

Air Quality Assessment

Former Dewsbury Fire Station, Huddersfield Road, Dewsbury

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Prepared by	Pearl Poulton			
Position	Air Quality Consultant			
Reviewed by	Jethro Redmore			
Position	Director			
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Heliport Business Park, Liverpool Road, Manchester, M30 7RU

info@red-env.co.uk | 0161 706 0075 | www.red-env.co.uk

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Executive Summary

Redmore Environmental Ltd was commissioned by WSG Property (Holdings) Limited to undertake an Air Quality Assessment in support of a planning application for a proposed mixed-use development at the site of the former Dewsbury Fire Station, Huddersfield Road, Dewsbury.

The proposals have the potential to cause air quality impacts as a result of fugitive dust emissions during construction and road traffic exhaust emissions associated with vehicles travelling to and from the site during operation, as well as expose future occupants to elevated pollution levels. As such, an Air Quality Assessment was required in order to determine baseline conditions, consider its suitability for the proposed end-use and assess potential effects as a result of the scheme.

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

Potential operational phase air quality impacts from vehicle exhaust emissions were assessed by predicting air quality conditions at sensitive locations both with and without the development in place. Results were subsequently verified using local monitoring data. Further to this, dispersion modelling was undertaken in order to predict pollutant concentrations across the proposed site as a result of emissions from the highway network.

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

The results of the assessment also demonstrated that predicted pollution levels were below the relevant air quality standards at the location of the proposed sensitive uses. As such, exposure of future users to poor air quality is considered unlikely as a result of the proposals.

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

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1.0 INTRODUCTION

1.1 Background

1.1.1 Redmore Environmental Ltd was commissioned by WSG Property (Holdings) Limited to undertake an Air Quality Assessment in support of a planning application for a mixed-use development at the site of the former Dewsbury Fire Station, Huddersfield Road, Dewsbury.

1.1.2 The proposed development has the potential to cause air quality impacts at sensitive locations during the construction and operational phases, as well as expose future occupants to elevated pollution levels. As such, an Air Quality Assessment was required in order to determine baseline conditions, consider site suitability for the proposed end-use and assess potential effects associated with the scheme.

1.2 Site Location and Context

1.2.1 The proposed development is located on the site of the former Dewsbury Fire Station, Huddersfield Road, Dewsbury, at approximate National Grid Reference (NGR): 423335, 420781. Reference should be made to Figure 1 for a map of the site and surrounding area.

1.2.2 The eastern part of the site is currently occupied by a three storey building, which is adjoined to the west by a unit accommodating five appliance bays. To the rear of the building lies a one storey extension and a six storey training tower. A small one storey structure lies within the south-eastern corner of the site.

1.2.3 The proposals include the demolition of the majority of the buildings on site, with the exception of the three storey building. The existing structure will be converted to a mix of uses to provide office and retail space at ground level and four residential units distributed across first and second floors. The remainder of the site will be redeveloped to provide four new warehouse units, with three associated showrooms.

1.2.4 The development has the potential to cause impacts at sensitive locations during the construction and operational phases. These may include fugitive dust emissions associated with construction works and road traffic exhaust emissions from vehicles

travelling to and from the site during the operational phase. Further to this, there are concerns that the proposals may introduce future users to exceedences of the relevant Air Quality Objectives (AQOs). An Air Quality Assessment was therefore undertaken in order to determine baseline conditions, consider site suitability for the proposed end-use and consider potential effects as a result of the proposals. This is detailed in the following report.

2.0 LEGISLATION AND POLICY

2.1 European Directives

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

- Directive 1999/30/EC - the First Air Quality "Daughter" Directive - sets ambient AQLVs for nitrogen dioxide (NO₂), oxides of nitrogen (NO_x), sulphur dioxide, lead and particulate matter with an aerodynamic diameter of less than 10µm (PM₁₀);
- Directive 2000/69/EC - the Second Air Quality "Daughter" Directive - sets ambient AQLVs for benzene and carbon monoxide; and,
- Directive 2002/3/EC - the Third Air Quality "Daughter" Directive - seeks to establish long-term objectives, target values, an alert threshold and an information threshold for concentrations of ozone in ambient air.

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

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

2.2 UK Legislation

2.2.1 The Air Quality Standards Regulations (2010) came into force on 11th June 2010 and transpose EU Directive 2008/50/EC into UK law. AQLVs were published in these regulations for 7 pollutants, as well as Target Values for an additional 5 pollutants.

2.2.2 Part IV of the Environment Act (1995) requires UK government to produce a national Air Quality Strategy (AQS) which contains standards, objectives and measures for improving ambient air quality. The most recent AQS was produced by the Department for

Environment, Food and Rural Affairs (DEFRA) and published in July 2007¹. The AQS sets out AQOs that are maximum ambient pollutant concentrations that are not to be exceeded either without exception or with a permitted number of exceedences over a specified timescale. These are generally in line with the AQLVs, although the requirements for the determination of compliance vary.

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

Table 1 Air Quality Objectives

Pollutant	Air Quality Objective	
	Concentration ($\mu\text{g}/\text{m}^3$)	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

2.2.4 Table 2 summarises the advice provided in DEFRA guidance² 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

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

² Local Air Quality Management (TG16), DEFRA, 2016.

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

2.3 Local Air Quality Management

2.3.1 Under Section 82 of the Environment Act (1995) (Part IV) Local Authorities (LAs) are required to periodically review and assess air quality within their area of jurisdiction under the system of Local Air Quality Management (LAQM). This review and assessment of air quality involves 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.

2.4 Dust

2.4.1 The main requirements with respect to dust control from industrial or trade premises not regulated under the Environmental Permitting (England and Wales) Regulations (2016), 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."

2.4.2 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). Enforcement can insist that there be no dust beyond the boundary of the works. The only defence is to show that the process to which the nuisance has been attributed and its operation are being controlled according to best practice measures.

2.5 National Planning Policy

2.5.1 The National Planning Policy Framework³ (NPPF) was published on 27th March 2012 and sets out the Government's core policies and principles with respect to land use planning, including air quality. The document includes the following considerations which are relevant to the proposed development:

"The planning system should contribute to and enhance the natural and local environment by: [...]

Preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability"

"Planning policies should sustain compliance with and contribute towards EU limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and the cumulative impacts on air quality from individual sites in local areas. Planning decisions should ensure that any new development in Air Quality Management Areas is consistent with the local air quality action plan."

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

³ NPPF, Department for Communities and Local Government, 2012.

2.6 National Planning Practice Guidance

2.6.1 The National Planning Practice Guidance⁴ (NPPG) web-based resource was launched by the Department for Communities and Local Government on 6th March 2014 to support the NPPF and make it more accessible. The air quality pages are summarised under the following headings:

1. Why should planning be concerned about air quality?
2. What is the role of Local Plans 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 be relevant to a planning decision?
6. Where to start if bringing forward a proposal where air quality could be a concern?
7. How detailed does an air quality assessment need to be?
8. How can an impact on air quality be mitigated?
9. How do considerations about air quality fit into the development management process?

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

2.7 Local Planning Policy

2.7.1 The Unitary Development Plan (UDP)⁵ sets out Kirklees Council's (KC's) policies and proposals for the use and development of land and buildings. The UDP was adopted in March 1999, and a direction issued by the Secretary of State for Communities and Local Government in September 2007 led to a review of the plans, where a number of policies were removed.

2.7.2 Review of the UDP policies saved beyond September 2007 revealed the following of relevance to this report:

"Built Environment

⁴ <http://planningguidance.planningportal.gov.uk>.

⁵ Kirklees Unitary Development Plan, Written Statement - Revised with Effect from 28 September 2007, KC, 2007.

BE1

all development should be of good quality design such that it contributes to a built environment which:

[...]

iv. promotes a healthy environment, including space and landscaping about buildings and avoidance of exposure to excessive noise or pollution; [...]"

2.7.3 KC are currently developing a new Local Plan which will form the new statutory plan for the district and will supersede the UDP. Review of the Strategy & Policies⁶ document from the Draft Local Plan revealed the following policies of relevance to this report:

"Policy PLP 47

Healthy, active and safe lifestyles

The council will, with its partners, create an environment which supports healthy, active and safe communities and reduces inequality.

Healthy, active and safe lifestyles will be enabled by:

[...]

g. ensuring that the current air quality in the district is monitored and maintained and, where required, appropriate mitigation measures included as part of new development proposals; [...]"

"Policy PLP 51

Protection and improvement of local air quality

⁶ Strategies and Policies, Draft Local Plan KC, 2016.

1. Development will be expected to demonstrate that it is not likely to result, directly or indirectly, in an increase in air pollution which would unacceptably affect or cause a nuisance to the natural and built environment or to people.

2. Proposals that have the potential to increase local air pollution either individually or cumulatively must be accompanied by evidence to show that the impact of the development has been assessed in accordance with the relevant guidance. Development which has the potential to cause levels of local air pollution to increase to unsafe levels must incorporate sustainable mitigation measures that reduce this impact to a safe level. If sustainable measures cannot be introduced the development will not be permitted.

3. Where the development introduces new receptors into Air Quality Management Areas or Areas of Concern or near other areas of relatively poor air quality, for example near roads or junctions, the development must incorporate sustainable mitigation measures that protect the new receptors from unacceptable levels of air pollution. Where sustainable mitigation measures cannot be introduced which prevent receptors from being exposed to unsafe levels of air pollution, development will not be permitted."

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

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, as well as expose future occupants to elevated pollution levels. These issues have been assessed in accordance with the following methodology.

3.2 Construction Phase Assessment

3.2.1 There is the potential for fugitive dust emissions to occur as a result of construction phase activities. These have been assessed in accordance with the methodology outlined within the Institute of Air Quality Management (IAQM) document 'Guidance on the Assessment of Dust from Demolition and Construction V1.1'⁷.

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

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

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

- Annoyance due to dust soiling;
- Harm to ecological receptors; and,
- The risk of health effects due to a significant increase in exposure to PM₁₀.

3.2.4 The assessment steps are detailed below.

⁷ Guidance on the Assessment of Dust from Demolition and Construction V1.1, IAQM, 2016.

Step 1

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

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

Step 2

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

- 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 through the construction phase. The relevant criteria are summarised in Table 3.

Table 3 Construction Dust - Magnitude of Emission

Magnitude	Activity	Criteria
Large	Demolition	<ul style="list-style-type: none"> • Total building volume greater than 50,000m³ • Potentially dusty construction material (e.g. concrete) • On-site crushing and screening • Demolition activities greater than 20m above ground level

Magnitude	Activity	Criteria
	Earthworks	<ul style="list-style-type: none"> Total site area greater than 10,000m² Potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size) More than 10 heavy earth moving vehicles active at any one time Formation of bunds greater than 8m in height More than 100,000 tonnes of material moved
	Construction	<ul style="list-style-type: none"> Total building volume greater than 100,000m³ On site concrete batching Sandblasting
	Trackout	<ul style="list-style-type: none"> More than 50 Heavy Duty Vehicle (HDV) trips per day Potentially dusty surface material (e.g. high clay content) Unpaved road length greater than 100m
Medium	Demolition	<ul style="list-style-type: none"> Total building volume 20,000m³ to 50,000m³ Potentially dusty construction material Demolition activities 10m to 20m above ground level
	Earthworks	<ul style="list-style-type: none"> Total site area 2,500m² to 10,000m² Moderately dusty soil type (e.g. silt) 5 to 10 heavy earth moving vehicles active at any one time Formation of bunds 4m to 8m in height Total material moved 20,000 tonnes to 100,000 tonnes
	Construction	<ul style="list-style-type: none"> Total building volume 25,000m³ to 100,000m³ Potentially dusty construction material (e.g. concrete) On site concrete batching
	Trackout	<ul style="list-style-type: none"> 10 to 50 HDV trips per day Moderately dusty surface material (e.g. high clay content) Unpaved road length 50m to 100m
Small	Demolition	<ul style="list-style-type: none"> Total building volume under 20,000m³ Construction material with low potential for dust release (e.g. metal cladding or timber) Demolition activities less than 10m above ground level

Magnitude	Activity	Criteria
	Earthworks	<ul style="list-style-type: none"> Total site area less than 2,500m² Soil type with large grain size (e.g. sand) Less than 5 heavy earth moving vehicles active at any one time Formation of bunds less than 4m in height Total material moved less than 20,000 tonnes Earthworks during wetter months
	Construction	<ul style="list-style-type: none"> Total building volume less than 25,000m³ Construction material with low potential for dust release (e.g. metal cladding or timber)
	Trackout	<ul style="list-style-type: none"> Less than 10 HDV trips per day Surface material with low potential for dust release Unpaved road length less than 50m

