Air Quality Assessment

Woolley Colliery Road, Darton

Client: Homes by honey and KEITH WIKE and BRENDA WIKE of Manor House Farm, Bloomhouse Lane, Darton, Barnsley, S75 5AS and CHRISTOPHER WIKE and SHARON WIKE of 23 Huddersfield Road, Darton, Barnsley, S75 5ND

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Executive Summary

Redmore Environmental Ltd was commissioned by Homes by honey and KEITH WIKE and BRENDA WIKE of Manor House Farm, Bloomhouse Lane, Darton, Barnsley, S75 5AS and CHRISTOPHER WIKE and SHARON WIKE of 23 Huddersfield Road, Darton, Barnsley, S75 5ND, to undertake an Air Quality Assessment in support of a proposed residential development on land off Woolley Colliery Road, Darton.

An Air Quality Assessment was undertaken to:

- Assess potential impacts associated with fugitive dust emissions during the construction phase of the proposed development;
- Assess potential impacts associated with road transport emissions during the operational phase of the proposed development; and,
- Identify any requirement for relevant mitigation measures.

Potential construction phase air quality impacts from fugitive dust emissions were assessed as a result of earthworks, construction and trackout activities. It is considered that the use of the identified site-specific 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 development. Dispersion modelling was therefore undertaken in order to predict pollutant concentrations at sensitive locations as a result of emissions from the 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 air quality impacts as a result of traffic generated by the development were not predicted to be significant at any sensitive location in the vicinity of the site.

A number of mitigation measures were identified in line with the requirements of the Barnsley Air Quality and Emissions Good Practice Planning Guidance in order to reduce vehicle exhaust emissions associated with the proposals. It is considered these are appropriate for a development of this scale and nature and will further control impacts during the operational phase.

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

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1.0 INTRODUCTION

1.1 Instruction

1.1.1 Redmore Environmental Ltd was commissioned by Homes by honey and KEITH WIKE and BRENDA WIKE of Manor House Farm, Bloomhouse Lane, Darton, Barnsley, S75 5AS and CHRISTOPHER WIKE and SHARON WIKE of 23 Huddersfield Road, Darton, Barnsley, S75 5ND, to undertake an Air Quality Assessment in support of a residential development on land off Woolley Colliery Road, Darton.

1.2 Site Location and Context

1.2.1 The site is located on land off Woolley Colliery Road, Darton, at approximate National Grid Reference (NGR): 431330, 410411. The relevant Local Authority (LA) is Barnsley Metropolitan Borough Council (BMBC). Reference should be made to Figure 1 for a map of the site and surrounding area.

1.2.2 The proposals comprise construction of 119 residential dwellings and associated infrastructure.

1.3 Assessment Scope

1.3.1 The proposals have the potential to cause air quality impacts at sensitive locations. As such, an Air Quality Assessment was undertaken to:

- Assess potential impacts associated with fugitive dust emissions during the construction phase of the development;
- Assess potential impacts associated with road transport emissions during the operational phase of the development; and,
- Identify the requirement for relevant mitigation measures.

1.3.2 This is detailed in the following report.

2.0 LEGISLATION AND POLICY

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 on 28th April 2023[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 The Environmental Improvement Plan 2025[2] was published in December 2025, providing long term and Interim Targets in order to reduce population exposure to $PM_{2.5}$. The Concentration Target for 2040 was adopted in the Environmental Targets (Fine Particulate Matter) (England) Regulations (2023).

[1] AQS: Framework for Local Authority Delivery, DEFRA, 2023.

[2] Environmental Improvement Plan 2025, DEFRA, 2025.

2.1.5 Table 1 presents the AQOs, Interim Target and Concentration Target for pollutants considered within this assessment.

Table 1 Air Quality Objectives/ Interim Target/ Concentration Target

Pollutant	Air Quality Objective/ Interim Target/ Concentration Target	
	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
$PM_{2.5}$	10(a)	Annual mean
	10(b)	Annual mean

Note: (a) Interim Target to be achieved by 2030.
(b) Concentration Target to be achieved by 2040.

2.1.6 Table 2 summarises the advice provided in DEFRA guidance[3] 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

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

Averaging Period	Objective Should Apply At	Objective Should Not Apply At
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 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 (AQAP), 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 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[4] (NPPF) was published in December 2024 and updated in February 2025. The document 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

[4] NPPF, Ministry of Housing, Communities and Local Government, 2024.

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[5] (NPPG) web-based resource was launched by the Department for Communities and Local Government 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?
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?

[5] https://www.gov.uk/guidance/air-quality--3.

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 Barnsley Local Plan[6] was adopted by BMBC on 3rd January 2019. A review of the document indicated the following of relevance to this assessment:

> "Policy GD1 General Development
>
> Proposals for development will be approved if:
>
> […]
>
> Any adverse impact on the environment, natural resources, waste and pollution is minimised and mitigated;
>
> […]"
>
> "Policy Poll 1 Pollution Control and Protection
>
> Development will be expected to demonstrate that it is not likely to result, directly or indirectly, in an increase in air, surface water and groundwater, noise, smell, dust, vibration, light or other pollution which would unacceptably affect or cause a nuisance to the natural and built environment or to people.
>
> We will not allow development of new housing or other environmentally sensitive development where existing air pollution, noise, smell, dust, vibration, light or other pollution levels are unacceptable and there is no reasonable prospect that these can be mitigated against.

[6] Barnsley Local Plan, BMBC, 2019.

Developers will be expected to minimise the effects of any possible pollution and provide mitigation measures where appropriate."

2.6.2 Policy AQ1 discusses development which may affect AQMAs:

"Development which may impact on areas sensitive to air pollution in air quality management areas will be expected to demonstrate that it will not have a harmful effect on the health or living conditions of any future users of the development in terms of air quality (including residents, employees, visitors and customers), taking into account any suitable and proportionate mitigation required for the development.

We will only allow residential development which impacts on areas sensitive to air pollution where the developer provides an assessment that shows living conditions will be acceptable for future residents, subject to any required mitigation.

We will only allow development which impacts on areas sensitive to air pollution which could cause more air pollution, where the developer provides an assessment that shows there will not be a significantly harmful effect on air quality, subject to any required mitigation.

Furthermore, development which impacts on areas sensitive to air pollution due to traffic emissions will be expected to demonstrate suitable and proportionate mitigation relative to the increased traffic emissions generated by the development."

2.6.3 The implications of the above policies were taken into consideration throughout the undertaking of the assessment.

2.6.4 BMBC has produced Air Quality and Emissions Good Practice Planning Guidance[7] which provides a template for integrating and air quality considerations into land-use planning and development management policies. This was taken into consideration throughout the assessment.

[7] Air Quality and Emissions Good Practice Planning Guidance, BMBC, 2021.

3.0 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 were assessed in accordance with the following methodology, which was agreed with Nigel Butterfield, Technical Officer (Air Quality) at BMBC, on 19th January 2026.

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 V2.2'[8].

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

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

3.2.4 The assessment steps are detailed below.

[8] Guidance on the Assessment of Dust from Demolition and Construction V2.2, IAQM, 2024.

Step 1 - Screen the Need for an Assessment

3.2.5 Step 1 screens the requirement for a more detailed assessment. Should human receptors be identified within 250m from the boundary or 50m from the construction vehicle route up to 250m 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 250m 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 - Assess the Risk of Dust Impacts

3.2.7 Step 2 assesses the risk of potential dust impacts. A site is allocated 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 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 during the construction phase. The relevant criteria are summarised in Table 3.

Table 3 Construction Dust - Magnitude of Emission

Magnitude	Activity	Criteria
Large	Earthworks	• Total site area greater than 110,000m^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 6m in height

Magnitude	Activity	Criteria
	Construction	• Total building volume greater than 75,000m^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	Earthworks	• Total site area 18,000m^2 to 110,000m^2 • Moderately dusty soil type (e.g. silt) • 5 to 10 heavy earth moving vehicles active at any one time • Formation of bunds 3m to 6m in height
	Construction	• Total building volume 12,000m^3 to 75,000m^3 • Potentially dusty construction material (e.g. concrete) • On site concrete batching
	Trackout	• 20 to 50 HDV trips per day • Moderately dusty surface material (e.g. high clay content) • Unpaved road length 50m to 100m
Small	Earthworks	• Total site area less than 18,000m^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 3m in height
	Construction	• Total building volume less than 12,000m^3 • Construction material with low potential for dust release (e.g. metal cladding or timber)
	Trackout	• Less than 20 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 sensitivities of specific receptors are shown in Table 4.

Table 4 Construction Dust - Sensitivities of Human and Ecological Receptors

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 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, farmland, short term car parks and roads	• Locally designated site e.g. Local Nature Reserve

3.2.11 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 250
High	More than 100	High	High	Medium	Low
	10 - 100	High	Medium	Low	Low

Receptor Sensitivity	Number of Receptors	Distance from the Source (m)			
		Less than 20	Less than 50	Less than 100	Less than 250
	1 - 10	Medium	Low	Low	Low
Medium	More than 1	Medium	Low	Low	Low
Low	More than 1	Low	Low	Low	Low

3.2.12 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 250
High	Greater than 32µg/m^3	More than 100	High	High	High	Medium
		10 - 100	High	High	Medium	Low
		1 - 10	High	Medium	Low	Low
	28 - 32µg/m^3	More than 100	High	High	Medium	Low
		10 - 100	High	Medium	Low	Low
		1 - 10	High	Medium	Low	Low
	24 - 28µg/m^3	More than 100	High	Medium	Low	Low
		10 - 100	High	Medium	Low	Low
		1 - 10	Medium	Low	Low	Low
	Less than 24µg/m^3	More than 100	Medium	Low	Low	Low
		10 - 100	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low
Medium	Greater than 32µg/m^3	More than 10	High	Medium	Low	Low
		1 - 10	Medium	Low	Low	Low
	28 - 32µg/m^3	More than 10	Medium	Low	Low	Low
		1 - 10	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 250
	24 - 28µg/m^3	More than 10	Low	Low	Low	Low
		1 -10	Low	Low	Low	Low
	Less than 24µg/m^3	More than 10	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low
Low	-	1 or more	Low	Low	Low	Low

3.2.13 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

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

3.2.15 Table 8 outlines the risk category from earthworks, construction and trackout activities.

Table 8 Construction Dust - Dust Risk Category from Earthworks, Construction and Trackout Activities

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

Step 3 - Site-specific Mitigation

3.2.16 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 - Determine Significance

3.2.17 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**.

3.2.18 The determination of significance relies on professional judgement and reasoning should be provided as far as practicable. The IAQM guidance suggests the provision of details of the assessor's qualifications and experience. These are provided in Appendix 2.

3.3 Operational Phase Assessment

3.3.1 The development has the potential to affect 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:

- 2024 - Verification.
- Opening year Do-Minimum (DM) (predicted traffic flows in 2030 should the proposals not proceed); and,
- Opening year Do-Something (DS) (predicted traffic flows in 2030 should the proposals be completed).

[9] Guidance on the Assessment of Dust from Demolition and Construction V2.2, IAQM, 2024.

3.3.2 Reference should be made to Appendix 1 for assessment input data and details of the verification process.

3.3.3 Locations sensitive to potential changes in off-site pollutant concentrations were identified within 200m of the highway network in accordance with National Highways guidance[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 Table 9.

Table 9 Significance of Operational Phase Road Vehicle Exhaust Emission Impacts

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

3.3.5 The matrix shown in Table 9 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**.

10 LA 105: Air Quality, National Highways, 2024.

11 Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

12 Land-Use Planning & Development Control: Planning for Air Quality, IAQM, 2017.

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**.

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 are provided in Appendix 2.

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

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

4.0 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), as amended by the Environment Act (2021), BMBC has undertaken Review and Assessment of air quality within their area of jurisdiction. This process has indicated that annual and 1-hour mean concentrations of NO_2 are above the relevant AQOs within the borough. As such, five AQMAs have been declared. The closest of these to the site is described as follows:

> "AQMA No.1 - An area encompassing residential properties one hundred metres either side of the central reservation of the M1 motorway in Barnsley."

4.2.2 The development is located approximately 335m west of the AQMA. As such, there is the potential for emissions associated with the development to increase pollution levels in this sensitive area. This has been considered throughout the assessment.

4.2.3 BMBC has 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 levels is undertaken by BMBC throughout its area of jurisdiction. Recent NO_2 concentrations recorded in the vicinity of the development, as provided in BMBC's '2025 Air Quality Annual Status Report (ASR)'[15] are shown in Table 10.

