivity of the Area to Human Health Impacts

Receptor Sensitivity	Annual Mean PM_{10} Concentration	Number of Receptors	Distance from the Source (m)				
			Less than 20	Less than 50	Less than 100	Less than 200	Less than 350
High	Greater than 32µg/m^3	More than 100	High	High	High	Medium	Low
		10 - 100	High	High	Medium	Low	Low
		1 - 10	High	Medium	Low	Low	Low
	28 - 32µg/m^3	More than 100	High	High	Medium	Low	Low
		10 - 100	High	Medium	Low	Low	Low
		1 - 10	High	Medium	Low	Low	Low
	24 - 28µg/m^3	More than 100	High	Medium	Low	Low	Low
		10 - 100	High	Medium	Low	Low	Low
		1 - 10	Medium	Low	Low	Low	Low
	Less than 24µg/m^3	More than 100	Medium	Low	Low	Low	Low
		10 - 100	Low	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low	Low
Medium	Greater than 32µg/m^3	More than 10	High	Medium	Low	Low	Low
		1 - 10	Medium	Low	Low	Low	Low
	28 - 32µg/m^3	More than 10	Medium	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low	Low
	24 - 28µg/m^3	More than 10	Low	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low	Low
	Less than 24µg/m^3	More than 10	Low	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low	Low

Receptor Sensitivity	Annual Mean PM_{10} Concentration	Number of Receptors	Distance from the Source (m)				
			Less than 20	Less than 50	Less than 100	Less than 200	Less than 350
Low	-	More than 1	Low	Low	Low	Low	Low

Table 7 outlines the sensitivity of the area to ecological impacts.

Table 7 Sensitivity of the Area to Ecological Impacts

Receptor Sensitivity	Distance from the Source (m)	
	Less than 20	Less than 50
High	High	Medium
Medium	Medium	Low
Low	Low	Low

Step 2C combines the dust emission magnitude with the sensitivity of the area to determine the risk of unmitigated impacts.

Table 8 outlines the risk category from demolition activities.

Table 8 Dust Risk Category from Demolition

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High	Medium	Medium
Medium	High	Medium	Low
Low	Medium	Low	Negligible

Table 9 outlines the risk category from earthworks and construction activities.

Table 9 Dust Risk Category from Earthworks and Construction

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High	Medium	Low
Medium	Medium	Medium	Low
Low	Low	Low	Negligible

Table 10 outlines the risk category from trackout.

Table 10 Dust Risk Category from Trackout

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High	Medium	Low
Medium	Medium	Low	Negligible
Low	Low	Low	Negligible

3.1.3 Step 3

Step 3 requires the identification of site specific mitigation measures within the IAQM guidance to reduce potential dust impacts based upon the relevant risk categories identified in Step 2. For sites with **negligible** risk, mitigation measures beyond those required by legislation are not required. However, additional controls may be applied as part of good practice.

3.1.4 Step 4

Once the risk of dust impacts has been determined and the appropriate mitigation measures identified, the final step is to determine the significance of any residual impacts. For almost all construction activity, the aim should be to control effects through the use of effective mitigation. Experience shows that this is normally possible. Hence the residual effect will normally be 'not significant'.

The determination of significance relies on professional judgement and reasoning should be provided as far as practicable. This has been considered throughout the assessment when defining predicted impacts. . The IAQM[5] guidance suggests the provision of details of the assessor's qualifications and experience. These are provided in Appendix III.

3.2 Operational Phase Assessment

The development has the potential to impact on existing air quality as a result of road traffic exhaust emissions, such as NO_2, PM_{10}, and $PM_{2.5}$ associated with vehicles travelling to and from the site.

Potential impacts as a result of additional road vehicle traffic generated by the site have been defined by predicting pollutant concentrations at sensitive locations using dispersion modelling for the following scenarios:

- 2017 Verification and do-minimum (DM); and
- Do-something (DS) (predicted traffic flows in 2017 should the proposals be completed, with the addition of traffic generated by the proposed development).

It should be noted that air quality is predicted to improve in the future. However, in order to provide realistic approach for the assessment, emission factors for 2017 were utilised within the dispersion model rather than future year emissions. The use of 2017 traffic data and emission factors is considered to provide a factual as well as worst-case scenario and therefore a sufficient level of confidence can be placed within the predicted pollution concentrations.

Reference should be made to Appendix II for assessment input data and details of the verification process.

Receptors potentially sensitive to changes in NO_2 and PM_{10} concentrations were identified within 200m of the affected highway network in accordance with the guidance provided within the Design Manual for Roads and Bridges (DMRB)[6] on the likely limits of pollutant dispersion from road sources. LAQM (TG16)[2] provides the following examples of where annual mean AQOs should apply:

- Residential properties;
- Schools;
- Hospitals; and
- Care homes.

The sensitivity impact at each receptor was defined in accordance with the criteria shown in Table 11. These are based upon the guidance provided within the Environmental Protection UK (EPUK) and Institute of Air Quality Management (IAQM) guidance 'Land-Use Planning and Development Control: Planning for Air Quality'[7].

Table 11 Operational Traffic Exhaust Emissions - Significance of Impact

Long Term Average Concentration	% Change in Concentration Relative to AQO			
	1	2-5	6-10	>10
75% or less of AQO	Negligible	Negligible	Slight	Moderate
76 - 94% of AQO	Negligible	Slight	Moderate	Moderate
95 - 102% of AQO	Slight	Moderate	Moderate	Substantial
103 - 109% of AQO	Moderate	Moderate	Substantial	Substantial
110% or more of AQO	Moderate	Substantial	Substantial	Substantial

The criteria shown in Table 11 is adapted from the EPUK and IAQM guidance 'Land-Use Planning and Development Control: Planning for Air Quality'[7] with sensitivity descriptors included to allow comparisons of various air quality impacts. It should be noted that changes of 0%, i.e. less than 0.5%, will be described as negligible in accordance with the EPUK and IAQM guidance.

Following the prediction of impacts at discrete receptor locations utilising the criteria in Table 11, the EPUK and IAQM[7] document states that this framework is to be used as a starting point to make a

6 Design Manual for Roads and Bridges Volume 11, Section 3, Part 1, HA207/07, Highways Agency, 2007.
7 Land-Use Planning and Development Control: Planning for Air Quality, Environmental Protection UK and Institute of Air Quality Management, 2015.

judgement on significance of effect but other influences might need to be accounted for. Whilst impacts might be determined as 'slight', 'moderate' or 'substantial' at individual receptors, overall effect might not necessarily be deemed as significant in some circumstances. The following factors may provide some assistance in determining the overall significance of a development:

- Number of properties affected by significant air quality impacts and a judgement on the overall balance;
- Where new exposure is introduced into an existing area of poor air quality, then the number of people exposed to levels above the objective will be relevant;
- The percentage change in concentration relative to the objective and the descriptions of the impacts at the receptors;
- Whether or not an exceedance of an objective is predicted to arise or be removed in the study area due to a substantial increase or decrease; and
- The extent to which an objective is exceeded e.g. an annual mean NO_2 concentration of 41µg/m^3 should attract less significance than an annual mean of 51µg/m^3.

These factors were considered and an overall significance determined for the impact of operational phase road traffic emissions. It should be noted that the determination of significance relies on professional judgement and reasoning should be provided as far as practicable. This has been considered throughout the assessment when defining predicted impacts.

4. BASELINE

Existing air quality conditions in the vicinity of the proposed development site were identified in order to provide a baseline for assessment. These are detailed in the following sections.

4.1 Local Air Quality Management

MCC has undertaken Review and Assessment of air quality within their area of administration. This process has indicated that annual mean concentrations of NO_2 are above the AQOs within the city. As such one AQMA has been declared which is described as:

> "An area covering the 10 districts of Greater Manchester, including arterial routes, district centres and airport."

The site is located within the Greater Manchester Combined Authority (GMCA) AQMA. As such, there is the potential for the proposals to cause impacts to existing sensitive receptors within the AQMA. MCC has concluded that concentrations of all other pollutants considered within the AQS are currently below the relevant AQOs and as such no further AQMAs have been designated.

4.2 Air Quality Monitoring

Monitoring of pollutant concentrations is undertaken by MCC using continuous and periodic methods throughout their area of administration. A review of MCC's most recent air quality data available[8] indicated that there are currently three automatic analysers operated by MCC. Due to the distance between the sites, similar pollutant concentrations would not be anticipated and this source of data has not been considered further within this report.

The closest automatic monitoring station is the A34 Stockport Cheadle (Urban Traffic) site. Data from the location is available from the Air Quality England (AQE) website[9]. The monitoring station is located approximately 2km south-west of the site. Recent monitoring results from this location are shown in Table 12. Exceedances of the AQO are shown in **bold**.

Table 12 Automatic Monitoring Results

Site ID	Type	NGR		Annual Mean NO_2 Concentration ($\mu g/m^3$)		
		X	Y	2015	2016	2017
A34 Stockport Cheadle	Roadside	385047	388339	-	-	**42.71**

As indicated in Table 12, annual mean NO_2 exceeded the relevant AQO at the A34 Stockport Cheadle during 2017. This is due to its roadside location within an AQMA. Reference should be made to Figure 2 within Appendix I for a graphical representation of the monitoring location.

[8] http://www.manchester.gov.uk/download/downloads/id/25051/nitrogen_dioxide_diffusion_tube_results_2010-16_updated_July_2017.pdf
[9] http://www.airqualityengland.co.uk/site/data?site_id=STK7

MCC also utilise passive diffusion tubes to monitor annual mean NO_2 concentrations throughout their area of administration. A review of the most recent LAQM Report[10] available indicated that there is one diffusion tubes located in the vicinity of the site. Recent monitoring results were provided by MCC Environment Health Department via email. This location is shown in Table 13. Exceedances of the AQO are shown in **bold**.

Table 13 Diffusion Tube Monitoring Results

Location	Type	NGR		Annual Mean NO_2 Concentration ($\mu g/m^3$)		
		X	Y	2015	2016	2017
56 Kingsway	Urban Traffic	385028	388278	**50.4**	**54.5**	**42.85**

As indicated in Table 13, annual mean NO_2 exceeded the relevant AQO at the 56 Kingsway during recent years due to its roadside location within an AQMA. Reference should be made to Figure 2 within Appendix I for a graphical representation of the monitoring locations.

4.3 Background Pollutant Concentrations

Predictions of background pollutant concentrations on a 1km by 1km grid basis have been produced by DEFRA for the entire of the UK to assist LAs in their Review and Assessment of air quality. The proposed development site is located in grid square NGR: 383500, 389500. Data for this location was downloaded from the DEFRA website[11] for the purpose of this assessment and is summarised in Table 14; for the base year and development opening year (2017).

Table 14 Predicted Background Pollutant Concentrations

Pollutant	Predicted Background Concentration ($\mu g/m^3$)
	2017
NO_x	33.89
NO_2	23.19
PM_{10}	13.47
$PM_{2.5}$	8.66

As shown in Table 14, background concentrations of NO_2 does not exceed the relevant AQOs. Comparison with the monitoring results, presented in Table 13, indicates the impact that vehicle exhaust emissions from the highway network have on pollutant concentrations at roadside locations.

[10] Annual Status Report – Manchester City Council 2016.
[11] http://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html.

4.4 Sensitive Receptors

A sensitive receptor is defined as any location which may be affected by changes in air quality as a result of a development. These have been defined for dust and road vehicle exhaust emission impacts in the following Sections.

4.4.1 Construction Phase Sensitive Receptors

A sensitive receptor is defined as any location which may be affected by changes in air quality as a result of a development. These have been defined for dust and road vehicle exhaust emission impacts in the following Sections.

