



## AIR QUALITY ASSESSMENT

on behalf of

**APPLETHWAITE LTD**

for

**LAND OFF CLITHEROE ROAD, WHALLEY,  
LANCASHIRE BB7 9AQ**

**REPORT DATE: 14TH JUNE 2019**

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# Summary

This air quality report is submitted in support of a planning application for a proposed mixed-use development of approximately 48 residential bungalows, 64 bed two storey care home and a number of commercial buildings located on the land off Clitheroe Road, Whalley, Lancashire BB7 9AQ.

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.

This report provides a 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. The suitability of the site for residential use in terms of air quality is also considered. The development is also deemed suitable for commercial use as it is unlikely to be exposed to NO<sub>2</sub> and PM<sub>10</sub> concentrations above the relevant short-term objectives.


Annual and short-term concentrations of NO<sub>2</sub> and PM<sub>10</sub> are predicted to be below the respective air quality objectives for both 'without development' and 'with development' scenarios in 2024 (the opening year of the development) 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

14th June 2019

Date

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### Record of changes

Version	Date	Change	Initials
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# 1 Introduction

- 1.1 This air quality report is submitted in support of a hybrid planning application for a mixed-use development located on the land off Clitheroe Road, Whalley, Lancashire BB7 9AQ. The site lies within the administrative boundary of Ribble Valley Borough Council (RVBC).
- 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, in accordance with Local Air Quality Management Technical Guidance<sup>1</sup>.
- 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 (NO<sub>2</sub>) and fine particulates – normally assessed as the fraction of airborne particles of mean aerodynamic diameter less than ten micrometres (PM<sub>10</sub>), 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 NO<sub>2</sub> and PM<sub>10</sub>.

# 2 Site Description

- 2.1 The site is located on land off Clitheroe Road, approximately 900 m to the north east of Whalley village centre.
- 2.2 To north of the site there are residential dwellings and fields. The A59 and A671 roundabout is to the east of the site. The A59 runs along the southern site boundary; there is also a residential dwelling to the south of the site. Clitheroe Road runs along the western site boundary.
- 2.3 The site does not lie within an air quality management area (AQMA); the nearest AQMA is located approximately almost 4 km away in Clitheroe. The site location is shown in **Appendix A**.

# 3 Proposed Development

- 3.1 The proposed development consists of approximately 48 residential bungalows, 64 bed two storey care home and a Costa Drive Thru within the commercial development plus an outline application for further commercial comprising serviced plots for a Petrol Filling Station and employment space on both the northern and southern plots, providing approximately 40,000 sq. ft of space overall. **Appendix B** shows the proposed site layout.

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<sup>1</sup> 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 standards and objectives relevant to the LAQM framework have been prescribed through the Air Quality (England) Regulations (2000) and the Air Quality (England) (Amendment) Regulations 2002; the Air Quality Standards Regulations 2010 set out the combined Daughter Directive limit values and interim targets for Member State compliance.
- 4.1.2 The current air quality standards and objectives (for the purpose of LAQM) 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 Strategy Objectives (England) for the Purposes of Local Air Quality Management**

Pollutant	Air Quality Objective		To be Achieved by
	Concentration	Measured As*	
Nitrogen dioxide (NO <sub>2</sub> )	200 µg/m <sup>3</sup>	1-hour mean not to be exceeded more than 18 times per year	31/12/2005
	40 µg/m <sup>3</sup>	Annual mean	31/12/2005
Particles (PM <sub>10</sub> )	50 µg/m <sup>3</sup>	24-hour mean not to be exceeded more than 35 per year	31/12/2004
	40 µg/m <sup>3</sup>	Annual mean	31/12/2004
Particles (PM <sub>2.5</sub> )	25 µg/m <sup>3</sup>	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 UK Air Quality (England) Regulations (2000).

- 4.1.3 Where an air quality objective is unlikely to be met by the relevant deadline, local authorities must designate those areas as 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.
- 4.1.4 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 Local Planning Policy and Guidance

4.2.1 Policy DMG1 of the RVBC Core Strategy (2014) states that:

*“Consider air quality and mitigate adverse impacts where possible.”*

# 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
Ribble Valley Borough Council (RVBC)	RVBC (April 2018) <i>2018 Air Quality Annual Status Report</i> RVBC (2014) <i>Core Strategy 2008 – 2028 A local Plan for Ribble Valley Adoption Version</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>

## 5.2 Consultation

5.2.1 Consultation in respect of the scope of this assessment and the methodology to be used was undertaken with Heather Barton of RVBC<sup>2</sup>. At the time of issuing this report no response had been received.

## 5.3 Construction Dust Assessment

5.3.1 The IAQM provide guidance<sup>3</sup> on the assessment of air quality impacts arising from construction and demolition activities and has been used in this assessment. This section follows a risk assessment to determine the likely

<sup>2</sup> Email Miller Goodall Ltd. to Heather Barton (RVBC) 11<sup>th</sup> June 2019.

<sup>3</sup> IAQM “Assessment of dust from demolition and construction” v1.1 2014

impact of the development on nearby receptor location 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 C**. 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 D**.

## 5.4 Road Traffic Emissions Assessment

### *Air Dispersion Model*

5.4.1 The Atmospheric Dispersion Modelling System for Roads (ADMS-Roads) v4.1.1.0 was used to assess the local air quality impact of development-generated vehicle exhaust emissions, on concentrations of NO<sub>2</sub> and PM<sub>10</sub>, 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](http://www.cerc.co.uk).

