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 Development. The full description of the Proposed Development is detailed in Chapter 4 (Description of the Proposed Development). Alternative designs initially proposed for the Proposed Development and their potential for effects on air quality are considered in Chapter 3 (Site Selection & Reasonable Alternatives).

10.1.1 Background

As detailed in Section 1.1.1 in Chapter 1 (Introduction), for the purposes of this EIAR, the various project components are described and assessed using the following references: 'Proposed Development', 'proposed turbines', the 'Site', the ' 2020 Application' and the 'Kealkill Wind Farm'. Please see Section 1.1.1 of this EIAR for further details. A detailed description of the Proposed Development is provided in Chapter 4 (Description of the Proposed Development) of this EIAR.

The Site is located approximately 6.8km northeast of Kealkill and 3.8km southwest of the village of Ballingeary. The approximate location for the centre of the Site is E508999, N562646. The Site covers an area of approximately 270 hectares, in total.

The townlands in which the Proposed Development is located are listed in Table 1-1 in Chapter 1 (Introduction) of this EIAR. The land uses and types within the Site comprises of commercial forestry, agricultural land and unutilised existing wind farm infrastructure. As noted in Chapter 1 (Introduction), the Site was previously an operational wind farm site, which was operational for approximately 12 years.

In addition to forestry and wind energy, other land-uses in the surrounding area include agriculture, and residential/commercial activities. The closest potential wind farm to the Site is the Maughanaclea Wind Farm, which is currently in the pre-planning system and is located approximately 3.6km south of the Site.

Due to the non-industrial nature of the Proposed Development, and the general character of the surrounding environment, baseline air quality sampling was deemed to be unnecessary for this EIAR. It is expected that the air quality in the existing environment is good, 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 air emissions as is expected 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 can be damaging to human health and the environment. Some temporary or short-term emissions are associated with the construction of the Proposed Development and include vehicular and dust emissions.

10.1.2 Statement of Authority

This section of the EIAR, has been prepared by Natasha Morley and Ellen Costello and reviewed by Sean Creedon of MKO. Natasha is an Environmental Scientist with MKO and holds a PgDip. in Environmental Sustainability Implementation from UCD. Natasha's key strengths and areas of expertise are in project management, environmental impact assessment, GIS mapping and modelling, and environmental surveying. Since joining MKO, Natasha has experience in report writing including feasibility studies and EIA screening reports and EIAR chapters including Air Quality chapters for large-scale renewable energy developments. Ellen is a Senior Environmental Scientist with over 5 years

of consultancy experience with MKO and has been involved in several wind energy EIAR applications involving the compilation of numerous chapters including chapters on Air Quality. Ellen holds a BSc. in Earth Science and a MSc. in Climate Change: Integrated Environmental and Social Science Aspects. Sean is an Associate Director in the Environment Team at MKO. He oversees a team of highly skilled environmental professionals working on EIAR for large-and medium scale Renewable Energy infrastructure. Sean has directed and overseen multiple renewable energy projects across wind, solar, battery and hydrogen as well as a range of thermal and other energy related developments. He is a member of the MKO senior management team responsible for developing the business, mentoring team members, fostering a positive culture and promoting continuous employee professional development. Sean has over 22 years' experience in program and project development, holds an MSc from NUI Galway and a Diploma in Project Management from Institute of Project Management Ireland.

10.1.3 Relevant Guidance

The air quality section of this EIAR is carried out 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)[1].
- Guidelines on the Information to be contained in Environmental Impact Assessment Reports – June 2022 (EPA, 2022)[2].
- Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (EC, 2017)[3].
- Air Quality in Europe 2022 (EEA, 2022)[4]
- Air Quality Status Report 2025 (EEA, 2025)[5]
- Air Quality in Ireland Report 2023 (EPA, 2024).[6]
- Best Practice Guidelines on the Preparation of Resource and Waste Management Plans for Construction & Demolition Projects (EPA, 2021)[7].
- Guidance of the Assessment of Dust from Demolition and Construction (IAQM, 2024).[8]
- Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes (TII, 2011).[9]
- Guidelines for Assessment of Ecological Impacts of National Roads Schemes (TII, 2009).[10]
- Clean Air Strategy for Ireland (Government of Ireland, 2023).[11]

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[1] *Transport Infrastructure Ireland (TII). (2022). Air Quality Assessment of Proposed National Roads – Standard (PE-ENV-01107). December 2022. <https://cdn.tii.ie/publications/PE-ENV-01107-01.pdf.>*
[2] *Environmental Protection Agency (EPA). (2022). Guidelines on the Information to be Contained in Environmental Impact Assessment Reports. June 2022. <https://www.epa.ie/publications/monitoring–assessment/assessment/guidelines-on-the-information-to-be-contained-in-environmental-impact-assessment.php.>*
[3] *European Commission (EC). (2017). Environmental Impact Assessment of Projects: Guidance on the Preparation of the Environmental Impact Assessment Report. <https://op.europa.eu/en/publication-detail/-/publication/2b399830-cb4b-11e7-a5d5-01aa75ed71a1>*
[4] *Air Quality in Europe 2022 <https://www.eea.europa.eu/publications/air-quality-in-europe-2022>*
[5] *European Environment Agency (EEA). (2025). Air Quality Status Report 2025. <https://www.eea.europa.eu/en/analysis/publications/air-quality-status-report-2025>*
[6] *Environmental Protection Agency (EPA). (2024). Air Quality in Ireland 2023.*
[7] *Environmental Protection Agency (EPA). (2021). Best Practice Guidelines on the Preparation of Resource and Waste Management Plans for Construction & Demolition Projects.*
[8] *Institute of Air Quality Management (IAQM). (2024). Guidance on the Assessment of Dust from Demolition and Construction.*
[9] *Transport Infrastructure Ireland (TII). (2011). Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes. <https://tii.sonitussystems.com/information/tii-and-air-quality>*
[10] *Transport Infrastructure Ireland (TII). (2009). Guidelines for Assessment of Ecological Impacts of National Road Schemes. <https://www.tii.ie/media/kzldoawo/guidelines-for-assessment-of-ecological-impacts-of-national-road-schemes.pdf>*
[11] *Government of Ireland. (2023). Clean Air Strategy for Ireland.*

- 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).[12]
- UK Highways Agency (UKHA) Design Manual for Roads and Bridges (DMRB) – LA 105 Air Quality (UKHA, 2019).[13]
- World Health Organization (WHO) Air Quality Guidelines for Particulate Matter, Ozone, Nitrogen Dioxide and Sulfur Dioxide Global Update 2021 (WHO 2021)[14].