Receptors sensitive to potential dust impacts during construction were identified from a desk-top study of the area up to 350m from the development boundary. These are summarised in Table 15 below.

Table 15 Construction Dust Sensitive Receptors

Distance from Site Boundary (m)	Approximate Number of Human Receptors	Approximate Number of Ecological Receptors
Less than 20	1 -10	0
20 - 50	10- 100	0
50 - 100	More than 100	-
100 - 350	More than 100	-

Reference should be made to Figure 3 within Appendix I for a graphical representation of construction dust buffer zones.

Receptors sensitive to potential dust impacts from trackout were identified from a desk-top study of the area up to 50m from the road network within 500m of the site access route. These are summarised in Table 16. The exact construction vehicle access routes were not available for the purpose of this assessment as they will depend on sourcing of materials. This is likely to be decided by the contractor. However, it was assumed construction traffic would access the site from east from Sharston Road and west from Longley Lane to ensure the maximum potential trackout distance was considered.

Table 16 Trackout Dust Sensitive Receptors

Distance from Site Access Route (m)	Approximate Number of Human Receptors	Approximate Number of Ecological Receptors
Less than 20	More than 100	0
20 - 50	More than 100	0

Reference should be made to Figure 4 within Appendix I for a graphical representation of trackout dust buffer zones.

There are no ecological receptors within 50m of the site or trackout boundary. As such, ecological impacts have not been assessed further within this report.

A number of additional factors have been considered when determining the sensitivity of the surrounding area. These are summarised in Table 17.

Table 17 Additional Area Sensitivity Factors

Guidance	Comment
Whether there is any history of dust generating activities in the area	The proposals are located in a predominantly industrial location. As such, historical dust generation is limited, but would arise from road vehicle emissions
The likelihood of concurrent dust generating activity on nearby sites	A review of the MCC planning portal[12] indicated that there are currently no major development schemes within 500m of the site. As such, there is limited potential for concurrent dust generation
Pre-existing screening between the source and the receptors	There is currently no vegetation present on site. Therefore, natural protective screening as a result of vegetation is limited to receptors in all directions
Conclusions drawn from analysing local meteorological data which accurately represent the area: and if relevant the season during which works will take place	The wind direction is predominantly from the south-west of the development, as shown in Figure 5 within Appendix I. As such, properties to the north-east would be most affected by dust emissions
Conclusions drawn from local topography	The topography of the area appears to be predominantly flat. As such, there are no constraints to dust dispersion
Duration of the potential impact, as a receptor may become more sensitive over time	The construction period is unlikely to extend over a year
Any known specific receptor sensitivities which go beyond the classifications given in the document.	No specific receptor sensitivities identified during the baseline

Based on the criteria shown in Table 4, the sensitivity of the receiving environment to potential dust impacts was considered to be **high**. This was because users would expect to enjoy a reasonable level of amenity, aesthetics or value of their property could be diminished by soiling and people would be expected to be present for extended periods of time e.g. residential properties.

The sensitivity of the receiving environment to specific potential dust impacts, based on the criteria shown in Section 2.6, is shown in Table 18.

[12] https://pa.manchester.gov.uk/online-applications/

Table 18 Sensitivity of the Surrounding Area

Potential Impact	Sensitivity of the Surrounding Area			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	Medium	Medium	Medium	High
Human Health	Low	Low	Low	Medium

4.4.2 Operational Phase Sensitive Receptors

Receptors sensitive to potential operational phase road vehicle exhaust emission impacts were identified from a desk-top study and are summarised in Table 19. All sensitive receptors were modelled at a height of 1.5m to 4.5 represent ground floor level and first floor level.

Table 19 Road Vehicle Exhaust Emission Sensitive Receptors

Receptor		NGR (m)		Height (m)
		X	Y	
R1	131 Longley Close	383299.4	389430.5	1.5
R2	149 Longley Close	383350.5	389387.6	1.5
R3	2 Brownington Close	383444.1	389317.1	1.5
R4	2 Marfold Close	382840.9	388866.0	1.5
R5	4 Kendal Court	383079.6	388622.7	1.5
R6	198 Altrincham Road	383226.6	388538.4	1.5
R7	The Hospital Group	383368.1	388497.4	1.5
R8	1 Larkhali Close	383437.2	388478.5	1.5
R9	275 Longley Lane	383829.3	388654.1	1.5
R10	35 Windsor Avenue	384174.4	388568.8	1.5
R11	28 Northenden Road	384321.9	388548.1	1.5
R12	7 Northenden Road	384424.2	388460.5	4.5
R13	94 Northenden Road	384685.9	388408.4	1.5
R14	167 Northenden Road	384584.6	388424.6	1.5
R15	1 The Mews	384767.5	388340.3	1.5
R16	131 Gatley Road	384982.7	388344.9	1.5
R17	202 Kingsway	385010.8	388342.2	1.5
R18	206 Kingsway	385020.4	388289.1	1.5

Receptor		NGR (m)		Height (m)
		X	Y	
R19	210 Kingsway	385025.0	388267.5	1.5
R20	201 Gatley Road	385056.2	388322.0	1.5
R21	218 Kingsway	385037.8	388205.7	1.5
R22	213 Kingsway	385074.9	388230.9	1.5
R23	95 Gatley Road	385104.7	388351.3	1.5
R24	199 Gatley Road	385052.0	388390.7	1.5
R25	200 Kingsway	385012.2	388410.9	1.5
R26	196 Kingsway	385009.9	388453.5	1.5
R27	195 Kingsway	385050.2	388435.6	1.5
R28	2 Park Road	383815.7	388602.5	1.5
R29	76 Lorna Grove	383769.0	388824.4	1.5
R30	27 Northumberland Way	383341.7	388756.1	1.5
R31	11 Northumberland Way	383149.7	388778.6	1.5

The sensitive receptors identified in Table 19 represent worst-case locations. However, this is not an exhaustive list and there may be other locations within the vicinity of the site that may experience air quality impacts as a result of the proposed development that have not been individually identified above. Reference should be made to Figure 6 within Appendix I for a graphical representation of road vehicle exhaust emission sensitive receptor locations.

5. ASSESSMENT

There is the potential for air quality impacts as a result of the construction and operational phases of the proposed development. These are assessed in the following Sections.

5.1 Construction Phase Assessment

5.1.1 Step 1

The undertaking of activities such as demolition, excavation, ground works, cutting, construction, concrete batching and storage of materials has the potential to result in fugitive dust emissions throughout the construction phase. Vehicle movements both on-site and on the local road network also have the potential to result in the re-suspension of dust from haul road and highway surfaces.

The potential for impacts at sensitive locations depends significantly on local meteorology during the undertaking of dust generating activities, with the most significant effects likely to occur during dry and windy conditions.

The desk-study undertaken to inform the baseline identified a number of sensitive receptors within 350m of the site boundary. As such, a detailed assessment of potential dust impacts was required.

5.1.2 Step 2

Demolition

Demolition will involve the removal of all existing building on site. It is anticipated that the volume of buildings to be demolished is likely to be less than 20,000m^3, additionally the materials existing on site have a low potential for dust release (e.g. metal cladding). In accordance with the criteria outlined in Table 3, the magnitude of potential dust emissions from earthworks is therefore **small**.

Table 18 indicates the sensitivity of the area to dust soiling effects on people and property is **medium**. In accordance with the criteria outlined in Table 8, the development is considered to be a **low** risk site for dust soiling as a result of demolition activities.

Table 18 indicates the sensitivity of the area to human health is **low**. In accordance with the criteria outlined in Table 8, the development is considered to be a **negligible** risk site for human health as a result of demolition activities.

Earthworks

Earthworks will primarily involve excavating material, haulage, tipping and stockpiling, as well as site levelling and landscaping. Information on soil type was not available for the purpose of this assessment. As such, the soil type was considered to be potentially dusty in order to provide a worst-case scenario.

The proposed development site is estimated to cover a total area of 2,500m^2 to 10,000m^2. In accordance with the criteria outlined in Table 3, the magnitude of potential dust emissions from earthworks is therefore **medium**.

Table 18 indicates the sensitivity of the area to dust soiling effects on people and property is **medium**. In accordance with the criteria outlined in Table 9, the development is considered to be a **medium** risk site for dust soiling as a result of earthworks activities.

Table 18 indicates the sensitivity of the area to human health is **low**. In accordance with the criteria outlined in Table 9, the development is considered to be a **low** risk site for human health as a result of earthwork activities.

Construction

Due to the size of the development site the total building volume is estimated to be between 25,000m^3 and 10,000m^3. In accordance with the criteria outlined in Table 9, the magnitude of potential dust emissions from construction is therefore **medium**.

Table 18 indicates the sensitivity of the area to dust soiling effects on people and property is **medium**. In accordance with the criteria outlined in Table 9, the development is considered to be a **medium** risk site for dust soiling as a result of construction activities.

Table 18 indicates the sensitivity of the area to human health is **low**. In accordance with the criteria outlined in Table 9, the development is considered to be a **low** risk site for human health as a result of construction activities.

Trackout

Information on the number of HDV trips to be generated during the construction phase of the development was not available at the time of assessment. Similarly, the surface material and unpaved road length was not known at this stage of the project.

Based on the site area, it is anticipated that the unpaved road length is likely to be less than 50m. In accordance with the criteria outlined in Table 10, the magnitude of potential dust emissions from trackout is therefore **small**.

Table 18 indicates the sensitivity of the area to dust soiling effects to people and property is **high**. In accordance with the criteria outlined in Table 10, the development is considered to be a **low** risk site for dust soiling as a result of trackout activities.

Table 18 indicates the sensitivity of the area to human health is **medium**. In accordance within the criteria outlined in Table 10, the development is considered to be a **negligible** risk site for human health as a result of trackout activities.

Summary of the Risk of Dust Effects

A summary of the risk from each dust generating activity is provided in Table 20.

Table 20 Summary of Potential Unmitigated Dust Risks

Potential Impact	Risk			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	Low	Medium	Medium	Low
Human Health	Negligible	Low	Low	Negligible

As indicated in Table 20, the potential risk of dust soiling is **low** for demolition and trackout activities and **medium** from earthwork and construction activities. The potential risk of human health impacts is **negligible** for demolition and trackout activities and **low** from earthworks and construction activities.

It should be noted that the potential for impacts depends significantly on the distance between the dust generating activity and receptor location. Risk was predicted based on a worst-case scenario of works being undertaken at the site boundary closest to each sensitive area. Therefore, actual risk is likely to be lower than that predicted during the majority of the construction phase.

5.1.3 Step 3

The IAQM[5] guidance provides a number of potential mitigation measures to reduce impacts during the construction phase. These measures have been adapted for the development site as summarised in Table 21. These may be reviewed prior to the commencement of construction works and incorporated into a Construction Environmental Management Plan if required by the Local Planning Authority.

