Sheringham Shoal and Dudgeon Offshore Wind Farm Extension Projects

Environmental Statement

Volume 3

Appendix 22.1 - Construction Dust and Fine Particulate Matter Assessment Methodology

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Glossary of Acronyms

DEP	Dudgeon Offshore Wind Farm Extension Project
HDV	Heavy Duty Vehicle
IAQM	Institute of Air Quality Management
LNR	Local Nature Reserve
PM_{10}	Particulate matter with an aerodynamic diameter of less than 10µm
SAC	Special Area of Conservation
SEP	Sheringham Shoal Offshore Wind Farm Extension Project
SPA	Special Protection Area
SSSI	Site of Specific Scientific Interest

Glossary of Terms

Dudgeon Offshore Wind Farm Extension Project (DEP)	The Dudgeon Offshore Wind Farm Extension onshore and offshore sites including onshore and offshore infrastructure.
Order Limits	The area subject to the application for development consent, including all permanent and temporary works for DEP and SEP.
Sheringham Shoal Offshore Wind Farm Extension Project (SEP)	The Sheringham Shoal Offshore Wind Farm Extension onshore and offshore sites including onshore and offshore infrastructure
The Applicant	Equinor New Energy Limited.

22.1. CONSTRUCTION PHASE DUST AND FINE PARTICULATE MATTER ASSESSMENT METHODOLOGY

22.1.1. Introduction

1. The following sections outline criteria developed by the Institute of Air Quality Management (IAQM) (IAQM, 2016) for the assessment of air quality impacts arising from construction activities associated with the Sheringham Shoal Offshore Wind Farm Extension Project (hereafter SEP) and Dudgeon Offshore Wind Farm Extension Project (hereafter DEP). The assessment procedure is divided into four steps and is summarised below.

22.1.2. Step 1: Screening the need for a Detailed Assessment

2. An assessment will normally be required where there are human receptors within 350m of the site boundary and/or within 50m of the route(s) used by construction vehicles on the public highway, up to 500m from the site entrance(s). Internal guidance from Natural England recommends that ecological receptors within 200m of a site should be considered in a construction dust and fine particulate matter assessment, as opposed to only those ecological sites within 50m of a site (as stated in IAQM Guidance (IAQM, 2016)).
3. An ‘ecological receptor’ refers to any sensitive habitat affected by dust soiling. For locations with a statutory designation, such as a Site of Special Scientific Interest (SSSI), Special Area of Conservation (SAC) and Special Protection Area (SPA), consideration should be given as to whether the particular site is sensitive to dust. Some non-statutory sites, such as ancient woodlands and local nature reserves (LNRs), have also be considered where appropriate.
4. Where the need for a more detailed assessment is screened out, it can be concluded that the level of risk is ‘negligible’.
5. The construction dust and fine particulate matter assessment was undertaken using a worst-case scenario whereby the maximum magnitude of works (e.g. cable trenching, a construction compound, jointing bay and link box construction) are undertaken in proximity to the greatest number of human and ecological receptors (this may not necessarily be in the same location). Recommended mitigation measures for the worst-case location(s) would then be applied to all onshore construction works, to provide a conservative assessment.
6. There are a number of human receptors within 350m and ecological receptors within 200m of the onshore SEP and/or DEP order limits. Therefore, a Detailed Assessment was required to consider the potential for impacts at both human and ecological receptors.

22.1.3. Step 2: Assess the Risk of Dust Impacts

7. A risk category is allocated to a site based on the scale and nature of the works (Step 2A) and the sensitivity of the area to dust impacts (Step 2B). These two factors are combined in Step 2C to determine the risk of dust impacts before the implementation of mitigation measures. The assigned risk categories may be different for each of the four construction activities outlined by the IAQM (demolition, construction, earthworks and trackout).

8. The site can also be divided into zones, for example on a large site where there are differing distances to the nearest receptors.

24.1.1.1 Step 2A: Define the Potential Dust Emission Magnitude

9. The IAQM guidance recommends that the dust emission magnitude is determined for earthworks, construction and trackout. The dust emission magnitude is based on the scale of the anticipated works. **Table 22.1.1** describes the potential dust emission class criteria for each outlined construction activity. As no demolition would be undertaken during the construction phase, impacts associated with demolition have not been considered within the assessment.

Table 22.1.1: Criteria Used in The Determination of Dust Emission Magnitude

Activity	Criteria used to determine dust emission class		
	Small	Medium	Large
Earthworks	Total site area <2,500m^2	Total site area 2,500 – 10,000m^2	Total site area >10,000m^2
Construction	Total building volume <25,000m^3	Total building volume 25,000 – 100,000m^3	Total building volume >100,000m^3
Trackout	<10 outward Heavy Duty Vehicle (HDV) trips in any one day. Unpaved road length <50m	10-50 outward HDV trips in any one day. Unpaved road length 50-100m	>50 outward HDV trips in any one day. Unpaved road length >100m

10. The potential dust emission magnitude for the Project was determined using criteria detailed in **Table 22.1.1**.

24.1.1.2 Step 2B: Define the Sensitivity of the Area

11. The sensitivity of the area takes into account the following factors and is detailed in **Table 22.1.2**:

- The specific sensitivities of receptors in the area;
- The proximity and number of receptors;
- The local background PM_{10} concentration; and
- Site-specific factors, such as whether there are natural shelters, such as trees, to reduce the risk of windblown dust.

