

AIR QUALITY ASSESSMENT

on behalf of

BARRATT HOMES AND BLOOR HOMES NORTH WEST

for

LAND SOUTH OF HOLT RD, WREXHAM

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Miller Goodall Ltd
Ground Floor
Ashworth House
Deakins Business Park
Blackburn Road
Egerton
Bolton
Lancashire
BL7 9RP

Tel: 01204 596166

www.millergoodall.co.uk

Company registration number 5201673



Summary

This air quality report is submitted in support of an outline planning application for a proposed residential development of up to 600 dwellings with associated landscape works, public open space and on-site infrastructure, with all matters reserved except for access on the land south of Holt Road, Wrexham.

This report is an update to a previous report dated 17th December 2018.

The assessment considers whether the proposed development could significantly change air quality during its construction phase. With the implementation of mitigation measures, the dust impacts from the construction are considered to be not significant when assessed following IAQM guidance.

The report provides an updated review of existing air quality in proximity to the proposed development site. The potential local air quality impacts associated with traffic generated by the development are assessed at existing and proposed residential receptors within the study area using the detailed dispersion model ADMS-Roads. Two scenarios are examined; 2023 and 2028. The suitability of the site for residential use in terms of air quality is also considered.

Annual and short-term concentrations of NO₂ and PM₁₀ are predicted to be below their respective air quality objectives for both the '*without development*' and '*with development*' scenarios in 2023 at all identified receptor locations. An assessment in accordance with Environmental Protection UK and Institute of Air Quality Management guidance on air quality significance criteria has identified that the local air quality impact of emissions from traffic associated with the proposed development is predicted to be **negligible**.

Annual and short-term concentrations of NO₂ and PM₁₀ are predicted to be below the respective air quality objectives for both '*without development*' and '*with development*' scenarios in 2028 at all identified receptor locations. An assessment in accordance with Environmental Protection UK and Institute of Air Quality Management guidance on air quality significance criteria has identified that the local air quality impact of emissions from traffic associated with the proposed development is predicted to be **negligible**.

There is, therefore no reason for this application to be refused on the grounds of air quality.

Prepared By Melody Horan

Reviewed By Lesley Goodall

Signed



Signed



Date

15th December 2020

Date

15th December 2020

Record of changes

Version	Date	Change	Initials
D	8 th August 2018	First draft	MH
1	14 th August 2018	Minor amendments	JLM
2	17 th December 2018	Change to the site layout. Change to the distribution of development traffic, update to model and results	MH
3	15 th December 2020	Updates to all technical Defra inputs. New base year of 2018, updated traffic data for 2023 and new 2028 scenario included.	LG

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1 Introduction

- 1.1 This air quality report is submitted in support of a planning application for proposed residential development of up to 600 dwellings with associated landscape works, public open space and on-site infrastructure, with all matters reserved except for access on land to the south of Holt Road, Wrexham. The site lies within the administrative boundary of Wrexham County Borough Council (WCBC).
- 1.2 The report provides a review of the existing air quality in proximity to the proposed development site and assesses the potential impact of the proposed development on local air quality following Local Air Quality Management Technical Guidance¹ in 2023 and 2028.
- 1.3 Air pollution in urban areas is generally dominated by emissions from road vehicles. The quantity and composition of vehicle emissions is dependent on the type of fuel used, engine type, size and efficiency, vehicle speeds and the type of exhaust emissions abatement equipment employed.
- 1.4 The main pollutants of health concern from road traffic exhaust releases are nitrogen dioxide (NO₂) and fine particulates – normally assessed as the fraction of airborne particles of mean aerodynamic diameter less than ten micrometres (PM₁₀) since these pollutants are most likely to approach their respective air quality objectives in proximity to major roads and in congested areas. This assessment has therefore focused on the impact of the proposed development on concentrations of NO₂ and PM₁₀.

2 Site Description

- 2.1 The site is located approximately 2.8 km to the east of Wrexham town centre and is currently undeveloped land. The site location is shown in **Appendix A**.
- 2.2 To the north of the site is the A534 and beyond that, Wrexham Golf Club. East of the site is greenfield and Clays Golf Course. The southern border of the site skirts around Bryn Estyn Court residential properties, which are served by Bryn Estyn Road, a quiet access road to the south of the site. To the west and northwest of the site are large areas of established residential use.

3 Proposed Development

- 3.1 The proposal is to develop a greenfield site of approximately 28 hectares for residential use involving the erection of up to 600 dwellings. The mix of dwellings has not been fixed and layout is reserved for consideration at a later date. The parameter plan for the development is shown in **Appendix B**.
- 3.2 The site forms part of a Key Strategic Site (KSS2 – Land East of Cefn Road, Wrexham). The land areas to the south and southwest of the site form the rest of KSS2. The Holt Road portion of KSS2 will include the northern portion of a new link road. A further KSS lies close to KSS2 and comprises land to the north of Bryn Lane, Wrexham Industrial Estate.

¹ Department for the Environment Food and Rural Affairs (2018) 'Local Air Quality Management Technical Guidance Document LAQM.TG (16)', London: Defra.

4 Policy Context

4.1 Air Quality Objectives

- 4.1.1 The air quality standards and objectives have been prescribed through the Air Quality Standards (Wales) Regulations 2000 (as amended). The current air quality standards and objectives (for the purpose of Local Air Quality Management) are presented in **Table 1**. Pollutant standards relate to ambient pollutant concentrations in air, set on the basis of medical and scientific evidence of how each pollutant affects human health. Pollutant objectives, however, incorporate target dates and averaging periods which take into account economic considerations, practicability and technical feasibility.

Table 1: Air Quality Standards (Wales) for the Purposes of Local Air Quality Management

Pollutant	Air Quality Objective		To be Achieved by
	Concentration	Measured As*	
Nitrogen dioxide (NO ₂)	200 µg/m ³	1-hour mean not to be exceeded more than 18 times per year	31/12/2005
	40 µg/m ³	Annual mean	31/12/2005
Particles (PM ₁₀)	50 µg/m ³	24-hour mean not to be exceeded more than 35 per year	31/12/2004
	40 µg/m ³	Annual mean	31/12/2004
Particles (PM _{2.5})	25 µg/m ³	Annual mean (target)	2020
	15% cut in annual mean (urban background exposure)		2010-2020

Note: *how the objectives are to be measured is set out in the Air Quality (Wales) Regulations 2010.

- 4.1.2 Where an air quality objective is unlikely to be met by the relevant deadline, local authorities must designate those areas as Air Quality Management Areas (AQMAs) and take action to work towards meeting the objectives. Following the designation of an AQMA, local authorities are required to develop an Air Quality Action Plan (AQAP) to work towards meeting the objectives and to improve air quality locally.
- 4.1.3 Possible exceedances of air quality objectives are generally assessed in relation to those locations where members of the public are likely to be regularly present and are likely to be exposed for a period of time appropriate to the averaging period of the objective.

4.2 Planning Policy Wales (PPW10)

- 4.2.1 PPW (10)² sets out the land use planning policies of the Welsh Government. Section '6.7 Air Quality and Soundscape' discusses the importance of local air quality and emphasises the importance of air quality objectives advising that it is desirable to keep levels of pollution as low as possible. The document also provides

² Welsh Government (December 2018) Planning Policy Wales Edition 10 [Planning Policy Wales - Edition 10 \(gov.wales\)](https://gov.wales/planning-policy-wales-edition-10)

a framework for addressing air quality and advises at 6.7.6 that in proposing new development, planning authorities and developers must:

- address any implication arising as a result of its association with, or location within, air quality management areas, noise action planning priority areas or areas where there are sensitive receptors;
- not create areas of poor air quality or inappropriate soundscape; and
- seek to incorporate measures which reduce overall exposure to air and noise pollution and create appropriate soundscapes.

4.2.2 Mitigation measures are considered at 6.7.8 and the document advises that these must be capable of being effectively implemented for their intended purpose, and could include those related to:

- traffic management and road safety;
- ensuring progress towards a shift to low or zero emissions means of road transport, such as electrical charging points;
- supporting low or zero emissions public transport;
- providing active travel infrastructure; and
- incorporating green infrastructure, where it can improve air quality by removing air pollution and aiding its dispersal, reduce real or perceived noise levels by absorbing and scattering noise and introducing natural sounds to soften man-made noise, provide areas of relative tranquillity, and reduce exposure by putting a buffer between sources of pollution and receptors.”

4.3 Local Planning Policy and Guidance

4.3.1 Policy GDP1 of Wrexham’s Unitary Development Plan states:

“All new development should: -

g) Ensure the safety and amenity of the public and safeguard the environment from the adverse effects of pollution of water, land or air, hazards from industry and quarrying, and associated noise, odour or vibration arising from development.”