[15] 2025 Air Quality ASR, BMBC, 2025.

Table 10 Monitoring Results

Monitoring Site		Monitored NO_2 Concentration (µg/m³)		
		2022	2023	2024
9	Claycliffe Road/Barugh Lane	21.2	20.5	20.3

4.3.2 As shown in Table 10, annual mean NO_2 concentrations were below the AQO at the 9 - Claycliffe Road/Barugh Lane monitor in recent years. Reference should be made to Figure 2 for a map of the survey position.

4.3.3 BMBC 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: 431500, 410500. Data for this location was downloaded from the DEFRA website[16] for the purpose of the assessment and is summarised in Table 11.

Table 11 Background Pollutant Concentration Predictions

Pollutant	Predicted Background Pollutant Concentration (µg/m³)		
	2024	2026	2030
NO_2	8.02	7.45	6.30
PM_{10}	11.02	10.86	10.60
$PM_{2.5}$	6.14	6.02	5.78

4.4.2 As shown in Table 11, predicted background concentrations are below the relevant AQOs and Concentration Target at the development site.

[16] http://uk-air.defra.gov.uk/data/laqm-background-maps?year=2021.

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 earthworks and construction were identified from a desk-top study of the area up to 250m from the development boundary. These are summarised in Table 12.

Table 12 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	10 - 100	0
Up to 100	More than 100	-
Up to 250	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 250m of the site access. These are summarised in Table 13.

Table 13 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	10 - 100	0

4.5.4 There are no ecological receptors within 50m of the development boundary or the access route within 250m of the site entrance. As such, ecological impacts have not been assessed further within this report.

4.5.5 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.

Operational Phase Sensitive Receptors

4.5.6 Locations sensitive to potential operational phase road vehicle exhaust emission impacts were identified from a desk-top study. These are summarised in Table 14. Receptor heights were included in order to account for less sensitive land uses at ground floor level, such as retail units.

Table 14 Operational Phase Road Vehicle Exhaust Emission Sensitive Receptor Locations

Receptor		NGR (m)		Height (m)
		X	Y	
R1	Residential - Bloomhouse Lane	431289.6	410559.0	1.5
R2	Residential - Wooley Colliery Road	431265.7	410294.9	1.5
R3	Residential - Station Road	431346.1	410104.0	1.5
R4	Residential - Station Road	431513.3	410024.3	1.5
R5	Darton Primary School	431593.3	409958.8	1.5
R6	Residential - Darton Lane	431709.8	409998.3	1.5
R7	Residential - Darton Lane	431941.0	409912.0	1.5
R8	Residential - Church Street	431261.5	410084.8	4.0
R9	Residential - Barnsley Road	431065.3	409847.7	1.5
R10	Residential - Richard Road	431119.6	409683.5	1.5
R11	Residential - Lansdowne Crescent	430873.5	409635.1	1.5
R12	Residential - Churchfield Lane	430793.9	409795.2	1.5
R13	Residential - Huddersfield Road	430730.2	410039.9	1.5
R14	Residential - Sackup Lane	431754.2	410080.1	1.5
R15	Residential - Sackup Lane	431901.9	410395.3	1.5
R16	Residential - Huddersfield Road	430900.6	409950.9	1.5

Receptor		NGR (m)		Height (m)
		X	Y	
R17	Residential - Bloomhouse Lane	431709.5	410428.8	1.5

4.5.7 Reference should be made to Figure 3 for a map of the road vehicle exhaust emission sensitive receptor locations.

5.0 CONSTRUCTION PHASE ASSESSMENT

5.1 Introduction

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

5.2 Step 1 - Screen the Need for an Assessment

5.2.1 The undertaking of activities such as excavation, groundworks, cutting, concrete batching, construction 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 250m of the site boundary. As such, a detailed assessment of potential dust impacts was required.

5.3 Step 2a - Define the Potential Dust Emission Magnitude

Earthworks

5.3.1 Earthworks will primarily involve excavating material, haulage, tipping and stockpiling, as well as site levelling and landscaping. The area of the proposed development site is between 18,000m^2 and 110,000m^2. In accordance with the criteria outlined in Table 3, the magnitude of potential dust emissions from earthworks is therefore **medium**.

Construction

5.3.2 Due to the size of the development, the total building volume is estimated to be greater than 75,000m^3. In accordance with the criteria outlined in Table 3, the magnitude of potential dust emissions from construction is therefore **large**.

Trackout

5.3.3 Based on the site area, it is anticipated that the unpaved road length will be greater than 100m during certain stages of construction. In accordance with the criteria outlined in Table 3, the magnitude of potential dust emissions from trackout is therefore **large.**

5.4 Step 2b - Define the Sensitivity of the Area

Dust Soiling

5.4.1 Table 12 shows that there are between 10 and 100 **high** sensitivity receptors within 20m of the site boundary. The sensitivity of the area with respect to dust soiling from earthworks and construction, as defined using the criteria summarised in Table 5, is therefore considered to be **high**.

5.4.2 Table 13 shows that there are between 10 and 100 **high** sensitivity receptors within 20m of the road network within 250m of the site access. The sensitivity of the area with respect to dust soiling from trackout, as defined using the criteria summarised in Table 5, is therefore considered **high**.

Human Health

5.4.3 Table 11 shows the annual mean PM_{10} background concentration at the site is 10.86µg/m^3. As shown in Table 6, where the background annual mean PM_{10} concentration is below 24µg/m^3 and there are between 10 and 100 **high** sensitivity receptors within 20m of the site boundary, the sensitivity of the area with respect to human health from earthworks and construction is considered to be **low**.

5.4.4 There are between 10 and 100 **high** sensitivity receptors within 20m of the road network within 250m of the site access. The sensitivity of the area with respect to human health

from trackout, as defined using the criteria summarised in Table 6, is therefore considered to be **low**.

5.5 Step 2c - Define the Risk of Dust Impacts

5.5.1 The derived dust emission magnitude for each activity was combined with the sensitivity of the area to determine the risk of unmitigated impacts in line with the methodology set out in Table 8. A summary of the risk from each dust generating activity is provided in Table 15.

Table 15 Summary of Potential Unmitigated Dust Risks

Potential Impact	Activity	Step 2A - Dust Emission Magnitude	Step 2B - Sensitivity of the Area	Step 2C - Risk
Dust Soiling	Earthworks	Medium	High	Medium
	Construction	Large	High	High
	Trackout	Large	High	High
Human Health	Earthworks	Medium	Low	Low
	Construction	Large	Low	Low
	Trackout	Large	Low	Low

5.5.6 As indicated in Table 15, the potential risk of dust soiling is **high** from construction and trackout and **medium** from earthworks. The potential risk of human health impacts is **low** from earthworks, construction and trackout.

5.5.7 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.

5.6 Step 3 - Site-specific Mitigation

5.6.1 The IAQM guidance[17] 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 16. These may be reviewed prior to the commencement of construction works and incorporated into a Construction Environmental Management Plan or similar if required by the LA.

Table 16 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 • Display the head or regional office contact information • Develop and implement a Dust Management Plan, which may include measures to control other emissions, approved by the 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	• Carry out regular site inspections, 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

[17] Guidance on the Assessment of Dust from Demolition and Construction V2.2, IAQM, 2024.

Issue	Control Measure
Site preparation	• Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible • Erect solid screens or barriers around dusty activities or the site • 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
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
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 during work 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, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place

Issue	Control Measure
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 • Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit • Access gates to be located at least 10m from receptors where possible

5.7 Step 4 - Determine Significance

5.7.1 Assuming the relevant mitigation measures outlined in Table 16 are implemented, the residual impacts from all dust generating activities is predicted to be **not significant**, in accordance with the IAQM guidance[18].

[18] Guidance on the Assessment of Dust from Demolition and Construction V2.2, IAQM, 2024.

6.0 OPERATIONAL PHASE ASSESSMENT

6.1 Introduction

6.1.1 The development has the potential to increase concentrations of NO_2, PM_{10} and $PM_{2.5}$ as a result of road traffic exhaust emissions associated with vehicles travelling to and from the site during the operational phase. 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.

6.1.2 The assessment considered the following scenarios:

- 2024 - Verification;
- 2030 - DM; and,
- 2030 - DS.

6.1.3 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, in addition to predicted vehicle trips associated with the operation of the proposals.

6.1.4 For the purpose of the assessment traffic data for 2030 was utilised as the development opening year. Air quality is predicted to improve in the future. However, in order to provide a robust assessment, emission factors and background concentrations for 2024 were utilised within the dispersion model. The use of 2030 traffic data and 2024 emission factors is considered to provide a robust scenario and therefore a sufficient level of confidence can be placed within the predicted pollution concentrations.

6.1.5 Reference should be made to Appendix 1 for full assessment input details.

6.2 Potential Development Impacts

Predicted Concentrations

6.2.1 Annual mean NO_2 concentrations were predicted at the sensitive receptor locations for the DM and DS scenarios. These are summarised in Table 17.

Table 17 Predicted Annual Mean NO_2 Concentrations

Receptor		Predicted Annual Mean NO_2 Concentration (µg/m³)		
		DM	DS	Change
R1	Residential - Bloomhouse Lane	9.74	9.77	0.03
R2	Residential - Wooley Colliery Road	10.57	10.59	0.02
R3	Residential - Station Road	13.36	13.54	0.18
R4	Residential - Station Road	13.11	13.26	0.15
R5	Darton Primary School	10.54	10.60	0.06
R6	Residential - Darton Lane	15.38	15.58	0.20
R7	Residential - Darton Lane	11.05	11.16	0.11
R8	Residential - Church Street	12.54	12.75	0.21
R9	Residential - Barnsley Road	17.70	17.95	0.25
R10	Residential - Richard Road	14.53	14.69	0.16
R11	Residential - Lansdowne Crescent	20.52	20.53	0.01
R12	Residential - Churchfield Lane	21.48	21.50	0.02
R13	Residential - Huddersfield Road	15.82	15.89	0.07
R14	Residential - Sackup Lane	11.07	11.10	0.03
R15	Residential - Sackup Lane	10.50	10.53	0.03
R16	Residential - Huddersfield Road	21.83	21.90	0.07
R17	Residential - Bloomhouse Lane	9.20	9.26	0.06

6.2.2 As indicated in Table 17, predicted annual mean NO_2 concentrations were below the AQO of 40µg/m³ at all sensitive receptors in both scenarios. Reference should be made to Figure 4 and Figure 5 for a graphical representation of the results.

6.2.3 Annual mean PM_{10} concentrations were predicted at the sensitive receptor locations for the DM and DS scenarios. These are summarised in Table 18.

Table 18 Predicted Annual Mean PM_{10} Concentrations

Receptor		Predicted Annual Mean PM_{10} Concentration (µg/m³)		
		DM	DS	Change
R1	Residential - Bloomhouse Lane	11.40	11.40	0.01
R2	Residential - Wooley Colliery Road	11.60	11.61	0.00
R3	Residential - Station Road	12.41	12.47	0.05
R4	Residential - Station Road	12.37	12.42	0.05
R5	Darton Primary School	11.63	11.65	0.02
R6	Residential - Darton Lane	12.98	13.04	0.06
R7	Residential - Darton Lane	11.83	11.87	0.03
R8	Residential - Church Street	12.15	12.22	0.07
R9	Residential - Barnsley Road	13.36	13.44	0.07
R10	Residential - Richard Road	12.68	12.73	0.05
R11	Residential - Lansdowne Crescent	13.54	13.54	0.00
R12	Residential - Churchfield Lane	13.94	13.95	0.01
R13	Residential - Huddersfield Road	12.79	12.82	0.02
R14	Residential - Sackup Lane	11.80	11.81	0.01
R15	Residential - Sackup Lane	11.70	11.71	0.01
R16	Residential - Huddersfield Road	14.04	14.06	0.03
R17	Residential - Bloomhouse Lane	11.30	11.31	0.02

6.2.4 As indicated in Table 18, predicted annual mean PM_{10} concentrations were below the AQO of 40µg/m³ at all sensitive receptors in both scenarios. Reference should be made to Figure 6 and Figure 7 for a graphical representation of the results.

6.2.5 Annual mean $PM_{2.5}$ concentrations were predicted at the sensitive receptor locations for the DM and DS scenarios. These are summarised in Table 19.

