Environmental Impact Assessment Report

Volume 1, Chapter 21: Air Quality

MarramWind Offshore Wind Farm

December 2025

MarramWind

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21.1 Introduction

21.1.1.1 This air quality Chapter of the Environmental Impact Assessment (EIA) Report presents the results of the assessment of the likely significant effects on air quality that may arise from the construction, operation and maintenance and decommissioning of the onshore Project landward of Mean Low Water Springs. It should be read in conjunction with the following Chapters:

- **Chapter 4: Project Description**;
- **Chapter 23: Terrestrial Ecology and Ornithology**: Due to the potential for emissions and dust associated with the Project to negatively affect habitats, flora and fauna. This Chapter will therefore inform the terrestrial ecology and ornithology assessment;
- **Chapter 26: Traffic and Transport**: This Chapter considers the effects of the Project's traffic generation on air quality; the traffic and transport chapter will therefore inform the air quality assessment; and
- **Chapter 28: Climate Resilience**: The relationship between climate resilience and air quality is captured in **Chapter 32: Inter-Related Effects** in relation to climate impacts.

21.1.1.2 This Chapter describes:

- the legislation, planning policy, guidance and other documentation that has informed the assessment (**Section 21.2: Relevant legislative and policy context**);
- the outcome of consultation and engagement that has been undertaken to date, including how matters relating to air quality have been addressed (**Section 21.3: Consultation and engagement**);
- the scope of the assessment for air quality (**Section 21.4: Scope of the assessment);**
- the data sources and methods used for gathering baseline data including surveys where appropriate (**Section 21.5: Methodology for baseline data gathering**);
- the overall environmental baseline (**Section 21.6: Baseline conditions**);
- the basis for the EIA Report (**Section 21.7: Basis for EIA Report**);
- methodology for the EIA Report (**Section 21.8: Methodology for EIA Report);**
- the assessment of air quality effects (**Section 21.9: Assessment of effects: construction**;
- a summary of effects (**Section 21.10: Summary of effects**);
- consideration of transboundary effects (**Section 21.11: Transboundary effects**);
- consideration of inter-related effects and cumulative effects (**Section 21.12: Inter-related effects** and **Section 21.13: Cumulative effects assessment**);
- a summary of residual effects for air quality (**Section 21.14: Summary of residual likely significant effects**);
- a reference list is provided (**Section 21.15: References**); and
- a glossary of terms and abbreviations is provided (**Section 21.16: Glossary of terms and abbreviations**).

21.1.1.3 This Chapter is also supported by the following Appendix in **Volume 3**:

- **Appendix 21.1: Air Quality Technical Data**.

21.2 Relevant legislative and policy context and technical guidance

21.2.1 Legislative and policy context

21.2.1.1 This Section identifies the relevant legislation and policy context that has informed the scope of the air quality assessment. Further information on policies relevant to the EIA and their status is set out in **Chapter 2: Legislative and Policy Context**, which provides an overview of the relevant legislative and policy context for the Project. **Chapter 2** is supported by **Volume 3, Appendix 2.1: Planning Policy Framework**, which provides a detailed summary of international, national, marine and local planning policies of relevance to the EIA. Individual policies of specific relevance to this assessment and associated appendices have been taken into account.

21.2.1.2 This summary provides a foundation for understanding the specific requirements that this Chapter must address in terms of assessing and mitigating impacts on receptors and relevant environmental issues.

21.2.1.3 The legislation relevant to air quality include:

- The Non-Road Mobile Machinery (Type-Approval and Emission of Gaseous and Particulate Pollutants) Regulations 2018 (UK Government, 2018);
- The Air Quality (Scotland) Regulations 2000, The Air Quality (Scotland) Amendment Regulations 2016 (Scottish Government, 2016);
- The Pollution Prevention and Control (Scotland) Regulations 2012 (Scottish Government, 2012);
- Directive 2008/50/EC on Ambient Air Quality and Cleaner Air for Europe (2008);
- Directive 2010/75/EU of the European Parliament and of the Council on industrial emissions (integrated pollution prevention and control) later referred to as the Industrial Emissions Directive (2010);
- The Air Quality (Scotland) Regulations 2000, The Air Quality (Scotland) Amendment Regulations 2016 (Scottish Government, 2016);
- The Air Quality (Scotland) Standards Regulations 2010 (Scottish Government, 2010);
- Directive 2008/50/EC on Ambient Air Quality and Cleaner Air for Europe (2008); and
- The Environment Protection Act 1990 (UK Government, 1990).
- The Non-Road Mobile Machinery (Type-Approval and Emission of Gaseous and Particulate Pollutants) Regulations 2018 (UK Government, 2018); and

21.2.1.4 The policies relevant to air quality includes:

- Aberdeenshire Local Development Plan 2023 (Aberdeenshire Council, 2023);
- National Planning Framework 4 (NPF4) 2023 (UK Government, 2023a); and
- Cleaner Air for Scotland 2 (CAFS2): Towards a Better Place for Everyone, 2021 (Scottish Government, 2021).

- National Planning Framework 4 (NPF4) 2023 (UK Government, 2023a).

21.2.1.5 The relevant Air Quality Standards (AQSs) and Air Quality Objectives (AQOs) adopted in Scotland, underpinned by the legislation and policy presented above, are presented in **Table 21.1.** Particulate matter (PM) is the key pollutant of concern for this assessment, and it is associated with construction activities that give rise to dust emissions. In addition, the AQSs for nitrogen dioxide (NO_2) are also presented, as they are emitted from construction traffic.

Table 21.1 AQSs and AQOs

Pollutant	Receptors affected	AQS / AQO	Averaging period	Value ($\mu g/m^3$)
Particulate matter of aerodynamic diameter ≤10 micrometres (µm) (PM_{10})	Human	AQS	Annual mean.	18
		AQS	Daily mean (not to be exceeded more than seven times a year).	50
Particulate matter of aerodynamic diameter ≤2.5µm ($PM_{2.5}$)	Human	AQO	Annual mean.	10
NO_2	Human	AQS	Annual mean.	40
		AQS	Hourly mean (not to be exceeded more than 18 times a year).	200

21.2.2 Relevant technical guidance

21.2.2.1 Other information and technical guidance relevant to the assessment undertaken for air quality include:

- IAQM, 2024. Guidance on the assessment of dust from demolition and construction (IAQM, 2024);
- Standards for Highways (2024). LA 105 Air quality (vertical barriers);
- Department for Environment, Food & Rural Affairs (Defra), 2022. Local Air Quality Management (LAQM) Technical Guidance, TG22 (Defra, 2022);
- World Health Organization 2021, Air Quality Guidelines (WHO, 2021);
- IAQM, 2020. A guide to the assessment of air quality impacts on designated nature conservation sites (IAQM, 2020);
- IAQM and Environmental Protection United Kingdom (EPUK) 2017. Land-use Planning and Development Control: Planning for Air Quality (IAQM and EPUK, 2017); and
- IAQM, 2020. A guide to the assessment of air quality impacts on designated nature conservation sites (IAQM, 2020);
- IAQM, 2024. Guidance on the assessment of dust from demolition and construction (IAQM, 2024);

- NatureScot (formerly known as Scottish Natural Heritage), 2017. Considering air pollution impacts in development management casework (NatureScot, 2017).

21.3 Consultation and engagement

21.3.1 Overview

21.3.1.1 This Section describes the consultation and stakeholder engagement undertaken on the Project in relation to air quality. This includes early engagement, the outcome of and response to the Scoping Opinions (Scottish Government, 2023b; Aberdeenshire Council, 2023b) in relation to the air quality assessment, non-statutory consultation, and the findings of the Project's Statutory Consultation. An overview of engagement undertaken for the Project as a whole can be found in Section 5.5 of **Chapter 5: Approach to the EIA**.

21.3.2 Key issues

21.3.2.1 A summary of the key issues raised during statutory and non-statutory consultation, specific to air quality, is outlined below in **Table 21.2** together with how these issues have been considered in the production of this EIA Report.

