Outer Dowsing Offshore Wind

The Applicant's Response to T.H. Clements' Dust Report, Assessment and Conclusions

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1.0 Introduction

Following submission of the Development Consent Order (DCO) application for the Outer Dowsing (ODOW) Offshore Wind Farm ('the Project'), T.H. Clements & Son Limited (T.H. Clements) submitted a Written Representation [REP1-050][1] at Deadline 1 (24 October 2024).

T.H. Clements raised concerns regarding the potential impact of construction dust on sensitive crops, specifically Brassica vegetables, citing risks to crop quality and commercial agreements with retailers. This was based on the findings of the Technical Report: Dust Deposition Modelling Appendix 14, conducted by Sweco UK.

This document provides a detailed response to the conclusions of the Technical Report submitted by T.H. Clements at Deadline 1 [REP1-050]. The scope of this response includes:

- A high-level review of the Technical Report: Dust Deposition Modelling assessment appended to their Written Representation [REP1-050];
- A review of established practice for assessing dust impacts in the UK; and
- A summary of the Applicant's assessment 6.1.19 Chapter 19 Onshore Air Quality [AS1-046], particularly in terms of how impacts identified by T.H. Clements have been assessed in line with established best practice and assigned the maximum level of dust risk and protection.

The following sections provide a detailed review of these aspects, evaluating the robustness of the assessment approaches used to address dust soiling impacts on commercially sensitive farmland.

[1] Mills & Reeve. Written Representation (Objection) on behalf of T.H. Clements & Son Limited ("T.H. Clements"). 23rd October 2024. Document Reference: 750492886_1.

2.0 Review of T.H. Clements' Written Representation

T.H. Clements in their Written Representation [REP1-050] claim that dust soiling from construction activities will lead to a visual degradation, contamination, and damage of sensitive crops (specifically Brassica vegetables) within proximity to the Order Limits.

A dust deposition modelling study was conducted by representatives of T.H. Clements to quantify the extent of dust soiling impacts on their land. Although no established assessment thresholds exist, a series of benchmarks were developed based on a review of international literature and considering the commercial sensitivity of the Brassica crops to dust.

The modelling study considered construction activities associated with the onshore Export Cable Corridor (ECC), specifically segments 5 to 14 (inclusive). This translates into a 48.3km section of the onshore ECC. Construction of the onshore ECC is divided into five phases (6.1.3 Chapter 3 Project Description [APP-058]). Modelling was conducted for the following dust generating phases:

- Stage 2: Enabling Works;
- Stage 3: Cable Infrastructure Installation; and
- Stage 5: Reinstatement Works & Demobilisation.

Stage 1: Pre-Construction Works and Stage 4: Cable Installation were excluded as they were not considered particularly dusty activities.

Key on-site dust sources during the modelled phases included:

- Topsoil stripping, transfer to stockpile areas and backfilling;
- Subsoil excavation, transfer to stockpile areas and backfilling;
- Heavy earth vehicle movements;
- Haul road aggregate installation, grading and stripping;
- HGV movements on haul roads (wheel-generated dust);
- Transfer of stripped aggregate; and
- Wind erosion (stockpiles and excavated areas).

The model considered emissions across the full 48.3km study area. All sources except for wind erosion are caused by construction activities (e.g. material handling and vehicle movements). These sources were assumed to be active during working hours (7am-7pm, Monday to Saturday). All other sources were assumed to be active throughout the modelled duration.

All three phases were assumed to span one year across the 48.3km onshore ECC segment, resulting in a total duration of three years. This assumption is based on the premise that Primary Construction Compounds (PCCs) and the haul road (excluding the section between the A52 and the landfall compound) would be operational for up to 36 months, as outlined in 6.1.3 Chapter 3 Project Description [APP-058].

Each phase has been treated as a single source across the entire 48.3km modelled onshore ECC segment. This approach simulates a continuous live construction site, fixed at its maximum spatial construction parameters for the full three-year period. Table 1 provides a summary of the modelled emission input data for each scenario.

Two modelled scenarios were considered (With and Without Dust Controls). These scenarios were based on the controls proposed by the Applicant, in so far as practically possible i.e. based on the availability of published emission factors. Thus, the focus is on the

With Dust Control scenarios as they are intended to test the effectiveness of the mitigation measures proposed by the Applicant and evaluate residual risk.

A source apportionment analysis identified key dust-generating activities as:

- Wind erosion sources (soil bunds (stockpiles) and exposed areas); and
- Wheel-generated dust (HGV movements on haul road).

These sources have already been accounted for and conservatively assessed within the Applicant's assessment.

The modelling assessment conducted by T.H. Clements' representatives indicates that despite the implementation of mitigation, their land would still be exposed to a high risk of dust deposition. This could compromise commercial arrangements with retailers relating to quality. The risk is particularly relevant during the Stage 2: Enabling Works and Stage 3: Cable Infrastructure Installation phases of construction. According to the modelling, approximately 100 hectares (247 acres) of T.H. Clements' land could be sterilised due to dust soiling. This was confirmed in the post-hearing submission following ISH 3 [REP3-060] as it had not been explicitly specified in their modelling report.

Table 1: Modelled Emission Source Activity

Phase	Activity Type	Modelled Dimension	Modelled Duration
Stage 2: Enabling Works	Topsoil strip	3,381,000m^2 Single source: 1 x 70m width x 48.3km length	One Year (7am-7pm, Mon-Sat)
	Transfer of stripped topsoil to soil bund areas		
	Bulldozer movements		
	Installation of haul road aggregate		
	Grading of haul road		
	Loaded HGV movements on haul road (wheel generated dust)	6.8m width x 48.3km length Split across each discrete onshore cable route segment (to account for varying traffic flows)	
	Unloaded HGV movements on haul road (wheel generated dust)		
	Wind erosion: Topsoil bunds	2 x 258,405m^2 = 516,810m^2 (one bund either side of 'typical 60 m wide permanent corridor') Two sources: 2 x 5m width x 48.3km length (1)	One Year (continuous)
	Wind erosion: Other exposed areas	3,381,000m^2 Single source: 1 x 70m width x 48.3km length	
Stage 3: Cable Infrastructure Installation	Excavation of subsoil (cable trenches)	3,381,000m^2 (70m width x 48.3km length)	One Year (7am-7pm, Mon-Sat)
	Transfer of subsoil to soil bund areas		
	Backfill of subsoil to cable trenches		
	Loaded HGV movements on haul road	6.8m width x 48.3km length Split across each discrete onshore cable route segment (to account for varying traffic flows)	
	Unloaded HGV movements on haul road		
	Wind erosion: Subsoil bunds	2 x 258,405m^2 = 516,810m^2 (one bund either side of 'typical 60 m wide permanent corridor') Two sources: 2 x 5m width x 48.3km length (1)	One Year (continuous)
	Wind erosion: Topsoil bunds		

Phase	Activity Type	Modelled Dimension	Modelled Duration
	Wind erosion: Exposed cable trenches	3,381,000m^2 Single source: 1 x 70m width x 48.3km length	
	Wind erosion: Other exposed surfaces		
Stage 5: Reinstatement & Demobilisation	Loaded HGV movements on haul road	6.8m width x 48.3km length Split across each discrete onshore cable route segment (to account for varying traffic flows)	One Year (7am-7pm, Mon-Sat)
	Unloaded HGV movements on haul road		
	Backfill of topsoil	3,381,000m^2 Single source: 1 x 70m width x 48.3km length	
	Haul road aggregate strip		
	Transfer of stripped aggregate		
	Bulldozer movements		
	Wind erosion: Exposed areas (excluding reinstated trenches and bunds)	3,381,000m^2 Single source: 1 x 70m width x 48.3km length	One Year (continuous)
(1) Wind erosion: Topsoil bunds: There appears to be a minor overrepresentation of the modelled area for bunds – using a 5.35m width. There is no clarification. *2 x 258,405m^2 = 516,810m^2* *Divided by 48.3km length* *= 5.35m width*			

2.1 Emission Factors

There is a lack of validated UK or European dust emission factors for the activities modelled in the T.H. Clements study. This reflects the fact that dust modelling in the UK is neither common nor an established practice. Instead, the Institute of Air Quality Management (IAQM) provides an alternative assessment framework to assess construction dust impacts (Section 3.0).

