

10. AIR QUALITY

10.1 Introduction

This chapter identifies, describes and assesses the potential significant direct and indirect effects on air quality arising from the construction, operation and decommissioning of the Proposed Project. The full description of the Proposed Project is detailed in Chapter 4. Alternative designs initially proposed for the Proposed Project and their potential for effects on air quality are considered in Chapter 3 Consideration of Reasonable Alternatives.

10.1.1 Background

As detailed in Section 1.1.1 in Chapter 1, for the purposes of this EIAR, the various project components are described and assessed using the following references: 'Proposed Project', 'Proposed Wind Farm', 'Proposed Grid Connection', 'Site' and the 'Proposed Wind Farm site'. Please see Section 1.1.1 of this Environmental Impact Assessment Report for further details. A detailed description of the Proposed Project is provided in Chapter 4 of this EIAR.

The Proposed Wind Farm is located within a rural, agricultural setting in east Galway, approx. 12km southeast of the town of Tuam. The village of Barnaderg is located approx. 3.3km west of the nearest proposed turbine, and the village of Moylough is located approx. 5.3km east of the nearest proposed turbine. The townlands within which the Proposed Wind Farm and Proposed Grid Connection is located can be found in Chapter 1 Introduction Table 1-1 of this EIAR.

Land use within the Site is predominately agricultural pasture. Other land uses within the Site include cutover and raised peat bogs, agricultural crops, tillage, transport and forestry. Land uses in the wider landscape comprises a mix of agriculture, peat bogs, electricity transmission and low density residential.

Due to the non-industrial nature of the Proposed Project and the general character of the surrounding environment, air quality sampling was deemed to be unnecessary for this EIAR. Based on professional judgement it is considered that air quality in the existing environment is reflective of the Environmental Protection Agency's (EPA) Air Quality Zone D, as described in Section 10.2.2.2 below, since there are no major sources of air pollution (e.g., heavy industry) in the vicinity of the Site.

The production of energy from wind turbines has no direct emissions as occurs from fossil fuel-based power stations. Harnessing more energy by means of renewable sources will reduce dependency on fossil fuels, thereby resulting in a reduction in harmful emissions that is damaging to human health and the environment. Some minor short term or temporary indirect emissions associated with the construction and decommissioning of the Proposed Project include vehicular and dust emissions.

10.1.2 Statement of Authority

This section of the EIAR has been prepared by Eileen Corley and reviewed by Brandon Taylor, both of MKO. Eileen Corley is an Environmental Scientist who has been working with MKO since September 2023. Eileen graduated from University of Galway and holds a BSc Environmental science where she focused her studies on environmental nature conservation and environmental legislation. Since taking up her position with MKO, Eileen has worked on Environmental Impact Assessment Screening Reports, Construction and Environmental Management Plan Reports, preparation of Environmental Impact Assessment Report Chapters, fee proposals for a wide range of projects such as wind energy, wastewater treatment plants, residential developments, quarries and QGIS mapping for a range of projects. Eileen is a graduate member of the Institute of Environmental Management and Assessment. Brandon Taylor is an Environmental Scientist with over two years of private consultancy experience. Brandon holds a BSc (Hons) in Geography from McGill University, and a MSc (Hons) in

Coastal & Marine Environments from the University of Galway. Brandon's key skills include scientific research and report writing, particularly in the context of local communities and their interactions with environmental stressors, and geospatial analysis and the application of GIS and remote sensing tools across the fields of renewable energy development, coastal zone management, and education and scientific communication. Since joining MKO, Brandon has been involved in the design and environmental impact assessment (EIA) of multiple large-scale onshore wind energy developments across Ireland, contributing to and managing the production of EIA reports.

10.1.3 Relevant Guidance

The air quality section of this EIAR has been completed in accordance with the EIA Directive 2011/92/EU as amended by Directive 2014/52/EU and having regard, where relevant, to guidance listed below.

- › Air Quality Assessment of Proposed National Roads – Standard PE-ENV-01107' (Transport Infrastructure Ireland, December 2022).
- › Guidelines on the Information to be contained in Environmental Impact Assessment Reports – June 2022 (EPA, 2022).
- › Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (EC, 2017).
- › Air Quality in Ireland Report 2023 (EPA 2024).
- › Best Practice Guidelines on the Preparation of Resource and Waste Management Plans for Construction & Demolition Projects (EPA 2021).
- › Guidance of the Assessment of Dust from Demolition and Construction (IAQM, 2024).
- › Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes (TII, 2011).
- › Guidelines for Assessment of Ecological Impacts of National Roads Schemes (TII, 2009).
- › Clean Air Strategy for Ireland (Government of Ireland April 2023).
- › UK Department of Environment Food and Rural Affairs (DEFRA) Part IV of the Environment Act 1995: Local Air Quality Management, LAQM.TG (16) (DEFRA 2018).
- › UK Highways Agency (UKHA) Design Manual for Roads and Bridges (DMRB) – LA 105 Air Quality (UKHA, 2019).
- › World Health Organization (WHO) Air Quality Guidelines for Particulate Matter, Ozone, Nitrogen Dioxide and Sulfur Dioxide Global Update 2021 (WHO 2021).

10.2 Air Quality

10.2.1 Relevant Legislation

In 1996, the Air Quality Framework Directive (96/62/EC) was published. This Directive was transposed into Irish law by the Environmental Protection Agency Act 1992 (Ambient Air Quality Assessment and Management) Regulations 1999 (S.I. No. 33 of 1999). The Directive was followed by four Daughter Directives, which set out limit values for specific pollutants:

- › The first Daughter Directive (1999/30/EC) addresses sulphur dioxide, oxides of nitrogen, particulate matter and lead.
- › The second Daughter Directive (2000/69/EC) addresses carbon monoxide and benzene. The first two Daughter Directives were transposed into Irish law by the Air Quality Standards Regulations 2002 (SI No. 271 of 2002).

- › The third Daughter Directive, Council Directive (2002/3/EC) relating to ozone was published in 2002 and was transposed into Irish law by the Ozone in Ambient Air Regulations 2004 (S.I. No. 53 of 2004).
- › The fourth Daughter Directive (2004/107/EC), published in 2004, relates to polycyclic aromatic hydrocarbons (PAHs), arsenic, nickel, cadmium and mercury in ambient air and was transposed into Irish law by the Arsenic, Cadmium, Mercury, Nickel and Polycyclic Aromatic Hydrocarbons in Ambient Air Regulations, 2009 (S.I. No. 58 of 2009) as amended by the Air Quality Standards (Amendment) and Arsenic, Cadmium, Mercury, Nickel and Polycyclic Aromatic Hydrocarbons in Ambient Air Regulations, 2016 (S.I. 659 2016).

The Air Quality Framework Directive and the first three Daughter Directives has been replaced by the Clean Air for Europe (CAFE) Directive (Directive 2008/50/EC on ambient air quality and cleaner air for Europe) (as amended by Directive EU 2015/1480) which encompasses the following elements:

- › The merging of most of the existing legislation into a single Directive (except for the Fourth Daughter Directive) with no change to existing air quality objectives.
- › New air quality objectives for PM_{2.5} (fine particles) including the limit value and exposure concentration reduction target.
- › The possibility to discount natural sources of pollution when assessing compliance against limit values.
- › The possibility for time extensions of three years (for particulate matter PM₁₀) or up to five years (nitrogen dioxide, benzene) for complying with limit values, based on conditions and the assessment by the European Commission.

Table 10-1 below sets out the limit values of the CAFE Directive, as derived from the Air Quality Framework Daughter Directives. Limit values are presented in micrograms per cubic metre ($\mu\text{g}/\text{m}^3$) and parts per billion (ppb). The notation PM₁₀ is used to describe particulate matter or particles of ten micrometres or less in aerodynamic diameter. PM_{2.5} represents particles measuring less than 2.5 micrometres in aerodynamic diameter.

The CAFE Directive was transposed into Irish legislation by the Air Quality Standards Regulations 2011 (S.I. No. 180 of 2011) as amended by the Air Quality Standards (Amendments) and Arsenic, Cadmium, Mercury, Nickel and Polycyclic Aromatic Hydrocarbons in Ambient Air Regulations, 2016 (S.I. 659 2016). The 2011 Regulations superseded the Air Quality Standards Regulations 2002 (S.I. No. 271 of 2002), the Ozone in Ambient Air Regulations 2004 (S.I. No. 53 of 2004) and the Ambient Air Quality Assessment and Management Regulations 1999 (S.I. No. 33 of 1999). The Air Quality Standards Regulations 2011 (S.I. No. 180 of 2011) was revoked on 31 December 2022 and has been replaced by the Ambient Air Quality Standards Regulations 2022 (S.I. No. 739/2022).

On 10 December 2024, Directive (EU) 2024/2881 on ambient air quality and cleaner air for Europe came into force. This directive recasts Directive 2008/50/EC (the CAFE Directive) and the fourth Daughter Directive (Directive 2004/107/EC relating to arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons in ambient air) and incorporates them into a single directive. This recast directive sets out limit values, target values, average exposure reduction obligations, average exposure concentration objectives, critical levels, alert thresholds, information thresholds and long-term objectives. It sets out air quality provisions with the aim of achieving the objectives of the European Commission's Zero Pollution Action Plan, so that air pollution within the EU is progressively reduced to levels no longer considered harmful to health and natural ecosystems at the latest by 2050. At the time of writing Directive (EU) 2024/2881 has not yet been transposed into Irish law.