### *Assessment Scenarios*

5.4.4 The assessment considered the following scenarios:

- Scenario 1: 2018 - base year;
- Scenario 2: 2024 - opening year 'without development'; and
- Scenario 3: 2024- opening year '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 Vectos (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:

- Clitheroe Road;
- A59; and
- A671.

5.4.7 The traffic data used in the assessment are detailed in **Appendix E**.

5.4.8 Vehicles within the study area will be assumed to travel at 48 kph on all roads apart from the approach to junctions and roundabouts where queuing traffic sections will be included in the model at 5 kph where appropriate, in accordance with Defra guidance (Defra, 2016).

5.4.9 LAQM.TG (16) recommends temporal variations to be considered within air quality modelling. Therefore, the model will use a 7-day profile based on the Department for Transport's statistics.

#### *Meteorological Data*

5.4.10 Meteorological data for 2018 from the Manchester Airport recording station was used in the ADMS-Roads model. This is the most representative recording station for the development site.

#### *Model Verification*

5.4.11 As there are no local authority monitoring points within the study area, model verification has not been utilised within this assessment.

#### *Sensitive Receptors*

5.4.12 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.

5.4.13 Onsite sensitive receptor locations were selected based on the proposed site layout.

#### *Conversion of NO<sub>x</sub> to NO<sub>2</sub>*

5.4.14 Oxides of nitrogen (NO<sub>x</sub>) concentrations were predicted using the ADMS-Roads model. The modelled road contribution of NO<sub>x</sub> at the identified receptor locations was then converted to NO<sub>2</sub> using the NO<sub>x</sub> to NO<sub>2</sub> calculator (v7.1, 2019)<sup>4</sup> in accordance with Defra guidance<sup>1</sup>.

#### *Emission Factors*

5.4.15 DEFRA's Emission Factor Toolkit (EFT), which is used within the ADMS model to predict emissions from road vehicles, was updated in May 2019 to version V9.0 and has been used within all scenarios.

#### *Background Concentrations*

5.4.16 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.

5.4.17 There are no background monitoring locations in the vicinity of the proposed development and receptor locations, therefore background NO<sub>x</sub>, NO<sub>2</sub> and PM<sub>10</sub> 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 and 2024).

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<sup>4</sup> <http://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html#NOxNO2calc>

### Assessment Significance Criteria

5.4.18 Guidance is provided by EPUK and IAQM on criteria for determining the significance of a developments impact on local air quality<sup>5</sup>. **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 RVBC has one AQMA within its administrative boundaries this AQMA is located in Clitheroe, approximately 3.8 km north of the development. The RVBC 2018 Air Quality Annual Status Report concluded that RVBC monitoring indicates that NO<sub>2</sub> concentrations are declining in the borough and in 2017 no exceedances of the NO<sub>2</sub> annual mean objective were recorded.

### 6.2 Air Quality Monitoring

#### *Nitrogen Dioxide (NO<sub>2</sub>)*

6.2.1 RVBC does not have any automatic monitoring sites within its authority.

6.2.2 RVBC undertake diffusion tube monitoring of NO<sub>2</sub> across its authority. The closest monitoring locations are approximately 4 km from the site in Clitheroe Town Centre and are thus unrepresentative of the proposed development site. The results from the diffusion tubes are shown in **Table 4**; the locations of the tubes are shown in **Appendix F**.

<sup>5</sup> EPUK (January 2017) Land Use Planning and Development Control: *Planning for Air Quality (v1.2)*

**Table 4: Annual Mean NO<sub>2</sub> Concentrations Monitored by the LA within the Study Area**

Site ID	Location		Annual Mean NO <sub>2</sub> Concentrations (µg/m <sup>3</sup> )		
			2015	2016	2017
DT2 (roadside)	374234	441291	35.4	38.8	35
DT3 (roadside)	374234	441291	38.5	<b>41</b>	37.6
DT4 (roadside)	374234	441291	33.4	36.4	34.4
DT5 (roadside)	374213	441240	35.2	35.5	34.2
DT6 (roadside)	374222	441315	26.1	27.9	25.4
DT7 (roadside)	374175	441153	28.2	31.1	25.6
Annual Mean NO <sub>2</sub> air quality objective				40 µg/m <sup>3</sup>	

6.2.3 The monitoring results in **Table 4** indicate that annual mean concentrations of NO<sub>2</sub> were below the NO<sub>2</sub> annual mean objective at all of the monitoring locations in 2017.

6.2.4 The results indicate that the short-term objective for NO<sub>2</sub> was unlikely to be exceeded at all of the monitoring sites as the annual mean concentrations was less than 60 µg/m<sup>3</sup> <sup>1</sup> during the time period shown.

#### *Particulate Matter (PM<sub>10</sub>)*

6.2.5 RVBC does not undertake PM<sub>10</sub> monitoring.

## 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<sub>x</sub>, NO<sub>2</sub> and PM<sub>10</sub> were therefore obtained from the background concentration maps provided by Defra for the grid squares covering the proposed development and receptor locations<sup>6</sup>. These are shown in **Table 5** below.

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

Grid Square	Pollutant	2018	2024
		(µg/m <sup>3</sup> )	(µg/m <sup>3</sup> )
373500, 437500	NO <sub>2</sub>	8.6	6.7
	NO <sub>x</sub>	11.4	8.7
	PM <sub>10</sub>	9.1	8.6

\* Background concentrations obtained from the latest 2017 based background maps

<sup>6</sup> <http://uk-air.defra.gov.uk/data/laqm-background-maps?year=2015>

## 7 Construction Dust Impact Assessment

### 7.1 Step 1 – The Need for a Detailed Assessment

7.1.1 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.