Table 21.2 Stakeholder issues responses – air quality

Stakeholder	Stakeholder issue ID	Date, document, forum	Stakeholder comment	How is this addressed in the EIA Report
Aberdeenshire Council	46	22 April 2023, Aberdeenshire Council Scoping Opinion (Aberdeenshire Council, 2023b).	*"The national policy section of Table 6.2.1 references SPP and NPF3, however as is discussed above and correctly included within the Policy section of the scoping report these now have been superseded by the adoption of NPF4. As such, reference to SPP and NPF3 is not required."*	Reference to documents have been updated and the latest policy is referenced (refer to **paragraph 21.2.1.3**).
	47	22 April 2023, Aberdeenshire Council Scoping Opinion (Aberdeenshire Council, 2023b).	*"Review and amendment of the study area for air quality as suggested in paragraph 6.2.7 is accepted. It is recommended that contact with Environmental Health Officers be made to discuss any proposals prior to the commencement of detailed assessments to ensure compliance with guidance and expectations."*	Further consultation was undertaken with the Council in June 2025 to agree the extent of the study area. In July 2025 the Council confirmed as the study area, a 250m buffer from the Onshore Red Line Boundary. This buffer is defined in the latest guidance on the assessment of dust from demolition and construction (IAQM, 2024).
	48	22 April 2023, Aberdeenshire Council Scoping Opinion (Aberdeenshire Council, 2023b).	*"The baseline conditions for the scoping site area are noted. The Council raises no concerns relating to these."*	Noted.
	49	22 April 2023, Aberdeenshire Council Scoping Opinion	*"It is noted in table 6.2.7 that only impacts from emissions of dust from*	Noted.

Stakeholder	Stakeholder issue ID	Date, document, forum	Stakeholder comment	How is this addressed in the EIA Report
		(Aberdeenshire Council, 2023b).	*construction are scoped in. The Council's Environmental Health service was consulted as part of the scoping exercise. The proposed approach to assessment detailed within section 6.2 of the scoping report is agreed. No additional comments or suggestions are made, and so the other topics scoped out of a future assessment can be agreed."*	
	50	23 April 2023, Aberdeenshire Council Scoping Opinion (Aberdeenshire Council, 2023b).	*"It is agreed that transboundary effects from air quality are unlikely. Consideration of other construction projects within 350m of the development within the air quality assessment is welcomed."*	The assessment considered any construction projects within 250m of the Project, in line with the latest IAQM (2024) guidance that amended the buffer from 350m to 250m (refer to **Chapter 33: Cumulative Effects Assessment**).
	192	22 April 2023, Aberdeenshire Council's Scoping Opinion (Aberdeenshire Council, 2023b).	*"The Environmental Health Service has reviewed the Environmental Impact Assessment – Scoping Report dated in respect of the above project and would comment as follows;* - *Air Quality Environmental Health would agree with proposed approach to assessment detailed in Section 6.2."*	Noted.

Stakeholder	Stakeholder issue ID	Date, document, forum	Stakeholder comment	How is this addressed in the EIA Report
	693	27 June 2023, Aberdeenshire Council Meeting.	*"The Project will look at construction vehicle emissions using the Institute of Air Quality Management guidance and the Project will consider other projects within 250m. Aberdeenshire Council confirmed they are happy with proposed approach to assessment of air quality."*	Since this meeting, it has been agreed by Aberdeenshire Council on 01 July 2025 that the study area for the air quality assessment will include a 250m buffer from the Onshore Red Line Boundary.

21.4 Scope of the assessment

21.4.1 Overview

21.4.1.1 This Section sets out the scope of the EIA for air quality. This scope has been developed as the Project's design has evolved and responds to stakeholder feedback received to-date, as set out in **Section 21.3**.

21.4.2 Spatial scope and study area

21.4.2.1 The spatial scope of the air quality assessment is defined as the Onshore Red Line Boundary together with the Zones of Influence (ZOIs) and forms the basis of the study area described in this Section. ZOIs for air quality are the area immediately around the Project (for a distance based on expert judgement and recognised guidance), and roads on which traffic related to the Project may travel.

21.4.2.2 Guidance published by the IAQM (2024) suggests dust impacts may extend up to 250m of the Onshore Red Line Boundary and construction site entrance(s), and within 50m of the routes(s) used by vehicles on the public highway. For ecological sites the distance is considered within 50m from Onshore Red Line Boundary, construction sites and routes used by construction vehicles on public highways up to 250m of the construction site entrance(s). For this Project the ZOI has been defined as 250m buffer from the Onshore Red Line Boundary ensuring a conservative assessment.

21.4.2.3 Regarding impacts from traffic emissions, LA 105 Air Quality recommends a ZOI extending for a distance of 200m from roads on which a significant increase in traffic would occur as a result of the Project. The study area is presented **Volume 2, Figure 21.1: Air quality study area**.

21.4.3 Temporal scope

21.4.3.1 It is anticipated that the construction of the Project will commence in 2030, with the first phase becoming fully operational by 2037. It is anticipated that the second phase of the Project would become fully operational by 2040 and the third phase by 2043. The operational lifetime of the Project for each phase is expected to be 35 years.

21.4.3.2 The temporal scope of the assessment of air quality is the entirety of the construction stage of the Project. Emissions of air pollutants during the operational and maintenance stage and the decommissioning stage have been **scoped out** of this assessment, details are provided in **Table 21.5**.

21.4.4 Identified receptors

21.4.4.1 The spatial and temporal scope of the assessment enables the identification of receptors that may experience a change as a result of the Project. The receptors identified that may experience likely significantly effects for air quality are outlined in **Table 21.3.**

Table 21.3 Identified receptors requiring assessment for air quality

Receptor group	Receptors included within group
Human receptors	Receptors mainly include residential properties, footpaths and industry. For assessing impacts from dust, the number of receptors has been counted (as per the IAQM guidance) within various distance bands of the Onshore Red Line Boundary. Human receptors located within 250m of the Onshore Red Line Boundary and within 50m of the route(s) used by construction vehicles on the public highway, up to 250m from the site entrances(s). For air quality impacts from traffic emissions, receptors within 200m have been considered.
Ecological receptors	Ecological receptors are habitats sensitive to dust within 50m of the Onshore Red Line Boundary and within 50m of the route(s) used by construction vehicles on the public highway and up to 250m from the site entrances(s). They include local (for example, LNR, AWs, national (for example, Site of Special Scientific Interest (SSSI)) and international (for example, Special Area of Conservation (SAC), Special Protection Area (SPA)) designations. An AW is located along the River Ugie, near Inverugie. It is partially within the Onshore Red Line Boundary. It is also within the cable routing area. The Rattray Head LNCS falls within the landfall zones. For air quality impacts from traffic emissions, sensitive human receptors within 200m have been considered.

21.4.5 Potential effects

21.4.5.1 Potential effects on air quality receptors that have been scoped in for assessment are summarised in **Table 21.4**.

Table 21.4 Potential effects for air quality

Receptor	Activity or impact	Potential effect
Construction stage		
Sensitive human receptors (for instance, residential properties and other locations where people may be exposed) and ecological sites, within 200m of affected roads and especially in Air Quality Management Areas (AQMAs)	Emissions of air pollutants from construction traffic on roads.	Health effects on human and ecological receptors.
Residential properties and other locations with public access within 250m from the temporary construction site boundary(s), 50m of the	Emissions of dust from construction.	Health effects on human receptors.

Receptor	Activity or impact	Potential effect
route(s) used by construction vehicles on the public highway and up to 250m from the site entrance(s)		
Ecological sites sensitive to dust within 50m of the Onshore Red Line Boundary and within 50m of the route (s) used by construction vehicles on the public highway, up to 250m from the site	Emissions of dust from construction.	Health effects on ecological receptors.

21.4.5.2 The air pollutants that have been scoped into the assessment are NO_2, PM_{10}, and $PM_{2.5}$. Both emissions and background concentrations of other pollutants are low and there is no risk of exceedance of any assessment levels.

21.4.6 Effects scoped out of assessment

21.4.6.1 A number of potential effects have been scoped out from further assessment, resulting from a conclusion of no likely significant effect. These conclusions have been made based on the knowledge of the baseline environment, the nature of planned works and the professional judgement on the potential for impact from such projects more widely. Each scoped out activity or impact is considered in turn in **Table 21.5**.

Table 21.5 Activities or effects scoped out of assessment

Activity or impact	Rational for scoping out
Emissions of air pollution from mobile plant and construction equipment	The small amount of construction plant required, the short duration of construction activity at any given location (embedded measure M-007), the avoidance of sensitive receptors along the route (embedded measure M-002), and the low background concentrations of air pollutants mean that the risk of causing significant air quality impacts at either human or ecological receptors is very low. This is supported by the experience of previous similar projects, such as the Green Volt Offshore Wind Farm project (Green Volt, 2023) and the Salamander Offshore Wind Farm (Salamander, 2024), where these effects were scoped out of the EIA.
Emissions of odour from the construction and decommissioning stages	No likely sources of odour have been identified, the short duration of construction activity at any given location (embedded measure M-007) and the avoidance of historic landfill sites and of sensitive receptors along the route (embedded measure M-002) mean that the risk of causing significant odour impacts at human receptors is very low.