10.2.2 Air Quality Standards

The recently implemented Ambient Air Quality Standards Regulations 2022 (S.I. No. 739/2022) remains aligned to the CAFE Directive and diverts to the CAFE Directive for the Limit values outlined

in Table 10-1, the Assessment Thresholds in Table 10-2, the Ozone limits and Assessment Thresholds in Table 10-3 and Table 10-4 respectively.

Table 10-1 Limit values of the CAFE Directive 2008/50/EC, Source: (<https://airquality.ie/information/air-quality-standards>)

Pollutant	Limit Value Objective	Averaging Period	Limit Value (ug/m ³)	Limit Value (ppb)	Basis of Application of Limit Value	Attainment Date
Sulphur dioxide (SO ₂)	Protection of Human Health	1 hour	350	132	Not to be exceeded more than 24 times in a calendar year	1 st Jan 2005
Sulphur dioxide (SO ₂)	Protection of human health	24 hours	125	47	Not to be exceeded more than 3 times in a calendar year	1 st Jan 2005
Sulphur dioxide (SO ₂)	Protection of vegetation	Calendar year	20	7.5	Annual mean	19 th Jul 2001
Sulphur dioxide (SO ₂)	Protection of vegetation	1st Oct to 31st Mar	20	7.5	Winter mean	19 th Jul 2001
Nitrogen dioxide (NO ₂)	Protection of human health	1 hour	200	105	Not to be exceeded more than 18 times in a calendar year	1 st Jan 2010
Nitrogen dioxide (NO ₂)	Protection of human health	Calendar year	40	21	Annual mean	1 st Jan 2010
Nitrogen monoxide (NO) and nitrogen dioxide (NO ₂)	Protection of ecosystems	Calendar year	30	16	Annual mean	19 th Jul 2001
Particulate matter 10 (PM ₁₀)	Protection of human health	24 hours	50	-	Not to be exceeded more than 35 times in	1 st Jan 2005

Pollutant	Limit Value Objective	Averaging Period	Limit Value ($\mu\text{g}/\text{m}^3$)	Limit Value (ppb)	Basis of Application of Limit Value	Attainment Date
					a calendar year	
Particulate matter 10 (PM_{10})	Protection of human health	Calendar year	40	-	Annual mean	1 st Jan 2005
Particulate matter 2.5 ($\text{PM}_{2.5}$) Stage 1	Protection of human health	Calendar year	25	-	Annual mean	1 st Jan 2015
Particulate matter 2.5 ($\text{PM}_{2.5}$) Stage 2	Protection of human health	Calendar year	20	-	Annual mean	1 st Jan 2020
Lead	Protection of human health	calendar year	0.5		Annual mean	1 st Jan 2005
Carbon Monoxide	Protection of human health	8 hours	10,000	8620	Not to be exceeded	1 st Jan 2005
Benzene	Protection of human health	calendar year	5	1.5	Annual mean	1 st Jan 2010

Table 10-2 Assessment Thresholds from CAFE Directive 2008/50/EC

Pollutant	Limit Value Objective	Averaging Period	Limit Value ($\mu\text{g}/\text{m}^3$)	Basis of Application of Limit Value
Sulphur dioxide (SO_2)	Upper assessment threshold for the protection of Human Health	24 hours	75	Not to be exceeded more than 3 times in a calendar year
Sulphur dioxide (SO_2)	Lower assessment threshold for the protection of human health	24 hours	50	Not to be exceeded more than 3 times in a calendar year
Nitrogen dioxide (NO_2)	Upper assessment threshold for the protection of human health	1 hour	140	Not to be exceeded more than 18 times in a calendar year
Nitrogen dioxide (NO_2)	Lower assessment threshold for the protection of human health	1 hour	100	Not to be exceeded more than 18 times in a calendar year

Pollutant	Limit Value Objective	Averaging Period	Limit Value ($\mu\text{g}/\text{m}^3$)	Basis of Application of Limit Value
Particulate matter 10 (PM_{10})	Upper assessment threshold	24 hours	35	Not to be exceeded more than 35 times in a calendar year
Particulate matter 10 (PM_{10})	Lower assessment threshold	24 hours	25	Not to be exceeded more than 35 times in a calendar year
Lead (Pb)	Upper assessment threshold	Calendar Year	0.35	-
Lead (Pb)	Lower assessment threshold	Calendar Year	0.25	-
Carbon Monoxide (CO)	Upper assessment threshold	8 hours	7000	-
Carbon Monoxide (CO)	Lower assessment threshold	8 hours	5000	-
Benzene (C_6H_6)	Upper assessment threshold	Calendar Year	3.5	-
Benzene (C_6H_6)	Lower assessment threshold	Calendar Year	2	-

Ozone is set out differently in the CAFE Directive in that it sets target values and long-term objectives for ozone rather than limit values. Table 10-3 presents the target values and long-term target value for ozone and Table 10-4 details the threshold values for Ozone.

Table 10-3 Target Values for Ozone defined in the Directive 2008/50/EC

Objective	Parameter	Target Value for 2010	Long-term Target Value from 2020
Protection of human health	Maximum daily 8-hour mean	120 $\mu\text{g}/\text{m}^3$ not to be exceeded more than 25 days per calendar year averaged over 3 years	120 $\mu\text{g}/\text{m}^3$
Protection of vegetation	AOT40* calculated from 1-hour values from May to July	18,000 $\mu\text{g}/\text{m}^3\cdot\text{h}$ averaged over 5 years	6,000 $\mu\text{g}/\text{m}^3\cdot\text{h}$

* AOT40 is a measure of the overall exposure of plants to ozone. It is the sum of the excess hourly concentrations greater than 80 $\mu\text{g}/\text{m}^3$ and is expressed as $\mu\text{g}/\text{m}^3$ hours.

Table 10-4 Threshold for Ozone Defined in Directive 2008/50/EC (source: <https://airquality.ie/information/air-quality-standards> and Directive 2008/50/EC)

Pollutant	Averaging Period	Threshold
Information Threshold	1-hour average	180 µg/m ³
Alert Threshold	1-hour average	240 µg/m ³

10.2.2.1 Air Quality and Health

In September 2024, the EPA published ‘*Air Quality in Ireland 2023*’¹ which reports that although Ireland met the current EU legal air quality limits in 2023, monitoring results were higher than the more stringent health-based World Health Organization air quality guidelines for a number of pollutants including: particulate matter (PM), nitrogen dioxide (NO₂), sulphur dioxide (SO₂) and ozone (O₃). The main sources of these pollutants are the burning of solid fuel in our towns and villages and traffic in our cities. People’s health and the health of our environment is impacted by these pollutants. Ireland’s ambition in the ‘Clean Air Strategy for Ireland’ (discussed below) is to move towards alignment with the World Health Organisation (WHO) Air Quality guidelines, this will be challenging but will have a significantly positive impact on health. Despite comparing favourably with many of our European neighbours, Ireland’s 2023 monitoring results would exceed the soon-approaching 2026 targets.

The European Environmental Agency (EEA) Briefing, ‘*Europe’s Air Quality Status 2025*’² highlights the negative effects that air pollution has on human health. The assessment shows that, in spite of constant improvements, exceedances of air quality standards are common across the EU, with concentrations well above the latest WHO recommendations. The briefing also notes that air pollution is Europe’s largest environmental health risk, causing cardiovascular and respiratory diseases that impact health, reduce quality of life and cause preventable deaths. In 2024, despite ongoing reductions in emissions, most of the EU’s monitoring locations were exposed to levels of key air pollutants that are damaging to health. In 2024 in the European Union, 92% of monitoring locations were exposed to levels of fine particulate matter (PM_{2.5}) above the health-based guideline level set by the World Health Organisation (WHO). Furthermore, in 2023 in the EU, 70% of all monitoring stations were above the WHO annual guideline for NO₂. Whilst there is the potential of such emissions to be generated from the Proposed Project, mitigation measures will be implemented at this site to reduce the impact from dust and vehicle emissions, which are discussed in Section 10.2.5 below.

The United States Department of Energy published an article on August 21, 2024 entitled ‘*How Wind Can help Us Breathe Easier*’.³ This article details the CO₂ emissions from different energy sources over the entire lifespan of the technology. It was found that wind energy produces around 11 grams of CO₂ per kilowatt-hour (g CO₂/kWh) of electricity generated, compared with about 980 g CO₂/kWh for coal and roughly 465 g CO₂/kWh for natural gas. That makes coal’s carbon footprint almost 90 times larger than that of wind energy, and the footprint of natural gas more than 40 times larger. During combustion of high-emitting energy sources, other air pollutants, i.e., nitrogen oxides (NO_x) and sulphur dioxide (SO₂), are also released into the atmosphere. This results in the emission of pollutants that can cause adverse health effects, including asthma, bronchitis, lower and upper respiratory symptoms, and heart attacks. Air pollution is responsible for a large number of premature deaths relating to these illnesses.

