PROFESSIONAL CONSULT

FUTURE ENVIRONMENTS

Air Quality Impact Assessment

Proposed Commercial Units - Mile End Road, Colwick

Client: **Meller**

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EXECUTIVE SUMMARY

This Air Quality Impact Assessment has been undertaken in support of a planning application for a proposed industrial/commercial development on land off Mile End Road, Colwick.

The proposals have the potential to cause air quality impacts at sensitive locations during the construction and operational phases. As such, an Air Quality Impact Assessment was undertaken in order to determine baseline conditions and assess potential effects as a result of the scheme.

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.

Potential impacts during the operational phase of the proposals may occur due to road traffic exhaust emissions associated with vehicles travelling to and from the site. Dispersion modelling was therefore undertaken in order to predict pollutant concentrations at sensitive locations as a result of emissions from the local highway network both with and without the development in place. Results were subsequently verified using local monitoring data.

Review of the dispersion modelling results indicated that predicted air quality impacts as a result of traffic generated by the development were not significant at any sensitive location in the vicinity of the site.

Consideration was made to the air quality planning guidance provided by the Local Authority. Suitable mitigation measures were subsequently identified in order to reduce potential impacts on air quality in the vicinity of the site.

Based on the assessment results, air quality factors are not considered a constraint to planning consent for the development.

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1 INTRODUCTION

1.1 Background

1.1.1 This Air Quality Impact Assessment has been prepared to support the planning application for a proposed industrial/commercial development on land off Mile End Road, Colwick.

1.1.2 The proposals have the potential to cause air quality impacts at sensitive locations during the construction and operational phases. As such, an Air Quality Impact Assessment was undertaken in order to determine baseline conditions and assess potential effects as a result of the scheme.

1.2 Site Location and Context

1.2.1 The site is located on land off Mile End Road, Colwick, at approximate National Grid Reference (NGR): 461496, 340108. Reference should be made to Figure 1 for a map of the site and surrounding area.

1.2.2 The proposals comprise demolition of the existing structures on site and subsequent construction of five multi-purpose industrial units.

1.2.3 The development has the potential to cause air quality impacts at sensitive locations. These may include fugitive dust emissions associated with construction works and road traffic exhaust emissions from vehicles travelling to and from the site during the operational phase. An Air Quality Impact Assessment was therefore undertaken in order to determine baseline and assess potential effects as a result of the proposals. This is detailed in the following report

1.2.4 All acronyms used within this report are defined in the Glossary presented in Appendix 1.

1.3 Confidentiality

1.3.1 Professional Consult has prepared this report solely for the use of the Client. Should any third party wish to use or rely upon the contents of the report, written approval must be sought from Professional Consult; a charge may be levied against such approval.

2 POLICY & GUIDANCE

2.1 Legislation

2.1.1 The Air Quality Standards Regulations (2010) and subsequent amendments include Air Quality Limit Values (AQLVs) for the following pollutants:

- Nitrogen dioxide (NO_2);
- Sulphur dioxide;
- Lead;
- Particulate matter with an aerodynamic diameter of less than 10µm (PM_{10});
- Particulate matter with an aerodynamic diameter of less than 2.5µm ($PM_{2.5}$);
- Benzene; and,
- Carbon monoxide.

2.1.2 Air Quality Target Values were also provided for several additional pollutants. It should be noted that the AQLV for $PM_{2.5}$ stated in the Air Quality Standards Regulations (2010) was amended in the Environment (Miscellaneous Amendments) (EU Exit) Regulations (2020).

2.1.3 The Air Quality Strategy (AQS) was produced by the Department for Environment, Food and Rural Affairs (DEFRA) and published in July 2007[1]. The document contains standards, objectives and measures for improving ambient air quality, including a number of Air Quality Objectives (AQOs). These are maximum ambient pollutant concentrations that are not to be exceeded either without exception or with a permitted number of exceedences over a specified timescale. These are generally in line with the AQLVs, although the requirements for the determination of compliance vary.

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

Table 1. Air Quality Objectives/Air Quality Limit Values

Pollutant	Air Quality Objective/Air Quality Limit Value	
	Concentration (µg/m³)	Averaging Period
NO_2	40	Annual mean
	200	1-hour mean, not to be exceeded on more than 18 occasions per annum
PM_{10}	40	Annual mean
	50	24-hour mean, not to be exceeded on more than 35 occasions per annum 50
$PM_{2.5}$	20	Annual mean

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

2.1.5 The Environment Act (2021) was published on 9th November 2021 and makes provision for the setting of lower $PM_{2.5}$ targets. However, the AQLV outlined in Table 1 remains the adopted air quality standard within the UK until further legislation is implemented.

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

Table 2. Examples of Where the Air Quality Objectives Apply

Averaging Period	Objective Should Apply At	Objective 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 and 8-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

2.2 Local Air Quality Management

2.2.1 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 comparing present and likely future pollutant concentrations against the AQOs. If it is predicted that levels at locations of relevant exposure, as summarised in Table 2, are likely to be exceeded, the LA is required to declare an Air Quality Management Area (AQMA). For each AQMA the LA is required to produce an Air Quality Action Plan, the objective of which is to reduce pollutant concentrations in pursuit of the AQOs.

2.3 Dust

2.3.1 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."

2.3.2 Enforcement of the Act, in regard to nuisance, is currently under the jurisdiction of the local Environmental Health Department, whose officers are deemed to provide an independent evaluation of nuisance. If the LA is satisfied

[2] Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

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). 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 practicable means.

2.4 National Planning Policy

2.4.1 The revised National Planning Policy Framework [3] (NPPF) was published in July 2021 and sets out the Government's planning policies for England and how these are expected to be applied.

2.4.2 The purpose of the planning system is to contribute to the achievement of sustainable development. In order to ensure this, the NPPF recognises three overarching objectives, including the following of relevance to air quality:

"c) An environmental objective - to protect and enhance our natural, built and historic environment; including making effective use of land, improving biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy."

2.4.3 Chapter 15 of the NPPF details objectives in relation to conserving and enhancing the natural environment. It states that:

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

[…]

e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality […]"

2.4.4 The NPPF specifically recognises air quality as part of delivering sustainable development and states that:

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

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

2.5 National Planning Practice Guidance

2.5.1 The National Planning Practice Guidance[4] (NPPG) web-based resource was launched by the Department for Communities and Local Government on 6th March 2014 and updated on 1st November 2019 to support the NPPF and make it more accessible. The air quality pages are summarised under the following headings:

1. What air quality considerations does planning need to address?
2. What is the role of plan-making with regard to air quality?
3. Are air quality concerns relevant to neighbourhood planning?
4. What information is available about air quality?

[3] NPPF, Ministry of Housing, Communities and Local Government, 2021.
[4] https://www.gov.uk/guidance/air-quality--3.

5. When could air quality considerations be relevant to the development management process?
6. What specific issues may need to be considered when assessing air quality impacts?
7. How detailed does an air quality assessment need to be?
8. How can an impact on air quality be mitigated?

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

2.6 Local Planning Policy

2.6.1 The Gedling Local Plan comprises of two documents. These are the Aligned Core Strategy (Part 1 Local Plan)[5] adopted by Gedling Borough Council (GBC) on 10th September 2014 and the Local Planning Document (Part 2 Local Plan)[6] adopted on 18th July 2018.

2.6.2 Review of the Aligned Core Strategy (Part 1 Local Plan) document indicated the following policy of relevance to this assessment:

"Policy 10: Design and Enhancing Local Identity

[…]

2. Development will be assessed in terms of its treatment of the following elements:

[…]

f) impact on the amenity of nearby residents or occupiers; […]"

2.6.3 Review of the Local Planning Document (Part 2 Local Plan) indicated the following policies of relevance to this assessment:

"Policy LPD 10 - Pollution

Planning permission will not be granted for development which would result in:-

a. an unacceptable level of pollution or is likely to result in exposure to sources of pollution or risks to safety;

[…]

c. unacceptable harm to the historic environment, the natural environment or the character of the landscape;

unless measures can be implemented to minimise pollution and risk to a level that provides a high standard of protection for health, environmental quality and amenity.
Proposals for development must identify potential nuisance issues arising from the nature of the proposal and address impacts on that development from existing land uses.
Conditions will be imposed relating to the restrictions or mitigation of pollution effects where appropriate."

"Policy LPD 11 - Air Quality

Planning permission will not be granted for development proposals that have the potential to adversely impact on air quality, unless measures to mitigate or offset their emissions and impacts have been incorporated, in

5 Gedling Borough Aligned Core Strategies Part 1 Local Plan, GBC, 2014.
6 Gedling Borough Local Planning Document Part 2 Local Plan, GBC, 2018.

accordance with the Borough Council's Air Quality and Emissions Mitigation guidance and other associated guidance documents.
In areas where air quality is a matter of concern, development proposals will be required to deliver a positive impact on air quality.
Development proposals must not exacerbate air quality beyond acceptable levels, either through poor design or as a consequence of site selection."

"Policy LPD 32 - Amenity

Planning permission will be granted for development proposals that do not have a significant adverse impact on the amenity of nearby residents or occupiers, taking into account potential mitigation measures. This will include consideration of the following issues:

[…]

h. other forms of pollution;

[…]"

2.6.4 The East Midlands Air Quality Network (EMAQN) has produced the 'Air Quality and Emissions Mitigation Guidance for Developers' Supplementary Planning Document (SPD)[7]. This was adopted by GBC in 2019.

2.6.5 The above policies and SPD were considered as necessary throughout the undertaking of the assessment.

[7] Air Quality and Emissions Mitigation Guidance for Developers, EMAQN, GBC, 2019.

3 METHODOLOGY

3.1 Introduction

3.1.1 The proposed development has the potential to cause air quality impacts during the construction and operational phases. These have been assessed in accordance with the following methodology, which was agreed with Brendan Cox, Scientific Officer - Public Protection at GBC, on 29th November 2022.

3.2 Construction Phase Assessment

3.2.1 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 V1.1'[8].

3.2.2 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.

3.2.3 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;
- The risk of health effects due to a significant increase in exposure to PM_{10}.

3.2.4 The assessment steps are detailed below.

Step 1

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

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

Step 2

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

[8] Guidance on the Assessment of Dust from Demolition and Construction V1.1, IAQM, 2016.

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

3.2.8 The two factors are combined in Step 2C to determine the risk of dust impacts without mitigation applied.

3.2.9 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 volume of building to be demolished greater than 50,000m³ • Potentially dusty material (e.g. concrete) • On-site crushing and screening • Demolition activities more than 20m above ground level
	Earthworks	• Total site area greater than 10,000m² • 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 100,000m³ • 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 volume of building to be demolished between 20,000m³ and 50,000m³ • Potentially dusty construction material • Demolition activities 10m to 20m above ground level
	Earthworks	• Total site area 2,500m² to 10,000m² • Moderately dusty soil type (e.g. silt) • 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 25,000m³ to 100,000m³ • 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
Low	Demolition	• Total volume of building to be demolished less than 20,000m³ • Construction material with low potential for dust release (e.g. metal cladding or timber) • Demolition activities less than 10m above ground and during wetter months
	Earthworks	• Total site area less than 2,500m² • 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 25,000m³ • Construction material with low potential for dust release (e.g. metal cladding or timber)

Magnitude	Activity	Criteria
	Trackout	• Less than 10 HDV trips per day • Surface material with low potential for dust release • Unpaved road length less than 50m

3.2.10 Step 2B defines the sensitivity of the area around the development to potential dust impacts. The influencing factors are shown in Table 4.

Table 4. Construction Dust - Examples of Factors Defining Sensitivity of an Area

Receptor Sensitivity	Examples	
	Human Receptors	**Ecological Receptors**
High	• Users expect 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
Medium	• Users expect to enjoy a reasonable level of amenity • Aesthetic 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, shopping streets, playing fields, farmland, short term car parks and roads	• Locally designated site e.g. Local Nature Reserve

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

- 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 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.

3.2.12 These factors were considered in the undertaking of this assessment.

3.2.13 The criteria for determining the sensitivity of the area to dust soiling effects on people and property is summarised in Table 5.

