

Shannon Technology and Energy Park (STEP) Power Plant

Appendix A8.1: Construction Dust Assessment Method

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A.1 Introduction

This section describes the technical method by which the air quality impact of the Proposed Development from construction phase particulate emissions has been considered. It is in line with the approach set out in Institute of Air Quality Management guidance on the assessment of dust from demolition and construction (IAQM, 2024).

STEP 1: Screen the Requirement for a Detailed Assessment

Sensitive receptors were identified and the distance to the site and construction routes were determined according to the examples of sensitivity shown in **Table A8.1.1**. According to the IAQM, an assessment will normally be required where there are sensitive receptors within 250 m of the boundary of a site and/or within 50 m of route(s) used by construction vehicles on the public highway, up to 250 m from the site entrance.

A human receptor, as considered within the IAQM guidance, is any location where a person or property may experience:

- i. The annoyance effects of airborne dust or dust soiling e.g. dwellings, industrial or commercial premises such as a vehicle showroom, food manufacturers, electronics manufacturers, amenity areas and horticultural operations; or
- ii. Exposure to PM₁₀ over a period relevant to the air quality objectives.

Ecological receptors within 50 m of the boundary of the site or routes used by construction vehicles on the public highway, up to 250 m from the site entrance, also need to be identified.

There are no ecological receptors which need to be considered as part of this assessment.

Table A8.1.1: Examples of Dust Sensitive Receptors

Sensitivity	Dust Soiling	Human Health	Ecological
High	<ul style="list-style-type: none"> • Dwellings. • Museum and other culturally important collections. • Medium- and long-term car parks. • Car showrooms. 	<ul style="list-style-type: none"> • Residential properties. • Hospitals. • Schools. • Residential care homes. 	<ul style="list-style-type: none"> • Locations with an international or national designation (e.g. SAC) and the designated features may be affected by dust soiling.
Medium	<ul style="list-style-type: none"> • Parks. • Places of work. 	<ul style="list-style-type: none"> • Office and shop workers, but will generally not include workers occupationally exposed to PM₁₀, as protection is covered by Health and Safety at Work legislation. 	<ul style="list-style-type: none"> • Locations with a national designation (e.g. SSSI) where the features may be affected by dust deposition.
Low	<ul style="list-style-type: none"> • Playing fields. • Farmland (unless commercially-sensitive horticultural). • Footpaths. • Short term car parks. • Roads. 	<ul style="list-style-type: none"> • Public footpaths. • Playing fields • Parks. • Shopping streets. 	<ul style="list-style-type: none"> • Locations with a local designation where the features may be affected by dust deposition local Nature Reserve with dust sensitive features.

SAC: Special Area of Conservation; SSSI: Site of Special Scientific Interest

STEP 2: Assess the Risk of Dust Impacts

The risk of dust arising in sufficient quantities to cause annoyance and / or health effects was determined for each activity (demolition, earthworks, construction works and track out), taking account of:

- i. The scale and nature of the works, which determines the potential dust emission magnitude (small, medium or large) (Step 2A); and
- ii. The sensitivity of the area (low, medium or high) (**Step 2B**).

These factors were then combined to give the risk of dust effects with no mitigation applied, as Negligible, Low, Medium or High.

It should be noted that where detailed information was not available to inform the risk category, professional judgement and experience was used and a cautious approach adopted, in accordance with the guidance.

STEP 2A: Define the Potential Dust Emission Magnitude

Demolition

Table A8.1.2 presents the demolition works dust emission classification. Demolition works will be minimal given the current state of the Site.

Table A8.1.2: Potential Demolition Works Dust Emission Classification

Potential Dust Emission Classes	Criteria
Large	<ul style="list-style-type: none"> • Large: Total building volume >75,000 m³ • Potentially dusty construction material (e.g. concrete) • On-site crushing and screening • Demolition activities >12 m above ground level
Medium	<ul style="list-style-type: none"> • Total building volume 20,000 m³ – 75,000 m³ • Potentially dusty construction material • Demolition activities 6-12 m above ground level
Small	<ul style="list-style-type: none"> • Total building volume <12,000 m³ • Construction material with low potential for dust release (e.g. metal cladding or timber) • Demolition activities <6 m above ground • Demolition during wetter months

Earthworks

Earthworks will primarily involve excavating material, haulage, tipping and stockpiling. The classifications in **Table A8.1.3** are based on examples of suitable criteria. Factors such as existing land use, topography, seasonality, duration and scale were also taken into consideration, where possible.

Table A8.1.3: Potential Earthworks Dust Emission Classification

Potential Dust Emission Classes	Criteria
Large	<ul style="list-style-type: none"> • Total site area: >110,000 m² • Potentially dusty soil type (e.g. clay). • >10 heavy earth moving vehicle active at any one time. • Formation of bunds >6 m in height.
Medium	<ul style="list-style-type: none"> • Total site area: 18,000 - 110,000 m² • Moderately dusty soil type (e.g. silt). • 5 -10 heavy earth moving vehicle active at any one time. • Formation of bunds 3 - 6 m in height.
Small	<ul style="list-style-type: none"> • Total site area: <18,000 m² • Soil type with large grain size (e.g. sand). • < 5 heavy earth moving vehicle active at any one time. • Formation of bunds < 3 m in height.

