10. AIR QUALITY

10.1 Introduction

This chapter identifies, describes and assessed 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 can be found in Chapter 4 of this EIAR.

10.1.1 Background

The site of the Proposed Development is located at the Existing Kilgarvan Wind Farm at Inchee, Inchincoosh and Lettercannon, Kilgarvan, Co. Kerry, approximately 5.5km northeast of the village of Kilgarvan, Co. Kerry and approximately 6km west of Coolea, Co. Cork. The townlands in which the Proposed Development is located within are listed in Table 1-1 in Chapter 1 of this EIAR. The primary land uses within and in the vicinity of the Proposed Development site are wind energy, commercial forestry, and low-intensity agriculture. Due to the non-industrial nature of the Proposed Development (i.e. wind farms are not known emissions producers) and the general character of the surrounding environment, air quality sampling was deemed to be unnecessary for the EIAR. It is expected that 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 emissions as is expected from coal or oil-based power stations. Harnessing more energy by means of renewable sources will reduce dependency on oil, gas and coal power stations, thereby resulting in a reduction in harmful emissions that can be damaging to human health and the environment. Some minor indirect emissions associated with the construction of the Proposed Development include vehicular and dust emissions.

10.1.2 Statement of Authority

This section of the EIAR has been prepared by Niamh McHugh and reviewed by Órla Murphy of MKO. Niamh is an Environmental Scientist who has been working with MKO since June 2021. Niamh possesses a BSc (Hons) in Environmental Science from the National University of Ireland, Galway. Niamh has been involved in the compilation and production of a number of EIARs, mainly in the field of Renewables. The chapter has been reviewed by Órla Murphy and Sean Creedon of MKO. Órla is a Senior Environmental Scientist with over 8 years' experience in the environmental sector where she has acted as Project Manager for a number of EIAR applications for wind energy developments, compiling numerous EIAR chapters including chapters on Population and Human Health. Órla holds a BSc. in Geography and MSc. in Environmental Protection and Management.

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 Specified Infrastructure Projects – Overarching Technical Document PE-ENV-01106 (Transport Infrastructure Ireland, December 2022)
- 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)

- Environmental Protection Agency (2023) Air Quality in Ireland Report 2022.
- Environmental Protection Agency (2021) Best Practice Guidelines on the Preparation of Resource and Waste Management Plans for Construction & Demolition Projects.
- European Environment Agency (2022) Air Quality in Europe 2022
- Guidance on the Assessment of Dust from Demolition and Construction V2.2 (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 Road Schemes (TII, 2009)
- Rialtas na Éireann Clean Air Strategy for Ireland (April 2023)
- UK Department of Environment Food and Rural Affairs (DEFRA) Part IV of the Environment Act 1995: Local Air Quality Management, (LAQM) (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 Sulphur Dioxide Global Update 2005 (WHO 2005).

10.2 Overview of Air Quality

10.2.1 Relevant Legislation

In 1996, the Air Quality Framework Directive (on ambient air quality assessment and management) (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. 22 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).
- A 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 (SI No. 53 of 2004).
- The fourth Daughter Directive (2004/107/EC), 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) 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 Air Quality Framework Directive and the first three Daughter Directives have 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 particulate matter less than 2.5 micrometres (µm), referred to as PM2.5, 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 less than 10µm (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 (µg/m^3) and parts per billion (ppb). The notation PM_{10} is used to describe particulate matter or particles of 10µm or less (coarse particle) in aerodynamic diameter. $PM_{2.5}$ represents particles measuring less than 2.5µm (fine particles) 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).

