

Appendix 16.1

Construction Assessment Methodology

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1.1 Introduction

- 1.1.1 The air quality impacts of construction dust and vehicle emissions have been considered following the Institute of Air Quality Management (2014) 'Guidance on the assessment of dust from demolition and construction'. Individual consideration for four activities are included in the guidance; demolition, earthworks, construction and track-out.
- 1.1.2 The aim of the assessment is to determine the risk of dust impacts from each construction activity in order to identify the level of required mitigation. First, the magnitude of dust emissions is found based on various factors, followed by the sensitivity of the area(s) surrounding the construction site to specific dust impacts. Finally, these factors are combined to determine the overall risk of dust impacts.

1.2 Assessment Methodology

- 1.2.1 The four construction activities have been assessed on the basis of the area sensitivity and the emission magnitude. The dust emission magnitude is based on the scale of the anticipated works and should be classified as Small, Medium, or Large. Dust emissions are defined according to the scale and nature of the work for each activity, see **Table 16-1-1** below.

Table 16-1-1: Quantitative determination of the magnitude of dust emissions for each of the four demolition and construction activities

Activity	Dust Emission Magnitude
Demolition	<p><u>Large</u>: Total building volume >50,000 m³, potentially dusty construction material (e.g. concrete), on-site crushing and screening, demolition activities >20 m above ground level;</p> <p><u>Medium</u>: Total building volume 20,000 m³ – 50,000 m³, potentially dusty construction material, demolition activities 10-20 m above ground level; and</p> <p><u>Small</u>: Total building volume <20,000 m³, construction material with low potential for dust release (e.g. metal cladding or timber), demolition activities <10m above ground, demolition during wetter months.</p>
Earthworks	<p><u>Large</u>: Total site area >10,000 m², potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size), >10 heavy earth moving vehicles active at any one time, formation of bunds >8 m in height, total material moved >100,000 tonnes;</p> <p><u>Medium</u>: Total site area 2,500 m² – 10,000 m², moderately, dusty soil type (e.g. silt), 5-10 heavy earth moving vehicles active at any one time, formation of bunds 4 m - 8 m in height, total material moved 20,000 tonnes – 100,000 tonnes; and</p> <p><u>Small</u>: Total site area <2,500 m², soil type with large grain size (e.g. sand), <5 heavy earth moving vehicles active at any one time, formation of bunds <4 m in height, total material moved <20,000 tonnes, earthworks during wetter months.</p>
Construction	<p><u>Large</u>: Total building volume >100,000 m³, on site concrete, batching, sandblasting;</p> <p><u>Medium</u>: Total building volume 25,000 m³ – 100,000 m³, potentially dusty construction material (e.g. concrete), on site concrete batching; and</p> <p><u>Small</u>: Total building volume <25,000 m³, construction material with low potential for dust release (e.g. metal cladding or timber).</p>
Track-out	<p><u>Large</u>: >50 HDV (>3.5t) outward movements in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length >100 m;</p> <p><u>Medium</u>: 10-50 HDV (>3.5t) outward movements in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length 50 m – 100 m; and</p> <p><u>Small</u>: <10 HDV (>3.5t) outward movements in any one day, surface material with low potential for dust release, unpaved road length <50 m.</p>
<p>Source: Institute of Air Quality Management (IAQM), Guidance on the assessment of dust from demolition and construction, February 2014.</p>	

- 1.2.2 The two types of sensitive receptors that may be impacted by dust from construction activities, as defined by IAQM (2014), are human and ecological. These are defined as:
“...a location that may be affected by dust emissions during demolition and construction. Human receptors include locations where people spend time and where property may be impacted by dust. Ecological receptors are habitats that might be sensitive to dust”.
- 1.2.3 The guidance refers to human receptors as those properties that may be subject to adverse impacts of dust or PM₁₀ over a time period relevant to the air quality objective. Specific properties include: dwellings, cultural heritage collections, food manufactures, etc. According to IAQM (2014) a single dwelling is classified as one receptor, whereas a school counts as 100. In addition, relevant designated (ecological) sites and their sensitivity to dust impacts, have also been considered.
- 1.2.4 Designated sites includes those that are protected areas because of their national importance. In particular Site of Specific Scientific Interest (SSSI), Special Areas of Conservation (SAC) and Special Protection Areas (SPAs) have been considered in the assessment.
- 1.2.5 Receptor sensitivity is defined by a number of factors including:
- Specific sensitivities of those receptors
 - Number of receptors
 - Proximity to construction site
 - Background PM₁₀ concentrations
 - Site-specific factors
- 1.2.6 The sensitivity of key receptors to each construction-related activity is determined for each of the following dust impacts:
- Dust soiling
 - Human health impacts
 - Impacts on ecological receptors
- 1.2.7 The sensitivity of an area to the potential impacts of each activity is defined at various distances from the work site, depending on the sensitivity and number of receptors. IAQM categorises these in several distance bands for different impacts at 20, 50, 100, 200 and 350m. Receptor sensitivity to dust soiling is assessed for only four IAQM distance bands, whereas sensitivity to human health impacts is assessed for all five. **Tables 16-1-2, 16-1-3 and 16-1-4** define the levels of sensitivity of areas at different distances for each of the impacts listed above.

Table 16-1-2: Area sensitivity to the effects of dust soiling

Receptor Sensitivity	Number of Receptors	Distance from the 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

Source: Institute of Air Quality Management, Guidance on the assessment of dust from demolition and construction, February 2014.

1.2.8 The sensitivity of the area to human health impacts is determined not only by the number of receptors within various distance bands from the site, but also by background PM₁₀ concentrations.

1.2.9 Estimated PM₁₀ concentrations were obtained using the Scottish Air Quality Background maps (<http://www.scottishairquality.co.uk/data/mapping?view=data>) for the base year of the Project (2013); the base year pollutant concentrations are considered the worst case, assuming improvements in air quality following stricter regulation in the future.

Table 16-1-3: Area sensitivity 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	-	>10	High	Medium	Low	Low	Low
	-	1-10	Medium	Low	Low	Low	Low
Low	-	>1	Low	Low	Low	Low	Low

Source: Institute of Air Quality Management, Guidance on the assessment of dust from demolition and construction, February 2014.

1.2.10 Ecological impacts of construction activities must be considered for designated sites within 20 and 50m from the works following **Table 16-1-4**. Construction and demolition impacts on designated sites may include physical changes that can affect photosynthetic processes, or

chemical changes to the soil that may lead to plant loss. Impacts are often reversible after work ceases.

Table 16-1-4: Area sensitivity to ecological impacts

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

Source: Institute of Air Quality Management, Guidance on the assessment of dust from demolition and construction, February 2014.

1.2.11 The two parts of the construction assessment, dust emissions magnitude and area sensitivities, are then combined in order to determine the overall risk of impacts with no applied mitigation, for each construction activity within each zone. **Table 16-1-5** below provides a view of the levels considered. The level of risk determined by this table will determine the level of mitigation to be followed at the construction site.

Table 16-1-5: Risk of impacts from each activity

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
<i>Demolition</i>			
High	High Risk	Medium Risk	Medium Risk
Medium	High Risk	Medium Risk	Low Risk
Low	Medium Risk	Low Risk	Negligible
<i>Earthworks and Construction</i>			
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible
<i>Track-out</i>			
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Low Risk	Negligible
Low	Low Risk	Low Risk	Negligible

Source: Institute of Air Quality Management, Guidance on the assessment of dust from demolition and construction, February 2014.