Activity or impact	Rational for scoping out
Emissions of air pollutants during the operational stage	There will be no emissions associated with the landfall(s) or onshore substations. The amount of road traffic for servicing this Project will be very low and are highly unlikely to exceed the criteria outlined in **Section 21.4.2.2.** Therefore, the risk of causing significant air quality impacts at either human or ecological receptors is very low.
Emissions of dust during the operational stage	There are no dust sources associated with the operation (and maintenance) of this Project.
Emissions of odour during the operational stage	There are no odour sources associated with the operation (and maintenance) of this Project.
Emissions of air pollutants from traffic on roads during decommissioning stage	Decommissioning is not due to begin for over 35 years. Decommissioning traffic is likely to be half of what is expected during the construction phase or on par as a worst case. Construction traffic (see **paragraph 21.8.1.10**) has been screened out as not significant and therefore decommissioning traffic will also be screened out as not significant.
Emissions of dust from construction during decommissioning stage	Decommissioning is not due to begin for over 35 years. Potential dust generation during the decommissioning phase is likely to be limited (due to the nature of the Project), and lower that what has been assessed for the construction stage. With application of appropriate mitigation measures dust generation can be reduced to negligible during the decommissioning stage.

21.5 Methodology for baseline data gathering

21.5.1 Overview

21.5.1.1 Baseline data collection has been undertaken to obtain information over the study area described in **Section 21.4: Scope of the assessment**. The current and future baseline conditions are presented in **Section 21.6: Baseline conditions.**

21.5.2 Desk study

21.5.2.1 The data sources that have been collected and used to inform this air quality assessment are summarised in **Table 21.6.**

Table 21.6 Data sources used to inform the air quality chapter

Source	Date	Summary	Coverage of study area
Background maps (Defra, 2021)	2021	Provide forecasted concentrations of pollutants at background locations for years from 2021 to present.	Full coverage of study area.
Annual Progress Report (APR) (Aberdeenshire Council, 2024)	2024	Provides details of AQMAs and monitoring results on a yearly basis, this is the most recent report.	Full coverage of study area.

21.5.3 Data limitations

21.5.3.1 To ensure transparency within the EIA process, the following limitation has been identified:

- Construction Dust Risk Assessment: professional judgement was used where detailed construction information was unavailable. To ensure a conservative assessment the highest level of construction activity was chosen out of the ranges in the guidance (IAQM, 2024) to address these limitations.

21.6 Baseline conditions

21.6.1 Current baseline

21.6.1.1 The Onshore Red Line Boundary (**Volume 2, Figure 21.1**) lies within the administrative area of Aberdeenshire Council. Aberdeenshire Council produces an APR (Aberdeenshire Council, 2024) which describes air quality in its administrative area, including any designated AQMAs, and the results of air quality monitoring.

21.6.1.2 There are no AQMAs within 5km of the Onshore Red Line Boundary. Additionally, Aberdeenshire Council have not declared any AQMAs, and the available evidence suggests that Aberdeenshire benefits from generally good air quality, in terms of those emissions currently considered under the LAQM regime (Aberdeenshire Council, 2024). Therefore, the baseline data outlined below are representative of the following:

- landfall(s);
- onshore export cable corridor zone A;
- onshore substation zone; and
- onshore export cable corridor zone B.

21.6.1.3 Aberdeenshire Council undertook non-automatic (passive) monitoring of NO_2 at 11 sites during 2023. There are two diffusion tubes located in Peterhead Bay, approximately 3km to the south of the Onshore Red Line Boundary. At these two locations, concentrations of NO_2 during 2023 remained between 14.8µg/m^3 and 16.5µg/m^3, compared to the annual mean objective of 40µg/m^3. It should be noted that 2020 and 2021 data are not considered representative of long-term air quality monitoring, due to the various COVID-19 lockdowns that were in place, where traffic was vastly reduced. Data for 2019 to 2023 have been

obtained from the APR (Aberdeenshire Council, 2024) and are displayed below in **Table 21.7**.

Table 21.7 Annual mean NO_2 monitoring results: non-automatic monitoring (µg/m^3)

Site ID – Site Name (Type)	Annual mean NO_2 concentration (µg/m^3)				
	2019	**2020***	**2021***	**2022**	**2023**
PH / BH – Peterhead BH (Roadside)	20.0	14.1	17.0	16.6	16.5
PH / MS – Peterhead MS (Kerbside)	17.0	11.9	15.0	15.0	14.8
**** Data for these years are not considered representative of long-term air quality monitoring due to the implications associated with the COVID-19 lockdown restrictions.***					

21.6.1.4 Defra (2017) maintains a nationwide model (the Pollution Climate Mapping (PCM) model) of current and future background air quality concentrations at a 1km grid square resolution. The datasets include annual average concentration estimates for NO_2, as well as other pollutants. The PCM model is semi-empirical in nature: it uses data from the National Atmospheric Emissions Inventory to model the concentrations of pollutants at the centroid of each 1km grid square but then calibrates these concentrations in relation to actual monitoring data. Concentrations represent background locations, not roadside locations or those particularly influenced by point sources.

21.6.1.5 The dataset was last updated in 2024 for a reference year of 2021 (Defra, 2024). Data for 2021 to 2024 have been obtained from the 2024 (2021 reference year) dataset. Concentrations of all pollutants gradually decrease between 2021 and 2024 and are all below their respective assessment levels, as shown below in **Table 21.8**.

21.6.1.6 Pollutants concentrations are lowest at the Scotstown landfall and Lunderton North landfall, increasing when moving inland to the onshore export cable corridor zone A, onshore substation zone and onshore export cable corridor zone B. Based on the collected data pollutant, concentrations across all Project elements, listed above, are comfortably below the relevant AQSs and AQOs.

Table 21.8 Annual background concentrations of NO_2, PM_{10} and $PM_{2.5}$ across the study area

Year	NO_2	PM_{10}	$PM_{2.5}$
2021	1.9 to 19.8	5.7 to 10.0	2.9 to 4.2
2022	1.9 to 19.6	5.6 to 9.9	2.9 to 4.1
2023	1.8 to 19.3	5.6 to 9.9	2.8 to 4.1
2024	1.7 to 19.1	5.6 to 9.9	2.8 to 4.0
AQS / AQO (annual mean)	**40**	**18**	**10**

21.6.2 Future baseline

21.6.2.1 Air quality in the UK has shown general improvement in recent years, particularly for NO_2, though progress varies by pollutant and location, and challenges remain in urban and roadside environments. At roadside locations, concentrations of NO_2 are expected to fall considerably as an improvement in emissions factors which outweighs the projected increase in vehicle numbers. For PM, future changes at roadside locations are more stable, as there has been less focus on reducing emissions of this family of pollutants in recent years.

21.6.2.2 Background concentrations of key pollutants, including NO_2, PM_{10} and $PM_{2.5}$ are expected to decline steadily into the future, in response to measures to reduce emissions from a range of key sources, including domestic, industrial and transport sources. It should, however, be noted that air pollution remains a concern for public health, and while progress is being made, some urban areas still experience levels above recommended guidelines.

21.6.2.3 Dust emissions are typically linked to local sources such as construction and industrial activity. As a result, no consistent national trends are expected. However, localised effects may still be relevant, particularly in areas with ongoing development or specific site activities.

21.7 Basis for the EIA Report

21.7.1 Maximum design scenario

1.1.1.1 The process of assessing using a parameter-based design envelope approach means that the assessment considers a maximum design scenario whilst allowing the flexibility to make improvements in the future in ways that cannot be predicted at the time of submission of the planning application, marine licences applications and section 36 consent.

1.1.1.2 The assessment of the maximum adverse scenario for each receptor establishes the maximum potential adverse effect and as a result effects of greater adverse significance would not arise should any other scenario (as described in **Chapter 4: Project Description**) to that assessed within this Chapter be taken forward in the final Project design.

1.1.1.3 The maximum design scenario parameters that have been identified to be relevant to air quality are outlined in **Table 21.9** and are in line with the project design envelope (**Chapter 4: Project Description**).

Table 21.9 Maximum design scenario for impacts on air quality

Impact / activity	Maximum design scenario parameter	Justification
Construction		
Impact C1: Emissions of dust from construction	Landfall(s): Assumes maximum footprint of construction activities for landfall(s) (Option 2: Scotstown and Lunderton): • Two temporary access roads up to 6m wide and 700m long, for location see **Volume 2, Figure 4.1: Onshore Red**	These assessment assumptions represent the greatest dust generation potential from temporary construction activities that may affect relevant receptors, therefore providing a worst-case scenario for assessment.

