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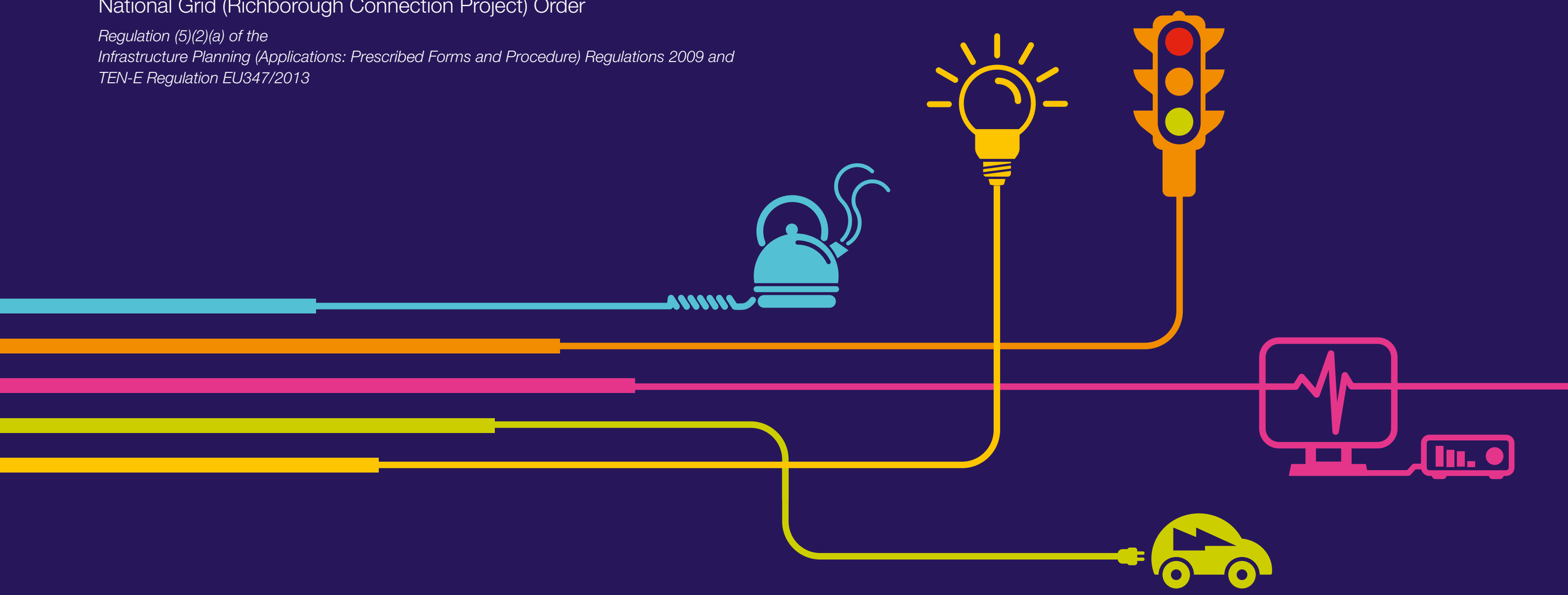
nationalgrid

12A Dust Risk Assessment

National Grid (Richborough Connection Project) Order

Regulation (5)(2)(a) of the
Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 and
TEN-E Regulation EU347/2013



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Richborough Connection Project

Volume 5

5.4 Environmental Statement Appendices

5.4.12A Dust Risk Assessment

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12. DUST RISK ASSESSMENT

12.1 Introduction

12.1.1 This dust risk assessment forms a technical appendix to **Chapter 12** of the Environmental Statement (ES) (Volume 5, Document 5.2) of the Richborough Connection Project ('the proposed development').

12.2 Methodology

12.2.1 The dust risk assessment has been undertaken in accordance with the Institute of Air Quality Management (IAQM) guidance[1].