Table 21 Fugitive Dust Mitigation Measures

Issue	Control Measure
Communications	• Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary • Develop and implement a stakeholder communications plan that includes community engagement • Display the head or regional office contact information • Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the LA
Site Management	• Record all dusty and air quality complaints and make the complaints log available to the LA when asked • Record any exceptional incidents that cause dust/or air emissions, and the action taken to resolve the situation • Make complaints log available to LA when requested.
Monitoring	• Undertake daily on-site and off-site inspection where receptors are nearby to monitor dust • Carry out regular site inspections to monitor compliance with the DMP • Increase frequency of site inspections when activities with a high potential to produce dust are being carried out

Issue	Control Measure
Preparing and Maintaining the Site	• Plan site layout so that machinery and dust causing activities are located away from receptors • Fully enclose site or specific operations where there is a high potential for dust production and the site as actives for an extensive period • Avoid site runoff of water or mud • Keep site fencing, barriers and scaffolding clean using wet methods • Remove materials that have a potential to produce dust from site as soon as possible • Cover, seed or fence stockpiles to prevent wind whipping Use water as dust suppressant where applicable
Operating Vehicle/ Machinery and Sustainable Travel	• Ensure all on-road vehicles comply with the requirements of the London Low Emission Zone and the London NRMM standards, where applicable • All vehicles to switch off engines - no idling vehicles • Avoid the use of diesel or petrol-powered generators where practicable • Impose and signpost a maximum-speed-limit of 15mph on surfaced and 10mph in unsurfaced haul roads • Produce a Construction Logistics Plan to manage sustainable deliveries Implement a Travel Plan that supports and encourages sustainable travel
Operations	• Cutting equipment to use water as dust suppressant or suitable local extract ventilation • Ensure adequate water supply on the site for effective dust/particulate matter suppression/mitigation • Use enclosed chutes and covered skips • Minimise drop heights • Ensure equipment is readily available on site to clean any spillages
Waste Management	• No bonfires or burning of waste materials
Demolition	• Soft strip inside buildings before demolition • Ensure effective water suppression is used during demolition operations, as proposed within the DMP and CLP • Avoid explosive blasting, using appropriate manual or mechanical alternatives. • Bag and remove any biological debris before demolition
Earthworks and Construction	• Re-vegetate earthworks and exposed areas • Use Hessian, mulches or trackifiers where it is not possible to re-vegetate • Only remove the cover in small areas during work and not all at once • Avoid scabbling

Issue	Control Measure
Trackout	• Use water-assisted dust sweeper on the access and local roads • Avoid dry sweeping of large areas • Ensure vehicles entering and leaving sites are covered to prevent escape of materials • Record all inspections of haul routes and any subsequent action in a site log book • Implement a wheel washing system at a suitable location near site exit

5.1.4 Step 4

Assuming the relevant mitigation measures outlined in Table 21 are implemented, the residual effect from all dust generating activities is predicted to be **negligible**, in accordance with the The IAQM[5] guidance.

5.2 Operational Phase Assessment

Additional vehicle movements associated with the operation of the proposed development will generate exhaust emissions, such as NO_2 PM_{10} and $PM_{2.5}$ on the local and regional road networks. An assessment was therefore undertaken using dispersion modelling in order to quantify potential changes in pollutant concentrations at sensitive locations in the vicinity of the site.

The assessment considered the following scenarios:

- 2017 Verification and DM;
- 2017 DS.

The DM (i.e. without development) scenario is representative of traffic data for 2017. The DS (i.e. with development) scenario is representative of traffic data for 2017 with the addition of predicted variations in traffic flow patterns as a result of the proposals.

Reference should be made to Appendix II for full assessment input details.

5.2.1 Nitrogen Dioxide

Annual mean NO_2 concentrations were predicted for the 2019 DM and DS scenarios at sensitive receptors and are summarised in Table 22.

Table 22 Predicted Annual Mean NO_2 Concentrations

Sensitive Receptor		Predicted Annual Mean NO_2 Concentration (µg/m^3)		
		DM	DS	Change
R1	131 Longley Close	31.38	31.65	0.27
R2	149 Longley Close	31.11	31.33	0.22

Sensitive Receptor		Predicted Annual Mean NO_2 Concentration (µg/m^3)		
		DM	DS	Change
R3	2 Brownington Close	29.90	30.08	0.18
R4	2 Marfold Close	37.22	37.40	0.18
R5	4 Kendal Court	28.78	29.11	0.33
R6	198 Altrincham Road	27.49	27.82	0.33
R7	The Hospital Group	26.17	26.36	0.19
R8	1 Larkhali Close	25.68	25.83	0.15
R9	275 Longley Lane	30.52	30.85	0.33
R10	35 Windsor Avenue	26.02	26.13	0.11
R11	28 Northenden Road	28.42	28.67	0.25
R12	7 Northenden Road	25.55	25.65	0.10
R13	94 Northenden Road	28.56	28.83	0.27
R14	167 Northenden Road	26.01	26.14	0.13
R15	1 The Mews	25.39	25.48	0.09
R16	131 Gatley Road	29.82	30.05	0.23
R17	202 Kingsway	35.56	35.90	0.34
R18	206 Kingsway	34.40	34.66	0.26
R19	210 Kingsway	33.94	34.18	0.24
R20	201 Gatley Road	**42.59**	**43.01**	0.42
R21	218 Kingsway	31.63	31.80	0.17
R22	213 Kingsway	37.50	37.77	0.27
R23	95 Gatley Road	30.14	30.33	0.19
R24	199 Gatley Road	**46.86**	**47.42**	0.56
R25	200 Kingsway	**41.24**	**41.65**	0.41
R26	196 Kingsway	39.80	40.13	0.33
R27	195 Kingsway	**45.57**	**46.02**	0.45
R28	2 Park Road	26.68	26.81	0.13
R29	76 Lorna Grove	35.81	35.93	0.12
R30	27 Northumberland Way	**42.81**	**42.91**	0.10

Sensitive Receptor		Predicted Annual Mean NO_2 Concentration (µg/m^3)		
		DM	DS	Change
R31	11 Northumberland Way	37.71	37.88	0.17

As indicated in Table 22, predicted annual mean NO_2 concentrations exceeded the AQO at 5 sensitive receptor locations for both DM and DS Scenarios. It should be noted that no new exceedances are anticipated as a result of the operation of the proposed development, as exceedances of the annual mean AQO are apparent in both the DM and DS scenarios. This has been taken into consideration in the assessment of significance.

The predicted beneficial impacts at 5 of the sensitive receptor locations are as a result of existing elevated vehicle emissions therefore considered as an AQMA by MCC.

Predicted impacts on annual mean NO_2 concentrations at the sensitive receptor locations are summarised in Table 23.

Table 23 Predicted NO_2 Impacts

Sensitive Receptor		% Change in Concentration Relative to AQO	Long Term Average Concentration	Significance of Impact
R1	131 Longley Close	0.67	76-94%	Negligible
R2	149 Longley Close	0.55	76-94%	Negligible
R3	2 Brownington Close	0.45	75% or Less	Negligible
R4	2 Marfold Close	0.45	76-94%	Negligible
R5	4 Kendal Court	0.82	75% or Less	Negligible
R6	198 Altrincham Road	0.83	75% or Less	Negligible
R7	The Hospital Group	0.47	75% or Less	Negligible
R8	1 Larkhali Close	0.37	75% or Less	Negligible
R9	275 Longley Lane	0.83	76-94%	Negligible
R10	35 Windsor Avenue	0.27	75% or Less	Negligible
R11	28 Northenden Road	0.63	75% or Less	Negligible
R12	7 Northenden Road	0.25	75% or Less	Negligible
R13	94 Northenden Road	0.67	75% or Less	Negligible
R14	167 Northenden Road	0.32	75% or Less	Negligible
R15	1 The Mews	0.23	75% or Less	Negligible
R16	131 Gatley Road	0.58	75% or Less	Negligible

Sensitive Receptor		% Change in Concentration Relative to AQO	Long Term Average Concentration	Significance of Impact
R17	202 Kingsway	0.85	76-94%	Negligible
R18	206 Kingsway	0.65	76-94%	Negligible
R19	210 Kingsway	0.60	76-94%	Negligible
R20	201 Gatley Road	**1.05**	**103-109%**	**Moderate**
R21	218 Kingsway	0.43	76-94%	Negligible
R22	213 Kingsway	0.68	95-102%	Slight
R23	95 Gatley Road	0.47	75% or Less	Negligible
R24	199 Gatley Road	**1.40**	**110+**	**Moderate**
R25	200 Kingsway	**1.02**	**103-109%**	**Moderate**
R26	196 Kingsway	0.83	95-102%	Slight
R27	195 Kingsway	**1.13**	**110+**	**Moderate**
R28	2 Park Road	0.32	75% or Less	Negligible
R29	76 Lorna Grove	0.30	76-94%	Negligible
R30	27 Northumberland Way	0.25	103-109%	Negligible
R31	11 Northumberland Way	0.43	95-102%	Negligible

As indicated in Table 23, the significance of impacts on annual mean NO_2 concentrations as a result of the development was predicted to be **negligible** at 25 representative receptor locations, slight at 2 receptor locations and moderate at 4 receptor locations. The receptor locations with moderate impacts are representative of a small number of properties located in an AQMA north and south of the Gatley Road, and east and west of Kingsway. The moderate impacts predicted at these sensitive locations are largely a result of the existing pollutant concentrations in the area meaning that even small increases in NO_2 concentrations as a result of the development have the potential to result in moderate impacts. It should also be noted that impacts at receptors close to those with moderate impacts are predicted to be slight and negligible.

Furthermore, the impacts are likely to be an overestimate of actual impacts due to the assumption that all HGV from the development would pass though the Gatley Road junction. Critically, no new exceedances were predicted as a result of the proposed development.

As such, the overall significance of operational phase road traffic emission impacts on annual mean NO_2 was determined **not significant**. Section 5.2.4 discusses the overall significance of the predicted impacts.

Predictions of 1-hour NO_2 concentrations were not produced as part of the dispersion modelling assessment. However, as stated in LAQM (TG16)[2] if annual mean NO_2 concentrations are below 60µg/m^3 then it is unlikely that the 1-hour AQO will be exceeded. As such based on the results in Table 22 it is not predicted that concentration will exceed the 1 hour mean AQO for NO_2 across the development site in the 2019 opening year scenario.

5.2.2 Particulate Matter

Predicted Concentrations at Sensitive Receptors

Annual mean PM_{10} concentrations were predicted for each scenario and are summarised in Table 24.

Table 24 Predicted Annual Mean PM_{10} Concentrations

Sensitive Receptor		Predicted Annual Mean PM_{10} Concentration (µg/m3)		
		DM	DS	Change
R1	131 Longley Close	14.48	14.50	0.02
R2	149 Longley Close	14.47	14.50	0.02
R3	2 Brownington Close	14.28	14.29	0.02
R4	2 Marfold Close	16.30	16.32	0.02
R5	4 Kendal Court	14.91	14.94	0.03
R6	198 Altrincham Road	14.76	14.79	0.04
R7	The Hospital Group	14.57	14.59	0.02
R8	1 Larkhali Close	14.50	14.51	0.01
R9	275 Longley Lane	15.15	15.18	0.03
R10	35 Windsor Avenue	12.96	12.97	0.01
R11	28 Northenden Road	13.31	13.34	0.02
R12	7 Northenden Road	12.91	12.92	0.01
R13	94 Northenden Road	13.35	13.38	0.03
R14	167 Northenden Road	12.98	12.99	0.01
R15	1 The Mews	12.90	12.91	0.01
R16	131 Gatley Road	13.51	13.53	0.02
R17	202 Kingsway	14.96	14.99	0.03
R18	206 Kingsway	14.83	14.86	0.03
R19	210 Kingsway	14.81	14.84	0.02

Sensitive Receptor		Predicted Annual Mean PM_{10} Concentration (µg/m3)		
		DM	DS	Change
R20	201 Gatley Road	16.17	16.21	0.04
R21	218 Kingsway	14.60	14.62	0.02
R22	213 Kingsway	15.63	15.66	0.04
R23	95 Gatley Road	14.20	14.22	0.02
R24	199 Gatley Road	16.76	16.81	0.06
R25	200 Kingsway	15.92	15.96	0.04
R26	196 Kingsway	15.76	15.79	0.03
R27	195 Kingsway	16.61	16.65	0.05
R28	2 Park Road	14.61	14.62	0.01
R29	76 Lorna Grove	15.56	15.57	0.01
R30	27 Northumberland Way	16.25	16.27	0.01
R31	11 Northumberland Way	15.67	15.68	0.02

As indicated in Table 24, annual mean PM_{10} concentrations were below the relevant AQO at all sensitive receptor locations for both scenarios considered.