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

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

Receptor Sensitivity	Examples	
	Human Receptors	Ecological Receptors
High	<ul style="list-style-type: none"> 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 PM₁₀. e.g. residential properties, hospitals, schools and residential care homes 	<ul style="list-style-type: none"> Internationally or nationally designated site e.g. Special Area of Conservation
Medium	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> Nationally designated site e.g. Sites of Special Scientific Interest

Receptor Sensitivity	Examples	
	Human Receptors	Ecological Receptors
Low	<ul style="list-style-type: none"> • Enjoyment of amenity would not reasonably be expected • Property would not be expected to be diminished in appearance • Transient exposure, where people would only be expected to be present for limited periods. e.g. public footpaths, playing fields, shopping streets, playing fields, farmland, footpaths, short term car park and roads 	<ul style="list-style-type: none"> • Locally designated site e.g. Local Nature Reserve

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

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

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

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

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

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

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

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

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

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

Receptor Sensitivity	Annual Mean PM ₁₀ Concentration	Number of Receptors	Distance from the Source (m)				
			Less than 20	Less than 50	Less than 100	Less than 200	Less than 350
	28 - 32µg/m ³	1 - 10	Medium	Low	Low	Low	Low
		More than 10	Medium	Low	Low	Low	Low
	24 - 28µg/m ³	1 - 10	Low	Low	Low	Low	Low
		More than 10	Low	Low	Low	Low	Low
	Less than 24µg/m ³	1 - 10	Low	Low	Low	Low	Low
		More than 10	Low	Low	Low	Low	Low
Low	-	1 or more	Low	Low	Low	Low	Low

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

Table 7 Construction Dust - Sensitivity of the Area to Ecological Impacts

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

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

3.2.17 Table 8 outlines the risk category from demolition activities.

Table 8 Construction Dust - Dust Risk Category from Demolition

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

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

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

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

3.2.19 Table 10 outlines the risk category from trackout activities.

Table 10 Construction Dust - Dust Risk Category from Trackout Activities

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

Step 3

3.2.20 Step 3 requires the identification of site specific mitigation measures within the IAQM guidance⁸ to reduce potential dust impacts based upon the relevant risk categories identified in Step 2. For sites with **negligible** risk, mitigation measures beyond those required by legislation are not required. However, additional controls may be applied as part of good practice.

Step 4

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

3.2.22 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 existing air quality as a result of road traffic exhaust emissions associated with vehicles travelling to and from the site, as well as expose future occupants to poor air quality. Potential impacts have been defined by predicting pollutant concentrations at sensitive locations using dispersion modelling for the following scenarios:

- Verification;
- Opening year Do-Minimum (DM) (predicted traffic flows in 2018 should the proposals not proceed); and,
- Opening year Do-Something (DS) (predicted traffic flows in 2018 should the proposals be completed).

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

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

Potential Development Impacts

3.3.3 Locations sensitive to potential changes in pollutant concentrations were identified within 200m of the highway network in accordance with the guidance provided within the Design Manual for Roads and Bridges (DMRB)⁹ on the likely limits of pollutant dispersion from road sources. The criteria provided within DEFRA guidance¹⁰ on where the AQOs apply, as summarised in Table 2, was utilised to determine appropriate receptor positions.

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'¹¹. 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 11.

Table 11 Significance of Impact

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

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

⁹ DMRB Volume 11, Section 3, Part 1, HA207/07, Highways Agency, 2007.

¹⁰ Local Air Quality Management (TG16), DEFRA, 2016.

¹¹ 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 document¹² 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. 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 should be provided as far as practicable. This has been considered throughout the assessment when defining predicted impacts. The IAQM guidance¹³ suggests the provision of details of the assessor's qualifications and experience. These are provided in Appendix 2.

Future Exposure

3.3.9 The proposed development has the potential to expose future residents to poor air quality. Pollutant concentrations were therefore quantified across the site using dispersion modelling. The results were subsequently compared with the relevant AQOs to determine the potential for any exceedence.

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

¹³ 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), KC has undertaken Review and Assessment of air quality within their area of jurisdiction. This process has indicated that annual mean concentrations of NO₂ are above the AQO within the council's administrative extents. As such, one AQMA has been declared, identified as Kirklees AQMA. This is described as:

"An area encompassing properties along two sections of the A62 Leeds Road, in the vicinity of the junctions with the A6107 Bradley Road, and with the A644."

4.2.2 The council have also identified that 24-hour mean PM₁₀ concentrations are above the AQO within the council's administrative extents. As such, one AQMA has been declared, identified as Kirklees AQMA 2. This is described as:

"Incorporating a number of properties along part of the Huddersfield Road A644."

4.2.3 The site is located approximately 5.5km east of the Kirklees AQMA. It is considered unlikely the proposals would cause air quality impacts over a distance of this magnitude. As such, this AQMA has not been considered further in the context of the assessment.

4.2.4 The site is partially included within the boundary of Kirklees AQMA 2. As such, there is the potential for the exposure of future residents to poor air quality and vehicles travelling to and from the site to increase pollution levels in this sensitive area. These issues have been considered throughout the assessment.

4.2.5 The council has recently undertaken several Detailed Assessments which identified exceedences of the annual mean NO₂ AQO at seven further locations within their

administrative extents. As such, it is anticipated that new AQMAs will be declared in the following areas:

- Birkenshaw;
- Birchencliffe;
- Eastborough;
- Edgerton;
- Heckmondwike;
- Huddersfield Town Centre; and,
- Outlane.

4.2.6 The closest identified sensitive area is located in Eastborough, approximately 1.7km north-east of the site. It is considered unlikely the proposals would cause air quality impacts over a distance of this magnitude. As such, this area has not been considered further in the context of the assessment.

4.3 Air Quality Monitoring

4.3.1 Monitoring of pollutant concentrations is undertaken by KC throughout their area of jurisdiction. Recent NO₂ results from the sites nearest to the development are shown in Table 12. Exceedences of the relevant AQO are shown in **bold**.

Table 12 Monitoring Results - NO₂

Monitoring Site	Monitored NO ₂ Concentration (µg/m ³)		
	2013	2014	2015
Trailer 2	23.90	22.00	21.00
Roadside 1	35.90	37.20	32.00
19	46.35	42.58	39.84

4.3.2 As shown in Table 12, annual mean NO₂ concentrations were below the AQO at all locations in 2015. Exceedence of the AQO was recorded at diffusion tube 19 during 2013 and 2014. As monitor 19 is positioned within an AQMA, elevated concentrations would be expected. Reference should be made to Figure 2 for a map of the monitoring positions.

4.3.3 Recent PM₁₀ monitoring results are summarised in Table 13.

Table 13 Monitoring Results - PM₁₀

Monitoring Site	Monitored PM ₁₀ Concentration (µg/m ³)		
	2013	2014	2015
Trailer 2	21.54	17.22	18.52
Roadside 1	30.34	16.78	19.28

4.3.4 As shown in Table 13, the annual mean for PM₁₀ was below the relevant AQO at both monitoring locations in recent years.

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: 423500, 420500. Data for this location was downloaded from the DEFRA website¹⁴ for the purpose of the assessment and is summarised in Table 14.

Table 14 Background Pollutant Concentration Predictions

Pollutant	Predicted Background Pollutant Concentration (µg/m ³)		
	2015	2017	2018
NO ₂	20.82	19.26	18.48
PM ₁₀	15.09	14.87	14.76

4.4.2 As shown in Table 14, predicted background NO₂ and PM₁₀ concentrations are below the relevant AQOs at the development site.

4.5 **Sensitive Receptors**

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

¹⁴ <https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2013>.

Construction Phase Sensitive Receptors

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

Table 15 Demolition, Earthworks and Construction Dust Sensitive Receptors

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

4.5.3 Receptors sensitive to potential dust impacts from trackout were identified from a desk-top study of the area up to 50m from the road network within 500m of the site access. These are summarised in Table 16. For the purpose of the assessment it was assumed construction phase traffic would access the site from the A644 Huddersfield Road.

Table 16 Trackout Dust Sensitive Receptors

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

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

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

Table 17 Additional Area Sensitivity Factors

Guidance	Comment
Whether there is any history of dust generating activities in the area	The desk top study identified that Thornhill Landfill Site is located 420m south-west of the site boundary. This may have caused historical dust impacts in the local area
The likelihood of concurrent dust generating activity on nearby sites	A review of the planning portal did not indicate any additional development proposals likely to result in concurrent dust generation in the vicinity of the site
Pre-existing screening between the source and the receptors	There is no significant screening around the site boundary
Conclusions drawn from analysing local meteorological data which accurately represent the area: and if relevant the season during which works will take place	As shown in Figure 3, the predominant wind bearing at the site is from the east. As such, receptors to the west of the site are most likely to be affected by dust releases
Conclusions drawn from local topography	There are no significant topographical constraints to dust dispersion
Duration of the potential impact, as a receptor may become more sensitive over time	Currently it is unclear as to the duration of the construction phase. However, it is possible that it will extend over one year
Any known specific receptor sensitivities which go beyond the classifications given in the document.	No specific receptor sensitivities identified during the baseline assessment

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

4.5.7 The sensitivity of the receiving environment to specific potential dust impacts, based on the criteria shown in Section 3.2, is shown in Table 18.

Table 18 Sensitivity of the Surrounding Area

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

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

Operational Phase Sensitive Receptors

4.5.8 Locations sensitive to potential operational phase road vehicle exhaust emission impacts were identified from a desk-top study and are summarised in Table 19.

Table 19 Sensitive Receptor Locations

Receptor		NGR (m)	
		x	y
R1	Residential - A644 Huddersfield Road	422849.3	420452.6
R2	Residential - A644 Huddersfield Road	423202.6	420718.1
R3	Residential - A644 Huddersfield Road	423267.2	420753.3
R4	Residential - A644 Huddersfield Road	423347.7	420847.4
R5	Residential - A644 Huddersfield Road	423451.7	420893.9
R6	Residential - A644 Huddersfield Road	423557.0	421014.6
R7	Residential - A644 Huddersfield Road	423703.9	421136.8

4.5.9 The sensitive receptors identified in Table 19 represent worst-case locations. However, this is not an exhaustive list and there may be other locations within the vicinity of the site that may experience air quality impacts as a result of the proposals that have not been individually identified above. Reference should be made to Figure 4 for a graphical representation of road vehicle exhaust emission sensitive receptor locations.

5.0 ASSESSMENT

5.1 Introduction

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

5.2 Construction Phase Assessment

Step 1

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

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

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

Step 2

Demolition

5.2.4 Demolition will be undertaken at the start of the construction phase and will involve clearance of the majority of the existing buildings on site.

5.2.5 It is estimated that the total building volume to be demolished is less than 20,000m³. In accordance with the criteria outlined in Table 3, the magnitude of potential dust emissions from demolition is therefore **small**.

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

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

Earthworks

5.2.8 Earthworks will primarily involve excavating material, haulage, tipping and stockpiling, as well as site levelling and landscaping. The proposed development site is estimated to cover an area between 2,500m² and 10,000m². In accordance with the criteria outlined in Table 3, the magnitude of potential dust emissions from earthworks is therefore **medium**.

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

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

Construction

5.2.11 Due to the size of the development the total building volume is likely to be less than 25,000m³. In accordance with the criteria outlined in Table 3, the magnitude of potential dust emissions from construction is therefore **small**.

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

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

Trackout

5.2.14 Information on the number of HDV trips to be generated during the construction phase of the development was not available at the time of assessment. However, based on the site area, it is anticipated that the unpaved road length is likely to be less than 50m. In accordance with the criteria outlined in Table 3, the magnitude of potential dust emissions from trackout is therefore **small**.

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

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

Summary of the Risk of Dust Effects

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

Table 20 Summary of Potential Unmitigated Dust Risks

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

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

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

Step 3

5.2.20 The IAQM guidance¹⁵ 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 21. These may be reviewed prior to the commencement of construction works and incorporated into a Construction Environmental Management Plan if required by the LA.

Table 21 Fugitive Dust Emission Mitigation Measures

Issue	Control Measure
Communications	<ul style="list-style-type: none"> • Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager • Display the head or regional office contact information • Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the LA
Site management	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the LA upon request • Increase the frequency of site inspections when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions
Site preparation	<ul style="list-style-type: none"> • Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible • Fully enclose site or specific operations where there is a high potential for dust production and they are active for an extensive period • Avoid site runoff of water or mud • Keep site fencing, barriers and scaffolding clean using wet methods • Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used • Cover, seed or fence stockpiles to prevent wind whipping

¹⁵ Guidance on the Assessment of Dust from Demolition and Construction V1.1, IAQM, 2016.