Table 5. Construction Dust - 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
Medium	More than 1	Medium	Low	Low	Low
Low	More than 1	Low	Low	Low	Low

3.2.14 Table 6 outlines the criteria for determining the sensitivity of the area to human health impacts.

Table 6. Construction Dust - Sensitivity of the Area to Human Health Impacts

Receptor Sensitivity	Background 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

Receptor Sensitivity	Background 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
		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
Low	-	1 or more	Low	Low	Low	Low	Low

3.2.15 Table 7 outlines the criteria for determining the sensitivity of the area to ecological impacts.

Table 7. Construction Dust - 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

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

3.2.17 Table 8 outlines the risk category from demolition activities.

Table 8. Construction Dust - Dust Risk Category from Demolition Activities

Receptor Sensitivity	Dust Emission Magnitude		
	Large	Medium	Small
High	High	Medium	Medium
Medium	High	Medium	Low
Low	Medium	Low	Negligible

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

Table 9. Construction Dust - Dust Risk Category from Earthworks and Construction Activities

Receptor Sensitivity	Dust Emission Magnitude		
	Large	Medium	Small
High	High	Medium	Low
Medium	Medium	Medium	Low
Low	Low	Low	Negligible

3.2.19 Table 10 outlines the risk category from trackout activities.

Table 10. Construction Dust - Dust Risk Category from Trackout Activities

Receptor Sensitivity	Dust Emission Magnitude		
	Large	Medium	Small
High	High	Medium	Low
Medium	Medium	Low	Negligible
Low	Low	Low	Negligible

Step 3

3.2.20 Step 3 requires the identification of site specific mitigation measures within the IAQM guidance[9] 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.

Step 4

3.2.21 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**.

3.3 Operational Phase Assessment

3.3.1 The proposed development has the potential to affect existing air quality as a result of road traffic exhaust emissions associated with vehicles travelling to and from the site. Potential impacts have therefore been defined by predicting pollutant concentrations at sensitive locations using dispersion modelling for the following scenarios:

- 2019 - Verification;
- Opening year Do-Minimum (DM) (predicted traffic flows in 2025 should the proposal not proceed); and;

[9] Guidance on the Assessment of Dust from Demolition and Construction V1.1, IAQM, 2016.

- Opening year Do-Something (DS) (predicted traffic flows in 2025 should the proposals be completed).

3.3.2 Reference should be made to Appendix 2 for assessment input data and details of the verification process.

3.3.3 Locations sensitive to potential changes in pollutant concentrations were identified within 200m of the highway network in accordance with the guidance provided within the 'Design Manual for Roads and Bridges' (DMRB)[10] on the likely limits of pollutant dispersion from road sources. The criteria provided within DEFRA guidance[11] on where the AQOs apply, as summarised in Table 2, was utilised to determine worst-case receptor positions in the vicinity of links likely to be affected by changes in traffic flows as a result of the development.

3.3.4 The significance of predicted air quality impacts was determined in accordance with the guidance provided within the IAQM document 'Land-Use Planning & Development Control: Planning for Air Quality'[12]. Using this methodology impacts were defined based on the interaction between the predicted pollutant concentration from the DS scenario and the magnitude of change between the DM and DS scenarios, as outlined in in Table 11.

Table 11. Significance of Road Vehicle Exhaust Emission Impact

Concentration at Receptor in Assessment Year	Predicted Concentration Change as Proportion of AQO/ AQLV (%)			
	1	2 - 5	6 - 10	> 10
75% or less of AQO/ AQLV	Negligible	Negligible	Slight	Moderate
76 - 94% of AQO/ AQLV	Negligible	Slight	Moderate	Moderate
95 - 102% of AQO/ AQLV	Slight	Moderate	Moderate	Substantial
103 - 109% of AQO/ AQLV	Moderate	Moderate	Substantial	Substantial
110% or more of AQO/ AQLV	Moderate	Substantial	Substantial	Substantial

3.3.5 The matrix shown in Table 11 is intended to be used by rounding the change in percentage pollutant concentration to whole numbers, which makes it clearer which cell the impact falls within. It should be noted that changes of 0%, i.e. less than 0.5%, are described as **negligible**.

3.3.6 Following the prediction of impacts at discrete receptor locations, the IAQM document[13] provides guidance on determining the overall air quality impact significance of the operation of a development. The following factors are identified for consideration by the assessor:

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

3.3.7 The IAQM guidance states that an assessment must reach a conclusion on the likely significance of the predicted impact. Where the overall effect is **moderate** or **substantial**, the effect is likely to be considered **significant**, whilst if the impact is **slight** or **negligible**, the impact is likely to be considered **not significant**. It should be noted that this is a binary judgement of either it is **significant** or it is **not significant**.

10 LA 105: Air Quality, Highways England, 2019.
11 Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.
12 Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.
13 Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.

3.3.8 The determination of significance relies on professional judgement and reasoning has been provided as far as practicable. The IAQM guidance[14] suggests the provision of details of the assessor's qualifications and experience. These may be provided on request.

[14] Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.

4 BASELINE

4.1 Introduction

4.1.1 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.

4.2 Local Air Quality Management

4.2.1 As required by the Environment Act (1995), GBC has undertaken Review and Assessment of air quality within their area of jurisdiction. This process has indicated that annual mean concentrations of NO_2 are above the AQO within the borough. As such, one AQMA has been declared. This is described as follows:

"Incorporating land adjacent to a stretch of the A60 Mansfield Road from its junction with Oxclose Lane and Cross Street south to its junction with Egerton Road."

4.2.2 The development is located approximately 5.3km south-east of the AQMA. It is considered unlikely the proposals would cause air quality impacts over a distance of this magnitude. As such, the AQMA has not been considered further in the context of this assessment.

4.2.3 The site is located approximately 370m east of Nottingham City Council's (NCC's) administrative extents. NCC has also undertaken Review and Assessment of air quality. This process has indicated that annual mean concentrations of NO_2 are above the AQO within the city. As such, one AQMA has been declared. This is described as follows:

"The AQMA covers the entire administrative area of Nottingham City Council."

4.2.4 The development is located approximately 370m east of the AQMA. As such, there is the potential for vehicles travelling to and from the site to increase pollution levels in this sensitive area. This has therefore been considered throughout the assessment.

4.2.5 GBC and NCC have concluded that concentrations of all other pollutants considered within the AQS are currently below the relevant AQOs. As such, no further AQMAs have been designated.

4.3 Air Quality Monitoring

4.3.1 Monitoring of pollutant concentrations is undertaken by GBC throughout their area of jurisdiction. Recent annual mean NO_2 concentrations recorded in the vicinity of the development are shown in Table 12.

Table 12. Monitoring Results

Monitoring Site		Monitored NO_2 Concentration (µg/m³)		
		2019	2020	2021
87411	Colwick Park Close	21.0	15.8	18.7
87460	Rectory Road/ Vale Road	24.0	18.6	21.0
87461	Mile End Road	31.0	24.7	25.5

4.3.2 As shown in Table 12, annual mean NO_2 concentrations were below the AQO of 40µg/m³ at all monitoring locations in recent years. Reference should be made to Figure 2 for a map of the survey positions.

4.3.3 Pollutant concentrations during 2020 and 2021 were lower than previous years due to a reduction in traffic and associated emissions caused by the COVID-19 pandemic. The results should therefore be viewed with caution.

4.3.4 GBC do not undertake PM_{10} or $PM_{2.5}$ monitoring within the vicinity of the site.

4.4 Background Pollutant Concentrations

4.4.1 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: 461500, 340500. Data for this location was downloaded from the DEFRA website[15] for the purpose of the assessment and is summarised in Table 13.

Table 13. Background Pollutant Concentration Predictions

Pollutant	Predicted Background Pollutant Concentration (µg/m³)		
	2019	2023	2025
NO_2	17.54	15.49	14.65
PM_{10}	13.97	13.25	12.97
$PM_{2.5}$	9.23	8.68	8.46

4.4.2 As shown in Table 12, predicted background NO_2, PM_{10} and $PM_{2.5}$ concentrations are below the relevant AQOs and AQLV at the development site.

4.5 Sensitive Receptors

4.5.1 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.

Construction Phase Sensitive Receptors

4.5.2 Receptors sensitive to potential dust impacts during demolition, earthworks and construction were identified from a desk-top study of the area up to 350m from the development boundary. These are summarised in Table 14.

Table 14. Demolition, Earthworks and Construction Dust Sensitive Receptors

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

4.5.3 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. These are summarised in Table 15.

[15] https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2018.

Table 15. Trackout Dust Sensitive Receptors

Distance from Site Access Route (m)	Approximate Number of Human Receptors	Approximate Number of Ecological Receptors
Up to 20	10 - 100	0
Up to 50	More than 100	0

4.5.4 There are no ecological receptors within 50m of the development boundary or the access route within 500m of the site entrance. As such, ecological impacts have not been assessed further within this report.

4.5.5 A number of additional factors have been considered when determining the sensitivity of the surrounding area. These are summarised These are summarised in Table 16.

Table 16. Additional Area Sensitivity Factors to Potential Dust Impacts

Guidance	Comment
Whether there is any history of dust generating activities in the area	A review of Google Maps imagery indicated a Sainsburys supermarket is currently being constructed approximately 570m east of the site. It is possible that construction of the development may have caused dust generation in the area in recent months
The likelihood of concurrent dust generating activity on nearby sites	A review of the planning portal did not indicate any additional development proposals likely to result in concurrent dust generation in the vicinity of the site
Pre-existing screening between the source and the receptors	Trees are located along the northern, southern and western site boundaries. These may act as a barrier between emission sources and receptors should they be retained during the construction phase
Conclusions drawn from analysing local meteorological data which accurately represent the area: and if relevant the season during which works will take place	As shown in Figure 3, the predominant wind bearing at the site is from the south-west. As such, receptors to the north-east of the boundary are most likely to be affected by dust releases
Conclusions drawn from local topography	There are no significant topographical constraints to dust dispersion
Duration of the potential impact, as a receptor may become more sensitive over time	Currently it is unclear as to the duration of the construction phase. However, it is possible that it will extend over one year. The sensitivity of nearby receptors is unlikely to change during this time
Any known specific receptor sensitivities which go beyond the classifications given in the document	No specific receptor sensitivities identified during the baseline assessment

4.5.6 Based on the criteria shown in Table 4, the sensitivity of the receiving environment to potential dust impacts was determined as **high**. This was because the identified receptors included residential properties.

4.5.7 The sensitivity of the receiving environment to specific potential dust impacts, based on the criteria shown in Section 3.2, is shown in Table 17.

Table 17. Sensitivity of the Surrounding Area to Potential Dust Impacts

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

Operational Phase Sensitive Receptors

4.5.8 Locations sensitive to potential operational phase road vehicle exhaust emission impacts were identified from a desk-top study and are summarised in Table 18.

Table 18. Operational Phase Road Vehicle Exhaust Emission Sensitive Receptor Locations

Receptor		NGR (m)	
		X	Y
R1	Residential - Crosslands Meadow	461504.6	340014.6
R2	Residential - Colwick Manor Farm	461455.4	340060.7
R3	Residential - Mile End Road	461341.6	340039.2
R4	Residential - Mile End Road	461228.3	340011.6
R5	Residential - Mile End Road	461216.0	340062.7
R6	Residential - A612 Colwick Loop Road	461199.2	340105.8
R7	Residential - A612 Colwick Loop Road	461277.1	340147.4
R8	Residential - Valeside Gardens	461482.4	340311.5
R9	Residential - First Avenue	461186.4	340130.3
R10	Residential - A612 Daleside Road East	461090.0	340118.4
R11	Residential - A612 Daleside Road East	461060.9	340096.1
R12	Residential - Byron Close	460786.2	340099.0

4.5.9 Reference should be made to Figure 4 for a graphical representation of road vehicle exhaust emission sensitive receptor locations.

5 ASSESSMENT

5.1 Introduction

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

5.2 Construction Phase Assessment

Step 1

5.2.1 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 roads and highway surfaces.

5.2.2 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.

5.2.3 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.

Step 2

Demolition

5.2.4 Demolition will be undertaken at the start of the construction phase and will involve clearance of existing buildings on site. It is estimated that the total building volume to be demolished is less than 20,000m^3. In accordance with the criteria outlined in Table 3, the magnitude of potential dust emissions from demolition is therefore **small**.