12.2.2 The risk of dust emissions from construction/demolition activities causing an adverse effect on human or ecological receptors depends on:

- the type of construction activities being undertaken, and the duration of these activities;
- the size of the construction site;
- the meteorological conditions (such as wind speed, wind direction and rainfall);
- the proximity of the receptors to the construction activities;
- the effectiveness of the dust mitigation measures; and
- receptors' sensitivity to dust.

12.2.3 Activities within the proposed site boundary and its vicinity have been divided into four types to reflect their different potential effects. These are:

- demolition;
- earthworks;
- construction; and
- trackout of mud and debris onto the highway.

12.2.4 The potential for dust emissions was assessed for each activity that is likely to take place and considers three separate dust effects:

- annoyance due to dust soiling;
- harm to ecological receptors; and
- the risk of health effects due to an increase in exposure to PM_{10} (Particulate Matter less than or equal to 10 microns in size).

12.2.5 The assessment steps are detailed below.

[1] The Institute of Air Quality Management (2014) Guidance on the Assessment of Dust from Demolition and Construction

Step 1

12.2.6 Step 1 screens the requirement for a more detailed assessment. An assessment will normally be required where there is:

- a 'human receptor' within 350m of the boundary of the site;
- an 'ecological receptor' within 50m of the boundary of the site; or
- either a human or ecological receptor within 50m of the route(s) used by construction vehicles on the public highway, up to 500m from the site entrance(s) for large sites, up to 200m from medium sites and 50m from small sites.

12.2.7 Should sensitive receptors not be present within the relevant distances then **negligible** effects would be expected and further assessment is not necessary.

Step 2

12.2.8 Step 2 assesses the risk of potential dust effects for each of the four types of construction activity. A site is allocated a risk category (Step 2C) based on two steps:

- Step 2A: The scale and nature of the works, which determines the magnitude of potential dust emissions as small, medium or large.
- Step 2B: The sensitivity of the area to dust effects, which is defined as low, medium or high sensitivity.

Step 2A

12.2.9 The magnitude of potential unmitigated dust emissions is determined based on the criteria shown in **Table 12.A.1**.

Table 12.A.1 Construction dust - magnitude of emission

Magnitude	Activity	Criteria
Large	Demolition	• Total building volume greater than 50,000m^3 • Potentially dusty construction material (e.g. concrete) • On-site crushing and screening • Demolition activities greater than 20m above ground level
	Earthworks	• Total site area greater than 10,000m^2 • Potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size) • More than ten heavy earth moving vehicles active at any one time • Formation of bunds greater than 8m in height • More than 100,000 tonnes of material moved
	Construction	• Total building volume greater than 100,000m^3 • On site concrete batching • Sandblasting

Magnitude	Activity	Criteria
	Trackout	• Greater than 50 Heavy Duty Vehicle (HDV) (greater than 3.5 tonnes) outward movements in any one day • Potentially dusty surface material (e.g. high clay content) • Unpaved road length greater than 100m
Medium	Demolition	• Total building volume 20,000m^3 - 50,000m^3 • Potentially dusty construction material • Demolition activities 10-20m above ground level
	Earthworks	• Total site area 2,500m^2 to 10,000m^2 • Moderately dusty soil type (e.g. silt) • Five to ten heavy earth moving vehicles active at any one time • Formation of bunds 4m to 8m in height • Total material moved 20,000 tonnes to 100,000 tonnes
	Construction	• Total building volume 25,000m^3 to 100,000m^3 • Potentially dusty construction material (e.g. concrete) • On site concrete batching
	Trackout	• 10-50 HDV (greater than 3.5 tonnes) outward movements in any one day • Moderately dusty surface material (e.g. high clay content) • Unpaved road length 50m to 100m
Small	Demolition	• Total building volume less than 20,000m^3 • Construction material with low potential for dust release (e.g. metal cladding or timber) • Demolition activities less than 10m above ground • Demolition during wetter months
	Earthworks	• Total site area less than 2,500m^2 • Soil type with large grain size (e.g. sand) • Less than five heavy earth moving vehicles active at any one time • Formation of bunds less than 4m in height • Total material moved less than 20,000 tonnes • Earthworks during wetter months
	Construction	• Total building volume less than 25,000m^3 • Construction material with low potential for dust release (e.g. metal cladding or timber)
	Trackout	• Less than 10 HDV (greater than 3.5 tonnes) outward movements in any one day • Surface material with low potential for dust release • Unpaved road length less than 50m