Table 4-3 [REP1-050] provides the source of emission factors used in the assessment. They are sourced from international guidance documents, including:

- Australian Government Department of the Environment and Heritage National Pollutant Inventory (NPI) 'Emission Estimation Technique Manual for Mining'; and
- United States Environmental Protection Agency 'Air Pollutant 42' (US EPA AP-42) suite of publications, specifically Chapter 13.2.4 Aggregate Handling and Storage Piles.

These documents focus on the mining industry, as evidenced by the title of the Australian NPI Mining manual (Emission Estimation Technique Manual for Mining). In the T.H. Clements study, six emission factors are used throughout. Five of these factors are sourced from the Australian NPI Mining guidance, which explicitly states:

> ***1 Introduction***
>
> *[…] This manual describes the procedures and recommended approaches for estimating emissions from facilities engaged in the mining of coal and metalliferous minerals.*

The emission factors are derived specifically from coal and metalliferous mining activities. While there are similarities between mining and construction dust activities, such as wind erosion from stockpiles and wheel-generated dust, their dust release characteristics differ fundamentally. For instance, the wind erosion emission factor is based on active coal stockpiles upon review of the Australian NPI Mining manual (Section 1.1.17 page 59). Wind erosion accounts for 83% of the emissions in the study used to support the 100-hectare assertion (With Controls) (further discussed in Section 2.4). As a result, using these emission factors to quantify construction dust soiling impacts associated with the Project undermines the reliability of the assessment.

Additionally, these emission factors are derived from the USA and Australia, where mining is prevalent and validated against their climatic conditions. These emission factors are not validated for UK climate conditions. As such, applying these factors to areas in the UK to estimate dust soiling impacts is inappropriate. This limitation is acknowledged in the study. Although in an effort to retain confidence, it references two dust assessments where these emission factors have been applied [paragraph 4.2.72]:

- Wolf Minerals (**July 2013**) Hemerdon Mining Waste Facility Environmental Permit Application EPR/FB3639RK/A001, Dust Risk Assessment and Management Plan Appendix 4B-4: Dust Dispersion Modelling; and
- London Borough of Ealing (**May 2006**) Detailed Assessment of Particulate Matter.

These studies do not relate to construction activities. Furthermore, they date back to 2006 and 2013, illustrating that dust modelling in the UK remains rare and does not set a precedent for established practice.

While local and site-specific variables, such as soil moisture content and precipitation data, have been used to adjust the emission factors, the underlying empirical basis remains constrained to data validated in different climatic regions (USA and Australia). As these emission factors are not validated for UK climate conditions, full local adjustment is not achievable.

Based on the information presented, applying these emission factors to represent construction activities in the UK is unsuitable for estimating potential dust soiling impacts.

2.1.1 UK Technical Guidance

The IAQM is the professional body for air quality professionals in the UK, responsible for maintaining, enhancing, and promoting the highest standards of working practices in the field.

As established in Section 2.1, the T.H Clements modelling study uses dust emission factors derived from the mining industry (specifically from Australia and USA). The IAQM provides separate guidance for assessing dust emissions from mineral sites in the UK, titled: "*Guidance on the Assessment of Mineral Dust Impacts for Planning"*[2]. Given the study's reliance on mining emission factors, this guidance is relevant.

The IAQM's mineral dust guidance includes a position statement on dust modelling in the UK, stating:

> *"Detailed dispersion modelling of dust impacts from minerals sites in the UK is extremely rare and is not generally recommended by the IAQM given the lack of accurate UK emissions data for this sector.*
>
> *…*
>
> *The collective view of the IAQM Working Group is that it is currently inappropriate to use a quantitative modelling approach to predict the impact in most cases and a qualitative risk-based approach using the S-P-R concept should usually suffice. This is primarily due to a lack of UK derived emission factors for minerals sites that could be used for modelling."*

The IAQM advise against modelling dust impacts from mineral activities, citing the lack of UK emissions data as the key limitation. The T.H. Clements modelling study uses mining emission factors derived from Australia and USA. Using these emission factors to estimate potential dust soiling impacts contravenes prevailing technical guidance.

Furthermore, the UK's Department for Environment, Food, and Rural Affairs (Defra) provides technical guidance for the purposes of Local Air Quality Management[3] (LAQM.TG(22)). While primarily aimed at local authorities for the protection of human health, this guidance includes technical elements directly relevant to the T.H. Clements study. It highlights that dust emissions from major construction works are not well quantified, making it difficult to make accurate predictions (pages 67–68). As a result, a qualitative assessment is recommended. This inherent uncertainty should not be overlooked.

2.2 Model Validation

The study acknowledges that field model validation for this specific assessment is not possible due to a lack of baseline data which is accepted. However, it does not reference published, peer-reviewed validation studies comparing modelled output with measured dust deposition rates to enhance the certainty of the model outputs.

[2] IAQM. Guidance on the Assessment of Mineral Dust Impacts for Planning. Version 1.1. May 2016.
[3] Defra. Local Air Quality Management Technical Guidance (TG22). August 2022.

Published validation studies[4,5,6,7] using AP-42 emission factors with dispersion modelling have applied a "factor-of-four" correction to account for the discrepancy between predicted and observed impacts of fugitive dust sources. Thus, based on the collective outcomes from a series of validation studies, without adjustment, the model outputs are susceptible to overprediction.

To address the inherent overprediction of the emission factors, the T.H. Clements study applied control factors derived from US EPA AP-42 and the Australian NPI Mining manual. These control factors were used to represent the implementation of measures proposed by the Applicant as far as possible to simulate the suppression of fugitive dust. The study assumed that all mitigation measures would be implemented effectively from inception and maintained consistently, without accounting for any potential reduction in efficacy - an assumption characterised as optimistic. The rationale for this approach is explained in Paragraph 146 [REP1-050]:

> *"146. It was deemed appropriate to ensure a level of optimism (i.e. promoting lower emissions) was preserved in this study to balance the precautionary (i.e. promoting higher emissions) use of emission factors derived from US EPA AP-42 and/or Australian NPI EETMs. This ensured that the model outputs would be less likely to skew towards either an over- or under-prediction."*

This is not considered a reasonable approach to addressing uncertainty for the following reasons:

- It does not address the systematic overprediction inherent in the emission factors; and
- The measures proposed by the Applicant within 8.1.2 Outline Air Quality Management Plan (AQMP) [APP-270] includes a regulated monitoring framework to evaluate the efficacy of the measures with the outcomes shared with the Local Authority and an enhanced communications framework (Section 4.2.5). It is therefore reasonable to assume mitigation will be effective.

2.3 Phasing

The model considered three discrete construction phases across a 48.3km segment of the onshore ECC (segments 5 to 14 inclusive). At this stage, a detailed construction phasing programme is unavailable due to various factors, including the nature of construction activities, resource availability, weather conditions, potential engineering challenges, and contractor appointment to inform the detailed design. This is discussed in 6.1.3 Chapter 3 Project Description [APP-058].