Issue	Control Measure
Operating vehicle/machinery and sustainable travel	<ul style="list-style-type: none"> • 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 • Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials
Operations	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Avoid bonfires and burning of waste materials
Demolition	<ul style="list-style-type: none"> • Soft strip inside buildings before demolition • Ensure effective water suppression is used during demolition operations • Avoid explosive blasting • Bag and remove any biological debris or damp down such material before demolition
Earthworks	<ul style="list-style-type: none"> • Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable • Use Hessian, mulches or tackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable
Construction	<ul style="list-style-type: none"> • Avoid scabbling (roughening of concrete surfaces) if possible • Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out • Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos
Trackout	<ul style="list-style-type: none"> • 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 • Access gates to be located at least 10m from receptors where possible

Step 4

5.2.21 Assuming the relevant mitigation measures outlined in Table 21 are implemented, the residual impacts from all dust generating activities is predicted to be **not significant**, in accordance with IAQM guidance¹⁶.

5.3 Operational Phase Assessment

5.3.1 Vehicle movements associated with the operation of the proposal will generate exhaust emissions on the local and regional road networks. An assessment was therefore undertaken using dispersion modelling in order to quantify potential changes in pollutant concentrations at sensitive locations in the vicinity of the site, as well as consider potential exposure of future occupants to AQO exceedences.

5.3.2 The assessment considered the following scenarios:

- 2015 - Verification;
- 2018 - DM; and,
- 2018 - DS.

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

5.3.4 For the purpose of the assessment traffic data for 2018 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 2015 were utilised within the dispersion model. The use of 2018 traffic data and 2015 emission factors and background concentrations is considered to provide a worst-case scenario and therefore a sufficient level of confidence can be placed within the predicted pollution levels.

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

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

Potential Development Impacts

Predicted Concentrations

5.3.6 Annual mean NO₂ concentrations were predicted at the sensitive receptor locations for the DM and DS scenarios. These are summarised in Table 22.

Table 22 Predicted Annual Mean NO₂ Concentrations

Receptor		Predicted Annual Mean NO ₂ Concentration (µg/m ³)		
		DM	DS	Change
R1	Residential - A644 Huddersfield Road	33.37	33.43	0.06
R2	Residential - A644 Huddersfield Road	34.51	34.57	0.06
R3	Residential - A644 Huddersfield Road	36.43	36.50	0.07
R4	Residential - A644 Huddersfield Road	31.02	31.07	0.05
R5	Residential - A644 Huddersfield Road	37.27	37.35	0.08
R6	Residential - A644 Huddersfield Road	33.15	33.20	0.05
R7	Residential - A644 Huddersfield Road	33.42	33.48	0.06

5.3.7 As indicated in Table 22, predicted annual mean NO₂ concentrations were below the relevant AQO at all sensitive receptors in both scenarios.

5.3.8 Reference should be made to Figure 5 and 6 for graphical representations of annual mean NO₂ concentrations across the assessment area for the DM and DS scenarios, respectively.

5.3.9 Annual mean PM₁₀ concentrations were predicted at the sensitive receptor locations for the DM and DS scenarios. These are summarised in Table 23.

Table 23 Predicted Annual Mean PM₁₀ Concentrations

Receptor		Predicted Annual Mean PM ₁₀ Concentration (µg/m ³)		
		DM	DS	Change
R1	Residential - A644 Huddersfield Road	18.98	18.99	0.02
R2	Residential - A644 Huddersfield Road	19.11	19.13	0.02
R3	Residential - A644 Huddersfield Road	19.34	19.36	0.02
R4	Residential - A644 Huddersfield Road	18.71	18.72	0.01
R5	Residential - A644 Huddersfield Road	19.44	19.46	0.02
R6	Residential - A644 Huddersfield Road	18.93	18.95	0.01
R7	Residential - A644 Huddersfield Road	18.98	19.00	0.02

5.3.10 As indicated in Table 23, predicted annual mean PM₁₀ concentrations were below the relevant AQO at all sensitive receptors in both scenarios.

5.3.11 Reference should be made to Figure 7 and 8 for graphical representations of annual mean PM₁₀ concentrations across the assessment area for the DM and DS scenarios, respectively.

Predicted Impacts

5.3.12 Predicted impacts on annual mean NO₂ concentrations at the sensitive receptor locations are summarised in Table 24.

Table 24 Predicted Impacts - NO₂

Receptor		Predicted Annual Mean NO ₂ Concentration	Predicted Concentration Change as Proportion of AQO (%)	Impact Significance
R1	Residential - A644 Huddersfield Road	76 - 94% of AQO	0	Negligible
R2	Residential - A644 Huddersfield Road	76 - 94% of AQO	0	Negligible
R3	Residential - A644 Huddersfield Road	76 - 94% of AQO	0	Negligible
R4	Residential - A644 Huddersfield Road	76 - 94% of AQO	0	Negligible

Receptor		Predicted Annual Mean NO ₂ Concentration	Predicted Concentration Change as Proportion of AQO (%)	Impact Significance
R5	Residential - A644 Huddersfield Road	76 - 94% of AQO	0	Negligible
R6	Residential - A644 Huddersfield Road	76 - 94% of AQO	0	Negligible
R7	Residential - A644 Huddersfield Road	76 - 94% of AQO	0	Negligible

5.3.13 As indicated in Table 24, impacts on annual mean NO₂ concentrations as a result of the proposed development were predicted to be **negligible** at all receptors.

5.3.14 Predicted impacts on annual mean PM₁₀ concentrations at the sensitive receptor locations are summarised in Table 25.

Table 25 Predicted Impacts - PM₁₀

Receptor		Predicted Annual Mean PM ₁₀ Concentration	Predicted Concentration Change as Proportion of AQO (%)	Impact Significance
R1	Residential - A644 Huddersfield Road	Below 75% of AQO	0	Negligible
R2	Residential - A644 Huddersfield Road	Below 75% of AQO	0	Negligible
R3	Residential - A644 Huddersfield Road	Below 75% of AQO	0	Negligible
R4	Residential - A644 Huddersfield Road	Below 75% of AQO	0	Negligible
R5	Residential - A644 Huddersfield Road	Below 75% of AQO	0	Negligible
R6	Residential - A644 Huddersfield Road	Below 75% of AQO	0	Negligible
R7	Residential - A644 Huddersfield Road	Below 75% of AQO	0	Negligible

5.3.15 As indicated in Table 25, impacts on annual mean PM₁₀ concentrations as a result of the proposed development were predicted to be **negligible** at all receptors.

Potential Future Exposure

- 5.3.16 The proposed development has the potential to cause exposure of future residents to elevated pollution levels. Dispersion modelling was therefore undertaken with the inputs described in Appendix 1 to quantify air quality conditions at the site. Reference should be made to Figure 9 and Figure 10 for a graphical representation of the results.
- 5.3.17 It should be noted that the proposals include retail, office and warehouse land use across ground floor level. These are not considered sensitive land uses for annual mean AQOs in accordance with the DEFRA guidance¹⁷. As such, the exposure assessment focused on concentrations at the residential units, which are to be located at first and second floor levels.
- 5.3.18 Figure 9 displays the contour plot for predicted annual mean NO₂ concentrations at first floor level. The results indicate that the annual mean AQO for NO₂ was achieved at all locations across the development. The maximum level at the site boundary was 32.40µg/m³.
- 5.3.19 Figure 10 displays the contour plot for predicted annual mean PM₁₀ concentrations at first floor level. The results indicate that the annual mean AQO for PM₁₀ was achieved at all locations of across development. The maximum level at the site boundary was 18.87µg/m³.
- 5.3.20 As shown in Figure 11, the number of days with PM₁₀ concentrations greater than 50µg/m³ was predicted to be below the permitted number of 35 at all locations across the development. The maximum number of days with concentrations above 50µg/m³ at the site boundary was 2.
- 5.3.21 Given that pollutant concentrations decrease with height due to increased distance from pollutant sources, such as roads, it can be assumed that the annual mean AQO for NO₂ and PM₁₀ and the 24-Hour mean AQO for PM₁₀ will be achieved at all locations above first floor. As such, further assessment above this level was not considered necessary.

¹⁷ Local Air Quality Management (TG16), DEFRA, 2016.

5.3.22 Based on the assessment results, future occupants are not predicted to be exposed to pollutant concentrations above the AQOs at any location within the development.

West Yorkshire Technical Planning Guidance

5.3.23 The West Yorkshire LAs have produced air quality technical guidance¹⁸ as part of an overarching Low Emissions Strategy to reduce road transport emissions in the county. It is aimed at helping LAs deliver AQO compliance through cost effective service planning brought about by the joint working and relevant Local Plan policies.

5.3.24 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 major under the following categories:

- Development generates 100 or more two-way vehicle movements per day; and,
- Proposals located within an AQMA.

5.3.25 The guidance¹⁹ provides a number of mitigation options that should be included on all major scale developments. Those relevant to the proposed development include the following:

- Promotion of alternative working practices - flexitime, teleworking, videoconferencing, compressed work periods;
- Local sourcing of staff, products and raw materials;
- Development of car clubs and car sharing with financial incentives and promotion;
- Use of pooled low emission vehicles - cars, vans, taxis, bicycles;
- Support smart driving training schemes;
- Support cycle training and awareness schemes;
- Bike/e-bike hiring schemes;
- Support secure and safe cycle parking facilities; and,
- Supporting community/local organisation groups to promote sustainable travel.

¹⁸ Air Quality and Emissions: Technical Planning Guidance, West Yorkshire Low Emissions Group, 2014.

¹⁹ Air Quality and Emissions: Technical Planning Guidance, West Yorkshire Low Emissions Group, 2014.

5.3.26 It is recommended that the following mitigation measures be integrated into the proposals in response to the assessment:

- Provision of secure cycle storage, promoting sustainable transport options;
- Four Electric Vehicle (EV) charging points serving 10% of the available car parking spaces; and,
- Production of a Travel Plan to address a number of the above sustainable transport initiatives.

5.3.27 It is considered the above mitigation measures are suitable for a development of this nature and will minimise air quality effects as a result of vehicle exhaust emissions.

Overall Impact Significance

5.3.28 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 in Section 3.3. Further justification is provided in Table 26.

Table 26 Overall Impact Significance

Guidance	Comment
The existing and future air quality in the absence of the development	<p>Exceedence of the annual mean NO₂ and PM₁₀ AQOs were not predicted at any receptor in the DM scenario</p> <p>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</p>
The extent of current and future population exposure to the impacts	The development is not predicted to affect the population exposed to exceedences of the AQOs
The influence and validity of any assumptions adopted when undertaking the prediction of impacts	<p>The assessment assumed that vehicle exhaust emission rates and background pollutant levels will not reduce in future years. This provides worst-case results when compared with DEFRA and Highways Agency methodologies</p> <p>Due to the adopted assumptions it is considered the presented results are sufficiently robust for an assessment of this nature</p>

5.3.29 The IAQM guidance²⁰ 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.

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

6.0 CONCLUSION

- 6.1.1 Redmore Environmental Ltd was commissioned by WSG Property (Holdings) Limited to undertake an Air Quality Assessment in support of a planning application for a mixed-use development at the site of the former Dewsbury Fire Station, Huddersfield Road, Dewsbury.
- 6.1.2 The proposals have the potential to cause air quality impacts as a result of fugitive dust emissions during construction and road traffic exhaust emissions associated with vehicles travelling to and from the site during operation, as well as expose future residents to any existing air quality issues. As such, an Air Quality Assessment was required in order to determine baseline conditions and assess potential effects as a result of the scheme.
- 6.1.3 During the construction phase of the development there is the potential for air quality impacts as a result of fugitive dust emissions from the site. These were assessed in accordance with the IAQM methodology. Assuming good practice dust control measures are implemented, the residual significance of potential air quality impacts from dust generated by demolition, earthworks, construction and trackout activities was predicted to be **not significant**.
- 6.1.4 The proposed development has the potential to expose future users to elevated pollution levels and impact existing air quality in the vicinity of the site during operation. Dispersion modelling was therefore undertaken using ADMS-Roads in order to predict pollutant concentrations as a result of emissions from the local highway network. Results were subsequently verified using local monitoring data.
- 6.1.5 Impacts on NO₂ and PM₁₀ concentrations as a result of operational phase road vehicle exhaust emissions were predicted to be **negligible** at all sensitive receptor locations.
- 6.1.6 The results of the dispersion modelling assessment indicated that predicted NO₂ and PM₁₀ concentrations were below the relevant AQOs at the proposed sensitive land use locations. Exposure of future residents to poor air quality is therefore considered unlikely as a result of the proposals.