10.1.4 Relevant Legislation

In 1996, the Air Quality Framework Directive (on ambient air quality assessment and management) (96/62/EC)[15] 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)[16] addresses sulphur dioxide, oxides of nitrogen, particulate matter and lead.
- The second Daughter Directive (2000/69/EC)[17] 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)[18] relating to ozone was published in 2002 and was transposed into Irish law by the Ozone in Ambient Air Regulations 2004 (SI No. 53 of 2004).
- The fourth Daughter Directive (2004/107/EC)[19], published in 2004, relates to polyaromatic 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) (amended by SI 659/2016 - Air Quality Standards (Amendment) and Arsenic, Cadmium, Mercury, Nickel and Polycyclic Aromatic Hydrocarbons in Ambient Air (Amendment) Regulations 2016.)

The Air Quality Framework Directive and the first three Daughter Directives were replaced by the Clean Air for Europe (CAFE) Directive (Directive 2008/50/EC[20] on ambient air quality and cleaner air for Europe) (as amended by Directive EU 2015/1480)[21] which encompasses the following elements:

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[12] *Department for Environment, Food and Rural Affairs (DEFRA). (2018). Local Air Quality Management Technical Guidance (LAQM.TG(16)).*
[13] *UK Highways Agency. (2019). Design Manual for Roads and Bridges (DMRB) – LA 105 Air Quality.*
[14] *World Health Organization (WHO). (2021). WHO Global Air Quality Guidelines: Particulate Matter (PM2.5 and PM10), Ozone, Nitrogen Dioxide, Sulfur Dioxide and Carbon Monoxide. <https://www.who.int/publications/i/item/9789240034228>*
[15] *Council Directive 96/62/EC of 27 September 1996 on ambient air quality assessment and management <https://eur-lex.europa.eu/eli/dir/1996/62/oj/engEuropean Environment Agency+2>*
[16] *Council Directive 1999/30/EC of 22 April 1999 relating to limit values for sulphur dioxide, nitrogen dioxide and oxides of nitrogen, particulate matter and lead in ambient air <https://eur-lex.europa.eu/eli/dir/1999/30/oj/eng>*
[17] *Directive 2000/69/EC of the European Parliament and of the Council of 16 November 2000 relating to limit values for benzene and carbon monoxide in ambient air <https://eur-lex.europa.eu/eli/dir/2000/69/oj/eng>*
[18] *Directive 2002/3/EC of the European Parliament and of the Council of 12 February 2002 relating to ozone in ambient air <https://eur-lex.europa.eu/eli/dir/2002/3/oj/eng>*
[19] *Directive 2004/107/EC of the European Parliament and of the Council of 15 December 2004 relating to arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons in ambient air <https://eur-lex.europa.eu/eli/dir/2004/107/oj/eng>*
[20] *Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe <https://eur-lex.europa.eu/eli/dir/2008/50/oj/eng>*
[21] *Commission Directive (EU) 2015/1480 of 28 August 2015 amending several annexes to Directives 2004/107/EC and 2008/50/EC <https://eur-lex.europa.eu/eli/dir/2015/1480/oj/engEUR-Lex+1FAOHome+1>*

- 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 PM2.5 (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 ($\mu g/m^3$) and parts per billion (ppb). The notation PM_{10} 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[22] 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.

10.1.5 Air Quality Standards

The recently implemented Ambient Air Quality Standards Regulations 2022 (S.I. No. 739/2022) remains aligned to the CAFÉ Directive and diverts to the CAFÉ 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 CAFÉ Directive 2008/50/EC (Source: https://airquality.ie/information/air-quality-standards)[23]

Pollutant	Limit Value Objective	Averaging Period	Limit Value (ug/m3)	Basis of Application of Limit Value	Attainment Date

[22] *Directive (EU) 2024/2881 of the European Parliament and of the Council of 23 October 2024 on ambient air quality and cleaner air for Europe (recast)* <https://eur-lex.europa.eu/eli/dir/2024/2881/oj/eng>
[23] *Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe (EC, 2008)* <https://eur-lex.europa.eu/eli/dir/2008/50/oj/eng>

Sulphur dioxide (SO_2)	Protection of human health	1 hour	350	Not to be exceeded more than 24 times in a calendar year	1st Jan 2005
Sulphur dioxide (SO_2)	Protection of human health	24 hours	125	Not to be exceeded more than 3 times in a calendar year	1st Jan 2005
Sulphur dioxide (SO_2)	Protection of vegetation	Calendar year	20	Annual mean	19th Jul 2001
Sulphur dioxide (SO_2)	Protection of vegetation	1st Oct to 31st Mar	20	Winter mean	19th Jul 2001
Nitrogen dioxide (NO_2)	Protection of human health	Calendar year	40	Annual mean	1st Jan 2010
Nitrogen dioxide (NO_2)	Protection of human health	1 hour	200	Not to be exceeded more than 18 times in a calendar year	1st Jan 2010
Nitrogen dioxide (NO_2)	Protection of human health	Calendar year	40	Annual mean	1st Jan 2010
Nitrogen monoxide (NO) and nitrogen dioxide (NO_2)	Protection of ecosystems	Calendar year	30	Annual mean	19th Jul 2001
Particulate matter 10 (PM_{10})	Protection of human health	24 hours	50	Not to be exceeded more than 35 times in a calendar year	1st Jan 2005
Particulate matter 10 (PM_{10})	Protection of human health	Calendar year	40	Annual mean	1st Jan 2005
Particulate matter 2.5 ($PM_{2.5}$) Stage 1	Protection of human health	Calendar year	25	Annual mean	1st Jan 2015
Particulate matter 2.5 ($PM_{2.5}$) Stage 2	Protection of human health	Calendar year	20	Annual mean	1st Jan 2020
Lead	Protection of human health	calendar year	0.5	Annual mean	1st Jan 2005
Carbon Monoxide	Protection of human health	8 hours	10,000	Not to be exceeded	1st Jan 2005
Benzene	Protection of human health	calendar year	5	Annual mean	1st Jan 2010

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

Pollutant	Limit Value Objective	Averaging Period	Limit Value ($\mu g/m^3$)	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
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 Directive 2008/50/EC

Objective	Parameter	Target Value for 2010	Long- term Objective
Protection of human health	Maximum daily 8-hour mean	120 µg/m^3 not to be exceeded more than 25 days per calendar year averaged over 3 years	120 µg/m^3
Protection of vegetation	AOT40* calculated from 1-hour values from May to July	18,000 µg/m^3.h averaged over 5 years	6,000 µg/m^3.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 µg/m3 and is expressed as µg/m3 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

On the 26th of October 2022 the EU Commission announced a proposed review of Air Quality Standards[24]. The proposed revision will set interim 2030 EU air quality standards, seeking to align more closely with WHO recommendations, while putting the EU on a trajectory to achieve zero pollution for air at the latest by 2050, in synergy with climate-neutrality efforts. To this end, regular reviews of the air quality standards are proposed to reassess them in line with latest scientific evidence as well as societal and technological developments. The first review is proposed to take place by the end of 2028, with the objective of ensuring full alignment with WHO recommendations.