Predicted impacts on annual mean PM_{10} concentrations are summarised in Table 25.

Table 25 Predicted PM_{10} Impacts

Sensitive Receptor		% Change in Concentration Relative to AQO	Long Term Average Concentration	Significance of Impact
R1	131 Longley Close	0.06	75% or Less	Negligible
R2	149 Longley Close	0.05	75% or Less	Negligible
R3	2 Brownington Close	0.05	75% or Less	Negligible
R4	2 Marfold Close	0.05	75% or Less	Negligible
R5	4 Kendal Court	0.09	75% or Less	Negligible
R6	198 Altrincham Road	0.09	75% or Less	Negligible
R7	The Hospital Group	0.05	75% or Less	Negligible
R8	1 Larkhali Close	0.04	75% or Less	Negligible
R9	275 Longley Lane	0.08	75% or Less	Negligible

Sensitive Receptor		% Change in Concentration Relative to AQO	Long Term Average Concentration	Significance of Impact
R10	35 Windsor Avenue	0.03	75% or Less	Negligible
R11	28 Northenden Road	0.06	75% or Less	Negligible
R12	7 Northenden Road	0.02	75% or Less	Negligible
R13	94 Northenden Road	0.06	75% or Less	Negligible
R14	167 Northenden Road	0.03	75% or Less	Negligible
R15	1 The Mews	0.02	75% or Less	Negligible
R16	131 Gatley Road	0.05	75% or Less	Negligible
R17	202 Kingsway	0.07	75% or Less	Negligible
R18	206 Kingsway	0.06	75% or Less	Negligible
R19	210 Kingsway	0.06	75% or Less	Negligible
R20	201 Gatley Road	0.11	75% or Less	Negligible
R21	218 Kingsway	0.05	75% or Less	Negligible
R22	213 Kingsway	0.09	75% or Less	Negligible
R23	95 Gatley Road	0.05	75% or Less	Negligible
R24	199 Gatley Road	0.14	75% or Less	Negligible
R25	200 Kingsway	0.10	75% or Less	Negligible
R26	196 Kingsway	0.09	75% or Less	Negligible
R27	195 Kingsway	0.11	75% or Less	Negligible
R28	2 Park Road	0.03	75% or Less	Negligible
R29	76 Lorna Grove	0.03	75% or Less	Negligible
R30	27 Northumberland Way	0.03	75% or Less	Negligible
R31	11 Northumberland Way	0.04	75% or Less	Negligible

As indicated in Table 25, impacts on annual mean PM_{10} concentrations as a result of road vehicle exhaust emissions associated with the development were predicted to be **negligible** at all receptor locations. As such, the overall significance of the operational phase traffic PM_{10} emissions were determined **not significant**.

5.2.3 Particulate Matter

Predicted Concentrations at Sensitive Receptors

Annual mean $PM_{2.5}$ concentrations were predicted for each scenario and are summarised in Table 24.

Table 26 Predicted Annual Mean PM_{10} Concentrations

Sensitive Receptor		Predicted Annual Mean $PM_{2.5}$ Concentration (µg/m3)		
		DM	DS	Change
R1	131 Longley Close	10.81	10.83	0.02
R2	149 Longley Close	9.53	9.54	0.01
R3	2 Brownington Close	9.42	9.43	0.01
R4	2 Marfold Close	9.93	9.95	0.01
R5	4 Kendal Court	9.35	9.37	0.02
R6	198 Altrincham Road	9.23	9.25	0.02
R7	The Hospital Group	9.12	9.13	0.01
R8	1 Larkhali Close	9.08	9.09	0.01
R9	275 Longley Lane	9.45	9.47	0.02
R10	35 Windsor Avenue	9.08	9.09	0.01
R11	28 Northenden Road	9.29	9.30	0.01
R12	7 Northenden Road	9.05	9.05	0.01
R13	94 Northenden Road	10.25	10.26	0.02
R14	167 Northenden Road	10.03	10.04	0.01
R15	1 The Mews	9.09	9.10	0.00
R16	131 Gatley Road	9.46	9.47	0.01
R17	202 Kingsway	10.27	10.29	0.02
R18	206 Kingsway	10.21	10.22	0.02
R19	210 Kingsway	10.21	10.22	0.02
R20	201 Gatley Road	11.02	11.05	0.03
R21	218 Kingsway	10.10	10.11	0.01
R22	213 Kingsway	10.71	10.73	0.02
R23	95 Gatley Road	9.90	9.91	0.01

Sensitive Receptor		Predicted Annual Mean $PM_{2.5}$ Concentration (µg/m3)		
		DM	DS	Change
R24	199 Gatley Road	11.43	11.47	0.04
R25	200 Kingsway	10.94	10.96	0.02
R26	196 Kingsway	10.85	10.87	0.02
R27	195 Kingsway	11.37	11.40	0.03
R28	2 Park Road	9.63	9.64	0.01
R29	76 Lorna Grove	10.29	10.30	0.01
R30	27 Northumberland Way	10.78	10.79	0.01
R31	11 Northumberland Way	10.39	10.40	0.01

As indicated in Table 24, annual mean $PM_{2.5}$ concentrations were below the relevant AQO at all sensitive receptor locations for both scenarios considered.

Predicted impacts on annual mean $PM_{2.5}$ concentrations are summarised in Table 25.

Table 27 Predicted $PM_{2.5}$ Impacts

Sensitive Receptor		% Change in Concentration Relative to AQO	Long Term Average Concentration	Significance of Impact
R1	131 Longley Close	0.06	75% or Less	Negligible
R2	149 Longley Close	0.05	75% or Less	Negligible
R3	2 Brownington Close	0.05	75% or Less	Negligible
R4	2 Marfold Close	0.05	75% or Less	Negligible
R5	4 Kendal Court	0.09	75% or Less	Negligible
R6	198 Altrincham Road	0.09	75% or Less	Negligible
R7	The Hospital Group	0.05	75% or Less	Negligible
R8	1 Larkhali Close	0.04	75% or Less	Negligible
R9	275 Longley Lane	0.08	75% or Less	Negligible
R10	35 Windsor Avenue	0.02	75% or Less	Negligible
R11	28 Northenden Road	0.06	75% or Less	Negligible
R12	7 Northenden Road	0.02	75% or Less	Negligible

Sensitive Receptor		% Change in Concentration Relative to AQO	Long Term Average Concentration	Significance of Impact
R13	94 Northenden Road	0.06	75% or Less	Negligible
R14	167 Northenden Road	0.03	75% or Less	Negligible
R15	1 The Mews	0.02	75% or Less	Negligible
R16	131 Gatley Road	0.05	75% or Less	Negligible
R17	202 Kingsway	0.08	75% or Less	Negligible
R18	206 Kingsway	0.06	75% or Less	Negligible
R19	210 Kingsway	0.06	75% or Less	Negligible
R20	201 Gatley Road	0.11	75% or Less	Negligible
R21	218 Kingsway	0.05	75% or Less	Negligible
R22	213 Kingsway	0.08	75% or Less	Negligible
R23	95 Gatley Road	0.05	75% or Less	Negligible
R24	199 Gatley Road	0.14	75% or Less	Negligible
R25	200 Kingsway	0.10	75% or Less	Negligible
R26	196 Kingsway	0.08	75% or Less	Negligible
R27	195 Kingsway	0.12	75% or Less	Negligible
R28	2 Park Road	0.03	75% or Less	Negligible
R29	76 Lorna Grove	0.04	75% or Less	Negligible
R30	27 Northumberland Way	0.04	75% or Less	Negligible
R31	11 Northumberland Way	0.04	75% or Less	Negligible

As indicated in Table 25, impacts on annual mean $PM_{2.5}$ concentrations as a result of road vehicle exhaust emissions associated with the development were predicted to be **negligible** at all receptor locations. As such, the overall significance of the operational phase traffic $PM_{2.5}$ emission were determined **not significant**.

5.2.4 Impact Significance

The overall significance of operational phase road traffic emission impacts was determined as **not significant**. This was based on the predicted impacts at discrete receptor locations and the considerations outlined in Section 3. Further justification is provided in Table 28.

Table 28 Overall Road Traffic Exhaust Emission Impact Significance

Guidance	Comment
Number of properties affected by slight, moderate or substantial air quality impacts and a judgement on the overall balance	Impacts on annual mean NO_2 concentrations were predicted to be moderate at 4 representative receptor locations, slight at 2 locations and negligible at 25 receptor locations. The receptor locations at which moderate impacts were predicted represent approximately 10 houses located close to the A34 junction with Gatley Road and located in an AQMA Impacts at other nearby sensitive receptors are predicted to be negligible All other sensitive receptors considered are predicted to have slight or negligible impacts and these represent all other sensitive locations near potentially affected roads In addition, the impacts at the Gatley Road junction are likely to be an overestimate as it has been assumed that all HGVs from the proposal would travel through this junction
Where new exposure is introduced into an existing area of poor air quality, then the number of people exposed to levels above the objective or limit value will be relevant	The proposed development would not introduce any new exposure to an area of poor air quality.
The percentage change in concentration relative to the objective and the descriptions of the impacts at the receptors	The change in concentration relative to the AQO was predicted to range from: ▶ 0.23% to 1.40% for NO_2; ▶ 0.02% to 0.14% for PM_{10}; and ▶ 0.02% to 0.14% for $PM_{2.5}$. As such, the predicted small number of moderately impacted properties is largely a reflection of existing elevated concentrations rather than as a result of the proposals Impacts upon both annual mean PM_{10} and $PM_{2.5}$ concentrations were deemed **negligible** at all locations.
Whether or not an exceedance of an objective is predicted to arise or be removed in the study area due to a substantial increase or decrease	There were predicted exceedances of the annual mean AQO for NO_2 at receptor locations near the A34 Gatley Road junction However, the AQO was predicted to exceed at these locations in the DM and DS scenarios and therefore the exceedances were not predicted to arise due to the proposed development There were no exceedances of PM_{10} at any location within the modelling extents

Guidance	Comment
The extent to which an objective is exceeded e.g. an annual mean NO_2 concentration of 41µg/m^3 should attract less significance than an annual mean of 51µg/m^3	There are predicted to be exceedances of the annual mean AQO for NO_2 above 41µg/m^3 at five sensitive locations within the modelled road network where the exceedances ranged between 41.74µg/m^3 and 49.44µg/m^3 during the DM and DS scenarios. Although exceedances of the AQO for NO_2 have been predicted, these are again apparent within both the DM and DS scenarios. As such it is not considered the proposed development will contribute significantly to the extent of the AQO exceedance for annual mean NO_2. It should be noted that the remaining twenty seven receptors are predicted to experience NO_2 concentrations below the annual AQO. Therefore, the overall magnitude of predicted impacts is judged to be **not significant** in the context of this assessment The annual mean AQO for PM_{10} and $PM_{2.5}$ was not exceeded at any location

Given the reasons described previously, it is considered that the overall impacts of the proposed development would be **not significant.** Due to the predicted impacts within an AQMA, and in line with EPUK and IAQM guidance[7], it is recommended that there should be a consideration of best practice measures to minimise the potential impacts.

6. CONCLUSION

Resource and Environmental Consultants Ltd (REC) was commissioned by PP O'Connor Limited to undertake an Air Quality Assessment in support of the proposed development at Sharston Recycling Centre, Off Shasrston Road, Manchester.