Table 22.1.2: Criteria Used for Determining Sensitivity of Receptors

Sensitivity of Receptor	Criteria for determining sensitivity		
	Human receptors		Ecological receptors
	Dust soiling effects	Health effects of PM_{10}	Ecological effects
High	Dwellings, museums and other culturally important collections, medium and long-term car parks and car showrooms.	Residential properties, hospitals, schools and residential care homes.	Locations with an international or national designation and the designated features may be affected by dust soiling.
Medium	Parks, places of work.	Office and shop workers not occupationally exposed to PM_{10}.	Locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown
Low	Playing fields, farmland, footpaths, short-term car parks and roads.	Public footpaths, playing fields, parks and shopping streets.	Locations with a local designation where the features may be affected by dust deposition

12. The criteria detailed in **Table 22.1.3** to
13. **Table** 22.1.5 were used to determine the sensitivity of the area to dust soiling effects, human health impacts and ecological effects. **Figure 22.2** in **Chapter 22 Air Quality** details the distance bands, as detailed in **Table 22.1.3** to
14. **Table** 22.1.5, from the DCO order limits for use in the construction phase assessment.

Table 22.1.3: Sensitivity of the Area to Dust Soiling Effects on People and Property

Sensitivity of Receptor	No. of receptors	Distance from source (m)			
		<20	<50	<100	<350
High	>100	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

Table 22.1.4: Sensitivity of the Area to Human Health Impacts

Sensitivity of Receptor	Annual mean PM_{10} conc.	No. of receptors	Distance from source (m)				
			<20	<50	<100	<200	<350
	>32µg.m^{-3}	>100	High	High	High	Medium	Low
		10-100	High	High	Medium	Low	Low
		1-10	High	Medium	Low	Low	Low
	28-32µg.m^{-3}	>100	High	High	Medium	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	High	Medium	Low	Low	Low

Sensitivity of Receptor	Annual mean PM_{10} conc.	No. of receptors	Distance from source (m)				
			<20	<50	<100	<200	<350
High	24-28µg.m^{-3}	>100	High	Medium	Low	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	<24µg.m^{-3}	>100	Medium	Low	Low	Low	Low
		10-100	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Medium	>32µg.m^{-3}	>10	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	28-32µg.m^{-3}	>10	Medium	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	<28µg.m^{-3}	≥1	Low	Low	Low	Low	Low
Low	-	≥1	Low	Low	Low	Low	Low

Table 22.1.5: Sensitivity of the Area to Ecological Effects

Sensitivity of Receptor	Distance from source (m)		
	<20	<50	<200
High	High	Medium	Low
Medium	Medium	Low	Low
Low	Low	Low	Low

24.1.1.3 Step 2C: Define the Risk of Impacts

15. The dust emission magnitude and sensitivity of the area are combined to determine the risk of impacts from each activity (earthworks, construction and trackout) before mitigation is applied. These criteria are detailed in **Table 22.1.6** and
16. **Table** 22.1.7.

Table 22.1.6: Risk of impacts – earthworks and construction

Sensitivity of Receptor	Dust emission magnitude		
	Large	Medium	Small
High	High risk	Medium risk	Low risk
Medium	Medium risk	Medium risk	Low risk
Low	Low risk	Low risk	Negligible risk

Table 22.1.7: Risk of impacts – trackout

Sensitivity of Receptor	Dust emission magnitude		
	Large	Medium	Small
High	High risk	Medium risk	Low risk

Sensitivity of Receptor	Dust emission magnitude		
	Large	Medium	Small
Medium	Medium risk	Low risk	Negligible risk
Low	Low risk	Low risk	Negligible risk

22.1.4. Step 3: Site Specific Mitigation

17. Step three of the IAQM guidance identifies appropriate site-specific mitigation. These measures are related to whether the site is a low, medium or high-risk site. Mitigation for the Project is detailed in **Chapter 22 Air Quality**.

22.1.5. Step 4: Determine Significant Effects

18. As shown in Step 2 above, in assessing the significance of construction dust impacts using the IAQM guidance (2016), the dust emission magnitude is combined with the sensitivity of the area to determine the risk of impacts prior to mitigation. Step 3 identifies appropriate site-specific mitigation depending on the risk of impact. This assessment deviates slightly from the methodology set out in **Chapter 5 EIA Methodology**, as the IAQM guidance does not assign a significance before applying mitigation measures. Once appropriate mitigation measures have been identified as required, the significance of construction phase impacts can be determined. The IAQM considers it to be most appropriate to only assign significance post mitigation as it assumes mitigation is inherent in the design/construction approach. The guidance (IAQM, 2016) states that with the implementation of mitigation measures, the residual impacts from construction would be not significant.

References

Institute of Air Quality Management (2016). Guidance on the assessment of dust from demolition and construction. Version 1.1.