5 Methodology

5.1 Data Sources

5.1.1 The air quality assessment of the proposed development was undertaken with reference to information from a number of sources, as detailed in **Table 2**.

Table 2: Key Information Sources

Data Source	Reference
North Wales Combined Authority (NWCA)	Wood Environment & Infrastructure Solutions UK Limited on behalf of NWCA (September 2019) <i>2019 Air Quality Progress Report</i>
Department for Environment Food and Rural Affairs (Defra)	Defra (2018) <i>Local Air Quality Management Technical Guidance TG(16)</i>
Environmental Protection UK (EPUK) and Institute of Air Quality Management (IAQM)	EPUK and IAQM (January 2017) <i>Land Use Planning and Development Control: Planning for Air Quality (v1.2)</i>
Defra's LAQM Support Tools	Local Air Quality Management 1 km x 1 km grid background pollutant maps
Institute of Air Quality Management (IAQM)	IAQM (2014) <i>Assessment of Dust from Demolition and Construction (v1.1)</i>
Natural Resources Wales	Location of processes permitted under the Environmental Permitting (England and Wales) Regulations 2016 (as amended).
CBO Transport Ltd	Traffic data

5.2 Consultation

5.2.1 Consultation in respect of the scope of the original assessment and the methodology to be used was undertaken with Paul Campini of WCBC. Mr Campini confirmed that the proposed methodology was suitable³. It was agreed that both a construction phase assessment and an assessment of road traffic emissions across the site would be undertaken for the proposed development. The types of assessments to be undertaken, meteorological data to be used, assessment roads, approach to verification and baseline data sources were also agreed and are detailed in the following sections.

5.3 Construction Dust Assessment

5.3.1 A construction dust assessment has been undertaken following the IAQM guidance, "Guidance on the assessment of dust from demolition and construction (v1.1)"⁴.

³ Email Miller Goodall Ltd. to Paul Campini (WCBC) 15th May 2018. Email Paul Campini (WCBC) to Miller Goodall Ltd. on 22nd May 2018.

⁴ IAQM "Assessment of dust from demolition and construction" v1.1 2014

5.4 Road Traffic Emissions Assessment

Air Dispersion Model

- 5.4.1 The Atmospheric Dispersion Modelling System for Roads (ADMS-Roads) v5.0.0.1 was used to assess the local air quality impact of development-generated vehicle exhaust emissions, on concentrations of NO₂ and PM₁₀, at existing receptors located adjacent to the assessed road network, and to assess the suitability of the site for residential use.
- 5.4.2 The ADMS-Roads model is a comprehensive tool for investigating air pollution in relation to road networks. The model uses algorithms for the height-dependence of wind speed, turbulence and stability to produce improved predictions. It can predict long-term and short-term concentrations, as well as calculations of percentile concentrations.
- 5.4.3 The ADMS-Roads model has been comprehensively validated in a large number of studies by the software manufacturer CERC (Cambridge Environmental Research Consultants). This includes comparisons with data from the UK's Automatic Urban Network (AUN) and specific validation exercises using standard field, laboratory and numerical data sets. CERC is also involved in European programmes on model harmonisation, and their models have been compared favourably against other EU and US EPA systems. Further information in relation to this is available from the CERC web site at www.cerc.co.uk.

Assessment Scenarios

- 5.4.4 The assessment considered the following scenarios:

- Scenario 1: 2018 - base year;
- Scenario 2: 2023 - 'without development';
- Scenario 3: 2023 - 'with development';
- Scenario 4: 2028 - 'without development'; and
- Scenario 5: 2028 'with development'.

Traffic Data

- 5.4.5 24-hour annual average daily traffic (AADT) flow data are required for input into the air quality assessment. Traffic data was provided by CBO Transport Ltd (the transport consultants for the project), for use in the assessment.
- 5.4.6 The spatial scope for the assessment focused on those routes affected by the proposed development. The study area therefore included the following road links:
- Holt Road;
 - A5156;
 - Borrass Road;
 - Borrass Park Road;
 - Birkdale Road;
 - Cilgant Sant Mellion;
 - Dean Road;
 - Bryn Estyn Road; and

- Cefn Road.

5.4.7 In the 2023 “without” flow data, there is no specific development included just Temprow traffic growth. In the 2023 “with” flow data, there is the level of development from KSS2 and KSS3 and the data reflect some junction improvements. Similarly, the 2028 flows include no specific development other than on KSS2 and 3. The traffic data used in the assessment are detailed in **Appendix C**.

5.4.8 Vehicles within the study area were assumed to travel at 48kph on all roads apart from the approach to junctions and roundabouts where queuing traffic sections were included in the model at 5 kph where appropriate, in accordance with Defra guidance (Defra, 2018).

Meteorological Data

5.4.9 Meteorological data for 2018 from the Hawarden Airport recording station was used in the ADMS-Roads model. This site is approximately 14 km from the development site and is considered the most representative recording station for the development site.

Model Verification

5.4.10 Model verification is the process of adjusting model outputs to improve the consistency of modelling results with respect to available monitored data. In this study, model uncertainty was minimised following Defra and EPUK guidance. The verification of the ADMS model output was achieved by modelling concentrations at existing monitoring locations WBC-021 and WBC-42 within the study area and comparing the modelled concentration with measured concentrations.

Sensitive Receptors

5.4.11 Sensitive receptor locations were selected based on their proximity to road links affected by the proposed development, where the potential effect of development-related traffic emissions on local air pollution would be most significant.

Conversion of NO_x to NO₂

5.4.12 Oxides of nitrogen (NO_x) concentrations were predicted using the ADMS-Roads model. The modelled road contribution of NO_x at the identified receptor locations was then converted to NO₂ using the NO_x to NO₂ calculator (v8.1, 2018)⁵ in accordance with Defra guidance¹.

Emission Factors

5.4.13 DEFRA's Emission Factor Toolkit (EFT) version 10.0 was used within the ADMS model to predict emissions from road vehicles.

Background Concentrations

5.4.14 The ADMS model requires the derivation of background pollutant concentration data that are factored to the year of assessment, to which the model adds contributions from the assessed roads.

⁵ <http://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html#NOxNO2calc>

5.4.15 There are no background monitoring locations in the vicinity of the proposed development and receptor locations, therefore background NO_x, NO₂ and PM₁₀ concentrations were obtained from the Defra LAQM support tools for the 1 km x 1 km grid squares covering the proposed development site and receptor locations for the years of assessment (2018, 2023 and 2028).

Assessment Significance Criteria

5.4.16 Guidance is provided by EPUK and IAQM on criteria for determining the significance of a development's impact on local air quality⁶. **Table 3** details the impact descriptors used for individual receptors in relation to annual mean pollutant concentrations. The overall significance of impacts was determined using professional judgement.

Table 3: Impact descriptors for individual receptors

Long term average Concentration at receptor in assessment year	% Change in concentration relative to Air Quality Assessment Level (AQAL)*			
	1	2-5	6-10	>10
75% or less of AQAL	Negligible	Negligible	Slight	Moderate
76-94% of AQAL	Negligible	Slight	Moderate	Moderate
95-102% of AQAL	Slight	Moderate	Moderate	Substantial
103-109% of AQAL	Moderate	Moderate	Substantial	Substantial
110% or more of AQAL	Moderate	Substantial	Substantial	Substantial

*AQAL = Air Quality Assessment Level, which may be an air quality objective, EU limit or target value, or an Environment Agency 'Environmental Assessment Level (EAL)'

6 Baseline Air Quality

6.1 Local Air Quality Management

- 6.1.1 WCBC form part of the North Wales Combined Authority (NWCA) and air quality reports are prepared for the NWCA as a whole.
- 6.1.2 WCBC has not declared any AQMAs; there are currently no AQMAs in North Wales. The 2019 NWCA Annual Progress Report concluded that none of the monitoring locations in WCBC exceeded the objectives in 2018.

⁶ EPUK (January 2017) Land Use Planning and Development Control: *Planning for Air Quality (v1.2)*

6.2 Air Quality Monitoring

Nitrogen Dioxide (NO₂)

- 6.2.1 WCBC undertake diffusion tube monitoring of NO₂ across its authority and diffusion tube monitoring was undertaken at 26 locations (including one triplicate site co-located with an AURN station) in 2018. Two diffusion tubes are in the proximity of the site and the results and locations are shown in **Table 4** and **Appendix D**. WCBC also have one automatic monitoring site within its authority, however, the automatic monitoring site is a roadside site located approximately 3.2 km southwest of the site, and is, therefore, unrepresentative of the study area.

Table 4: Annual Mean NO₂ Concentrations From Diffusion Tube Monitoring Sites Within The Study Area.