### 7.2 Step 2 – Assess the Risk of Dust Impacts

#### *Step 2A Dust Emission Magnitude*

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

- Demolition: No demolition is required for this site.
- Earthworks: The total site area is 10,000 m<sup>2</sup>. The dust emission magnitude for earthworks is, therefore, considered to be **large**.
- Construction: The total building volume to be constructed is 25,000 – 100,000 m<sup>3</sup>. The dust emission magnitude for construction is, therefore, considered to be **medium**.
- Trackout: The data for the number of HDV movements was not available at the time of issuing this report. Therefore, the HDV outward movements has been assumed to be >50 HDV outward movements in any one day as a worst-case scenario. The dust emission magnitude for trackout is, therefore, considered to be **large**.

7.2.2 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	NA	<ul style="list-style-type: none"> <li>• no demolition is required for this site</li> </ul>
Earthworks	large	<ul style="list-style-type: none"> <li>• the site area is 10,000 m<sup>2</sup></li> </ul>
Construction	medium	<ul style="list-style-type: none"> <li>• total building volume to be constructed is 25,000 – 100,000 m<sup>3</sup></li> </ul>
Trackout	large	<ul style="list-style-type: none"> <li>• there are likely to be &gt;50 HDV outward movements in any one day</li> </ul>

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

7.2.3 Human receptors are located in residential houses adjacent to the site within a distance of 20 m 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 C** and the IAQM guidance, the sensitivity of human receptors to the effects of dust soiling and health effects from construction, demolition, earthwork activities, and from trackout is therefore likely to be **high**.

### *Step 2B Sensitivity of the Area to Dust Soiling*

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

- Demolition - no demolition is required for this site;
- Earthworks - sensitivity is considered to be **high** as earthworks activities takes place within 20 m of 10 - 100 highly sensitivity receptors;
- Construction - sensitivity is considered to be **high** as construction activities takes place within 20 m of 10 - 100 highly sensitivity receptors; and
- Trackout activities – sensitivity is considered to be **high** as there are 10 - 100 highly sensitivity receptors within 20 m of roads which relevant vehicles are likely to use that are up to 500 m from the site.

### *Step 2B Sensitivity of People to the Health Effects of PM<sub>10</sub>*

7.2.5 The background PM<sub>10</sub> concentrations for 2018 and 2024 'without development' are shown in **Table 5**. Therefore, local levels of PM<sub>10</sub> are likely to be <24 µg/m<sup>3</sup>, during the construction phase.

7.2.6 Using this information and **Table 4** in **Appendix C**, the sensitivity of human receptors to health impacts from dust and PM<sub>10</sub> for each activity were defined as:

- Demolition - no demolition is required for this site;
- Earthworks - sensitivity is considered to be **low** as earthworks activities takes place within 20 m of 10 - 100 highly sensitivity receptors and the background PM<sub>10</sub> concentration is predicted to be <24 µg/m<sup>3</sup>;
- Construction - sensitivity is considered to be **low** as construction activities takes place within 20 m of 10 - 100 highly sensitivity receptors and the background PM<sub>10</sub> concentration is predicted to be <24 µg/m<sup>3</sup>; and
- Trackout activities – sensitivity is considered to be **low** as there are 10 - 100 highly sensitivity receptors within 20 m of roads which relevant vehicles are likely to use that are up to 500 m from the site, and the background PM<sub>10</sub> concentration is predicted to be <24 µg/m<sup>3</sup>.

7.2.7 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*

7.2.8 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 C.**

- Demolition – no demolition is required for this site;
- Earthworks – is considered to be **high** risk for dust soiling and **low** risk for human health;
- Construction – is considered to be **medium** 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;

7.2.9 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	Medium	High
Human Health	N/A	Low	Low	Low

### 7.3 Step 3 – Site-Specific Mitigation

7.3.1 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.

7.3.2 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 ‘medium risk’ classification (in this instance the site is classified as “high” risk due to earthworks and trackout)<sup>7</sup>. Mitigation measures specific to earthworks, construction and trackout are proposed based on the risk classifications in **Table 8.**

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

### 7.4 Step 4 – Determine Significant Effects

7.4.1 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.

<sup>7</sup> 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.

## 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 NO<sub>2</sub> and PM<sub>10</sub> 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	373533	437494
R2	373485	437292
R3	374044	437076

### 8.2 Proposed Receptor Locations

- 8.2.1 Three proposed residential receptor locations were considered within the development site. NO<sub>2</sub> and PM<sub>10</sub> concentrations were calculated at these locations to determine whether future site users may be exposed to elevated pollutant levels. These receptor locations were based on the site layout, shown in **Appendix B**, and chosen as worst case scenario due to being in the closest proximity to the road.
- 8.2.2 The proposed sensitive receptor locations are presented in **Table 10** and **Appendix H**.

**Table 10: Proposed Sensitive Receptor Locations**

Receptor	Grid Ref	
R4	373526	437445
R5	373515	437394
R6	373593	437234

### 8.3 Baseline Assessment

- 8.3.1 The ADMS model was used to estimate contributions of vehicle exhaust emissions to annual and short term NO<sub>2</sub> and PM<sub>10</sub> 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 E**. **Table 11** details the results of the baseline assessment.

