

Appendix 14A

Construction Dust Assessment Methodology and Baseline

Welsh Government
Global Centre of Rail Excellence
Air Quality Appendix

Air quality

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14.1 Air quality assessment methodology and baseline

Methodology for construction dust risk assessment

- 14.1.1 The impacts of construction and associated air quality effects upon locally sensitive receptors from demolition, earthworks, trackout and construction activities have been assessed using the qualitative approach guidance prescribed by the Institute of Air Quality Management (IAQM)¹.
- 14.1.2 An ‘impact’ is described as a change in pollutant concentrations or dust deposition, while an ‘effect’ is described as the consequence of an impact. The main impacts that may arise during demolition and construction of the proposed development are:
- dust deposition, resulting in the soiling of surfaces;
 - visible dust plumes;
 - elevated PM10 concentrations as a result of dust generating activities at the proposed development; and
 - an increase in NO2 and PM10 concentrations due to exhaust emissions from non-road mobile machinery and vehicles accessing the proposed development.
- 14.1.3 The IAQM guidance¹ considers the potential for dust emissions from activities such as demolition of existing structures, earthworks, construction of new structures and trackout. Earthworks refer to the processes of soil stripping, ground levelling, excavation and land capping, while trackout is the transport of dust and dirt from the proposed development onto the public road network where it may be deposited and then re-suspended by vehicles using the network. This arises when vehicles leave the site with dust materials, which may then spill onto the road, or when they travel over muddy ground on site and then transfer dust and dirt onto the road network.
- 14.1.4 There are five steps in the assessment process described in the IAQM guidance¹. These are summarised in Diagram 1 and are further outlined in the paragraphs below.

¹ IAQM (2016), Guidance on the Assessment of Dust from Demolition and Construction (Version 1.1)

Step 1: Need for assessment

- 14.1.5 The first step is the initial screening for the need for a detailed assessment. According to the IAQM guidance, an assessment is required where there are sensitive receptors within 350m of the proposed development boundary (or 50m where there are ecological receptors) and/or within 50m of the route(s) used by the construction vehicles on the public highway and up to 500m from the proposed development entrance(s).

Step 2: Assess the risk of dust impacts

- 14.1.6 This step is split into three sections as follows:
- 2A – define the potential dust emission magnitude;
 - 2B – define the sensitivity of the area; and
 - 2C – define the risk of impacts.
- 14.1.7 Each of the dust-generating activities is prescribed a dust emission magnitude depending on the scale and nature of the works (Step 2A) based on the criteria shown in Table 1.
- 14.1.8 The sensitivity of the surrounding area is then determined (Step 2B) for each dust effect from the above dust-generating activities, based on the proximity and number of receptors, their sensitivity to dust, the local PM₁₀ background concentrations and any other site-specific factors.
- 14.1.9 Table 2 to Table 4 shows the criteria for defining the sensitivity of the area to different dust effects.
- 14.1.10 The overall risk of the impacts for each activity is then determined (Step 2C) prior to the application of any mitigation measures (Table 5) and an overall risk for the proposed development derived.

Step 3: Determine the site-specific mitigation

- 14.1.11 Once each of the activities is assigned a risk rating, appropriate mitigation measures are identified. Where the risk is negligible, no mitigation measures beyond those required by legislation are necessary.

Step 4: Determine any significant residual effects

- 14.1.12 Once the risk of dust impacts has been determined and the appropriate dust mitigation measures identified, the final step is to determine whether there are any residual significant effects. The IAQM guidance¹ notes that it is anticipated that with the implementation of effective site-specific mitigation measures, the environmental effect will not be significant in most cases.