Step 2B

12.2.10 The sensitivity of the area takes account of a number of factors:

- the specific sensitivities of receptors in the area;
- the proximity and number of those receptors;

- in the case of PM_{10}, the local background concentration; and
- site-specific factors, such as whether there are natural shelters, such as trees, to reduce the risk of wind-blown dust.

12.2.11 **Table 12.A.2** provides guidance on determining the sensitivity of different types of receptors to dust soiling, health effects and ecological effects.

Table 12.A.2 Guidance on the sensitivity of types of receptor to dust soiling, health effects and ecological effects

	High sensitivity receptor	**Medium sensitivity receptor**	**Low sensitivity receptor**
Sensitivities of people to dust soiling effects	▪ Users can reasonably expect an enjoyment of a high level of amenity; or ▪ The appearance, aesthetics or value of their property would be diminished by soiling; and the people or property would reasonably be expected to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land. ▪ Indicative examples include dwellings, museums and other culturally important collections, medium and long term car parks and car showrooms.	▪ Users would expect to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home; or ▪ The appearance, aesthetics or value of their property could be diminished by soiling; or ▪ The people or property would not reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land. ▪ Indicative examples include parks and places of work.	▪ The enjoyment of amenity would not reasonably be expected; or ▪ Property would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling; or ▪ There is transient exposure, where the people or property would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land. ▪ Indicative examples include playing fields, farmland (unless commercially-sensitive horticultural), footpaths, short term car parks and roads.

	High sensitivity receptor	Medium sensitivity receptor	Low sensitivity receptor
Sensitivities of people to the health effects of PM_{10}	▪ Locations where members of the public are exposed over a time period relevant to the air quality objective for PM_{10} (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day). ▪ Indicative examples include residential properties. Hospitals, schools and residential care homes should also be considered as having equal sensitivity to residential areas for the purposes of the assessment.	▪ Locations where the people exposed are workers, and exposure is over a time period relevant to the air quality objective for PM_{10} (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day). ▪ Indicative examples include office and shop workers, but will generally not include workers occupationally exposed to PM_{10}, as protection is covered by Health and Safety at Work legislation.	▪ Locations where human exposure is transient. ▪ Indicative examples include public footpaths, playing fields, parks and shopping streets.
Sensitivities of ecological receptors to dust effects	▪ Locations with an international or national designation *and* the designated features may be affected by dust soiling; or ▪ Locations where there is a community of a particularly dust sensitive species such as vascular species included in the Red Data	▪ Locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown; or ▪ Locations with a national designation where the features may be affected by dust deposition.	▪ Locations with a local designation where the features may be affected by dust deposition. ▪ Indicative example is a local Nature Reserve with dust sensitive features.

	High sensitivity receptor	Medium sensitivity receptor	Low sensitivity receptor
	List for Great Britain. ▪ Indicative examples include a SAC designated for acid heathlands or a local site designated for lichens adjacent to the demolition of a large site containing concrete (alkali) buildings.	▪ Indicative example is a SSSI with dust sensitive features.	

12.2.12 Following identification of the receptor sensitivity, the sensitivity of the area to dust soiling, human health and ecological effects is determined using **Table 12.A.3**, for each of the four activities (demolition, construction, earthworks and trackout).