**Table 11: Predicted Baseline NO<sub>2</sub> and PM<sub>10</sub> Annual Mean Concentrations (µg/m<sup>3</sup>) at Sensitive Receptor Locations**

Receptor	Receptor Height above Ground Level (m)	Scenario 1: Base Year (2018)		Scenario 2: Without Development (2024)	
		NO <sub>2</sub> (µg/m <sup>3</sup> )	PM <sub>10</sub> (µg/m <sup>3</sup> )	NO <sub>2</sub> (µg/m <sup>3</sup> )	PM <sub>10</sub> (µg/m <sup>3</sup> )
R1	1.50	13.52	9.52	10.29	9.00
R2	1.50	11.65	9.63	8.85	9.13
R3	1.50	13.04	9.67	9.82	9.18
<b>Annual Mean NO<sub>2</sub> &amp; PM<sub>10</sub> Air Quality Objective</b>				<b>40 (µg/m<sup>3</sup>)</b>	

8.3.3 The baseline air quality assessment for the base year (2018) and opening year 'without development' (2024) scenarios show that concentrations of NO<sub>2</sub> and PM<sub>10</sub> are below the respective annual mean air quality Objective of 40 µg/m<sup>3</sup> at all receptors for all 'without development' scenarios.

8.3.4 In accordance with Defra guidance<sup>1</sup>, it may be assumed that exceedences of the 1-hour mean Objective for NO<sub>2</sub> are unlikely as the predicted annual mean concentrations are less than 60 µg/m<sup>3</sup>. The short term PM<sub>10</sub> Objective is predicted to be met at all identified receptor locations with no exceedences of the daily mean Objective of 50 µg/m<sup>3</sup>.

## 8.4 Impact Assessment

### Existing Receptors

8.4.1 Predicted NO<sub>2</sub> and PM<sub>10</sub> concentrations for the opening year (2024) 'with development' scenario are detailed in **Table 12**. Predicted concentrations for the 'without development' scenario and the predicted change in NO<sub>2</sub>, and PM<sub>10</sub> 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 guidance<sup>5</sup> and contained within **Table 3** above.

**Table 12: Dispersion Modelling Results and Significance of Development for the Opening Year (2024) Scenario at Existing Receptor Locations**

Receptor name	Difference in opening year without and with development	Annual average NO <sub>2</sub> (µg/m <sup>3</sup> )	Significance	Annual average PM <sub>10</sub> (µg/m <sup>3</sup> )	Significance
R1	Without Development	10.29	Negligible	9.00	Negligible
	With Development	10.33		9.01	
	% Change relative to AQAL & (Impact)	0.1 (+0.04)		0.01 (+0.01)	
	% of AQAL with Development	26		23	
R2	Without Development	8.85	Negligible	9.13	Negligible
	With Development	8.96		9.15	

Receptor name	Difference in opening year without and with development	Annual average NO <sub>2</sub> (µg/m <sup>3</sup> )	Significance	Annual average PM <sub>10</sub> (µg/m <sup>3</sup> )	Significance
	% Change relative to AQAL & (Impact)	0.28 (+0.11)		0.05 (+0.02)	
	% of AQAL with Development	22		23	
	Without Development	9.82		9.18	
	With Development	9.90		9.20	
R3	% Change relative to AQAL & (Impact)	0.2 (+0.08)	Negligible	0.03 (+0.02)	Negligible
	% of AQAL with Development	25		23	
<b>AQAL: Annual Mean NO<sub>2</sub> &amp; PM<sub>10</sub> Air Quality Objective (µg/m<sup>3</sup>)</b>				<b>40</b>	

8.4.3 All receptors are expected to have an increase of less than 0.11 µg/m<sup>3</sup> for both NO<sub>2</sub> and PM<sub>10</sub>.

8.4.4 The results of the ADMS modelling assessment for 2024 indicate that annual mean concentrations of NO<sub>2</sub> and PM<sub>10</sub> would be below the respective annual objectives in 2024, at all existing sensitive receptor locations within the study area, both 'with' and 'without' the development.

8.4.5 In accordance with Defra guidance<sup>1</sup>, it may be assumed that exceedances of the 1-hour mean objective for NO<sub>2</sub> are unlikely as the predicted annual mean concentrations are less than 60 µg/m<sup>3</sup>. The 24-hour PM<sub>10</sub> objective of 50 µg/m<sup>3</sup> is predicted to be met at all modelled locations.

8.4.6 Predicted annual mean NO<sub>2</sub> and PM<sub>10</sub> concentrations in the 'with development' scenario are all 26% or less of the AQAL. The proposed development is therefore predicted to have a **negligible** impact on concentrations of NO<sub>2</sub> and PM<sub>10</sub> in 2024.

#### Proposed Receptors

8.4.7 Predicted NO<sub>2</sub> and PM<sub>10</sub> concentrations for the assessment years (2024) 'with development' scenario at proposed receptor locations are detailed in **Table 13**.

**Table 13: Predicted Annual Mean Pollutant Concentrations for 2024 at Proposed Receptor Locations**

Receptor	Receptor Height above Ground Level (m)	Annual Average Concentration (µg/m <sup>3</sup> )	
		NO <sub>2</sub>	PM <sub>10</sub>
R4	1.5	9.86	8.96
R5	1.5	9.81	8.97
R6	1.5	9.37	9.21
<b>Annual Mean NO<sub>2</sub> &amp; PM<sub>10</sub> Air Quality Objective (µg/m<sup>3</sup>)</b>			<b>40 µg/m<sup>3</sup></b>