More recently a few key messages are outlined in the ‘Air Quality Status Report 2025’ published in April 2025 on the European Environment Agency website⁴ These are:

¹ Environmental Protection Agency: *Air Quality in Ireland 2023*. Available at: <https://www.epa.ie/publications/monitoring-assessment/air/air-quality-in-ireland/2023.php#:~:text=Summary%3A%20Air%20quality%20in%20Ireland,based%20WHO%20guidelines%20in%202023.>

² European Environment Agency, *Air Quality Status report 2025*. Available at: <https://www.eea.europa.eu/en/analysis/publications/air-quality-status-report-2025>

³ US Department of Energy ‘*How Wind Can Help Us Breathe Easier*’ August 2024. Available at: <https://www.energy.gov/eere/wind/articles/how-wind-can-help-us-breathe-easier>

⁴ <https://www.eea.europa.eu/en/analysis/publications/air-quality-status-report-2025>

- EU air quality standards are still not fully met across Europe, despite ongoing overall improvements.
- Since 2011, all countries have reduced exposure of their urban population to fine PM_{2.5} particles, the most harmful pollutant from a health perspective. Nevertheless, the vast majority (94%) of the EU urban population remains exposed to PM_{2.5} concentrations above the World Health Organization guideline level, highlighting the need for additional measures to reduce the associated health risks.
- Many locations already have air quality concentrations below the new EU 2030 standards. But in order to meet these new standards everywhere, and based on current progress, additional measures to improve air quality, especially in cities, are likely to be needed.

A 2024 EPA report ‘Ireland’s State of the Environment Report’⁵ states that the pollutants of most concern are Fine Particulate matter (PM_{2.5}), Nitrogen Dioxide (NO₂) and Ammonia (NH₃). The EPA 2024 report goes on to state that:

“The planned transition to more renewable energy sources, and away from combustion-sourced heating systems to electrification, is a shift that could see greenhouse gas emissions from industry significantly decrease.

As a consequence of meeting these growing demands primarily with oil, natural gas, coal and peat, our energy system is highly dependent on fossil fuels. Ireland has made some progress in transforming the electricity system through the deployment of wind farms, with renewable energy currently providing more than 40% of electricity used. However, electricity represents only one-fifth of Ireland’s energy use, and our transport and heating systems remain heavily reliant on fossil fuel systems, with lock-ins that need to be addressed.

While Ireland’s renewable energy share has increased from 10.7% in 2018 (reported in the last State of the Environment Report) to 13.1% in 2022, this is the lowest level in the EU (well below the EU average of 23.0%), and Ireland is not on track to meet the EU-wide binding target of 42.5% renewable energy share by 2030. Reaching the target of 80% renewable electricity by 2030, while ensuring a stable energy supply, will require new capacity, a more flexible grid and increased interconnectivity (EC, 2024)

Established technologies, such as wind energy, solar photovoltaics and bioenergy, will be key in meeting short-term emission reduction targets (i.e. 2030), whereas significant growth in offshore wind infrastructure is expected to be the key essential element of future energy systems.”

The EPA also published a report in May 2025 providing details of emissions of air pollutants in Ireland in the period 1990 to 2023 and projected emissions of these pollutants for 2030. The key findings of the report with respect to assessment of targets are:

- Ireland is compliant with current and future emission reduction commitments for ammonia (NH₃), non-methane volatile organic compounds (NMVOC), sulphur dioxide (SO₂), nitrogen oxides (NO_x) and fine particulate matter (PM_{2.5})
- Ammonia emissions are projected to be in compliance out to 2030
- An adjustment to NMVOC emissions is required in order to meet the required emission reduction commitment made in 2023

The Proposed Project therefore represents an opportunity to further harness Ireland’s significant renewable energy resources, with valuable benefits to air quality and in turn to human health. The

⁵ Environmental Protection Agency (2024). Ireland’s State of the Environment Report 2024). <https://www.epa.ie/our-services/monitoring-assessment/assessment/irelands-environment/state-of-environment-report/>

consumption of fossil fuels for energy results in the release of particulates, sulphur dioxide and nitrogen dioxide to our air. The use of wind energy, by providing an alternative to electricity derived from coal, oil or gas-fired power stations, results in emission savings of carbon dioxide (CO₂), oxides of nitrogen (NO_x), and sulphur dioxide SO₂, thereby resulting in cleaner air and associated positive health effects.

Whilst there is the potential of such emissions to be generated from the construction, operational and decommissioning phases of the Proposed Project, mitigation measures will be implemented at this Site to reduce the impact from dust and vehicle emissions, which are discussed in Section 10.2.4 below.

10.2.2.1.1 **Clean Air Strategy for Ireland 2023**

Ireland's Clean Air Strategy 2023⁶ sets out the detail of seven strategic frameworks that will be used to ensure that Air Quality continues to improve. The aims of these key strategic frameworks are:

- › To set the appropriate targets and limits to ensure continuous improvements in Air Quality across the country, to deliver health benefits for all.
- › To ensure the integration of clean air considerations into policy development across Government.
- › To increase the evidence base that will help us to continue to evolve our understanding of the sources of pollution and their impacts on health, in order to address them more effectively.
- › To enhance regulation required to deliver improvements across all pollutants.
- › To improve the effectiveness of our enforcement systems.
- › To promote and increase awareness of the importance of clean air, and the links between cleaner air and better health.
- › To develop the additional targeted/specific policy measures as required to deal with national or local Air Quality issues.

Since the publication of the Clean Air Strategy 2023, the Clean Air Strategy for Ireland *First Progress Report 2024* was released. This report detailed the significant progress that has been made on the actions in the strategy since its publication in April 2023. The key takeaways that have been implemented since the publication of the strategy include the operational use of the Air Pollution Act 1987 (Solid Fuels) which has seen significant air quality improvements made in areas prone to burning solid fuels, however too premature to quantify the exact impacts. The strategy saw a push for the submission of Ireland's second National Air Pollution Control Programme completed in May 2024 and the development of new public awareness campaigns. The strategy has furthermore increased the frequency and financial supports given to local authorities to conduct sulphur testing⁷.

⁶ *Rialtas na hÉireann Clean Air Strategy April 2023*. Available at: <https://www.gov.ie/en/publication/927e0-clean-air-strategy/#:~:text=The%20Clean%20Air%20Strategy%20provides,delivering%20on%20wider%20national%20objectives.>

⁷ *Clean Air Strategy For Ireland First Progress Report 2024*



Figure 10-1 Seven Strategic Frameworks for Air Quality, with associated chapters in brackets. Reproduced as Figure 1 from Clean Air Strategy 2023

Chapter 11 of the Clean Air Strategy discusses Air Quality Policy Development. The chapter discusses energy policy and acknowledges how the State's accelerated transition to renewable electricity will be critical to successfully meeting the ambitious renewable energy and greenhouse gas emission reduction targets outlined in the European Green Deal and Ireland's Climate Action Plan 2023, as well as to protecting against security of supply risks and removal of fossil fuels from power generation. Wind (offshore and onshore) and solar energy will be the leading cost-effective technologies to achieve our energy and emissions targets, as well as displacing emissions in other sectors, including household heating and vehicle transport. In the Clean Air Strategy, the Climate Action Plan 2023 is referenced, while Climate Action Plan 2025 is currently the latest revision. The targets of the Climate Action Plan 2025 and the Green Deal are to deliver net-zero GHG emissions by 2050 and reduce GHG emissions to at least 55% by 2030, compared to 1990 levels.

10.2.3 Methodology

10.2.3.1 Air Quality Zones

The air quality zone for the Proposed Project was selected, followed by a review of EPA collated baseline air quality data, namely Sulphur Dioxide (SO₂), Particulate Matter (PM₁₀), Nitrogen Dioxide (NO₂), Carbon Monoxide (CO) and Ozone (O₃) for the selected air quality zone to determine the representative levels of such emissions for the Proposed Project.

The EPA has designed four Air Quality Zones for Ireland.

- > Zone A: Dublin City and environs.
- > Zone B: Cork City and environs.
- > Zone C: 16 urban areas with population greater than 15,000.
- > Zone D: Remainder of the country.

These zones were defined to meet the criteria for air quality monitoring, assessment and management described in the CAFE Directive. The Site of the Proposed Project lies within Zone D, which represents rural areas located away from large population centres.

10.2.3.2 Air Quality Data Review

The EPA publishes Air Monitoring Station Reports for monitoring locations in all four Air Quality Zones. The most recent report on air quality in Ireland, ‘*Air Quality in Ireland 2023*’ was published by the EPA in 2024. The EPA reports provide SO₂, PM₁₀, NO₂ and O₃ concentrations for areas in Zone D. These are detailed in the Baseline Air Quality section below.