Table 12.A.3 Sensitivity of the area in terms of dust soiling effects, human health impacts and ecological impacts

Receptor sensitivity	Annual Mean PM_{10} Concentration	Number of receptors*	Distance from source (m) <20	<50	<100	<200	<350
Dust soiling effects							
	n/a	>100	High	High	Medium	Low	Low
High	n/a	10 – 100	High	Medium	Low	Low	Low
	n/a	1 - 10	Medium	Low	Low	Low	Low
Medium	n/a	>1	Medium	Low	Low	Low	Low
Low	n/a	>1	Low	Low	Low	Low	Low
Health impacts							
	>32µg/m³	>100	High	High	High	Medium	Low
		10 – 100	High	High	Medium	Low	Low
		1 - 10	High	Medium	Low	Low	Low
	28-32µg/m³	>100	High	High	Medium	Low	Low
		10 – 100	High	Medium	Low	Low	Low
High		1 - 10	High	Medium	Low	Low	Low
	24-28µg/m³	>100	High	Medium	Low	Low	Low
		10 – 100	High	Medium	Low	Low	Low
		1 - 10	Medium	Low	Low	Low	Low
	<24µg/m³	>100	Medium	Low	Low	Low	Low
		10 – 100	Low	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low	Low
Medium	n/a	>10	High	Medium	Low	Low	Low
	n/a	1 - 10	Medium	Low	Low	Low	Low
Low	n/a	>1	Low	Low	Low	Low	Low
Ecological effects							
High	n/a	n/a	High	Medium	n/a	n/a	n/a
Medium	n/a	n/a	Medium	Low	n/a	n/a	n/a
Low	n/a	n/a	Low	Low	n/a	n/a	n/a

* In the case of high sensitivity receptors with high occupancy (such as schools or hospitals), receptor number is approximate of the number of people likely to be present. In the case of residential dwellings, receptor number is just the number of properties.

12.2.13 The guidance also provides the following factors to consider when determining the sensitivity of an area to potential dust effects during the construction phase.

- Any history of dust generating activities in the area.
- The likelihood of concurrent dust generating activity on nearby sites.
- Any pre-existing screening between the source and the receptors.
- Any conclusions drawn from analysing local meteorological data which accurately represent the area; and if relevant the season during which works will take place.
- Any conclusions drawn from local topography.

- Duration of the potential effect, as a receptor may become more sensitive over time.
- Any known specific receptor sensitivities which go beyond the classifications given in the document.

Step 2C

12.2.14 The risk of effects with no mitigation applied is then defined based upon the interaction between the magnitude of emission and the highest level of area sensitivity (determined in Steps 2A and 2B, respectively) for each construction activity. The matrices presented in **Table 12.A.4** provide a method of assigning the level of risk for each activity.

Table 12.A.4 Risk of dust effects

Sensitivity of area	**Dust emission magnitude**		
	Large	**Medium**	**Small**
Demolition			
High	High Risk	Medium Risk	Medium Risk
Medium	High Risk	Medium Risk	Low Risk
Low	Medium Risk	Low Risk	Negligible
Earthworks			
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible
Construction activities			
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible
Trackout			
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Low Risk	Negligible
Low	Low Risk	Low Risk	Negligible

Step 3

12.2.15 Step 3 requires the identification of site specific mitigation measures to reduce potential dust effects based upon the relevant risk categories identified in Step 2. For sites with negligible risk, mitigation measures beyond those required by legislation are not required.

Step 4

12.2.16 Once the risk of dust effects has been determined in Step 2C and the appropriate dust mitigation measures identified in Step 3, the final step is to determine whether there are significant effects arising from the construction phase of a proposed

development. This is based on professional judgement but takes account of the significance of the effects for each of the potential dust generating activities.

12.2.17 For almost all construction activity, the aim should be to prevent significant effects on receptors through the use of effective mitigation.

12.3 Risk Assessment

Step 1

12.3.1 The desk-study undertaken to inform the baseline identified a number of sensitive receptors within 350m of the site boundary (see **Figure 12.1 in Volume 5, Document 5.3**). As such, a dust risk assessment has been undertaken. The dust risk assessment has considered the Order limits for the proposed development in determining the site risk, given that the Order limits represent where potential development activities would take place. The public highway routes that extend beyond the Order limits, in order to connect to the wider road network for example, are also taken into account.