Impact / activity	Maximum design scenario parameter	Justification
	Line Boundary and indicative onshore infrastructure overview. • Up to three temporary construction compounds (TCCs) area 345m x 70m. • Up to seven below ground transition joint bay(s), typically 12m long x 3.5m wide x 2.5m deep. • Up to eight cable ducts. • Cable ducts installed using horizontal directional drilling (HDD) (or similar trenchless technique) installation methodology. In relation to trenchless crossings, HDD has been presented in the EIA. Whilst other trenchless methods are available, HDD is presented herein as it is likely to have the largest construction impact. • Duration: ▸ phase 1 – up to one year; ▸ phase 2 – up to one year; and ▸ phase 3 – up to one year. Onshore export cable corridor: • 15 temporary access roads / haul roads up to 6m wide totalling 3km in length, for location see **Volume 2, Figure 4.1**. • For the onshore export cable corridor from the landfall(s) to the onshore substations, the onshore export cable corridor is up to 89m wide with an approximate length of 11km. • Up to six trenches, based on minimum depth of ducts at 0.9m and with a typical depth of up to 1.5m. Typical depth cover including intimate (engineered) backfill will be 0.9m to 1.2m. All topsoil can therefore be reinstated if suitable for use. It is likely that most of the natural subsoil can also be restored above the cable ducts and the intimate backfill around them, given the proposed depth of the trenches. • Onshore export cable corridor from the onshore substations to the Scottish and Southern Electricity Networks (SSEN) Netherton Hub, the corridor is up to 99m wide and an approximate length of 2.35km.	A worst-case scenario assumes that development may take place anywhere within the Onshore Red Line Boundary. These assessment assumptions represent the greatest dust generation potential from temporary construction activities that may affect relevant receptors, therefore providing a worst-case scenario for assessment. A worst-case scenario assumes that development may take place anywhere within the Onshore Red Line Boundary.

Impact / activity	Maximum design scenario parameter	Justification
	• Up to seven trenches, with typical trench depth of up to 1.5m. Onshore substations: • up to 15 hectares (ha) permanent area for the onshore substations with two permanent access roads up to 6m wide (up to 4.2ha in area), plus drainage / landscaping areas; and • up to 3.06ha additional temporary construction compound area. • duration: ▸ phase 1 – up to three years; ▸ phase 2 – up to three years; and ▸ phase 3 – up to three years. Joint bay(s): • typically, joint bay(s) are located every 600m to 1000m; • at each joint bay location, along the onshore export cable corridor from the landfall(s) to the onshore substations, there are up to six joint bay(s); • at each joint bay location, along the onshore export cable corridor from the onshore substations to the SSEN Netherton Hub, there are up to seven joint bay(s); • each joint bay will be approximately 9m long by 3m wide), with a depth of up to 2m; • each joint bay will have an associated link box and fibre optic cable (FOC) junction box that will be accessible at surface level; and • each link box and FOC junction box will be approximately 3m long by 1m wide, with a depth of up to 1.5m. Trenchless crossings: • the onshore export cable corridor widens to up to 300m at locations where trenchless crossings are required; • 18 trenchless crossing compounds for onshore substations;	

Impact / activity	Maximum design scenario parameter	Justification
	• four onshore substations to grid trenchless crossing compounds; • trenchless crossing compound dimensions: up to 300m x 50m (width and length); and • six to twelve months construction duration per trenchless crossing location (does not include cable pulling duration). A crossings schedule is provided in the **Volume 3, Appendix 4.1: Crossings Register**. TCCs: • Up to three temporary primary construction compound locations (each up to 125m x 125m in area). • Six temporary secondary construction compound locations (each up to 100m x 100m in area). Four between the landfall(s) to the onshore substations and two between the onshore substations to grid connection. • Construction of each joint bay will require a TCC (each up to 85m x 30m in area). These compounds are likely to be accommodated within the onshore export cable corridor and the land required is therefore included above under onshore export cable corridor. Onshore export cable corridor construction works duration: • phase 1 – up to two and a half years; • phase 2 – up to one year; and • phase 3 – up to one year. Core working hours of 08:00 to 18:00 Monday to Friday; and 08:00 to 13:00 on Saturday. Prior to and following the core working hours Monday to Friday, a 'shoulder hour' for mobilisation and shut down will be applied. No activity outside of these hours, including Sundays, public holidays or bank holidays will take place apart from under the following circumstances: • for other works requiring extended working hours such as concrete pouring which will require the relevant planning authority to be notified at least 72 hours in advance;	

Impact / activity	Maximum design scenario parameter	Justification
	• for the delivery of abnormal loads to the connection works, which may cause congestion on the local road network, where the relevant highway authority has been notified prior to such works 72 hours in advance; or • as otherwise agreed in writing with the relevant planning authority.	
Impact C2: Emissions to air from construction traffic	The maximum design scenario is based on the Annual Average Daily Traffic (AADT) for 2031 (year 2 - the year with the highest levels of construction traffic), generated as part of the construction traffic data informing the assessment of transport effects (**Chapter 26: Traffic and Transport**).	The assumptions represent a reasonable worst case to screen whether potential effects from construction traffic emissions may occur. This allows a large array of sources to be evaluated and only undertake detailed assessment on those road links with potential significant effects, for instance: large increases in vehicle movements on roads, where residential receptors are present.

21.7.2 Embedded environmental measures

21.7.2.1 As part of the Project design process, embedded environmental measures have been adopted to reduce the potential for adverse impacts on air quality. These embedded environmental measures have evolved over the development process as the EIA has progressed and in response to consultation.

21.7.2.2 These measures also include those that have been identified as good or standard practice and include actions that would be undertaken to meet existing legislation requirements. As there is a commitment to implementing these embedded environmental measures, and also to various standard sectoral practices and procedures, they are considered inherently part of the design of the Project and are set out in the EIA Report.

21.7.2.3 **Table 21.10** sets out the relevant embedded environmental measures within the design and how these affect the air quality assessment.

Table 21.10 Relevant air quality embedded environmental measures

ID	Environmental measure proposed	Project stage measure introduced	How the environmental measures will be secured	Relevance to air quality assessment
M-002	Sensitive sites will be avoided by the temporary and permanent onshore project footprint including SPAs, SACs, SSSIs, National Nature Reserve (NNR), Local Nature Reserves, Local Wildlife Sites, AW, areas of consented development, areas of historic landfill and other known areas of potential contamination, Scottish National Trust land, listed buildings and scheduled monuments, potable water supply abstractions, floodplains and geomorphic risk areas.	Scoping Amended at EIA Report	**Volume 4: Outline Construction Environmental Management Plan** (CEMP), description of Project and planning conditions.	Reduces risk of adverse air quality effects on sensitive sites. Avoiding areas of historic and authorised landfills and other contamination reduces risk of odour impacts.
M-007	Best practice air quality management measures will be applied as described in IAQM (2024) Guidance on the Assessment of Dust from Demolition and Construction to avoid adverse effects on sensitive features. Examples of pathway include windblown dust / fibres or tracking back of dust / fibres is a potential contamination migration and vehicle standards.	Scoping Amended at EIA Report	**Volume 4: Outline Construction Environmental Management Plan** and planning conditions.	This measure will ensure appropriate air quality management practices are in place to minimise adverse effects.
M-019	The onshore export cable will be constructed in sections. The trenches will be excavated, the cable ducts will	Scoping	**Volume 4: Outline Construction Environmental Management Plan**.	Reduces risk of adverse air quality effects on sensitive receptors.

ID	Environmental measure proposed	Project stage measure introduced	How the environmental measures will be secured	Relevance to air quality assessment
	be laid, the trenches backfilled, and the reinstatement process commenced in as short a timeframe as practicable.			
M-063	A CEMP will be implemented by the contractor in accordance with **Volume 4: Construction Environmental Management Plan**. The contractor will ensure that the relevant environmental measures within the CEMP and health and safety procedures are implemented. The CEMP identifies the project management structure roles and responsibilities for managing and reporting on the environmental impact of the construction stage.	Scoping Amended at EIA Report	**Volume 4: Outline Construction Environmental Management Plan** and planning conditions.	Reduces risk of adverse air quality effects on sensitive receptors.

21.7.2.4 Further detail on the embedded environmental measures in **Table 21.10 i**s provided in the **Volume 3, Appendix 5.2: Commitments Register**, which sets out how and where particular embedded environmental measures will be implemented and secured.

21.8 Methodology for the EIA Report

21.8.1 Introduction

21.8.1.1 The project-wide approach to assessment is set out in **Chapter 5: Approach to EIA.** Whilst this has informed the approach that has been used in this air quality assessment, it is necessary to set out how this methodology has been applied, and adapted as appropriate, to address the specific needs of the air quality assessment.

Construction dust

21.8.1.2 The guidance (IAQM, 2024) provides a method to assess the significance of construction effects by considering the annoyance due to dust soiling, as well as harm to ecological receptors and the risk of health effects due to any significant increases to PM_{10} or $PM_{2.5}$.