Step 5: Prepare a dust assessment report

14.1.13 The last step of the assessment is the preparation of a Dust Assessment Report which forms part of the EIA.

Diagram 1: IAQM dust assessment methodology

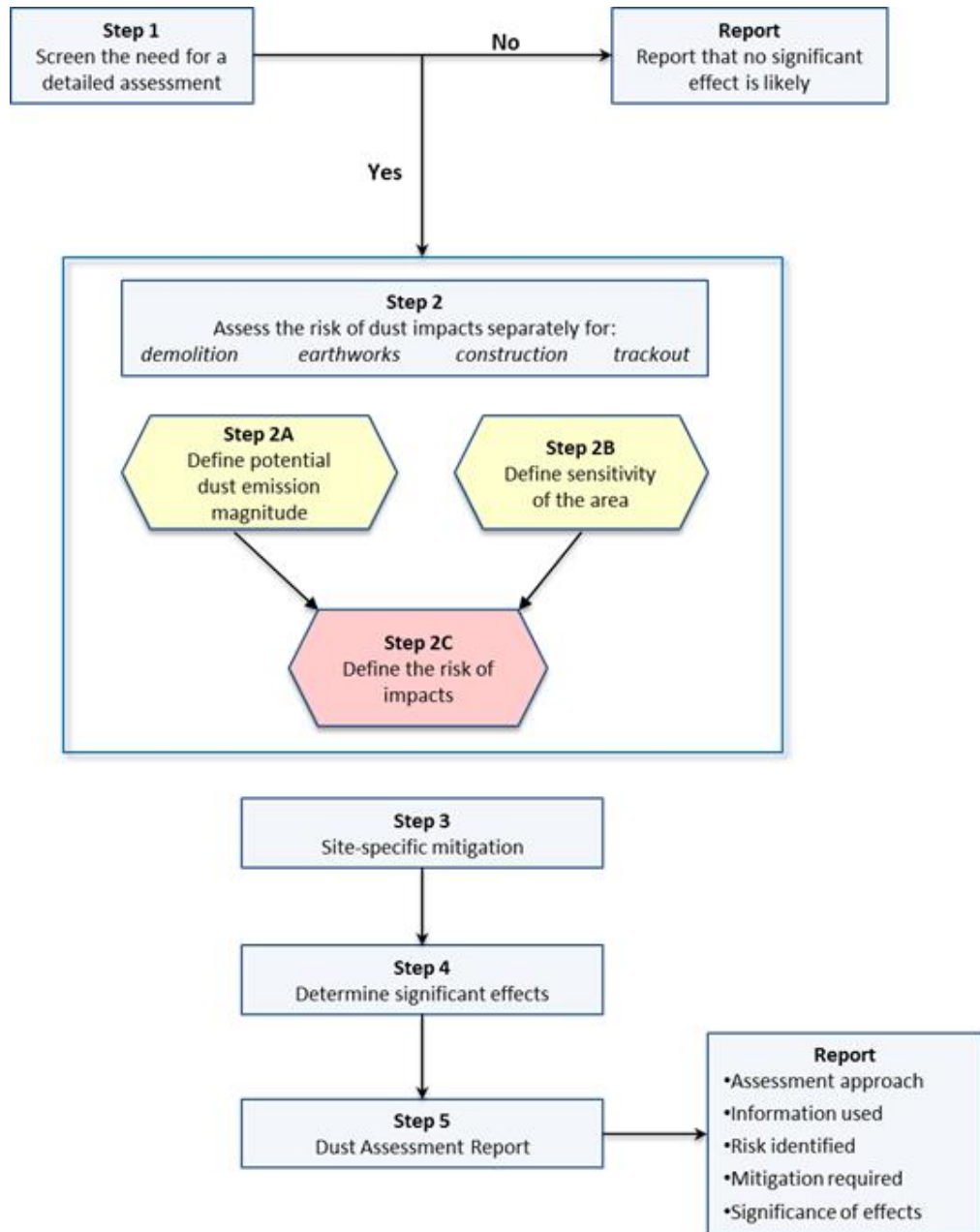


Table 1: Dust emission magnitude

Dust emission magnitude		
Small	Medium	Large
Demolition		
<ul style="list-style-type: none"> total building volume <20,000m³; construction material with low potential for dust release (e.g. metal cladding or timber); demolition activities <10m above ground; and demolition during wetter months. 	<ul style="list-style-type: none"> total building volume 20,000 – 50,000m³; potentially dusty construction material; and demolition activities 10 – 20m above ground level. 	<ul style="list-style-type: none"> total building volume >50,000m³; potentially dusty construction material (e.g. concrete); on-site crushing and screening; and demolition activities >20m above ground level.
Earthworks		
<ul style="list-style-type: none"> total site area <2,500m² soil type with large grain size (e.g. sand); <5 heavy earth moving vehicles active at any one time; formation of bunds <4m in height; total material moved <10,000 tonnes; and earthworks during wetter months. 	<ul style="list-style-type: none"> total site area 2,500m² – 10,000m² moderately dusty soil type (e.g. silt); 5 – 10 heavy earth moving vehicles active at any one time; formation of bunds 4 – 8m in height; and total material moved 20,000 – 100,000 tonnes. 	<ul style="list-style-type: none"> total site area >10,000m²; 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 >8m in height; and total material moved >100,000 tonnes.
Construction		
<ul style="list-style-type: none"> total building volume <25,000m³; and construction material with low potential for dust release (e.g. metal cladding or timber). 	<ul style="list-style-type: none"> total building volume 25,000 – 100,000m³; potentially dusty construction material (e.g. concrete); and on-site concrete batching. 	<ul style="list-style-type: none"> total building volume >100,000m³; on-site concrete batching; and sandblasting.
Trackout		