- 8.4.8 The proposed receptor locations are positioned within the proposed residential areas and the care home. The development will also include commercial buildings. The annual mean NO<sub>2</sub> and PM<sub>10</sub> objectives do not apply for commercial use. However, the short-term objectives do apply.
- 8.4.9 The results of the dispersion modelling assessment indicate that annual mean concentrations of NO<sub>2</sub> and PM<sub>10</sub> would be below the respective objectives in 2024 at proposed residential receptors once the development is operational.
- 8.4.10 All predicted NO<sub>2</sub> concentrations are well below 60 µg/m<sup>3</sup> and therefore, in accordance with guidance in LAQM.TG (16), the 1-hour mean objective is unlikely to be exceeded. The short term PM<sub>10</sub> objective is predicted to be met at all proposed receptor locations with no exceedances of the daily mean objective of 50 µg/m<sup>3</sup>.
- 8.4.11 Concentrations of NO<sub>2</sub> and PM<sub>10</sub> are predicted to be well below the respective annual mean and short term objectives in 2024 at proposed residential receptors, the site is therefore considered suitable for residential use with regards to air quality. As it is unlikely that the development will be exposed to NO<sub>2</sub> and PM<sub>10</sub> concentrations above the short-term objectives, the site is also considered suitable for commercial use.

## 8.5 Road Traffic Mitigation Measures

- 8.5.1 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 NO<sub>2</sub> and PM<sub>10</sub> are predicted to be below the respective objectives in 2024 at proposed residential receptors. No specific mitigation is therefore proposed. However, as stated within the Design and Access Statement;
- Electric vehicle charging points will be provided in a proportion to be agreed with Lancashire County Council (LCC);
  - Cycle parking will be provided in accordance with the LCC standards at convenient locations around the developments; and
  - Outside of the site, the proposals include for the creation of a new footpath along the eastern side of Clitheroe Road providing access north. This new footpath will provide access from the site to the adjacent Lamb Roe Gardens development and beyond to existing bus stops.

## 9 Summary of Impacts and Conclusion

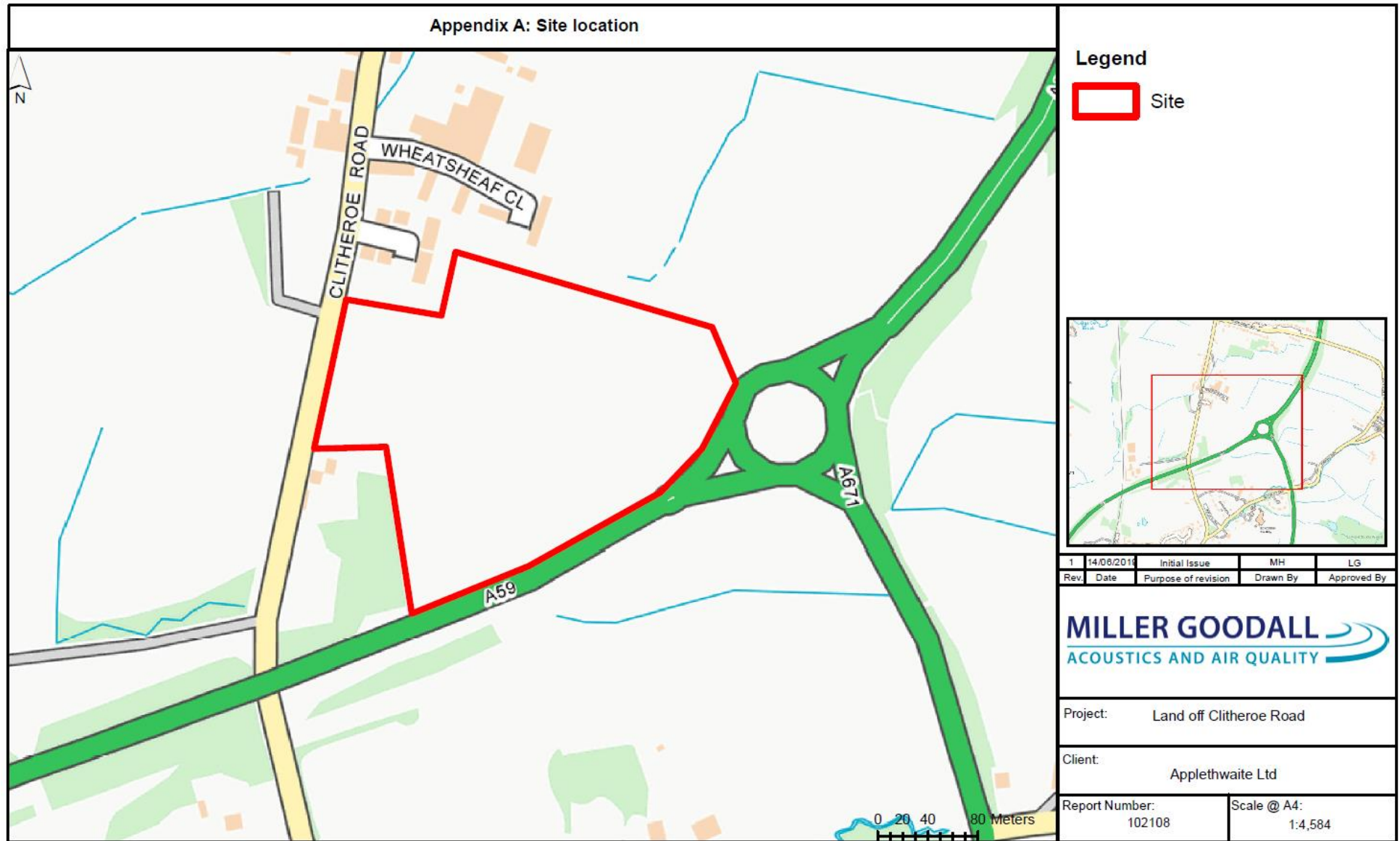
- 9.1 A road traffic emissions assessment was undertaken to consider the impact of vehicle exhaust emissions associated with the proposed residential development, on identified receptor locations within the study area.
- 9.2 The assessment considered whether the proposed development could significantly 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 NO<sub>2</sub> and PM<sub>10</sub> were predicted to be well below the respective air quality objectives for both '*without development*' and '*with development*' scenarios in 2024 at all modelled receptor locations. Predicted annual mean NO<sub>2</sub> and PM<sub>10</sub> concentrations in the '*with development*' scenario are all 26% or less of the AQAL.