The proposals comprise the the development of the site to provide for the creation of a new access point off Sharston Road to existing waste transfer station together with installation of waste processing equipment, site cabins, weigh bridges and storage bins

The development site is located within the Greater Manchester AQMA which has been declared for exceedances of the annual mean AQO for NO_2 and subsequently there are concerns that the proposals may have the potential to introduce future site users to poor air quality, as well as to cause fugitive dust impacts during the construction phase of the development. As such, an Air Quality Assessment was required to quantify pollutant levels across the site, consider its suitability for the proposed end-use and assess potential construction phase impacts as a result of the development.

A separate report has been produced to assess the potential impact from fugitive dust emissions during the operational phase.

During the construction phase of the development there is the potential for air quality impacts as a result of fugitive dust emissions from the site. These were assessed in accordance with the IAQM methodology. Assuming good practice dust control measures are implemented, the residual significance of potential air quality impacts from dust generated by earthworks and construction, and trackout activities was predicted to be **not significant**.

Predicted impacts on NO_2, PM_{10} and $PM_{2.5}$ concentrations as a result of operational phase exhaust emissions were predicted at representative sensitive receptor location within the vicinity of the site. Dispersion modelling indicated that the impacts were moderate at a small number of properties near the A34 / Gatley Road junction. As it was assumed that all potential development generated traffic would pass through this junction this is likely to be an overestimate. In addition, the AQO was predicted to exceed the AQO in both the DM and DS scenarios.

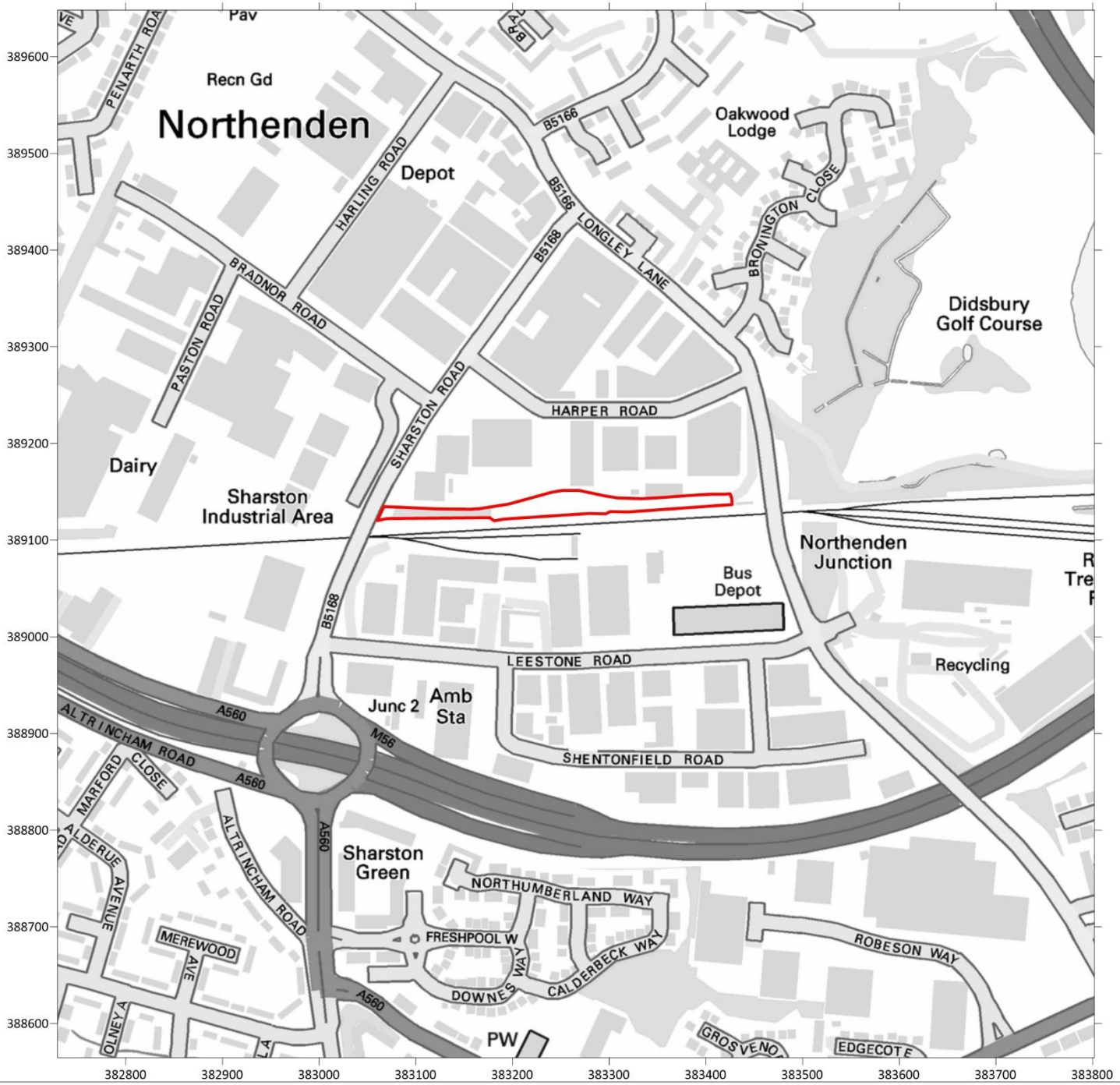
The impacts at all other representative receptors potentially affected by the proposals was predicted to be negligible or slight, although it is recommended that there should be a consideration of best practice measures to minimise the potential impacts.

Therefore the overall significance of the potential impacts was determined to be **not significant**. Based on the assessment results, air quality is not considered a constraint to planning consent for the proposed development.

ABBREVIATIONS

AADT	Annual Average Daily Traffic
ADM	Atmospheric Dispersion Modelling
APEC	Air Pollution Exposure Criteria
APPLE	Air Pollution Planning and Local Environment
AQAP	Air Quality Action Plan
AQLV	Air Quality Limit Value
AQMA	Air Quality Management Area
AQO	Air Quality Objectives
AQS	Air Quality Strategy
CERC	Cambridge Environmental Research Consultants
CLP	Construction Logistics Plan
CMP	Construction Management Plan
DEFRA	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
DM	Do Minimum
DMP	Dust Management Plan
DMRB	Design Manual for Roads and Bridges
DS	Do Something
EPUK	Environmental Protection UK
EU	European Union
HDV	Heavy Duty Vehicle
IAQM	Institute of Air Quality Management
LA	Local Authority
IAQM	Institute of Air Quality Management
MCC	Manchester City Council
NGR	National Grid Reference
NO_2	Nitrogen dioxide
NO_x	Oxides of nitrogen
NPPF	National Planning Policy Framework
NPPG	National Planning Practice Guidance
$PM_{2.5}$	Particulate matter with an aerodynamic diameter of less than 2.5µm
PM_{10}	Particulate matter with an aerodynamic diameter of less than 10µm
REC	Resource and Environmental Consultants
TEMPRO	Trip End Model Presentation Program
z_0	Roughness Length

APPENDIX I FIGURES



Legend

Site Boundary

Title

Figure 1

Site Location

Project

Air Quality Assessment
Sharston Recycling Centre off Sharston Road

Project Number

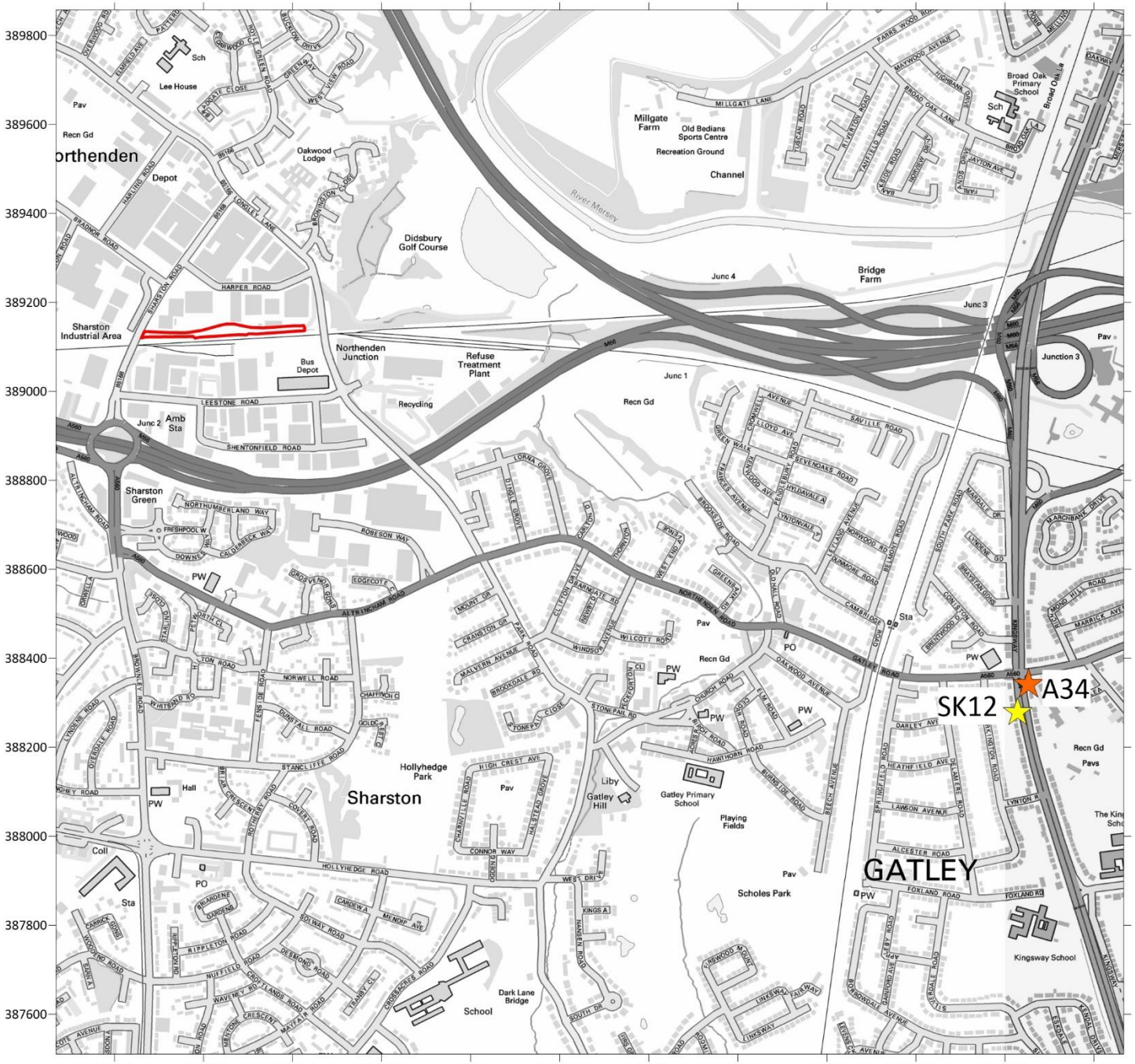
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Legend

- Site Boundary
- Diffusion Tube Monitoring Locations
- Automatic Analyser Monitoring Location