The Ambient Air Quality Standards Regulation (2022) made the provisions necessary for the implementation of Directive 2008/50/EC of the European Parliament and of the Council on ambient air quality and cleaner air for Europe (as amended), establishes the limit values and alert thresholds for concentrations of certain pollutants in ambient air, provides for the assessment of concentrations of certain pollutants in ambient air, provides for the maintenance of ambient air quality, and ensures that adequate information on concentrations of pollutants are made available to the public.

10.1.5.1 Air Quality and Health

In September 2024, the EPA published '*Air Quality in Ireland 2023*' 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 (NO_2), sulphur dioxide (SO_2) and ozone (O_3). 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

[24] European Commission (October 2022) Revision of the Ambient Air Quality Directives. <https://environment.ec.europa.eu/topics/air/air-quality/revision-ambient-air-quality-directives_en>

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 WHO targets,

The European Environmental Agency (EEA) Report, '*Air Quality in Europe 2022'* report highlights the negative effects of air pollution on human health. The report assessed that poor air quality in Europe accounted for premature deaths of approximately 238,000 people in the 27 EU Member States in 2020[25]. In 2020 in the European Union, 96% of the urban population was exposed to levels of fine particulate matter above the health-based guideline level set by the World Health organisation. Furthermore, in 2020 damaging levels of nitrogen deposition to ecosystems were exceeding in 75% of the total ecosystems that are in the EU-27. This represents a fall of 12% since 2005. The estimated effects on the population in Europe of exposure to NO_2 and O_3 concentrations in 2020 were around 49,000 and 24,000 premature deaths, respectively. From this, 490 Irish deaths were attributable to fine particulate matter ($PM_{2.5}$), 50 Irish deaths were attributable to nitrogen oxides (NO_2) and 70 Irish deaths were attributable to Ozone (O_3) (Source: *'Air Quality in Europe – 2022 Report',* EEA, 2022)[26]. These figures are further informed by the EEA publication of 'Ireland – air pollution country fact sheet 2024' on the 10th December 2024 [27]. This states that 530 Irish deaths were attributable to fine particulate matter ($PM_{2.5}$), 100 Irish deaths were attributable to nitrogen oxides (NO_2) and 240 Irish deaths were attributable to Ozone (O_3).

The Office of Energy Efficiency and Renewable Energy in the United States published an article on August 24, 2023 entitles '*How Wind Can help Us Breathe Easier*.'[28] This article details the CO_2 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 CO_2/kWh) of electricity generated, compared with about 980 g CO_2/kWh for coal and roughly 465 g CO_2/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 (NOx) and sulphur dioxide (SO_2), 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.

The EEA published a briefing on Europe's air quality status in April 2024[29]. This briefing presented the status of concentrations of pollution in ambient air in 2022 and 2023 for regulated pollutants in relation to both EU air quality standards and the 2021 WHO guideline levels. 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. These emissions, along with others including sulphur oxides (SO_x) are produced during fossil fuel-based electricity generation in various amounts, depending on the fuel and technology used, emissions from industry and power plants, vehicles emissions and transport fuels.

More recently a few key messages are outlined in the 'Air Quality Status Report 2025' published on the 09/04/2025 on the European Environment Agency web site. These are:

- EU air quality standards are still not fully met across Europe, despite ongoing overall improvements.

[25] *European Environment Agency. (2022). Air quality in Europe – 2022 report. <https://www.eea.europa.eu/publications/air-quality-in-europe-2022/>*
[26] *European Environment Agency (EEA). (2022). Air Quality in Europe – 2022 Report. <https://www.eea.europa.eu/publications/air-quality-in-europe-2022/>*
[27] *European Environment Agency (EEA). (2024). Ireland – Air Pollution Country Fact Sheet 2024. <https://www.eea.europa.eu/en/topics/in-depth/air-pollution/air-pollution-country-fact-sheets-2024/ireland-air-pollution-country-fact-sheet-2024>*
[28] *Office of Energy Efficiency and Renewable Energy (2023) How Wind Can Help Us Breathe Easier*
[29] *Europe's air quality status 2024 briefing. <https://www.eea.europa.eu//publications/europes-air-quality-status-2024>*

- 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'* [30] states that the pollutants of most concern are Fine Particulate matter ($PM_{2.5}$.), Nitrogen Dioxide (NO_2) and Ammonia (NH_3). 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[31]. 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 (NOx) and fine particulate matter (PM2.5)
- 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 Development 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

[30] *Environmental Protection Agency (2024). Irelands State of the Environment Report 2024)* <https://www.epa.ie/our-services/monitoring--assessment/assessment/irelands-environment/state-of-environment-report-/>
[31] *Environmental Protection Agency (EPA). (2025). Ireland's Air Pollutant Emissions 1990–2030.* <https://www.epa.ie/publications/monitoring--assessment/climate-change/air-emissions/EPA-Air-Pollutant-Final-Report.pdf>

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 (CO_2), oxides of nitrogen (NO_x), and sulphur dioxide SO_2, 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 Development mitigation measures will be implemented at this Site to reduce the impact from dust and vehicle emissions, which are discussed in Section 10.3 below.

Ireland's Clean Air Strategy 2023[32] sets out the detail of seven strategic frameworks that will be used to ensure that air quality continues to improve (Figure 10-1). 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 and 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 Ireland to continue to evolve it's 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 to 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 testing[33].