- 9.4 No exceedance of the short term 1-hour NO<sub>2</sub> and 24-hour PM<sub>10</sub> 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 NO<sub>2</sub> and PM<sub>10</sub> would be below the respective objectives in 2024 at proposed residential receptors with the development in place. The development is also deemed suitable for commercial use as it is unlikely to be exposed to NO<sub>2</sub> and PM<sub>10</sub> concentrations above the short-term objectives.
- 9.7 There is, therefore no reason for this application to be refused on the grounds of air quality.

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## **APPENDICES**

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## Appendix C: 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 activities<sup>8</sup>. 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 <sup>3</sup> , construction materials with low potential for dust release.	Total building volume 20,000 m <sup>3</sup> – 50,000 m <sup>3</sup> , potential dusty construction material.	Total building volume >50,000 m <sup>3</sup> , potentially dusty construction material.
Earthworks	Total site area <2,500 m <sup>2</sup> , soil type with large grain	Total site area 2,500 – 10,000 m <sup>2</sup> , moderately dusty soil type	Total site area >10,000 m <sup>2</sup> , potentially dusty soil type
Construction	Total building volume <25,000 m <sup>3</sup> .	Total building volume 25,000 – 100,000 m <sup>3</sup> .	Total building volume >100,000 m <sup>3</sup> .

<sup>8</sup> IAQM "Assessment of dust from demolition and construction" 2014

Activity	Criteria used to Determine Dust Emission Magnitude		
	Small	Medium	Large
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 PM<sub>10</sub> 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 <sub>10</sub>	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 <sub>10</sub>	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

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

Potential Impact Sensitivity of the Area	Dust Emission Magnitude		
	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*

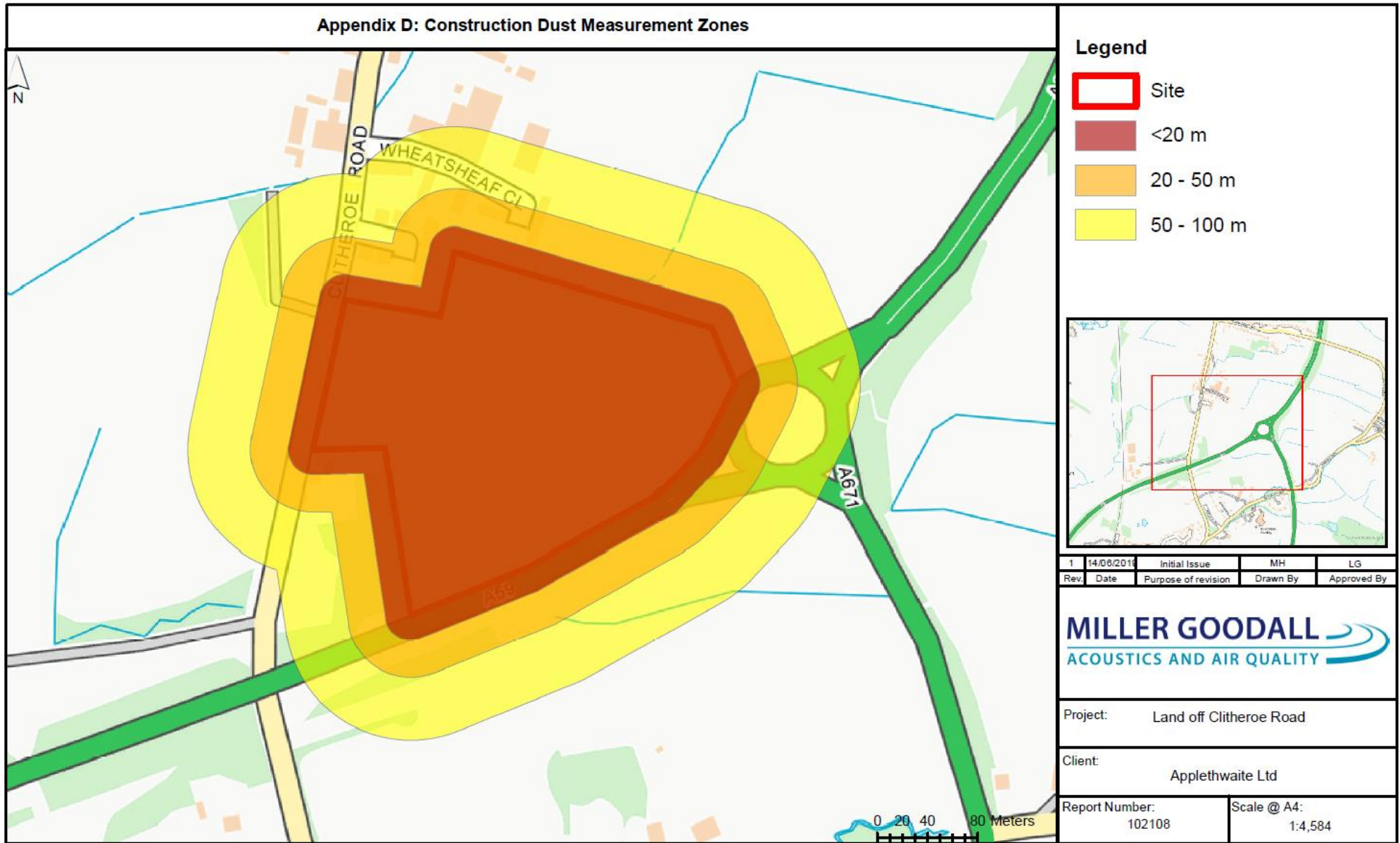
Step three of the IAQM guidance identifies appropriate site-specific mitigation. These measures are related to whether the site is a low, medium or high risk site.