Table 19 Predicted Annual Mean $PM_{2.5}$ Concentrations

Receptor		Predicted Annual Mean $PM_{2.5}$ Concentration (µg/m³)		
		DM	DS	Change
R1	Residential - Bloomhouse Lane	6.36	6.37	0.00
R2	Residential - Wooley Colliery Road	6.48	6.48	0.00
R3	Residential - Station Road	6.92	6.95	0.03
R4	Residential - Station Road	6.89	6.91	0.03
R5	Darton Primary School	6.49	6.50	0.01
R6	Residential - Darton Lane	7.22	7.25	0.03
R7	Residential - Darton Lane	6.59	6.61	0.02
R8	Residential - Church Street	6.78	6.82	0.04
R9	Residential - Barnsley Road	7.47	7.51	0.04
R10	Residential - Richard Road	7.09	7.11	0.03
R11	Residential - Lansdowne Crescent	7.72	7.72	0.00
R12	Residential - Churchfield Lane	7.93	7.93	0.00
R13	Residential - Huddersfield Road	7.19	7.20	0.01
R14	Residential - Sackup Lane	6.58	6.58	0.00
R15	Residential - Sackup Lane	6.52	6.52	0.00
R16	Residential - Huddersfield Road	7.98	7.99	0.01
R17	Residential - Bloomhouse Lane	6.30	6.31	0.01

6.2.6 As indicated in Table 19, predicted annual mean $PM_{2.5}$ concentrations were below the Concentration Target of 10µg/m³ at all sensitive receptors in both scenarios. Reference should be made to Figure 8 and Figure 9 for a graphical representation of the results.

Predicted Impacts

6.2.7 Predicted impacts on annual mean NO_2 concentrations at the sensitive receptor locations are summarised in Table 20.

Table 20 Predicted Impacts - NO_2

Receptor		Predicted Annual Mean NO_2 Concentration	Predicted Concentration Change as Proportion of AQO (%)	Impact Significance
R1	Residential - Bloomhouse Lane	Below 75% of AQO	0	Negligible
R2	Residential - Wooley Colliery Road	Below 75% of AQO	0	Negligible
R3	Residential - Station Road	Below 75% of AQO	0	Negligible
R4	Residential - Station Road	Below 75% of AQO	0	Negligible
R5	Darton Primary School	Below 75% of AQO	0	Negligible
R6	Residential - Darton Lane	Below 75% of AQO	1	Negligible
R7	Residential - Darton Lane	Below 75% of AQO	0	Negligible
R8	Residential - Church Street	Below 75% of AQO	1	Negligible
R9	Residential - Barnsley Road	Below 75% of AQO	1	Negligible
R10	Residential - Richard Road	Below 75% of AQO	0	Negligible
R11	Residential - Lansdowne Crescent	Below 75% of AQO	0	Negligible
R12	Residential - Churchfield Lane	Below 75% of AQO	0	Negligible
R13	Residential - Huddersfield Road	Below 75% of AQO	0	Negligible
R14	Residential - Sackup Lane	Below 75% of AQO	0	Negligible
R15	Residential - Sackup Lane	Below 75% of AQO	0	Negligible
R16	Residential - Huddersfield Road	Below 75% of AQO	0	Negligible
R17	Residential - Bloomhouse Lane	Below 75% of AQO	0	Negligible

6.2.8 As indicated in Table 20, impacts on annual mean NO_2 concentrations as a result of the proposed development were predicted to be **negligible** at all receptor locations.

6.2.9 Predicted impacts on annual mean PM_{10} concentrations at the sensitive receptor locations are summarised in Table 21.

Table 21 Predicted Impacts - PM_{10}

Receptor		Predicted Annual Mean PM_{10} Concentration	Predicted Concentration Change as Proportion of AQO (%)	Impact Significance
R1	Residential - Bloomhouse Lane	Below 75% of AQO	0	Negligible
R2	Residential - Wooley Colliery Road	Below 75% of AQO	0	Negligible
R3	Residential - Station Road	Below 75% of AQO	0	Negligible
R4	Residential - Station Road	Below 75% of AQO	0	Negligible
R5	Darton Primary School	Below 75% of AQO	0	Negligible
R6	Residential - Darton Lane	Below 75% of AQO	0	Negligible
R7	Residential - Darton Lane	Below 75% of AQO	0	Negligible
R8	Residential - Church Street	Below 75% of AQO	0	Negligible
R9	Residential - Barnsley Road	Below 75% of AQO	0	Negligible
R10	Residential - Richard Road	Below 75% of AQO	0	Negligible
R11	Residential - Lansdowne Crescent	Below 75% of AQO	0	Negligible
R12	Residential - Churchfield Lane	Below 75% of AQO	0	Negligible
R13	Residential - Huddersfield Road	Below 75% of AQO	0	Negligible
R14	Residential - Sackup Lane	Below 75% of AQO	0	Negligible
R15	Residential - Sackup Lane	Below 75% of AQO	0	Negligible
R16	Residential - Huddersfield Road	Below 75% of AQO	0	Negligible
R17	Residential - Bloomhouse Lane	Below 75% of AQO	0	Negligible

6.2.10 As indicated in Table 21, impacts on annual mean PM_{10} concentrations as a result of the proposed development were predicted to be **negligible** at all receptor locations.

6.2.11 Predicted impacts on annual mean $PM_{2.5}$ concentrations at the sensitive receptor locations are summarised in Table 22.

Table 22 Predicted Impacts - $PM_{2.5}$

Receptor		Predicted Annual Mean $PM_{2.5}$ Concentration	Predicted Conc. Change as Proportion of Concentration Target (%)	Impact Significance
R1	Residential - Bloomhouse Lane	Below 75% of Concentration Target	0	Negligible
R2	Residential - Wooley Colliery Road	Below 75% of Concentration Target	0	Negligible
R3	Residential - Station Road	Below 75% of Concentration Target	0	Negligible
R4	Residential - Station Road	Below 75% of Concentration Target	0	Negligible
R5	Darton Primary School	Below 75% of Concentration Target	0	Negligible
R6	Residential - Darton Lane	Below 75% of Concentration Target	0	Negligible
R7	Residential - Darton Lane	Below 75% of Concentration Target	0	Negligible
R8	Residential - Church Street	Below 75% of Concentration Target	0	Negligible
R9	Residential - Barnsley Road	76 - 94% of Concentration Target	0	Negligible
R10	Residential - Richard Road	Below 75% of Concentration Target	0	Negligible
R11	Residential - Lansdowne Crescent	76 - 94% of Concentration Target	0	Negligible
R12	Residential - Churchfield Lane	76 - 94% of Concentration Target	0	Negligible
R13	Residential - Huddersfield Road	Below 75% of Concentration Target	0	Negligible
R14	Residential - Sackup Lane	Below 75% of Concentration Target	0	Negligible
R15	Residential - Sackup Lane	Below 75% of Concentration Target	0	Negligible
R16	Residential - Huddersfield Road	76 - 94% of Concentration Target	0	Negligible

Receptor		Predicted Annual Mean $PM_{2.5}$ Concentration	Predicted Conc. Change as Proportion of Concentration Target (%)	Impact Significance
R17	Residential - Bloomhouse Lane	Below 75% of Concentration Target	0	Negligible

6.2.12 As indicated in Table 22, impacts on annual mean $PM_{2.5}$ concentrations as a result of the proposed development were predicted to be **negligible** at all receptor locations.

6.3 Interim Planning Guidance for $PM_{2.5}$

6.3.1 Interim Planning Guidance[19] on the consideration of the $PM_{2.5}$ targets identified in the Environment Act (2021) in planning decisions has been produced by DEFRA. This requires evidence that the key sources of air pollution within a development have been identified and appropriate action to minimise emissions of $PM_{2.5}$ and its precursors as far as is reasonably practicable be provided in support of planning applications. To assist the process, two questions and associated considerations are provided. These are summarised in Table 23, along with the development response.

Table 23 Interim Planning Guidance Questions

Question	Response
How has exposure to $PM_{2.5}$ been considered when selecting the development site? Factors to consider include: • Site proximity to people (particularly large populations and/or vulnerable groups, e.g. schools, hospitals, care homes, areas of deprivation) and the impact of the development on these • Site proximity to pollution sources and the impact of these on users of the development • Exposure and emissions during both construction and in-use	The site is located to the north of Darton town centre, bordered by North Gawber Football club to the east, agricultural fields to the north and west and residential properties to the south. Receptors along the wider road network have the potential to be affected by exhaust emissions associated with vehicles travelling to and from the site. However, the assessment results summarised in Section 5.7 and 6.2 demonstrate that the impact of the development on local air quality is predicted to be **negligible** The site is distanced from any major pollution sources. As such, $PM_{2.5}$ concentrations are likely to be below the Concentration Target across the site As outlined in Table 16, a number of mitigation measures will be used throughout the construction phase in order to reduce fugitive dust emissions as far as practicable. This will control potential exposure at off-site locations

[19] https://uk-air.defra.gov.uk/pm25targets/planning.

Question	Response
What actions and/or mitigations have been considered to reduce $PM_{2.5}$ exposure for development users and nearby receptors and to reduce emissions of $PM_{2.5}$ and its precursors? Factors to consider include: • Site layout • The development's design • Technology used in the construction or installed for use in the development • Construction and future use of the development	The development is set back from major road sources and associated vehicle exhaust emissions. This will reduce the potential for $PM_{2.5}$ exposure for future residents In order to reduce emissions of $PM_{2.5}$ with associated impacts at nearby receptors, secure cycle storage will be provided within the scheme to encourage the use of sustainable transport modes. Electric Vehicle (EV) charging will also be provided Further to the above, in order to reduce emissions during the construction phase, a number of mitigation measures will be used to minimise dust generation from associated activities

6.3.2 Based on the responses provided in Table 23 and the results of the assessment, as outlined in Sections 5.5 and 6.2, it is considered that the development has identified key sources of air pollution and taken appropriate action to minimise emissions of $PM_{2.5}$.

6.4 Overall Impact Significance

6.4.1 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 24.

Table 24 Overall Impact Significance of Road Vehicle Exhaust Emission Impacts

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 relevant AQOs and Concentration Target at all sensitive locations in the DM and DS scenarios 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 or Concentration Target

Guidance	Comment
The influence and validity of any assumptions adopted when undertaking the prediction of impacts	It was assumed that vehicle exhaust emission rates and background concentrations will not reduce in future years. This provides conservative 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

6.4.2 The IAQM guidance[20] 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.

6.5 Barnsley Air Quality and Emissions Good Practice Planning Guidance

6.5.1 BMBC has produced Air Quality and Emissions Good Practice Planning Guidance[21] which includes direction on when an air quality assessment will be required and the associated scope of works. The guidance provides a methodology for determining the scale of a development as minor, medium or major and the required air quality mitigation for the relevant banding. Review of the relevant criteria indicated the proposals were classified as **medium** under the following category:

- Dwelling Houses (C3) more than 50 units.

6.5.2 The guidance provides a number of mitigation options that should be considered for inclusion with **medium** developments. Those to be incorporated into the scheme include:

- Provision of 1 EV charging point per dwelling;
- Secure cycle storage; and,
- Travel Plan including agreed mechanisms for discouraging high emission vehicle use and encouraging modal shift (i.e. public transport, cycling and walking) as well as the uptake of low emission fuels and technologies.

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

[21] Air Quality and Emissions Good Practice Planning Guidance, BMBC, 2021.

6.5.3 It is recommended that the above measures are adopted in order to minimise air quality effects as a result of vehicle exhaust emissions as far as practicable. This can be secured through planning condition if required by BMBC.

7.0 CONCLUSION

7.1.1 Redmore Environmental Ltd was commissioned by Homes by honey and KEITH WIKE and BRENDA WIKE of Manor House Farm, Bloomhouse Lane, Darton, Barnsley, S75 5AS and CHRISTOPHER WIKE and SHARON WIKE of 23 Huddersfield Road, Darton, Barnsley, S75 5ND, to undertake an Air Quality Assessment in support of a proposed residential development on land off Woolley Colliery Road, Darton.

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

7.1.3 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. Site-specific dust control measures were subsequently determined based on the identified risk ratings. Subject to implementation, potential air quality impacts from dust generated by earthworks, construction and trackout activities are predicted to be **not significant**.

7.1.4 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 development. Dispersion modelling was therefore undertaken in order to predict pollutant concentrations at sensitive locations as a result of emissions from the highway network both with and without the development in place. Results were subsequently verified using local monitoring data.