[32] *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.*
[33] *Clean Air Strategy For Ireland First Progress Report 2024*

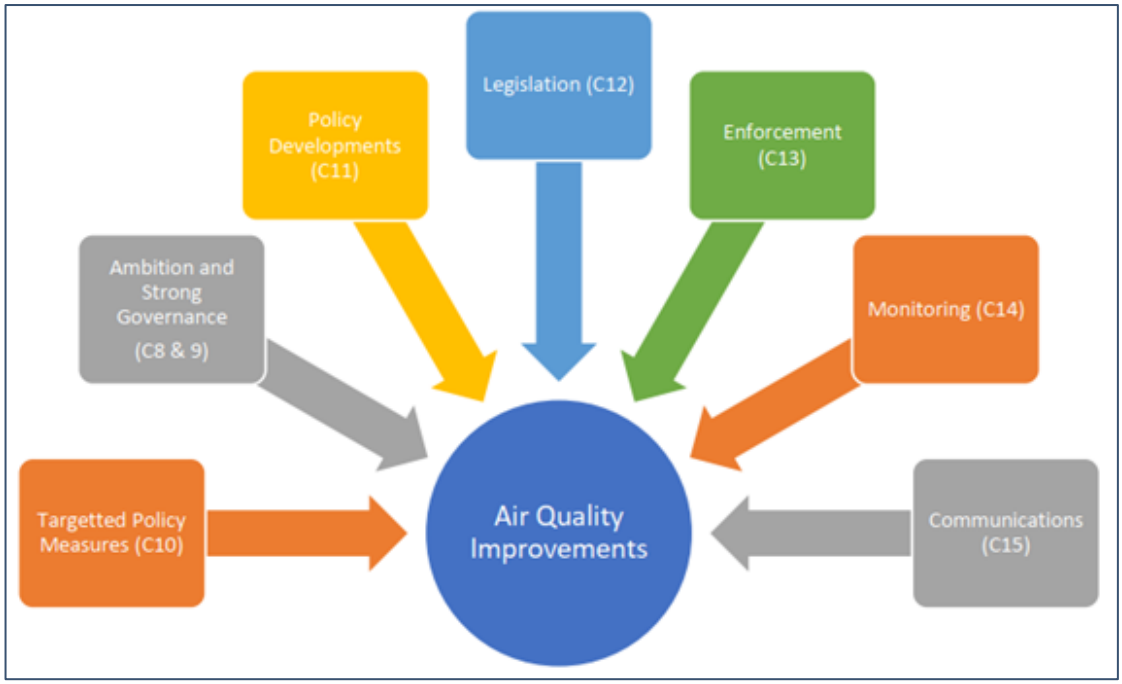


Figure 10-1 Seven Strategic Frameworks for Air Quality, with associated chapters in brackets. Reproduced as Figure 1 from Clean Air Strategy 2023.

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.

10.1.6 Methodology

10.1.6.1 Air Quality Zones

The air quality zone for the Site was selected, followed by a review of EPA collated baseline air quality data namely Sulphur Dioxide (SO_2), Particulate Matter (PM_{10}), Nitrogen Dioxide (NO_2), Carbon Monoxide (CO) and Ozone (O_3) for the selected air quality zone to determine the representative levels of such emissions for the Proposed Development.

The EPA has designated four Air Quality Zones for Ireland:

- Zone A: Dublin City and Environs
- Zone B: Cork City and Environs
- Zone C: 16 urban areas within 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 as described in the CAFE Directive. The Site lies within Zone D, which represents rural areas located away from large population centres.

10.1.6.2 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 October 2024[34]. The EPA reports provide SO_2, PM_{10}, NO_2 and O_3 concentrations for areas in Zone D. These are detailed in the Baseline Air Quality section.

10.1.6.3 Dust

The Institute of Air Quality Management in the UK (IAQM) guidance document '*Guidance on the Assessment of Dust from Demolition and Construction*' (2024)[35] was considered in the dust impact assessment. The guidance document 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 guidance (2024) to reflect their different potential impacts. These are:

- Demolition (There are no demolition works required for any phase of the Proposed Development);
- Earthworks;
- Construction;
- Trackout[36].

The magnitude of dust generating activities is divided into 'Large', 'Medium' or 'Small' scale depending on the nature of the activities involved. The magnitude of each activity is combined with the overall sensitivity of the area to determine the risk of dust impacts from site activities. IAQM (2024) guidance provides example definitions for the scale of the activities, and these are applied for this development as outlined in Table 10-5.

Table 10-5 Description of magnitude for nature of activities IAQM 2024 Guidance

	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

[34] *Environmental Protection Agency: Air Quality in Ireland 2022. Available at : https://www.epa.ie/publications/monitoring-assessment/air/air-quality-in-ireland 2022.php#:~:text=In%202022%20air%20monitoring%20results,threats%20to%20good%20air%20quality.*

[35] *Institute of Air Quality Management (IAQM). (2024). Guidance on the Assessment of Dust from Demolition and Construction. <https://iaqm.co.uk/wp-content/uploads/2013/02/Construction-Dust-Guidance-Jan-2024.pdf >*

[36] *The transport of dust and dirt from the construction / demolition 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) leave the construction / demolition site with dusty materials, which may then spill onto the road, and/or when HGVs transfer dust and dirt onto the road having travelled over muddy ground on site*

	Large	Medium	Small
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 >6m 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)
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 earthwork requirements as outlined in Appendix 4-2 of this EIAR, results in the classification of the Site as 'Medium' for Earthworks and Construction activities. 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 Site as 'Medium'.

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

10.1.6.3.1 *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 PM_{10}
- Sensitivities of Receptors to Ecological Effects

Sensitivities of People to Dust Soiling Effects

Dust soiling effects can occur for a distance of 250m from works areas, but the majority of deposition occurs within the first 50m (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 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

Sensitivities of People to the Health Effects of PM_{10}

When assessing sensitivity of people to the health effects of PM_{10}, 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 PM_{10} over a 24-hour period. Table 10-7 below identifies the sensitivity of an area to human health effects of PM_{10}, relative to different receptor sensitivities.

Table 10-7 Sensitivity of the Area to Human Health Impacts. 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	>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

Receptor Sensitivity	Annual Mean PM_{10} concentration	Number Of Receptors	Distance from source (m)			
			<20	<50	<100	<250
		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 are no sensitive habitats, as described by the IAQM (2024) guidance within 50m of the Proposed Development footprint. Therefore, dust impacts on ecological receptors in relation to the Proposed Development have been scoped out from this assessment.

10.1.6.3.2 *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 matrices in Table 10-9, Table 10-10 and Table 10-11 provide a method of assigning the level of risk for each activity.