10.2.3.3 Dust

The Institute of Air Quality Management in the UK (IAQM) 2024 guidance document ‘*Guidance on the Assessment of Dust from Demolition and Construction*’⁸ (hereafter referred to as ‘IAQM 2024 Guidance’) was considered in the dust impact assessment. The IAQM 2024 Guidance outlines an assessment method for predicting the impact of dust emissions from construction activities based on the scale and nature of the works and the sensitivity of the area to dust impacts. This methodology has been used to predict the likely risk of dust as a result of the construction phase works, operational phase activities and decommissioning phase. The use of UK guidance is considered best practice in the absence of applicable Irish guidance. The major dust generating activities are divided into four types within the IAQM 2024 Guidance to reflect their different potential impacts. These are:

- Demolition;
- Earthworks;
- Construction;
- Trackout⁹

Table 10-5 Description of magnitude for nature of activities

	Large	Medium	Small
Demolition	Total building volume >75,000 m ³ , potentially dusty construction material (e.g. concrete), on-site crushing and screening, demolition activities >12 m above ground level	Total building volume 12,000 m ³ – 75,000 m ³ , potentially dusty construction material, demolition activities 6-12m above ground level	Total building volume <12,000 m ³ , construction material with low potential for dust release (e.g. metal cladding or timber), demolition activities <6 m above ground, demolition during wetter months
Earthworks	Large: Total site area >110,000 m ² , potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size), >10 heavy earth moving vehicles active at any one time, formation of bunds >6 m in height	Total site area 18,000 m ² – 110,000 m ² , moderately dusty soil type (e.g. silt), 5-10 heavy earth moving vehicles active at any one time, formation of bunds 3m - 6m in height	Total site area <18,000 m ² , soil type with large grain size (e.g. sand), <5 heavy earth moving vehicles active at any one time, formation of bunds <3 m in height
Construction	Total building volume >75,000 m ³ , on site concrete batching, sandblasting	Total building volume 12,000 m ³ – 75,000 m ³ , potentially dusty construction material (e.g. concrete), on site concrete batching	Total building volume <12,000 m ³ , construction material with low potential for dust release (e.g. metal cladding or timber)

⁸ IAQM (2024) *Guidance on the Assessment of Dust from Demolition and Construction*. Available at: <https://iaqm.co.uk/wp-content/uploads/2013/02/Construction-Dust-Guidance-Jan-2024.pdf>

⁹ The transport of dust and dirt from the site onto the public road network, where it may be deposited and then re-suspended by vehicles using the network. This arises when Heavy Goods Vehicles (HGVs) and/or Heavy Duty Vehicles (HDV) leave the construction / demolition site with dusty materials, which may then spill onto the road, and/or when HGVs/HDVs transfer dust and dirt onto the road having travelled over muddy ground on site.

	Large	Medium	Small
Trackout	>50 HDV (>3.5t) outward movements in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length >100 m	20-50 HDV (>3.5t) outward movements in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length 50 m – 100 m	<20 HDV (>3.5t) outward movements in any one day, surface material with low potential for dust release, unpaved road length <50 m
Note: A vehicle movement is a one way journey. i.e. from A to B and excludes the return journey. HDV movements during a construction project vary over its lifetime, and the number of movements is the maximum not the average			

The magnitude of dust generating activities is divided into ‘Large’, ‘Medium’ or ‘Small’ scale depending on the nature of the activities involved. The demolition works as outlined in the Appendix 4-5 of this EIAR are classified as ‘Small’. The earthwork requirements as outlined in Appendix 4-5 of this EIAR results in the classification of the Proposed Wind Farm as ‘Large’ for Earthworks and Construction activities. The Proposed Grid Connection falls under the classification of ‘Medium’ for Earthworks and ‘Small’ for Construction due to the lower volumes of construction material required. The number of heavy-duty vehicle movements per day, as outlined in Section 15.1 in Chapter 15 Material Assets of this EIAR, results in the classification of the Proposed Wind Farm Site as ‘Large’ and Proposed Grid Connection as ‘Medium’ for Trackout activities.

The magnitude of each activity is combined with the overall sensitivity of the area to determine the risk of dust impacts from Site activities.

10.2.3.3.1 **Defining the Sensitivity of the Area**

For the purposes of this assessment, high sensitivity receptors are residential properties and dust sensitive ecological habitats. Commercial properties and places of work are regarded as medium sensitivity while low sensitivity receptors are places where people are present for short periods or do not expect a high level of amenity.

The IAQM 2024 Guidance has outlined three types of effects to be considered:

- Sensitivities of People to Dust Soiling Effects
- Sensitivities of People to the Health Effects of PM₁₀
- Sensitivities of Receptors to Ecological Effects

Sensitivities of People to Dust Soiling Effects

Dust soiling effects can occur for a distance of 250 m from works areas, but the majority of deposition occurs within the first 50 m (IAQM, 2024). Table 10-6 below identifies the sensitivity of an area to dust soiling effects on people and their properties, relative to different receptor sensitivities.

Table 10-6 Sensitivity of the Area to Dust Soiling Effects on People and Property. Guidance on the Assessment of Dust from Construction (IAQM, 2024)

Receptor Sensitivity	Number Of Receptors	Distance from source (m)			
		<20	<50	<100	<250
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

Sensitivities of People to Health Effects of PM₁₀

When assessing sensitivity of receptors to the health effects of PM₁₀, the IAQM 2024 Guidance recommends the use of sensitivities bands based on whether or not the receptor is likely to be exposed to elevated concentrations of PM₁₀ over a 24-hour period. Table 10-7 below identifies the sensitivity of an area to human health effects of PM₁₀, relative to different receptor sensitivities.

Table 10-7 Sensitivity of the Area to Human Health Impacts. Guidance on the Assessment of Dust from Construction (IAQM, 2024)

Receptor Sensitivity	Annual Mean PM ₁₀ concentration	Number Of Receptors	Distance from source (m)			
			<20	<50	<100	<250
High	>32 µg/m ³	>100	High	High	High	Medium
		10-100	High	High	Medium	Low
		1-10	High	Medium	Low	Low
	28-32 µg/m ³	>100	High	High	Medium	Low
		10-100	High	Medium	Low	Low
		1-10	High	Medium	Low	Low
	24-28 µg/m ³	>100	High	Medium	Low	Low
		10-100	High	Medium	Low	Low
		1-10	Medium	Low	Low	Low
	<24 µg/m ³	>100	Medium	Low	Low	Low
		10-100	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
Medium	>32 µg/m ³	>10	High	Medium	Low	Low
		1-10	Medium	Low	Low	Low
	28-32 µg/m ³	>10	Medium	Low	Low	Low
		1-10	Low	Low	Low	Low
	24-28 µg/m ³	>10	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
	<24 µg/m ³	>10	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
Low	-	≥1	Low	Low	Low	Low

Sensitivities of Receptors to Ecological Effects

Dust deposition due to demolition, earthworks, construction and trackout has the potential to physically and chemically affect sensitive habitats and plant communities. Table 10-8 below identifies the sensitivity of an area to ecological impacts.

Table 10-8 Sensitivity of the Area to Ecological Impacts. Guidance on the Assessment of Dust from Demolition and Construction (IAQM, 2024)

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

There is one ecological receptor and habitat within 20m of the development footprint which as described by the IAQM 2024 Guidance may be sensitive to dust. This ecologically sensitive habitat and its designation is the Article 17 Mapped Annex I Habitat – Active Raised Bog [7110]. By taking a precautionary approach, this habitat area has also been assessed as ‘Degraded Raised Bog Still Capable of Natural Regeneration [7120].

This above identified sensitive ecological receptor has been assessed within Chapter 6 Biodiversity and Chapter 9 Water. The individual qualifying features which have the potential to be adversely affected by the construction phase, along with the site-specific conservation objectives and threats and pressures for the qualifying features of each site were considered. The NPWS Article 17 Report *The Status of EU Protected Habitats and Species in Ireland – Habitats Assessments (2019)* was consulted in order to assess the potential of adverse effects due to the presence of dust within the vicinity of these sites. NPWS Mapped Article 17 habitats and *The Status of the EU Protected Habitats and Species in Ireland* map viewer were also consulted.

The proposed new access road in the northwest of the Proposed Wind Farm between T7-T9 traverses through this mapped Article 17 habitat for approx. 1.6km. As the Proposed Wind Farm construction works will be located directly within this habitat, it has been assessed in order to quantify the sensitivity of this ecological receptor to dust. the overall conservation status of Active Raised Bog [7110] in Ireland is ‘Bad’ and the overall trend in conservation status is ‘deteriorating’.

Dust is not considered one of the main threats and pressures listed win the Article 17 Report (NPWS, 2019). However, there are increasing concerns about the potential negative impacts on raised bog habitats from air pollution (nitrogen deposition) and climate change.

High levels of particulate matter and dust deposition has potential to lead to vegetation smothering within bog habitats which can alter vegetation composition. Particulate matter and dust often contain trace elements which may lead to an increase nutrient load, which may cause fertilization, thus altering the bog vegetation composition. This ecological receptor is classified as ‘High’ sensitivity.

Further consideration is given to these ecologically sensitive habitats in Chapter 6 Biodiversity accompanying this application.

10.2.3.3.2 Defining the Risk of Impacts

The dust emission magnitude is combined with the sensitivity of the area to determine the risk of impacts with no mitigation applied. The matrix in Table 10-9 provides a method of assigning the level of risk for each activity.