Site ID and Type	Location		Annual Mean NO ₂ Concentrations (µg/m ³)				
			2014	2015	2016	2017	2018
WBC-042 (roadside)	335359	352178	23	24.6	25.6	24.4	23.2
WBC-021 (roadside)	334100	350700	22.3	18.8	19.9	17.8	18.8
Annual Mean NO ₂ air quality objective					40 µg/m ³		

- 6.2.2 The monitoring results in **Table 4** indicate that annual mean concentrations of NO₂ have not been close to the NO₂ annual mean objective at these monitoring tubes during the period shown. The results also indicate that the short term objective for NO₂ is unlikely to be exceeded at the monitoring site as annual mean concentrations are less than 60 µgm³¹.

Particulate Matter (PM₁₀)

- 6.2.3 WCBC undertake PM₁₀ monitoring at their automatic monitoring site, however, this site is unrepresentative of the study area.

6.3 Background Concentrations

- 6.3.1 There are no background monitoring locations in the vicinity of the proposed development site or at receptor locations included in the air quality assessment. Background concentrations of NO_x, NO₂ and PM₁₀ were therefore obtained from the background concentration maps provided by Defra for the grid squares covering the proposed development and receptor locations⁷. These are shown in **Table 5** below.

⁷ <http://uk-air.defra.gov.uk/data/laqm-background-maps?year=2018>

Table 5: Background Pollutant Concentrations Obtained for the 1km x 1km Grid Squares Covering the Site and Receptor Locations*

Grid Square	Pollutant	2018	2023	2028
		($\mu\text{g}/\text{m}^3$)	($\mu\text{g}/\text{m}^3$)	($\mu\text{g}/\text{m}^3$)
334500,350500	NO _x	12.28	10.16	8.81
	NO ₂	9.43	7.90	6.90
	PM ₁₀	11.93	11.09	10.81
335500,352500	NO _x	11.68	9.40	8.00
	NO ₂	9.02	7.35	6.31
	PM ₁₀	11.44	10.66	10.38
335500,351500	NO _x	11.86	9.72	8.35
	NO ₂	9.14	7.58	6.56
	PM ₁₀	12.23	11.42	11.14

* Background concentrations obtained from the latest 2018 based background maps

7 Construction Dust Impact Assessment

7.1.1 The IAQM provide guidance⁴ on the assessment of air quality impacts arising from construction and demolition activities. This section follows a risk assessment to determine the likely impact of the development on nearby receptor locations during the construction phase and goes on to recommend mitigation measures which should be implemented to reduce any impact. The methodology for the assessment is shown in **Appendix E**. The study area in relation to construction dust and the buffer zones of <20 m, 20 m – 50 m and 50 – 100 m from site are shown in **Appendix F**.

7.2 Step 1 – The Need for a Detailed Assessment

7.2.1 The site boundary is within 350 m of human receptors. In addition, there are human receptors within 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance. Therefore, a detailed assessment of the construction phase of the development was undertaken. The detailed assessment has not addressed ecological receptors.

7.3 Step 2 – Assess the Risk of Dust Impacts

Step 2A Dust Emission Magnitude

7.3.1 The potential dust emission magnitude in relation to the development has been determined using the criteria detailed in **Table 1** in **Appendix E**:

- Demolition: No demolition work is required for the development.
- Earthworks: The total site area is >10,000 m². The dust emission magnitude for earthworks is, therefore, considered to be **large**.
- Construction: The total building volume to be constructed is >100,000 m³. The dust emission magnitude for construction is, therefore, considered to be **large**.
- Trackout: It is conservatively assumed that there are likely to be >50 HDV outward movements in any one day. The dust emission magnitude for trackout is, therefore, considered to be **large**.

- 7.3.2 The scale and nature of works onsite were considered to determine the potential dust emission magnitude for demolition, earthworks and trackout activities as outlined in **Table 6**.

Table 6: Dust Emission Magnitudes for Each Activity

Activity	Dust Emission Magnitudes	Justification
Demolition	n/a	No demolition work is required for the development.
Earthworks	large	the site area is >10,000 m²
Construction	large	total building volume to be constructed is >100,000 m³
Trackout	large	there are likely to be >50 HDV outward movements in any one day

Step 2B Sensitivity of the Receptors to Dust Soiling and Health Effects

- 7.3.3 Human receptors are located in residential houses adjacent to the site within a distance of <20m from construction, demolition and earthworks and 20 m of road edges used by traffic associated with the site construction. In accordance with the criteria in **Table 2** in **Appendix E** and the IAQM guidance, the sensitivity of human receptors to the effects of dust soiling and health effects from construction, earthwork activities, and from trackout is therefore likely to be **high**.

Step 2B Sensitivity of the Area to Dust Soiling

- 7.3.4 The sensitivity of the area to dust soiling effects has been determined using the criteria detailed in **Table 3** in **Appendix E**:

- Demolition – n/a;
- Earthworks - sensitivity is considered to be **high** as earthworks activities take place <20m of 10 - 100 high sensitivity receptors;
- Construction - sensitivity is considered to be **high** as construction activities take place <20m of 10 - 100 high sensitivity receptors; and
- Trackout activities – sensitivity is considered to be **high** as there are 10 - 100 high sensitivity receptors within 20 metres of roads which relevant vehicles are likely to use that are up to 500 metres from the site.

Step 2B Sensitivity of People to the Health Effects of PM₁₀

- 7.3.5 The background PM₁₀ concentrations for 2018, 2023 and 2028 'without development' are shown in **Table 5**.
- 7.3.6 Local levels of PM₁₀ are therefore likely to be <24 µg/m³, during the construction phase.
- 7.3.7 Using this information and **Table 4** in **Appendix E**, the sensitivity of human receptors to health impacts from dust and PM₁₀ for each activity were defined as:
- Demolition - n/a;
 - Earthworks - sensitivity is considered to be **low** as earthworks activities take place <20m from 10 - 100 high sensitivity receptors and the background PM₁₀ concentration is predicted to be <24 µg/m³;
 - Construction - sensitivity is considered to be **low** as construction activities take place <20m from 10 - 100 high sensitivity receptors and the background PM₁₀ concentration is predicted to be <24 µg/m³; and

- Trackout activities – sensitivity is considered to be **low** as there are 10 - 100 high sensitivity receptors within 20 metres of roads which relevant vehicles are likely to use that are up to 500 metres from the site, and the background PM₁₀ concentration is predicted to be <24 µg/m³.

7.3.8 The sensitivity of the area to dust soiling and human health in each activity is summarised in **Table 7**.

Table 7: Outcome of Defining the Sensitivity of the Area

Potential Impact	Sensitivity of the Surrounding Area			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	n/a	high	high	high
Human Health	n/a	low	low	low

Step 2C Risk of Impacts

7.3.9 The dust emission magnitude and sensitivity of the area were combined and the risk of impacts determined using the criteria detailed in **Table 5** to **Table 8** in **Appendix E**.

- Demolition – n/a;
- Earthworks – is considered to be **high** risk for dust soiling and **low** risk for human health;
- Construction – is considered to be **high** risk for dust soiling and **low** risk for human health; and
- Trackout activities – is considered to be **high** risk for dust soiling and **low** risk for human health.

7.3.10 A summary of the risks, before mitigation measures are applied, for dust soiling and human health are shown in **Table 8**.

Table 8: Risk of Dust Impacts

Potential Impact	Dust Risk			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	n/a	high	high	high
Human Health	n/a	low	low	low

7.4 Step 3 – Site-Specific Mitigation

7.4.1 Step 3 of the IAQM guidance identifies appropriate site-specific mitigation. These measures are related to the site risk for each activity. Good practice mitigation measures highly recommended for the proposed development taken from the IAQM guidance are detailed below.

7.4.2 The general mitigation measures (for site management, preparing and maintaining the site, operating vehicle/machinery, operations and waste management), are appropriate for a site with a 'high risk' classification

(in this instance the site is classified as “high” risk due to earthworks, construction and trackout)⁸. Mitigation measures specific to earthworks, construction and trackout are proposed based on the risk classifications in **Table 8**.

7.4.3 Recommended mitigation measures are shown in **Appendix G**.

7.5 Step 4 – Determine Significant Effects

7.5.1 The characteristics of the site and the surrounding area suggest that mitigation would not be impracticable or ineffective. With the implementation of the above mitigation measures, therefore, the residual impacts from the construction are considered to be not significant, in accordance with IAQM guidance.

8 Road Traffic Assessment

8.1 Existing Receptor Locations

8.1.1 Existing sensitive receptor locations were identified within the study area for consideration in the assessment. Predicted changes in NO₂ and PM₁₀ concentrations, as a result of development-generated traffic, were calculated at these locations. The sensitive receptor locations are detailed in **Table 9** and **Appendix H**.

Table 9: Sensitive Receptor Locations

Receptor	Grid Ref	
R1	335843	351789
R2	335618	351637
R3	335112	351254
R4	335397	352160

8.2 Model Verification

8.2.1 Monitoring is undertaken by WCBC at two monitoring sites within 2 km of the site using diffusion tubes as shown in **Appendix D**. Concentrations of NO₂ at these sites were predicted for use in the verification process as detailed in **Table 10**.