Construction

The key issues when determining the potential dust emission magnitude during the construction phase include the size of the building(s) / infrastructure, method of construction, construction materials and duration of build. The classifications in **Table A8.1.4** are based on examples of suitable criteria. Factors such as seasonality, building type, duration and scale were also taken into consideration, where possible.

Table A8.1.4: Potential Construction Works Dust Emission Classification

Potential Dust Emission Classes	Criteria
Large	<ul style="list-style-type: none"> Total building volume >75,000 m³ Piling, on site concrete batching, sandblasting.
Medium	<ul style="list-style-type: none"> Total building volume 12,000 – 75,000 m³ Potentially dusty construction material (e.g. concrete). On-site concrete batching.
Small	<ul style="list-style-type: none"> Total building volume <12,000 m³ Construction material with low potential for dust release (e.g. metal cladding or timber).

Track-out

Track-out is 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 local road network. The classifications in **Table A8.1.5** are based on examples of suitable criteria. Factors such as vehicle size, speed, numbers, geology and duration were also taken into consideration, where possible.

Table A8.1.5: Potential Track-out Dust Emission Classification

Potential Dust Emission Classes	Criteria
Large	<ul style="list-style-type: none"> 50 HGV (>3.5t) outward movements in any one day. Potentially dusty surface material. Unpaved road length > 100 m.
Medium	<ul style="list-style-type: none"> 25 – 100 HGV (>3.5t) outward movements in any one day. Moderately dusty surface material. Unpaved road length 50 – 100 m.
Small	<ul style="list-style-type: none"> < 25 HGV (>3.5t) outward movements in any one day. Surface material with low potential for dust release. Unpaved road length < 50 m.

STEP 2B: Define the Sensitivity of the Area

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

- i. The specific sensitivities of receptors in the area;
- ii. The proximity and number of those receptors;
- iii. In the case of PM₁₀, the local background concentrations; and
- iv. Site specific factors, such as whether there are natural shelters, such as trees to reduce the risk of wind-blown dust.

The sensitivity of the area is determined separately for dust soiling impacts on people and properties (**Table A8.1.6** human health impacts (**Table A8.1.7**).

Table A8.1.6: Sensitivity of the Area to Dust Soiling Effects on People and Property

Receptor Sensitivity	Number of Receptors	Distance from the Source (m)			
		< 20 m	< 50 m	< 100 m	< 250 m
High	>100	High	High	Medium	Low
Medium	10 – 100	High	Medium	Low	Low
Low	1 -10	Medium	Low	Low	Low
Low	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

Table A8.1.7: Sensitivity of the Area to Human Health Impacts

Receptor Sensitivity	Annual Mean PM ₁₀ Concentration	Number of Receptors	Distance from the Source (m)			
			< 20 m	< 50 m	< 100 m	< 250 m
High	> 32 µg/m ³	>100	High	High	High	Medium
		10 – 100	High	High	Medium	Low
		1 -10	High	Medium	Low	Low
	28 - 32 µg/m ³	>100	High	High	Medium	Low
		10 – 100	High	Medium	Low	Low
		1 -10	High	Medium	Low	Low
	24 - 28 µg/m ³	>100	High	Medium	Low	Low
		10 – 100	High	Medium	Low	Low
		1 -10	Medium	Low	Low	Low
	< 24 µg/m ³	>100	Medium	Low	Low	Low
		10 – 100	Low	Low	Low	Low
		1 -10	Low	Low	Low	Low
Medium	>32 µg/m ³	> 10	High	Medium	Low	Low
		1 -10	Medium	Low	Low	Low
	28 – 32 µg/m ³	> 10	Medium	Low	Low	Low
		1 -10	Low	Low	Low	Low
	24 – 28 µg/m ³	> 10	Low	Low	Low	Low
		1 -10	Low	Low	Low	Low
<24 µg/m ³	> 10	Low	Low	Low	Low	
	1 -10	Low	Low	Low	Low	
Low	-	≥1	Low	Low	Low	Low

STEP 2C: Define the Risk of Impacts

The dust emission magnitude determined at Step 2A should be combined with the sensitivity of the area determined at Step 2B to determine the risk of effects with no mitigation applied (**Table A8.1.8**). This Step is undertaken for each activity undertaken on site.

Table A8.1.8: Risk of Dust Impacts

Activity	Sensitivity of Area	Dust Emission Classification		
		Large	Medium	Small
Demolition	High	High	Medium	Medium
	Medium	High	Medium	Low
	Low	Medium	Low	Negligible
Earthworks	High	High	Medium	Low

Activity	Sensitivity of Area	Dust Emission Classification		
		Large	Medium	Small
Construction	Medium	Medium	Medium	Low
	Low	Low	Low	Negligible
	High	High	Medium	Low
	Medium	Medium	Medium	Low
	Low	Low	Low	Negligible
	High	High	Medium	Low
Track-out	Medium	Medium	Medium	Low
	Low	Low	Low	Negligible

STEP 3: Identify the need for Site-Specific Mitigation

Based on the risk of effects determined in Step 2C for each activity, appropriate site-specific mitigation measures were recommended. Appropriate mitigation measures are set out in the IAQM Guidance.

STEP 4: Define Impacts and Their Significance

Finally, the significance of the potential residual dust impacts, i.e. after mitigation, was determined. According to the IAQM Guidance the residual impacts assumes that all mitigation measures (recommended in Step 3) to avoid or reduce impacts are adhered to, and therefore the residual impacts should be 'not significant'.