Table 10-9 Risk of Dust Impacts - Earthworks (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

Table 10-10 Risk of Dust Impacts - Construction

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

Table 10-11 Risk of Dust Impacts - Trackout

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

EPA classification terminology as presented in Table 1-2 of Chapter 1 (Introduction) of this EIAR, have been correlated with the equivalent risk rating from Table 10-12 below.

Table 10-12 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	Medium

EPA Term	EPA Description	Risk Rating
	existing and emerging baseline trends	
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 Earthworks, Construction and Trackout activities from the Proposed Development is set out in Section 10.3 below.

10.2 Baseline Air Quality

The air quality in the vicinity of the Proposed Development is typical of that of rural areas 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 most recent report on air quality in Ireland, 'Air Quality in Ireland 2023' was published by the EPA in 2024. The EPA reports provide SO_2, PM_{10}, NO_2 and O_3 concentrations for areas in Zone D. These are detailed in the following tables.

10.2.1.1 Sulphur Dioxide

The Sulphur dioxide data from Cork Harbour, Kilkitt, Askeaton, Edenderry and Letterkenny in 2023 is presented in Table 10-13.

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

Parameter	Measurement
Annual Mean	4.3 µg/m^3
Hourly values > 350	0.0
Hourly max (Average)	80.9 µg/m^3
Daily values > 125	0
Daily max (Average)	23.2 µg/m^3

During the monitoring period there were no exceedances of the daily limit values for the protection of human health. As can be observed from Table 10-13 the average maximum hourly value recorded during the assessment period was 80.9 µg/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 Site are similar or lower than those recorded for the Zone D sites above.

10.2.1.2 Particulate Matter (PM_{10})

Sources of particulate matter include vehicle exhaust emissions, dust from soil and road surfaces, construction works and industrial emissions. The EPA report[37] provides annual mean PM_{10} concentration for sixteen Zone D towns, Tipperary Town, Carrick-on-Shannon/Askeaton, Enniscorthy,

[37] *EPA (2024). Air Quality in Ireland 2023.*

Birr, Macroom, Castlebar, Cobh Carrignafoy, Claremorris, Kilkitt, Cavan, Roscommon Town, Edenderry, Mallow, Longford and Cobh Cork Harbour and Killarney Particulate matter (PM_{10}) data for 2023 is presented in Table 10-14.

Table 10-14 Average Particulate Matter (PM_{10}) Data for Zone D Sites in 2023

Parameter	Measurement
Annual Mean	11.0 µg/m^3
% Data Capture (Average)	90.8%
Values > 50 ug/m^3	Max 6 (Edenderry)
Daily Max (Average)	45.4 µg/m^3

The daily limit of 50 µg/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 µg/m^3 applicable from 2005. The greatest number of exceedances occurred at Edenderry where the PM_{10} daily limit was exceeded on 6 no. occasions. In the EPA 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 Proposed Development is similar or lower than those recorded for the Zone D sites above.

10.2.1.3 Nitrogen Dioxide (NO_2)

Nitrogen dioxide data for Birr, Castlebar, Carrick-on-Shannon, Edenderry, Emo Court and Kilkitt in 2023 is presented in Table 10-15.

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

Parameter	Measurement
Annual Mean (Average)	8.1 µg/m^3
NO_2 Values >200	0
Values > 140 (UAT)	0
Values >100 (LAT)	4
Hourly Max. (Average)	67.6 µg/m^3

The annual NO_2 value was below the annual mean limit value for the protection of human health of 40 µg/m^3. The lower assessment threshold of 100 µg/m3 was exceeded 4 no. times during the monitoring period in Emo Court, Co. Laois and the upper assessment threshold of 140 µg/m^3 was exceeded once during the monitoring period, also in Emo Court, Co. Laois. Both did not exceed the 18days limit during the monitoring period. In 2023, no other monitoring locations in Zone D had exceedances in the lower and upper assessment thresholds of 100 and 140 µg/m^3. The average hourly max. NO_2 value of 67.6 µg/m^3 measured during the monitoring period was below the hourly max threshold of 200 µg/m^3. It is expected based on professional judgement that NO_2 values at the Site is similar or lower than those recorded for the Zone D sites above.

10.2.1.4 Carbon Monoxide (CO)

The EPA Report provides rolling 8-hour carbon monoxide concentrations for Birr, a Zone D site. Carbon Monoxide data for 2023 is presented in Table 10-16.

Table 10-16 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 µg/m^3 (or 10 mg/m^3). On no occasions were values in excess of the 10 mg limit value set out in Directive 2008/50/EC. It is expected based on professional judgement that the CO value at the Site is similar or lower than those recorded for the Zone D site above.

10.2.1.5 Ozone (O_3)

The EPA report provides rolling 8-hour ozone concentrations for seven Zone D sites, Emo Court, Kilkitt, Carnsore Point, Mace Head, Castlebar, Valentia and Malin Head. Ozone (O_3) data for 2023 is presented in Table 10-17. As can be observed from Table 10-17 there were 10 no. exceedances of the maximum daily eight-hour mean limit of 120 µg/m^3. The CAFE Directive stipulates that this limit should not be exceeded on more than 25 days per calendar year averaged over 3 years. It would be expected on professional judgement that O_3 values at the Site would be similar or lower than those recorded for the Zone D sites below.

Table 10-17 Average Ozone Data for Zone D Sites in 2023.

Parameter	Measurement
Annual Mean	61.5µg/m^3
Median	72.8 µg/m3
% Data Capture	95.5%
No. of days > 120 µg/m^3	10 days

10.2.1.6 Dust

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

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 10.3 below.

10.3 Likely and Significant Impacts and Associated Mitigation Measures

10.3.1 'Do-Nothing' Effect

If the Proposed Development were not to proceed, the Site will continue to function as it does at present, with no changes to the current land-use and air quality. The impact of this is considered neutral in the context of the EIAR. If the Proposed Development were not to proceed, there would be no potential for negative effects on human health during the construction phase of the Proposed Development related to potential emissions to air of dust. However, the opportunity to utilise existing infrastructure and capture an even greater part of County Cork's valuable renewable energy resource would be lost, as would the opportunity to further contribute to meeting Government and EU targets for the production and consumption of electricity from renewable resources and the reduction of greenhouse gas emissions.

10.3.2 Construction Phase

10.3.2.1 Exhaust Emissions

Pre-Mitigation Impact

Exhaust emissions associated with vehicles and plant such as NO_2, Benzene and PM_{10} will arise as a result of construction activities.