5.2.5 Table 17 indicates the sensitivity of the area to dust soiling effects on people and property is **high**. In accordance with the criteria outlined in Table 8, the development is considered to be a **medium** risk site for dust soiling as a result of demolition activities.

5.2.6 Table 17 indicates the sensitivity of the area to human health impacts is **low**. In accordance with the criteria outlined in Table 8, the development is considered to be a **negligible** risk site for human health impacts as a result of demolition activities.

Earthworks

5.2.7 Earthworks will primarily involve excavating material, haulage, tipping and stockpiling, as well as site levelling and landscaping. The proposed development site covers an area between 2,500m^2 and 10,000m^2. In accordance with the criteria outlined in Table 3, the magnitude of potential dust emissions from earthworks is therefore **medium**.

5.2.8 Table 17 indicates the sensitivity of the area to dust soiling effects on people and property is **high**. 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.

5.2.9 Table 17 indicates the sensitivity of the area to human health impacts is **low**. In accordance with the criteria outlined in Table 9, the development is considered to be a **low** risk site for human health impacts as a result of earthworks.

Construction

5.2.10 Due to the size of the development the total building volume is likely to be less than 25,000m^3. In accordance with the criteria outlined in Table 3, the magnitude of potential dust emissions from construction is therefore **small**.

5.2.11 Table 17 indicates the sensitivity of the area to dust soiling effects on people and property is **high**. In accordance with the criteria outlined in Table 9, the development is considered to be a **low** risk site for dust soiling as a result of construction activities.

5.2.12 Table 17 indicates the sensitivity of the area to human health impacts is **low**. In accordance with the criteria outlined in Table 9, the development is considered to be a **negligible** risk site for human health impacts as a result of construction activities.

Trackout

5.2.13 Based on the site area, it is anticipated that the unpaved road length will be less than 50m. In accordance with the criteria outlined in Table 3, the magnitude of potential dust emissions from trackout is therefore **small**.

5.2.14 Table 17 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.

5.2.15 Table 17 indicates the sensitivity of the area to human health impacts is **low**. In accordance with the criteria outlined in Table 10, the development is considered to be a **negligible** risk site for human health impacts as a result of trackout activities.

Summary of the Risk of Dust Effects

5.2.16 A summary of the risk from each dust generating activity is provided in Table 19.

Table 19. Summary of Potential Unmitigated Dust Risks

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

5.2.17 As indicated in Table 19, the potential risk of dust soiling is **medium** from demolition and earthworks and **low** from construction and trackout. The potential risk of human health impacts is **low** from earthworks and **negligible** from demolition, construction and trackout.

5.2.18 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.

Step 3

5.2.19 The IAQM guidance[16] provides potential mitigation measures to reduce impacts as a result of fugitive dust emissions during the construction phase. These have been adapted for the development site as summarised in Table 20. These may be reviewed prior to the commencement of construction works and incorporated into a Construction Environmental Management Plan (CEMP) or similar if required by the LA.

Table 20. Fugitive Dust Emission Mitigation Measures

Issue	Control Measure
Communications	• Develop and implement a stakeholder communications plan that includes community engagement before work commences on site • Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager • Display the head or regional office contact information • Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the LA
Site management	• Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken • Make the complaints log available to the LA upon request • Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the log book
Monitoring	• Undertake daily on-site and off-site inspection to monitor dust, record inspection results, and make the log available to the LA upon request • Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the LA upon request • Increase the frequency of site inspections when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions
Site preparation	• Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible • Fully enclose site or specific operations where there is a high potential for dust production and they are active for an extensive period • Avoid site runoff of water or mud • Keep site fencing, barriers and scaffolding clean using wet methods • Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used • Cover, seed or fence stockpiles to prevent wind whipping
Operating vehicle/machinery and sustainable travel	• Ensure all vehicles switch off engines when stationary - no idling vehicles • Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable • Impose and signpost a maximum-speed-limit of 15mph on surfaced and 10mph on unsurfaced haul roads and work areas • Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials
Operations	• Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques • Ensure an adequate water supply on the site for effective dust suppression, using non-potable water where possible and appropriate • Use enclosed chutes and conveyors and covered skips • Minimise drop heights and use fine water sprays wherever appropriate • Ensure equipment is available to clean any dry spillages, and clean up spillages as soon as reasonably practicable using wet cleaning methods
Waste management	• Avoid bonfires or burning of waste materials
Demolition	• Ensure effective water suppression is used during demolition operations • Avoid explosive blasting, using appropriate manual or mechanical alternatives • Bag and remove any biological debris or damp down such material before demolition

[16] Guidance on the Assessment of Dust from Demolition and Construction V1.1, IAQM, 2016.

Issue	Control Measure
Earthworks	• Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable • Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil as soon as practicable • Only remove the cover in small areas and not all at once
Construction	• Avoid scabbling (roughening of concrete surfaces) if possible • Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out • Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos
Trackout	• Use water-assisted dust sweeper on access and local roads, if required • Avoid dry sweeping of large areas • Ensure vehicles entering and leaving site are covered to prevent escape of materials • Implement a wheel washing system, if required

Step 4

5.2.20 Assuming the relevant mitigation measures outlined in Table 20 are implemented, the residual impact from all dust generating activities is predicted to be **not significant**, in accordance with the IAQM guidance[17].

5.3 Operational Phase Assessment

5.3.1 Vehicle movements associated with the operation of the proposal will generate exhaust emissions 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.

5.3.2 The assessment considered the following scenarios:

- 2019 - Verification;
- 2025 - DM; and,
- 2025 - DS.

5.3.3 The DM scenario (i.e. without development) included baseline traffic data, inclusive of anticipated growth, for the relevant assessment year. The DS scenario (i.e. with development) included baseline traffic data, inclusive of anticipated growth, for the relevant assessment year, in addition to predicted vehicle trips associated with the operation of the proposals.

5.3.4 For the purpose of the assessment traffic data for 2025 was utilised as the development opening year. Air quality is predicted to improve in the future. However, in order to provide a robust assessment, emissions factors for 2019 were utilised within the dispersion model. The use of 2025 traffic data and 2019 emission factors is considered to provide a worst-case scenario and therefore a sufficient level of confidence can be placed within the predicted pollution concentrations.

5.3.5 Reference should be made to Appendix 2 for full assessment input details.

Predicted Concentrations

5.3.6 Annual mean NO_2 concentrations were predicted at the sensitive receptor locations for the DM and DS scenarios. These are summarised in Table 21.

[17] Guidance on the Assessment of Dust from Demolition and Construction V1.1, IAQM, 2016.

Table 21. Predicted Annual Mean NO_2 Concentrations

Receptor		Predicted Annual Mean NO_2 Concentration (µg/m³)		
		DM	DS	Change
R1	Residential - Crosslands Meadow	19.08	19.10	0.02
R2	Residential - Colwick Manor Farm	21.08	21.19	0.11
R3	Residential - Mile End Road	21.74	21.89	0.15
R4	Residential - Mile End Road	20.70	20.80	0.10
R5	Residential - Mile End Road	23.72	23.92	0.20
R6	Residential - A612 Colwick Loop Road	29.68	29.84	0.16
R7	Residential - A612 Colwick Loop Road	25.43	25.50	0.07
R8	Residential - Valeside Gardens	22.00	22.04	0.04
R9	Residential - First Avenue	28.67	28.78	0.11
R10	Residential - A612 Daleside Road East	30.36	30.46	0.10
R11	Residential - A612 Daleside Road East	27.01	27.08	0.07
R12	Residential - Byron Close	27.14	27.21	0.07

5.3.7 As indicated in Table 21, predicted annual mean NO_2 concentrations were below the relevant AQO at all receptor locations in both scenarios.

5.3.8 Reference should be made to Figures 5 and 6 for graphical representations of annual mean NO_2 concentrations across the assessment area for the DM and DS scenarios, respectively.

5.3.9 Annual mean PM_{10} concentrations were predicted at the sensitive receptor locations for the DM and DS scenarios. These are summarised in in Table 22.

Table 22. Predicted Annual Mean PM_{10} Concentrations

Receptor		Predicted Annual Mean PM_{10} Concentration (µg/m³)		
		DM	DS	Change
R1	Residential - Crosslands Meadow	14.27	14.27	0.01
R2	Residential - Colwick Manor Farm	14.66	14.68	0.02
R3	Residential - Mile End Road	14.78	14.81	0.03
R4	Residential - Mile End Road	14.54	14.56	0.02
R5	Residential - Mile End Road	15.02	15.05	0.03
R6	Residential - A612 Colwick Loop Road	16.11	16.13	0.03

Receptor		Predicted Annual Mean PM_{10} Concentration (µg/m³)		
		DM	DS	Change
R7	Residential - A612 Colwick Loop Road	15.63	15.65	0.01
R8	Residential - Valeside Gardens	14.93	14.94	0.01
R9	Residential - First Avenue	16.01	16.03	0.02
R10	Residential - A612 Daleside Road East	16.15	16.17	0.02
R11	Residential - A612 Daleside Road East	15.57	15.58	0.01
R12	Residential - Byron Close	15.86	15.88	0.01

5.3.10 As indicated in Table 22, predicted annual mean PM_{10} concentrations were below the relevant AQO at all receptor locations in both scenarios.

5.3.11 Reference should be made to Figures 7 and 8 for graphical representations of annual mean PM_{10} concentrations across the assessment area for the DM and DS scenarios, respectively.

5.3.12 Annual mean $PM_{2.5}$ concentrations were predicted at the sensitive receptor locations for the DM and DS scenarios. These are summarised in Table 23.

Table 23. Predicted Annual Mean $PM_{2.5}$ Concentrations

Receptor		Predicted Annual Mean $PM_{2.5}$ Concentration (µg/m³)		
		DM	DS	Change
R1	Residential - Crosslands Meadow	9.40	9.41	0.00
R2	Residential - Colwick Manor Farm	9.63	9.64	0.01
R3	Residential - Mile End Road	9.70	9.72	0.02
R4	Residential - Mile End Road	9.57	9.58	0.01
R5	Residential - Mile End Road	9.85	9.87	0.02
R6	Residential - A612 Colwick Loop Road	10.49	10.50	0.02
R7	Residential - A612 Colwick Loop Road	10.19	10.20	0.01
R8	Residential - Valeside Gardens	9.79	9.79	0.00
R9	Residential - First Avenue	10.42	10.44	0.01
R10	Residential - A612 Daleside Road East	10.52	10.53	0.01
R11	Residential - A612 Daleside Road East	10.17	10.18	0.01
R12	Residential - Byron Close	10.33	10.34	0.01

5.3.13 As indicated in Table 23, predicted annual mean $PM_{2.5}$ concentrations were below the relevant AQLV at all receptor locations in both scenarios.

5.3.14 Reference should be made to Figures 9 and 10 for graphical representations of annual mean $PM_{2.5}$ concentrations across the assessment area for the DM and DS scenarios, respectively.

Predicted Impacts

5.3.15 Predicted impacts on annual mean NO_2 concentrations at the sensitive receptor locations are summarised in Table 24.

Table 24. Predicted Impacts - NO_2

Receptor		Predicted Annual Mean NO_2 Concentration	Predicted Concentration Change as Proportion of AQO (%)	Impact Significance
R1	Residential - Crosslands Meadow	Below 75% of AQO	0	Negligible
R2	Residential - Colwick Manor Farm	Below 75% of AQO	0	Negligible
R3	Residential - Mile End Road	Below 75% of AQO	0	Negligible
R4	Residential - Mile End Road	Below 75% of AQO	0	Negligible
R5	Residential - Mile End Road	Below 75% of AQO	1	Negligible
R6	Residential - A612 Colwick Loop Road	Below 75% of AQO	0	Negligible
R7	Residential - A612 Colwick Loop Road	Below 75% of AQO	0	Negligible
R8	Residential - Valeside Gardens	Below 75% of AQO	0	Negligible
R9	Residential - First Avenue	Below 75% of AQO	0	Negligible
R10	Residential - A612 Daleside Road East	76 - 94% of AQO	0	Negligible
R11	Residential - A612 Daleside Road East	Below 75% of AQO	0	Negligible
R12	Residential - Byron Close	Below 75% of AQO	0	Negligible

5.3.16 As indicated in Table 24, impacts on annual mean NO_2 concentrations as a result of the proposed development were predicted to be **negligible** at all receptor locations.