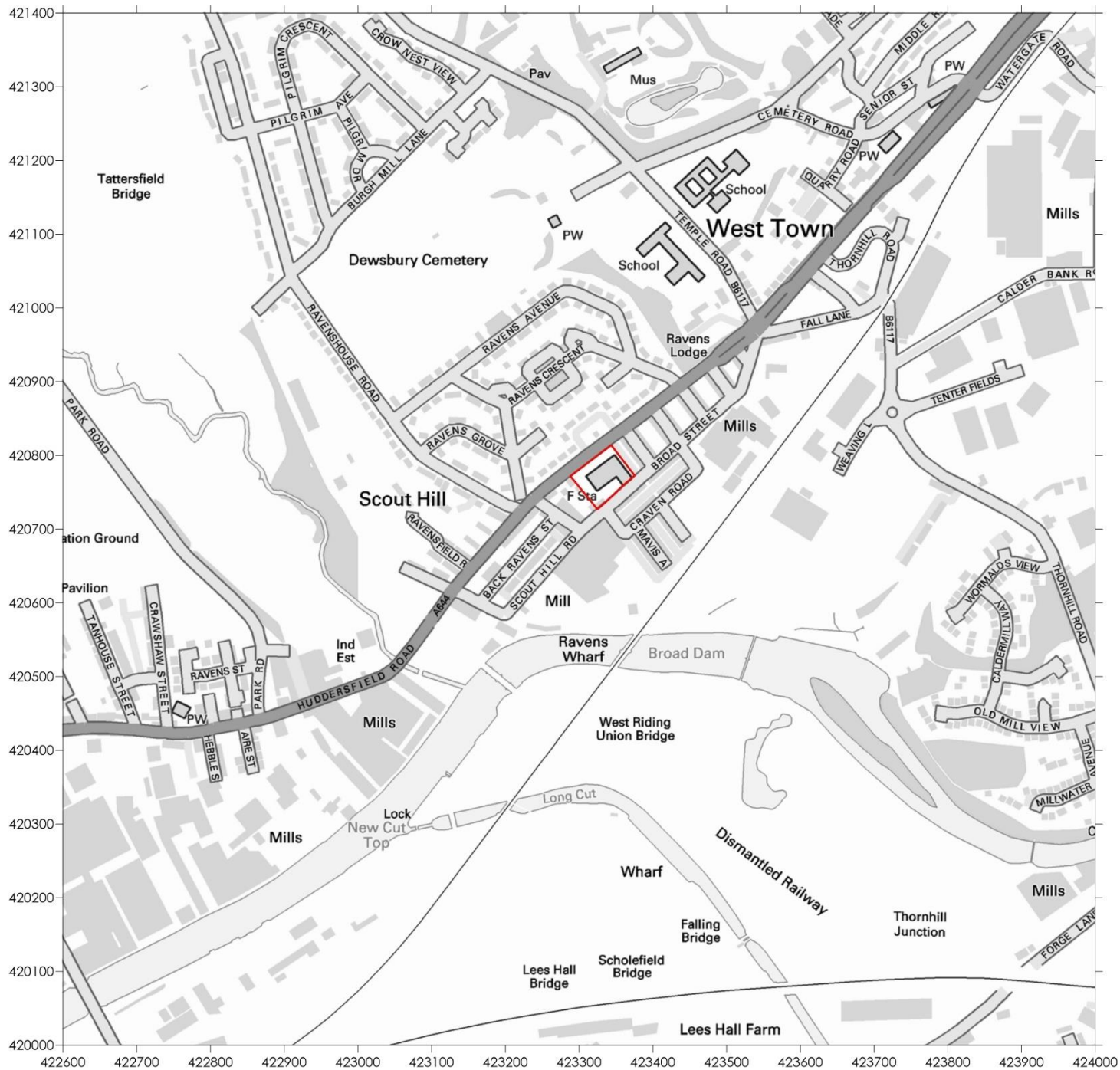
6.1.7 Following consideration of the relevant issues, air quality impacts as a result of the operation of the proposals were considered to be **not significant**, in accordance with the IAQM guidance.

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

7.0 ABBREVIATIONS

AADT	Annual Average Daily Traffic
ADM	Atmospheric Dispersion Modelling
AQAP	Air Quality Action Plan
AQLV	Air Quality Limit Value
AQMA	Air Quality Management Area
AQO	Air Quality Objective
AQS	Air Quality Strategy
CERC	Cambridge Environmental Research Consultants
DEFRA	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
DM	Do-Minimum
DMP	Dust Management Plan
DMRB	Design Manual for Roads and Bridges
DS	Do-Something
EU	European Union
EV	Electric Vehicle
HDV	Heavy Duty Vehicle
IAQM	Institute of Air Quality Management
KC	Kirklees Council
LA	Local Authority
LAQM	Local Air Quality Management
NGR	National Grid Reference
NPPF	National Planning Policy Framework
NPPG	National Planning Policy Guidance
NO ₂	Nitrogen dioxide
NO _x	Oxides of nitrogen
PM ₁₀	Particulate Matter with an aerodynamic diameter of less than 10µm
UDP	Unitary Development Plan
Z ₀	Roughness length

Figures



Legend

-  Site Boundary

Title

Figure 1 - Site Location

Project

Air Quality Assessment
Former Dewsbury Fire Station
Huddersfield Road, Dewsbury

Project Reference

1600

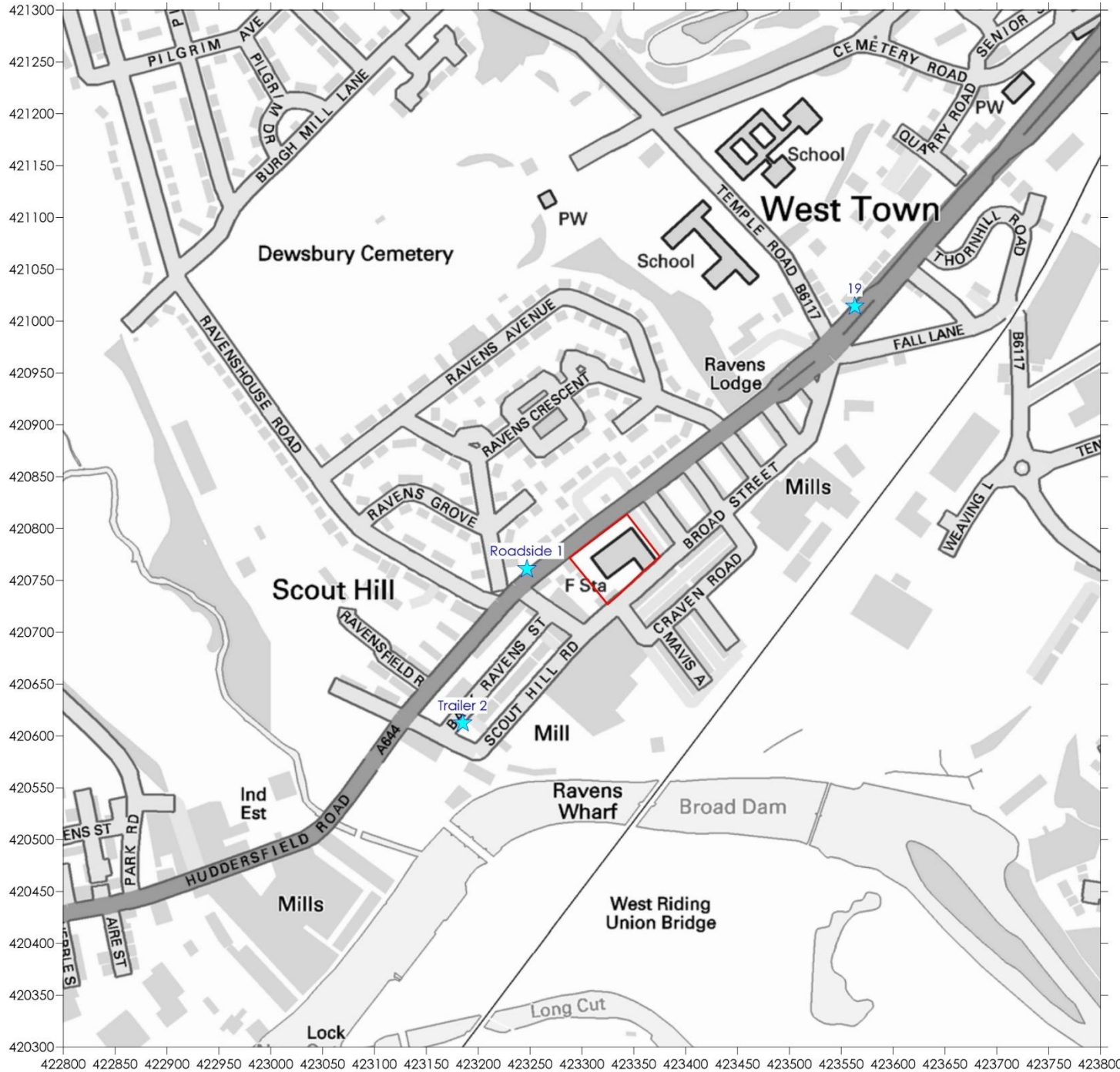
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Legend

-  Site Boundary
-  Monitor

Title
Figure 2 - Monitoring Locations

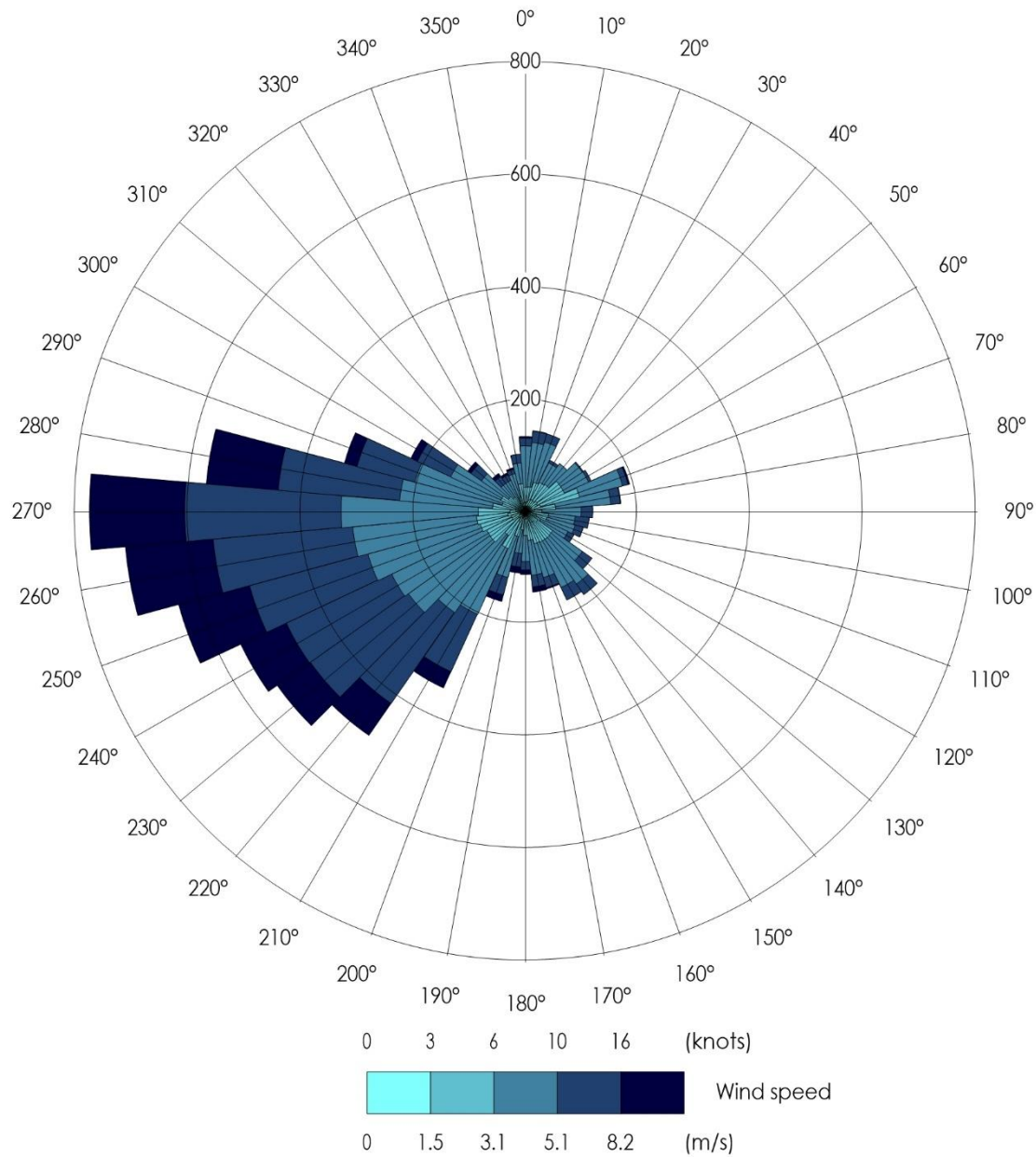
Project
Air Quality Assessment
Former Dewsbury Fire Station
Huddersfield Road, Dewsbury