7.1.5 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 receptor locations. Following consideration of the relevant issues, residual impacts as a result of the operation of the development were considered to be **not significant**, in accordance with the IAQM guidance.

7.1.6 A number of mitigation measures were identified in line with the requirements of the Barnsley Air Quality and Emissions Good Practice Planning Guidance in order to reduce vehicle exhaust emissions associated with the proposals. It is considered these are

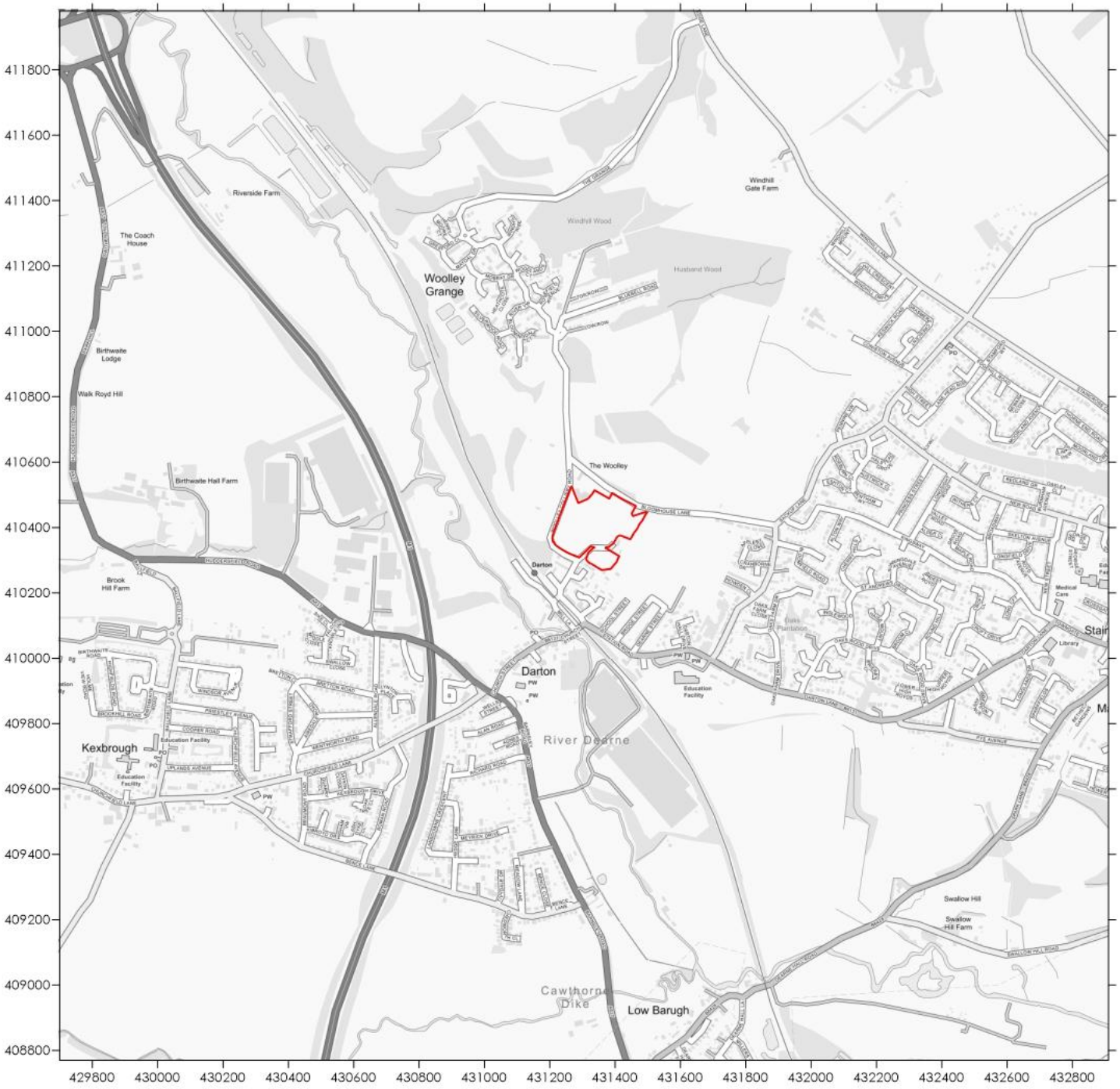
appropriate for a development of this scale and nature and will further control impacts during the operational phase.

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

8.0 ABBREVIATIONS

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
ASR	Annual Status Report
BMBC	Barnsley Metropolitan Borough Council
CERC	Cambridge Environmental Research Consultants
DEFRA	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
DM	Do-Minimum
DS	Do-Something
EFT	Emissions Factor Toolkit
EV	Electric Vehicle
HDV	Heavy Duty Vehicle
IAQM	Institute of Air Quality Management
LA	Local Authority
LAQM	Local Air Quality Management
NB	Northbound
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
SB	Southbound
SP	Slow Phase
z_0	Roughness length

Figures



Legend

Site Boundary

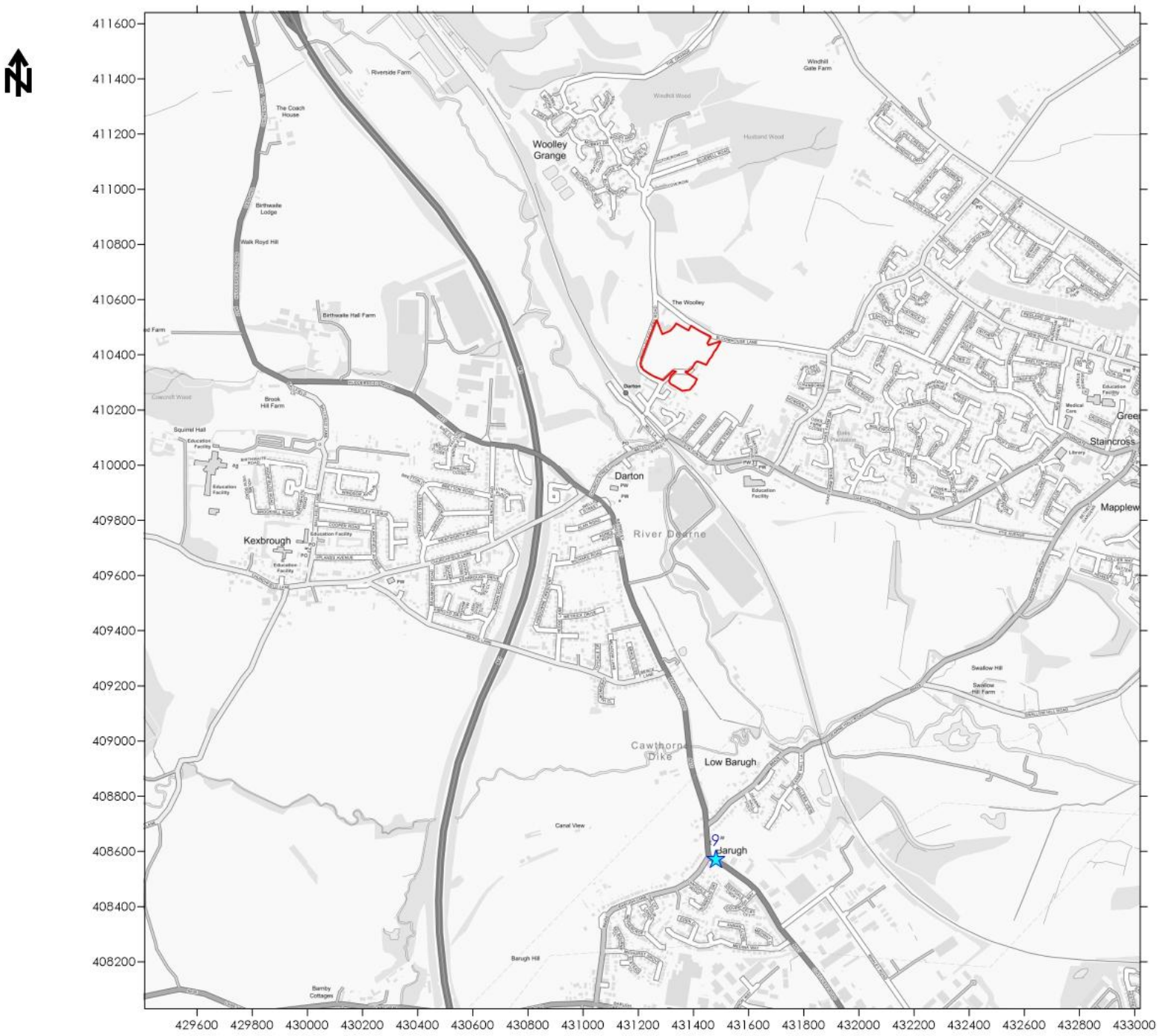
Title
Figure 1 - Site Location

Project
Air Quality Assessment
Woolley Colliery Road, Darton

Project Reference
10370

Client
Homes by honey and Keith Wike and Brenda Wike, and Christopher Wike and Sharon Wike

Redmore environmental
www.red-env.co.uk | 0161 7060075



Legend

Site Boundary

Monitor

Title
Figure 2 - Monitoring Location

Project
Air Quality Assessment
Woolley Colliery Road, Darton

Project Reference
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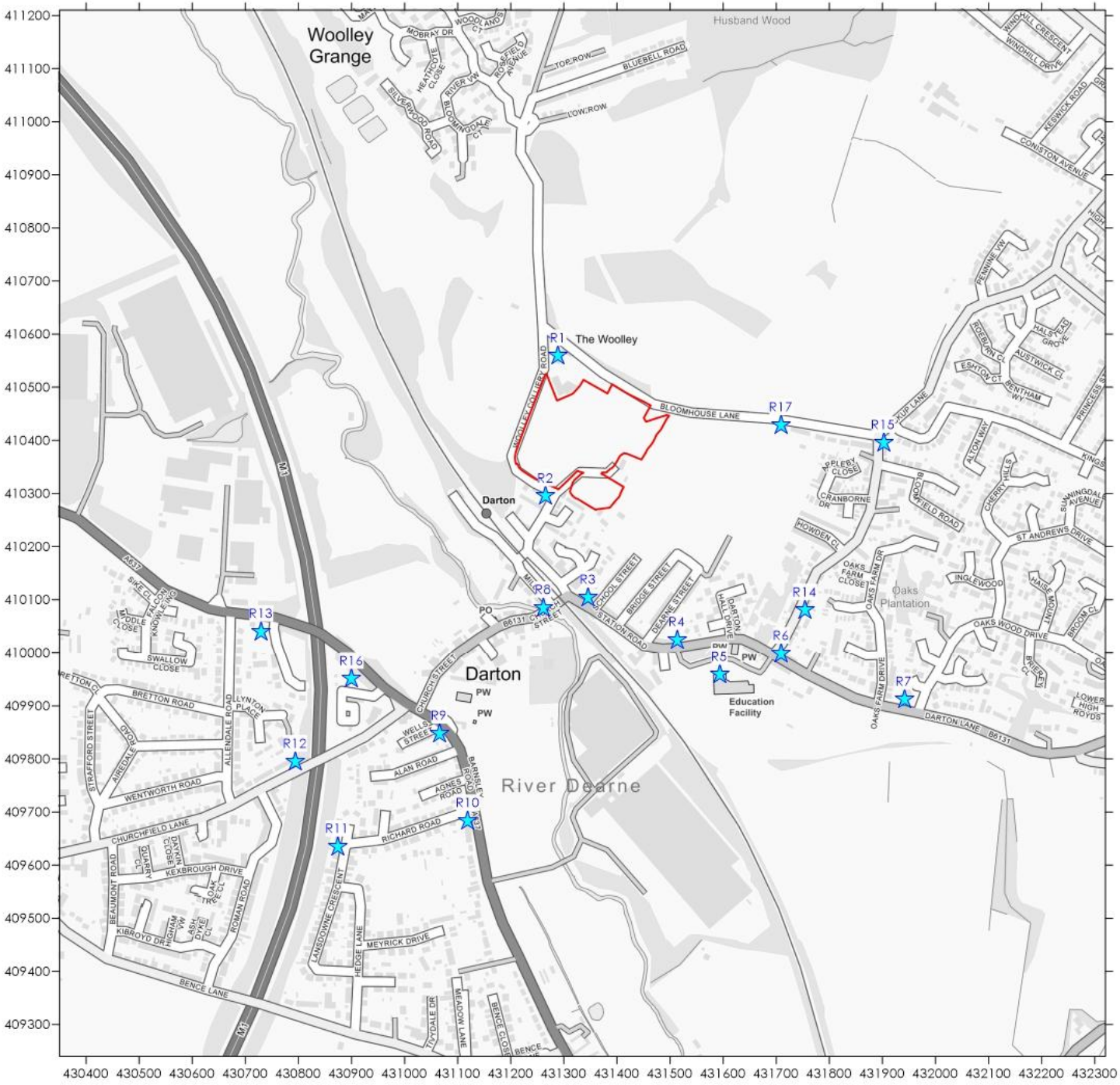