21.8.1.3 A detailed assessment is deemed to be required as described in the guidance (IAQM, 2024) where there is:

- a *"human receptor"* located within: 250m of the Onshore Red Line Boundary and construction site entrance(s), and within 50m of the routes(s) used by vehicles on the public highway; or
- an *"ecological receptor"* located within 50m from Onshore Red Line Boundary, construction sites and routes used by construction vehicles on public highways up to 250m of the construction site entrance(s).

21.8.1.4 A temporary construction site has been classified according to the risk of effects (based upon the scale and nature of the works, plus the proximity of sensitive receptors), appropriate site-specific environmental measures have been identified, and the significance of effects has been determined.

21.8.1.5 The dust assessment methodology (IAQM, 2024) starts by determining the risk of significant impacts, starting with the assumption that there will be no dust mitigation measures, in other words the counterfactual case in which the embedded environmental measures do not exist. The resulting level of risk is then used to determine the level of environmental measures required to ensure that actual impacts are not significant.

21.8.1.6 In the methodology (IAQM, 2024), site activities are divided into four types to reflect their different potential effects:

- demolition: *"an activity involved with the removal of an existing structure or structures"*;
- earthworks: *"the process of soil-stripping, ground-levelling, excavation and landscaping"*;
- construction: *"an activity involved in the provision of a new structure"*; and
- trackout: *"the transport of dust and dirt from the site onto the public road network […]. This arises when vehicles leave site with dust materials or transfer dust and dirt onto the road having travelled over muddy ground onsite."*

21.8.1.7 The methodology addresses three types of impact:

- dust soiling effects on people and property;

- human health impacts; and
- ecological impacts.

21.8.1.8 The methodology (IAQM, 2024) for determining the risk of dust impacts proceeds through a number of steps. These are summarised briefly as follows:

- Determine the potential dust emission magnitude (classified as large, medium or small). That is, how much dust the activity is likely to generate, without mitigation. This is done for each of the four types of activity (demolition, earthworks, construction and trackout).
- Determine the sensitivity of receptors that may be affected by dust (classified as high, medium or low), for each of the three impact types. For example, residential receptors are high sensitivity for dust soiling, while footpaths are low sensitivity.
- Define the sensitivity of the area (classified as high, medium or low), for each of the three impact types. This is determined by considering how many receptors there are, and how sensitive the receptors are, at various distances (e.g. 20m, 50m etc.) from the source. Background levels of PM_{10} also affect the sensitivity of the area.
- Define the risk of impacts in the absence of mitigation (classified as high risk, medium risk, low risk or negligible risk). This is determined by combining the dust emission magnitude with the sensitivity of the area. This is done for each of the four types of activity (demolition, earthworks, construction and trackout) and each of the three impact types (dust soiling, health and ecological) in-combination.
- Determine the necessary mitigation to reduce the risk of impacts to a negligible level.

21.8.1.9 The IAQM assessment tables that are used to undertake the steps above are presented in **Volume 3, Appendix 21.1: Air Quality Technical Data**.

Construction traffic

21.8.1.10 IAQM and EPUK (2017) guidance states when impacts from traffic need to be considered. The guidance further defines a significant increase in traffic as follows:

- cause a significant change in light duty vehicle (LDV) traffic flows on local roads with relevant receptors:
  - more than 100 AADT within or adjacent to an AQMA; or
  - more than 500 AADT elsewhere;
- cause a significant change in Heavy Duty Vehicle (HDV) flows on local roads with relevant receptors:
  - more than 25 AADT within or adjacent to an AQMA; or
  - more than 100 AADT elsewhere;
- realign roads, for instance changing the proximity of receptors to traffic lanes, where the change is 5m or more and the road is within an AQMA; or
- introduce a new junction or remove an existing junction near to relevant receptors. This applies to junctions that cause traffic to significantly change vehicle accelerate / decelerate (for example, traffic lights, or roundabouts).

21.8.1.11 An estimation of traffic generation during the construction has been calculated by WSP's Traffic and Transport team. The highest level of construction traffic is expected in 2031, which represents the peak construction year. During this period, the Project is anticipated

to generate 357 AADT light-duty vehicles (LDVs) along the A950 and 23 AADT heavy-duty vehicles (HDVs) along the A90.

21.8.1.12 This level of traffic remains below the screening threshold for a detailed air quality assessment, and therefore, the effects of construction traffic on air quality can be screened out from further assessment in this Chapter and considered **Not Significant**.

21.8.2 Significance evaluation methodology

Overview

21.8.2.1 The significance level attributed to each effect has been assessed based on the value of the affected receptor and the magnitude of change resulting from the onshore Project. The level of significance has then been determined by the combination of value and magnitude.

21.8.2.2 In line with the EIA Regulations 2017, the EIA for the onshore Project will consider those impacts where there is a risk of likely significant effect only. The following Section draws on industry experience and expertise to identify those effect-receptor pathways that may potentially lead to a significant impact. Where experience and available evidence indicates an effect-receptor pathway will not lead to a significant impact with regards to the EIA Regulations 2017 the pathway is scoped out from assessment.

Value of receptor

21.8.2.3 The sensitivity of human and ecological receptors to dust emissions is outlined in the IAQM guidance (IAQM, 2024). In brief, receptors are classified as:

- high: residential properties, hospital, schools, international and nationally designated ecological sites with high dust sensitivity;
- medium: office and shop workers, national designated ecological sites with moderate dust sensitivity; and
- low: public footpaths, playing fields, parks and shopping streets, local ecological sites with low dust sensitivity.

Magnitude of changes

21.8.2.4 The magnitude of impact in the construction dust assessment is assigned for four key site activities; demolition, earthworks, construction and track out, based on the intensity of the activity (for instance: site area, volume of construction, etc.) as defined in the IAQM Construction Dust (IAQM, 2024) guidance. The potential for dust emissions (PM_{10} and $PM_{2.5}$) are assessed for each site activity that is likely to take place and considers the 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}.

Significant evaluation

21.8.2.5 The IAQM Construction Dust (IAQM, 2024) guidance "*recommends that significance is only assigned to the effect after considering the construction activity with mitigation*". The purpose of the construction dust assessment is to determine the levels of risk posed in terms of loss of amenity due to dust soiling and to human health from PM emissions so that an appropriate level of mitigation can be assigned. As the purpose of the mitigation is to prevent a significant effect, the normal finding is that the residual effect is **Not Significant**.

The IAQM measures from the construction dust assessment are incorporated within the **Volume 4: Outline Construction Environmental Management Plan**.

21.9 Assessment of effects: construction stage

21.9.1 Introduction

21.9.1.1 This Section provides an assessment of the effects for air quality from the construction of the onshore elements of the Project.

21.9.1.2 The operational and maintenance stage and the decommissioning stage have been scoped out of assessment and are therefore omitted from this Section.

21.9.1.3 The assessment methodology set out in **Section 21.8** has been applied to assess effects to air quality from the Project.

Dust emission magnitude (without embedded environmental measures)

21.9.1.4 **Table 21.11** details the potential dust emission magnitude for each of the four types of activity according to the different components of the Project considered relevant to the dust assessment. Justification for the attribution of magnitude are given with reference to IAQM guidance (IAQM, 2024) where appropriate. Note that these emission magnitudes assume, counterfactually, that no mitigation is in place; this is part of the IAQM assessment (IAQM, 2024) process and, in reality, all necessary mitigation against construction dust is a commitment. It is worth nothing that demolition has been listed as not applicable (n/a) as it is understood that there is no demolition expected for the Project.

21.9.1.5 TCCs will be required in support the construction of the onshore elements of the Project and have been considered within **Table 21.11**. Details of these are in **Chapter 4: Project Description.**

Table 21.11 Dust emission magnitude

Element		Demolition	Earthworks	Construction	Trackout
Landfall(s)	**Option 1: Lunderton**	n/a	Large (total site area >110,000m^2	Large (total building volume >75,000m^3)	Large >50 HDVs)
	Option 2: Scotstown and Lunderton	n/a	Large (total site area >110,000m^2	Large (total building volume >75,000m^3)	Large >50 HDVs)
Onshore export cable corridor (landfall(s) to onshore substations)		n/a	Large (total site area >110,000m^2	Large (total building volume >75,000m^3)	Large >50 HDVs)
Onshore substations		n/a	Large (total site area >110,000m^2	Large (total building volume >75,000m^3)	Large >50 HDVs)
Onshore export cable corridor (onshore substations to SSEN		n/a	Large (total site area >110,000m^2	Large (total building volume >75,000m^3)	Large >50 HDVs)

Element	Demolition	Earthworks	Construction	Trackout
Netherton Hub point of connection)				

Sensitivity of the area

21.9.1.6 Receptors potentially affected by dust include residential properties, schools, prisons, medical facilities etc., which have high sensitivity to dust soiling and health effects. The IAQM (2024) guidance expresses other types of receptors as equivalent to a certain number of residential properties based on the judgement of the assessor.