Table 10-9 Risk of Dust Impacts - for Demolition, Earthworks, Construction, Trackout (IAQM, 2024)

Sensitivity of Area	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

The risk of dust impacts for the Demolition, Earthworks, Construction and Trackout activities from the Proposed Project is summarised in Section 10.2.5 below.

EPA classification terminology as presented in Table 1-2 of Chapter 1 of this EIAR have been correlated with the equivalent risk rating from Table 10-10 below.

Table 10-10 Correlation of Impact Classification Terminology (EPA, 2022) to Risk Rating

EPA Term	EPA Description	Risk Rating
Imperceptible	An effect capable of measurement but without significant consequences	Negligible
Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities	Low
Moderate	An effect that alters the character of the environment in a manner consistent with existing and emerging baseline trends	Medium
Significant	An effect, which by its character, magnitude, duration or intensity alters a sensitive aspect of the environment	High

The risk of dust impacts for the Demolition, Earthworks, Construction and Trackout activities from the Proposed Project is summarised in Section 10.2.5 below.

10.2.4 Baseline Air Quality

The air quality in the vicinity of the Site is typical of that of rural areas in the southwest of Ireland, i.e., Zone D. Prevailing south-westerly winds carry clean, unpolluted air from the Atlantic Ocean onto the Irish mainland. The EPA publishes Air Monitoring Station Reports for monitoring locations in all four Air Quality Zones. The Air Quality in Ireland 2023 report provides SO₂, PM₁₀, NO₂ and O₃ concentrations for areas in Zone D.

10.2.4.1 Sulphur Dioxide (SO₂)

Sulphur dioxide data for Cork Harbour, Kilcitt, Shannon Estuary/Askeaton, Edenderry and Letterkenny in 2023 is presented in Table 10-11.

Table 10-11 Average Sulphur Dioxide Data for Zone D Sites in 2023

Parameter	Measurement
Annual Mean	4.3 $\mu\text{g}/\text{m}^3$
Hourly values > 350	0
Hourly max	80.9 $\mu\text{g}/\text{m}^3$
Daily values > 125	0
Daily max	23.2 $\mu\text{g}/\text{m}^3$

During the monitoring period there were no exceedances of the hourly and daily limit values for the protection of human health. As can be observed from Table 10-11 the average maximum hourly value recorded during the assessment period was 80.9 $\mu\text{g}/\text{m}^3$. In addition, there were no exceedances of the annual mean limit for the protection of ecosystems. It is expected based on professional judgement that SO_2 values at the Proposed Project would be similar or lower than those recorded for the Zone D sites above.

10.2.4.2 Particulate Matter (PM_{10})

Sources of particulate matter include vehicle exhaust emissions, dust from soil and road surfaces, construction works and industrial emissions. The Air Quality in Ireland 2023 report provide annual mean PM_{10} concentration for sixteen Zone D towns, Tipperary Town, Carrick-on-Shannon, Enniscorthy, Birr, Askeaton, Macroom, Castlebar, Cobh Carrignafof, Claremorris, Kilkitt, Cavan, Edenderry, Mallow, Longford, Cobh Cork Harbour, Roscommon Town and Killarney. Particulate matter (PM_{10}) data for 2023 is presented in Table 10-12.

Table 10-12 Average Particulate Matter (PM_{10}) Data for Zone D Sites in 2023

Parameter	Measurement
Annual Mean	11.0 $\mu\text{g}/\text{m}^3$
% Data Capture (Average)	90.8%
Values > 50 $\mu\text{g}/\text{m}^3$	Max 6
Daily Max (Average)	45.4 $\mu\text{g}/\text{m}^3$

Notes: ¹ PM_{10} daily limit for the protection of human health: No more than 35 days >50 $\mu\text{g}/\text{m}^3$

The daily limit of 50 $\mu\text{g}/\text{m}^3$ for the protection of human health was exceeded on 40 days which is greater than the PM_{10} daily limit for the protection of human health of a max 35 days >50 $\mu\text{g}/\text{m}^3$ applicable from 2005. The greatest number of exceedances occurred at Edenderry where the PM_{10} daily limit was exceeded on 6 occasions. In the Air Quality in Ireland 2023 report, it notes that there were breaches in the levels of particulate matter (PM) which “in Ireland mainly comes from the burning of solid fuel, such as coal, peat, and wood to heat our homes.” It is expected based on professional judgement that PM_{10} values at the Site would be similar or lower than those recorded for the Zone D sites above.

10.2.4.3 Nitrogen Dioxide (NO_2)

Nitrogen dioxide data for Emo Court, Birr, Castlebar, Carrick-on-Shannon, Kilkitt and Edenderry in 2023 is presented in Table 10-13.

Table 10-13 Average Nitrogen Dioxide Data for Zone D Sites in 2023

Parameter	Measurement
Annual Mean	8.1 $\mu\text{g}/\text{m}^3$
NO ₂ Values >200	0
Values > 140 (UAT)	0
Values >100 (LAT)	4
Hourly Max.	67.6 $\mu\text{g}/\text{m}^3$

The annual NO₂ value was below the annual mean limit value for the protection of human health of 40 $\mu\text{g}/\text{m}^3$. The lower assessment threshold of 100 $\mu\text{g}/\text{m}^3$ was exceeded 4 no. times during the monitoring period in Briarhill and the upper assessment threshold of 140 $\mu\text{g}/\text{m}^3$ was not exceeded during the monitoring period. The 18 days limit during the monitoring period was not exceeded. In 2023, no other monitoring locations in Zone D had exceedances in the lower and upper assessment thresholds of 100 and 140 $\mu\text{g}/\text{m}^3$. The average hourly max. NO₂ value of 67.6 $\mu\text{g}/\text{m}^3$ measured during the monitoring period was below the hourly max threshold of 200 $\mu\text{g}/\text{m}^3$. It would be expected that NO₂ values at the Site would be similar or lower than those recorded for the Zone D sites above.

10.2.4.4 Carbon Monoxide (CO)

The Air Quality in Ireland 2023 report provides rolling 8-hour carbon monoxide concentrations for Birr, a Zone D site. Carbon Monoxide data for 2023 is presented in Table 10-14 below.

Table 10-14 Carbon Monoxide Data for Birr - Zone D Site in 2023

Parameter	Measurement
Annual Mean	0.6 mg/m^3
Median	0.6 mg/m^3
% Data Capture	99.8%
Values > 10	0
Max	2.2 mg/m^3

The average concentration of carbon monoxide was 0.6 mg/m^3 . The carbon monoxide limit value for the protection of human health is 10,000 $\mu\text{g}/\text{m}^3$ (or 10 mg/m^3). On no occasions were values in excess of the 10 mg limit value set out in Directive 2008/69/EC. It is expected based on professional judgement that CO values at the Site would be similar or lower than those recorded for the Zone D site above.

10.2.4.5 Ozone (O₃)

The Air Quality in Ireland 2023 report provide rolling 8-hour ozone concentrations for seven Zone D sites, Emo Court, Kilkitt, Carnsore Point, Mace Head, Castlebar, Valentia and Malin Head. Ozone (O₃) data for 2023 is presented in Table 10-15. As can be observed from Table 10-15 there were 10 no. exceedances of the maximum daily eight-hour mean limit of 120 $\mu\text{g}/\text{m}^3$. The CAFE Directive stipulates that this limit should not be exceeded on more than 25 days. It is expected based on professional judgement that O₃ values at the Site would be similar or lower than those recorded for the Zone D sites below.

Table 10-15 Average Ozone Data for Zone D Sites in 2023

Parameter	Measurement
Annual Mean	61.5 $\mu\text{g}/\text{m}^3$
Median	72.8 $\mu\text{g}/\text{m}^3$
% Data Capture	95.5%
No. of days > 120	10 days

10.2.4.6 Dust

There are no statutory limits for dust deposition in Ireland. However, EPA guidance suggests that a deposition of 10 $\text{mg}/\text{m}^2/\text{hour}$ can generally be considered as posing a soiling nuisance. This equates to 240 $\text{mg}/\text{m}^2/\text{day}$. The EPA recommends a maximum daily deposition level of 350 $\text{mg}/\text{m}^2/\text{day}$ when measured according to the German TA Luft Standard 2002. This limit value can also be implemented with regard to dust impacts from construction activities associated with the Proposed Project.

The extent of dust generation at any site depends on the type of activity undertaken, the location, the nature of the dust, i.e., soil, sand, etc., and the weather. In addition, dust dispersion is influenced by external factors such as wind speed and direction and/or, periods of dry weather. Construction dust has the potential to be generated from on-site activities such as excavation and backfilling. Construction traffic movements also have the potential to generate dust as they travel along the haul route.

The potential dust-related effects on local air quality and the relevant associated mitigation measures are presented in Sections 10.2.5 below.

10.3 Likely and Significant Effect and Associated Mitigation Measures

10.3.1 'Do-Nothing' Scenario

If the Proposed Project were not to proceed, the current land use of predominantly agricultural with areas in the north of the Site occupied by active raised blanket bog would likely continue, and the air quality would likely remain similar to the current status for Zone D areas. In addition, there would be no exhaust emissions from construction plant and vehicles, nor would there be dust emissions due to the movement of the same.