Legend

Site Boundary

Receptor

Title

Figure 3 - Operational Phase Road Vehicle Exhaust Emission Sensitive Receptor Locations

Project

Air Quality Assessment
Woolley Colliery Road, Darton

Project Reference

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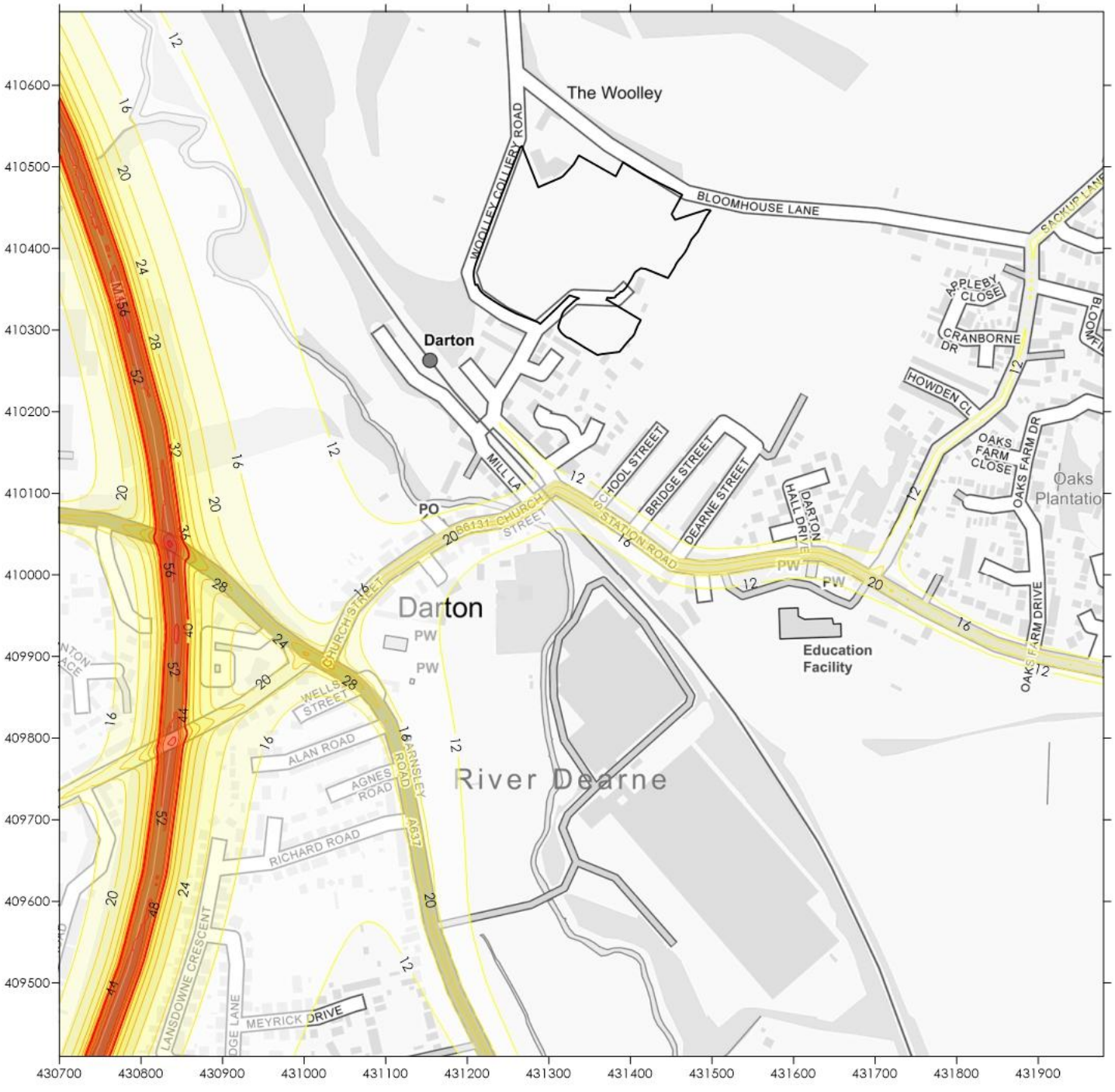

Legend

Site Boundary

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

60
56
52
48
44
40
36
32
28
24
20
16
12

Title

Figure 4 - Predicted Annual Mean NO_2 Concentration ($\mu g/m^3$)
Do-Minimum

Project

Air Quality Assessment
Woolley Colliery Road, Darton

Project Reference

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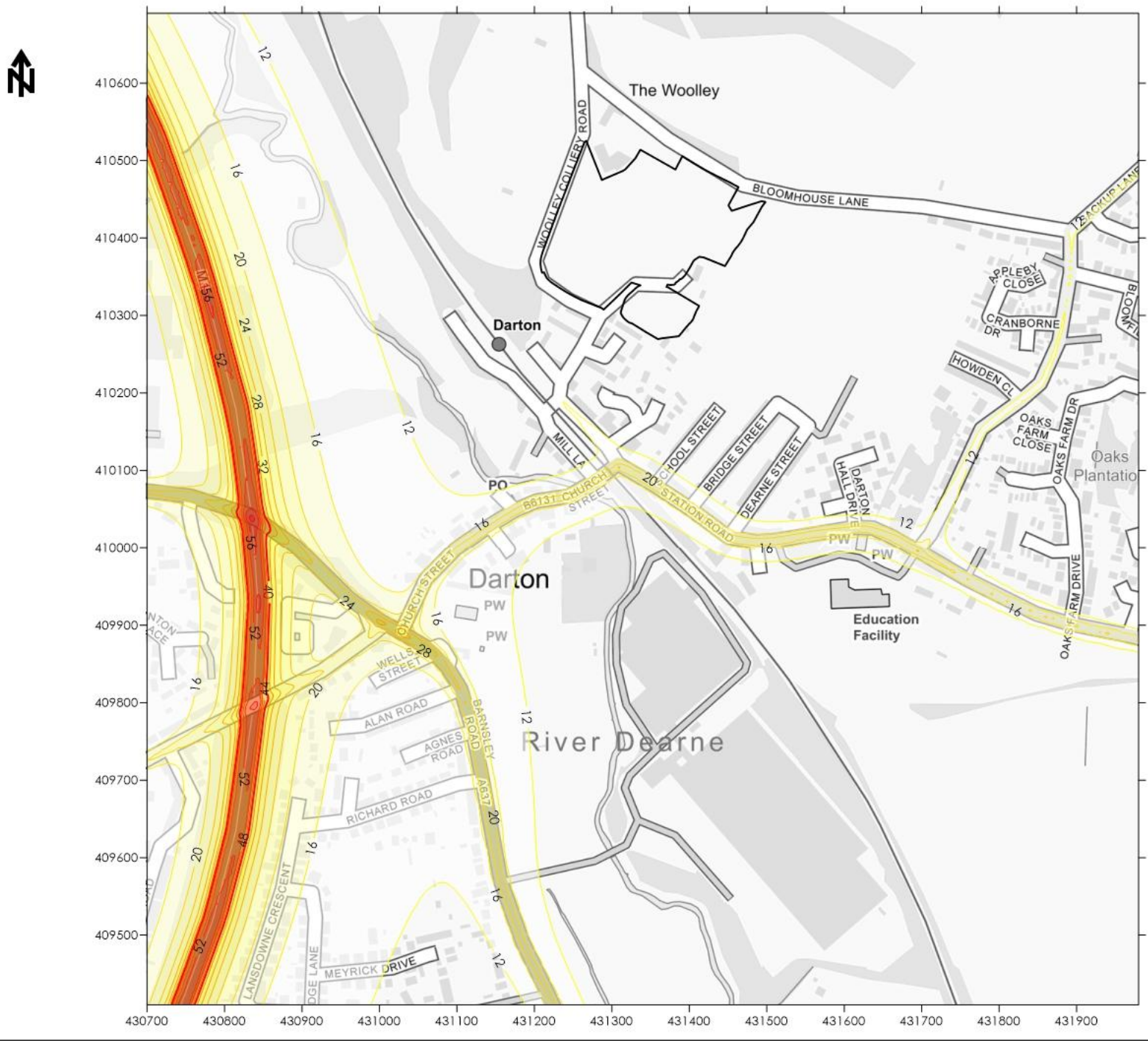

Legend

Site Boundary

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

60
56
52
48
44
40
36
32
28
24
20
16
12

Title

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

Project

Air Quality Assessment
Woolley Colliery Road, Darton

Project Reference

10370

Client

Homes by honey and Keith Wike and Brenda Wike, and Christopher Wike and Sharon Wike

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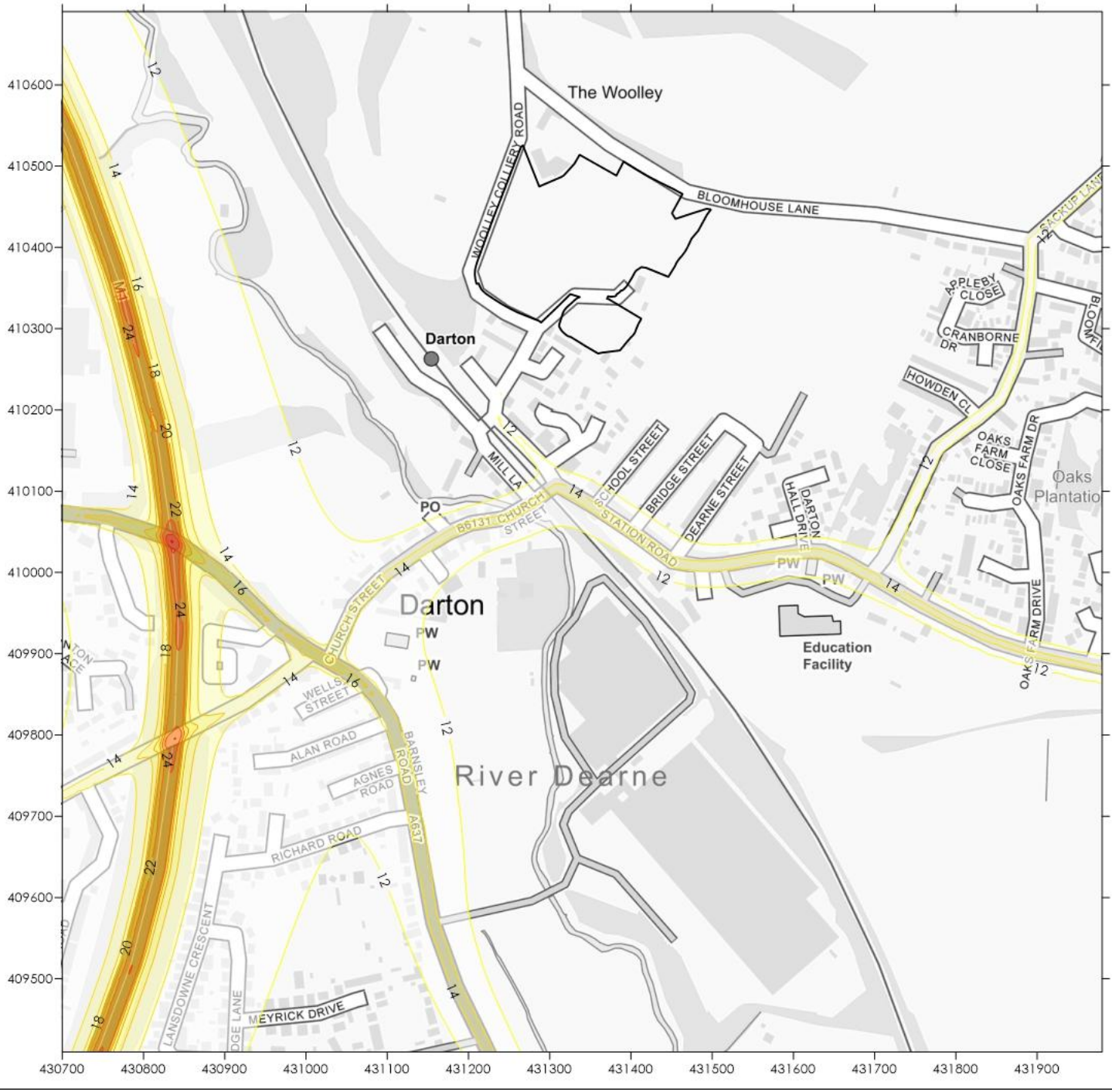