Title

Figure 2

Diffusion Tube and Automatic Analyser Monitoring Locations

Project

Air Quality Assessment
Sharston Recycling Centre off Sharston Road

Project Number

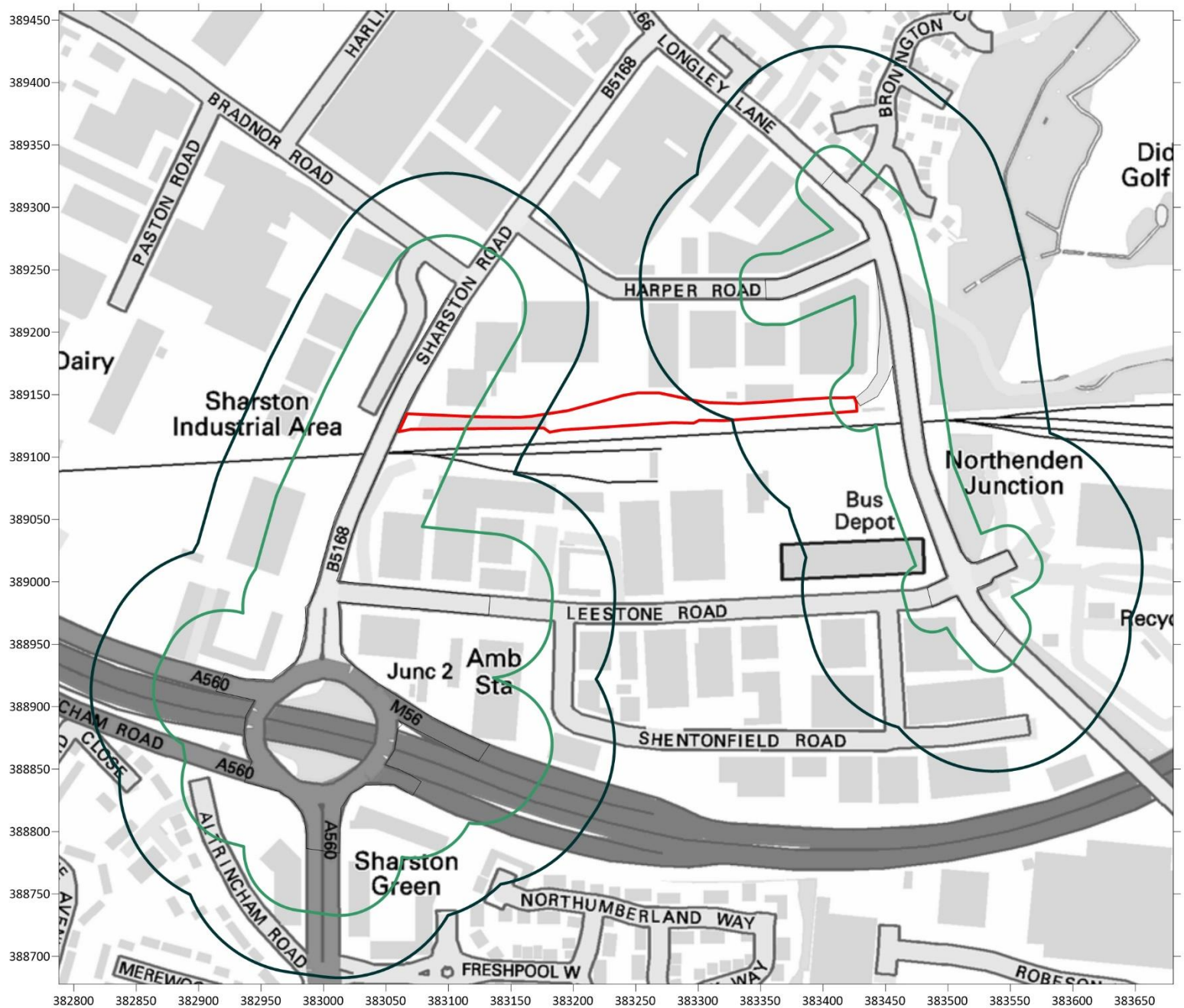
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Legend

- Site Boundary
- 20m from Site Access Route
- 50m from Site Access Route

Title

Figure 4

Trackout Dust Buffer Zones

Project

Air Quality Assessment
Sharston Recycling Centre off Sharston Road

Project Number

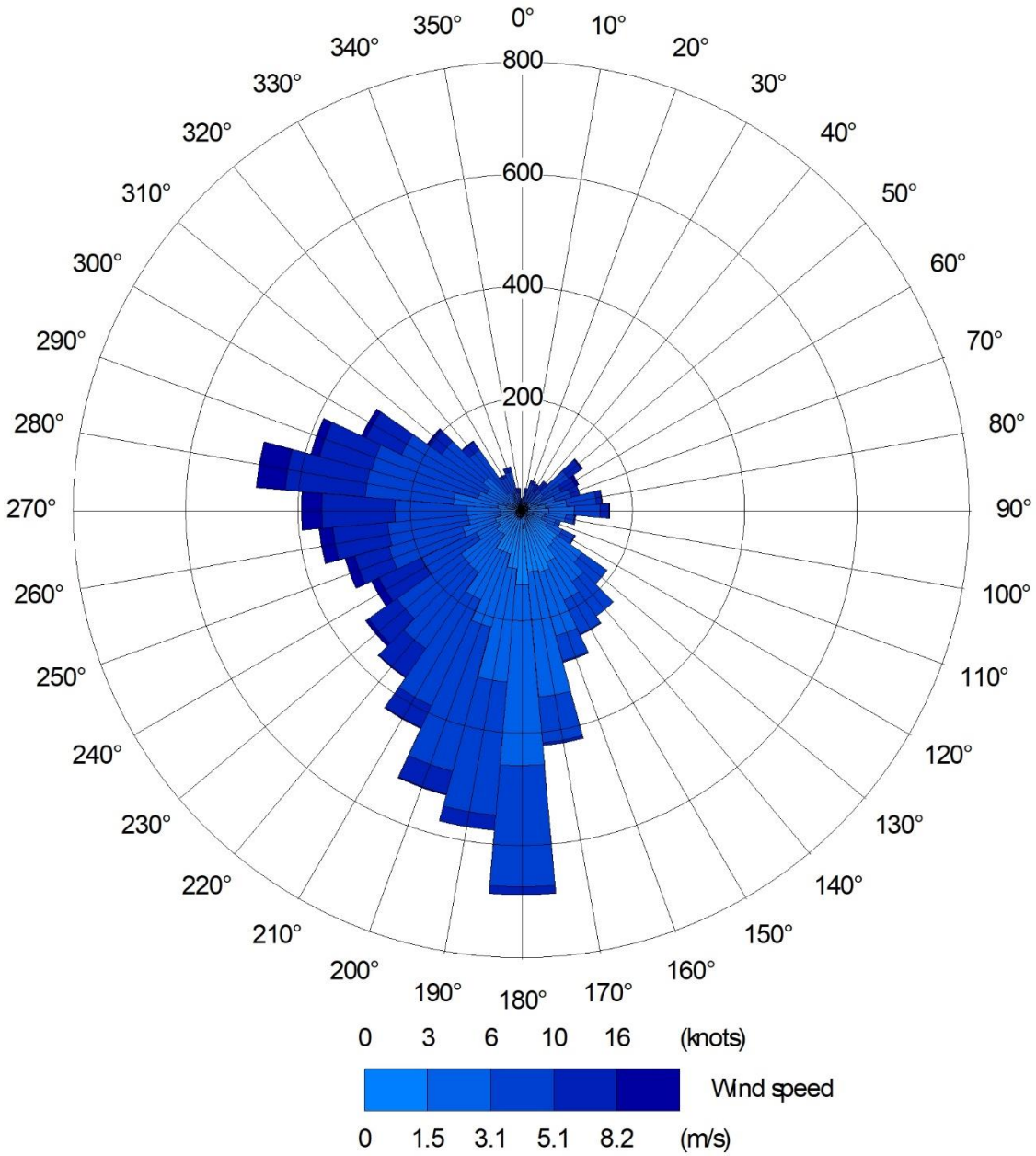
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Title

Figure 5

Wind Rose 2017
Manchester Ringway,
Meteorological Station

Project

Air Quality Assessment
Sharston Recycling Centre off Sharston Road

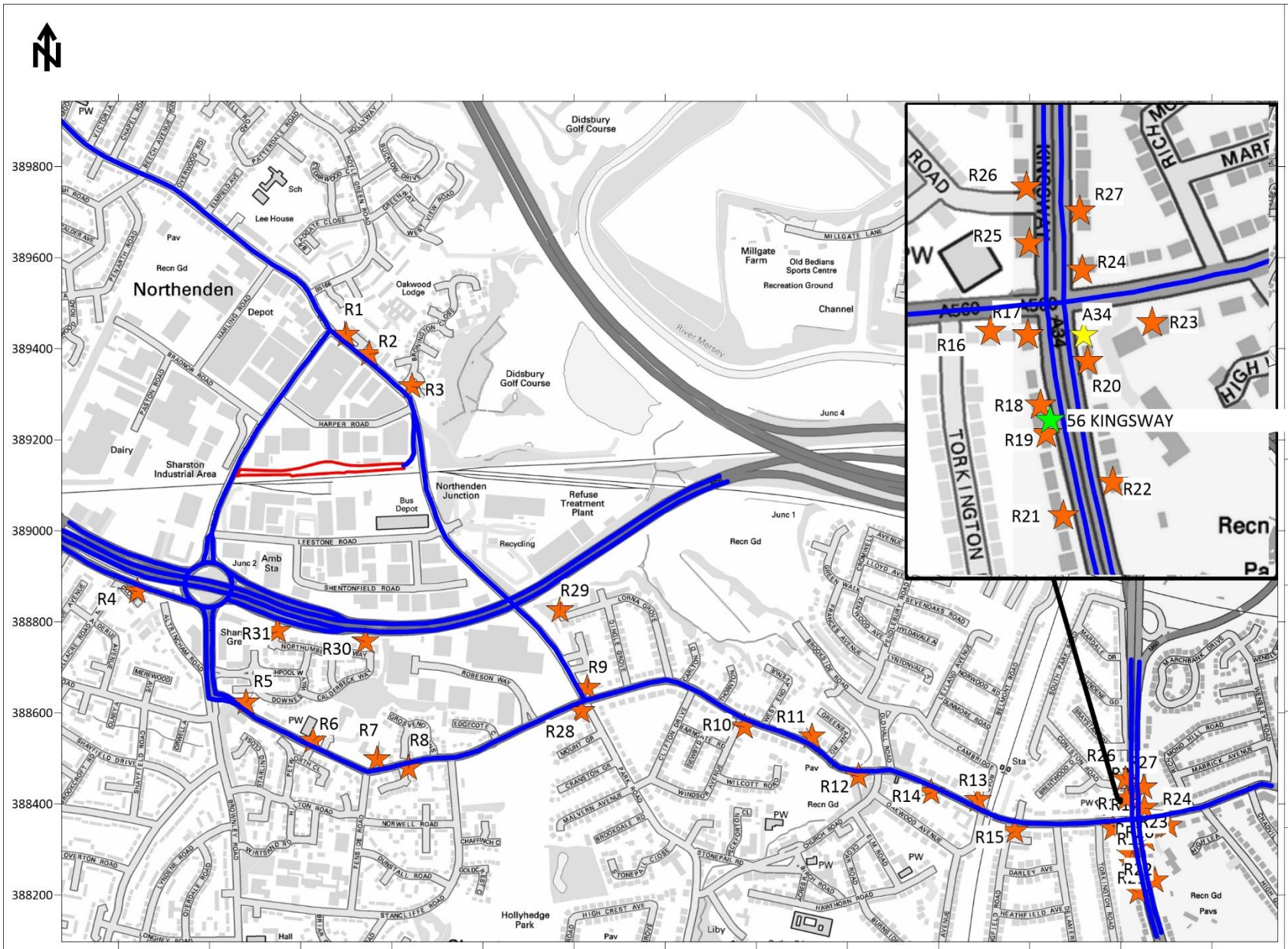
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Legend

- Site Boundary
- Modelled Road Link
- Diffusion Tube Monitoirng Location
- Sensitive Receptor Locations
- Automatic Analyser Monitoring Location

Title

Figure 6

ADMS-Roads Input

Project

Air Quality Assessment
Sharston Recycling Centre off Sharston Road

Project Number

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APPENDIX II ASSESSMENT INPUT DATA

ADMS-ROADS ASSESSMENT INPUTS

Road vehicle trips associated with the development have the potential to result in air quality impacts as a result of increased traffic exhaust emissions. Dispersion modelling using ADMS Roads was therefore undertaken to predict NO_2, PM_{10} and $PM_{2.5}$ concentrations at sensitive locations both with and without the development in order to consider potential changes as a result of the proposals.