<ul style="list-style-type: none"> <10 Heavy duty vehicle (HDV) (>3.5t) outward movements in any one day; surface material with low potential for dust release; and unpaved road length <50m. 	<ul style="list-style-type: none"> 10 – 50 HDV (>3.5t) outward movements in any one day; moderately dusty surface material (e.g. high clay content); and unpaved road length 50 – 100m. 	<ul style="list-style-type: none"> >50 HDV (>3.5t) outward movements in any one day; potentially dusty surface material (e.g. high clay content); and unpaved road length >100m.

Table 2: Sensitivity of the area to dust soiling effects

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
	< 10	Medium	Low	Low	Low
Medium	> 1	Medium	Low	Low	Low
Low	> 1	Low	Low	Low	Low

Table 3: Sensitivity of the area to human health impacts

Background PM ₁₀ concentrations (annual mean)	Number of receptors	Distance from the source (m)				
		< 20	< 50	< 100	< 200	< 350
High receptor sensitivity						
> 32µg/m ³	> 100	High	High	High	Medium	Low
	10 – 100			Medium	Low	
	< 10		Medium	Low		
28 – 32µg/m ³	> 100	High	High	High	Low	Low
	10 – 100			Medium	Low	
	< 10		Medium	Low		
24 – 28µg/m ³	> 100	High	Medium	Medium	Low	Low
	10 – 100			Low	Low	
	< 10		Medium	Low		
< 24µg/m ³	> 100	Medium	Low	Low	Low	Low
	10 – 100	Low				
	< 10	Low				
Medium receptor sensitivity						
> 32µg/m ³	> 10	High	Medium	Low	Low	Low
	< 10	Medium	Low			
28 – 32µg/m ³	> 10	Medium	Low	Low	Low	Low
	< 10	Low				
24 – 28µg/m ³	> 10	Low	Low	Low	Low	Low
	< 10					
< 24µg/m ³	> 10	Low	Low	Low	Low	Low
	< 10					
Low receptor sensitivity						
–	> 1	Low	Low	Low	Low	Low

Table 4: Sensitivity of the area to ecological impacts

Receptor sensitivity	Distance from the source (m)	
	< 20	< 50
High	High	Medium
Medium	Medium	Low

Low	Low	Low
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Table 5: Risk of dust impacts

Sensitivity of area	Dust emission magnitude		
	Large	Medium	Small
Demolition			
High	High risk site	Medium risk site	Medium risk site
Medium	High risk site	Medium risk site	Low risk site
Low	Medium risk site	Low risk site	Negligible
Earthworks			
High	High risk site	Medium risk site	Low risk site
Medium	Medium risk site	Medium risk site	Low risk site
Low	Low risk site	Low risk site	Negligible
Construction			
High	High risk site	Medium risk site	Low risk site
Medium	Medium risk site	Medium risk site	Low risk site
Low	Low risk site	Low risk site	Negligible
Trackout			
High	High risk site	Medium risk site	Low risk site
Medium	Medium risk site	Low risk site	Negligible
Low	Low risk site	Low risk site	Negligible