Legend

Site Boundary

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

28
26
24
22
20
18
16
14
12

Title

Figure 6 - Predicted Annual Mean PM_{10} Concentration ($\mu g/m^3$) Do-Minimum

Project

Air Quality Assessment
Woolley Colliery Road, Darton

Project Reference

10370

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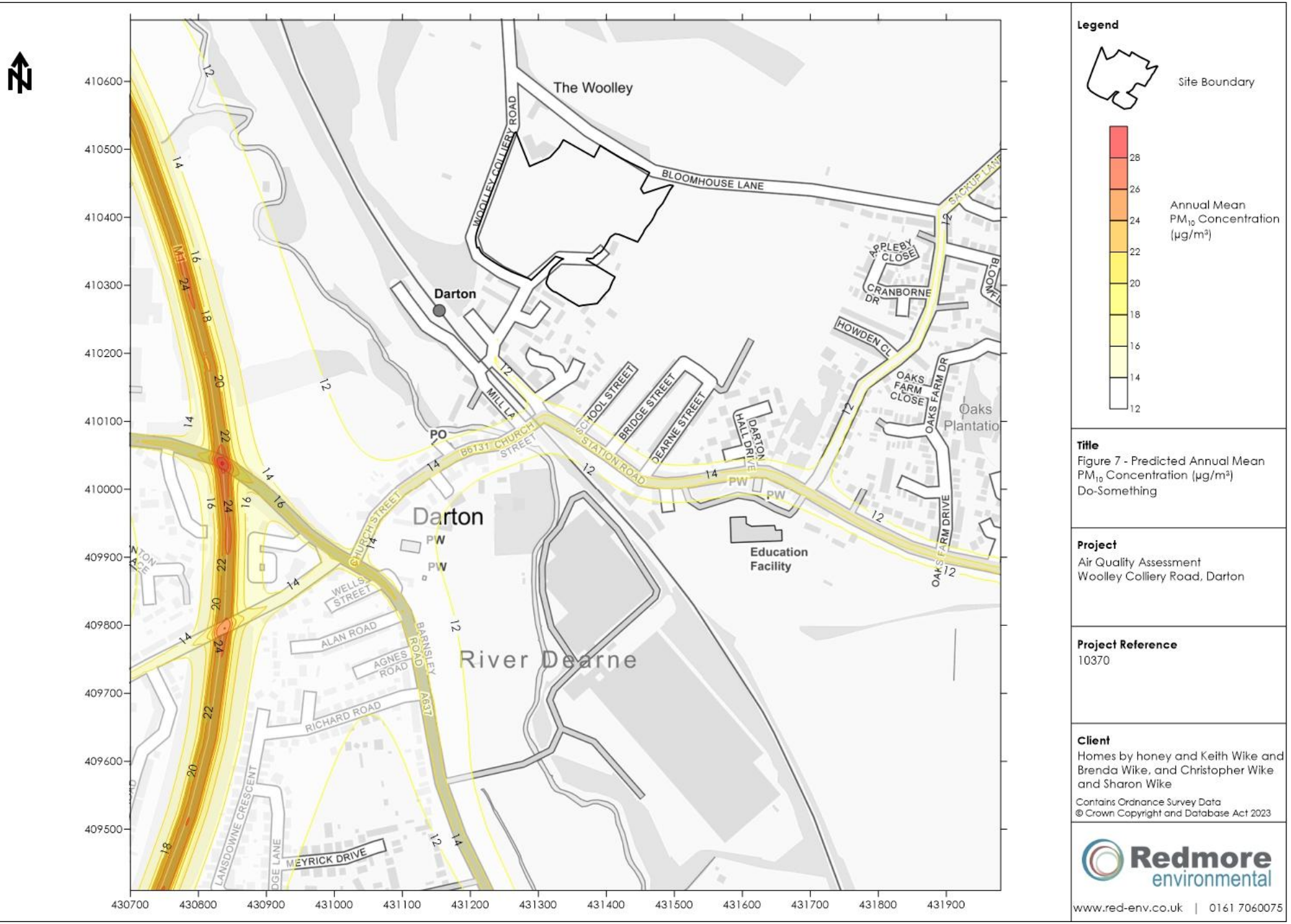

Legend

Site Boundary

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

28
26
24
22
20
18
16
14
12

Title

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

Project

Air Quality Assessment
Woolley Colliery Road, Darton

Project Reference

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Client

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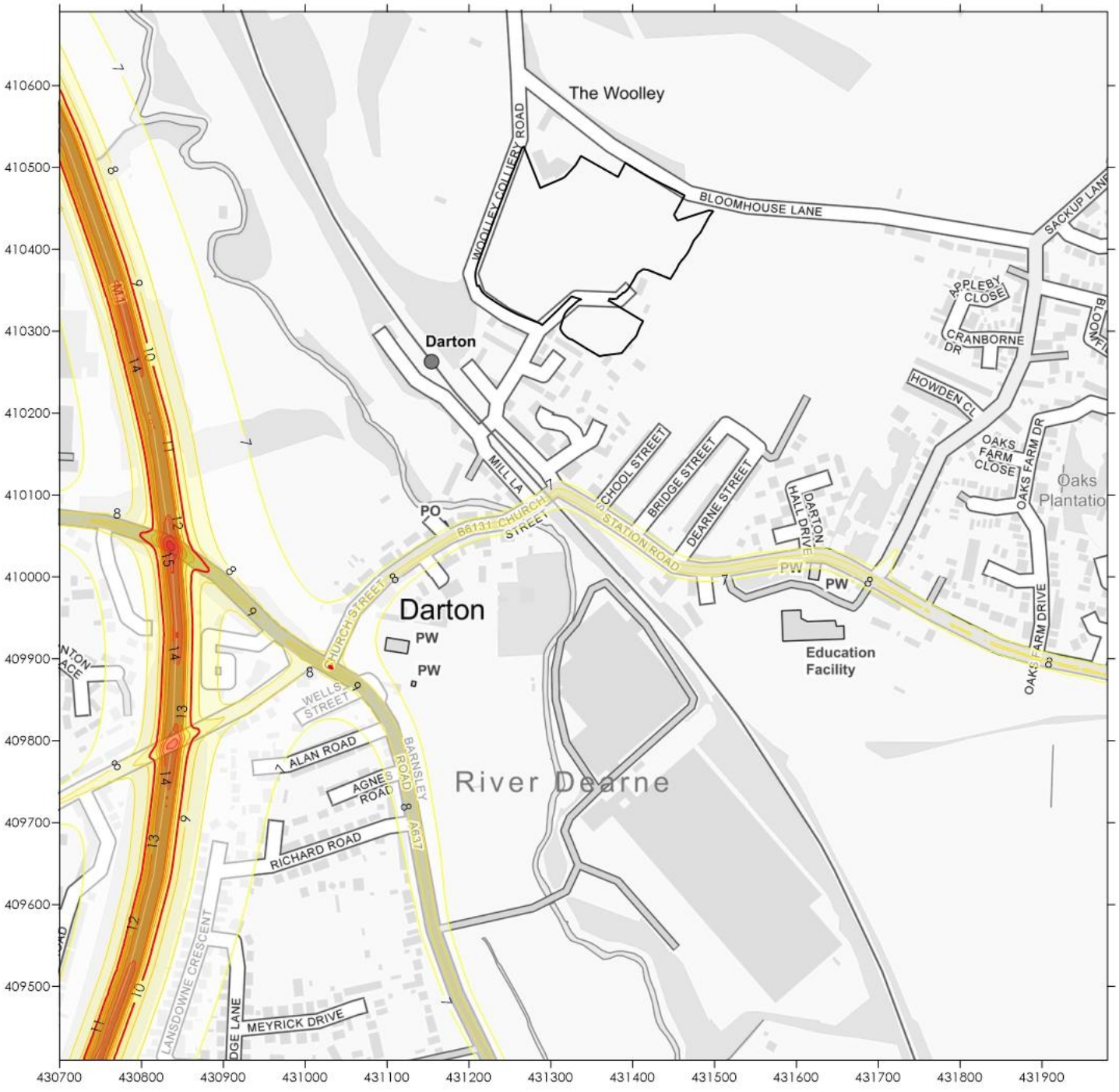

Legend

Site Boundary

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

16
15
14
13
12
11
10
9
8
7

Title

Figure 8 - Predicted Annual Mean $PM_{2.5}$ Concentration ($\mu g/m^3$)
Do-Minimum

Project

Air Quality Assessment
Woolley Colliery Road, Darton

Project Reference

10370

Client

Homes by honey and Keith Wike and Brenda Wike, and Christopher Wike and Sharon Wike

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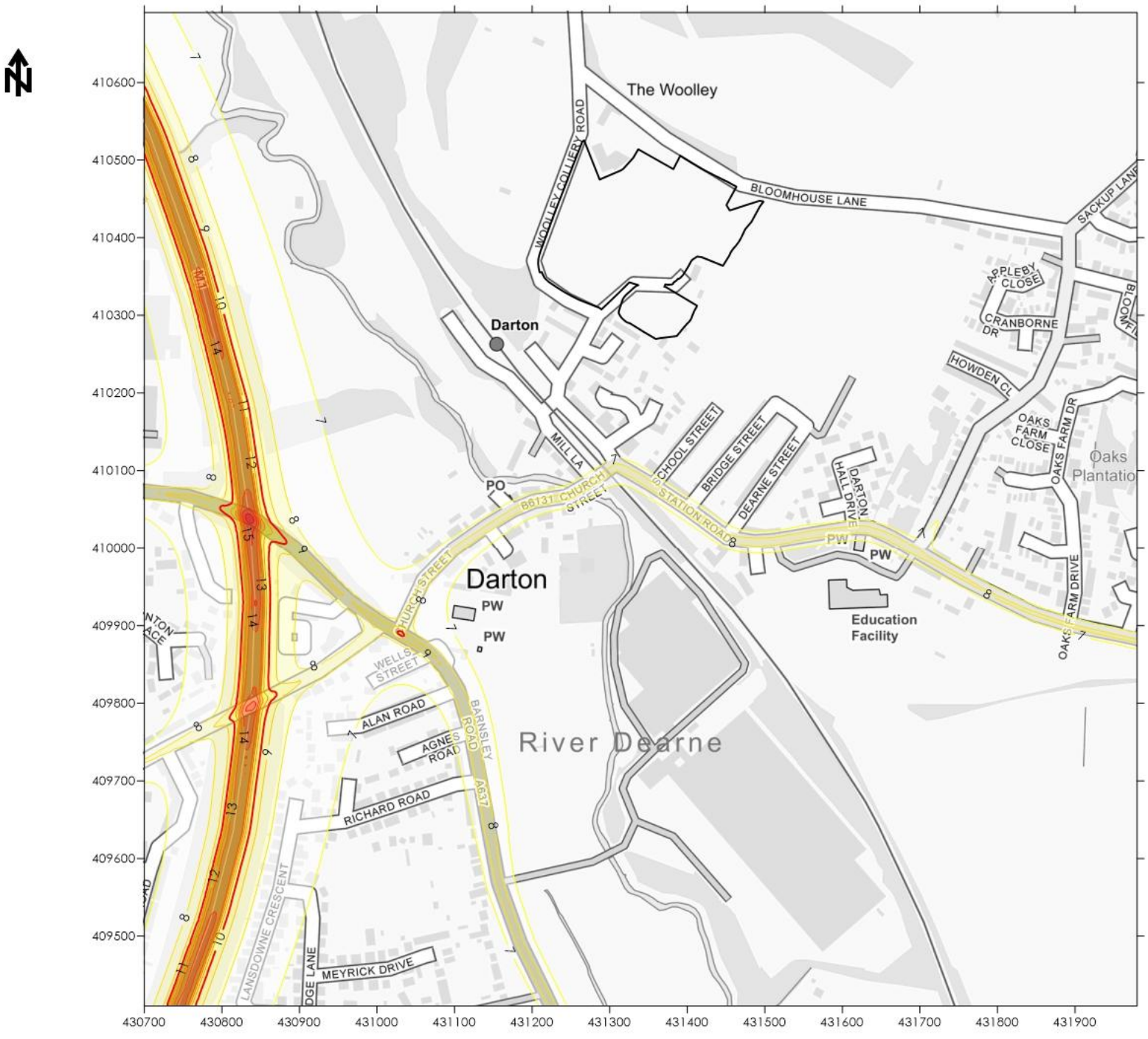