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Legend

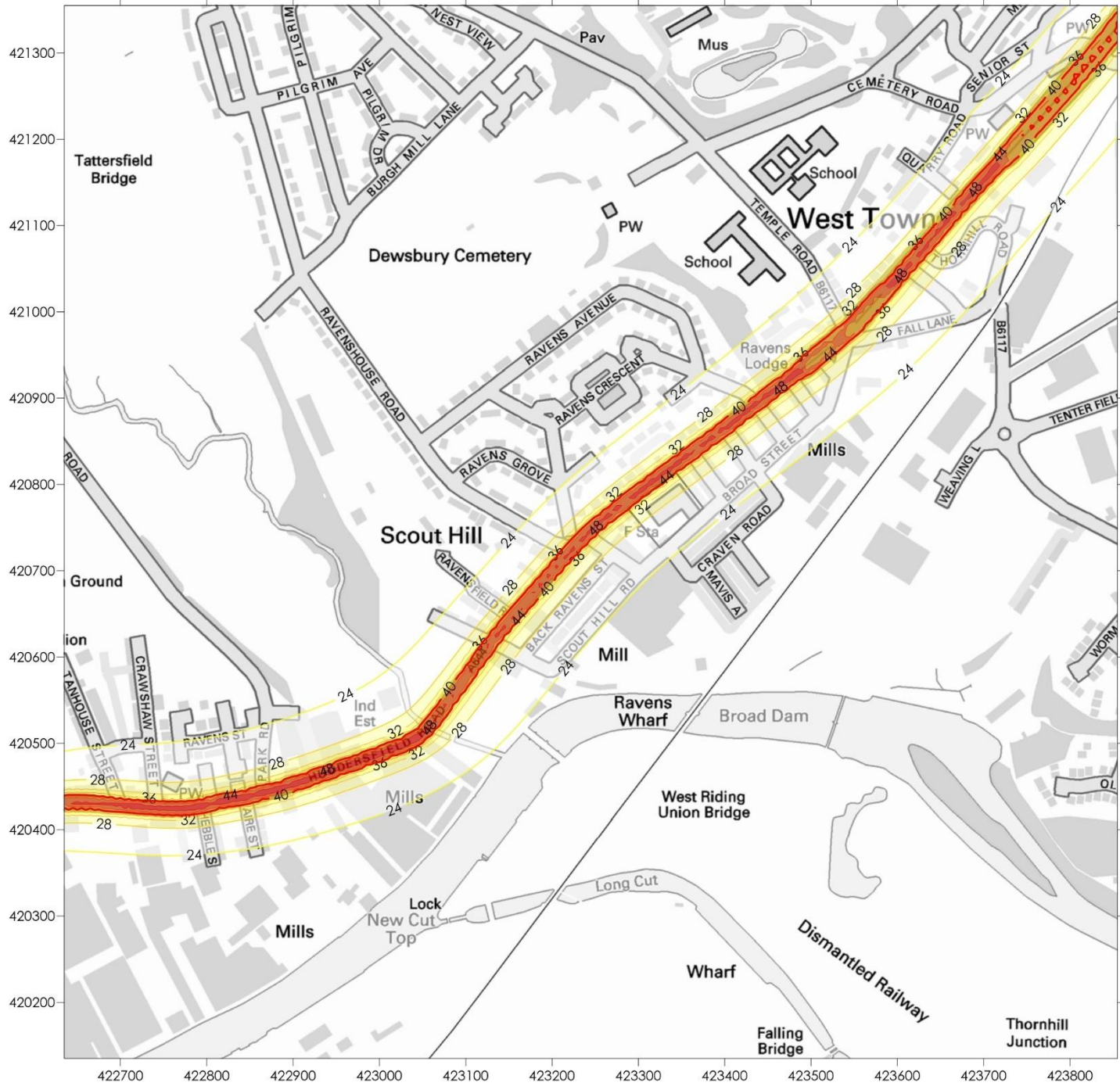
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 Figure 3 - Wind Rose of 2015
 Leeds/Bradford Airport
 Meteorological Data

Project
 Air Quality Assessment
 Former Dewsbury Fire Station
 Huddersfield Road, Dewsbury

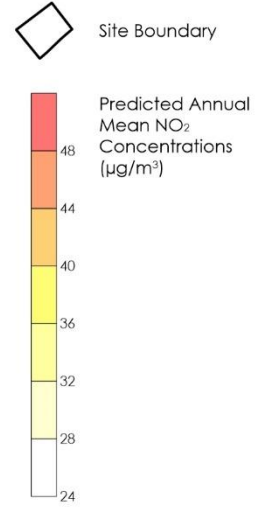
Project Reference
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Legend



Title
Figure 5 - Predicted Annual Mean NO₂ Concentrations (µg/m³)
Do-Minimum
Ground Floor

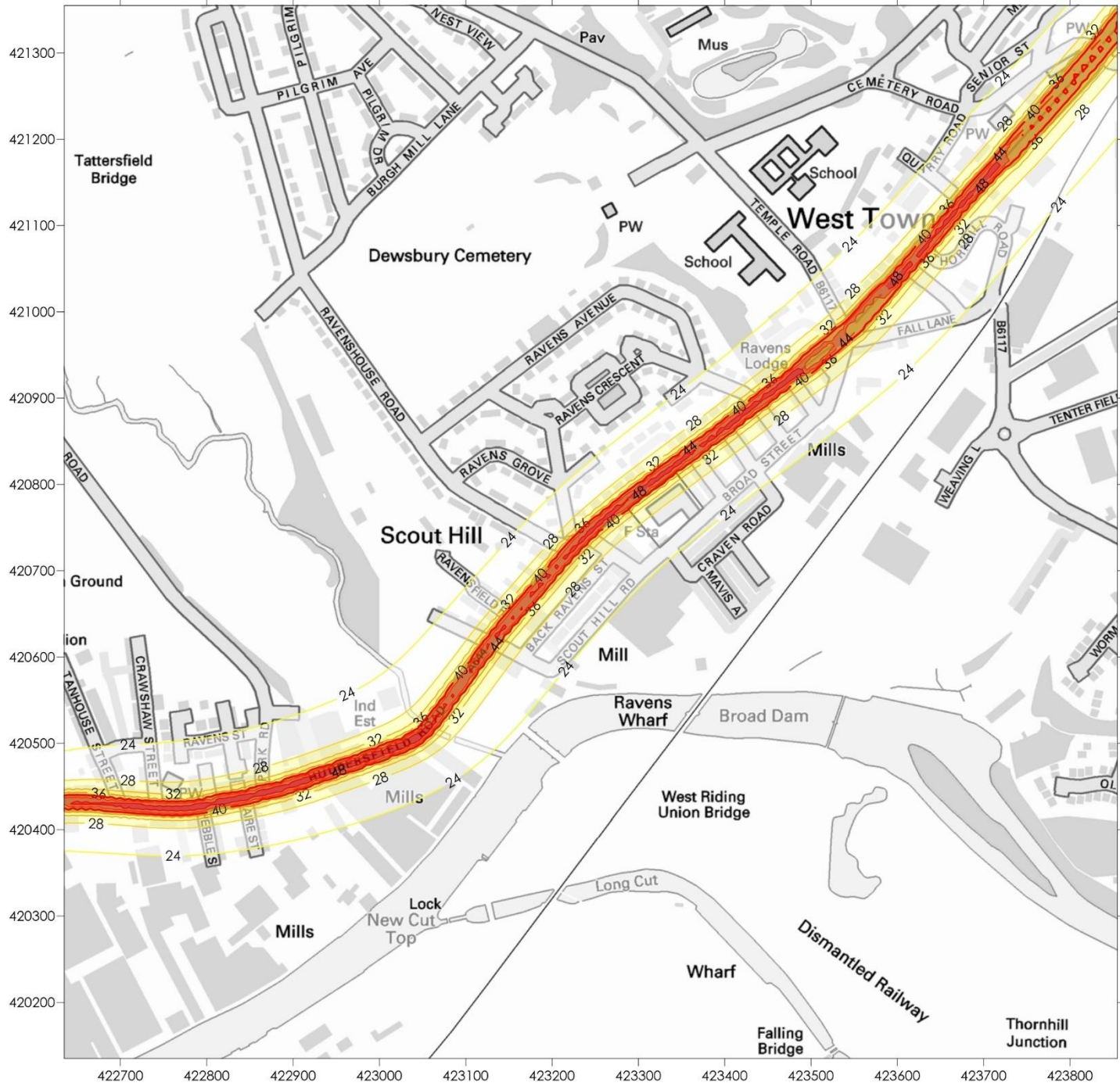
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Former Dewsbury Fire Station
Huddersfield Road, Dewsbury

Project Reference
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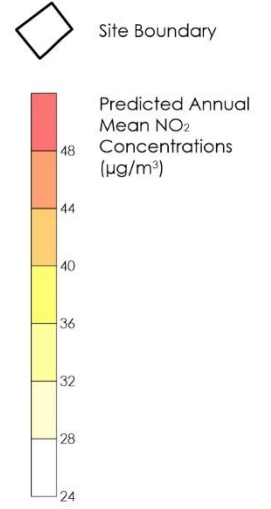
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Legend



Title
Figure 6 - Predicted Annual Mean NO₂ Concentrations (µg/m³) Do-Something Ground Floor

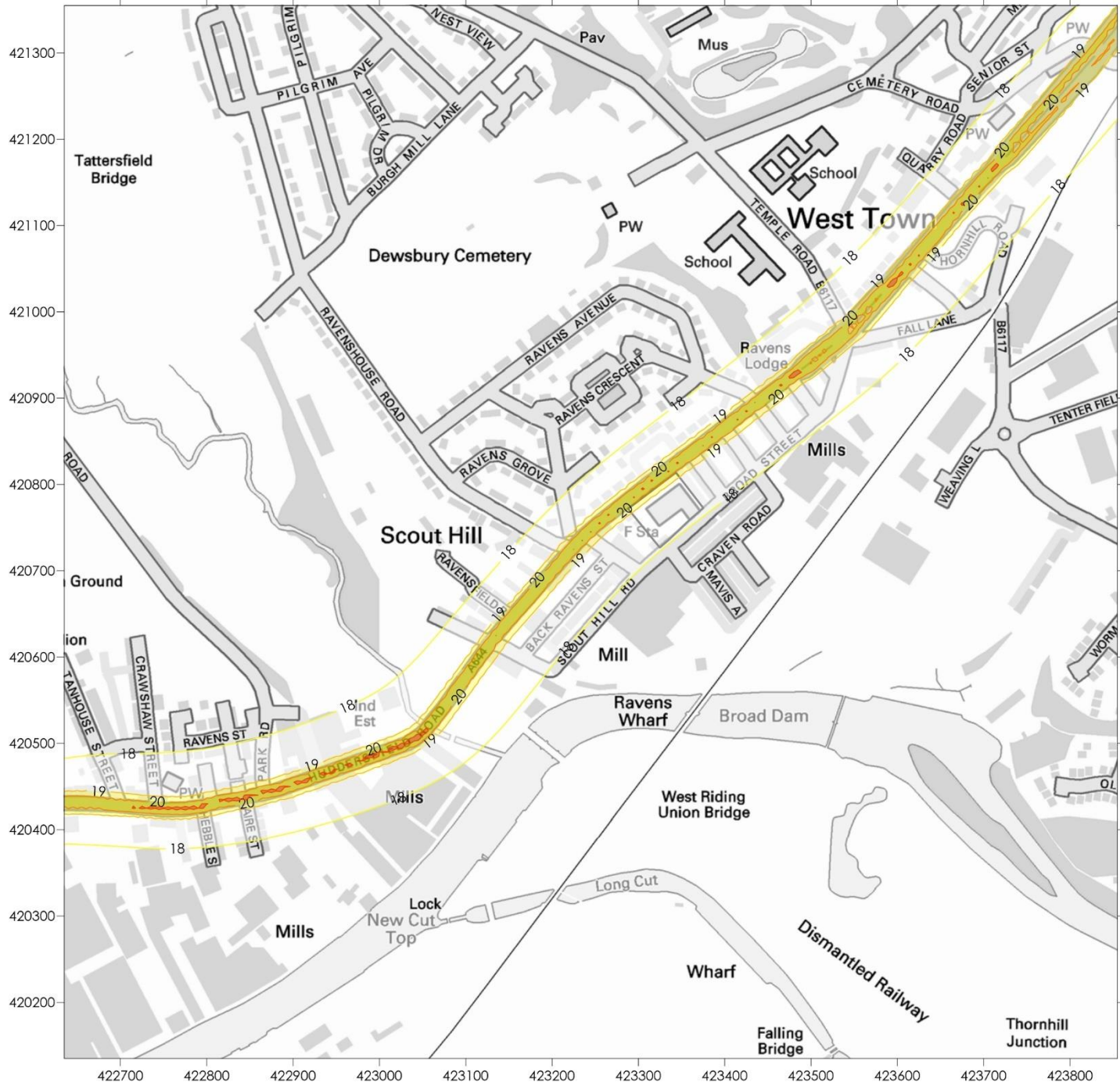
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Former Dewsbury Fire Station
Huddersfield Road, Dewsbury