However, if the Proposed Project were not to proceed, the opportunity to reduce emissions of carbon dioxide, oxides of nitrogen (NO_x), and sulphur dioxide (SO_2) to the atmosphere would be lost due to the continued dependence on electricity derived from coal, oil and gas-fired power stations, rather than renewable energy sources, such as the Proposed Project.

If the Proposed Project were not to proceed, the opportunity to capture part of County Galway's valuable renewable energy resource would be lost, as would the opportunity to contribute to meeting Government and EU targets for the production and consumption of electricity from renewable resources and the reduction of greenhouse gas emissions.

This will result in an indirect negative impact on air quality.

10.3.2 Construction Phase

10.3.2.1 Exhaust Emissions

Pre-Mitigation Impact

Proposed Wind Farm

The construction of turbines, the meteorological mast, site roads road widening works along the local road and other Proposed Wind Farm infrastructure (as outlined in Chapter 4 of this EIAR) and the importation of material will require the operation of construction vehicles and plant on site and the transport of workers to and from the Proposed Wind Farm site. Exhaust emissions associated with vehicles and plant such as NO₂, Benzene and PM₁₀ will arise as a result of construction activities. This potential effect will be restricted to the duration of the construction phase as outlined in Section 4.8 of Chapter 4 of this EIAR and localised to works areas as described in Chapter 4 of this EIAR. Therefore, this is considered a Short-term, Slight, Negative effect. Mitigation measures to reduce this effect are presented below and will be implemented in full.

Proposed Grid Connection

The construction of the Proposed Grid Connection from the proposed onsite substation to the existing Cloon 110kV substation will require the use of construction machinery, thereby giving rise to exhaust emissions such as NO₂, Benzene and PM₁₀, as already outlined for the Proposed Wind Farm activities. This is a Temporary, Slight, Negative effect, which will be reduced through use of the best practice mitigation measures as presented below and will be implemented in full.

Transport to and from the Proposed Wind Farm site and the Proposed Grid Connection

The transport of turbine components, construction materials, waste and workers to and from the Proposed Wind Farm and Proposed Grid Connection, (see Section 15.1 of this EIAR), will also give rise to exhaust emissions associated with the transport vehicles. This constitutes a Short-term, Moderate, Negative effect in terms of air quality. Mitigation measures in relation to exhaust emissions are presented below and will be implemented in full.

Mitigation

- All construction vehicles and plant used onsite during the construction phase will be maintained in good operational order. If a vehicle requires repairs this work will be carried out at an appropriate offsite location, thereby minimising any emissions that arise.
- Turbines components will be transported to the Proposed Wind Farm on specified routes only (see Chapter 15 Material Assets), unless otherwise agreed with the Planning Authority.
- All machinery and vehicles will be switched off when not in use and not left idling.
- The majority of aggregate materials for the construction of the Proposed Project will be imported from off-site. This will significantly reduce the number of delivery vehicles accessing the Proposed Wind Farm, thereby reducing the amount of emissions associated with vehicle movements.
- Deliveries of aggregate materials will be sourced from local quarries which will reduce the distance of these deliveries, thereby reducing the effect to traffic and transport in the wider area.
- The Materials Recovery Facility (MRF) will be as close as possible to the Proposed Wind Farm and Proposed Grid Connection to reduce the amount of emissions associated with vehicle movements.

Residual Effect

The residual effect from the construction phase and the implementation of the above mitigation measures will result in a Temporary-to-Short-term, Slight, Negative effect.

Significance of Effects

Based on the evaluation above there will be no significant direct or indirect effects on air quality due to the construction of the Proposed Project.

10.3.2.1.2 **Dust Emissions**

Pre-Mitigation Impact

Proposed Wind Farm site

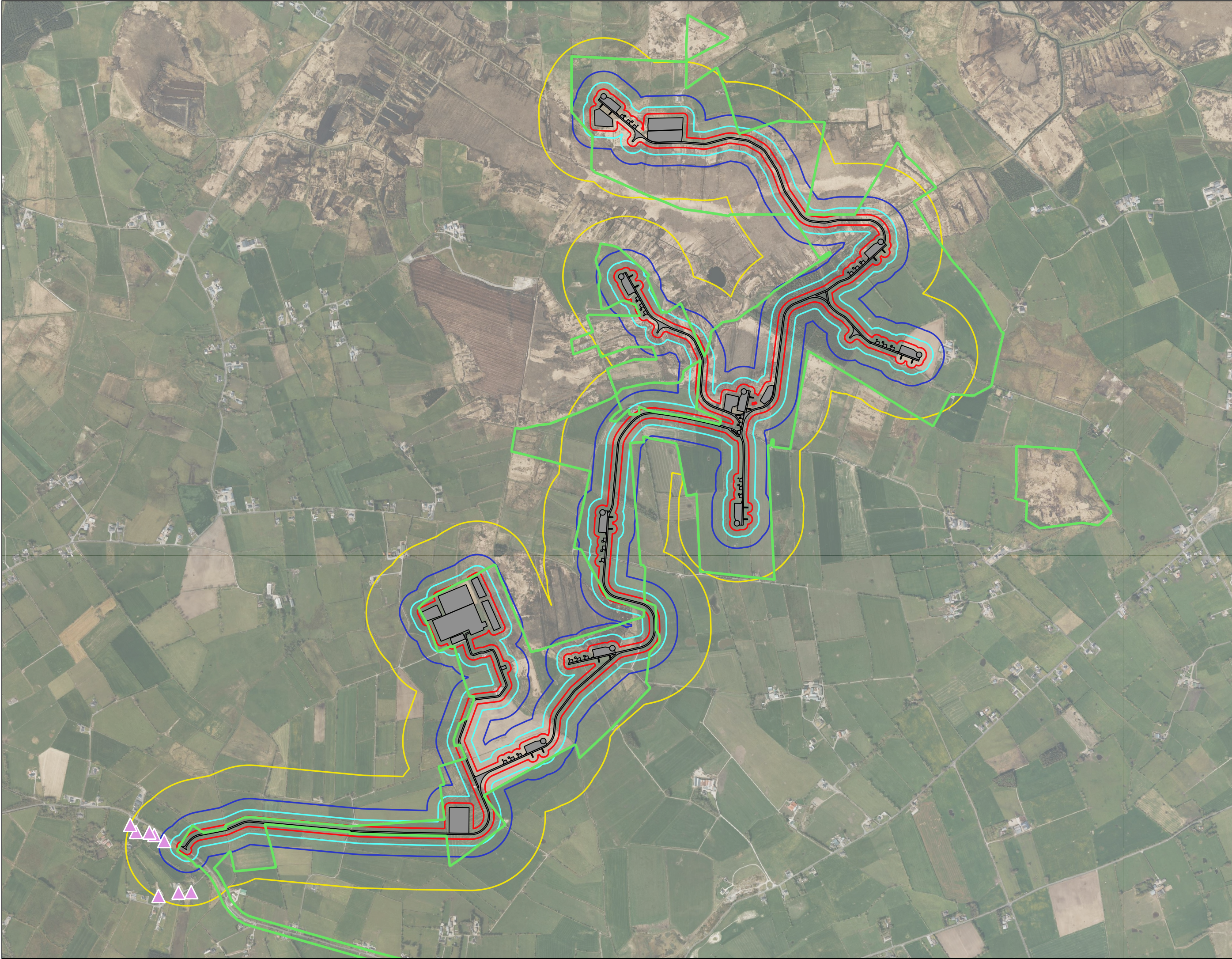
The construction of turbines and associated foundations and hard-standing areas, 110kV electrical substation, meteorological mast, access roads, temporary construction compound, underground cabling, site drainage, tree felling, demolition of an existing derelict house and outbuilding and all ancillary works and apparatus will give rise to dust emissions.

The majority of the construction materials for the Proposed Wind Farm will be imported onsite, with an estimated 120, 430m³ of materials will be sourced for construction. The removal of the topsoil followed by its transportation and deposition at the spoil management area during the construction phase will give rise to dust emissions.

In order to accommodate the delivery of turbine components, accommodation works will be required at 2 no. of locations along the R332 Regional Road in the townland of Slievegorm, Co. Galway. Works associated with the accommodation works will give rise to localised dust emissions.

The IAQM (2024) methodology for *the Assessment of Dust from Demolition and Construction* as discussed in Section 10.2.3.3.1 above is used to assess the potential risk to sensitive receptors from dust deposition. Dust deposition impacts can occur for a distance of 250 m from works areas, but the majority of deposition occurs within the first 50 m (IAQM, 2024). The High Sensitive Receptors were identified using a constraints mapping process, and detailed and updated planning searches which informed the project sensitive receptor dataset. These are shown in Figure 10-2 below.

- There are no high sensitivity properties located within 20 m of the Proposed Wind Farm footprint;
- There are no high sensitivity properties located within 50 m of the Proposed Wind Farm footprint;
- There is 1 no. high sensitivity property located within 100 m of the Proposed Wind Farm footprint;
- There are 8 no. high sensitivity properties located within 250 m of the Proposed Wind Farm footprint.