Furthermore, it should be noted that Schedule 1, part 3, Requirement 8 of the Draft Development Consent Order secures that the detail of the stages (equivalent to phases) of works will be submitted and approved by the relevant planning authority. The detailed design stage will be undertaken post consent, which will include construction phasing. Each stage of the onshore works will not be able to commence until the written scheme setting out the

[4] Countess, Richard. "Reconciling Fugitive Dust Emission Inventories with Ambient Measurements." Presented at Emission Inventory Conference. November 15, 2007.
[5] Pace, Thompson G. Methodology to Estimate the Transportable Fraction (TF) of Fugitive Dust Emissions for Regional and Urban scale Air Quality Analyses. U.S. Environmental Protection Agency, Research Triangle Park, NC. August 3, 2005.
[6] Pace, T.G.; Cowherd, C. Jr.: "Estimating $PM_{2.5}$ Transport Fraction Using Acreage-Weighted Country Land Cover Characteristics—Examples of Concept," In Proceedings of the 96th Annual Meeting of the Air and Waste Management Association: San Diego, CA, June 2003.
[7] Cowherd, C. Jr: "Transportability Assessment of Haul Road Dust Emissions". Report Issued to USEPA. August 2009

stages of the onshore transmission works have been submitted to and approved by the planning authority.

The T.H. Clements study assumes a total construction duration of 36 months (aligning with the maximum lifespan of the PCCs and haul road). However, the modelled approach oversimplifies the phasing. It treats each phase as lasting one full year across the entire 48.3km segment of the onshore ECC and does not consider any spatial progression of works along the onshore ECC. Key limitations of this approach are discussed below.

2.3.1 Continuous Maximum Working Areas

The model assumes a single continuous working area of 3,381,000m^2 (Table 1) for the full duration of each phase. For context, this area is roughly equivalent in size to London's Hyde Park and suggests continuous construction activity over three years, posing major logistical, operational, and workforce challenges.

This approach is not correct. As specified in 6.1.3 Chapter 3 Project Description [APP-058], construction activities along the onshore ECC will progress sequentially, with work fronts completing tasks at one location before advancing to the next. The Outline AQMP [APP-270] also emphasises minimising the working area to reduce dust emissions.

2.3.2 Fully Developed Infrastructure

By failing to account for the spatial progression of works, the study presumes the immediate existence of all infrastructure across the onshore ECC, fixed at its maximum construction spatial parameters (Table 1). This includes:

- **Haul Road**: A live fully developed 48.3km haul road (split across each segment) for three full years.
- **Soil Bunds**: Two live fully developed continuous soil bunds (5m width and 48.3km in length) subject to wind erosion for two years (excluding Stage 5: Reinstatement Works and Mobilisation).

These assumptions conflict with the principles outlined in 6.1.3 Chapter 3 Project Description [APP-058]:

- The haul road will be constructed progressively, in sections (para 222); and
- The soil bunds will also be constructed progressively and reinstated following the completion of duct installation works. A continuous 48.3km bund in operation for two years is therefore highly unrealistic.

Further, it is impossible for this infrastructure to be fully developed from the outset.

2.3.3 Conflicting Construction Activities

By assuming the immediate existence of all infrastructure, the model introduces an inherent flaw: it simulates sequential construction activities as if they occur simultaneously across the onshore ECC for the full modelled duration (Table 1). For example:

- Stage 2: Enabling Works:
  - Installation of the haul road **with** HGV movements across the whole length of the haul road.
  - Maximum stripping of soils **with** wind erosion of the exposed area.

This does not represent a realistic construction scenario.

2.3.4 Summary

The modelled approach inaccurately simulates a live, continuous construction site covering the 48.3km onshore ECC segment for a fixed duration of three years, at its maximum spatial construction parameters. While a detailed phasing programme is not currently available, this approach still fails to reflect the spatial progression of works outlined in 6.1.3 Chapter 3 Project Description [APP-058].

While the haul road will be retained to maintain access (para 257), construction activities at any specific location are expected to last only a few months at most, influenced by factors such as resource availability, weather conditions, and task complexity.

Assuming continuous construction over the full 48.3km onshore ECC for three years is therefore inaccurate and leads to a significant overestimation of potential impacts, rendering the modelling predictions unreliable.

2.4 Wind Erosion

The T.H Clements study presents the emissions inventory for total suspended particulate (TSP) (i.e. dust) used in the modelling assessment [Table 4-6 REP1-050]. This inventory is calculated for each activity within each modelled scenario and offers transparency in the emission calculations. This highlights that wind erosion (soil bunds and exposed areas) is the dominant source of dust emissions.

The Applicant has undertaken further analysis of the data presented in Table 4-6 [REP1-050]. The emissions across each modelled scenario have been aggregated and grouped into two categories: wind erosion sources vs. construction activity sources. The data is detailed in Table 2, while the percentage contributions are illustrated in Figure 1.

Table 2: TSP Source Apportionment) [Table 4-6 REP1-050]

Activity	Stage 2: Enabling Works	Stage 3: Cable Installation	Stage 5: Reinstatement	Total
	TSP Tonnes / Annum			
Without Controls				
Wind Erosion	8,151	6,858	3,712	18,721 (80%)
Construction	1,608	1,505	1,539	4,652 (20%)
Total	9,759	8,363	5,251	23,373
With Controls (100-hectare assertion)				
Wind Erosion	4,891	4,632	2,227	11,750 (83%)
Construction	846	753	787	2,386 (17%)
Total	5,737	5,385	3,014	14,136

During the With Controls scenario, the total mass of construction dust (TSP) modelled across the 48.3km onshore ECC segment is 14,136 tonnes. This illustrates the conservative nature of the assessment. 83% is generated from wind erosion (11,750 tonnes).

Across each of the modelled scenarios, wind erosion consistently accounts for over 70% of total emissions (Figure 1). Dust soiling risks are particularly high during the Stage 2: Enabling Works and Stage 3: Cable Infrastructure Installation phases (Section 2.0), where wind erosion contributes over 85% of emissions. Wind erosion is the dominant source. In response to this, wind erosion emission input calculations have been reviewed, with reference to the guidance documents outlined in Section 2.1.

A single dust emission factor (7.943kg/ha/hour) was applied uniformly across all wind erosion activities (soil bunds and exposed areas) [Table 4-6 [REP1-050]. The origin of this emission factor equation is referenced as 'Page 59, 2012 NPI EETM for Mining' [Table 4-6 [REP1-050]. Specifically, this relates to 'Section 1.1.17 Wind erosion from active coal stockpiles' in the 2012 Australian NPI Mining document. As discussed in Section 2.1, applying coal-based dust emission factors to represent construction dust is not appropriate.

The 2012 Australian NPI Mining coal stockpile equation is presented as part of an initial literature review and derives from the 1988 US-EPA 'Control of Open Fugitive Dust Sources'[8] mining guidance. This equation is not included in the latest US-EPA AP-42 suite of emission factors (Section 2.1). The 2012 Australian NPI Mining manual uses this equation to calculate a wind erosion emission rate of 1.92kg/ha/hour for active coal stockpiles which it considers "**a high estimate for Australian conditions**" and subsequently recommends a default rate of 0.4kg/ha/hour. Thus, the applied factor in the dust deposition modelling report (7.943kg/ha/hour) is roughly 20 times higher than what is validated in Australian conditions for coal mining. The 2012 Australian NPI Mining manual also advise the default rate of 0.4kg/ha/hour can be applied to wind erosion from exposed (coal and metalliferous mining) areas.