5.3.17 Predicted impacts on annual mean PM_{10} concentrations at the sensitive receptor locations are summarised in Table 25.

Table 25. Predicted Impacts - PM_{10}

Receptor		Predicted Annual Mean PM_{10} Concentration	Predicted Concentration Change as Proportion of AQO (%)	Impact Significance
R1	Residential - Crosslands Meadow	Below 75% of AQO	0	Negligible
R2	Residential - Colwick Manor Farm	Below 75% of AQO	0	Negligible

Receptor		Predicted Annual Mean PM_{10} Concentration	Predicted Concentration Change as Proportion of AQO (%)	Impact Significance
R3	Residential - Mile End Road	Below 75% of AQO	0	Negligible
R4	Residential - Mile End Road	Below 75% of AQO	0	Negligible
R5	Residential - Mile End Road	Below 75% of AQO	0	Negligible
R6	Residential - A612 Colwick Loop Road	Below 75% of AQO	0	Negligible
R7	Residential - A612 Colwick Loop Road	Below 75% of AQO	0	Negligible
R8	Residential - Valeside Gardens	Below 75% of AQO	0	Negligible
R9	Residential - First Avenue	Below 75% of AQO	0	Negligible
R10	Residential - A612 Daleside Road East	Below 75% of AQO	0	Negligible
R11	Residential - A612 Daleside Road East	Below 75% of AQO	0	Negligible
R12	Residential - Byron Close	Below 75% of AQO	0	Negligible

5.3.18 As indicated in Table 25, impacts on annual mean PM_{10} concentrations as a result of the proposed development were predicted to be **negligible** at all receptor locations.

5.3.19 Predicted impacts on annual mean $PM_{2.5}$ concentrations at the sensitive receptor locations are summarised in Table 26.

Table 26. Predicted Impacts - $PM_{2.5}$

Receptor		Predicted Annual Mean $PM_{2.5}$ Concentration	Predicted Concentration Change as Proportion of AQLV (%)	Impact Significance
R1	Residential - Crosslands Meadow	Below 75% of AQLV	0	Negligible
R2	Residential - Colwick Manor Farm	Below 75% of AQLV	0	Negligible
R3	Residential - Mile End Road	Below 75% of AQLV	0	Negligible
R4	Residential - Mile End Road	Below 75% of AQLV	0	Negligible
R5	Residential - Mile End Road	Below 75% of AQLV	0	Negligible
R6	Residential - A612 Colwick Loop Road	Below 75% of AQLV	0	Negligible
R7	Residential - A612 Colwick Loop Road	Below 75% of AQLV	0	Negligible
R8	Residential - Valeside Gardens	Below 75% of AQLV	0	Negligible
R9	Residential - First Avenue	Below 75% of AQLV	0	Negligible
R10	Residential - A612 Daleside Road East	Below 75% of AQLV	0	Negligible

Receptor		Predicted Annual Mean $PM_{2.5}$ Concentration	Predicted Concentration Change as Proportion of AQLV (%)	Impact Significance
R11	Residential - A612 Daleside Road East	Below 75% of AQLV	0	Negligible
R12	Residential - Byron Close	Below 75% of AQLV	0	Negligible

5.3.20 As indicated in Table 26, impacts on annual mean $PM_{2.5}$ concentrations as a result of the proposed development were predicted to be **negligible** at all receptor locations.

Overall Impact Significance

5.3.21 The overall significance of operational phase road traffic emission impacts was determined as **negligible**. This was based on the overall predicted impacts at discrete receptor locations and the considerations outlined previously. Further justification is provided in Table 27.

Table 27. Overall Road Vehicle Exhaust Emissions Impact Significance

Guidance	Comment
The existing and future air quality in the absence of the development	Predicted annual mean NO_2, PM_{10} and $PM_{2.5}$ concentrations were below the AQOs and AQLV at all sensitive receptors in the DM scenario. It is considered unlikely that future air quality conditions will change significantly in the absence of the development given the relatively established nature of the area
The extent of current and future population exposure to the impacts	The development is not predicted to affect the population exposed to exceedences of the AQOs
The influence and validity of any assumptions adopted when undertaking the prediction of impacts	The assessment assumed that vehicle exhaust emission rates and pollutant background concentrations will not reduce in future years. This provides worst-case results when compared with DEFRA and National Highways methodologies Due to the adopted assumptions it is considered the presented results are sufficiently robust for an assessment of this nature

5.3.22 The IAQM guidance[18] states that only if the impact is greater than **slight**, the effect is considered **significant**. As impacts were predicted to be **negligible**, overall effects are considered **not significant**, in accordance with the stated methodology.

5.4 EMAQN Air Quality and Emissions Mitigation Guidance

5.4.1 The EMAQN Air Quality and Emissions Mitigation Guidance[19] has been developed to supplement the NPPF. The document aims to improve air quality across the East Midlands by, where possible, preventing new emissions sources or encouraging emissions reductions.

5.4.2 The guidance provides a methodology for determining scale of a development as small, medium or large and the required air quality mitigation for the relevant banding. Review of the criteria indicated the proposals were classified as **medium** under the following categories:

- General industrial (B2) less than 4,000m^2 (GFA); and,
- Any developments generating 100 or more two-way vehicle movements per day.

18 Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.
19 Air Quality and Emissions Mitigation Guidance for Developers, EMAQN, GC, 2021.

5.4.3 The guidance provides a number of mitigation measures that should be included within **medium** scale developments. These were reviewed and the following included in the proposals:

- Provision of Electric Vehicle (EV) charging points;
- Implementation of the mitigation measures outlined within the IAQM guidance[20], as summarised in Table 19, to control emissions during the construction phase of the development; and,
- Provision of secure cycle storage for staff.

5.4.4 The implementation of the above measures is considered appropriate for a development of this size and nature and will further assist with minimising air quality effects as a result of construction dust and vehicle exhaust emissions.

[20] Guidance on the Assessment of Dust from Demolition and Construction V1.1, IAQM, 2016.

6 CONCLUSION

6.1.1 Professional Consult Limited, working with our approved associate consultant Redmore Environmental Ltd, was instructed by Meller, to prepare an Air Quality Impact Assessment in support of a planning application for a proposed industrial/commercial development on land off Mile End Road, Colwick.

6.1.2 The proposals have the potential to cause air quality impacts at sensitive locations during the construction and operational phases. As such, an Air Quality Impact Assessment was undertaken in order to determine baseline conditions and assess potential effects as a result of the scheme.

6.1.3 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 demolition, earthworks, construction and trackout activities was predicted to be **not significant**.

6.1.4 Potential impacts during the operational phase of the proposals may occur due to road traffic exhaust emissions associated with vehicles travelling to and from the site. Dispersion modelling was therefore undertaken in order to predict pollutant concentrations at sensitive locations as a result of emissions from the local highway network both with and without the development in place. Results were subsequently verified using local monitoring data.

6.1.5 Review of the dispersion modelling results indicated that impacts on annual mean NO_2, PM_{10} and $PM_{2.5}$ concentrations as a result of traffic generated by the development were predicted to be **negligible** at all sensitive receptor locations.

6.1.6 Following consideration of the relevant issues, air quality impacts as a result of the operation of the development were considered to be **not significant**, in accordance with the IAQM guidance.

6.1.7 Consideration was made to the EMAQN Air Quality and Emissions Mitigation Guidance SPD. A number of mitigation measures were subsequently identified for inclusion within the scheme in order to minimise potential air quality impacts.

6.1.8 Based on the assessment results, air quality factors are not considered a constraint to the development.

APPENDIX 1: GLOSSARY

AADT	Annual Average Daily Traffic
ADM	Atmospheric Dispersion Modelling
AQLV	Air Quality Limit Value
AQMA	Air Quality Management Area
AQO	Air Quality Objective
AQS	Air Quality Strategy
CEMP	Construction Environmental Management Plan
CERC	Cambridge Environmental Research Consultants
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
EB	Eastbound
EMAQN	East Midlands Air Quality Network
EV	Electric Vehicle
GBC	Gedling Borough Council
HDV	Heavy Duty Vehicle
IAQM	Institute of Air Quality Management
LA	Local Authority
LAQM	Local Air Quality Management
NCC	Nottingham City Council
NGR	National Grid Reference
NO_2	Nitrogen dioxide
NO_x	Oxides of nitrogen
NPPF	National Planning Policy Framework
NPPG	National Planning Policy Guidance
PM_{10}	Particulate matter with an aerodynamic diameter of less than 10µm
$PM_{2.5}$	Particulate matter with an aerodynamic diameter of less than 2.5µm
SP	Slow Phase
SPD	Supplementary Planning Document
WB	Westbound

APPENDIX 2: ASSESSMENT INPUT DATA

Introduction

The proposed development has the potential to cause air quality impacts as a result of vehicles travelling to and from the site. In order to assess NO_2, PM_{10} and $PM_{2.5}$ concentrations at sensitive locations, detailed dispersion modelling was undertaken in accordance with the following methodology.

Dispersion Model

Dispersion modelling was undertaken using the ADMS-Roads dispersion model (version 5.0.1.3). 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.

The 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 (z_0); and,
- Monin-Obukhov length.

These are detailed in the following Sections.

Assessment Area

The assessment area was defined based on the site location and anticipated vehicle trip distribution from the development. Ambient concentrations were predicted over the area NGR: 460750, 339670 to 461590, 340510. One cartesian grid was included within the model to product data suitable for contour plotting using the Surfer software package.

Reference should be made to Figure 11 for a graphical representation of the assessment area.

Traffic Flow Data

Baseline traffic data for use in the assessment, including 24-hour Annual Average Daily Traffic (AADT) flows and fleet composition as HDV proportion, was obtained from the Department for Transport (DfT)[21]. The DfT web tool enables the user to view and download traffic flows on every link of the 'A' road and motorway network, as well as selected minor roads, in Great Britain for the years 1999 to 2021. It should be noted that the DfT web tool is referenced in DEFRA guidance[22] as being a suitable source of data for air quality assessments and it is therefore considered to provide a

[21] https://roadtraffic.dft.gov.uk/#6/55.254/-11.107/basemap-regions-countpoints.
[22] Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

reasonable estimate of traffic flows in the vicinity of the site.

Traffic data for Road No.1/Road No.2 and Mile End Road, which run adjacent to the site, were not available from the DfT. It was necessary to include emissions from these roads within the model in order to provide a robust assessment. As such, data was supplemented with information from an Air Quality Assessment [23] produced in support of a Sainsburys supermarket approximately 570m east of the proposed development. As planning permission was granted for the scheme, the report was considered to provide suitable data in lieu of other sources.

The baseline traffic data was converted to the site opening year utilising a factor obtained from TEMPro (version 8.0). This software package has been developed by the DfT to calculate future traffic growth throughout the UK.

A summary of the traffic flows is provided in Table A.1. Road widths and vehicle speeds were estimated from aerial photography and UK highway design standards.

Table A.1: Traffic Data

Link		24-hour AADT Flow			HDV Prop. of Fleet (%)	Road Width (m)	Speed (km/h)
		Verif.	2025 DM	2025 DS			
L1	Road No.1 / Road No.2	6,916	7,333	7,333	5.80	9.1	45
L2	Mile End Road	6,916	7,333	7,626	5.80	6.8	45
L3	Mile End Road approach to A612 Colwick Loop Road Slow Phase (SP)	6,916	7,333	7,626	5.80	13.2	30
L4	A612 Daleside Road East, west of Mile End Road Westbound (WB) SP	9,860	10,454	10,527	5.84	6.4	30
L5	A612 Daleside Road East, west of Mile End Road WB	9,860	10,454	10,527	5.84	5.9	45
L6	A612 Daleside Road East	19,362	20,528	20,674	5.90	10.0	45
L7	A612 Daleside Road East, west of Mile End Road Eastbound (EB) SP	9,502	10,074	10,147	5.97	5.5	30
L8	A612 Daleside Road East, west of Mile End Road EB	9,502	10,074	10,147	5.97	4.0	45
L9	A612 Daleside Road East, west of Mile End Road WB SP	9,860	10,454	10,527	5.84	5.9	30
L10	A612 Colwick Loop Road	19,362	20,528	20,674	5.90	9.4	65

Reference should be made to Figure 11 for a graphical representation of the road link locations.