Map Legend

- EIAR Site Boundary
- IAQM Sensitive Receptor
- Proposed Wind Farm Infrastructure Footprint
- 20m IAQM Dust Deposition Band
- 50m IAQM Dust Deposition Band
- 100m IAQM Dust Deposition Band
- 250m IAQM Dust Deposition Band

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Drawing Title
IAQM Dust Deposition Bands and Relevant Sensitive Receptors for the Proposed Wind Farm Site Assessment

Project Title
Cooloo Wind Farm, Co. Galway

Drawn By EC	Checked By BT
Project No. 190723	Drawing No. Figure 10-2
Scale 1:15,000	Date 2025-09-22

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Table 10-16 below identifies sensitivity of the area to dust soiling effects on people and property surrounding the development footprint of the Proposed Wind Farm to dust soiling effects, as described in Section 10.2.2.4.1 above. The overall sensitivity of the area to dust soiling effects is considered to be Low.

Table 10-16 Sensitivity of the Area to Dust Soiling Effects on People and Property from the Proposed Wind Farm construction works. Guidance on the Assessment of Dust from Demolition and Construction (IAQM, 2024)

Receptor Sensitivity	Number Of Receptors	Distance from source (m)			
		<20	<50	<100	<250
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 10-17 below identifies the sensitivity of people in the area surrounding the development footprint of the Proposed Wind Farm to the health effects of PM₁₀, as described in Section 10.2.3.2 above. The overall sensitivity of the area to human health effects of PM₁₀ is considered to be Low.

It is noted below that PM₁₀ annual mean concentration for the Proposed Wind Farm site is expected to be similar or lower than that recorded for Zone D as per Table 10-12 above (11.0 ug/m³).

Table 10-17 Sensitivity of the Area to Human Health Impacts from Proposed Wind Farm site construction works. Guidance on the Assessment of Dust from Demolition and Construction (IAQM, 2024)

Receptor Sensitivity	Annual Mean PM ₁₀ Concentration	Number Of Receptors	Distance from source (m)			
			<20	<50	<100	<250
High	<24 µg/m ³	>100	Medium	Low	Low	Low
		10-100	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
Medium	<24 µg/m ³	>10	Low	Low	Low	Low
		1-10				
Low	-	≥1	Low	Low	Low	Low

Table 10-18 below identifies the sensitivity of the receptors to ecological effects in the area surrounding the development footprint of the Proposed Wind Farm. As noted above in Section 10.2.3.3.1, there is 1 no. sensitive ecological receptor (habitats) within 20m of the Proposed Wind Farm footprint, Annex 1 Habitat - Active Raised Bog [7110]. The overall sensitivity of the areas surrounding the development footprint of the Proposed Wind Farm is 'Medium'. Please note, a detailed ecological impact assessment assessing impacts on these ecological receptors during the construction phase (including effects from dust) is contained in Chapter 6 of this EIAR.

Table 10-18 Sensitivity of the Proposed Wind Farm to Ecological Impacts. Guidance on the Assessment of Dust from Demolition and Construction (IAQM, 2024)

Receptor Sensitivity	Distance from source (m)	
	<20	<50

High	High	Medium
Medium	Medium	Low
Low	Low	Low

As identified in Section 10.2.3.3 above, the Proposed Wind Farm is classified as ‘Small’ for Demolition works, ‘Large’ for Earthworks, Construction and Trackout activities. Therefore, when combined with the sensitivity of the area, using Table 10-9 to 10-11 above as guidance, the pre-mitigation risk of impacts from the Proposed Wind Farm site is summarised in Table 10-19 below.

Table 10-19 Summary Dust Risk Table for Wind Farm Site Activities

Potential Impact	Risk			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	Low Risk	Low Risk	Low Risk	Low Risk
Human Health	N/A	Low Risk	Low Risk	Low Risk
Ecological	N/A	High	High	High

The overall risk of dust emissions impacts with no mitigation applied for the major dust generating activities during the construction phase of the Proposed Wind Farm is Low. Therefore, the potential effects of dust from the construction phase of the Proposed Wind Farm are considered to be equivalent to Short-term, Slight Negative effects.

Proposed Grid Connection

The construction of the Proposed Grid Connection will give rise to dust emissions. It is proposed to provide construction grade materials for the Proposed Grid Connection infrastructure from local licenced quarries.

The number of sensitive receptors within 250 m from Proposed Grid Connection works areas and their likely risk of dust impacts during the construction works, as highlighted in the IAQM (2024) methodology discussed above are as follows. Please see Figure 10-3 for further detail:

- There are 23 no. sensitive properties located within 20 m from the Proposed Grid Connection route;
- There are 127 no. sensitive properties located within 50 m of the Proposed Grid Connection route;
- There are 153 no. sensitive properties located within 100 m of the Proposed Grid Connection route;
- There are 223 no. sensitive properties located within 250 m of the Proposed Grid Connection route;



Map Legend

- EIAR Site Boundary
- IAQM Sensitive Receptor
- Proposed Wind Farm Infrastructure Footprint
- 20m IAQM Dust Deposition Band
- 50m IAQM Dust Deposition Band
- 100m IAQM Dust Deposition Band
- 250m IAQM Dust Deposition Band

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Drawing Title
IAQM Dust Deposition Bands and Relevant Sensitive Receptors for the Proposed Grid Connection Site Assessment

Project Title
Coolloo Wind Farm, Co. Galway

Drawn By EC	Checked By BT
Project No. 190723	Drawing No. Figure 10-3
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Table 10-20 below identifies the sensitivity of the area surrounding the development footprint of the Proposed Grid Connection to dust soiling effects, as described in Section 10.2.2.4 above. The overall sensitivity of the area to dust soiling effects is High due to the number of sensitive properties within 20m of the Proposed Grid Connection route.

Table 10-20 Sensitivity of the Area to Dust Soiling Effects from the Proposed Grid Connection construction works on People and Property. Guidance on the Assessment of Dust from Demolition and Construction (IAQM, 2024)

Receptor Sensitivity	Number Of Receptors	Distance from source (m)			
		<20	<50	<100	<250
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 10-21 below identifies the sensitivity of people in the area surrounding the development footprint of the Proposed Grid Connection to the health effects of PM₁₀, as described in Section 10.2.4.2.2 above. The overall sensitivity of the area to human health effects of PM₁₀ is Low.

Table 10-21 Sensitivity of the Area to Human Health Impacts from the Proposed Grid Connection construction works. Guidance on the Assessment of Dust from Demolition and Construction (IAQM, 2024).

Receptor Sensitivity	Annual Mean PM ₁₀ Concentration	Number Of Receptors	Distance from source (m)			
			<20	<50	<100	<250
High	<24 µg/m ³ (<14 µg/m ³ in Scotland)	>100	Medium	Low	Low	Low
		10-100	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
Medium	<24 µg/m ³ (<14 µg/m ³ in Scotland)	>10	Low	Low	Low	Low
		1-10				
Low	-	≥1	Low	Low	Low	Low

As identified in Section 10.2.2.4 above, the Proposed Grid Connection is classified as ‘Medium’ for Earthworks, ‘Small’ for Construction, and ‘Medium’ for Trackout activities. Therefore, when combined with the sensitivity of the area, using Table 10-9 to Table 10-11 above as guidance, the pre-mitigation risk of impacts from the Proposed Grid Connection is summarised in Table 10-22.

Table 10-22 Summary Dust Risk Table for Grid Connection Activities

Potential Impact	Dust Emission Risk			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	N/A	Medium Risk	Low Risk	Medium Risk
Human Health	N/A	Low Risk	Negligible	Low Risk
Ecological	N/A	N/A	N/A	N/A

The overall risk of dust emissions impacts with no mitigation applied for the major dust generating activities during the construction phase of the Proposed Grid Connection is Medium. Therefore, the potential effects of dust from the construction phase of the Proposed Grid Connection are considered to be equivalent to Temporary, Moderate, Negative effects. Mitigation measures to reduce this effect are presented below and will be implemented in full.