Step 2A

Demolition

12.3.2 The dismantling and removal of the existing 132kV overhead line involves: removing conductors, fittings, metallic structures and foundations (to 1.5m below the surface) along the route length of the line. It is understood that the cable section underground between PX6 and PX7 would not be removed[2]. As each of the pylon sites are confined to a relatively small area and the majority of the structures to be removed are metal, it is considered that there would be generally low potential for dust release during the removal of the existing pylons. However, in some instances, steelwork may need to be cut up, which has the potential to cause dust. Additionally, the foundations of the pylons would require removal, up to a depth of 1.5m. The magnitude of potential dust emissions from demolition is therefore considered to be medium.

Earthworks

12.3.3 Earthworks will involve the excavation of material, to accommodate the foundations of the pylons and land drains. The amount of excavation required for the foundations varies dependent on the type of foundation. For example, piled foundations using steel tubes involve minimal excavation, whereas pad and chimney foundations require excavations for each pylon leg. Land drains will be installed where required at pylon sites, and would typically be 1m deep. As any excavation would be limited to a relatively small area, it is considered that the magnitude of potential dust emissions from earthworks would be medium.

Construction

12.3.4 Whilst the construction of the pylons would have a low potential for dust release, concrete would be used for the foundations, and temporary haul roads would be constructed. It is therefore considered that the magnitude of potential dust emissions from construction works would be medium.

[2] Mott MacDonald. Construction Methodology for the Richborough Connection Project. 2014

Trackout

12.3.5 Given the proposed number of HDVs on construction routes and that the temporary haul roads would comprise the placement of a geotextile membrane upon which stone is then laid and rolled, it is considered that the magnitude of potential dust emissions from trackout could be medium at receptor locations in close proximity to the temporary haul roads.

12.3.6 The dust emission magnitude for the proposed development is summarised in **Table 12.A.5**.

Table 12.A.5 Dust emission magnitude summary

Activity	Dust emission magnitude
Demolition	Medium
Earthworks	Medium
Construction	Medium
Trackout	Medium

Step 2B

12.3.7 There are relatively few receptors within the vicinity of the proposed development, with the exception of Section A which covers North East Canterbury. Section A has therefore been considered separately to Sections B, C and D.

12.3.8 The sensitivities of the areas have been determined following **Table 12.A.2** and **Table 12.A.3** and for each construction activity, and are summarised in **Table 12.A.6** and **Table 12.A.7**.

Table 12.A.6 Summary of the sensitivity of the area – Section A

Potential effect	Sensitivity of the surrounding area			
	Demolition	**Earthworks**	**Construction**	**Trackout**
Dust soiling	High	High	High	High
Human health	Medium	Low	Low	Medium
Ecological	High	High	High	High

Table 12.A.7 Summary of the sensitivity of the area – Sections B, C and D

Potential effect	Sensitivity of the surrounding area			
	Demolition	**Earthworks**	**Construction**	**Trackout**
Dust soiling	Medium	Medium	Medium	High
Human health	Low	Low	Low	Low
Ecological	Low	Low	Low	High

Step 2C

12.3.9 The risk of effects with no mitigation applied was then defined based upon the interaction between the magnitude of emission and the highest level of area sensitivity (determined in Steps 2A and 2B, respectively) for each construction activity. Using the matrices presented in **Table 12.A.4**, the risk of dust effects was determined, as presented in **Table 12.A.8** and **Table 12.A.9**, for Sections A and Sections B, C and D, respectively.