Emission Factors

Emission factors for each link were calculated using the relevant traffic flows and the Emissions Factor Toolkit (Version 11.0). This has been produced by DEFRA and incorporates COPERT 5 vehicle emission factors and fleet information.

There is uncertainty over NO_2 concentrations within the UK, with the implementation of new vehicle emission standards not resulting in the previously expected reduction in roadside levels. Therefore, 2019 emission factors were utilised in preference to the development opening year in order to provide robust concentration predictions. As predictions for 2019 were verified, it is considered the results are a robust indication of worst case concentrations for the future year.

[23] Air Quality Assessment, Colwick Loop Regeneration, ARUP, 2013.

Meteorological Data

Meteorological data used in the assessment was taken from Nottingham Watnall meteorological station over the period 1st January 2019 to 31st December 2019 (inclusive). Nottingham Watnall meteorological station is located at NGR: 450431, 345004, which is approximately 12km north-west of the development. It is anticipated that conditions would be reasonably similar over a distance of this magnitude. The data was therefore considered suitable for an assessment of this nature.

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 3 for a wind rose of the utilised meteorological data.

Roughness Length

The z_0 is a modelling parameter applied to allow consideration of surface height roughness elements. A z_0 of 0.5m was used to describe the modelling extents and meteorological site. This value is considered appropriate for the morphology of both areas and is suggested within ADMS-Roads as being suitable for 'parkland, open suburbia'.

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 to describe the modelling extents. This value is considered appropriate for the nature of the area and is suggested within ADMS-Roads as being suitable for 'cities and large towns'.

A minimum Monin-Obukhov length of 10m was used to describe the meteorological site. This value is considered appropriate for the nature of the area and is suggested within ADMS-Roads as being suitable for 'small towns <50,000'.

Background Concentrations

Background NO_2, PM_{10} and $PM_{2.5}$ concentrations for use in the assessment were obtained from the DEFRA mapping study for the grid square containing the development site, as shown in Table 13.

Similarly to emission factors, background concentrations from 2019 were utilised in preference to the development opening year. This provided a robust assessment and is likely to overestimate pollutant concentrations during the operation of the proposals.

NO_x to NO_2 Conversion

Predicted annual mean NO_2 concentrations were converted to NO_2 concentrations using the spreadsheet (version 8.1) provided by DEFRA, which is the method detailed within DEFRA guidance[24].

Verification

The 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;

[24] Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

- 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 the assessment, model verification was undertaken for 2019 using traffic data, meteorological data and monitoring results from this year. The choice of 2019 as the verification year aligns with the IAQM position statement 'Use of 2020 and 2021 Monitoring Datasets'[25], which states:

> *"If you are carrying out an air quality study that includes validation against monitoring data, use 2019 monitoring data as the last typical year."*

Monitoring of NO_2 concentrations was undertaken at three locations within the vicinity of roads included within the model during 2019. Results were obtained and the road contributions to total NO_x concentrations calculated following the methodology contained within DEFRA guidance[26]. The monitored annual mean NO_2 concentrations and calculated road NO_x concentrations are summarised in Table A.2.

Table A.2: Verification - Monitoring Results

Monitoring Location		Monitored NO_2 Concentration (µg/m³)	Calculated Road NO_x Concentration (µg/m³)
87411	Colwick Park Close	21.0	6.50
87460	Rectory Road/Vale Road	24.0	12.28
87461	Mile End Road	31.0	26.38

The annual mean road NO_x concentrations predicted from the dispersion model and the 2019 road NO_x concentrations calculated from the monitoring results are summarised in Table A.3.

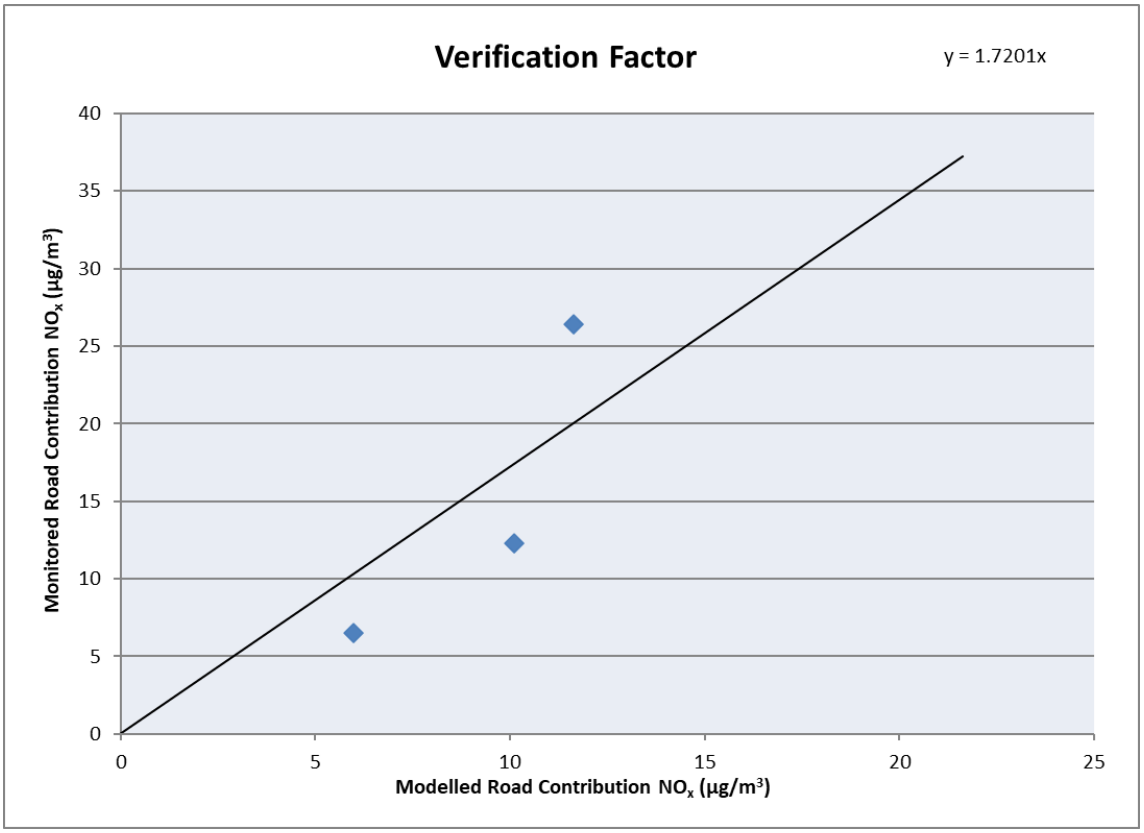
Table A.3: Verification - Modelling Results

Monitoring Location		Calculated Road NO_x Concentration (µg/m³)	Modelled Road NO_x Concentration (µg/m³)
87411	Colwick Park Close	6.50	5.98
87460	Rectory Road/Vale Road	12.28	10.10
87461	Mile End Road	26.38	11.64

The monitored and modelled road NO_x concentrations were graphed and the equation of the trendline based on linear progression through zero calculated. This indicated that a verification factor of 1.7201 was required to be applied to all NO_x modelling results, as shown in Graph 1.

Graph 1 NO_x Verification Factor

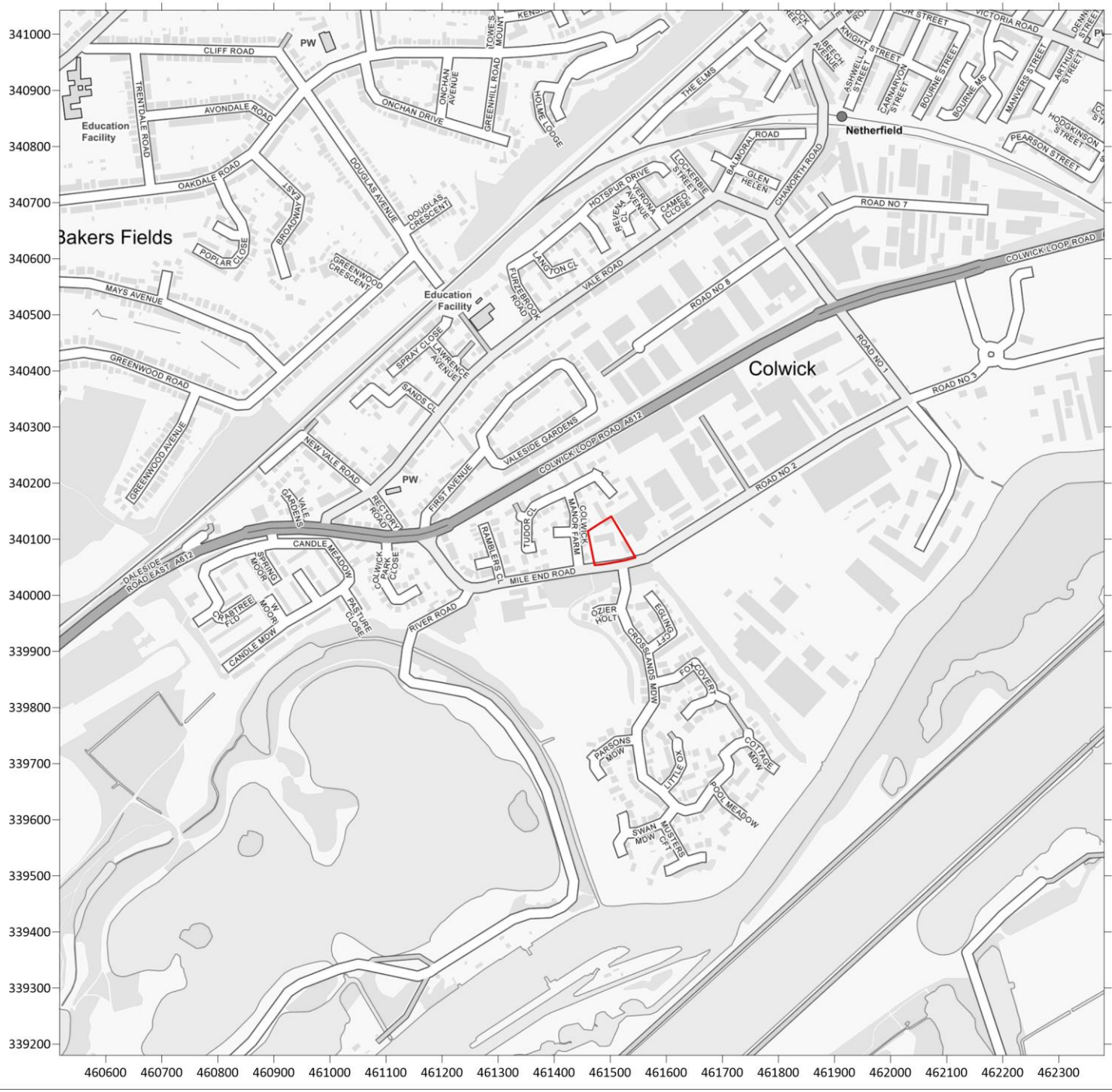
[25] Use of 2020 and 2021 Monitoring Datasets, IAQM, 2021.
[26] Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.



Monitoring of PM_{10} or $PM_{2.5}$ concentrations is not undertaken within the assessment extents. The NO_x verification factor was therefore used to adjust model predictions of these species in lieu of more accurate data in accordance with DEFRA guidance[27].