8.2.2 No adjustment of the model is required. A comparison of modelled total NO₂ and monitored total NO₂ suggests that the adjusted model is performing very well, as modelled and monitored concentrations are within 10% of each other.

8.2.3 There is no PM₁₀ monitoring undertaken within the study area, therefore it was not possible to undertake verification of PM₁₀ concentrations.

⁸ For those mitigation measures that are general, the highest risk category should be applied. For example, if the site is medium risk for earthworks and construction, but a high risk for demolition and track-out, the general measures applicable to a high risk site should be applied.

Table 10: NO₂ Model Verification Procedure

Monitor	2018 Monitored Total NO ₂	2018 Monitored Road NO _x	2018 Background NO ₂	2018 Background NO _x	Monitored Road Contribution NO ₂ (total - background)	Modelled Road Contribution NO _x (excludes background)	Ratio of Monitored Road Contribution NO _x / Modelled Road Contribution NO _x	Adjustment Factor	Adjusted Road Contribution NO _x	Adjusted Modelled Total Nox (including background NO _x)	Modelled Total NO ₂ (based on empirical NO _x / NO ₂ relationship)	% Difference [(modelled - monitored) / monitored] x 100
WBC-021	18.8	17.42	9.43	12.3	9.4	19.4	0.899	0.80	15.5	27.8	17.8	-5.3
WBC-042	23.2	26.86	9.02	11.7	14.2	38.9	0.691	0.80	31.1	42.8	25.29	9.0

8.3 Baseline Assessment

- 8.3.1 The ADMS model was used to estimate contributions of vehicle exhaust emissions to annual and short term NO₂ and PM₁₀ concentrations for the 'baseline' and 'without development' scenarios considered in the assessment.
- 8.3.2 The 24-hour AADT flows used in the assessment for 'without development' scenarios are detailed in **Appendix C. Table 11** details the results of the baseline assessment.

Table 11: Predicted Baseline NO₂ and PM₁₀ Annual Mean Concentrations (µg/m³) at Sensitive Receptor Locations

Receptor	Receptor Height above Ground Level (m)	Base Year (2018)		2023 Without Development		2028 Without Development	
		NO ₂ (µg/m ³)	PM ₁₀ (µg/m ³)	NO ₂ (µg/m ³)	PM ₁₀ (µg/m ³)	NO ₂ (µg/m ³)	PM ₁₀ (µg/m ³)
WBC-021	1.6	17.80	12.48	13.81	12.09	10.70	11.77
WBC-042	1.6	25.29	13.58	19.25	11.90	15.21	11.59
R1	1.5	13.00	12.62	10.22	11.79	8.43	11.50
R2	1.5	15.53	12.90	11.88	12.04	9.46	11.74
R3	1.5	17.89	12.40	13.70	12.33	10.61	12.03
R4	1.5	20.06	0.88	15.24	11.46	12.24	11.16
Annual Mean NO ₂ & PM ₁₀ Air Quality Objective						40 (µg/m ³)	

- 8.3.3 The baseline air quality assessment for the base year (2018) and 'without development' 2023 and 2028 scenarios show that concentrations of NO₂ and PM₁₀ are below the respective annual mean air quality Objective of 40 µg/m³ at all receptors for all 'without development' scenarios.
- 8.3.4 In accordance with Defra guidance¹, it may be assumed that exceedances of the 1-hour mean Objective for NO₂ are unlikely as the predicted annual mean concentrations are less than 60 µg/m³. The short term PM₁₀ Objective is predicted to be met at all identified receptor locations with no exceedances of the daily mean Objective of 50 µg/m³.

8.4 2023 Impact Assessment

- 8.4.1 Predicted NO₂ and PM₁₀ concentrations for the 2023 'with development' scenario are detailed in **Table 12**. Predicted concentrations for 'without development' scenario and the predicted change in NO₂ and PM₁₀ concentrations, as a result of the proposed development, are also shown for comparison purposes.
- 8.4.2 Changes in predicted pollutant concentrations between the 'without development' scenario and the 'with development' scenario were compared to the significance criteria detailed in EPUK and IAQM guidance⁶ and contained within **Table 3**.

Table 12: Dispersion Modelling Results and Significance of Development for 2023 Scenario at Existing Receptor Locations

Receptor	Difference in 2023 without and with development	Annual average NO ₂ (µg/m³)	Significance	Annual average PM ₁₀ (µg/m³)	Significance
WBC-021	Without Development	13.81	Negligible	12.09	Negligible
	With Development	14.17		12.15	
	% Change relative to AQAL & (Impact)	0.9(+0.36)		0.15(+0.06)	
	% of AQAL with Development	35		30	
WBC-042	Without Development	19.25	Negligible	11.90	Negligible
	With Development	20.24		12.01	
	% Change relative to AQAL & (Impact)	2.48(+0.99)		0.27(+0.11)	
	% of AQAL with Development	51		30	
R1	Without Development	10.22	Negligible	11.79	Negligible
	With Development	10.48		11.83	
	% Change relative to AQAL & (Impact)	0.65(+0.26)		0.1 (+0.04)	
	% of AQAL with Development	26		30	
R2	Without Development	11.88	Negligible	12.04	Negligible
	With Development	12.31		12.09	
	% Change relative to AQAL & (Impact)	1.08 (+0.43)		0.13 (+0.05)	
	% of AQAL with Development	31		30	
R3	Without Development	13.70	Negligible	12.33	Negligible
	With Development	14.18		12.39	
	% Change relative to AQAL & (Impact)	1.2 (+0.48)		0.15 (+0.06)	
	% of AQAL with Development	35		31	
R4	Without Development	15.24	Negligible	11.46	Negligible
	With Development	15.93		11.53	
	% Change relative to AQAL & (Impact)	1.73(+0.69)		0.17 (+0.07)	
	% of AQAL with Development	40		29	
AQAL: Annual Mean NO ₂ & PM ₁₀ Air Quality Objective (µg/m³)				40	

8.4.3 All receptors are expected to have an increase of less than 0.99 µg/m³ for both NO₂ and PM₁₀.

8.4.4 The results of the ADMS modelling assessment for 2023 indicate that annual mean concentrations of NO₂ and PM₁₀ would be below the respective annual objectives in 2023, at all existing sensitive receptor locations within the study area, both 'with' and 'without' the development.

8.4.5 In accordance with Defra guidance¹, it may be assumed that exceedances of the 1-hour mean objective for NO₂ are unlikely as the predicted annual mean concentrations are less than 60 µg/m³. The 24-hour PM₁₀ objective of 50 µg/m³ is predicted to be met at all modelled locations.

8.4.6 Predicted annual mean NO₂ and PM₁₀ concentrations in the 'with development' scenario are all 51% or less of the AQAL. It is likely that concentrations predicted at individual receptor locations are also worst-case scenario as they have been chosen due to being close to the main junctions used by the development traffic. The proposed development is therefore predicted to have a **negligible** impact on concentrations of NO₂ and PM₁₀ in 2023.

8.5 2028 Impact Assessment

8.5.1 Predicted NO₂ and PM₁₀ concentrations for 2028 'with development' scenario are detailed in **Table 12**. Predicted concentrations for 'without development' scenario and the predicted change in NO₂, and PM₁₀ concentrations, as a result of the proposed development, are also shown for comparison purposes.

8.5.2 Changes in predicted pollutant concentrations between the 'without development' scenario and the 'with development' scenario were compared to the significance criteria detailed in EPUK and IAQM guidance⁶ and contained within **Table 3**.