Separately, with respect to wind erosion from exposed areas, US EPA AP-42 Section 11.9 Western Surface Coal Mining lists an emission factor for 'wind erosion of exposed areas' described as 'seeded land, stripped overburden, graded overburden' of 0.85 tonnes/ha/year (equating to 0.1kg/ha/hr) for use in the USA. Thus, the applied factor in the dust deposition modelling report is roughly 80 times higher than what is validated in USA conditions.

The wind erosion emission factor applied in the modelling study therefore does not align with the recommendations prescribed within guidance that the modelling report claims as its basis (Section 2.1). These guidance documents prescribe considerably lower emission factors, validated for the climatic conditions of Australia and the USA. It would be reasonable to suggest UK emission factors would be lower, as implied by comments in the IAQM minerals guidance (Section 2.1.1). The use of these emission factors presents a substantial overestimate, even when adjusted for UK-specific conditions. This is because the underlying equation lacks validation and has been shown to overestimate dust emissions in arid regions like Australia.

The rationale behind using this equation in the modelling study was so local and site-specific variables could be considered where possible, rather than adopting a default emission factor [para 4.2.75 [REP1-050]. However, this approach inadvertently results in emissions estimates 20 to 80 times higher than default values recommended in Australia and the USA, respectively. Thus, the approach is flawed. Other default emission factors are used in the modelling assessment (e.g. topsoil stripping).

In summary, 83% of the total emissions (With Controls) in the study are based on an emission factor that is 20 to 80 times higher than default factors validated in Australia and the USA, respectively. This factor was also dismissed by the 2012 Australian NPI Mining guidance for being overly conservative for Australian conditions. The over-reliance on this emission factor raises significant concerns about its appropriateness and validity.

Separately, the model parameterisation process appears flawed. Wind erosion occurs when elevated wind speeds (above the threshold friction velocity) lift soil particles into the air. To reflect this phenomenon, the emission factor equation accounts for periods when hourly wind speeds exceed 5.4m/s (which occurs 38.5% of the time based on five years of meteorological data).

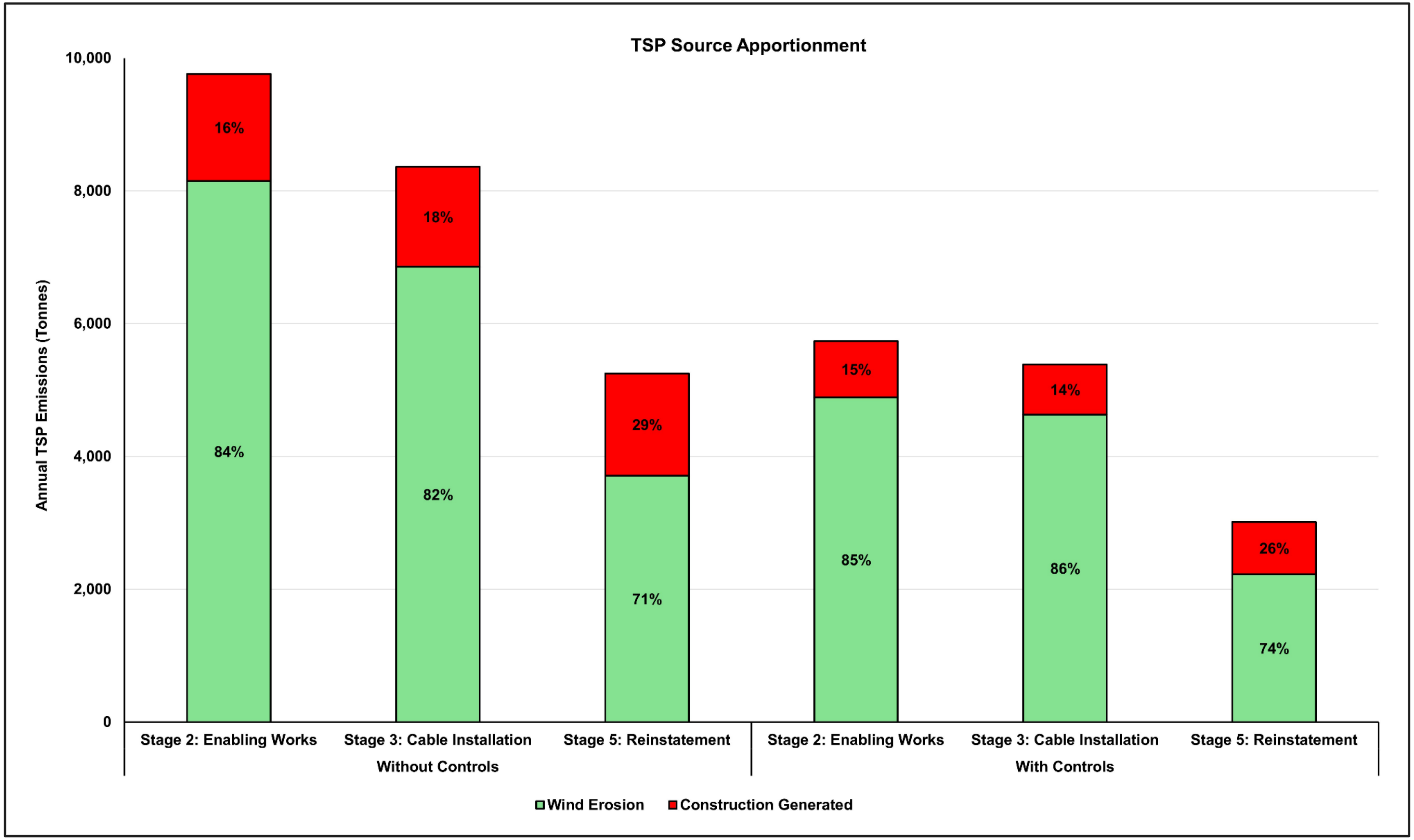
[8] US EPA. Control of Open Fugitive Dust Sources. September 1988. Section 4.1.3: Wind Emissions from Continually Active Piles. [redacted].

Once the emission rates are calculated, they are input into the dispersion model to simulate releases in practice. The model includes functionality to incorporate the concept of threshold friction velocity and release emissions during wind conditions capable of initiating wind-blown dust. However, Section 4.3.5 [REP1-050] indicates wind erosion sources are treated as being 'active' at all times, with a continuous emission modelled regardless of wind conditions. This approach fails to accurately represent windblown dust emissions, as it predicts emissions even during periods when wind speeds are too low to initiate wind erosion. Consequently, it will lead to overpredictions near the Order Limits, as emissions are modelled under low dispersion conditions. Research[9] states that fugitive windblown dust is generally not a concern during low wind conditions but is overestimated when emissions are assumed to be released continuously.

In conclusion, the approach to modelling wind erosion is flawed and does not align with prevailing guidance or the practical realities of wind erosion occurrences. Given these fundamental issues, the modelling approach results in an overestimation of potential impacts, rendering the predictions unreliable.

[9] Cliffs Natural Resources Air Quality Modeling and Impacts on the Mining Industry. October 2012.

Figure 1: TSP Source Apportionment [Table 4-6 REP1-050]



2.5 Trenchless Crossings

As discussed in 6.1.3 Chapter 3 Project Description [APP-058], the onshore export cables will be buried requiring the excavation of trenches using either an open-cut approach or trenchless techniques for installing cable ducts. Trenchless technology is an underground construction method designed to minimise or eliminate the need for extensive surface excavation. This technique will be utilised for major crossings such as rivers, flood defenses, railway lines, and major roads, potentially using Horizontal Directional Drilling (HDD).