[27] Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

APPENDIX 3: FIGURES



Legend

Site Boundary

Title

Figure 1 - Site Location Plan

Project

Air Quality Assessment
Mile End Road, Colwick

Legend

Site Boundary

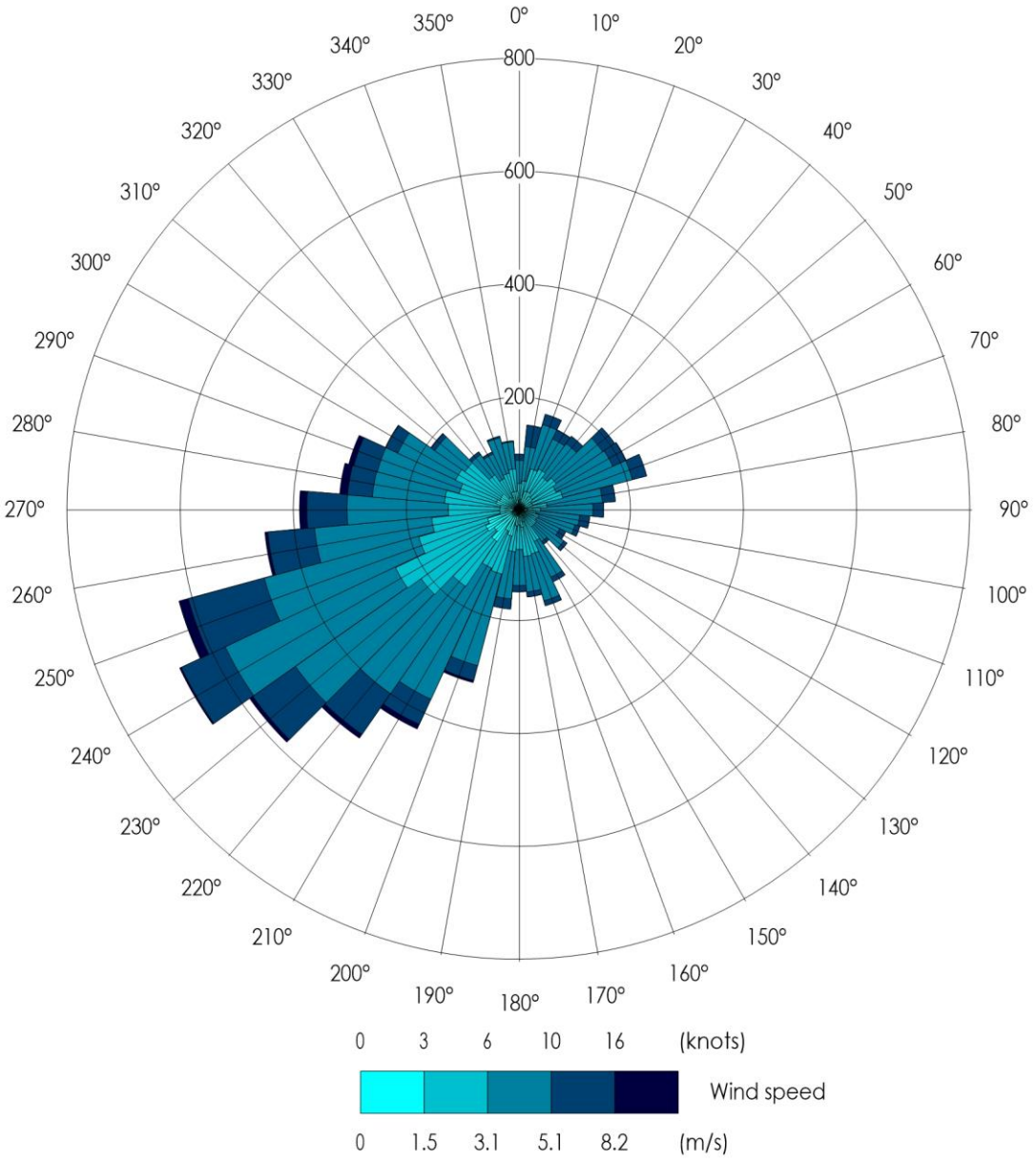
Monitor

Title

Figure 2 - Monitoring Locations

Project

Air Quality Assessment
Mile End Road, Colwick



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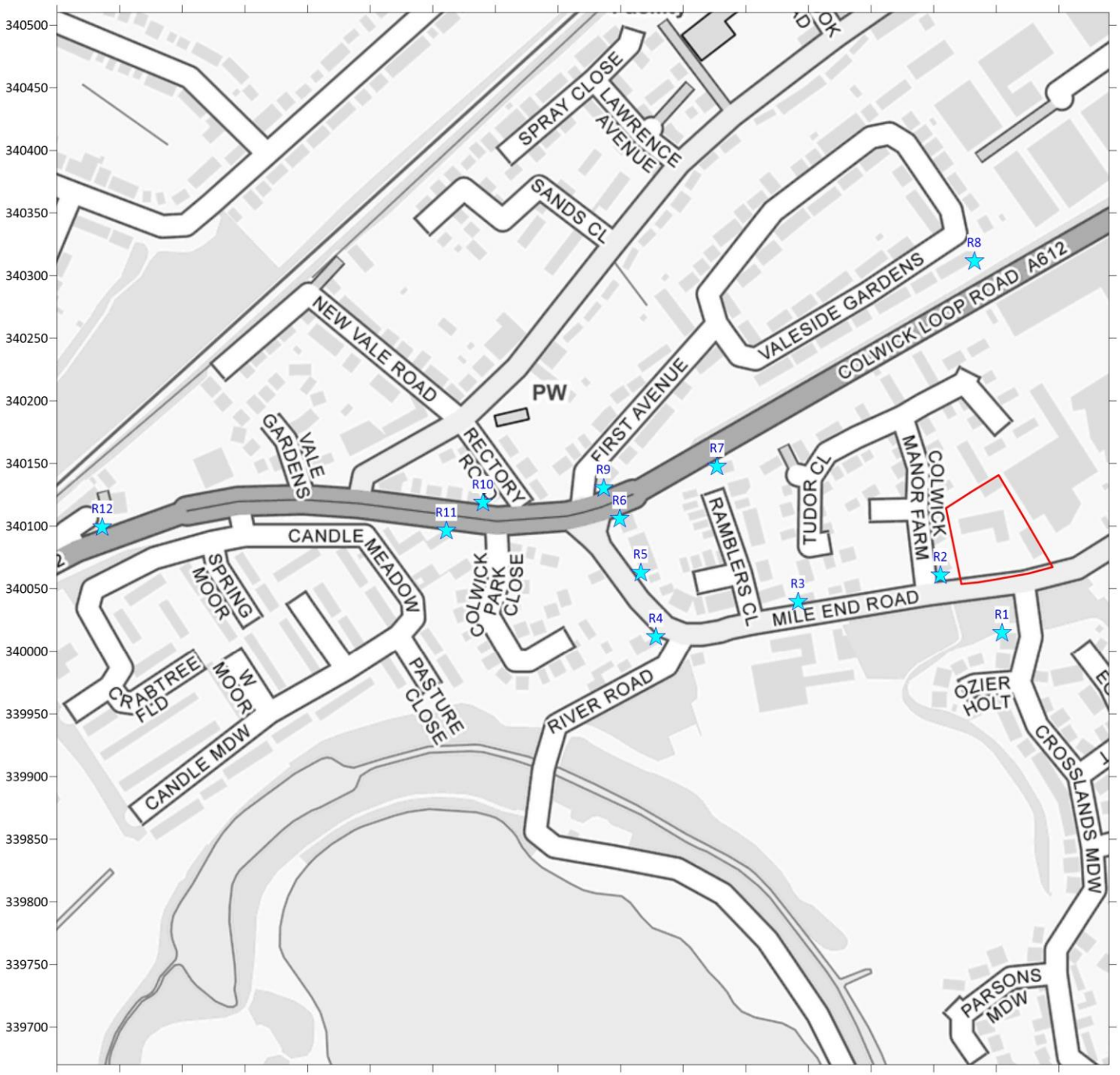
Title

Figure 3 - Wind Rose of 2019
Nottingham Watnall Meteorological Data

Project

Air Quality Assessment
Mile End Road, Colwick



Legend

Site Boundary

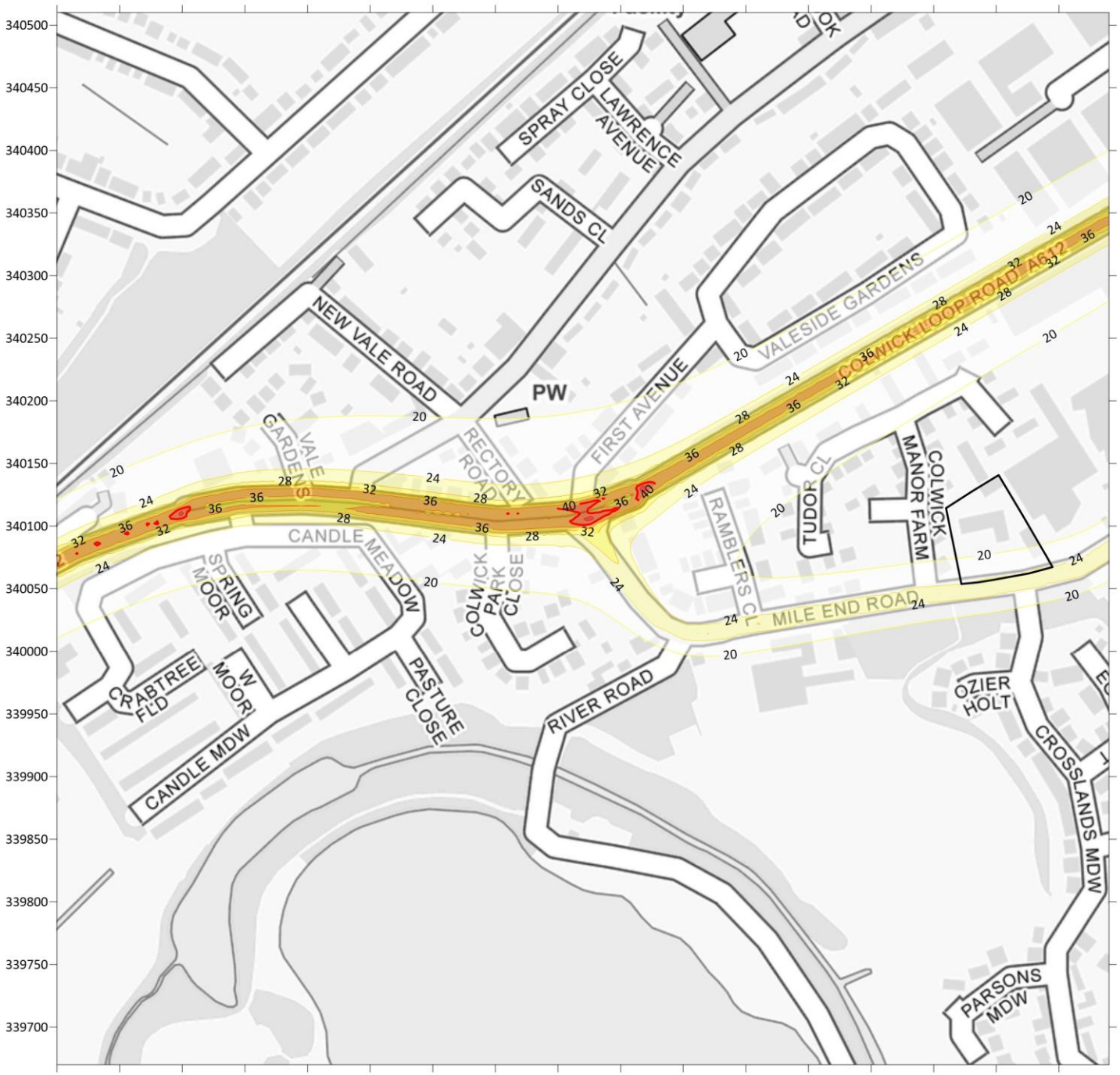
Receptor

Title

Figure 4 - Road Vehicle Exhaust Emission Sensitive Receptor Locations

Project

Air Quality Assessment
Mile End Road, Colwick



Legend

Site Boundary

Annual Mean NO_2 Concentration ($\mu g/m^3$)