The construction of turbines and associated foundations and hardstanding areas, meteorological mast, access roads, temporary construction compound, site drainage, felling, and all ancillary works and apparatus, will require the operation of construction vehicles. This constitutes a short-term, slight, negative effect in terms of air quality. Mitigation measures in relation to exhaust emissions are presented below.

The proposed borrow pit located in the townland of Curraglass will require the use of construction machinery and plant, thereby giving rise to exhaust emissions. The borrow pit location is approx. 1.3km from the nearest sensitive receptor. The potential effect from exhaust emissions will not be significant and will be restricted to the duration of the construction phase and localised to works areas. Therefore, this is considered a short-term, slight, negative effect. Mitigation measures to reduce this effect are presented below.

The construction of the peat and spoil management areas will require the use of construction machinery and plant, thereby giving rise to exhaust emissions. Therefore, this is considered a short-term, slight, negative effect. Mitigation measures to reduce this effect are presented below.

The construction of the turbine component turning area will require the use of construction machinery and plant, thereby giving rise to exhaust emissions. Therefore, this is considered a short-term, slight, negative effect. Mitigation measures to reduce this effect are presented below.

Transport to and from Site

The transport of turbine components, construction materials, waste and workers to and from the Site, (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.

Mitigation & Monitoring Measures for the Proposed Development

- Proposed Development construction staff will be trained how to inspect and maintain construction vehicles and plant to ensure good operational order while onsite, thereby minimising any emissions that arise. The Site Supervisor/Construction Manager produce and follow a site inspection and machinery checklist which will be followed and updated if/when required.
- All plant and materials vehicles shall be stored in dedicated areas (onsite). Machinery will be switched off when not in use.
- Turbines and construction materials will be transported to the Site on specified routes only, unless otherwise agreed with the Planning Authority. Please see Chapter 15 (Material Assets) for details.
- All plant and materials vehicles shall be stored in dedicated areas (onsite).
- Areas of excavation will be kept to a minimum, and stockpiling will be minimised by coordinating excavation, spreading and compaction.
- The expected waste volumes generated onsite are unlikely to be large enough to warrant source segregation at the Site. Therefore, all wastes streams generated onsite will be deposited into a single waste skip which will be covered. This 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.
- Aggregate materials for the construction of the Proposed Development infrastructure will be predominantly sourced onsite.
- A Construction and Environmental Management Plan (CEMP) will be in place throughout the construction phase (see Appendix 4-3).

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 and is not significant.

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 Development.

10.3.2.2 Dust Emissions

Pre-Mitigation Impact

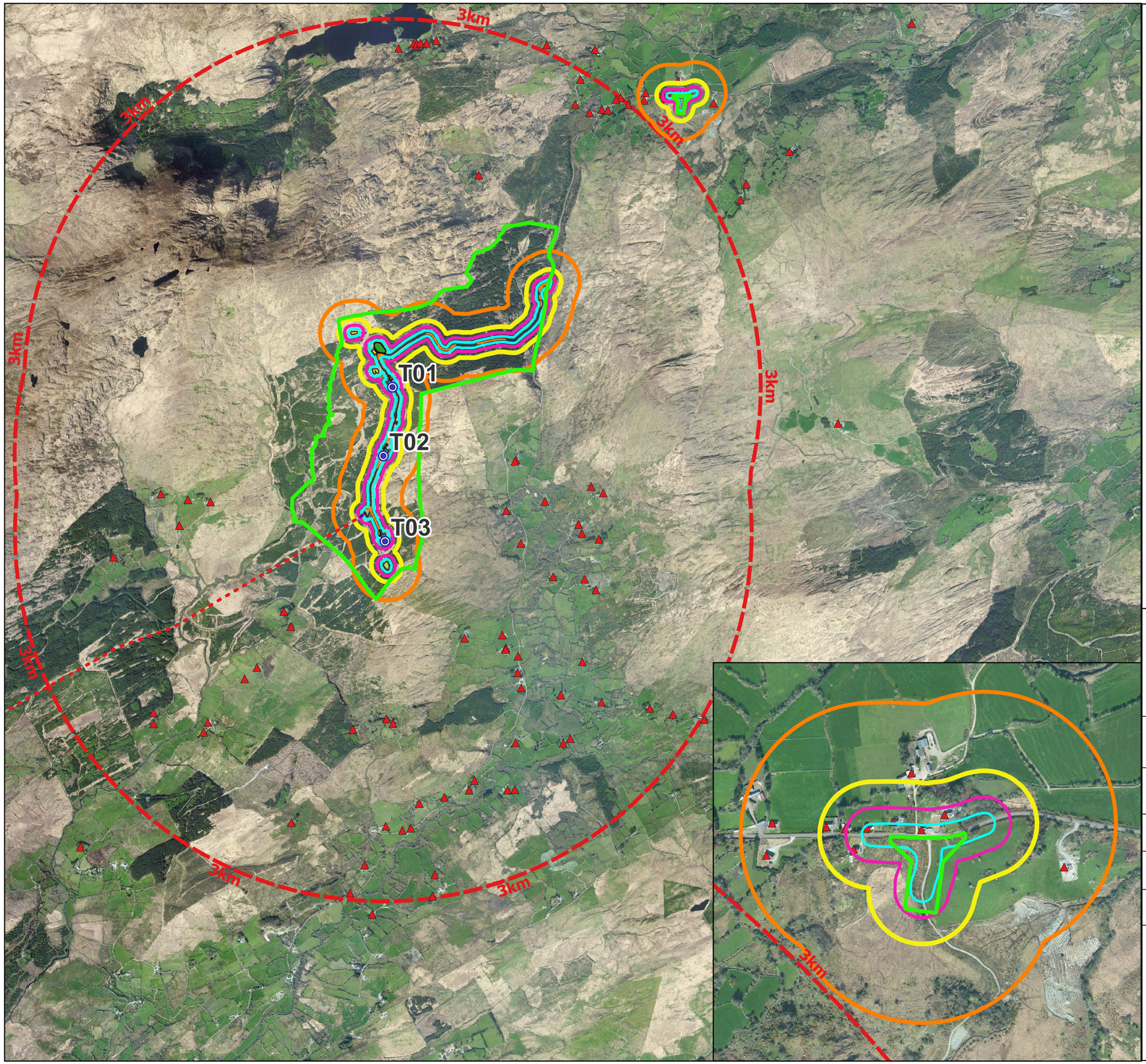
The construction of turbines and associated foundations and hard-standing areas, meteorological mast, access roads, temporary construction compound, site drainage, tree felling, and all ancillary works and apparatus will give rise to dust emissions.