According to Table 1, the total modelled exposed working area is 3,381,000m^2, covering a 48.3km continuous section of the onshore ECC (segments 5 to 14) with a 70m width. This area has been modelled as a single active source, with emissions apportioned across its full extent. The model assumes that the entire source is subject to the full suite of open-cut excavation techniques (e.g. excavation, wind erosion and backfilling). However, it does not account for trenchless techniques, which avoid exposed excavation at the surface.

The Applicant has provided locations for the proposed excavation methods in 6.2.3 Chapter 3 Project Description Figures [APP-089]. This information identifies where trenchless methods are proposed and where there is flexibility for either trenchless or open-cut approaches, reflecting potential optionality.

In summary, there are over 150 confirmed locations within Segments 5 to 14 of the onshore ECC where trenchless techniques will be employed. This equates to 20% of the modelled study area. As a result, the modelled predictions are not reliable for accurately representing potential impacts.

2.6 HGV Movements

According to Table 1, HGV movements have been modelled across each individual phase. As per Table 4-1 in [REP1-050], the data originates from the average HGV Annual Average Daily Traffic (AADT) figures presented in 6.3.27.1 Chapter 27 Appendix 1 Onshore Transport Assessment [Table 27.28 AS1-086]. This data is provided 'per segment' of the Onshore ECC and has been applied to each discrete segment (5 to 14 inclusive).

These AADT figures represent daily average HGV movements and have been multiplied by the number of working days per phase. Table 1 indicates that each phase is modelled to last one full year of working days, equivalent to 281 days. The AADT values have been multiplied by this figure to estimate the total number of movements within a phase. However, as noted in Section 2.2, it is unrealistic to assume that each phase will span a full year.

Additionally, the modelling assumes that all HGV movements cover the entire length of the haul road within each segment, encompassing for both arrival and departure trips. This suggests that every HGV trip traverses the entire length of haul roads within each segment continuously during working hours over a full year for each phase, totalling three years. This is an unrealistic basis for an assessment.

For example, Segment 8 has an average of 59 HGV AADT movements. This approach results in 33,158 one-way HGV movements per phase (one year) travelling across the entire segment. Over the full duration (three years), this equates to almost 100,000 one-way HGV movements.

Each segment has a dedicated access point. Supplementary data in Table 27.8 [AS1-086] provides a breakdown of Construction Access Locations for each segment, and 6.3.27.1 Chapter 27 Appendix 1 Transport Assessment Annex E [APP-121] shows the locations of these access points. For instance, Segment 8 has 10 access points. This indicates that HGV movements within each segment may be more localised, rather than covering the full segment length continuously. It is unrealistic to assume that all movements will traverse the full length of the haul road within Segment 8. Reasonable assumptions could have been made to reflect this more accurately.

Furthermore, according to 6.1.3 Chapter 3 Project Description [APP-058]), haul roads may not be constructed at locations where trenchless construction is planned (e.g. at major water courses). Therefore, the modelling assumption that HGVs will travel across the full extent of the haul roads is inaccurate.

The current modelling approach exaggerates the scale of HGV movements and their associated impacts. As HGV movements represent a primary dust-generating activity, these inaccuracies have a significant impact on the overall reliability of the modelling.

2.7 Implications in Practice

The modelling suggests that despite the mitigation proposed by the Applicant, approximately 100 hectares (247 acres) of farmland could still be sterilised due to dust soiling [REP3-060] (Section 2.0).

On the 23rd December 2024, Sweco UK, on behalf of T.H. Clements, provided the land ownership GIS data used in their assessment. In order to match this assertion, the estimated extent of residual dust impacts would need to extend beyond 150m from the Order Limits (assuming a linear decline in dust deposition).

This finding is highly unusual in the UK context, especially given the comprehensive mitigation measures proposed, with the Applicant assigning the maximum level of protection recommended by the IAQM (Section 4.0). Further, the construction techniques outlined by the Applicant are consistent with those successfully agreed for other with Nationally Significant Infrastructure Projects (NSIPs) traversing agricultural land. This highlights the compounding impact of the input parameters used in the T.H. Clements study, illustrating its unreliability in practice.

3.0 Established Practice for Assessing Dust Impacts in the UK

The IAQM has developed an assessment framework for evaluating dust impacts from construction activities in the UK, detailed in its "*Guidance on the Assessment of Dust from Demolition and Construction*". The assessment framework represents the established standard for assessing construction dust impacts within the context of land-use planning in the UK.

The IAQM framework employs a risk-based approach to determine the appropriate level of mitigation required in response to the risk of dust impacts. This framework has been established to provide an effective solution to assessing dust impacts in the UK, largely in response to the uncertainties associated with modelling dust impacts (Section 2.1.1). The methodology is formulated by a working group of professional experts, based on their practical experience. It provides detailed guidance for developers, consultants, and environmental health practitioners on how to assess and mitigate construction dust impacts.

This framework has been established since 2014[10] and gone through two major updates in 2016[11] and more recently in 2024[12], ensuring it remains an effective approach aligned with emerging best practices and evolving challenges. Despite these updates, the overarching framework remains unchanged. As the document was last updated in 2024, it is considered to represent the latest best practice techniques and controls for assessing and mitigating construction dust impacts in the UK.

Since its inception in 2014 and through extensive application, it is reasonable to suggest that the IAQM framework has encountered and addressed a broad spectrum of challenges, such as dust soiling impacts on the appearance, aesthetics or value of sensitive crops.

The most recent version the IAQM construction dust guidance (2024) has been used in 6.1.19 Chapter 19 Onshore Air Quality [AS1-046].

3.1 Recent NSIPs Using the IAQM Guidance

The IAQM framework is recognised and accepted by the Planning Inspectorate (PINS) and statutory consultees for evaluating construction activities associated with NSIPs.

The examples below illustrate that the IAQM assessment framework is considered an effective and appropriate approach for managing dust impacts from extensive construction activities, particularly in rural areas with sensitive farmland. These projects involve construction activities similar to those associated with the Project and identified within the T.H. Clements study as the primary contributors to dust impacts (Section 2.0).

3.1.1 Sheringham and Dudgeon Extensions NSIP

The Sheringham Shoal and Dudgeon OWF Extensions NSIP[13] consists of a 60km cable corridor within Norfolk in the southeast of England, stretching from Weybourne beach to the south of Norwich, traversing sensitive farmland.

The onshore cable construction involves open cut trenching, with cable ducts installed within the trenches and backfilled with soil. Stripped topsoil and excavated subsoil will be stored

[10] IAQM. Guidance on the Assessment of Dust from Demolition and Construction. Version 1. February 2014.
[11] IAQM. Guidance on the Assessment of Dust from Demolition and Construction. Version 1.1. June 2016.
[12] IAQM. Guidance on the Assessment of Dust from Demolition and Construction. Version 2.2. January 2024.
[13] https://national-infrastructure-consenting.planninginspectorate.gov.uk/projects/EN010109.

separately along the working width[14,15]. It includes a 55km haul road running along the cable route corridor, which is maintained throughout the full three-year duration of works.

The 2016 iteration of the IAQM guidance was applied to assess the construction dust impacts. The cable corridor was considered a medium risk and recommended control measures were incorporated into an Outline Code of Construction Practice[16] rendering effects as not significant upon implementation. Construction dust was not raised as a topic of discussion within the Statement of Common Ground with National Farmers Union[17].

The DCO for the Sheringham and Dudgeon Extensions NSIP was awarded in April 2024[18].