10.2.2 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)

Pollutant	Limit Value Objective	Averaging Period	Limit Value (µg/m3)	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	1st 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	1st Jan 2005
Sulphur dioxide (SO_2)	Protection of vegetation	Calendar year	20	7.5	Annual mean	19th Jul 2001

Pollutant	Limit Value Objective	Averaging Period	Limit Value (µg/m3)	Limit Value (ppb)	Basis of Application of Limit Value	Attainment Date
Sulphur dioxide (SO_2)	Protection of vegetation	1st Oct to 31st Mar	20	7.5	Winter mean	19th 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	1st Jan 2010
Nitrogen dioxide (NO_2)	Protection of human health	Calendar year	40	21	Annual mean	1st Jan 2010
Nitrogen monoxide (NO) and nitrogen dioxide (NO_2)	Protection of vegetation	Calendar year	30	16	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 (Pb)	Protection of human health	Calendar year	0.5	-	Annual mean	1st Jan 2005
Carbon Monoxide (CO)	Protection of human health	8 hours	10,000	8,620	Not to be exceeded	1st Jan 2005

Pollutant	Limit Value Objective	Averaging Period	Limit Value (µg/m3)	Limit Value (ppb)	Basis of Application of Limit Value	Attainment Date
Benzene (C_6H_6)	Protection of human health	Calendar Year	5	1.5	Annual mean	1st Jan 2010

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

Pollutant	Limit Value Objective	Averaging Period	Limit Value (µg/m3)	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	-

Pollutant	Limit Value Objective	Averaging Period	Limit Value (µg/m3)	Basis of Application of Limit Value
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. 3 presents the target values and long-term target values for ozone and Table 10-3 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 Target Value from 2020
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

*AOT_{40} is a measure of the overall exposure of plants to ozone. It is the sum of the excess hourly concentrations greater than 80 g/m^3 and is expressed as g/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

On the 26th of October 2022 the EU Commission announced a proposed review of Air Quality Standards.[1] 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

[1] *European Commission, Revision of the Ambient Air Quality Directives.* <https://environment.ec.europa.eu/topics/air/air-quality/revision-ambient-air-quality-directives_en>

10.2.2.1 Air Quality and Health

In September 2023 the EPA published '*Air Quality in Ireland 2022*[2] which reports that although air quality in Ireland is generally good and on track to meet the majority of 2030 EU Commitments for national emission levels, there are concerning localised issues. Fine particulate matter ($PM_{2.5}$) from solid fuel combustion and nitrogen dioxide (NO_2) from vehicle emissions are the main pollutants. People's health and the health of our environment is impacted by these pollutants. Ireland's ambition in the 'Clean Air Strategy for Ireland' (Section 10.1.3.2.1 below) is to move towards alignment with the WHO Air Quality guidelines, this will be challenging but will have a significantly positive impact on health.

The European Environmental Agency (EEA) Report, '*Air Quality in Europe 2022*[3] 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 2021. 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 exceed in 75% of the total ecosystems are in the EU-27. This represents a fall of 12% since 2005.

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*.'[4] 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 (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. As stated above, air pollution is responsible for a large number of premature deaths relating to these illnesses.

The EEA published a briefing[5] on Europe's air quality status in April 2023. This briefing presented the status of concentrations of pollution in ambient air in 2021 and 2022 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. Full validated data on air quality in Europe in 2022 will only be available later in 2023 and presented in the 2024 briefing.

These emissions, including sulphur oxides, carbon monoxide, benzene and lead are produced during fossil fuel-based electricity generation and traffic in various amounts, depending on the fuel and technology used. Whilst there is the potential of such emissions to be generated from site operations throughout the construction, operation and decommissioning of the Proposed Development, mitigation measures will be implemented at the Proposed Development, to reduce the impact from dust and vehicle emissions, which are discussed in Section 10.2.2.2 below.