Project Reference
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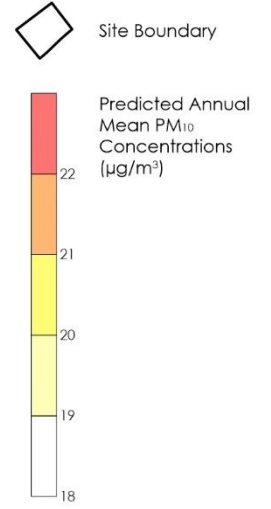
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Legend



Title
Figure 7 - Predicted Annual Mean PM₁₀ Concentrations (µg/m³)
Do-Minimum Ground Floor

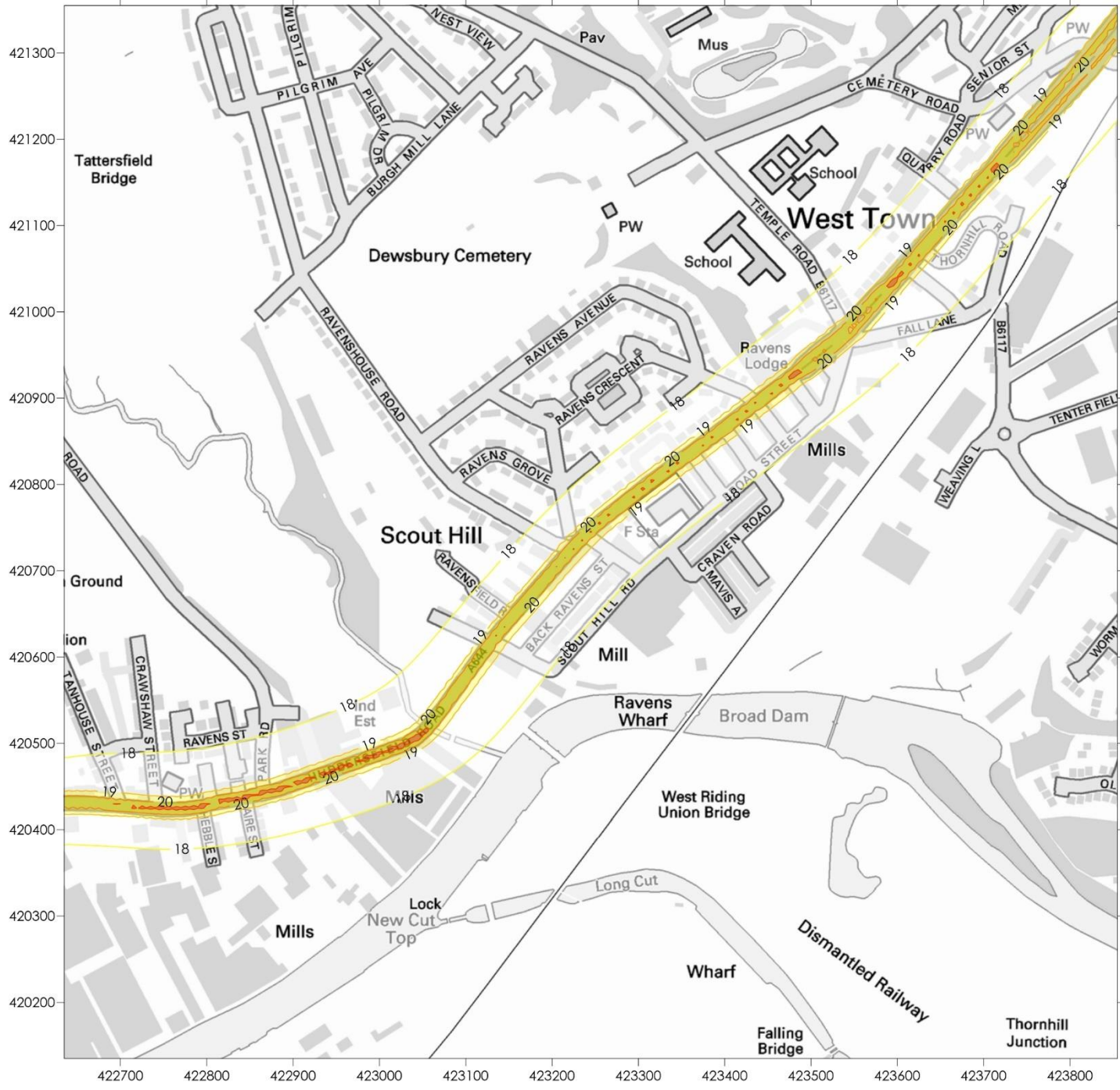
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Former Dewsbury Fire Station
Huddersfield Road, Dewsbury

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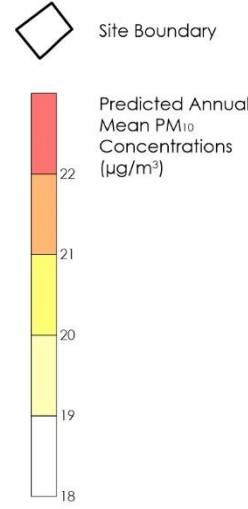
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Legend



Title
Figure 8 - Predicted Annual Mean PM₁₀ Concentrations (µg/m³)
Do-Something
Ground Floor

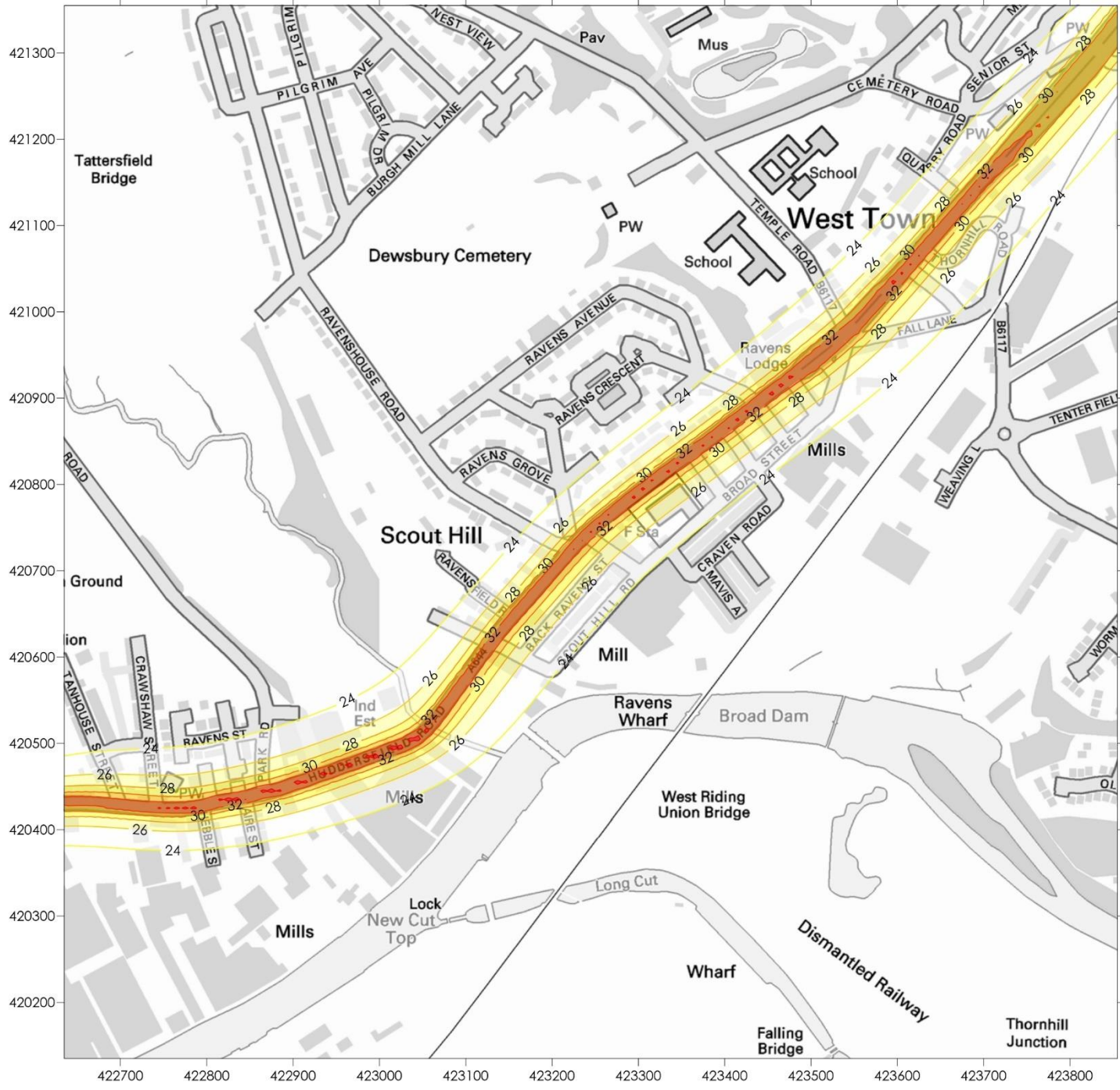
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Air Quality Assessment
Former Dewsbury Fire Station
Huddersfield Road, Dewsbury

Project Reference
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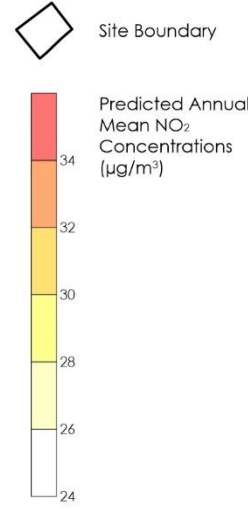
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Legend



Title
Figure 9 - Predicted Annual Mean NO₂ Concentrations (µg/m³) Do-Something First Floor

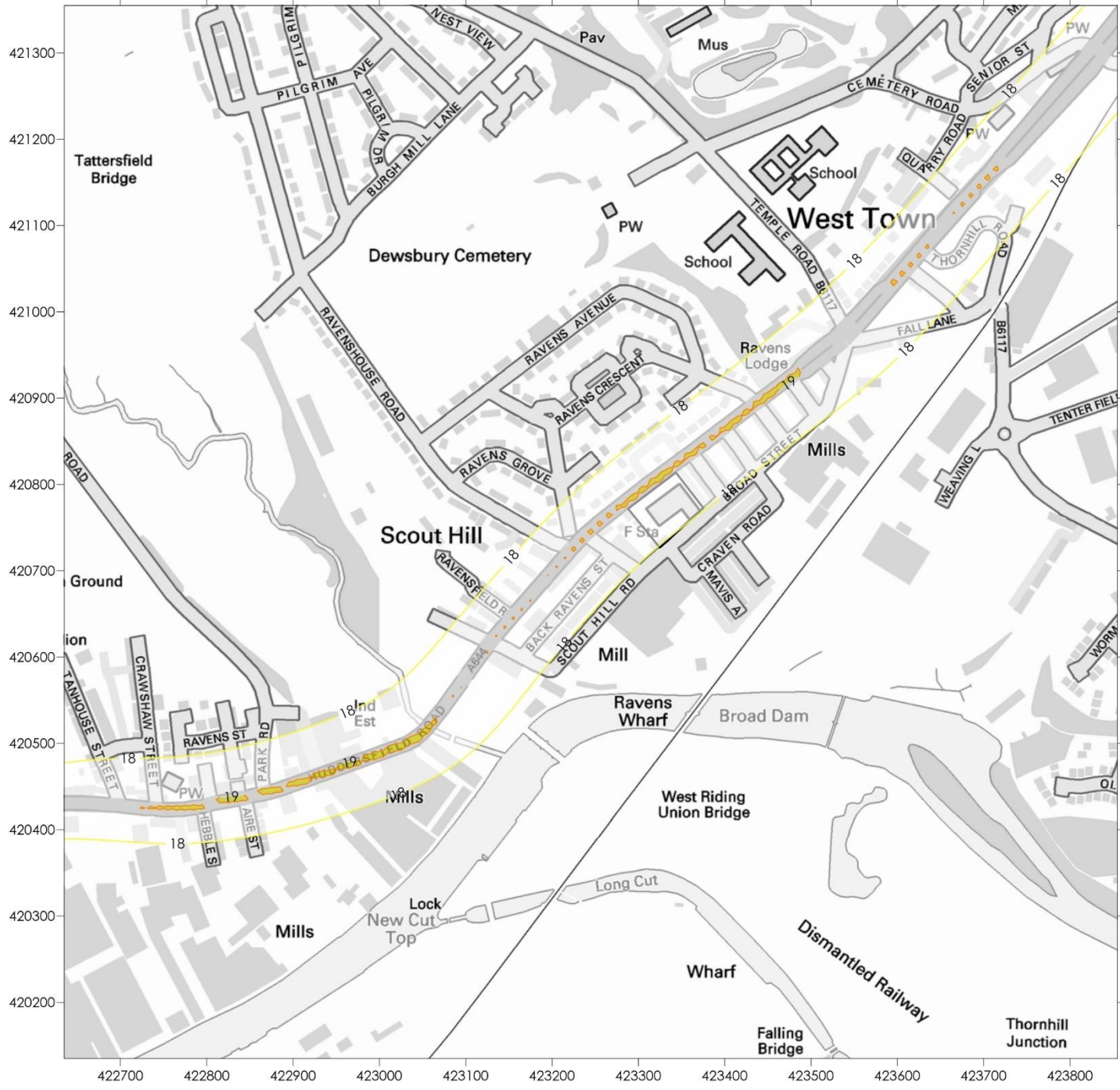
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Air Quality Assessment
Former Dewsbury Fire Station
Huddersfield Road, Dewsbury

