Appendix 18.1: Construction Phase Dust and Fine Particulate Matter Assessment Methodology

Introduction

The following section outlines an assessment procedure developed by the Institute of Air Quality Management (IAQM, 2016) for the assessment of air quality impacts arising from construction activities. The assessment procedure is divided into four steps and is summarised below.

Step 1: Screening the Need for a Detailed Assessment

An assessment will normally be required where there are human receptors within 350 m of the development 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). Designated ecological sites within 200 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. A designated ecological site refers to any sensitive habitat that can potentially be affected by dust soiling. For locations with a statutory designation, such as a Sites of Specific Scientific Interest (SSSI), Special Areas of Conservation (SAC) and Special Protection Areas (SPA), 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'.

Step 2: Assess the Risk of Dust Impacts

A site is allocated to a risk category based on 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 four categories of construction activities outlined by the IAQM (demolition, construction, earthworks and trackout).

Step 2A: Define the Potential Dust Emission Magnitude

The IAQM guidance (IAQM, 2016) recommends that the dust emission magnitude is determined for demolition, earthworks, construction and trackout. The dust emission magnitude is based on the scale of the anticipated works. **Table A18.1** describes the potential dust emission class criteria for each outlined construction activity.

Table A18.1 Criteria used in the determination of dust emission class

Activity	Criteria used to Determine Dust Emission Class		
	Small	Medium	Large
Demolition	Total building volume <20,000m^3 Construction material with a low potential for dust release (e.g. metal cladding or timber) Demolition activities <10m above ground level Demolition during wetter months	Total building volume 20,000 to 50,000m^3 Potentially dusty material (e.g. concrete) Demolition activities 10 - 20m above ground level	Total building volume >50,000m^3 Potentially dusty material (e.g. concrete) On-site crushing and screening Demolition activities >20m above ground level

Activity	Criteria used to Determine Dust Emission Class		
	Small	Medium	Large
Earthworks	Total site area <2,500 m^2; <5 heavy moving earth vehicles active at any one time.	Total site area 2,500 – 10,000 m^2; 5 – 10 heavy moving earth moving vehicles active at any one time.	Total site area >10,000 m^2, >10 heavy earth moving vehicles active at any one time.
Construction	Total building volume <25,000 m^3; Construction material with low potential for dust release.	Total building volume 25,000 – 100,000 m^3; Potentially dusty construction material (e.g. concrete).	Total building volume >100,000 m^3; On site concrete batching.
Trackout	<10 outward HGV trips in any one day; Unpaved road length <50 m.	10 – 50 outward HGV trips in any one day. Unpaved road length 50 – 100 m.	>50 outward HGV trips in any one day; Unpaved road length >100 m.

Step 2B: Define the Sensitivity of the Area

The sensitivity of the area considers the following factors:

- the specific sensitivities of receptors in the area;
- the proximity and number of receptors;
- the local background PM_{10} concentration; and
- site-specific factors, such as the presence of natural shelters, such as trees, to reduce the risk of windblown dust.

Table A18.2 outlines the criteria used for determining the sensitivity of receptors.

Table A18.2 Criteria for determining sensitivity of receptors

Sensitivity of Receptor	Criteria for Determining Sensitivity		
	Dust Soiling Effects	**Health Effects of PM_{10}**	**Ecological Effects**
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	Locations with an international or national designation and the designated features may be affected by dust soiling. Locations where there is a community of a particularly dust sensitive species such as vascular species included in the Red Data List For Great Britain
Medium	Parks, places of work	Office and shop workers not occupationally exposed to PM_{10}	Locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown Locations with a national designation where the features 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	Locations with a local designation where the features may be affected by dust deposition.

The criteria detailed in **Tables A18.3** to **A18.5** were used to determine the sensitivity of the area to dust soiling effects and human health impacts. **Figure 18.3** details the distance bands, as detailed in **Tables A18.3** and **A18.4**, from the site boundary for use in the construction phase assessment.

Table A18.3 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

Table A18.4 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	>32µg.m^3	>100	High	High	High	Medium	Low
		10-100	High	High	Medium	Low	Low
		1-10	High	Medium	Low	Low	Low
	>28-32µg.m^3	>100	High	High	Medium	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	High	Medium	Low	Low	Low
	>24-28µg.m^3	>100	High	Medium	Low	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	<24µg.m^3	>100	Medium	Low	Low	Low	Low
		10-100	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Medium	-	>10	High	Medium	Low	Low	Low
	-	1-10	Medium	Low	Low	Low	Low

Receptor Sensitivity	Annual Mean PM_{10} Concentrations	Number of Receptors	Distance from the Source (m)				
			<20	<50	<100	<200	<350
Low	-	>1	Low	Low	Low	Low	Low

Table A8.5 Sensitivity of the area to ecological impacts

Receptor Sensitivity	Distance from Source (m)	
	<20	<50
High	High	Medium
Medium	Medium	Low
Low	Low	Low

Step 2C: Define the Risk of Impacts

The dust emission magnitude and sensitivity of the area are combined and the risk of impacts from each activity (demolition, earthworks, construction and trackout) before mitigation is applied should be determined using the criteria detailed in **Tables A18.6** – **A18.9**.

Table A18.6 Risk of dust impacts - demolition

Potential Impact	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 A18.7 Risk of dust impacts- earthworks

Potential Impact	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 A18.8 Risk of dust impacts- construction

Potential Impact	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 A18.9 Risk of dust impacts- trackout

Potential Impact	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

Step 3: 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 Significant Effects

With the implementation of the relevant mitigation measures, the residual impacts from the construction are considered to be **not significant**, in accordance with IAQM guidance.