The EPA 2020 report '*Ireland's Environment – An Integrated Assessment*[6] states that across Europe, the most problematic pollutants have consistently been particulate matter, nitrogen oxides and ozone. The EPA 2020 report goes on to state that:

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[2] *Air Quality in Ireland 2022* <https://www.epa.ie/publications/monitoring-assessment/air/air-quality-in-ireland-2022.php#:~:text=Circular%20Economy-,Air%20quality%20in%20Ireland%202022,on%20the%20air%20we%20breathe.>
[3] *Air Quality in Europe 2022* <https://www.eea.europa.eu/publications/air-quality-in-europe-2022>
[4] *Office of Energy Efficiency and Renewable Energy (2023) How Wind Can Help Us Breathe Easier*
[5] *Europe's air quality status 2023 briefing.* <https://www.eea.europa.eu/publications/europes-air-quality-status-2023>
[6] *Ireland's Environment – An Integrated Assessment (2020)* <https://www.epa.ie/our-services/monitoring-assessment/assessment/irelands-environment/state-of-environment-report-/>

"Ireland has excellent indigenous renewable energy resources, and renewable energy is playing an increasing role in the domestic energy supply. Ireland has more onshore (land-based) and offshore energy potential than most other European countries.

The use of renewable energy reduces or eliminates generation losses, which are significant for combustion related generation. Reducing these losses also contributes to meeting energy targets and decarbonisation. Overall, reducing the loss and waste of energy has multiple ***benefits for the climate and human health and wellbeing****."*

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 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.

10.2.2.1.1 Clean Air Strategy for Ireland 2023

Ireland's Clean Air Strategy 2023[7] 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, 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.

[7] *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.*

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 (reaffirmed 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. The targets of the Climate Action Plan 2024 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. For further details on greenhouse gas emissions please refer to Chapter 11 of this EIAR.

10.2.3 Methodology

The assessment of the development footprint of the Proposed Development site, within this EIAR Chapter, is based on the maximum potential footprint for all of the infrastructural elements. This precautionary approach is taken as the assessment of the maximum development footprint will, in the absence of mitigation measures, give rise to the greatest potential for significant effects. Should the development footprint be less than the maximum, the potential for significant effects will also be reduced.

10.2.4 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 Environmental Protection Agency (EPA) has designated four Air Quality Zones for Ireland:

- Zone A: Dublin City and Environs
- Zone B: Cork City and Environs
- Zone C: other cities and large towns comprising Limerick, Galway, Waterford, Drogheda, Dundalk, Bray, Navan, Ennis, Tralee, Kilkenny, Carlow, Naas, Sligo, Newbridge, Mullingar, Wexford, Letterkenny, Athlone, Celbridge, Clonmel, Balbriggan, Greystones, Leixlip and Portlaoise.
- 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, Framework Directive and Daughter Directives. The site of the Proposed Development lies within Zone D, which represents rural areas located away from large population centres.

10.2.4.1 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 2022' was published by the EPA in 2023[8]. 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 below.

10.2.4.2 Dust

The Institute of Air Quality Management in the UK (IAQM) guidance document '*Guidance on the Assessment of Dust from Demolition and Construction*' (2024) 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 maintenance and monitoring 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 (There are no demolition works required for any phase of the Proposed Development)
- Earthworks.
- Construction.
- Trackout.

The magnitude of dust generating activities is divided into 'Large', 'Medium' or 'Small' scale depending on the nature of the activities involved. 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.

[8] *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.*

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)
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 Proposed Development as 'Large' 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 Proposed Development site as 'Large' 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

10.2.4.2.1 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 (2014) 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 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 receptors 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 10-7below 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 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

Sensitivities of Receptors to Ecological Effects

Dust deposition due to earthworks, construction and trackout has the potential to physically and chemically affect sensitive habitats and plant communities. Table 10-8 below identifies the sensitivity bands to be used when assessing ecological impacts from dust deposition.

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

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

There are no high sensitive receptors, as described by the IAQM (2024) guidance within 50m of the Proposed Development. Therefore, dust impacts on ecological receptors have been scoped out from this assessment.

10.2.4.2.2 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

The significance rating of environmental effects from the 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 10-9 to Table 10-11 above.

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 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 Earthworks, Construction and Trackout activities from the Proposed Development is summarised in Section 10.2.4 below.

10.2.5 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 2022' was published by the EPA in 2023. 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.

10.2.5.1 Sulphur Dioxide (SO_2)

The Sulphur dioxide data from Cork Harbour, Kilkitt, Shannon Estuary/Askeaton, Edenderry and Letterkenny in 2022 is presented in Table 10-13.