Project Reference
1600

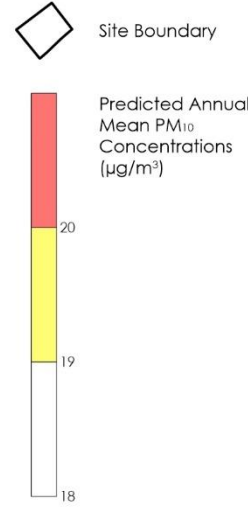
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Legend



Title
Figure 10 - Predicted Annual Mean PM₁₀ Concentrations (µg/m³) Do-Something First Floor

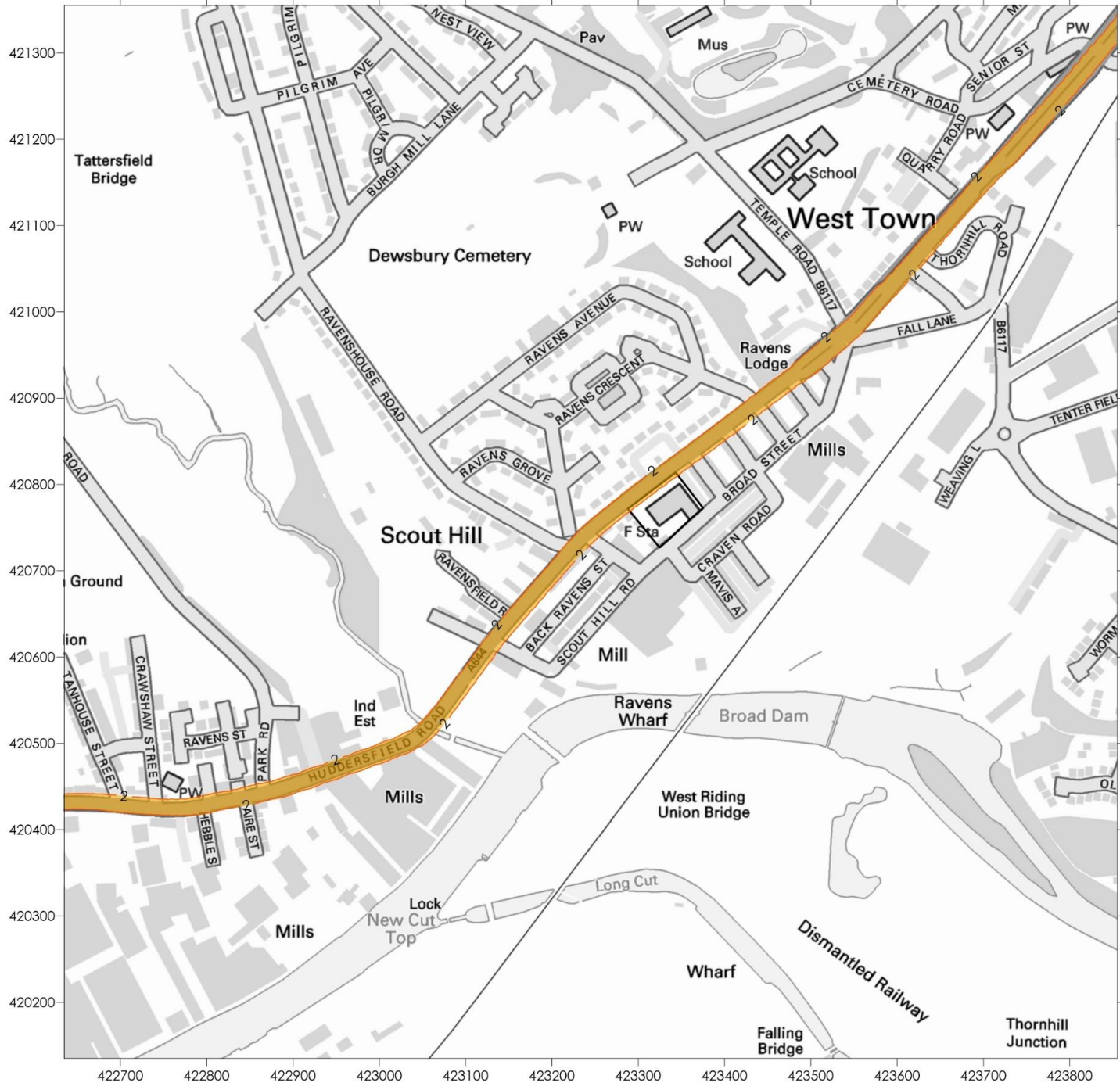
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Former Dewsbury Fire Station
Huddersfield Road, Dewsbury

Project Reference
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

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Legend

-  Site Boundary
-  Number of Days with 24-hour Mean PM₁₀ Concentrations Above 50µg/m³

Title
Figure 11 - Predicted Number of Days with 24-hour Mean PM₁₀ Concentrations Above 50µg/m³ First Floor

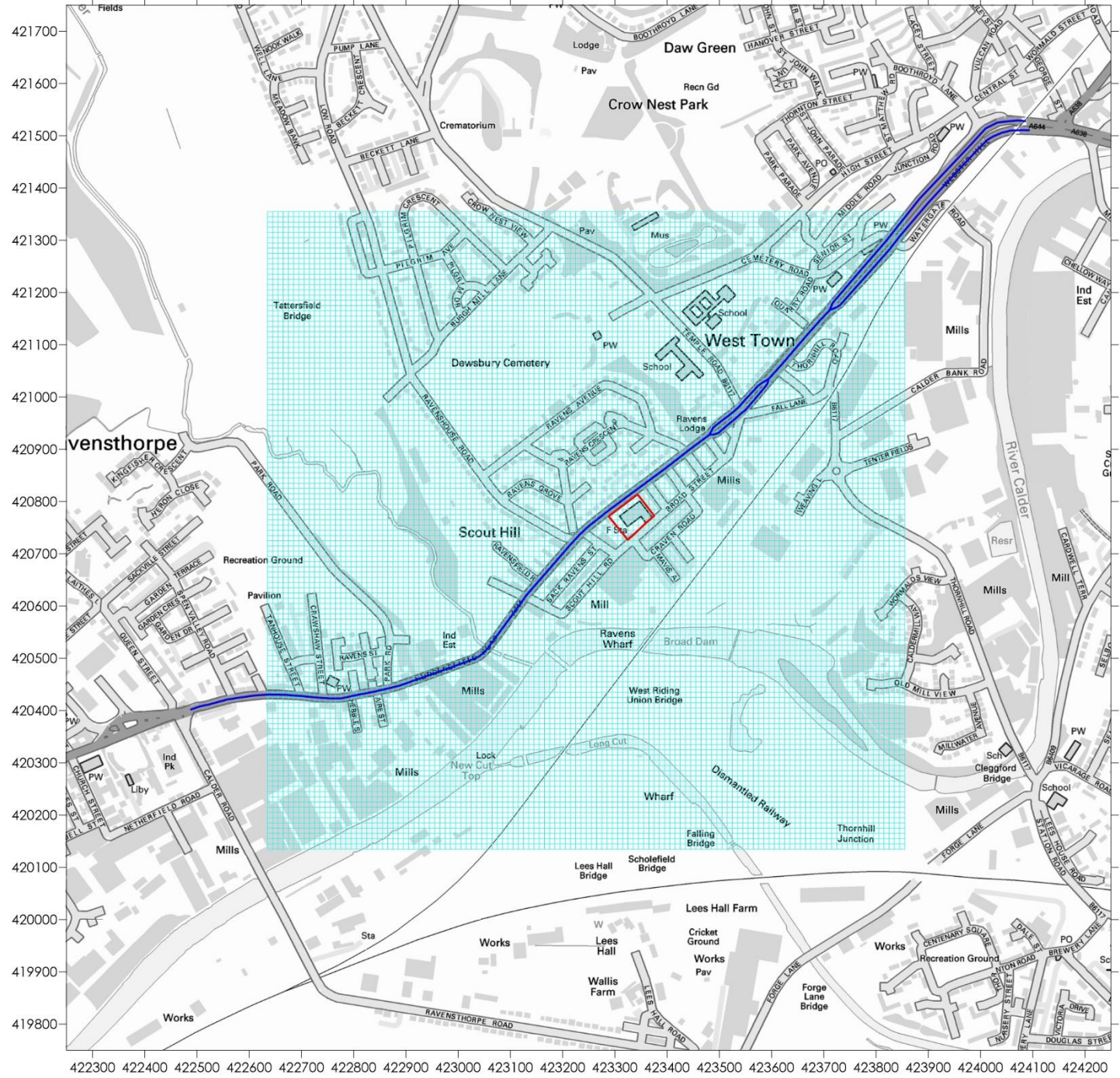
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Former Dewsbury Fire Station
Huddersfield Road, Dewsbury




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- Legend**
-  Site Boundary
 -  Output Grid
 -  Road Link

Title
Figure 12 - ADMS Roads Inputs

Project
Air Quality Assessment
Former Dewsbury Fire Station
Huddersfield Road, Dewsbury

Project Reference
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Appendix 1 - Assessment Input Data

Introduction

The proposed development has the potential to cause air quality impacts as a result of vehicles travelling to and from the site, as well as expose future occupants to elevated pollution levels. In order to assess NO₂ and PM₁₀ concentrations at sensitive locations, detailed dispersion modelling was undertaken in accordance with the following methodology.

Dispersion Model

Dispersion modelling was undertaken using the ADMS-Roads dispersion model (version 4.1.1.0). ADMS-Roads is developed by Cambridge Environmental Research Consultants (CERC) and is routinely used throughout the world for the prediction of pollutant dispersion from road sources. Modelling predictions from this software package are accepted within the UK by the Environment Agency and DEFRA.

The model requires input data that details the following parameters:

- Traffic flow data;
- Vehicle emission factors;
- Spatial co-ordinates of emissions;
- Street width;
- Meteorological data;
- Roughness length (z_0); and,
- Monin-Obukhov length.

These are detailed in the following Sections.

Assessment Area

The assessment area was defined based on the development location, the anticipated access routes and the positioning of residential properties. Ambient concentrations were predicted over the area NGR: 422635, 420135 to 423855, 421355. One Cartesian grid was used within the model to produce data suitable for contour plotting using the Surfer software package.

Reference should be made to Figure 12 for a graphical representation of the assessment grid extents.

Traffic Flow Data

Baseline traffic data for the A644 Huddersfield Road was obtained from the Transport Statement produced in support of a previous planning application for the site (Ref: 2015/60/92563/E) and adjusted to the relevant assessment year utilising factors obtained from TEMPro. This software package has been developed by the Department for Transport (DfT) to calculate traffic growth throughout the UK

Traffic generation associated with the proposals was provided by Paragon Highways, the Transport Consultants for the project. This was applied to the relevant road links based on the most likely traffic distribution patterns from the site.

A summary of the traffic flows is provided in Table A1.1.

Table A1.1 Traffic Flows

Link		24-hour AADT Flow			HDV Prop. of Fleet (%)	
		Verif.	2018 DM	2018 DS	Verif. 2018 DM	2018 DS
L1	A644 Huddersfield Road, East of Calder Road	18,736	19,430	19,848	9.97	9.62
L2	A644 Huddersfield Road, West of Site Access	18,736	19,430	19,848	9.97	9.62
L3	A644 Huddersfield Road, East of Site Access	18,736	19,430	19,848	9.97	9.62
L4	A644 Huddersfield Road, South of Temple Road, Northbound	10,588	10,981	11,190	10.01	9.67
L5	A644 Huddersfield Road, North of Temple Road, Northbound	10,588	10,981	11,190	10.01	9.67
L6	A644 Huddersfield Road, South of Temple Road, Southbound	8,148	8,450	8,659	9.90	9.54
L7	A644 Huddersfield Road, North of Temple Road, Southbound	8,148	8,450	8,659	9.90	9.54
L8	A644 Huddersfield Road, North of Temple Road	18,736	19,430	19,848	9.97	9.62
L9	A644 Huddersfield Road, North of Thornhill Road, Northbound	10,588	10,981	11,190	10.01	9.67
L10	A644 Huddersfield Road, North of Thornhill Road, Southbound	8,148	8,450	8,659	9.90	9.54

Reference should be made to Figure 12 for a graphical representation of the road link locations.