The dispersion model requires input data that details the following parameters:

- Assessment area;
- Traffic flow data;
- Vehicle emission factors;
- Spatial co-ordinates of emissions;
- Street width;
- Meteorological data;
- Roughness length; and
- Monin-Obukhov length.

Assessment inputs are described in the following subsections.

Dispersion Model

Dispersion modelling was undertaken using the ADMS-Roads dispersion model (version 4.0.1.0). ADMS-Roads is developed by Cambridge Environmental Research Consultants (CERC) and is routinely used throughout the world for the prediction of pollutant dispersion from road sources. Modelling predictions from this software package are accepted within the UK by the Environment Agency and DEFRA.

Traffic Flow Data

24-hour flows and fleet composition were downloaded from the Department for Transport (DfT) Matrix. The Dft Matrix web tool enables the user to view and download traffic flows on every link of the A, B & U roads and motorway network in Great Britain for the years 1999 to 2017. It should be noted that the DfT matrix is referenced in DEFRA guidance LAQM.TG (16)[2] as being a suitable source of data for air quality assessments and is therefore considered to provide a reasonable representation of traffic flows in the vicinity of the site.

Road widths were estimated from aerial photography and UK highway design standards. Reference should be made to Figure 6 within Appendix I for a graphical representation of the road link locations.

A summary of the traffic data used in the verification and modelled scenarios is provided in Table AII.1.

Table AII.1 2017 Traffic Data

Road Link		Road Width (m)	24-hour AADT Flow	HDV Prop. (%)	Mean Vehicle Speed (km/h)
L1	Longley Lane	6.5	8,661	2.57	40
L2	Longley Lane	7.2	8,661	2.57	48
L3	Longley lane/ South of Elmfield Avenue	8.2	8,661	2.57	20
L4	Longley Lane/ Royal Green Road	8.5	8,661	2.57	20
L5	Sharston Road	7.2	8,661	2.57	30
L6	Sharston Road Approach	7.5	4,331	2.57	15
L7	Sharston Road Exit	7.2	4,331	2.57	20
L8	Sharston Roundabout	10.2	34,053	4.17	20
L9	Altrincham Road Oneway	8.2	12,865	4.47	45
L10	Altrincham Road Oneway Approach	9.2	12,865	4.47	25
L11	Altrincham Road Oneway	8.5	12,865	4.47	45
L12	Altrincham Road Onway Exit	9.2	12,865	4.47	30
L13	Altrincham Road South Approach	8.5	9,170	3.77	20
L14	Altrincham Road South	7.8	9,170	3.77	35
L15	Altrincham Road South Exit	8.2	9,170	3.77	30
L16	Altrincham Road South	7.5	9,170	3.77	35
L17	Altrincham Road/ Edgecote Close	7.2	4,585	3.77	40
L18	Northenden Road	6.5	9,752	3.82	35
L19	Northenden Road/ Gatley Road West	12.5	9,752	3.82	25
L20	Gatley Road East	10.2	12,036	4.07	30
L21	A34 Kingsway North	8.5	35,454	2.07	55
L22	A34 Kingsway North/ Gatley Road	11.5	35,454	2.07	35
L23	A34 Kingsway Southbound	8.5	35,454	2.07	45
L24	A34 Kingsway Southbound/ Gatley Road	11.5	35,454	2.07	25
L25	A34 Kingsway Northbound South of Gatley Road	11.2	28,171	2.55	25
L26	A34 Kingsway Northbound/ Lynton Road	7.5	28,171	2.55	50

Road Link		Road Width (m)	24-hour AADT Flow	HDV Prop. (%)	Mean Vehicle Speed (km/h)
L27	A34 Kingsway Southbound / South of Gatley Road	10.2	28,171	2.55	35
L28	A34 Kingsway Southbound / Lynton Road	7.5	28,171	2.55	50
L29	Longley Lane South of Sharston Road	8.5	8,661	2.57	30
L30	Longley Lane	7.2	8,661	2.57	35
L32	Langley Lane North	6.2	8,661	2.57	35
L33	Langley Lane Bus Depot to Site	7.5	8,661	2.57	40
L34	Slip M56 Exit	7.5	10,904	5.87	50
L35	M56 East of Sharston Road	7.2	109,037	5.87	80
L36	M56 East of Sharston Road	7.2	109,037	5.87	80
L37	M56 Slip Approach	8.5	10,904	5.87	35
L38	M56 Eastbound	7.2	109,037	5.87	50
L39	M56 Underbridge	7.2	109,037	5.87	80
L40	M56	7.2	109,037	5.87	80
L41	M56	7.2	109,037	5.87	80
L42	M56 Underbridge	7.2	109,037	5.87	80
L43	M56 Westbound	7.2	109,037	5.87	50

The road widths, mean vehicle speeds and road heights shown in Table All.1 remained the same for the 2017 scenario. A summary of the 2017 DM and DS Scenarios traffic data is shown in Table All.2.

Table AII.2 2017 Traffic Data

Road Link		DM		DS	
		24-hour AADT Flow	HDV Prop. (%)	24-hour AADT Flow	HDV Prop. (%)
L1	Longley Lane	8,661	2.57	8,761	3.69
L2	Longley Lane	8,661	2.57	8,761	3.69
L3	Longley lane/ South of Elmfield Avenue	8,661	2.57	8,761	3.69
L4	Longley Lane/ Royal Green Road	8,661	2.57	8,711	3.13

Road Link		DM		DS	
		24-hour AADT Flow	HDV Prop. (%)	24-hour AADT Flow	HDV Prop. (%)
L5	Sharston Road	8,661	2.57	8,711	3.13
L6	Sharston Road Approach	4,331	2.57	4,381	3.69
L7	Sharston Road Exit	4,331	2.57	4,381	3.69
L8	Sharston Roundabout	34,053	4.17	34,153	5.11
L9	Altrincham Road Oneway	12,865	4.47	12,965	5.20
L10	Altrincham Road Oneway Approach	12,865	4.47	12,965	5.20
L11	Altrincham Road Oneway	12,865	4.47	12,965	5.20
L12	Altrincham Road Oneway Exit	12,865	4.47	12,965	5.20
L13	Altrincham Road South Approach	9,170	3.77	9,270	4.81
L14	Altrincham Road South	9,170	3.77	9,270	4.81
L15	Altrincham Road South Exit	9,170	3.77	9,270	4.81
L16	Altrincham Road South	9,170	3.77	9,270	4.81
L17	Altrincham Road/ Edgecote Close	4,585	3.77	4,685	5.83
L18	Northenden Road	9,752	3.82	9,852	4.80
L19	Northenden Road/ Gatley Road West	9,752	3.82	9,852	4.80
L20	Gatley Road East	12,036	4.07	12,136	4.86
L21	A34 Kingsway North	35,454	2.07	35,554	2.35
L22	A34 Kingsway North/ Gatley Road	35,454	2.07	35,554	2.35
L23	A34 Kingsway Southbound	35,454	2.07	35,554	2.35
L24	A34 Kingsway Southbound/ Gatley Road	35,454	2.07	35,554	2.35
L25	A34 Kingsway Northbound South of Gatley Road	28,171	2.55	28,271	2.89
L26	A34 Kingsway Northbound/ Lynton Road	28,171	2.55	28,271	2.89
L27	A34 Kingsway Southbound/ South of Gatley Road	28,171	2.55	28,271	2.89
L28	A34 Kingsway Southbound/ Lynton Road	28,171	2.55	28,271	2.89
L29	Longley Lane South of Sharston Road	8,661	2.57	8,761	3.12
L30	Longley Lane	8,661	2.57	8,761	3.12

Road Link		DM		DS	
		24-hour AADT Flow	HDV Prop. (%)	24-hour AADT Flow	HDV Prop. (%)
L32	Langley Lane North	8,661	2.57	8,761	3.69
L33	Langley Lane Bus Depot to Site	8,661	2.57	8,761	3.69
L34	Slip M56 Exit	10,904	5.87	11,004	6.72
L35	M56 East of Sharston Road	109,037	5.87	109,137	5.95
L36	M56 East of Sharston Road	109,037	5.87	109,137	5.95
L37	M56 Slip Approach	10,904	5.87	11,004	6.72
L38	M56 Eastbound	109,037	5.87	109,137	5.95
L39	M56 Underbridge	109,037	5.87	109,137	5.95
L40	M56	109,037	5.87	109,137	5.95
L41	M56	109,037	5.87	109,137	5.95
L42	M56 Underbridge	109,037	5.87	109,137	5.95
L43	M56 Westbound	109,037	5.87	109,137	5.95

Emission Factors

Emission factors for each link were calculated using the relevant traffic flows and the Emissions Factor Toolkit (version 7.0.1) released in 2017, which incorporates updated COPERT5 vehicle emissions factors for NO_x and vehicle fleet information.

There is current uncertainty over NO_2 concentrations within the UK, with roadside levels not reducing as previously expected due to the implementation of new vehicle emission standards. Therefore, 2017 emission factors have been utilised for the prediction of pollution levels for all scenarios in preference to a future year scenario in order to provide a realistic assessment.

Meteorological Data

Meteorological data used in this assessment was taken from Manchester Airport meteorological station over the period 1st January 2017 to 31st December 2017 (inclusive). Manchester Airport meteorological station is located at approximate NGR 381745, 383960, which is approximately 3.9km south-west of the proposed development.

All meteorological records used in the assessment were provided by Atmospheric Dispersion Modelling (ADM) Ltd, which is an established distributor of data within the UK. Reference should be made to Figure 5 within Appendix I for a wind rose of utilised meteorological data.

Roughness Length

A roughness length (z_0) of 1m was used in this dispersion modelling study. This value of z_0 is considered appropriate for the morphology of the assessment area and is suggested within ADMS-Roads as being suitable for 'Cities, Woodlands'.

A z_0 of 0.3m was utilised to represent the morphology of the meteorological station location and is suggested as being suitable for 'Agricultural areas (max)'.

Monin-Obukhov Length

The Monin-Obukhov length provides a measure of the stability of the atmosphere. A minimum Monin-Obukhov length of 30m was used in this dispersion modelling study. This value is considered appropriate for the nature of the assessment area and is suggested within ADMS-Roads as being suitable for 'Mixed urban/ industrial'.

A Monin-Obukhov length of 10m was used to represent the meteorological station location and is suggested within ADMS-Roads as being suitable for 'Small towns< 50, 000'.

Background Concentrations

An annual mean NO_2 concentration of 23.19µg/m^3, PM_{10} concentration of 13.47µg/m^3 and $PM_{2.5}$ concentration of 8.66µg/m^3, as predicted by DEFRA, was utilised in the dispersion modelling assessment to represent annual mean pollutant levels across the development site.

Since both the monitoring locations and the receptor locations are located in several grid squares, predicted concentrations from their respective grid squares were used to represent their respective background concentrations for the modelling process.

Table AII.3 displays the specific background concentrations by DEFRA used for each diffusion tube and automatic monitoring location used in the verification process. This data was used in to ensure an accurate and robust model.