Table 13: Dispersion Modelling Results and Significance of Development for the 2028 Scenario at Existing Receptor Locations

Receptor	Difference in 2028 without and with development	Annual average NO ₂ (µg/m ³)	Significance	Annual average PM ₁₀ (µg/m ³)	Significance
WBC-021	Without Development	10.70	Negligible	11.77	Negligible
	With Development	11.31		11.93	
	% Change relative to AQAL & (Impact)	1.53(+0.61)		0.4(+0.16)	
	% of AQAL with Development	28		30	
WBC-042	Without Development	15.21	Negligible	11.59	Negligible
	With Development	16.76		11.78	
	% Change relative to AQAL & (Impact)	3.88(+1.55)		0.47(+0.19)	
	% of AQAL with Development	42		29	
R1	Without Development	8.43	Negligible	11.50	Negligible
	With Development	8.76		11.56	
	% Change relative to AQAL & (Impact)	0.83(+0.33)		0.15(+0.06)	
	% of AQAL with Development	22		29	
R2	Without Development	9.46	Negligible	11.74	Negligible
	With Development	9.64		11.77	
	% Change relative to AQAL & (Impact)	0.45(+0.18)		0.07(+0.03)	
	% of AQAL with Development	24		29	
R3	Without Development	10.61	Negligible	12.03	Negligible
	With Development	10.91		12.10	
	% Change relative to AQAL & (Impact)	0.75(+0.3)		0.18(+0.07)	
	% of AQAL with Development	27		30	

Receptor	Difference in 2028 without and with development	Annual average NO ₂ (µg/m³)	Significance	Annual average PM ₁₀ (µg/m³)	Significance
R4	Without Development	12.24	Negligible	11.16	Negligible
	With Development	13.36		11.30	
	% Change relative to AQAL & (Impact)	2.8(+1.12)		0.35(+0.14)	
	% of AQAL with Development	33		28	
AQAL: Annual Mean NO ₂ & PM ₁₀ Air Quality Objective (µg/m³)				40	

8.5.3 All receptors are expected to have an increase of less than 1.55 µg/m³ for both NO₂ and PM₁₀.

8.5.4 The results of the ADMS modelling assessment for 2028 indicate that annual mean concentrations of NO₂ and PM₁₀ would be below the respective annual objectives in 2028, at all existing sensitive receptor locations within the study area, both 'with' and 'without' the development.

8.5.5 In accordance with Defra guidance¹, it may be assumed that exceedances of the 1-hour mean objective for NO₂ are unlikely as the predicted annual mean concentrations are less than 60 µg/m³. The 24-hour PM₁₀ objective of 50 µg/m³ is predicted to be met at all modelled locations.

8.5.6 Predicted annual mean NO₂ and PM₁₀ concentrations in the 'with development' scenario are all 42% or less of the AQAL. It is likely that concentrations predicted at individual receptor locations are also worst-case scenario as they have been chosen due to being close to the main junctions used by the development. The proposed development is therefore predicted to have a **negligible** impact on concentrations of NO₂ and PM₁₀ in 2028.

8.6 Road Traffic Mitigation Measures

8.6.1 The detailed air dispersion modelling undertaken indicates that vehicle exhaust emissions associated with traffic generated by the development will have a negligible impact on local air quality at all receptor locations. Annual mean concentrations of NO₂ and PM₁₀ are predicted to be below the respective objectives in 2023 and 2028 at proposed residential receptors. No specific mitigation is therefore proposed. However, in order to future-proof the development, infrastructure to enable electric vehicle charging points to be easily installed is recommended within the development.

9 Summary of Impacts and Conclusion

9.1 A road traffic emissions assessment was undertaken to consider the impact of vehicle exhaust emissions associated with the proposed residential development, on identified receptor locations within the study area.

9.2 The assessment considered whether the proposed development could significantly change air quality during the construction phase. With the implementation of mitigation measures the dust impacts from the construction are considered to be not significant, in accordance with IAQM guidance.

9.3 Annual concentrations of NO₂ and PM₁₀ were predicted to be well below the respective air quality objectives for both 'without development' and 'with development' scenarios in 2023 and 2028 at all modelled receptor

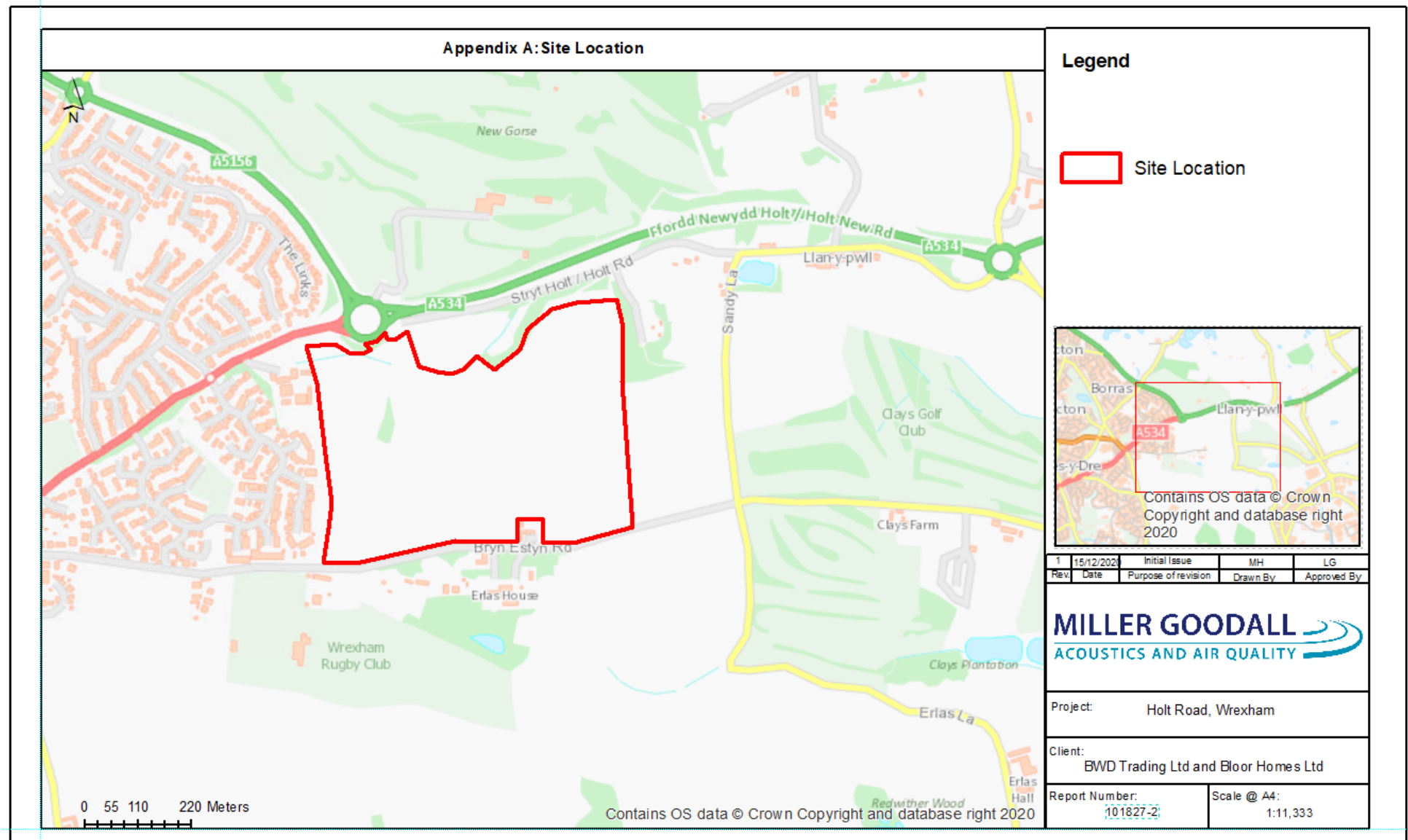
locations. Predicted annual mean NO₂ and PM₁₀ concentrations in the 'with development' scenario are all 51% or less of the AQAL.

- 9.4 No exceedance of the short term 1-hour NO₂ and 24-hour PM₁₀ air quality objectives were predicted at sensitive receptor locations.
- 9.5 In accordance with EPUK and IAQM guidance on air quality significance criteria, the local air quality impact of emissions from traffic associated with the proposed development on the road network surrounding the site is predicted to be *negligible*.
- 9.6 The suitability of the site for residential receptors with regards to air quality was also considered. The results of the dispersion modelling assessment indicate that annual mean and short-term concentrations of NO₂ and PM₁₀ would be below the respective objectives in 2023 and 2028 at proposed residential receptors with the development in place.
- 9.7 There is, therefore no reason for this application to be refused on the ground of air quality.