All the construction materials for the Proposed Development will be won onsite from the borrow pit where the estimated quantity of available rock within the borrow pit is 30,000m^3. The removal of peat

and topsoil followed by its transportation and deposition at the peat and spoil management areas during the construction phase will give rise to dust emissions.

The IAQM (2024) methodology for *the Assessment of Dust from Demolition and Construction* as discussed in Section 10.1.6.3 above is used to assess the potential risk to high sensitivity receptors from dust deposition. Dust deposition impacts can occur for a distance of 250m from works areas, but the majority of deposition occurs within the first 50m (IAQM, 2024). The high sensitivity receptors were identified using a constraints mapping process, and detailed and updated planning searches which informed the project sensitive receptor dataset.

- There are 2 no. High Sensitive Properties, 1 of which is a Participating Property, within 20m of the Proposed Development footprint;
- There are 3 no. High Sensitive Properties within 50m of the Proposed Development footprint;
- There are 2 no. High Sensitive Properties, 1 no. of which is a Participating Property, within 100m of the Proposed Development footprint
- There are 4 no. High Sensitive Properties within 250m of the Proposed Development footprint.



Map Legend

- EIAR Site Boundary
- Dwellings

IAQM Air Quality Bands

- 20m dust receptor buffer IAQM Band
- 50m dust receptor buffer IAQM Band
- 100m dust receptor buffer IAQM Band
- 250m dust receptor buffer IAQM Band

Drawing Title

IAQM Sensitive Dust Receptors

Project Title

Curraglass Wind Farm Co. Cork

Drawn By	Checked By
NM	SC
Project No.	**Drawing No.**
240614	Figure 10-2
Scale	**Date**
1:30,000	2025-07-24

MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email:info@mkoireland.ie
Website: ww.mkoireland.ie

Table 10-18 below identifies the sensitivity of the area surrounding the development footprint of the Proposed Development to dust soiling effects, as described in Section 10.1.6.3 above. The overall sensitivity of the area to dust soiling impacts is considered to be Low. For the construction phase of the Proposed Development, the potential impact from dust emissions is considered to be a short term, slight, negative effect, which is not significant.

Table 10-18 Sensitivity of the Area to Dust Soiling Effects 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 10-19 below identifies the high sensitivity receptors in the area surrounding the development footprint of the Proposed Development to the health effects of PM_{10}, as described in Section 10.1.6.3.1 above. The annual mean PM_{10} concentration of Zone D in Ireland is 11 µg/m^3. The overall sensitivity of the area to human health effects of PM_{10} is considered to be Low.

Table 10-19 Sensitivity of the Area to Human Health Impacts from the Proposed Development 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 10.1.6.3 above, the Proposed Development is classified as 'Medium' for Earthworks, Construction and Trackout activities. Therefore, when combined with the sensitivity of the area, using Tables 10-6 to 10-8 above as guidance, the pre-mitigation risk of impacts from the Proposed Development is summarised in Table 10-20 below.

Table 10-20 Summary Dust Risk Table for Proposed Development Activities

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

The overall risk of dust emissions impacts with no mitigation applied for the major dust generating activities during the construction phase of the Proposed Development is Low. Therefore, the potential effects of dust from the construction phase of the Proposed Development are considered to be equivalent to short-term, slight negative effects and not significant.

Please note that the assessment of the potential impact of dust on the ecological receptors included in this assessment (i.e. the Conigar Bog NHA, Article 17 Habitats – Active Blanket Bog , Alpine and Subalpine Heath , Wet Heath , Dry Heath) follows the methodology set out in the IAQM 2024 guidance. However, a more detailed ecological impact assessment assessing impacts on these receptors during the construction phase (including effects from dust) is contained in Chapter 6 (Biodiversity) of this EIAR.

Mitigation & Monitoring Measures for the Proposed Development

- Sporadic 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 may be necessary along haul roads to ensure dust does not cause a nuisance. Water bowser movements will be carefully monitored to avoid, insofar as reasonably possible, increased runoff.
- All plant and materials vehicles shall be stored in dedicated areas within the Site.
- 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 Site on specified haul routes only.
- The agreed haul route road adjacent to the Site will be regularly inspected for cleanliness and cleaned as necessary.
- The roads adjacent to the Site entrances will be checked weekly for damage/potholes and repaired as necessary.
- The transportation of materials from the borrow pit around the Site will be covered by tarpaulin or similar covered vehicles where necessary.
- The transportation of construction materials from locally sourced quarries for the Proposed Development to the Site will be covered by tarpaulin where necessary.
- If necessary, excavated material will be dampened prior to transport to the peat and spoil management areas.
- 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 Proposed Development to reduce the amount of emissions associated with vehicle movement.
- A Construction and Environmental Management Plan (CEMP) will be in place throughout the construction phase (see Appendix 4-3). The CEMP includes dust suppression measures.

Residual Effect

With the implementation of the above, the Proposed Development is considered to have a short-term not significant 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 will be not significant for the Wind Farm Site.

10.3.3 Operational Phase

10.3.3.1 Exhaust Emissions

Exhaust emissions associated with the operational phase of the Proposed Development will arise from machinery and vehicles that are intermittently required onsite for maintenance. This will give rise to a Long-term, Not Significant, Negative effect due to the localised and intermittent nature of the maintenance.

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 be required to turn off engines.

Residual Effect

Long-term Imperceptible Negative effect and not significant.

Significance of Effects

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

10.3.3.2 Air Quality

The Proposed Development, by providing an alternative to electricity derived from coal, oil or gas-fired power stations, will result in emission savings of carbon dioxide (CO_2), oxides of nitrogen (NO_x), and sulphur dioxide (SO_2). The production of renewable energy from the Proposed Development will have a Long-term, Moderate, Positive effect on air quality, and thus not requiring mitigation. Further details on the carbon dioxide savings associated with the Proposed Development are presented in Section 11.3.4 of Chapter 11 (Climate) within this EIAR.

Residual Effect

Long-term Moderate Positive impact due to the offsetting of approximately 9,535 tonnes of Carbon Dioxide per annum and the Proposed Development will not directly emit carbon dioxide (CO_2), oxides of nitrogen (NO_x), or sulphur dioxide (SO_2).

Significance of Effects

Based on the assessment above there will be a positive effect on air quality due to the operation of the Proposed Development and is not significant.