Road widths were estimated from aerial photography and UK highway design standards. Road widths and average vehicle speeds are shown in Table A1.2.

Table A1.2 Road Parameters

Link	Road Width (m)	Average Vehicle Speed (km/h)	
L1	A644 Huddersfield Road, East of Calder Road	8.8	45
L2	A644 Huddersfield Road, West of Site Access	10.7	45
L3	A644 Huddersfield Road, East of Site Access	10.7	45
L4	A644 Huddersfield Road, South of Temple Road, Northbound	8.6	40
L5	A644 Huddersfield Road, North of Temple Road, Northbound	4.2	45
L6	A644 Huddersfield Road, South of Temple Road, Southbound	4.2	45
L7	A644 Huddersfield Road, North of Temple Road, Southbound	8.3	40
L8	A644 Huddersfield Road, North of Temple Road	9.7	45
L9	A644 Huddersfield Road, North of Thornhill Road, Northbound	6.6	45
L10	A644 Huddersfield Road, North of Thornhill Road, Southbound	6.6	45

Emission Factors

The emission factors were calculated using the relevant traffic flows and the Emissions Factor Toolkit (version 7.0). This has been produced by DEFRA and incorporates updated COPERT4v11 vehicle emission factors and fleet information.

There is current uncertainty over NO₂ concentrations within the UK, with the implementation of new vehicle emission standards not resulting in the previously expected reduction in roadside levels. Therefore, 2015 emission factors were utilised in preference to the development opening year in order to provide robust model outputs. As predictions for 2015 were verified, it is considered the results are a robust indication of worst case concentrations for the future year.

Meteorological Data

Meteorological data used in the assessment was taken from Leeds/Bradford Airport meteorological station over the period 1st January 2015 to 31st December 2015 (inclusive). Leeds/Bradford Airport meteorological station is located at NGR: 422029, 441016, which is approximately 20.3km north of the assessment area. It is anticipated that conditions would be reasonably similar over a distance of this magnitude. The data was therefore considered suitable for an assessment of this nature.

All meteorological records used in the assessment were provided by Atmospheric Dispersion Modelling (ADM) Ltd, which is an established distributor of data within the UK. Reference should be made to Figure 3 for a wind rose of utilised meteorological data.

Roughness Length

A z_0 of 0.5m was used to describe the modelling extents. This value of z_0 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 of z_0 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 10m was used to describe the modelling extents. This value is considered appropriate for the nature of the area and is suggested within ADMS-Roads as being suitable for 'small towns <50,000'.

A minimum Monin-Obukhov length of 30m was used to describe the meteorological site. This value is considered appropriate for the nature of the area and is suggested within ADMS-Roads as being suitable for 'cities and large towns'.

Background Concentrations

A review of DEFRA data and local monitoring results was undertaken in order to identify an appropriate background value for use in the assessment. Trailer 2 monitors at an urban background location in close proximity to an industrial area. Therefore, it is considered that background concentrations recorded at the continuous site are likely to be influenced by industrial emissions. As such, Trailer 2 was not considered representative of air quality within the modelling extents. Background concentrations were therefore obtained from the DEFRA mapping study for the grid square containing the development site, as shown in Table 14.

Similarly to emission factors, the background concentrations from 2015 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 NO₂ Conversion

Predicted annual mean NO_x concentrations were converted to NO₂ concentrations using the spreadsheet (version 5.1) provided by DEFRA, which is the method detailed within DEFRA guidance²¹.

Verification

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

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

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

²¹ Local Air Quality Management (TG16), DEFRA, 2016.

verification was undertaken for 2015 using traffic data, meteorological data and monitoring results from this year.

KC undertook monitoring of NO₂ concentrations at three locations within the modelling extents during 2015. Review of these sites indicated that the Trailer 2 monitor was positioned on a road link that was not included within the model. As such, it was removed from the verification process to avoid under prediction of pollutant concentrations.

Results were obtained from the remaining monitors and the road contributions to total NO_x concentrations calculated following the methodology contained within DEFRA guidance²². The monitored annual mean NO₂ concentrations and calculated road NO_x concentrations are summarised in Table A1.3.

Table A1.3 Verification - Monitoring Result

Monitoring Location	Monitored NO ₂ Concentration (µg/m ³)	Calculated Road NO _x Concentration (µg/m ³)
Roadside 1	32.00	23.11
19	39.84	41.07

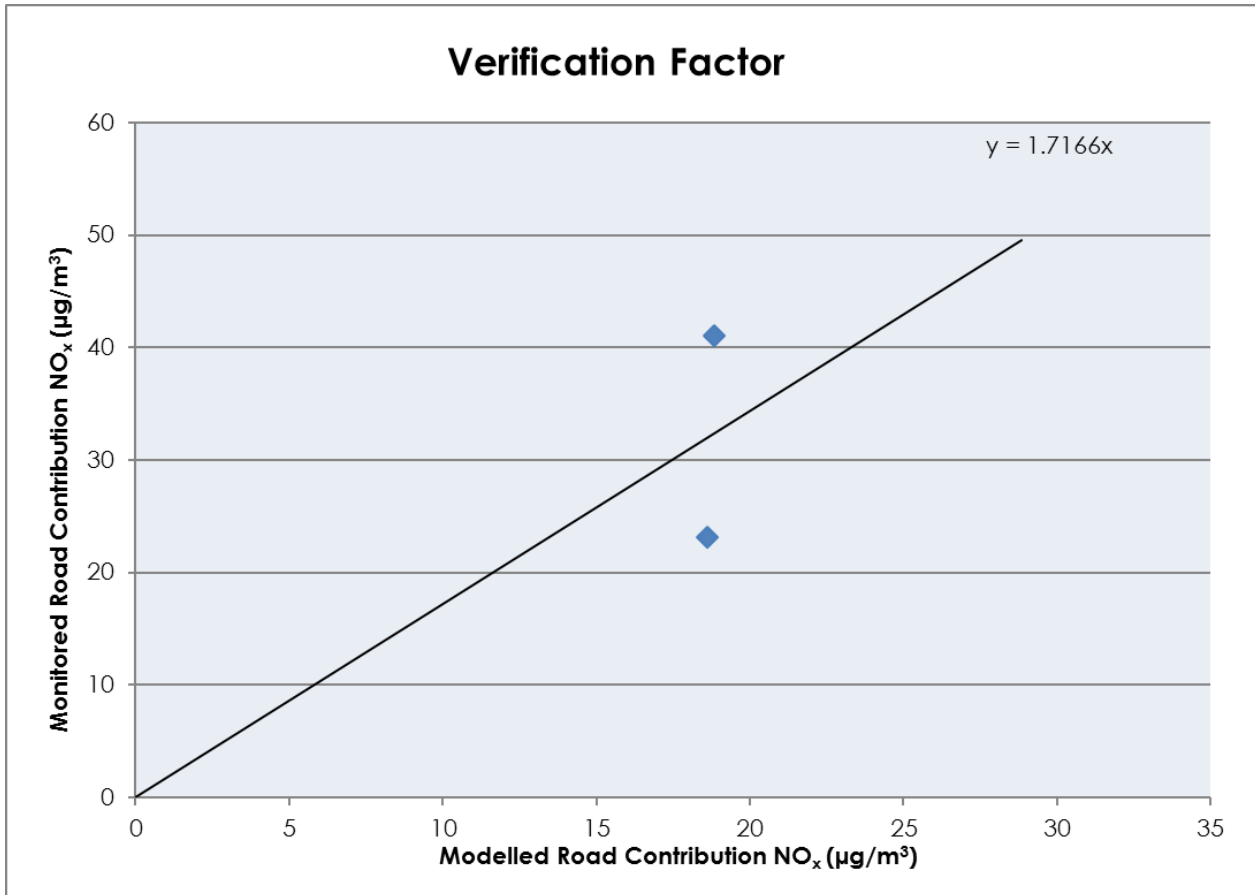
The annual mean road NO_x concentrations predicted from the dispersion model and the 2015 road NO_x concentrations calculated from the monitoring results are summarised in Table A1.4.

Table A1.4 Verification - Modelling Result

Monitoring Location	Calculated Road NO _x Concentration (µg/m ³)	Modelled Road NO _x Concentration (µg/m ³)
Roadside 1	23.11	18.60
19	41.07	18.85

The monitored and modelled road NO_x concentrations were graphed and the equation of the trendline based on linear progression through zero calculated. This indicated that a verification factor of 1.7166 was required to be applied to all road NO_x modelling results, as shown in Graph 1.

²² Local Air Quality Management (TG16), DEFRA, 2016.

Graph 1 Verification Factor

KC undertook monitoring of PM₁₀ concentrations at Roadside 1 during 2015. The monitored annual mean PM₁₀ concentration and modelled PM₁₀ concentration is shown in A1.5.

Table A1.5 PM₁₀ Verification - Modelling Results

Monitoring Location	Monitored PM ₁₀ Concentration (µg/m ³)	Modelled PM ₁₀ Concentration (µg/m ³)
Roadside 1	19.28	16.52

The monitored and modelled PM₁₀ concentrations were compared to calculate the associated ratio. This indicated a verification factor of 1.1673 was required to be applied to all modelling results.

Appendix 2 - Curricula Vitae

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-5, 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.

KEY EXPERIENCE:

Pearl is an Environmental Consultant 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 exhaust emissions using ADMS-Roads. Studies have included assessment of road traffic exhaust emissions on sensitive receptors and exposure of new residents to poor air quality.
- Assessment of construction dust impacts from a range of development sizes.
- Assessment of fugitive dust impacts from a range of mineral extraction developments.
- Production of air quality mitigation strategies specifically tailored to address issues at individual sites.
- Definition of baseline air quality and identification of sensitive areas across the UK.
- Odour surveys to assess amenity and suitability of sites for potential future development for residential use.
- Odour monitoring at industrial sites to quantify odour emission rates.

SELECT PROJECTS SUMMARY:

Maid Marian House, Nottingham

Air Quality Assessment for a change of use from office units to residential use. Concerns were raised regarding the exposure of future occupants to poor air quality due to road traffic emissions from the A6008 Maid Marian Way. Dispersion modelling took place at several different heights reflective of residential units within the development. Predicted concentrations of NO₂ were found to exceed air quality criteria at numerous levels of the proposed building. Mechanical ventilation was specified in the appropriate units within the development as a form of mitigation.

Victoria Quarter, London

Air Quality Assessment in support of residential development in an AQMA. Dispersion modelling was undertaken to consider the potential impact of development generated vehicles and CHP/Boiler emissions on air quality at sensitive receptor locations within the vicinity of the site. Different heights within the development, reflective of the proposed residential units, were also considered. The assessment identified a range of impacts, as such, a range of mitigation was specified. Mechanical ventilation was also specified in the appropriate units predicted to be exposed to poor levels of air quality.

Monks Farm, Townsend Grove

Air Quality EIA in support of residential development comprising 456 dwellings and primary school. NO₂ and PM₁₀ concentrations were predicted to be below the air quality objectives at the sensitive receptors considered. Air quality effects as a result of the proposals was determined to be not significant.

Stanton Harcourt, West Oxford

Odour Assessment for the redevelopment of the former Stanton Harcourt Airfield to residential properties. Due to the location of the site, being adjacent to a recently capped landfill, odour surveys were required to assess the level of odour across the site. A risk assessment was also undertaken in accordance with appropriate odour guidance. Taking into account the results of the odour surveys, recent odour complaint history and odour risk assessment the potential for odour effects across the site was determined to be not significant.

Hunter Street, Chester

Air Quality Assessment in support of a development for student accommodation. Concerns were raised regarding the exposure of future occupants to poor air quality due to road traffic emissions from the A5268. Dispersion modelling took place at several different heights of the proposed building. Predicted concentrations of NO₂ were found to exceed air quality criteria at ground to first floor level for those apartments facing the A5268. Mechanical ventilation was specified in these units as a form of mitigation.

Botley Road, West End, Southampton

Co-ordination and management of a six month diffusion study in support of a proposed residential development. Concerns were raised regarding the exposure of future residents to poor air quality due to road traffic emissions from the M27. The results of the monitoring study identified NO₂ concentrations across the site to be below the air quality objective and therefore deemed suitable for residential use.