21.9.1.7 The following subsections outline the sensitivity of the areas surrounding each component of the Project considered within this assessment. It should be noted that as demolition is not included, it has not been discussed below.

Dust soiling

Landfall(s)

Option 1: Lunderton landfall

21.9.1.8 There are four residential properties within 20m of the Onshore Red Line Boundary for this area. The area is therefore classified as having **medium** sensitivity to dust soiling from earthworks and construction. Less than ten residential properties lie within 50m of roads up to 250m from the landfall area at the Lunderton landfall, so the area is classified as having **low** sensitivity to dust soiling from trackout.

Option 2: Scotstown and Lunderton landfall

21.9.1.9 There are between one and ten residential properties within 20m of the Onshore Red Line Boundary for these areas, one receptor at Scotstown and four at Lunderton. These areas are therefore classified as having **medium** sensitivity to dust soiling from earthworks and construction. Less than ten residential properties lie within 50m of roads up to 250m from the landfall at the Scotstown and Lunderton landfall. Therefore, these areas are classified as having **low** sensitivity to dust soiling from trackout.

Onshore export cable corridor (landfall(s) to onshore substations)

21.9.1.10 There are approximately 30 residential properties within 20m of the Onshore Red Line Boundary and the area is classified as having **high** sensitivity to dust soiling from earth works and construction. There is a maximum of between one and ten residential properties within 50m of roads up to 250m from the Onshore Red Line Boundary and so the area is classified as having **low** sensitivity to dust soiling from trackout.

Onshore substations

21.9.1.11 There are four residential properties within 20m of the Onshore Red Line Boundary and, therefore, the area is classified as having **medium** sensitivity to dust soiling from the earthworks and construction of the onshore substations. There is a maximum of between one and ten within 50m of roads up to 250m from the substations and so the area is classified as having **low** sensitivity to dust soiling from trackout.

Onshore export cable corridor (onshore substations to SSEN Netherton Hub point of connection)

21.9.1.12 There are two residential properties within 20m of the Onshore Red Line Boundary and so the area is classified as having **medium** sensitivity to dust soiling from earth works and construction. There is a maximum of between one and ten residential properties within 50m of roads up to 250m from the Onshore Red Line Boundary and so the area is classified as having **low** sensitivity to dust soiling from trackout.

Human health

Background PM_{10} concentrations

21.9.1.13 The background annual mean PM_{10} concentration across the Project's Onshore Red Line Boundary is less than 10µg/m^3 (see **Table 21.8**). There is one receptor at Scotstown and four at Lunderton within 20m of the Onshore Red Line Boundary at the landfall zones. There are approximately 35 residential properties within 20m of the Onshore Red Line Boundary at the onshore export cable corridor. Considering the number of residential properties, all areas are classified as having **low** sensitivity.

Ecological sites

21.9.1.14 The are two relevant ecological receptor the AW along the River Ugie, which crosses the Onshore Red Line Boundary and part of onshore export cable corridor near Inverugie, and the Rattray Head LNCS that crosses the landfall zones. The ecological sites are considered to have a **low** sensitivity to dust soiling from earthworks, construction and trackout.

Risk of impacts (without embedded environmental measures)

21.9.1.15 Combining the dust emission magnitude with the sensitivity of the area, the risk of dust impacts in the absence of embedded environmental measures is determined as shown in **Table 21.12**.

21.9.1.16 For the landfall(s) (Option 1 and Option 2), earthworks and construction activities are classed as medium risk to dust soiling impacts and trackout as low risk to dust soiling. Regarding human health and ecology, impacts are classed as low risk.

21.9.1.17 For the onshore export cable corridor (landfall(s) to onshore substations), earthworks and construction activities are classed as high risk to dust soiling impacts and trackout as low risk to dust soiling. Regarding human health and ecology, impacts are classed as low risk.

21.9.1.18 For the onshore substations, earthworks and construction activities are classed as Medium Risk to dust soiling impacts and trackout as low risk to dust soiling. Regarding human health, impacts are classed as low risk.

21.9.1.19 For the onshore export cable corridor (onshore substations to SSEN Netherton Hub point of connection), earthworks and construction activities are classed as medium risk to dust soiling impacts and trackout as low risk to dust soiling. Regarding human health, impacts are classed as low risk.

Table 21.12 Summary dust risk (without embedded environmental measures)

Element		Earthworks	Construction	Trackout
Landfall, Option 1: Lunderton	**Dust soiling**	Medium risk.	Medium risk.	Low risk.
	Human health	Low risk.	Low risk.	Low risk.
	Ecological	Low risk.	Low risk.	Low risk.
Landfall, Option 2: Scotstown and Lunderton	**Dust soiling**	Medium risk.	Medium risk.	Low risk.
	Human health	Low risk.	Low risk.	Low risk.
	Ecological	Low risk.	Low risk.	Low risk.
Onshore export cable corridor (landfall(s) to onshore substations)	**Dust soiling**	High risk.	High risk.	Low risk.
	Human health	Low risk.	Low risk.	Low risk.
	Ecological	Low risk.	Low risk.	Low risk.
Onshore substations	**Dust soiling**	Medium risk.	Medium risk.	Low risk.
	Human health	Low risk.	Low risk.	Low risk.
	Ecological	n/a	n/a	n/a
Onshore export cable corridor (onshore substations to SSEN Netherton Hub point of connection)	**Dust soiling**	Medium risk.	Medium risk.	Low risk.
	Human health	Low risk.	Low risk.	Low risk.
	Ecological	n/a	n/a	n/a

Environmental measures

21.9.1.20 As stated in **Section 21.7**, embedded environmental measures M-002, M-007, M-019 and M-063 will be secured through an Outline CEMP. Planning conditions will ensure best practice air quality management measures are applied as described in IAQM *Guidance on the Assessment of Dust from Demolition and Construction, Version 2.2* (2024) (IAQM, 2024).

21.9.1.21 Given the risks of impacts assessed above (see **paragraphs 21.9.1.6** to **21.9.1.16**), it is possible to determine the specific environmental measures required to ensure that the overall effects are **Negligible**. These are given in **Table 21.13** and represent the measures relevant to this Project that are classed as highly recommended or desirable in the IAQM guidance.

21.9.1.22 These environmental measures therefore constitute the best practice air quality management measures referred to in embedded environmental measure M-007 (see **Table**

21.10) in relation to the construction stage of the onshore elements of the Project. **Table 21.13** also highlights the areas that these apply.

Table 21.13 Specific environmental measures to be applied for construction dust management (from IAQM 2024)

IAQM number	Environmental measure	Applicable areas
Mitigation for all sites: Communications		
1	*"Develop and implement a stakeholder communications plan that includes community engagement before work commences on site"*	All – highly recommended.
2	*"Display the name and contact details of the person(s) accountable for air quality and dust issues on site. This may be the environmental manager/engineer or the site manager."*	All – highly recommended.
3	*"Display the head or regional office contact information."*	All – highly recommended.
Mitigation for all sites: Dust management		
4	*"Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk and should include as a minimum the highly recommended measures in this document. The desirable measures should be included as appropriate for the site. In London additional measures may be required to ensure compliance with the Mayor of London's guidance. The DMP may include monitoring of dust deposition, dust flux, real-time PM_{10} continuous monitoring and/or visual inspections."*	All – highly recommended.
Site management		
5	*"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."*	All – highly recommended.
6	*"Make the complaints log available to the Local Authority when asked."*	All – highly recommended.
7	*"Record any exceptional incidents that cause dust and/or air emissions, either*	All – highly recommended.

IAQM number	Environmental measure	Applicable areas
	on- or offside and the action taken to resolve the situation in the log book."	
8	*"Hold regular liaison meetings with other high risk construction sites within 250m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the offsite transport/ deliveries which might be using the same network routes."*	Onshore export cable corridor (landfall(s) to onshore substations) – highly recommended.
Monitoring		
9	*"Undertake daily on-site and offsite inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100m of the site boundary, with cleaning to be provided if necessary."*	Onshore export cable corridor (landfall(s) to onshore substations) – highly recommended. Landfall, Option 1: Lunderton, Landfall, Option 2: Scotstown and Lunderton, onshore substations, onshore export cable corridor (onshore substations to SSEN Netherton Hub point of connection) – desirable.
10	*"Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked."-*	All – highly recommended.
11	*"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."*	All – highly recommended.
12	*"Agree dust deposition, dust flux, or real-time PM continuous monitoring locations 10 with the Local Authority. Where possible commence baseline monitoring at least three months before work commences on site or, if it a large site, before work on a phase commences. Further guidance is provided by IAQM on monitoring during demolition, earthworks and construction."*	All – highly recommended.