Table 12.A.8 Summary of the risk of dust effects – Section A

Potential Effect	Risk Demolition	Earthworks	Construction	Trackout
Dust soiling	Medium Risk	Medium Risk	Medium Risk	Medium Risk
Human health	Medium Risk	Low Risk	Low Risk	Low Risk
Ecological	Medium Risk	Medium Risk	Medium Risk	Medium Risk

Table 12.A.9 Summary of the risk of dust effects – Section B, C and D

Potential effect	Risk Demolition	Earthworks	Construction	Trackout
Dust soiling	Medium Risk	Medium Risk	Medium Risk	Medium Risk
Human health	Low Risk	Low Risk	Low Risk	Low Risk
Ecological	Low Risk	Low Risk	Low Risk	Medium Risk

12.3.10 It should be noted that the potential for effects depends significantly on the distance between the dust generating activity and receptor location. Risk was predicted based on a worst-case scenario of works being undertaken at the proposed Order limits boundary closest to each sensitive area. Therefore, actual risk is likely to be lower than that predicted during the majority of the construction phase.

Step 3

12.3.11 Based on the risk ratings presented in **Table 12.A.8** and **Table 12.A.9**, environmental measures have been proposed to reduce the potential effects, as summarised in **Table 12.A.10**. These measures are derived from the IAQM guidance and have been adapted for the proposed development, based on the worst case risk for each construction activity. As the worst case risk for each activity is the same for all Sections, the measures have been combined. These are incorporated in the Construction Environmental Management Plan (CEMP).

Table 12.A.10 Environmental measures for Sections A to D

Measure	Highly recommended (H) or Desirable (D) measure
Communications	
Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.	H
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.	H
Display the head or regional office contact information.	H
Site management	
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.	H
Make the complaints log available to the local authorities when asked.	H
Record any exceptional incidents that cause dust and/or air emissions, either on- or off-site, and the action taken to resolve the situation in the log book.	H
Hold regular liaison meetings with other high risk construction sites within 500m of the site boundary if applicable 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.	D
Monitoring	
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 Authorities when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100m of site boundary, with cleaning to be provided if necessary.	D
Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authorities when asked.	H
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.	H
Consider dust monitoring within Section A and agree monitoring locations with the Local Authorities.	H
Preparing and maintaining the site	
Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.	H
Erect solid screens or barriers around dusty activities or the site boundary so that they are at least as high as any stockpiles on site.	H
Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period.	H
Avoid site runoff of water or mud.	H
Keep site fencing, barriers and scaffolding clean using wet methods.	H

Measure	Highly recommended (H) or Desirable (D) measure
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.	H
Cover, seed or fence stockpiles to prevent wind whipping.	H
Operating vehicle/machinery and sustainable travel	
Ensure all vehicles switch off engines when stationary - no idling vehicles.	H
Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.	H
Impose and signpost a maximum-speed-limit of 15mph on surfaced and 10mph 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 Authorities, where appropriate).	D
Contractor to prepare Construction Traffic Management Plan, which includes measures to manage the sustainable delivery of goods and materials.	H
Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).	D
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.	H
Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.	H
Use enclosed chutes and conveyors and covered skips, should they be required.	H
Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.	H
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.	H
Waste management	
No bonfires and burning of waste materials.	H
Demolition	
Ensure effective water suppression is used during demolition operations where applicable. Hand held sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition, high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground.	H
Avoid explosive blasting, using appropriate manual or mechanical alternatives.	H
Bag and remove any biological debris or damp down such material before demolition.	H
Earthworks	
Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.	D

Measure	Highly recommended (H) or Desirable (D) measure
Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable. Only remove the cover in small areas during work and not all at once.	D
Construction	
Avoid scabbling (roughening of concrete surfaces) if possible.	D
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.	H
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.	H
For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust.	D
Trackout	
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.	H
Avoid dry sweeping of large areas.	H
Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.	H
Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.	H
Record all inspections of haul routes and any subsequent action in a site log book.	H
Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.	H
Implement a wheel washing system.	H
Ensure there is an adequate area of hard surfaced road between the wheel washing area and the site exit, wherever site size and layout permits.	H
Access gates to be located at least 10m from receptors where possible.	H
Construction traffic	
Construction vehicles should avoid travelling through Air Quality Management Areas (AQMAs) where possible, namely, the Canterbury City Council AQMA (refer to **Figure 12.1 in Volume 5, Document 5.3**).	D

12.3.12 It is considered that with the implementation of the proposed environmental measures, construction dust effects would not be significant.