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APPENDICES

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Appendix B: Site Parameters Plan

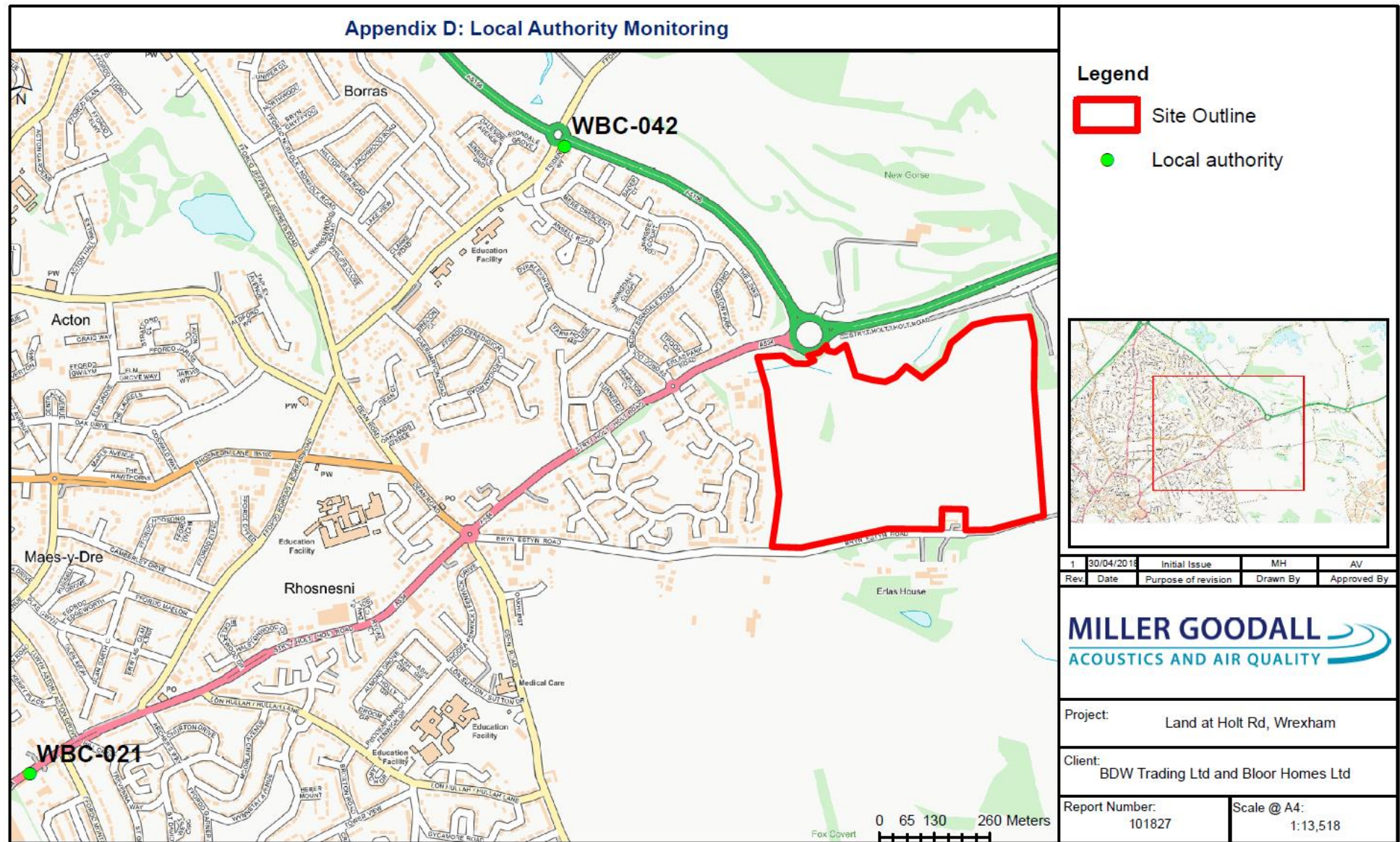


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Appendix C: Traffic Data used in the Air Quality Assessment

Link	Road	2018 Base Year/Verification		2023 Without Development		2023 With Development		2028 Without Development		2028 With Development	
		Hourly LGV	Hourly HGV	Hourly LGV	Hourly LGV	Hourly HGV	Hourly LGV	Hourly HGV	Hourly HGV	Hourly LGV	Hourly HGV
1 -	Holt Rd (East of Site Access)	951	72	992	75	1,111	84	995	75	1,227	92
2 -	A5156 (North of Site Access)	962	84	991	86	1,081	94	1,004	87	1,203	105
3 -	Borras Road	40	1	41	0	41	0	41	0	41	0
4 -	A5156 (North of Roundabout)	1,033	78	1,076	81	1,174	88	1,089	82	1,303	98
5 -	Borras Park Road	252	3	248	8	264	8	253	8	236	7
6 -	Holt Road (West of Site Access)	509	16	523	16	580	18	525	16	583	18
7 -	Birkdale Road	83	1	83	0	83	0	83	0	83	0
8 -	Cilgant Sant Mellion	56	0	56	0	56	0	56	0	56	0
9 -	Holt Road (East of Dean Road)	538	17	547	17	600	19	549	17	507	16
10 -	Dean Road	300	6	312	6	328	7	320	7	365	7
11 -	Bryn Estyn Road	49	1	49	1	49	1	49	1	49	1
12 -	Cefn Road	329	10	330	10	381	12	336	10	303	9
13 -	Holt Road (West of Dean Road)	425	9	455	9	476	10	451	9	499	10
14 -	Holt Road (West of Archer's Way)	610	12	640	13	677	14	630	13	738	15

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Appendix E: Dust Risk Assessment Methodology

The following section outlines criteria developed by the IAQM for the assessment of air quality impacts arising from construction and demolition activities⁴. The assessment procedure is divided into four steps and is summarised below:

Step 1: Screen the Need for a Detailed Assessment

An assessment will normally be required where there are human receptors within 350 m of the site boundary and/or within 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance(s). Ecological receptors within 50 m of the site boundary or within 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance(s), are also identified at this stage. An ecological receptor refers to any sensitive habitat affected by dust soiling. For locations with a statutory designation, such as a Site of Specific Scientific Interest (SSSI), Special Area of Conservation (SACs) and Special Protection Areas (SPAs), consideration should be given as to whether the particular site is sensitive to dust. Some non-statutory sites may also be considered if appropriate.

Where the need for a more detailed assessment is screened out, it can be concluded that the level of risk is 'negligible' and any effects will not be significant.

Step 2: Assess the Risk of Dust Impacts

In step two, a site is allocated to a risk category on the basis of the scale and nature of the works (Step 2A) and the sensitivity of the area to dust impacts (Step 2B). These two factors are combined in Step 2C to determine the risk of dust impacts before the implementation of mitigation measures. The assigned risk categories may be different for each of the construction activities outlined by the IAQM (construction, demolition, earthworks and trackout). A site can be divided into zones, for example on a large site where there are differing distances to the nearest receptors.

Step 2A: Define the Potential Dust Emission Magnitude

Dust emission magnitude is based on the scale of the anticipated works and is classified as Small, Medium or Large. The IAQM guidance recommends that the dust emission magnitude is determined separately for demolition, earthworks, construction and trackout. **Table 1** describes the potential dust emission class criteria for each outlined activity.

Table 1: Criteria Used in the Determination of Dust Emission Magnitude

Activity	Criteria used to Determine Dust Emission Magnitude		
	Small	Medium	Large
Demolition	Total building volume <20,000 m ³ , construction materials with low potential for dust release.	Total building volume 20,000 m ³ – 50,000 m ³ , potential dusty construction material.	Total building volume >50,000 m ³ , potentially dusty construction material.
Earthworks	Total site area <2,500 m ² , soil type with large grain	Total site area 2,500 – 10,000 m ² , moderately dusty soil type	Total site area >10,000 m ² , potentially dusty soil type
Construction	Total building volume <25,000 m ³ .	Total building volume 25,000 – 100,000 m ³ .	Total building volume >100,000 m ³ .
Trackout	<10 outward HDV trips in any one day. Unpaved road length <50 m.	10-50 outward HDV trips in any one day. Unpaved road length 50-100 m.	>50 outward HDV trips in any one day. Unpaved road length >100 m.

Step 2B: Define the Sensitivity of the Area

The sensitivity of the area takes into account the following factors:

- the specific sensitivities of receptors in the area;
- the proximity and number of receptors;
- the local background PM₁₀ concentration; and
- site-specific factors, such as whether there are natural shelters, such as trees, to reduce the risk of windblown dust.

The criteria detailed in **Table 2** is used to determine the sensitivity of the receptor in relation to dust soiling, health effects and ecological effects.

Table 2: Criteria for Determining Sensitivity of Receptors

Sensitivity of Receptor	Criteria for Determining Sensitivity		
	Dust Soiling Effects	Health Effects of PM ₁₀	Ecological Sites
High	Dwellings, museums and other culturally important collections, medium and long-term car parks and car showrooms	Residential properties, hospitals, schools and residential care homes	International or national designation <i>and</i> the features may be affected by dust soiling
Medium	Parks, places of work	Office and shop workers not occupationally exposed to PM ₁₀	Presence of an important plant species where dust sensitivity is uncertain or locations with a national designation with features that may be affected by dust deposition
Low	Playing fields, farmland, footpaths, short-term car parks and roads	Public footpaths, playing fields, parks and shopping streets	Local designation where features may be affected by dust deposition

Table 3 and **Table 4** are then used to define the sensitivity of the area to dust soiling and human health effects. This should be derived for each of construction, demolition, earthworks and trackout.

Table 3: Sensitivity of the Area to Dust Soiling Effects on People and Property.

Receptor Sensitivity	Number of Receptors	Distance from Source (m)*			
		<20	<50	<100	<350
High	>100	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

*distances considered are to the dust source

Table 4: Sensitivity of the Area to Human Health Impacts

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

The sensitivity of the area is then summarised.