IAQM number	Environmental measure	Applicable areas
Preparing and maintaining the site		
13	*"Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible."*	All – highly recommended.
14	*"Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site."*	All – highly recommended.
15	*"Fully enclose site or specific operations where there is a high potential for dust production and the site is actives for an extensive period."*	All – highly recommended.
16	*"Avoid site runoff of water or mud."*	All – highly recommended.
17	*"Keep site fencing, barriers and scaffolding clean using wet methods."*	All – highly recommended.
18	*"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."*	All – highly recommended.
19	*"Cover, seed or fence stockpiles to prevent wind whipping."*	All – highly recommended.
Operating vehicle / machinery and sustainable travel		
20	*"Ensure all on-road vehicles comply with the requirements of the London Low Emission Zone and the London NRMM standards, where applicable."*	All – highly recommended.
21	*"Ensure all vehicles switch off engines when stationary - no idling vehicles."*	All – highly recommended.
22	*"Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable."*	All – highly recommended.
23	*"Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph 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 authority, where appropriate)."*	Onshore export cable corridor (landfall(s) to onshore substations) – highly recommended. Landfall, Option 1: Lunderton, Landfall, Option 2: Scotstown and Lunderton, onshore substations, onshore export cable corridor (onshore substations to SSEN Netherton

IAQM number	Environmental measure	Applicable areas
		Hub point of connection) – desirable.
24	*"Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials."*	Onshore export cable corridor (landfall(s) to onshore substations) – highly recommended.
25	*"Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing)."*	Onshore export cable corridor (landfall(s) to onshore substations) – highly recommended. Landfall, Option 1: Lunderton, Landfall, Option 2: Scotstown and Lunderton, onshore substations, onshore export cable corridor (onshore substations to SSEN Netherton Hub point of connection) – desirable.
Operations		
26	*"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."*	All – highly recommended.
27	*"Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate"*	All – highly recommended.
28	*"Use enclosed chutes and conveyors and covered skips."*	All – highly recommended.
29	*"Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate."*	All – highly recommended.
30	*"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."*	All – highly recommended.
Waste management		
31	*"Avoid bonfires and burning of waste materials."*	All – highly recommended.

IAQM number	Environmental measure	Applicable areas
Measures specific to earthworks		
36	*"Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable."*	Onshore export cable corridor (landfall(s) to onshore substations) – highly recommended. Landfall, Option 1: Lunderton, Landfall, Option 2: Scotstown and Lunderton, onshore substations, onshore export cable corridor (onshore substations to SSEN Netherton Hub point of connection) – desirable.
37	*"Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable."*	Onshore export cable corridor (landfall(s) to onshore substations) – highly recommended. Landfall, Option 1: Lunderton, Landfall, Option 2: Scotstown and Lunderton, onshore substations, onshore export cable corridor (onshore substations to SSEN Netherton Hub point of connection) – desirable.
38	*"Only remove the cover in small areas during work and not all at once."*	Onshore export cable corridor (landfall(s) to onshore substations) – highly recommended. Landfall, Option 1: Lunderton, Landfall, Option 2: Scotstown and Lunderton, onshore substations, onshore export cable corridor (onshore substations to SSEN Netherton Hub point of connection) – desirable.
Measures specific to construction		
39	*"Avoid scabbling (roughening of concrete surfaces) if possible."*	Onshore export cable corridor (landfall(s) to onshore substations) – highly recommended. Landfall, Option 1: Lunderton, Landfall, Option 2: Scotstown and Lunderton, onshore substations, onshore export cable corridor (onshore substations to SSEN Netherton

IAQM number	Environmental measure	Applicable areas
		Hub point of connection) – desirable.
40	*"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."*	All – highly recommended.
41	*"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."*	Onshore export cable corridor (landfall(s) to onshore substations) – highly recommended. Landfall, Option 1: Lunderton, Landfall, Option 2: Scotstown and Lunderton, onshore substations, onshore export cable corridor (onshore substations to SSEN Netherton Hub point of connection) – desirable.
42	*"For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust."*	All – desirable.
Measures specific to trackout		
43	*"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."*	All – desirable.
44	*"Avoid dry sweeping of large areas."*	All – desirable.
45	*"Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport."*	All – desirable.
46	*"Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable."*	All – not required.
47	*"Record all inspections of haul routes and any subsequent action in a site log book."*	All – desirable.
48	*"Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned."*	All – not required.

IAQM number	Environmental measure	Applicable areas
49	*"Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable)."*	All – desirable.
50	*"Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits."*	All – not required.
51	*"Access gates to be located at least 10 m from receptors where possible."*	All – not required.

21.9.2 Determine significance of effect

21.9.2.1 In the IAQM methodology (IAQM, 2024), once the risk of dust impacts has been determined and the appropriate dust mitigation measures identified, the final step is to determine whether there are significant effects arising from the construction stage of the Project.

21.9.2.2 IAQM guidance (IAQM, 2024) states:

> *"For almost all construction activity, the aim should be to prevent significant effects on receptors through the use of effective mitigation. Experience shows that this is normally possible. Hence the residual effect will normally be 'not significant'."*

21.9.2.3 No reasons have been identified why this should not apply to the Project. The embedded environmental measures (as shown in **Table 21.10**) include a commitment to embed the measures recommended by IAQM (IAQM, 2024) guidance under environmental measure M-007. The residual effect is therefore direct, temporary and **Negligible** (**Not Significant**) in EIA terms. This applies to the landfall(s), onshore export cable corridor (landfall(s) to onshore substations), onshore substations, onshore export cable corridor (onshore substations to SSEN Netherton Hub point of connection).

21.10 Summary of effects

21.10.1.1 A summary of the effects arising from the construction stage of the Project in relation to air quality are summarised in **Table 21.14**.

Table 21.14 Summary of effects during the construction

Element	Sensitivity / value	Activity and potential effect	Embedded environmental measures	Magnitude of effect	Significance of effects
Construction					
Emissions of dust from construction	Human receptors – **High**	Emissions of dust to air from the construction of the Project.	M-002 M-007 M-019 M-063	**Negligible**	**Negligible effect (Not Significant)**.

Element	Sensitivity / value	Activity and potential effect	Embedded environmental measures	Magnitude of effect	Significance of effects
	Ecological receptors – **Low**				

21.11 Transboundary effects

21.11.1.1 Transboundary effects arise when impacts from a development with one European Economic Area (EEA) State affects the environment of another EEA State(s). A screening of transboundary effects has been carried out and is presented in Appendix 4B of the Scoping Report (MarramWind Ltd., 2023).

21.11.1.2 Based on the knowledge of the baseline environment, the nature of planned works and the wealth of evidence on the potential for impact from such projects more widely, there are not considered to be any transboundary effects on air quality receptors from the Project.

21.12 Inter-related effects

21.12.1.1 A description and assessment of the likely inter-related effects arising from the Project on air quality is provided in **Chapter 32: Inter-Related Effects**.

21.13 Assessment of cumulative effects

21.13.1.1 A description and assessment of the cumulative effects arising from the Project on air quality is provided in **Chapter 33: Cumulative Effects Assessment**.

21.14 Summary of residual likely significant effects

21.14.1.1 There are no residual likely significant effects on air quality receptors assessed in this EIA Report Chapter.

21.15 References

Aberdeenshire Council, (2023a). *Aberdeenshire Local Development Plan 2023.* [online] Available at: https://www.aberdeenshire.gov.uk/planning/plans-and-policies/ldp-2023/ [Accessed 17 July 2025].

Aberdeenshire Council, (2023b). *Aberdeenshire Council's Scoping Opinion for Offshore Wind Farm Project at MarramWind Offshore Wind Farm*. [online] Available at: https://upa.aberdeenshire.gov.uk/online-applications/applicationDetails.do?activeTab=documents&keyVal=RPB0TVCA04U00 [Accessed: 1 June 2025].

Aberdeenshire Council, (2024). *2024 Air Quality Annual Progress Report for Aberdeenshire Council. 26 June 2024.* [online] Available at: https://www.scottishairquality.scot/laqm-reports/aberdeenshire-council [Accessed 01 June 2025].

Department for Environment, Food & Rural Affairs (Defra), (2017). *Defra national Pollution Climate Mapping (PCM) modelled background concentrations.* [online] Available at: https://www.data.gov.uk/dataset/394bf17d-ef9f-4649-b628-64d99de69618/defra-national-pollution-climate-mapping-pcm-modelled-background-concentrations [Accessed 22 July 2025].

Department for Environment, Food & Rural Affairs (Defra), (2022). *Local Air Quality Management Technical Guidance (TG22) 2022*. [online] Available at: https://laqm.defra.gov.uk/air-quality/featured/uk-regions-exc-london-technical-guidance/ [Accessed 01 June 2025].