Legend

Site Boundary

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

16
15
14
13
12
11
10
9
8
7

Title

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

Project

Air Quality Assessment
Woolley Colliery Road, Darton

Project Reference

10370

Client

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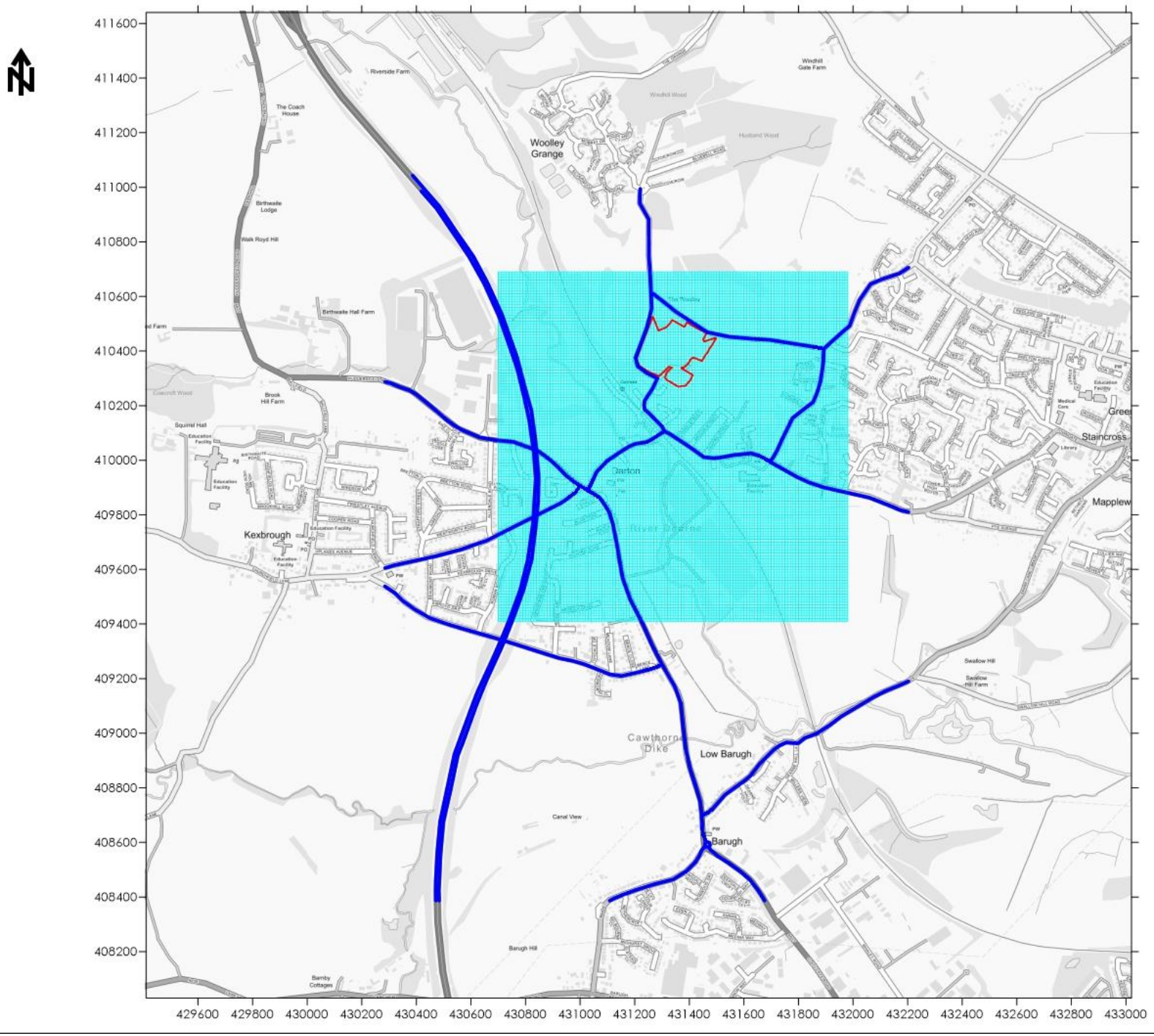

Legend

Site Boundary

Output Grid

Road Link

Title
Figure 10 - ADMS-Roads Inputs

Project
Air Quality Assessment
Woolley Colliery Road, Darton

Project Reference
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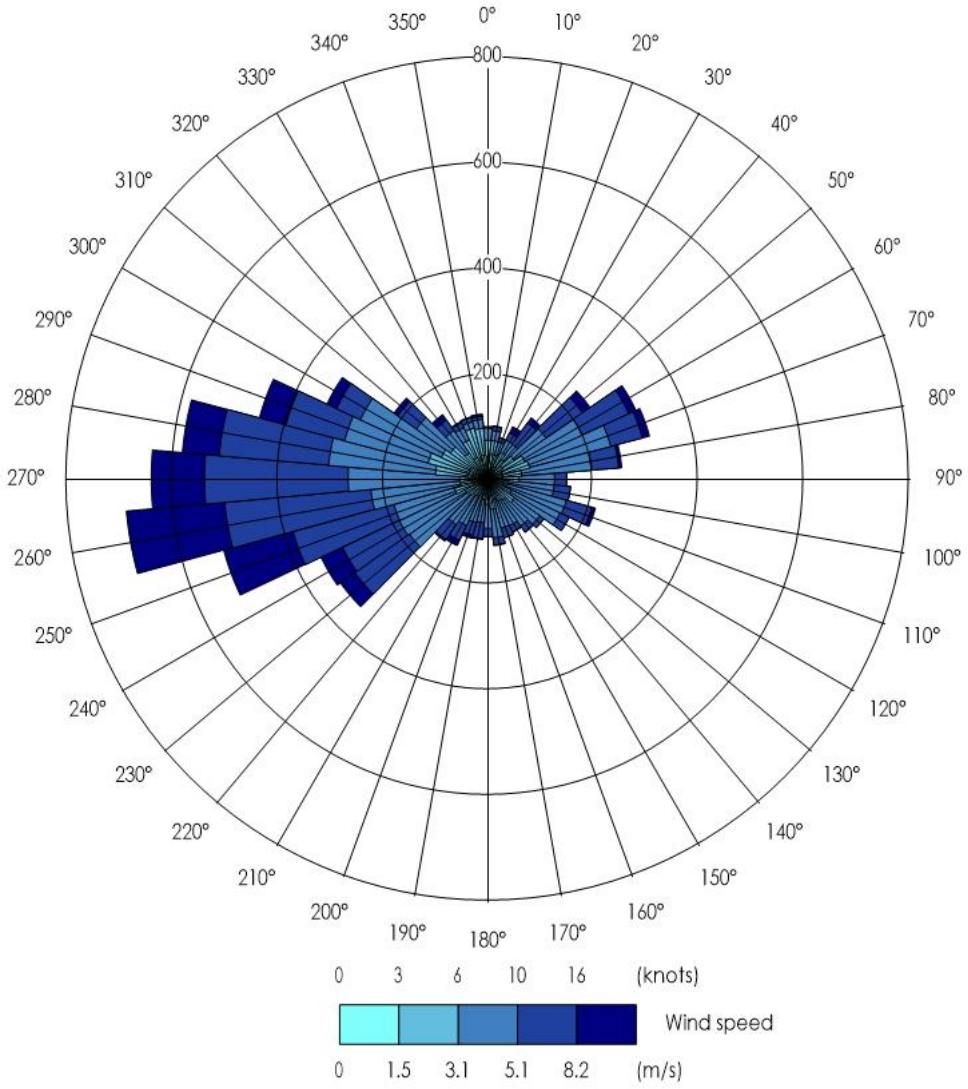

Legend

Title
Figure 11 - Wind Rose of 2024 Sheffield City Meteorological Data

Project
Air Quality Assessment
Woolley Colliery Road, Darton

Project Reference
10370

Client
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Appendix 1 - Assessment Input Data

Introduction

The proposals have the potential to cause air quality impacts as a result of exhaust emissions associated with vehicles travelling to and from the development. 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 in order to predict NO_2, PM_{10} and $PM_{2.5}$ concentrations across the site using the ADMS-Roads dispersion model (version 5.1.0.2). 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.

The relevant inputs are detailed in the following Sections.

Assessment Area

Ambient concentrations were predicted over the area NGR: 430700, 409410 to 431980, 410690. One Cartesian grid was included within the model to produce data suitable for contour plotting using the Surfer software package. The default intelligent grid spacing option was selected within ADMS-Roads in order to improve contour resolution within the vicinity of sources.

Receptors potentially sensitive to changes in pollutant concentrations were included in the assessment as outlined in the main report text.

Reference should be made to Figure 10 for a graphical representation of the assessment grid extents.

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)[22]. 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 2024. It should be noted that the DfT web tool is referenced in DEFRA guidance[23] as being a suitable source of data for air quality assessments and it is therefore considered to provide a reasonable estimate of traffic flows in the vicinity of the site.

The baseline traffic data was converted to the opening year of the development 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.

Daily vehicle movements generated as a result of the proposals were provided by Bryan G Hall, the Transport Consultants for the project. These were added to the relevant links in order to establish the DS scenario.

Road parameters for input into the model were based on the following:

- Road widths were estimated from aerial photography and UK highway design standards;
- Vehicle speeds were estimated as an average for the relevant road link over the course of a 24-hour period;
- Vehicle speeds were determined following review of speed limits within the study extents, as well as congestion data available from GoogleMaps;

22 https://roadtraffic.dft.gov.uk/#6/55.254/-6.053/basemap-regions-countpoints.

23 Local Air Quality Management Technical Guidance (TG22), DEFRA, 2022.

- Vehicle speeds specific to slow phases were determined using the methodology outlined in the DEFRA guidance[24];
- Necessary adjustments to slow phase vehicle speeds were based upon congestion data available from GoogleMaps; and,
- The length for slow phases was derived using the approaching distance of 25m outlined in the DEFRA guidance[25], and adjusted accordingly based on aerial photography and congestion data available from GoogleMaps.

A summary of the traffic data used in the assessment is provided in Table A1.1.