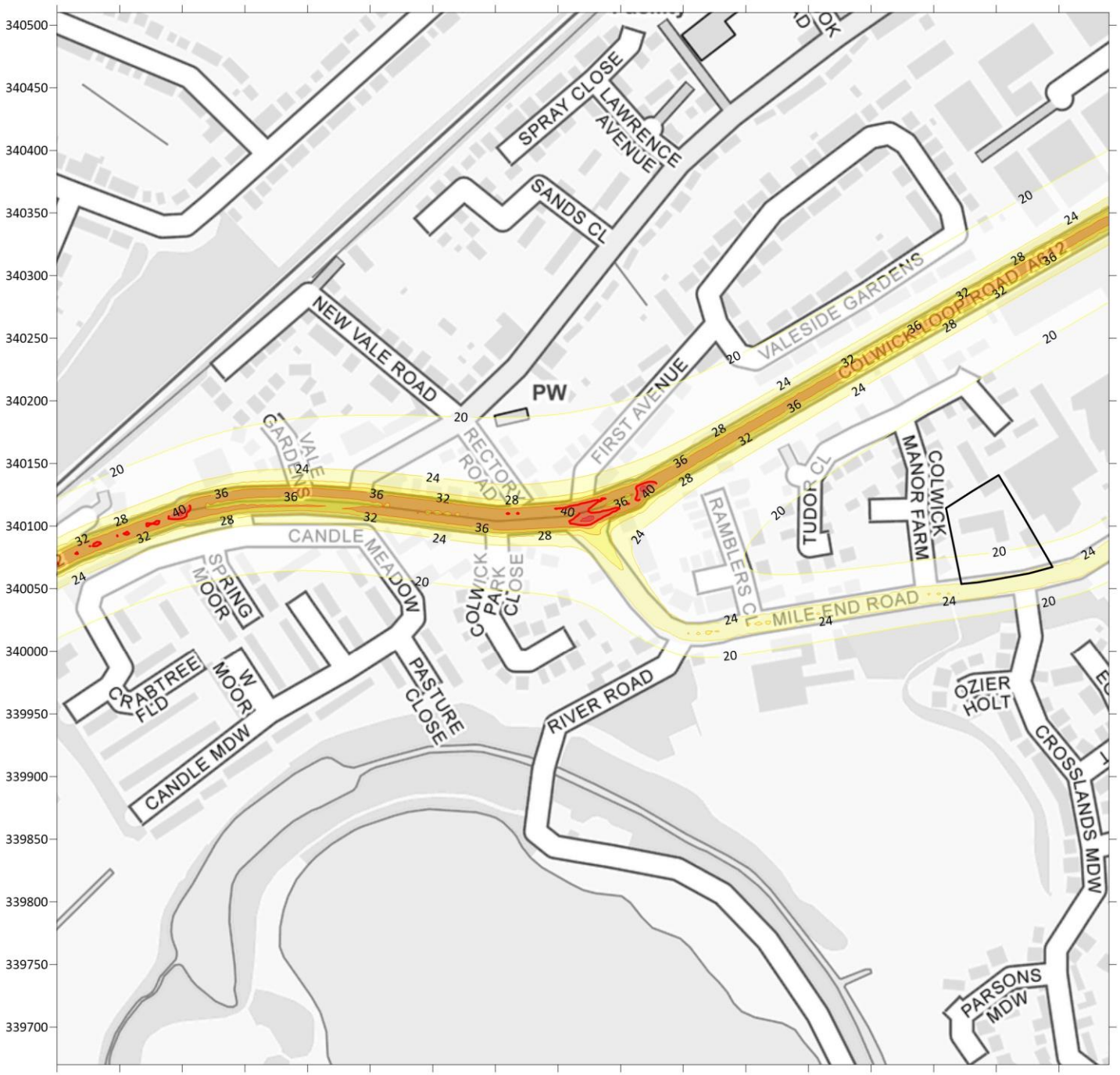
44
40
36
32
28
24
20

Title

Figure 5 - Predicted Annual Mean NO_2 Concentrations ($\mu g/m^3$)
Do-Minimum

Project

Air Quality Assessment
Mile End Road, Colwick



Legend

Site Boundary

Annual Mean NO_2 Concentration ($\mu g/m^3$)

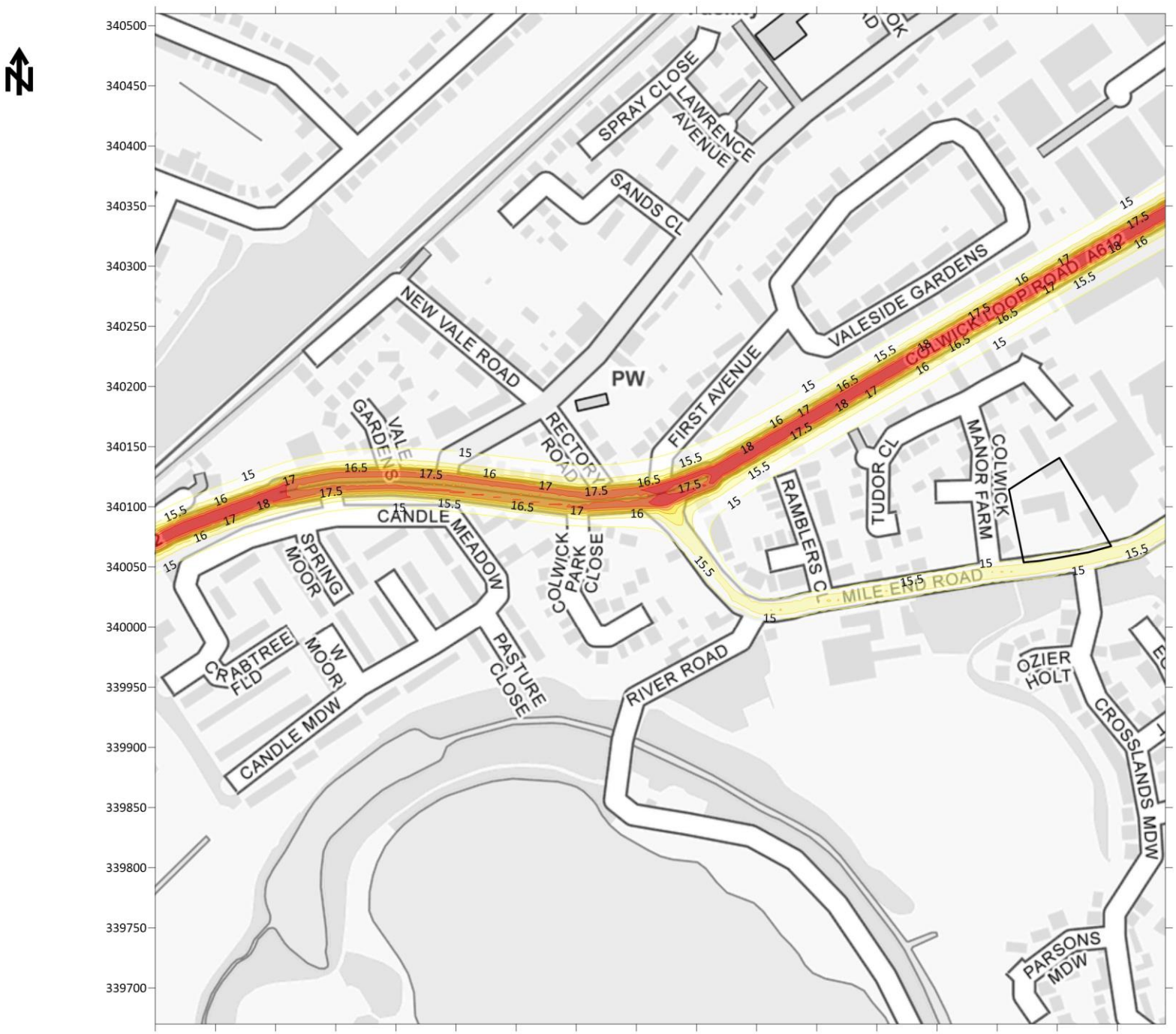
44
40
36
32
28
24
20

Title

Figure 6 - Predicted Annual Mean NO_2 Concentrations ($\mu g/m^3$)
Do-Something

Project

Air Quality Assessment
Mile End Road, Colwick



Legend

Site Boundary

18
17.5
17
16.5
16
15.5
15

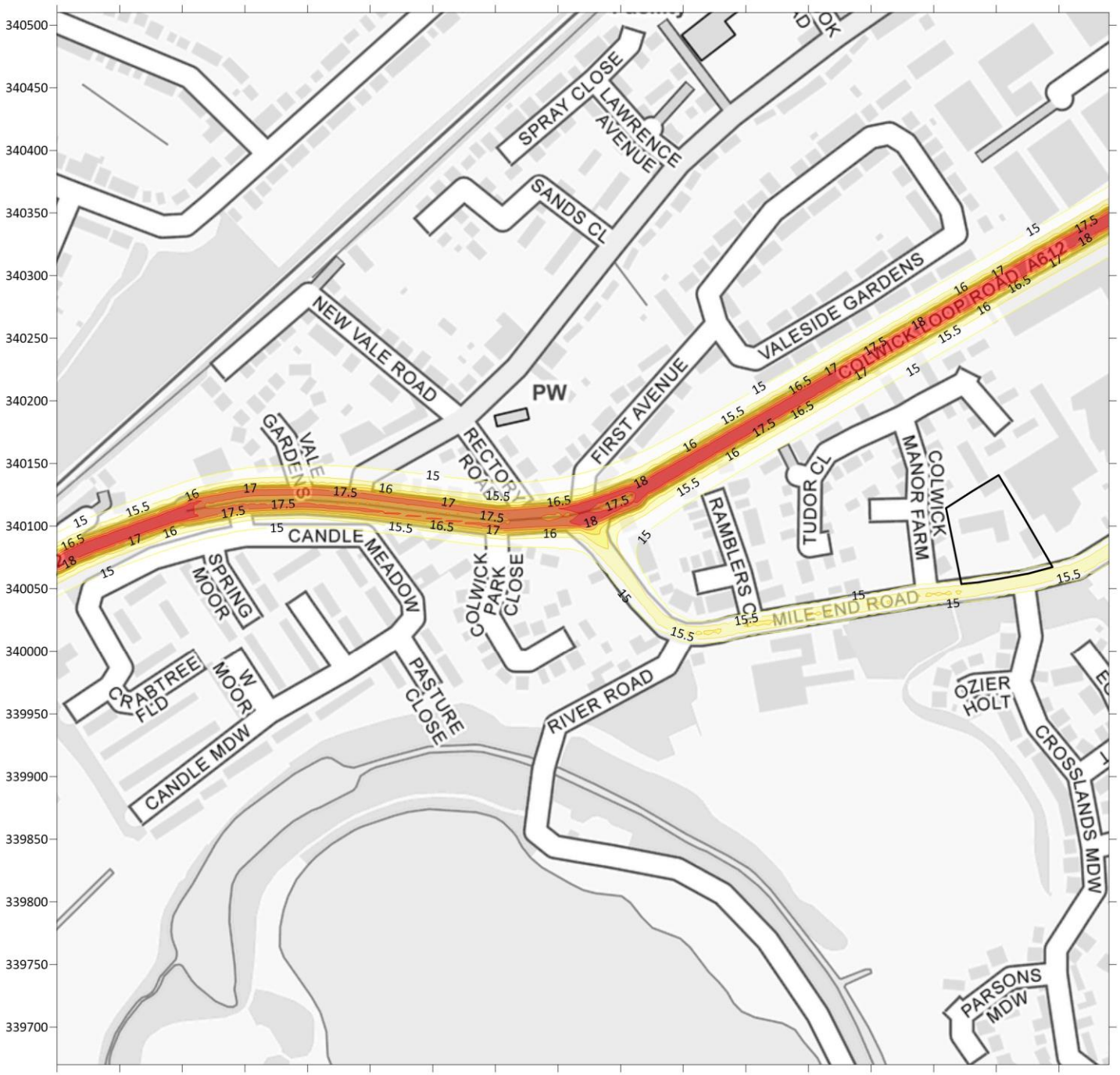
Annual Mean PM_{10} Concentration ($\mu g/m^3$)

Title

Figure 7 - Predicted Annual Mean PM_{10} Concentrations ($\mu g/m^3$)
Do-Minimum

Project

Air Quality Assessment
Mile End Road, Colwick



Legend

Site Boundary

Annual Mean PM_{10} Concentration ($\mu g/m^3$)