Mitigation & Monitoring Measures for the Proposed Project

- › A wheel wash facility will be installed on the Proposed Wind Farm site and will be used by vehicles before leaving the Site
- › Wetting of loose stone surface will be carried out during the construction phase to minimise movement of dust particles to the air. In periods of extended dry weather, dust suppression will be carried out along haul roads to ensure dust does not cause a nuisance. Water bowser movements will be carefully monitored to avoid increased runoff.
- › All plant and materials vehicles for the Proposed Project will be stored in dedicated areas within the Proposed Wind Farm.
- › Areas of excavation will be kept to a minimum, and stockpiling will be minimised by coordinating excavation, spreading and compaction.
- › Turbines and construction traffic will be transported to the Proposed Wind Farm on specified haul routes only.
- › The Proposed Grid Connection infrastructure will be transported to the Proposed Grid Connection on specified haul routes only.
- › Construction materials for the Proposed Project will be sourced locally from licenced quarries.
- › The agreed haul route road adjacent to the Proposed Wind Farm will be checked weekly by the Site Manager for cleanliness and cleaned as necessary.
- › The roads adjacent to the Proposed Wind Farm entrances will be checked weekly for damage/potholes and repaired as necessary.
- › The transportation of materials around the Proposed Wind Farm will be covered by tarpaulin or similar covered vehicles.
- › The transportation of construction materials from locally sourced quarries for the Proposed Grid Connection infrastructure and a small volume for the Proposed Wind Farm Site will be covered by tarpaulin.
- › In periods of extended dry weather, excavated material will be dampened prior to transport to the spoil management areas.
- › Waste material will be transferred to a licensed/permitted Materials Recovery Facility (MRF) by an appropriately licensed waste contractor. The MRF facility will be local to the Proposed Project to reduce the amount of emissions associated with vehicle movements
- › The Construction and Environmental Management Plan (CEMP) submitted as part of this planning application will be a key contract document and will be implemented in full by the contractor throughout the construction phase. (see Appendix 4-5). The CEMP includes dust suppression measures.

Residual Effect

Proposed Wind Farm

With the implementation of the above, the Proposed Wind Farm is considered to have a Short-term, Not Significant, Negative effect on air quality brought about by dust emissions generated during the construction activities.

Proposed Grid Connection

The Proposed Grid Connection is considered to have a Temporary, Slight, Negative effect on air quality brought about by dust emissions generated during the construction activities.

Significance of Effects

The effects on air quality from dust emissions during the construction phase of the Proposed Project during the construction phase of the Proposed Project are considered to be Not Significant.

10.3.3 Operational Phase

10.3.3.1.1 Exhaust Emissions

Exhaust emissions associated with the operational phase of the Proposed Project will arise from machinery and vehicles that are intermittently required onsite for maintenance, in the form of light goods vehicles (LGVs) visiting the Site 1-2 times per day for inspections but on occasion, daily visits by LGVs and HGVs may be required over short periods during maintenance/component replacement activities. This will give rise to a Long-term, Not Significant, Negative effect due to the localised and intermittent nature of the maintenance.

In addition to the above, the Proposed Wind Farm site will continue to be used as a working farm and therefore farm machinery will continue to utilise the Site as required.

Proposed Grid Connection

Mitigation

- Any vehicles or plant brought onsite during the operational phase will be maintained in good operational order that comply with the Road Traffic Acts 1961 as amended, thereby minimising any emissions that arise.
- When stationary, delivery and on-site vehicles will have their engines switched off.
- Waste material will be transferred to a licensed/permitted Materials Recovery Facility (MRF) by a fully licensed waste contractor where the waste will be sorted into individual waste streams for recycling, recovery or disposal.
- The MRF facility will be local to the Site to reduce the emissions associated with vehicle movements.

Residual Effect

Based on the above, the impact on air quality from exhaust emissions during the operational phase is a long-term, imperceptible, negative effect.

Significance of Effects

Based on the assessment above there will be no significant direct effects on air quality from exhaust emissions during the operation of the Proposed Project.

10.3.3.1.2 Air Quality

The Proposed Project, by providing an alternative to electricity derived from coal, oil or gas-fired power stations, will result in emission savings of carbon dioxide (CO₂), oxides of nitrogen (NO_x), and sulphur dioxide (SO₂). The production of renewable energy from the Proposed Project will have a Long-term, Significant, Positive effect on air quality, and thus not requiring mitigation. Further details on the carbon dioxide savings associated with the Proposed Project are presented in Chapter 11 Climate.

Residual Effect

Long-term Significant Positive effect for all turbines within the range. For the purposes of the air quality assessment this EIAR, a rated generating capacity of 7 MW has been chosen to calculate the potential capacity of the proposed 9-turbine renewable energy development, which would result in an estimated installed capacity of 63 MW of electricity that doesn't directly emit carbon dioxide (CO₂), oxides of nitrogen (NO_x), or sulphur dioxide (SO₂). Whilst there are potentially turbines with a greater MW output capacity, the residual effect will not be altered.

Significance of Effects

Based on the assessment above there will be significant positive effect on air quality due to the operation of the Proposed Project.

10.3.3.1.3 **Human Health**

Whilst the operational phases of the Proposed Project will give rise to minor increases in vehicle emissions, the implementation of the mitigation measures discussed in Section 10.3.3.1.1 above, and good management practices will avoid, reduce or offset potential effects off-site. The potential for health effects are considered negligible as the potential for exhaust emissions will be limited and controlled through site layout design and mitigation measures.

Exposure to chemicals such as SO₂ and NO_x are known to be harmful to human health. The production of clean renewable energy from the Proposed Project will offset the emission of these harmful chemicals by fossil fuel-powered sources of electricity and, therefore, will have a Long-term Slight Positive effect on human health. Further information on the impact of the Proposed Project on Human Health is contained in Chapter 5: Population and Human Health.

Residual Effect

Based on the assessment above there will be Long Term, Slight, Positive effect on Human Health due to the operation of the Proposed Project.

Significance of Effects

Based on the assessment above there will be no significant effects.

10.3.3.2 **Decommissioning Phase**

The wind turbines proposed as part of the Proposed Wind Farm are expected to have a lifespan of 35 years. Following the end of this lifespan, the wind turbines may be replaced with a new set of turbines, subject to planning permission being obtained, or the Proposed Wind Farm site will be decommissioned fully as described at Section 4.11 of Chapter 4 of this EIAR.

The works required during the decommissioning phase are described in Section 4.9 of Chapter 4. Any impact and consequential effects that occur during the decommissioning phase are similar to that which occur during the construction phase, be it of less impact. The electrical cabling connecting the Proposed Project to the national grid will be left in-situ as it is considered the most environmentally prudent option, avoiding unnecessary excavation and soil disturbance for an underground element that is not visible. Likewise, the substation will remain on site resulting in no additional truck movements or requirement for demolitions and removal works for this piece of infrastructure. The mitigation measures prescribed for the construction phase of the Proposed Project will be implemented during the decommissioning phase thereby minimising any potential impacts.

A Decommissioning Plan is included as Appendix 4-6 of this EIAR for the decommissioning of the Proposed Project, the detail of which will be agreed with the planning authority prior to any decommissioning. Any impact and consequential effect that occurs during the decommissioning phase are similar to that which occur during the construction phase, be it of less magnitude. The mitigation measures prescribed for the construction phase of the Proposed Project will be implemented during the decommissioning phase thereby minimising any potential effects. The potential for effects during the decommissioning phase of the Proposed Project has been fully assessed within this EIAR.

10.3.4 Cumulative Assessment

The potential for impact between the Proposed Project, and other relevant developments has been carried out with the purpose of identifying what influence the Proposed Project (Proposed Wind Farm site and Proposed Grid Connection combined) will have on the surrounding environment when considered cumulatively and in combination with relevant existing permitted or proposed projects and plans in the vicinity of the Site, such as other wind energy developments, extractive industries, battery energy storage systems, forestry etc. Please see Section 2.9 of Chapter 2 for the cumulative assessment methodology used.

During the construction phase of the Proposed Project and the construction of other permitted or proposed projects and plans in the area (please see Section 2.9 in Chapter 2 and Appendix 2-3 of this EIAR), there will be exhaust emissions from construction plant and machinery and potential dust emissions associated with the construction activities. However, once the mitigation proposals, as outlined in the above assessment are implemented during the construction phase of the Proposed Project, there will be no cumulative negative effect on air quality.

Exhaust and dust emissions during the operational phase of the Proposed Project will be minimal, relating to the use of maintenance machinery and vehicles onsite, and therefore there will be no measurable negative cumulative effect with other developments on air quality.

The nature of the Proposed Project is such that, once operational, it will have a long-term, moderate, positive impact on the air quality. There will be no measurable negative cumulative effect with other developments on air quality.

10.3.5 Conclusion

This chapter identifies, describes and assesses the potential significant direct and indirect effects on air quality arising from the construction, operation and decommissioning of the Proposed Project.

Construction Phase

The Proposed Project is considered to have a Temporary-to-Short-term, Slight, Negative effect on air quality brought about by exhaust emissions generated during the construction activities.

The Proposed Wind Farm is considered to have a Short-term, Slight Negative effect on air quality brought about by dust emissions generated during the construction activities.

The Proposed Grid Connection is considered to have a Temporary, Slight Negative effect on air quality brought about by dust emissions generated during the construction activities.

Operational Phase

The Proposed Project is considered to have a Long-term, Imperceptible, Negative effect on air quality brought about by exhaust emissions generated during the operational phase.

The Proposed Project, by providing an alternative to electricity derived from coal, oil or gas-fired power stations, will result in emission savings of carbon dioxide (CO₂), oxides of nitrogen (NO_x), and sulphur dioxide (SO₂). The production of renewable energy from the Proposed Project will have a Long-term, Significant, Positive effect on air quality.

Decommissioning Phase

The mitigation measures prescribed for the construction phase of the Proposed Project will be implemented during the decommissioning phase thereby minimising any potential effects.

The residual effects are of the same significance for all permutations within the range. The same mitigation will be applied regardless of the turbine installed within the range.