Table AII.3 Predicted Diffusion Tube Monitoring Background Pollutant Concentrations

Receptor Grid Square	Receptors	Pollutant	Predicted Background Concentration (µg/m^3)
			2017
385500, 389500	56 Kingsway (DT) and A34 Stockport Cheadle	NO_x	31.90
		NO_2	22.00
		PM_{10}	13.22
		$PM_{2.5}$	8.53

Table AII.4 displays the predicted background concentrations by DEFRA used in the operational phase assessment for the sensitive receptor locations.

Table AII.4 Predicted Background Pollutant Concentrations for Receptors

Receptor Grid Square	Receptors	Pollutant	Predicted Background Concentration (µg/m^3)
			2017
383500, 389500	R1, R2, R3	NO_x	33.89
		NO_2	23.19
		PM_{10}	13.47
		$PM_{2.5}$	8.86
382500, 388500	R4	NO_x	35.35
		NO_2	24.12
		PM_{10}	14.72
		$PM_{2.5}$	9.26
383500, 388500	R5 to R9, and R28 to R31	NO_x	34.91
		NO_2	23.72
		PM_{10}	14.20
		$PM_{2.5}$	9.02
384500, 388500	R10 to R16	NO_x	28.93
		NO_2	20.12
		PM_{10}	12.61
		$PM_{2.5}$	8.16
385500, 388500	R17 to R27	NO_x	31.90
		NO_2	22.00
		PM_{10}	13.22
		$PM_{2.5}$	8.53

Similar to emission factors, background concentrations for 2017 were utilised in preference to the a future year. This provided a robust assessment and is likely to overestimate actual pollutant concentrations during the operation of the proposals.

NO_x to NO_2 Conversion

Predicted annual mean NO_x concentrations from the dispersion model were converted to NO_2 concentrations using the spreadsheet provided by DEFRA, which is the method detailed within LAQM (TG16)[2].

Verification

The predicted results from a dispersion model may differ from measured concentrations for a large number of reasons, including:

- Estimates of background concentrations;
- Uncertainties in source activity data such as traffic flows and emission factors;
- Variations in meteorological conditions;
- Overall model limitations; and
- Uncertainties associated with monitoring data, including locations.

Model verification is the process by which these and other uncertainties are investigated and where possible minimised. In reality, the differences between modelled and monitored results are likely to be a combination of all of these aspects.

For the purpose of this assessment model verification was undertaken for 2017, using traffic data, meteorological data and monitoring results from this year.

MCC undertakes monitoring of NO_2 concentrations at one location suitable for verification purposes within the assessment extents. The road contribution to total NO_x concentration was calculated from the monitored NO_2 result for use in the verification process. This was undertaken following the methodology contained within IAQM and EPUK guidance LAQM (TG16)[2].

The dispersion model was run with the traffic input data previously detailed for 2017 to predict the NO_x concentration at the monitoring locations. The results are shown in Table AII.5.

Table AII.5 NO_x Verification Results

Monitoring Location	Modelled Road NO_x Concentration ($\mu g/m^3$)	Monitored Road NO_x Concentration ($\mu g/m^3$)	Difference (%)
56 Kingsway	29.57	**44.82**	34.04
A34 Stockport Cheadle	**42.90**	**44.46**	3.50

The monitored and modelled NO_x road contribution concentrations were compared this indicated that a verification factor of **1.1907** was required to be applied to all NO_x modelling results, showing the model has a tendency to underestimate pollutant concentrations.

The monitored and modelled NO_x road contribution concentrations were graphed and the equation of the trendline based on the linear progression through zero calculated, as shown in Graph 1. This indicated that a verification factor of **1.1907** was required to be applied to all NO_x modelling results, showing that the model tended to underestimate pollutant concentrations throughout the assessment extents.

Graph 1 Verification Factor

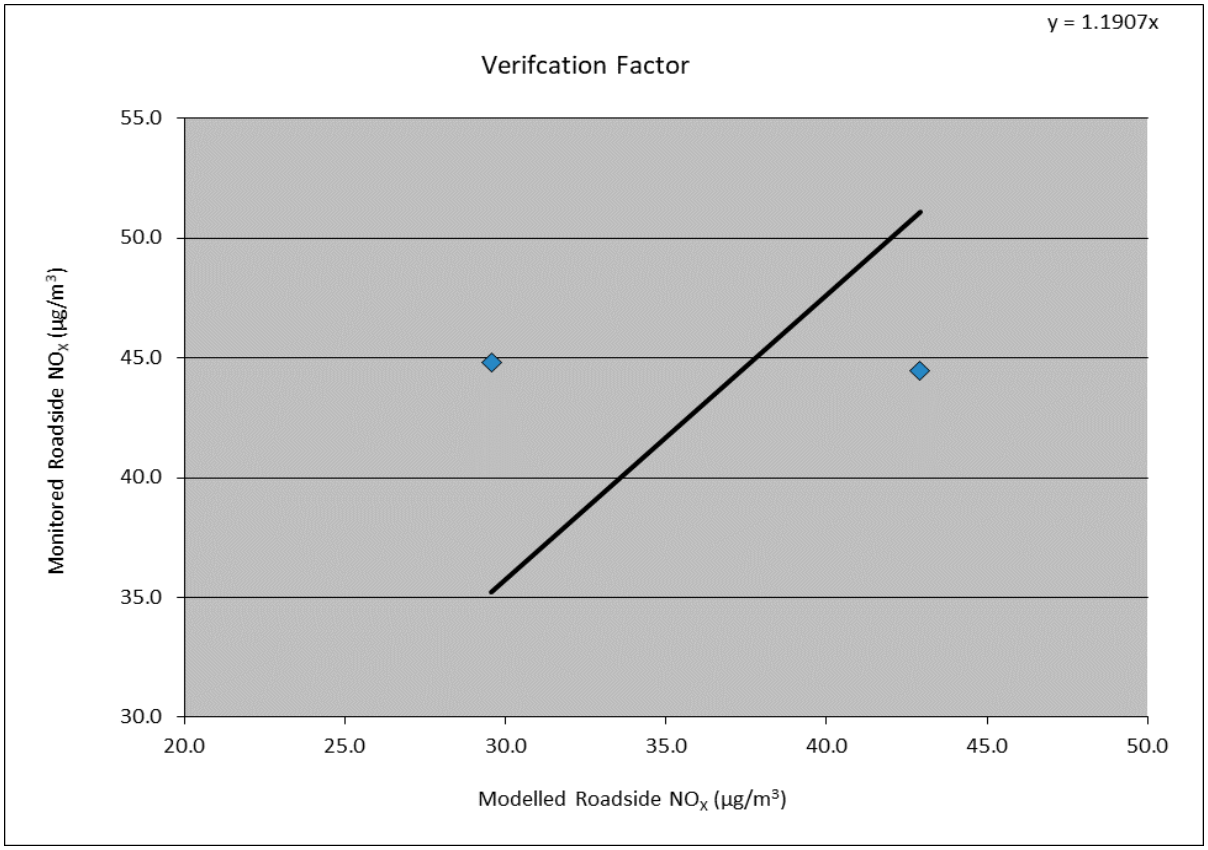


Table AII.6 presents the monitored annual mean NO_2 concentrations and the adjusted modelled total NO_2 concentration based on the above verification factor. Exceedances of the relevant AQO are highlighted in **bold.**

Table AII.6 NO_2 Verification Results

Monitoring Location	Monitored NO_2 Concentration (µg/m^3)	Adjusted Modelled Total NO_2 Concentration (µg/m^3)	Difference (%)
56 Kingsway	**42.85**	38.75	9.58
A34 Stockport Cheadle	**42.71**	**45.44**	-6.38

MCC undertakes monitoring of annual mean PM_{10} concentrations at one suitable monitoring location within the assessment extents, it was therefore possible to provide a separate PM_{10} verification factor. Table AII.9 indicates the monitored and calculated annual mean PM_{10} concentrations.

Table AII.9 PM_{10} Monitoring Results

Monitoring Location	Monitored PM_{10} Concentration (µg/m^3)	Modelled PM_{10} concentration (µg/m^3)	Difference (%)
A34 Stockport Cheadle	17.75	3.36	18.91

The monitored and modelled roadside concentrations were compared to calculate the associated ratio. This indicated a verification factor of **1.0707** was required to be applied to all PM_{10} and $PM_{2.5}$ modelling results, in preference to the calculated ratio and in accordance with the guidance provided within LAQM (TG16)[2].

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APPENDIX III ASSESSOR'S CURRICULUM VITAE

CONAL KEARNEY

Associate Director

BEng (Hons), MSc, MIAQM, MIEnvSc

KEY EXPERIENCE:

Conal is a Principal Consultant with specialist experience in the air quality and odour sector. His key capabilities include:

- Advanced atmospheric air dispersion modelling of road vehicle and industrial emissions using ADMS-ROADS and AIRVIRO.
- Preparation of factual and interpretative Air Quality Assessment reports and Air Quality Environmental Statement chapters in the vicinity of proposed schemes and developments in accordance with DEFRA, Environment Agency and Environmental Protection UK (EPUK) and Institute of Air Quality Management (IAQM) methodologies.
- Management and delivery of project work on key, land development and urban regeneration projects.
- Assessment of road vehicle exhaust emissions using the Design Manual for Roads and Bridges (DMRB) calculation spreadsheet.
- Assessment of dust impacts from construction sites to the Institute of Air Quality Management (IAQM) methodology.
- Dust and Odour impact assessments from minerals and waste sites
- Representing clients at public enquiries and planning hearings.

QUALIFICATIONS:

- Bachelor of Engineering
- Master of Science
- Member of Institute of Air Quality Management
- Member of the Institute of Environmental Science (IES)

SELECT PROJECTS SUMMARY:

Industrial Developments

Buck Park, Denholme - AQA and dust assessment for proposed mineral extraction and site restoration project.

Messingham Quarry, North Lincolnshire - AQA and dust impacts for proposed new sand extraction site.

Arden Quarry, Derbyshire - AQA for proposed mineral extraction and site restoration

Calder Brick Works, Yorkshire - AQA for proposed site restoration plan

Coopers Moss, St Helens AQA and dust assessment for materials import and site restoration.

Clayton Hall Landfill, Chorley - AQA and odour assessment for proposed landfill extension and mineral extraction.

Highways Developments

Alderley Edge Bypass, Cheshire - AQA for major new road scheme.

South Heywood – EIA for new link road and mixed use joint development

Residential Developments

Beck's Mill, Silsden – AQA and emissions calculation for proposed residential development

Bredbury Curve, Stockport - AQA assessment for proposed residential development in AQMA.

Hollin Lane, Middlewich – AQA for large scale residential development.

Friars School, Southwark, London. School development for mixed use education and residential building in AQMA.

Abbotsford House, Bearsden, Scotland – AQA and dust assessment for residential development

Kelvedon Street, Newport, South Wale – AQA for new housing development

Westcraig, Edinburgh - EIA for residential development

Public Sector

Technical advisor on Manchester Airport Consultative Committee - advise members on environmental technical matters in relation to the airport's operations.

Cheshire County Council - compile AQ chapters for Local Transport Plan

Cheshire East Council - specialist AQ advice on highways, minerals and waste projects

Local Air Quality Management

Broughton Gyratory, Chester - dispersion model for City Centre detailed assessment report

Congleton town centre - dispersion modelling assessment for detailed and further assessment reports.

Disley - dispersion modelling assessment for detailed and further assessments

Holmes Chapel - dispersion modelling assessment for detailed and further assessment reports for road and rail sources.

Crewe - town centre dispersion modelling for detailed and further assessment reports.

Commercial Developments

Granta Park Daycare Centre, Oxfordshire. AQA for new build daycare centre adjacent to major road.

Curzon Cinema, Colchester. Air quality assessment for town centre new build cinema.

Newfoundland Circus, Bristol - AQA for hotel development in city centre

Salesians School, Chertsey - AQA for school extension near M25