3.1.2 HyNet Carbon Dioxide Pipeline NSIP

The HyNet Carbon Dioxide Pipeline NSIP[19] consists of a 60.4km pipeline stretching from Flintshire to Cheshire, traversing farmland. Construction activities[20] resemble those proposed for the Project. Key construction processes involve open cut trenching with a maximum working width of 32m, during which topsoil is stripped and temporarily stored as bunds along the edge. Furthermore, heavy earth moving vehicles and HGVs will be used across the pipeline.

The 2014 iteration of the IAQM guidance was applied to assess construction dust impacts, with recommended control measures incorporated into a Dust Management Plan[21] rendering effects as not significant upon implementation.

The DCO for the HyNet Carbon Dioxide Pipeline was awarded in March 2024[22] (corrected in October 2024).

3.2 IAQM Construction Dust Assessment Methodology

Initially, proposed construction activities are reviewed to inform the dust emission magnitude potential, without considering mitigation. This is performed for the full life cycle of construction, targeting four discrete activities:

- **Demolition**: Removal of existing structures;
- **Earthworks**: Soil-stripping, leveling, excavation, and landscaping;
- **Construction**: Activities involved in creating or modifying structures; and
- **Trackout**: Dust resuspension by HGVs on public and haul roads.

Regarding trackout, it could be argued that the framework primarily focuses on the resuspension of dust on public roads caused by vehicles exiting construction sites. However, the recommended control measures for managing trackout risks also encompass strategies for addressing dust on on-site haul roads, so is considered appropriate for managing dust on

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[14] Sheringham Shoal and Dudgeon Offshore Wind Farm Extension Projects, Environmental Statement Volume 1 Chapter 22 - Air Quality, August 2022.
[15] Sheringham Shoal and Dudgeon Offshore Wind Farm Extension Projects, Environmental Statement Volume 1 Chapter 4 – Project Description, Revision C, June 2023.
[16] Sheringham Shoal and Dudgeon Offshore Wind Farm Extension Projects, Outline Code of Construction Practice (Revision G), Document Reference: 9.17, July 2023.
[17] Sheringham Shoal and Dudgeon Offshore Wind Farm Extension Projects, Final Statement of Common Ground with National Farmers Union, PINS Document no.: 16.18, Revision: C, July 2023.
[18] Statutory Instruments. 2024 No. 564 Infrastructure Planning: The Sheringham Shoal and Dudgeon Extensions Offshore Wind Farm Order 2024.
[19] https://infrastructure.planninginspectorate.gov.uk/projects/wales/hynet-carbon-dioxide-pipeline/
[20] HyNet North-West. Environmental Statement (Volume II) Chapter 3 – Description of the DCO Proposed Development: HyNet Carbon Dioxide Pipeline DCO. September 2022.
[21] HyNet North-West. Environmental Statement (Volume II) Chapter 6 – Air Quality: HyNet Carbon Dioxide Pipeline DCO. June 2023.
[22] Statutory Instruments. 2024 No. 436 Infrastructure Planning: The HyNet Carbon Dioxide Pipeline Order 2024.

public and haul roads. Further, the importance of dust raised by vehicles on unpaved haul roads is separately discussed within Box 5 of the IAQM guidance; stating it is likely to be a dominant source within the UK. It therefore forms inherent consideration of the guidance.

Separately, the sensitivity of the surrounding area is characterised with reference to three discrete impacts. These include:

- Dust soiling effects on people and property;
- Health effects from increased particulate matter (PM_{10}) exposure; and
- Harm to ecological receptors.

The sensitivity of these elements can vary depending on the characteristics of the receiving environment, such as ecological designations, baseline PM_{10} conditions, or high value possessions.

For defining the dust emission magnitude and sensitivity of the area, a series of thresholds and matrices are defined in the IAQM guidance to guide the assessor.

Once identified, the likely dust emission magnitude is considered in conjunction with the sensitivity of the surrounding area to determine the risk of impact for each activity. This is done iteratively, as impacts can vary based on the nature of the activity (demolition, earthworks etc.), and receptor context (ecology, human health etc.), providing a tailored assessment.

The maximum risk level (identified through these iterative calculations) is then used as a benchmark to inform mitigation measures, both generically and in response to specific activities (e.g. earthworks, construction, and trackout). This ensures a comprehensive assessment, capturing all construction activities and impacts, with the highest risk serving as a benchmark to inform effective mitigation.

The overall aim is to determine the proportionate level of mitigation necessary to prevent significant effects on receptors from construction activities. By classifying the risk of dust impacts from proposed construction activities, targeted mitigation measures, commensurate with the identified risk, can be effectively applied.

Upon successful implementation of these controls, residual effects associated with construction dust are expected to be not significant. Given the importance of control measure effectiveness, the controls include a monitoring and communications framework to continuously evaluate and assure the adequacy of control measures. Should monitoring reveal that current measures are insufficient, further actions will be taken to minimise environmental impacts. This approach ensures that dust impacts are effectively minimised and continuously monitored.

3.2.1 Consideration of Sensitive Crops

The concerns raised by T.H. Clements [REP1-050] relate to the visual degradation, contamination, or damage of crops by dust soiling from construction activities potentially impacting commercial agreements with retailers. These concerns are inherently covered in the assessment of dust soiling effects on people and property (Section 3.1).

The IAQM guidance assigns high sensitivity to land uses where dust soiling could diminish the appearance, aesthetics, or value of property. For instance, as a high-sensitivity receptor for dust soiling, it states:

Box 6: Sensitivities of People to Dust Soiling Effect

High sensitivity receptor – surrounding land where:

- *[…] The appearance, aesthetics or value of their property would be diminished by soiling; and*

Additionally, the IAQM guidance makes clear reference to horticultural and farming as a receptor distinguishing between low and high sensitivities based on commercial importance. For instance, as a low-sensitivity receptor for dust soiling, it states:

> ***Box 6: Sensitivities of People to Dust Soiling Effect***
>
> ***Low sensitivity receptor***
>
> - *[…] Indicative examples include playing fields, farmland (unless commercially sensitive horticultural) footpaths, short term car parks and roads.*

Given this distinction, it would be reasonable to conclude that commercially sensitive horticultural land would be assigned a greater level of sensitivity. As per Section 4.2.3, the Applicant assigned the maximum sensitivity in relation to dust soiling effects on property (High) across the entire Order Limits.

Additionally, paragraph 4.5 of the IAQM guidance explains that receptors for dust soiling may include horticultural operations such as salad or soft-fruit production:

> *"[…] In terms of annoyance effects, this will most commonly relate to dwellings but may also refer to other premises such as buildings housing cultural heritage collections (e.g. museums and galleries), vehicle showrooms, food manufacturers, electronics manufacturers, amenity areas and horticultural operations (e.g. salad or soft-fruit production)."*

Therefore, the framework inherently considers dust impacts on sensitive crops and the associated commercial risks. Providing the assessment is conducted robustly and effective mitigation is applied, it can be confidently concluded that residual effects associated with construction dust, including those on sensitive crops, will be not significant.

4.0 The Applicant's Assessment

The Applicant has undertaken an assessment of air quality impacts associated with the Project that may occur across the full extent of the Project lifecycle within 6.1.19 Chapter 19 Onshore Air Quality [AS1-046]. The scope was informed by the latest guidance, policy, legislation, the EIA consultation process and established best practice.

This comprised a construction dust assessment to establish the extent of impacts associated with onshore construction activities on the environment. The construction dust assessment has been conducted in accordance with the latest 2024 Institute of Air Quality Management guidance, which represents the standard practice for evaluating major construction activities in the UK (Section 3.0). The outcomes of this assessment were used to recommend proportionate controls to minimise impacts. These recommendations formed the basis of the measures outlined in the Outline AQMP [APP-270].