Step 2C Define the Risks of Impacts

The dust emission magnitude from **Table 1** and sensitivity of the area and receptors from **Table 2**, **Table 3** and **Table 4** are combined, and the risk of impacts from each activity (demolition, earthworks, construction and trackout) before mitigation is applied, is determined using the criteria detailed in **Table 5** to **Table 8**.

Table 5: Risk of Dust Impacts - Demolition

Dust Emission Magnitude

Potential Impact Sensitivity of the Area	Large	Medium	Small
High	High Risk	Medium Risk	Medium Risk
Medium	High Risk	Medium Risk	Low Risk
Low	Medium Risk	Low Risk	Negligible

Table 6: Risk of Dust Impacts- Earthworks

Potential Impact Sensitivity of the Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Table 7: Risk of Dust Impacts- Construction

Potential Impact Sensitivity of the Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Table 8: Risk of Dust Impacts- Trackout

Potential Impact Sensitivity of the Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Low Risk	Negligible
Low	Low Risk	Low Risk	Negligible

Step 3 Determine Site Specific Mitigation

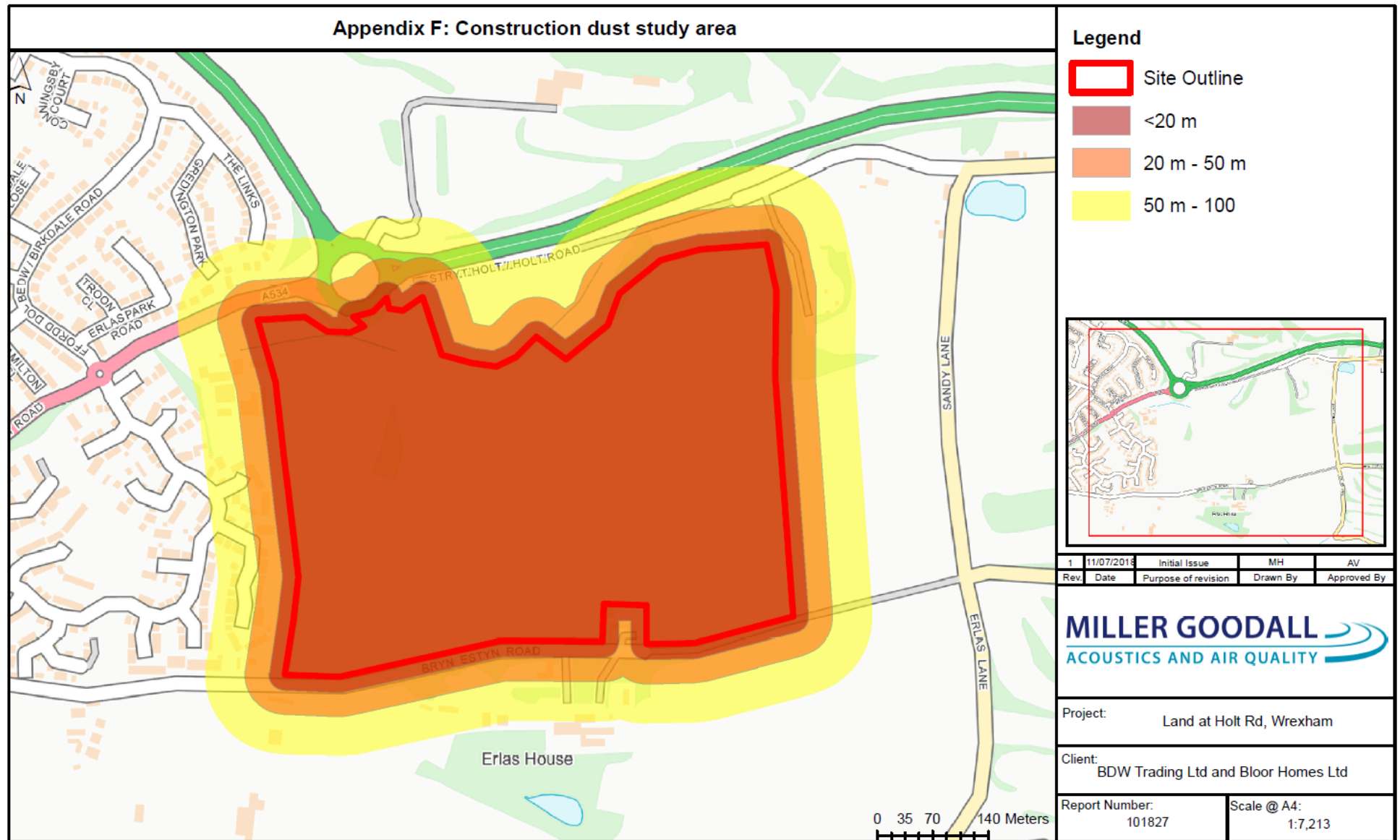
Step three of the IAQM guidance identifies appropriate site-specific mitigation. These measures are related to whether the site is a low, medium or high risk site.

Step 4 Determine Significance of Residual Effects

At step four the significance of residual effects is assessed. For almost all construction activity, the aim should be to prevent significant effects on receptors through the use of effective mitigation. Experience shows that this is normally possible. Hence the residual effect will normally be 'not significant'.

There may be cases where, for example, there is inadequate access to water for dust suppression to be effective, and even with other mitigation measures in place there may be a significant effect. Therefore, it is important to consider the specific characteristics of the site and the surrounding area to ensure that a conclusion of no significant effect is robust.

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Appendix G: Dust Assessment Mitigation

xx Highly Recommended

x Desirable

Measures relevant for demolition, earthworks, construction and trackout.

Mitigation Measure	High Risk
Communications	
Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.	xx
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.	xx
Display the head or regional office contact information.	xx
Develop and implement a Dust Management Plan (DMP).	xx
Site management	
Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.	xx
Make the complaints log available to the local authority when asked.	xx
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.	xx
Hold regular liaison meetings with other high risk construction sites within 500 m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/ deliveries which might be using the same strategic road network routes.	xx
Monitoring	
Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100 m of site boundary, with cleaning to be provided if necessary.	xx
Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked.	xx
Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.	xx
If requested by the Local Authority: Agree dust deposition, dust flux, or real-time PM ₁₀ continuous monitoring locations with the Local Authority; where possible commence baseline monitoring at least three months before work commences on site or, if it a large site, before work on a phase commences. Further guidance is provided by IAQM on monitoring during demolition, earthworks and construction.	xx
Preparing and maintaining the site	
Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.	xx

Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.	xx
Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period.	xx
Avoid site runoff of water or mud.	xx
Keep site fencing, barriers and scaffolding clean using wet methods.	xx
Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below.	xx
Cover, seed or fence stockpiles to prevent wind whipping.	xx
Operating vehicle/machinery and sustainable travel	
Ensure all on-road vehicles comply with the requirements of the London Low Emission Zone and the London NRMM standards, where applicable.	xx
Ensure all vehicles switch off engines when stationary - no idling vehicles.	xx
Avoid the use of diesel or petrol-powered generators and use mains electricity or battery powered equipment where practicable.	xx
Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate).	xx
Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.	xx
Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).	xx
Operations	
Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.	xx
Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.	xx
Use enclosed chutes and conveyors and covered skips.	xx
Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.	xx
Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.	xx
Waste management	
Avoid bonfires and burning of waste materials.	xx

Measures specific to earthworks.

Mitigation Measure	High Risk
Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.	xx
Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable.	xx
Only remove the cover in small areas during work and not all at once.	xx