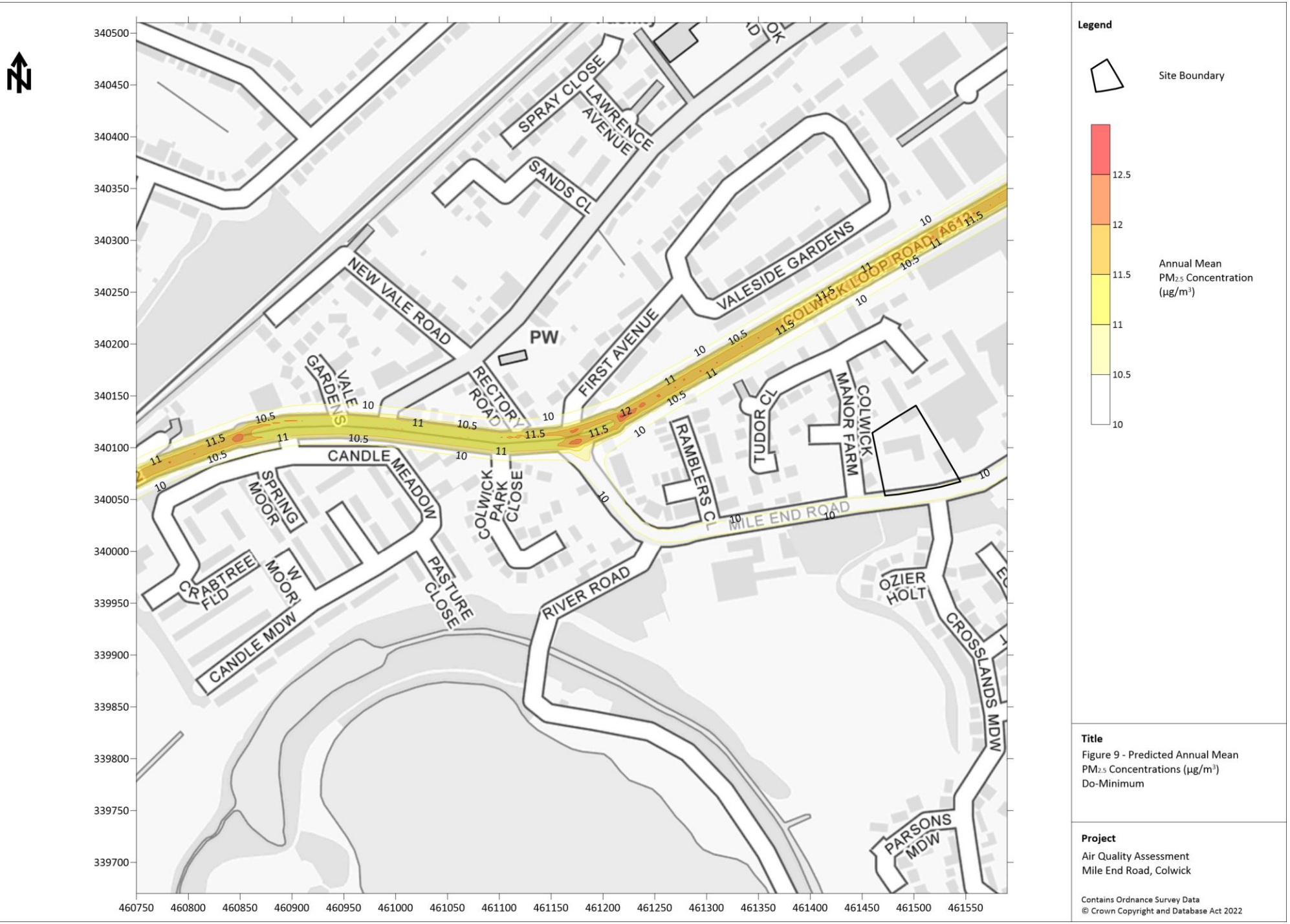
18
17.5
17
16.5
16
15.5
15

Title

Figure 8 - Predicted Annual Mean PM_{10} Concentrations ($\mu g/m^3$) Do-Something

Project

Air Quality Assessment
Mile End Road, Colwick



Legend

Site Boundary

Annual Mean $PM_{2.5}$ Concentration ($\mu g/m^3$)

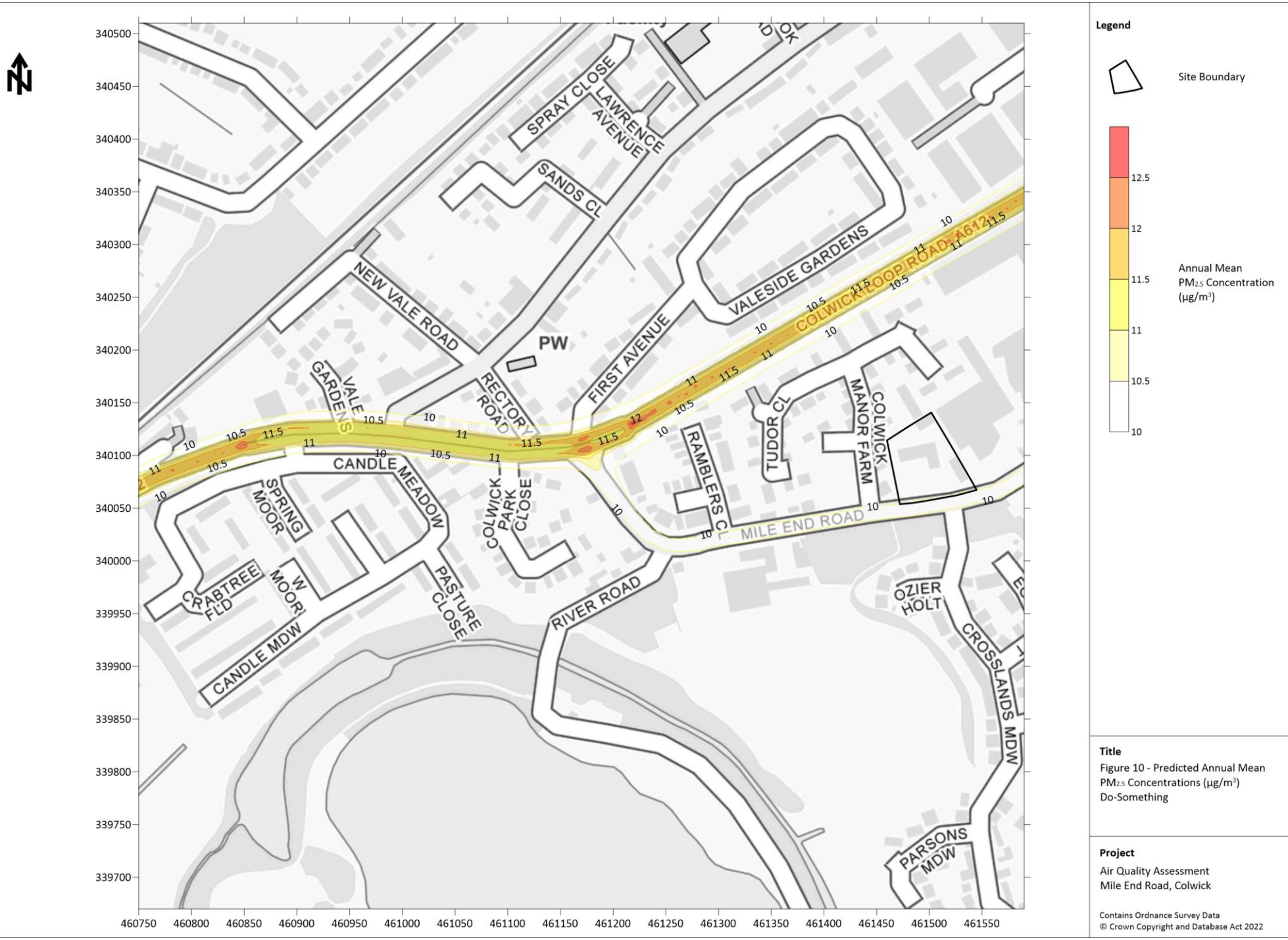
12.5
12
11.5
11
10.5
10

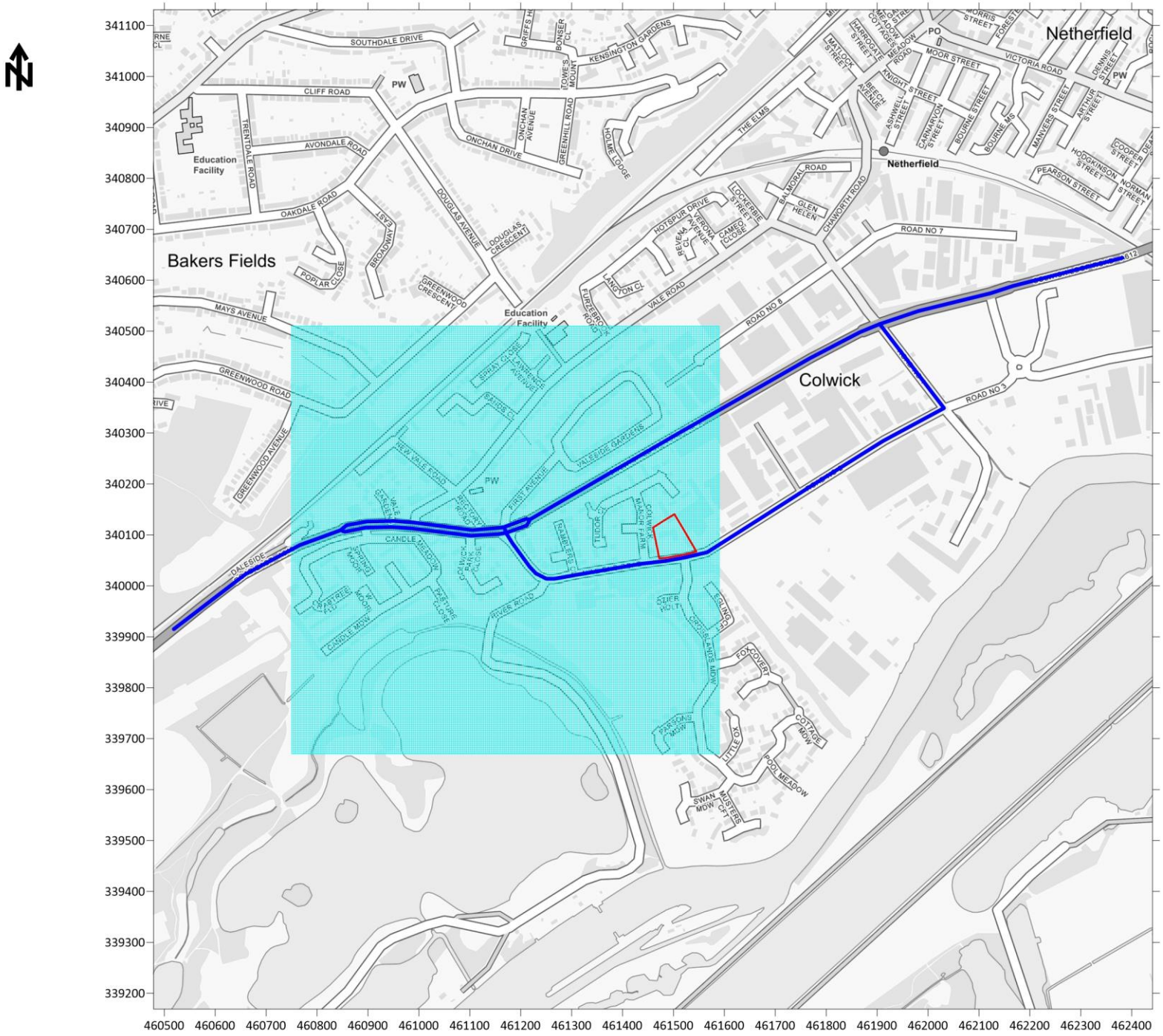
Title

Figure 9 - Predicted Annual Mean $PM_{2.5}$ Concentrations ($\mu g/m^3$)
Do-Minimum

Project

Air Quality Assessment
Mile End Road, Colwick





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Site Boundary

Road Link

Output Grid

Title

Figure 11 - ADMS-Roads Inputs

Project

Air Quality Assessment
Mile End Road, Colwick