4.1 Consultation Outcomes

The Applicant's assessment has been principally informed by the EIA consultation process. The purpose is to ensure issues were adequately addressed.

A summary of the key issues raised during consultation to date, specific to Onshore Air Quality, and how these have been accounted for is outlined in 6.1.19 Chapter 19 Onshore Air Quality [AS1-046]. Several comments related to the impact of dust. The National Farmers' Union raised concerns of potential dust impacts on high value vegetable crops and emphasised the need for suitable controls, particularly on haul roads. These comments and recommendations were addressed.

4.2 Assessment Context

Chapter 19 Onshore Air Quality [AS1-046] has been reviewed to illustrate how the key sources identified by T.H. Clements are addressed and impacts on crops are already accounted for in the assessment outcomes.

4.2.1 Maximum Design Scenario

To ensure a precautionary approach to the assessment, a series of conservative assumptions have been incorporated to establish a Maximum Design Scenario (MDS) [Table 19.11 AS1-046]. The purpose is to evaluate the maximum realistic effects on air quality. In relation to the construction dust assessment, examples include:

- Maximum design parameters / extents of any proposed construction area have been used for the purposes of defining potential dust sources. This has included the use of the Order Limits to determine the extent of all potential dust sources; and
- Onshore construction areas have been assessed for the entire onshore Order Limits, rather than in the discrete route segments. While dust impacts along the full extent of the Order Limits will not overlap, the assessment assumes a single source active at one time, interacting simultaneously with the surrounding environment.

While it could be argued that the T.H. Clements study similarly assessed the 48.3km onshore ECC segment as a single active source, due consideration must be given to the context of its application. The IAQM approach adopted by the Applicant reasonably utilises this assumption to identify potential impacts and recommend controls to minimise impacts (which will be refined at a later stage - see Section 4.2.6). In contrast, the T.H. Clements study focusses solely on quantifying impacts with use of unreliable inputs and a methodology not recommended by the IAQM (Section 2.0).

In recognition of the MDS applied, the assessment may overestimate the extent of dust impacts and recommend higher levels of mitigation than would typically be necessary, both generally and at specific locations, thereby ensuring comprehensive protection. The practical implications of this approach are illustrated below.

4.2.2 Dust Emission Magnitude

Initially, proposed construction activities were reviewed to inform the dust emission magnitude (Table 3).

All activities were assigned the maximum level of dust emission magnitude, in response to the MDS (Section 4.2.1). As there are no demolition activities proposed, impacts were not considered further.

Table 3: Potential Dust Emission Magnitude [Table 19.14 AS1-046]

Activity	Dust Emission Magnitude
Demolition	n/a
Earthworks	Large
Construction	Large
Trackout	Large

4.2.3 Sensitivity of the Area

The sensitivity of the surrounding area with respect to construction dust was established for each construction activity. As established in Section 3.2.1, dust soiling is appropriate for considering impacts on the aesthetic value of property, including crops / farming, and has therefore been the primary focus of this analysis.

To define sensitivity, the assessment considered residential properties, identified as high-sensitivity receptors, due to their prevalence near the Order Limits. For each activity, the highest sensitivity level (e.g. High) was assigned. Any additional specific consideration for properties of high aesthetic value, such as sensitive crops, would not alter this outcome.

The outcomes are detailed in Table 4.

Table 4: Sensitivity of the Area [Table 19.15 AS1-046]

Potential Impact	Sensitivity of the Surrounding Area		
	Earthworks	Construction	Trackout
Dust Soiling	High	High	High

4.2.4 Risk of Dust Impacts

Dust impact risk for each activity is outlined in Table 5.

Table 5: Risk of Dust Impacts (Without Mitigation) [Table 19.16 AS1-046]

Potential Impact	Activity		
	Earthworks	Construction	Trackout
Dust Soiling	High Risk	High Risk	High Risk

As discussed in Section 3.2, the maximum level of risk for each activity is used as a benchmark to inform mitigation. The outcomes are:

- Earthworks: High Risk;
- Construction: High Risk; and
- Trackout: High Risk.

Each activity has been assigned the maximum level of risk.

4.2.5 Mitigation

Based on the assessment outcomes (e.g. High Risk) the recommendation is to implement the full suite of relevant best available controls as prescribed by the IAQM guidance to minimise dust impacts, where relevant. These recommendations form the basis of the measures outlined in Outline AQMP [APP-270]. This establishes the overarching principles for all onshore construction activities across the Order Limits. It is secured under the Outline Code of Construction Practice (CoCP) [REP2-029].

Table 6 provides a breakdown summary of the recommended suite of controls.

Table 6: Breakdown of Recommended Controls [APP-270]

Type	Activity	Count
Highly Recommended	Communications	4
	Construction	4
	Earthworks	3
	Monitoring	4
	Operating Vehicle / Machinery and Sustainable Travel	6
	Operations	7
	Preparing and Maintaining the Site	5
	Site Management	5
	Trackout	9
	Waste Management	3
	Total	**50**
Desirable	Construction	1
	Total	**1**

In total, 50 proactive control measures are proposed to target specific activities across the full extent of the Order Limits.

As per the IAQM guidance, upon effective implementation of these controls, residual effects associated with construction dust will be not significant across the full extent of the Order Limits, including dust soiling on sensitive crops.

4.2.5.1 Monitoring

The Outline AQMP [APP-270] also includes a robust monitoring framework to continuously evaluate the effectiveness of control measures and provide necessary assurances. Key elements include:

- Daily on-site and off-site inspections near sensitive receptors, with results recorded and made available to the local authority upon request;

- Carry out regular site inspections to monitor compliance with the AQMP measures, record inspection results, and make the log available to the Local Authority;
- 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; and
- Conduct dust deposition, dust flux, or real-time PM_{10} continuous monitoring locations at pre-agreed locations with the Local Authority.

Importantly, the monitoring outcomes will be shared with the Local Authority to maintain transparency and accountability. Should monitoring (e.g. visual inspections and / or instrumental measurements) identify dust soiling, an immediate investigation will be carried out, and appropriate mitigation measures will be swiftly implemented. This proactive approach ensures that dust impacts are quickly addressed, effectively minimised, and continuously monitored.

4.2.5.2 Communication

Communication is a key element of the Outline AQMP [APP-270], and a proactive communication strategy is vital to effectively address concerns and ensure compliance. Measures to facilitate effective communication and maintain accountability include:

- A comprehensive Stakeholder Communications Plan;
- Displaying contact details for the head or regional office;
- Record all dust and air quality complaints and take appropriate measures. Make the complaints log available to the Local Authority;
- Clearly displaying the name and contact information of the person(s) responsible for air quality and dust management within the Order Limits, such as the environment manager/engineer or the site manager; and
- Hold regular liaison meetings with other high risk construction sites and / or land operations (e.g. farming) within 500m of the Order Limits, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised.

All complaints will be shared with the Local Authority to maintain transparency and accountability.

4.2.6 Future Commitments

The Outline AQMP [APP-270] outlines the overarching strategies for managing air quality during the construction of all onshore elements of the Project.

Following consent, construction activities along the onshore ECC will be divided into sections to account for differing activities and expertise, with separate Principal Contractors appointed for each section. To complement this, the Outline CoCP and supporting management plans (including the Outline AQMP) will be developed into Final CoCPs for each transmission section, tailored to specific activities and sensitivities.