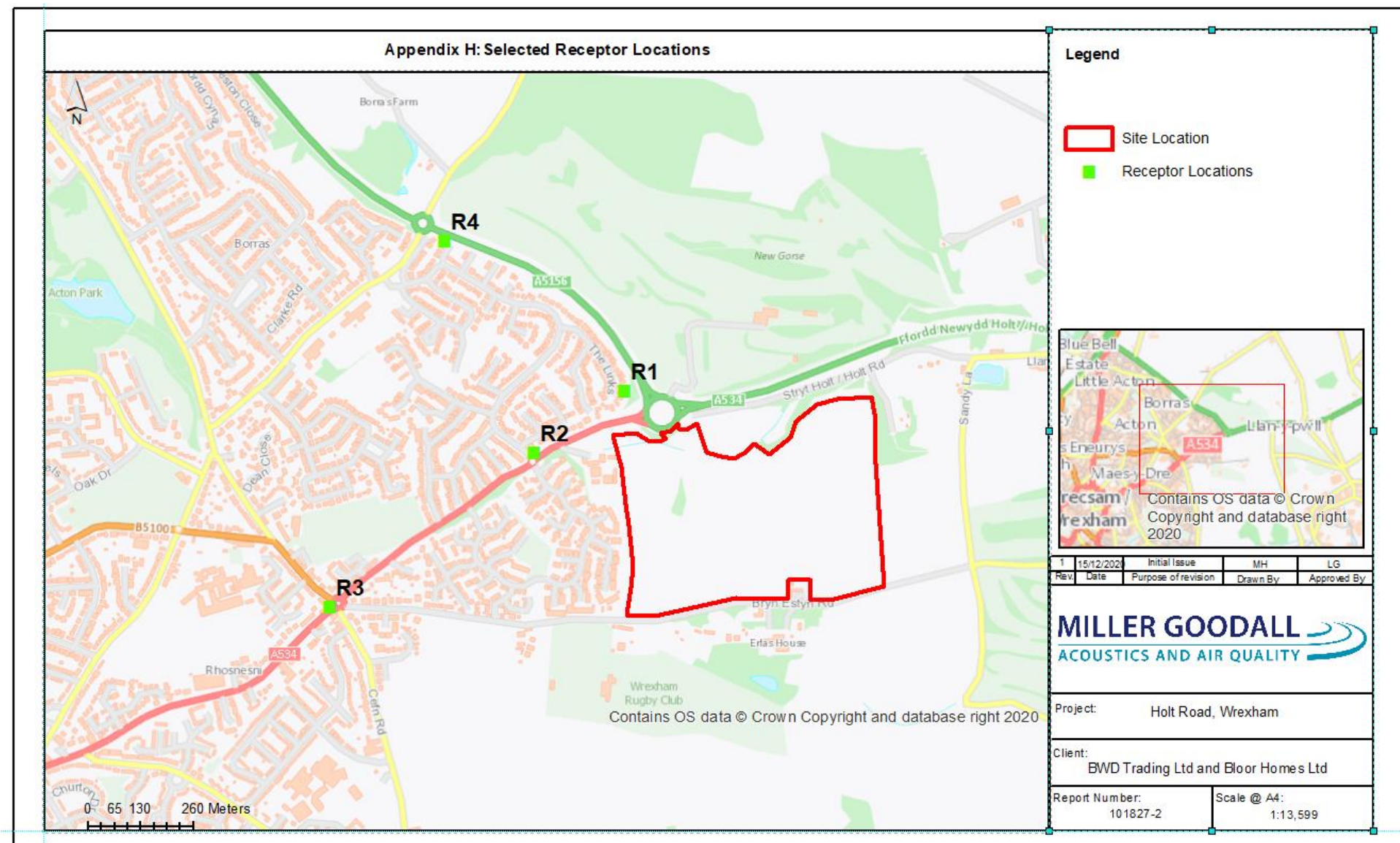
Measures specific to construction.

Mitigation Measure	High Risk
Avoid scabbling (roughening of concrete surfaces) if possible.	xx
Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.	xx
Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.	xx

Measures specific to trackout.

Mitigation Measure	High Risk
Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use.	xx
Avoid dry sweeping of large areas.	xx
Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.	xx
Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable	xx
Record all inspections of haul routes and any subsequent action in a site log book.	xx
Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.	xx
Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).	xx
Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.	xx
Access gates to be located at least 10 m from receptors where possible.	xx

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Glossary of Terms

AADT Annual Average Daily Traffic flow

Air Quality Standard Pollutant standards relate to ambient pollutant concentrations in air, set on the basis of medical and scientific evidence of how each pollutant affects human health and the environment

Air Quality Objective Pollutant Objectives incorporate future dates by which a standard is to be achieved, taking into account economic considerations, practicability and technical feasibility

Annual Mean A mean pollutant concentration value in air which is calculated on a yearly basis, yielding one annual mean per calendar year. In the UK air quality regulations, the annual mean for a particular substance at a particular location for a particular calendar year is:

- (a) in the case of lead, the mean of the daily levels for that year;
- (b) in the case of nitrogen dioxide, the mean of the hourly means for that year;
- (c) in the case of PM₁₀, the mean of the 24-hour means for that year.

Annoyance (Dust) Loss of amenity due to dust deposition or visible dust plumes, often related to people making complaints, but not necessarily sufficient to be a legal nuisance.

AQAP Air Quality Action Plan

AQEG Air Quality Expert Group

AQMA Air Quality Management Area

AQMP Air Quality Management Plan

AQO Air Quality Objective

AQS Air Quality Strategy for England, Scotland, Wales and Northern Ireland

Background Concentrations The term used to describe pollutant concentrations which exist in the ambient atmosphere, excluding local pollution sources such as roads and stacks

CO Carbon monoxide

Construction Any activity involved with the provision of a new structure (or structures), its modification or refurbishment. A structure will include a residential dwelling, office building, retail outlet, road, etc.

Construction Impact Assessment An assessment of the impacts of demolition, earthworks, construction and trackout. In this Guidance, specifically the air quality impacts.

Defra Department for Environment, Food and Rural Affairs

Demolition Any activity involved with the removal of an existing structure (or structures). This may also be referred to as de-construction, specifically when a building is to be removed a small part at a time.

Deposited Dust that is no longer in the air and which has settled onto a surface. Deposited dust is also sometimes called amenity dust or nuisance dust, with the term nuisance applied in the general sense rather than the specific legal definition.

DMRB Design Manual for Roads and Bridges

DMP Dust Management Plan; a document that describes the site-specific methods to be used to control dust emissions.

Dust Solid particles that are suspended in air, or have settled out onto a surface after having been suspended in air. The terms dust and particulate matter (PM) are often used interchangeably, although in some contexts one term tends to be used in preference to the other. In this guidance the term 'dust' has been used to include the particles that give rise to soiling, and to other human health and ecological effects. Note: this is different to the definition given in BS 6069, where dust refers to particles up to 75 µm in diameter.

Earthworks Covers the processes of soil-stripping, ground-levelling, excavation and landscaping.

Effects The consequences of the changes in airborne concentration and/or dust deposition for a receptor. These might manifest as annoyance due to soiling, increased morbidity or mortality due to exposure to PM₁₀ or PM_{2.5} or plant dieback due to reduced photosynthesis. The term 'significant effect' has a specific meaning in EIA regulations. The opposite is an insignificant effect. In the context of construction impacts any effect will usually be adverse, however, professional judgement is required to determine whether this adverse effect is significant based in the evidence presented.

EPAQS Expert Panel on Air Quality Standards

EPUK Environmental Protection UK

HGV Heavy Goods Vehicle

Impacts The changes in airborne concentrations and/or dust deposition. A scheme can have an 'impact' on airborne dust without having any 'effects', for instance if there are no receptors to experience the impact.

LAQM Local Air Quality Management

LDF Local Development Framework

LGV Light Goods Vehicle

Mg/m³ Microgrammes (of pollutant) per cubic metre of air. A measure of concentration in terms of mass per unit volume. A concentration of 1 µg/m³ means that one cubic metre of air contains one microgramme (millionth of a gramme) of pollutant

NO₂ Nitrogen Dioxide

NO_x A collective term used to represent the mixture of nitrogen oxides in the atmosphere, as nitric oxide (NO) and nitrogen dioxide (NO₂)

NPPF National Planning Policy Framework

Nuisance The term nuisance dust is often used in a general sense when describing amenity dust. However, this term also has specific meanings in environmental law:

Statutory nuisance, as defined in S79(1) of the Environmental Protection Act 1990 (as amended from time to time).

Private nuisance, arising from substantial interference with a person's enjoyment and use of his land.

Public nuisance, arising from an act or omission that obstructs, damages or inconveniences the right of the community.

Each of these applying in so far as the nuisance relates to the unacceptable effects of emissions. It is recognised that a significant loss of amenity may occur at lower levels of emission than would constitute a statutory nuisance.

Note: as nuisance has a specific meaning in environmental law, and to avoid confusion, it is recommended that the term is not used in a more general sense.

PM_{2.5} The fraction of particles with a mean aerodynamic diameter equal to, or less than, 2.5 µm. More strictly, particulate matter which passes through a size selective inlet as defined in the reference method for the sampling and measurement of PM_{2.5}, EN 14907, with a 50% efficiency cut-off at 2.5 µm aerodynamic diameter

PM₁₀ The fraction of particles with a mean aerodynamic diameter equal to, or less than, 10 µm. More strictly, particulate matter which passes through a size selective inlet as defined in the reference method for the sampling and measurement of PM₁₀, EN 12341, with a 50% efficiency cut-off at 10 µm aerodynamic diameter

RSS Regional Spatial Strategy

Running Annual Mean A mean pollutant concentration value in air which is calculated on an hourly basis, yielding one running annual mean per hour. The running annual mean for a particular substance at a particular location for a particular hour is the mean of the hourly levels for that substance at that location for that hour and the preceding 8759 hours

Trackout The transport of dust and dirt from the construction/demolition site onto the public road network, where it may be deposited and then re-suspended by vehicles using the network. This arises when heavy duty vehicles (HDVs) leave the construction/demolition site with dusty materials, which may then spill onto the road, and/or when HDVs transfer dust and dirt onto the road having travelled over muddy ground on site.