Department for Environment, Food & Rural Affairs (Defra), (2024). *Background Mapping data for local authorities - 2021.* [online] Available at: https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2021 [Accessed 01 June 2025].

Environment Protection Act 1990. (SI 1990 43) [online] Available at: https://www.legislation.gov.uk/ukpga/1990/43/contents [Accessed 22 July 2025].

Green Volt, (2023). *Green Volt Offshore Windfarm Onshore Environmental Impact Assessment Report, Volume 1.* [online] Available at: https://greenvoltoffshorewind.com/wp-content/uploads/2024/03/Green-Volt-%E2%80%93-Onshore-EIA-report.pdf [Accessed 22 July 2025].

Institute of Air Quality Management (IQMA) and Environmental Protection UK, (2017). *Land-Use Planning & Development Control: Planning For Air Quality*. [online] Available at: https://www.iaqm.co.uk/text/guidance/air-quality-planning-guidance.pdf [Accessed 01 June 2025].

Institute of Air Quality Management (IQMA), (2020). *A guide to the assessment of air quality impacts on designated nature conservation sites. Version 1.1.* [online] Available at: https://iaqm.co.uk/text/guidance/air-quality-impacts-on-nature-sites-2020.pdf [Accessed 01 June 2025].

Institute of Air Quality Management (IQMA), (2024). *Guidance on the assessment of dust from demolition and construction (Version 2.2).* [online] Available at: https://iaqm.co.uk/wp-content/uploads/2013/02/Construction-Dust-Guidance-Jan-2024.pdf [Accessed 01 June 2025].

Infrastructure Planning Commission, (2010). *Proposed Rampion Offshore Wind Farm, October 2010.* [online] Available at: https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/2010/10/Rampion_Scoping_Opinion.pdf [Accessed 22 June 2023].

Marine Directorate – Licensing Operations Team (MD-LOT), (2023). *MarramWind Offshore Wind Farm Environmental Impact Assessment – Scoping Opinion.* [online] Available at: https://marine.gov.scot/node/23928 [Accessed 22 June 2023].

MarramWind Limited, (2023). *MarramWind Offshore Wind Farm Environmental Impact Assessment – Scoping Report*. [online] Available at: https://marramwind.co.uk/scoping-report [Accessed: 1 June 2025].

Royal Haskoning DHV, (2016). *Annual Report 2016*. [online] Available at: https://www.haskoning.com/en/newsroom/news/results/royal-haskoningdhv-delivers-solid-performance-in-2016. [Accessed 01 June 2025].

Salamander, (2024). *Salamander Offshore Wind Farm, Onshore EIA Report, Volume ER.B.3, Chapter 11: Terrestrial Air Quality*. [online] Available at: https://salamanderfloatingwind.com/wp-content/uploads/2024/onshore-consent-pdf/Volume%20ER.B.3%20Chapter%2011%20-%20Terrestrial%20Air%20Quality.pdf [Accessed 22 July 2025].

Scottish Government, (2015). *Scotland's National Marine Plan: A Single Framework for Managing our Seas.* [online] Available at: https://www.gov.scot/binaries/content/documents/govscot/publications/strategy-plan/2015/03/scotlands-national-marine-plan/documents/00475466-pdf/00475466-pdf/govscot%3Adocument/00475466.pdf [Accessed 01 June 2025].

Scottish Government, (2021). *Cleaner Air for Scotland 2 - Towards a Better Place for Everyone.* [online] Available at: https://www.gov.scot/publications/cleaner-air-scotland-2-towards-better-place-everyone/documents/ [Accessed 01 June 2025].

Scottish Government, (2023a). *National Planning Framework 4.* [online] Available at: https://www.gov.scot/publications/national-planning-framework-4/documents [Accessed 01 June 2025].

Scottish Government, (2023b). *MarramWind Offshore Wind Farm Environmental Impact Assessment – Scoping Opinion.* [online] Available at: https://marine.gov.scot/?q=node/23928 [Accessed: 10 September 2025].

Scottish Natural Heritage, (2017). *Considering air pollution impacts in development management casework*. [online] Available at: https://www.nature.scot/sites/default/files/2018-10/Guidance%20-%20Considering%20air%20pollution%20impacts%20in%20development%20management%20casework.pdf [Accessed 01 June 2025].

Standards for Highways, (2024). *LA 105 – Air Quality (vertical barriers)* Version 0.1.0. Available at: https://www.standardsforhighways.co.uk/search/af7f4cda-08f7-4f16-a89f-e30da703f3f4

The Air Quality Standards (Scotland) Regulations 2000. (Scottish SI 2000 97). [online] Available at: https://www.legislation.gov.uk/ssi/2000/97/made [Accessed 17 July 2025].

The Air Quality Standards (Scotland) Regulations 2010. (Scottish SI 2010 204). [online] Available at: https://www.legislation.gov.uk/ssi/2010/204/regulation/1 [Accessed 7 July 2025].

The Air Quality (Scotland) Amendment Regulations 2016. (Scottish SI 2016 162). [online] Available at: https://www.legislation.gov.uk/ssi/2016/162/contents/made [Accessed 7 July 2025].

The Non-Road Mobile Machinery (Type-Approval and Emission of Gaseous and Particulate Pollutants) Regulations 2018. (SI 2018 764). [online] Available at: https://www.legislation.gov.uk/uksi/2018/764/contents [Accessed 7 July 2025].

The Pollution Prevention and Control (Scotland) Regulations 2012. (Scottish SI 2012 360). [online] Available at: https://www.legislation.gov.uk/ssi/2012/360/regulation/1 [Accessed 7 July 2025].

World Health Organization, (2021). *WHO global air quality guidelines: Particulate matter ($PM_{2.5}$ and PM_{10}), ozone, nitrogen dioxide, sulfur dioxide and carbon monoxide. Geneva: World Health Organization*. [online] Available at: https://www.who.int/publications/i/item/9789240034228. [Accessed 01 June 2025].

21.16 Glossary of terms and abbreviations

21.16.1 Abbreviations

Acronym	Definition
µg/m^3	Microgram per metre cubed
AADT	Annual Average Daily Traffic
APR	Annual Progress Report
AQMA	Air Quality Management Area
AQO	Air Quality Objective
AQS	Air Quality Standard
AW	Ancient Woodland
CEMP	Construction Environment Management Plan
Defra	Department for Food, Environment & Rural Affairs
EEA	European Economic Area
EIA	Environmental Impact Assessment
EPUK	Environmental Protection United Kingdom
FOC	Fibre Optic Cable
ha	hectare
HDD	Horizontal Directional Drilling
HDV	Heavy Duty Vehicle
IAQM	Institute of Air Quality Management
LAQM	Local Air Quality Management
LDV	Light Duty Vehicle
NO_2	Nitrogen dioxide

Acronym	Definition
NPF4	National Planning Framework 4
PCM	Pollution Climate Mapping
PM	Particulate matter
PM_{10}	Particulate matter of less than 10 microns in diameter
$PM_{2.5}$	Particulate matter of less than 2.5 microns in diameter
SAC	Special Area of Conservation
SPA	Special Protection Area
SPP	Sustainable Public Procurement
SSEN	Scottish and Southern Electricity Networks
SSSI	Site of Special Scientific Interest
TCC	Temporary Construction Compounds
ZOI	Zone of Influence

21.16.2 Glossary of terms

Term	Definition
Air Quality Management Area	An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives.
Air Quality Objectives	Air Quality Objectives are policy targets generally expressed as a maximum ambient concentration to be achieved, either without exception or with a permitted number of exceedances, within a specified timescale. The Air Quality Objectives are set out in the UK Government's Air Quality Strategy for the key air pollutants.
Air Quality Standards	Air Quality Standards are the concentrations of pollutants in the atmosphere that can broadly be taken to achieve a certain level of environmental quality. Air Quality Standards are based on an assessment of the effects of each pollutant on human health, including the effects on sensitive sub-groups.

Term	Definition
Diffusion tube	Passive diffusion tube samplers collect nitrogen dioxide and other pollutants by molecular diffusion along an inert tube to an efficient chemical absorbent. After exposure for a known time, the absorbent material is chemically analysed and the concentration calculated.
Local Air Quality Management	The Local Air Quality Management (LAQM) process requires Local Authorities to periodically review and assess the current and future quality of air in their areas. A Local Authority must designate an Air Quality Management Area (AQMA) if any of the Air Quality Objectives set out in the regulations are not likely to be met over a relevant time period.
National Atmospheric Emissions Inventory	The NAEI compiles annual estimates of UK emissions to the atmosphere from sources such as road transport, power stations and industrial plants. These emissions are estimated to inform policy, and to help to identify ways of reducing the impact of human activities on the environment and our health. The NAEI is funded by Defra, the Scottish Executive, the Welsh Assembly Government and the Department for the Environment in Northern Ireland.

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