This mechanism is enshrined within Requirement 18 of the draft DCO, which states:

> *"(1) No stage of the onshore transmission works may commence until a code of construction practice (which must accord with the outline code of construction practice) for that stage has been submitted to and approved by the relevant planning authority following consultation, as appropriate, with*
>
> *(a) Lincolnshire County Council;*
>
> *(b) the Environment Agency;*
>
> *(c) relevant statutory nature conservation body;*

(d) in respect of the surface water drainage strategy referred to in paragraph (2)(b), Anglian Water Services Limited; and,

(e) if applicable, the MMO.

(2) The code of construction must include—

(a) an air quality management plan (which accords with the outline air quality management plan);

[…]

(3) Any code of construction practice submitted under sub paragraph (1) may cover one or more of the stages of the onshore transmission works.

(4) All construction works for each stage must be undertaken in accordance with the relevant approved code of construction practice."

At this stage, the construction dust assessment will be revised to incorporate detailed construction data once the Principal Contractor is appointed, improving the precision of the mitigation strategy. It will also account for updated techniques and best practices which may evolve ahead of construction (expected in 2027). Full consideration will be given to sensitive receptors, including potential dust impacts on sensitive crops. The outcomes will form the final suite of controls.

It should be noted that Section 1.1 of the Outline CoCP (Document reference 8.1, rev 5) states that prior to submission to the LPA, the final CoCP will be submitted to the Landowner Interest Group (LIG) providing no less than 10 working days for comments to be provided. Comments will be taken on board by the Project and alterations will be made where appropriate. It should be noted that the appointed agent for T.H. Clements is a member of the LIG.

Final AQMPs will also feature tailored monitoring and communication strategies. For example, establishing direct communication with landowners and occupiers to understand when sensitive crops may be in proximity to high-risk construction activities.

The Outline AQMP [APP-270] is intended to establish the overarching construction principles for all onshore works in the absence of a detailed design and the appointment of a Principal Contractor. By committing to the Final AQMP as part of the Final CoCP for each transmission section, the strategies can be refined at a more appropriate time once further details become available. Requirement 18 of the draft DCO ensures the Final AQMP aligns with the overarching principles of the Outline AQMP. Agreement on these overarching principles now will provide a foundation for refinement at an appropriate time.

This approach allows flexibility to incorporate detailed information while establishing the overarching commitments. It is a standard approach for NSIPs and was successfully used for the Sheringham Shoal and Dudgeon OWF Extensions NSIP.

While T.H. Clements prefer to refine the measures in the Outline AQMP [APP-270], detailed refinement of measures for a specific onshore transmission stage are best addressed within a targeted Final AQMP.

5.0 Summary

T.H. Clements in their Written Representation [REP1-050] claim the dust soiling from construction activities will lead to a visual degradation, contamination, and damage of sensitive crops (specifically Brassica vegetables) within proximity to the Order Limits. To quantify potential impacts, Sweco UK on behalf of T.H. Clements, conducted a dust deposition modelling study.

A review of the T.H. Clements modelling study [REP1-050] has been conducted. Critical issues associated with the dust deposition modelling assessment have been identified and highlighted. These include:

- **Contradicts UK Technical Guidance**: The modelling study uses mining dust emission factors from USA and Australia, which are not validated for the UK climate. The IAQM explicitly advises against using these emission factors in dispersion modelling, describing it as "extremely rare", "not recommended" and "inappropriate".
- **Coal Mining Emission Factors**: The study relies on dust emission factors from coal mines which are not representative of construction dust characteristics.
- **Inappropriate Wind Erosion Modelling**: 83% of the emissions in the study are based on a known flawed wind erosion emission factor 20-80 times higher than default factors validated in Australia and the USA. Additionally, the model simulates emissions even during periods of insufficient wind speeds to initiate erosion, leading to overpredictions.
- **No Model Validation**: The study relies on predictions, but no validation exercise was conducted to improve its reliability. Validation studies in the USA indicate a four-fold overestimation in dust emission modelling.
- **Continuous Construction**: The study assumes uninterrupted construction over a 48.3km segment for three years at maximum parameters, which is incorrect as construction is intended to be sequential.
- **Conflicting Construction Activities**: The model assumes overlapping, simultaneous activities, such as continuous soil stripping and wind erosion over a year, which is neither feasible nor representative of practical construction scenarios.
- **Misalignment with the Project Description:** The modelling approach incorporates activities that are misaligned with the scope and sequencing of the Project, eroding its reliability.
- **Trenchless Techniques Excluded**: The modelling disregards trenchless construction techniques that avoid surface-level excavation. There are over 150 defined trenchless locations within segments 5 to 14 of the onshore ECC (20% of the study area), yet the study presumes continuous open-cut excavation for the full 48.3km length.
- **Unrealistic HGV Movements**: The study assumes that HGV movements will traverse the entire length of the haul roads within each segment generating dust continuously over the three years, overlooking access points specified in the application. Further, haul roads may not be constructed at locations where trenchless construction is planned.

Due to these issues, the assessment is inherently unreliable and unsuitable for estimating potential dust soiling impacts and determining the extent of land potentially affected for farming. The evidence base underpinning the claim that approximately 100 hectares of land would be rendered unusable is flawed. This is exemplified in practice, as in order to match this assertion, the extent of residual dust impacts would need to extend beyond 150m from the Order Limits - a finding that is highly unusual in the UK context. While justifications may be provided, the Applicant maintains the IAQM's position is clear: using non-UK mining dust emission factors to model dust impacts in this context is inappropriate.

The IAQM's "*Guidance on the Assessment of Dust from Demolition and Construction*" is the established standard for evaluating dust impacts from construction activities, including NSIPs. This risk-based framework, developed by a working group of air quality professionals, has been operational for over a decade and was most recently updated in 2024. It addresses a wide range of dust-related issues, including impacts on the appearance, aesthetics, and value of sensitive crops, and informs the required level of mitigation. It is therefore considered appropriate. With appropriate mitigation measures, residual effects of construction dust are deemed not significant.

The Applicant conducted a construction dust assessment in accordance with the latest 2024 IAQM guidance. The Applicant's assessment assigns the maximum level of dust risk and protection in line with prevailing IAQM guidance. Any additional specific consideration for properties of high aesthetic value, such as sensitive crops, would not alter this outcome. These controls, along with a comprehensive monitoring and communication plan, are detailed in the Outline AQMP [APP-270]. This establishes the overarching principles for all onshore construction activities across the Order Limits.

Upon the effective implementation of the IAQM recommended controls, residual effects from construction dust are predicted to be not significant within proximity of the Order Limits, inherently covering dust soiling impacts on sensitive crops.

Following consent, construction activities along the onshore ECC will be divided into sections to account for differing activities and expertise. To complement this, Requirement 18 of the draft DCO mandates that a final CoCP be prepared, submitted, and approved by relevant authorities for each transmission section, prior to commencement. This will incorporate a final AQMP.

The construction dust assessment will be revised to include detailed construction data once the Principal Contractor is appointed and will account for evolving best practices. Full consideration will be given to sensitive receptors including sensitive crops. The outcomes will inform the final suite of controls which will be issued to the LIG for consultation. By committing to the Final AQMP for each transmission section, the strategies can be refined at a more appropriate time once further details become available. Requirement 18 of the draft DCO ensures the Final AQMP aligns with the overarching principles of the Outline AQMP. Agreement on these overarching principles now will provide a foundation for refinement at an appropriate time.

This approach allows flexibility to incorporate detailed information while establishing the overarching commitments. It is a standard approach for NSIPs and was successfully used for the Sheringham Shoal and Dudgeon OWF Extensions NSIP. For these reasons, detailed refinement of measures for a specific onshore transmission stage are best addressed within a targeted Final AQMP.