#### *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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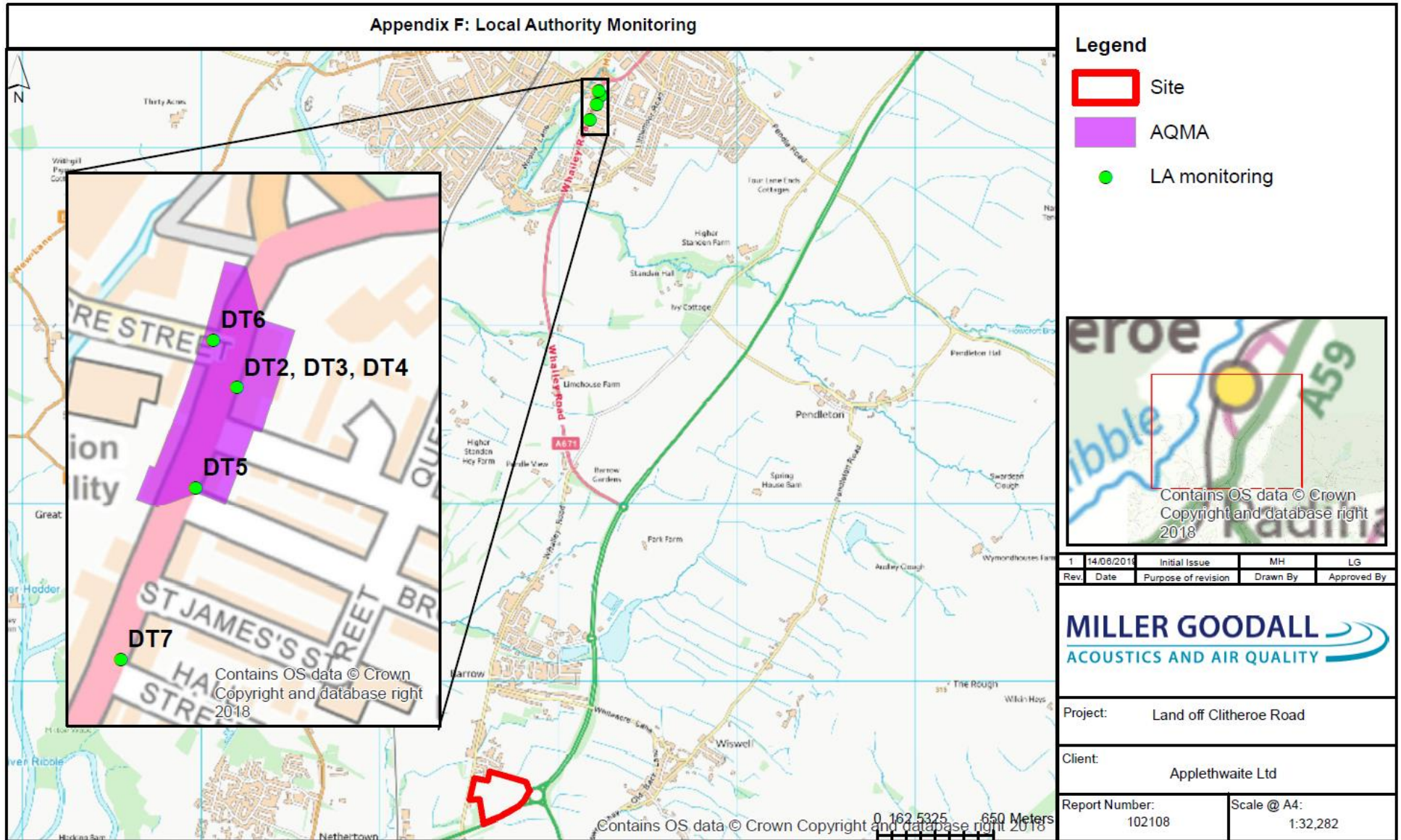
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## Appendix E: Traffic Data used in the Air Quality Assessment

Link Number	Road	2018 Base Year/Verification		2024 Base Year		2024 With Development	
		AADT LDV	AADT HDV	AADT LDV	AADT HDV	AADT LDV	AADT HDV
1 -	Clitheroe Road, north of site	5,671	265	6,774	271	6,843	271
2 -	Clitheroe Road, south of site	5,671	265	6,774	271	7,123	271
3 -	A59 south	18,202	1,149	21,388	1,178	21,765	1,178
4 -	A671	19,047	912	22,839	936	23,377	936
5 -	A59 north	30,108	1,841	36,905	1,889	37,038	1,889
6 -	Roundabout circulating (north)	17,543	1,036	20,855	1,063	21,503	1,063
7 -	Roundabout circulating (east)	16,484	957	20,069	982	20,712	982
8 -	Roundabout circulating (south)	16,980	1,002	20,447	1,028	21,103	1,028
9 -	Roundabout circulating (site)*	17,543	1,036	20,855	1,063	21,497	1,063
10 -	Site Access (A59)	0	0	0	0	1,577	0

\*in the base year scenarios, the roundabout circulating (site) flows are the same as the roundabout circulating (north).