10.3.3.3 Human Health

Whilst the operational phases of the Proposed Development may give rise to minor increases in dust and vehicle emissions, the implementation of the mitigation measures discussed above in Section 10.3.2.1 and Section 10.3.2.2, and good management practices can prevent or minimise potential effects off-site. Good management practice consists of good site design and layout, adopting appropriate working methods, choosing the right equipment, ensuring that the workforce understands the company's responsibilities and is familiar with good working practice and dust suppression techniques. The potential for health effects are considered negligible as the potential for both exhaust and dust emissions will be limited and controlled through site layout design and mitigation measures.

Exposure to chemicals such as SO_2 and NO_x are known to be harmful to human health. The production of clean renewable energy from the Proposed Development 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 Development on Human Health is contained in Chapter 5 (Population & Human Health).

Residual Effect

Long-term Slight Positive effect and not significant.

Significance of Effects

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

10.3.4 Decommissioning Phase

The Proposed Development is seeking permission for an operational life of 35 years from commissioning of the wind farm. Wind turbines are expected to have a lifespan of approximately 30-35 years. Following the end of their life, the wind turbines may be replaced or upgraded subject to planning permission being obtained, or the turbines may be decommissioned fully.

A Decommissioning Plan is included as Appendix 4-6 of this EIAR for the decommissioning of the Proposed Development, the detail of which will be agreed with the local 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 effect. The mitigation measures prescribed for the construction phase of the Proposed Development will be implemented during the decommissioning phase thereby minimising any potential effects. The potential for effects during the decommissioning phase of the Proposed Development has been fully assessed within this EIAR.

10.3.5 Cumulative Effects

The potential for impact between the Proposed Development, and other relevant developments has been carried out with the purpose of identifying what influence the Proposed Development will have on the surrounding environment when considered cumulatively and in combination with relevant existing permitted or proposed developments and plans in the vicinity of the Site, such as other wind energy developments, grid infrastructure, extractive industries, battery energy storage systems, forestry

etc. Please see Section 2.8 of Chapter 2 (Background to the Proposed Development) for the cumulative assessment methodology used.

During the construction phase of the Proposed Development and the construction of other permitted or proposed developments and plans in the area (please see Section 2.8 in Chapter 2 (Background to the Proposed Development) 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 Development, there will be no cumulative negative effect on air quality.

Exhaust and dust emissions during the operational phase of the Proposed Development 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 Development 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 and it is not significant.

10.3.5.1 Construction Phase

Air Quality

During the construction phase of the Proposed Development, and other permitted or proposed projects and plans in the area, there will be minor exhaust emissions from construction plant and machinery and potential dust emissions associated with the construction activities. However, once the mitigation proposals, as outlined in Sections 10.3.2.1 to 10.3.2.2 are implemented during the construction phase of the Proposed Development, there will be no cumulative negative effect on air quality.

As established in section 10.3.2, there are short-term, imperceptible to slight, negative effects on air quality during the construction phase from:

- Exhaust emissions arising from the construction of Proposed Development
- Dust Emissions arising from the construction of Proposed Development infrastructure.

Therefore, it is considered here will be no cumulative effects on air quality, should other proposed or consented plans and projects within the surrounding landscape be constructed in parallel with the Proposed Development.

10.3.5.2 Operational Phase

Air Quality

There will be no net carbon dioxide (CO_2) emissions from the operation of the Proposed Development. Exhaust emissions of carbon dioxide (CO_2), oxides of nitrogen (NO_x), sulphur dioxide (SO_2) or dust emissions during the operational phase of the Proposed Development will be minimal, relating to the use of operation and maintenance vehicles onsite, and therefore there will be no measurable negative cumulative effect with other developments on air quality.

As established above in section 10.3.3, there will be a long-term imperceptible negative effect on air quality due to:

- Exhaust and dust emissions from maintenance LGV vehicles visiting the Site daily for site inspections; and,

- Increased exhaust and dust emissions on occasion due to more frequent LGV and HGV visits during component or substation infrastructure replacement.

It is similarly established in section 10.3.3 that there will be an overall long-term moderate positive effect on air quality given:

- There will be no net carbon dioxide (CO_2) emissions from operation of the Proposed Development. By providing an alternative to electricity derived from coal, oil or gas-fired power stations, the Proposed Development will result in emission savings of carbon dioxide (CO_2), oxides of nitrogen (NO_x), and sulphur dioxide (SO_2).
- The production of renewable energy from the Proposed Development will have a Long-Term Moderate Positive effect on air quality due to the offsetting of approximately 9,535 tonnes of Carbon Dioxide (CO_2) per annum, or 333,725 tonnes of carbon dioxide over the proposed 35-year lifecycle of the Proposed Development.

It is therefore considered there will be no measurable negative cumulative effects on air quality should other proposed or consented plans and within the surrounding landscape be operational in parallel with the Proposed Development. However, once the Proposed Development is operational, there will be a long-term, moderate, positive impact on the air quality and is not significant.

10.3.5.3 Decommissioning Phase

The works required during the decommissioning phase are described in Section 4.11 in Chapter 4 (Description of the Proposed Development). Any cumulative impact and consequential effect that occurs during the decommissioning phase are similar to that which occur during the construction phase, be it of less impact. The mitigation measures prescribed for the construction phase of the Proposed Development will be implemented during the decommissioning phase thereby minimising any potential cumulative effects.

10.3.5.4 Summary

The cumulative air quality assessment for the Proposed Development indicates that, when considered alongside other existing or planned developments in the area, there will be no significant negative cumulative impacts on air quality across all project phases. While minor exhaust and dust emissions are anticipated from construction activities, the implementation of mitigation measures detailed in Sections 10.3.2.1 and 10.3.2.2 will effectively minimize these impacts. Consequently, no significant cumulative negative effects on air quality are expected during this phase. During the operational phase, minimal emissions may arise from maintenance activities involving light and heavy goods vehicles; however, these are considered negligible. Activities during decommissioning are expected to be similar to or less impactful than those during construction. The application of previously outlined mitigation measures will ensure that any potential cumulative effects on air quality remain insignificant. Notably, the project will offset approximately 9,535 tonnes of CO_2 annually, totalling over 333,725 tonnes over its 35-year lifespan. This substantial reduction in carbon emissions contributes to a long-term, moderate positive effect on air quality, with no measurable negative cumulative effects anticipated when combined with other developments. Overall, the Proposed Development is projected to have a net positive cumulative impact on air quality, aligning with regional and national environmental objectives.