Table A1.1 Traffic Data

Link		24-hour AADT Flow			HDV Prop. of Fleet (%)	Avg. Vehicle Speed (km/h)	Road Width (m)
		2024	2030 DM	2030 DS			
L1	Sackup Lane	2,938	3,086	3,086	5.02	40	6.4
L2	Sackup Lane - slow phase (SP)	2,938	3,086	3,086	5.02	20	7.0
L3	B6131 - Darton Lane	7,727	8,118	8,510	8.57	40	5.8
L4	B6131 - Station Road to site exit	9,643	10,131	10,523	6.49	30	7.1
L5	B6131 - Station Road from site exit to Church Street	9,643	10,131	10,523	6.49	35	6.9
L6	B6131 - Church Street to A637 Barnsley Rd Jct Approach	8,408	8,834	9,717	4.37	35	7.1
L7	B6131 - Church Street to A637 Barnsley Rd Jct - SP	8,408	8,834	9,717	4.37	20	11.6
L8	A637 Huddersfield Rd - SP	10,586	11,121	11,441	8.33	20	9.7
L9	A637 - Huddersfield Rd to Falcon Knowling	10,586	11,121	11,441	8.33	40	10.2
L10	A637 - Huddersfield Rd	10,586	11,121	11,441	8.33	70	8.2
L11	A637 - Barnsley Rd - SP	12,119	12,732	13,288	7.81	20	9.0
L12	A637 - Barnsley Rd to Richard Road	12,119	12,732	13,288	7.81	40	9.3

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

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

Link		24-hour AADT Flow			HDV Prop. of Fleet (%)	Avg. Vehicle Speed (km/h)	Road Width (m)
		2024	2030 DM	2030 DS			
L13	A637 - Barnsley Rd to Dearne Hall Ln Roundabout Approach	12,119	12,732	13,288	7.81	55	8.1
L14	A637 - Barnsley Rd Dearne Hall Ln Roundabout Approach - SP	12,119	12,732	13,288	7.81	20	10.3
L15	Dearne Hall Ln Roundabout exit onto B6428 - Barugh Ln - SP	7,369	7,742	8,020	3.16	20	6.2
L16	B6428 - Barugh Lane	7,369	7,742	8,020	3.16	40	6.5
L17	A637 - South of Dearne Hall Ln Roundabout - SP	12,119	12,732	13,010	7.81	20	9.0
L18	A637 - Claycliffe Road	12,119	12,732	13,010	7.81	40	6.0
L19	B4628 - Dearne Hall Road, Barnsley Rd Approach - SP	7,124	7,491	7,491	2.79	20	5.8
L20	B4628 - Dearne Hall Road to railway line	7,124	7,491	7,491	2.79	40	6.1
L21	B4628 - Dearne Hall Road	7,124	7,491	7,491	2.79	55	7.2
L22	M1 - northbound (NB)	50,694	53,259	53,259	10.47	95	11.0
L23	M1 - southbound (SB)	50,694	53,259	53,259	10.47	95	11.0
L24	Bence Lane, Barnsley Road Approach - SP	2,235	2,348	2,348	0.45	20	8.0
L25	Bence Lane	2,235	2,348	2,348	0.45	40	5.2
L26	Churchfield Lane A637 Approach - SP	7,369	7,742	7,742	3.16	20	12.9
L27	Churchfield Lane	7,369	7,742	7,742	3.16	40	7.7
L28	Station Road to Station Road approach - SP	1,454	1,528	1,528	5.63	20	8.1
L29	Wooley Colliery Road to Station Road	1,454	1,528	1,528	5.63	40	6.1
L30	Wooley Colliery Road North to Bloomhouse Lane	1,356	1,425	1,538	5.51	40	6.2
L31	Bloomhouse Lane to Wooley Colliery Road Approach	568	597	710	1.25	20	6.7
L32	Bloomhouse Lane to Sackup Lane Approach	568	597	710	1.25	40	5.0
L33	Bloomhouse Lane to Sackup Lane - SP	568	597	710	1.25	20	8.8

Link		24-hour AADT Flow			HDV Prop. of Fleet (%)	Avg. Vehicle Speed (km/h)	Road Width (m)
		2024	2030 DM	2030 DS			
R1	Dearne Hall Ln Roundabout	10,561	11,068	11,346	6.35	20	13.2

Reference should be made to Figure 10 for a graphical representation of the road link locations.

Emission Factors

The emission factors were calculated using the relevant traffic flows and the Emissions Factor Toolkit (EFT) (version 13.1). This has been produced by DEFRA and incorporates COPERT 5.8 vehicle emission factors.

There is current 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, 2024 emission factors were utilised in preference to the scheme opening year in order to provide robust model outputs. As predictions for 2024 were verified, it is considered the results are a robust indication of concentrations for the future year.

Meteorological Data

Meteorological data used in the assessment was taken from Sheffield City meteorological station over the period 1st January 2024 to 31st December 2024 (inclusive). Sheffield City meteorological station is located at NGR: 440795, 388748, which is approximately 24.1km south-east of the scheme. 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 11 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. This value is considered

appropriate for the morphology of the area and is suggested within ADMS- Roads as being suitable for 'parkland, open suburbia'.

A z_0 of 0.3m was used to describe the meteorological site. This value is considered appropriate for the morphology of the area and is suggested within ADMS-Roads 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 to describe both the modelling extents and the meteorological site. This is considered appropriate for the nature of both areas and is suggested within ADMS-Roads as being suitable for 'cities and large towns'.

Background Concentrations

Background annual mean 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 site, as shown in Table 11.

Similarly to emission factors, background concentrations from 2024 were utilised in preference to the future year. This provided a robust assessment and is likely to overestimate pollutant concentrations during the operation of the proposal.

NO_x to NO_2 Conversion

Predicted annual mean NO_x concentrations were converted to NO_2 concentrations using the spreadsheet (version 9.1) provided by DEFRA, which is the method detailed within DEFRA guidance[26].

Verification

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

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

- 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 the assessment, model verification was undertaken for 2024 using traffic data, meteorological data and monitoring results from this year.

BMBC undertook monitoring of NO_2 concentrations at one location within the vicinity of roads included in the model during 2024. The result was obtained and the road contribution to total NO_x concentration calculated following the methodology contained within DEFRA guidance[27]. The monitored annual mean NO_2 concentration and calculated road NO_x concentration is summarised in Table A1.2.

Table A1.2 NO_x Verification - Monitoring Result

Monitoring Location		Monitored NO_2 Concentration ($\mu g/m^3$)	Calculated Road NO_x Concentration ($\mu g/m^3$)
9	Claycliffe Road / Barugh Lane	20.3	27.23

The annual mean road NO_x concentration predicted from the dispersion model and the road NO_x concentration calculated from the monitoring result is summarised in Table A1.3.

Table A1.3 NO_x Verification - Modelling Result

Monitoring Location		Calculated Road NO_x Concentration ($\mu g/m^3$)	Modelled Road NO_x Concentration ($\mu g/m^3$)
9	Claycliffe Road / Barugh Lane	27.23	10.94

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

The monitored and modelled road NO_x concentrations were compared to calculate the associated ratio. This indicated a verification factor of 2.4898 was required to be applied to all road NO_x modelling results.

Monitoring of PM_{10} and $PM_{2.5}$ 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[28].

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

Appendix 2 - Curricula Vitae

JETHRO REDMORE

Director

BEng (Hons), MSc, MIAQM, MIEnvSc, PISEP, CEnv

KEY EXPERIENCE:

Jethro is a Chartered Environmentalist and Director of Redmore Environmental with specialist experience in the air quality and odour sectors. His key capabilities include:

- Production and management of Air Quality, Dust and Odour Assessments for a wide-range of clients from the retail, residential, infrastructure, commercial and industrial sectors.
- Production and co-ordination of Environmental Permit applications for a variety of industrial sectors.
- Detailed dispersion modelling of road vehicle and industrial emissions using ADMS-Roads, ADMS-6, AERMOD-PRIME and BREEZE-ROADS. Studies have included impact assessment of ground level pollutant and odour concentrations and assessment of suitability of development sites for proposed end-use.
- Project management and co-ordination of Environmental Impact Assessments and scoping reports for developments throughout the UK.
- Provision of expert witness services at Planning Inquiries.
- Design and project management of pollutant monitoring campaigns.
- Co-ordination and management of large-scale multi-disciplinary projects and submissions.
- Provision of expert advice to local government and international environmental bodies, as well as involvement in production of industry guidance.

SELECT PROJECTS SUMMARY:

Industrial

Shanks Waste Management - Odour Assessments of two waste management facilities to support Environmental Permit Applications.

Tatweer Petroleum - dispersion modelling of Bahrain oil field.

Doha South Sewage Treatment Works - AQA for works extension in Qatar.

IRIS Environmental Appraisal Report Reviews, Isle of Man Government - odour assessment reviews.

Lankem, Greater Manchester - Environmental Permit Application for chemical manufacturing plant.

Newport Docks Bulk Drying, Pelleting and CHP Facility - air quality EIA for gas CHP.

Springshades, Leicester - Environmental Permit Variation Application for textile manufacturing plant.

Valspar, Chester - Odour Assessment and production of Odour Management Plan for a paint manufacturing plant in response to neighbour complaints.

Agrivert - dispersion modelling of odour and CHP emissions from numerous AD plants.

James Cropper Paper Mill, Cumbria - air quality EIA, Environmental Permit Variation and Human Health Risk Assessment for new biomass boiler adjacent to SSSI.

Rigg Approach, Leyton - Air Quality Assessment in support of waste transfer site.

Lynchford Lane Waste Transfer Station - biomass facility energy recovery plant.

Barnes Wallis Heat and Power, Cobham - biomass facility adjacent to AQMA.

Residential

Wood St Mill, Bury - residential development adjacent to scrap metal yard.

Hyams Lane, Holbrook - Odour Assessment to support residential development adjacent to sewage works.

North Wharf Gardens, London - peer review of EIA undertaken for large residential development.

Loxford Road, Alford - Air Quality EIA for residential development, included consideration of impacts from associated package sewage works

Elephant and Castle Leisure Centre - baseline AQA for redevelopment.

Carr Lodge, Doncaster - EIA for large residential development.

Queensland Road, Highbury - residential scheme including CHP.

Bicester Ecotown - dispersion modelling of energy centre.

Castleford Growth Delivery Plan - baseline air quality constraints assessment for town redevelopment.

York St, Bury - residential development adjacent to AQMA.

Temple Point Leeds - residential development adjacent to M1.

Commercial and Retail

Etihad Stadium - Air Quality EIA for the extension to the capacity of the Etihad Stadium, Manchester.

Wakefield College - redevelopment of city centre campus in AQMA.

Manchester Airport Cargo Shed - commercial development.

Manchester Airport Apron Extension - EIA including aircraft emission modelling.

National Youth Theatre, Islington - redevelopment to provide new arts space and accommodation.

EMILY PEARS-RYDING

Director

BSc (Hons), MIAQM, MIEnvSc

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KEY EXPERIENCE:

Emily is a Director with specialist experience in the air quality sector Her key capabilities include:

- Production of Air Quality Assessments in accordance with Department for Environment, Food and Rural Affairs (DEFRA) methodologies for a range of residential, commercial and industrial sectors.
- Detailed dispersion modelling of road vehicle and industrial emissions using ADMS-Roads and ADMS-6. Studies have included impact assessment of ground level pollutant and odour concentrations and assessment of suitability of development sites for proposed end-use.
- Project management and co-ordination of Environmental Impact Assessments and scoping reports for developments throughout the UK.
- Assessment of fugitive dust impacts from a range of mineral extraction developments.
- Assessment of petrol stations to address benzene concentrations and their impact on adjacent developments.
- Production of air quality mitigation strategies specifically tailored to address issues at individual sites.
- Assessment of potential effects associated with network realignment schemes and highway developments.

SELECT PROJECTS SUMMARY:

Broad Street, Birmingham

Air Quality Assessment in support of a residential-led development on land at Broad Street, Birmingham. The proposals were located adjacent to a section of the Midland Metro Westside which runs along Broad Street. Consideration was made to the potential for re-alignment of the local road network as a result of the Metro to effect pollution levels at the development. The assessment indicated NO_2 concentrations exceeded air quality criteria from ground to third floor level as a result of road vehicle exhaust emissions. Mitigation was therefore specified for the affected units.

Home Farm, Forest Road, Warfield

Ecological Air Quality Assessment in support of a residential development. Natural England held concerns regarding potential impacts at sensitive ecological designations as a result of traffic exhaust emissions associated with the development. The predicted change in NO_x and ammonia concentrations and nitrogen and acid deposition was below the relevant criteria at all locations within the ecological designations. Impacts were therefore not considered to be significant.

Saltcoats Road, Stevenston

Air Quality Assessment in support of an educational campus and associated energy centre. Impacts associated with emissions from the proposed gas and biomass boilers were assessed through detailed dispersion modelling. This indicated impacts on annual mean NO_2 and PM_{10} concentrations were predicted to be not significant.

Blackthorn & Piddington

Environmental Impact Assessment in support of a railway embankment scheme on land at the Network Railway Embankment between Piddington and Blackthorn. Due to the extensive stabilisation works a Fugitive Dust Emissions Assessment was undertaken in addition to consideration of road vehicle exhaust emissions. Due to the location of the site in relation to nearby sensitive receptors, potential impacts associated with construction works were not considered to be significant.

Blackmoorfoot Road, Huddersfield

Air Quality in support of a residential-led development in close proximity to an operational minerals facility. Due to the presence of the Johnsons Wellfield Quarry to the south of the site a Fugitive Dust Emissions Assessment was undertaken to determine potential impacts. Dispersion modelling of road vehicle exhaust emissions was also undertaken in support of the scheme. Results indicated the overall significance of fugitive dust emissions from the quarry and air quality impacts associated with operation of the development itself were not significant.

Lockwood Bar, Huddersfield

Air Quality Assessment for the proposed highway realignment scheme along Lockwood Road, Huddersfield. Changes in pollution levels were considered at sensitive receptors as a result of variations to road geometry and associated redistribution of vehicle trips across the local area. Results of the dispersion modelling study indicated air quality impacts as a result of the scheme were not significant.