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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
<b>Communications</b>	
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
<b>Site management</b>	
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
<b>Monitoring</b>	
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 <sub>10</sub> 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
<b>Preparing and maintaining the site</b>	
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
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### **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

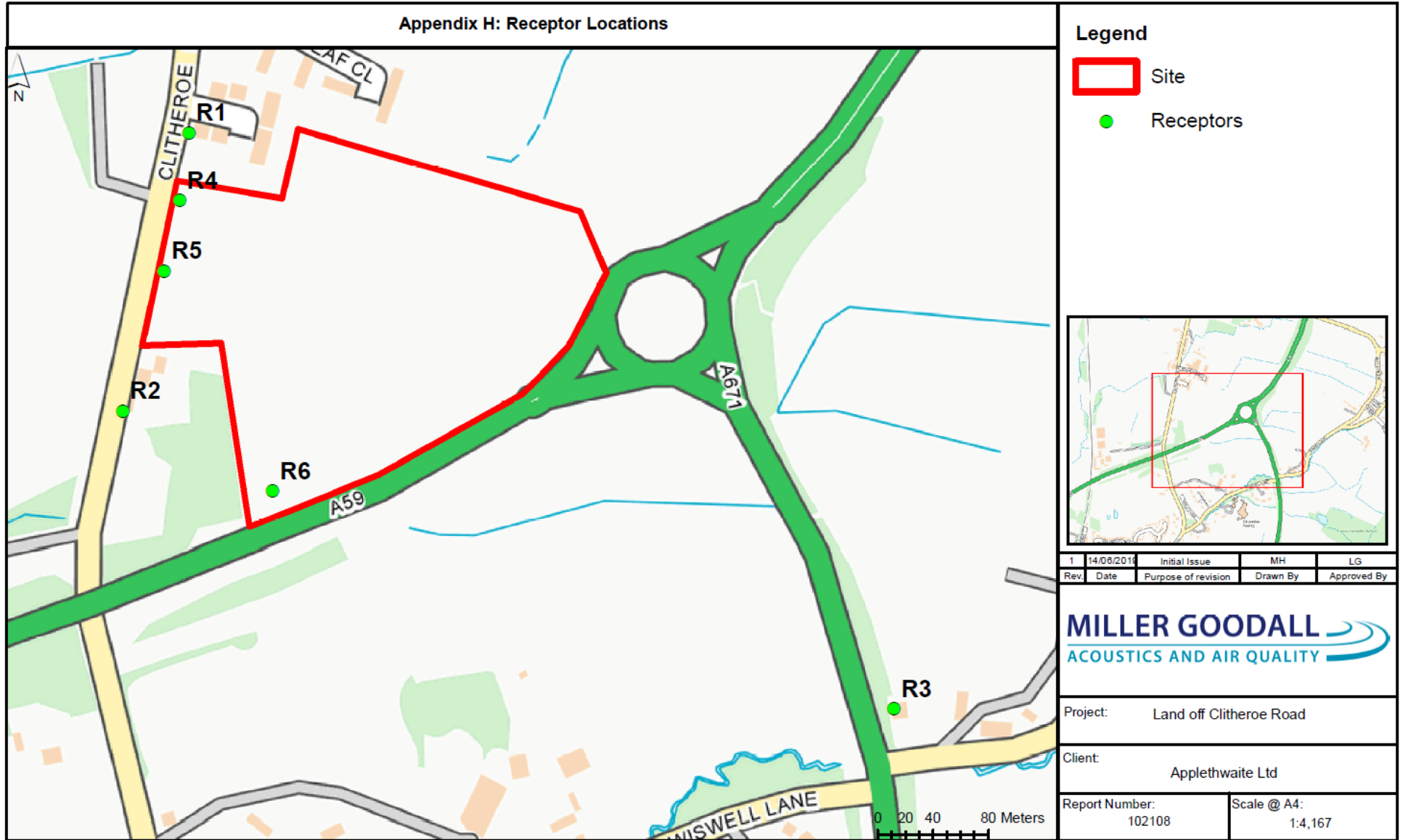
### **Measures specific to construction.**

Mitigation Measure	Medium Risk
Avoid scabbling (roughening of concrete surfaces) if possible.	x
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.	x

### **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 PM<sub>10</sub>, 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 PM<sub>10</sub> or PM<sub>2.5</sub> 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

**HDV** Heavy Duty 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

**LDV** Light Duty Vehicle

**Mg/m<sup>3</sup>** Microgrammes (of pollutant) per cubic metre of air. A measure of concentration in terms of mass per unit volume. A concentration of 1 µg/m<sup>3</sup> means that one cubic metre of air contains one microgramme (millionth of a gramme) of pollutant

**NO<sub>2</sub>** Nitrogen Dioxide

**NO<sub>x</sub>** A collective term used to represent the mixture of nitrogen oxides in the atmosphere, as nitric oxide (NO) and nitrogen dioxide (NO<sub>2</sub>)

**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<sub>2.5</sub>** 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<sub>2.5</sub>, EN 14907, with a 50% efficiency cut-off at 2.5 µm aerodynamic diameter

**PM<sub>10</sub>** 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 PM<sub>10</sub>, 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.