Table 10-13 Average Sulphur Dioxide Data for Zone D in 2022

Parameter	Measurement
Annual Mean	5.0 µg/m^3
Hourly values > 350	0.0
Hourly max	83.6 µg/m^3
Daily values > 125	0
Daily max	22.8

During the monitoring period there were no exceedances of the daily limit values of the protection of human health. As can be observed from Table 10-13, the average maximum hourly value recorded during their assessment period was 83.6 µg/m^3. In addition, there were no exceedances of the usual annual mean limit for the protection of ecosystems. It would be expected that SO_2 values at the site would be similar or lower than those recorded for the Zone D sites above.

10.2.5.2 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 provides annual mean PM_{10} concentration for sixteen Zone D towns; Tipperary town, Carrick-on-Shannon, Enniscorthy, Birr, Askeaton, Macroom, Castlebar, Cobh Carrignafoy, Claremorris, Kilkitt, Cavan, Edenderry, Mallow, Longford, Cobh Cork Harbour, Killarney and Roscommon town. Particulate matter (PM_{10}) data for 2022 is presented in Table 10-14.

Table 10-14 Average Particulate Matter (PM_{10}) Data for Zone D Sites in 2022

Parameter	Measurement
Annual Mean	12.7 µg/m^3
% Data Capture	93.2%
Values > 50 ug/m3	Max 10
Daily Max	56.5 µg/m^3

The daily limit of 50 µg/m3 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/m3 applicable from 2005. It would be expected that PM_1 values at the site would be similar to or lower than those recorded for the Zone D sites above. The greatest number of exceedances occurred at Edenderry where the PM10 daily limit was exceeded on 10 occasions. In the EPA 2022 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 site would be similar or lower than those recorded for the Zone D sites above.

10.2.5.3 Nitrogen Dioxide (NO_2)

Nitrogen dioxide data for Birr, Castlebar, Carrick-on-Shannon, Edenderry, Emo Court and Kilkitt in 2022 is presented in Table 10-15.

Table 10-15 Average Nitrogen Dioxide Data for Zone D Sites in 2022

Parameter	Measurement
Annual Mean	7.4 µg/m^3
NO2 Values >200	0
Values > 140 (UAT)	1
Values >100 (LAT)	4
Hourly Max.	87.3 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/m3 was exceeded once during the monitoring period, also in Emo Court, Co. Laois. Both did not exceed the 18 days limit during the monitoring period. In 2022, no other monitoring locations in Zone D had exceedances in the lower and upper assessment thresholds of 100 and 140 µg/m3/. The average hourly max. NO_2 value of 87.3 µg/m^3 measured during the monitoring period was below the hourly max threshold of 200 µg/m^3. It would be expected that NO_2 values at the site would be similar or lower than those recorded for the Zone D sites above.

10.2.5.4 Carbon Monoxide (CO)

The EPA Report provides rolling 8-hour carbon monoxide concentrations for Birr, a Zone D site. Carbon Monoxide data for 2022 is presented in Table 10-16.

Table 10-16 Carbon Monoxide Data for Birr – Zone D Site in 2022.

Parameter	Measurement
Annual Mean	0.8 mg/m^3
Median	0.7 mg/m^3
% Data Capture	95.9%
Values > 10	0
Max	3.4 mg/m^3

The average concentration of carbon monoxide was 0.8 mg/m^3. The carbon monoxide limit value for the protection of human health is 10,000 µg/m^3 (or 10mg/m^3). On no occasions were values in excess of the 10 mg limit value set out in Directives 2008/69/EC. It would be expected that CO values at the Proposed Development site would be similar or lower than those recorded for the Zone D site above.

10.2.5.5 Ozone (O_3)

The EPA 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 (O_3) data for 2022 is presented in Table 10-17. As can be observed there were 17 no. exceedances of the maximum daily eight-hour mean limit of 120 µg/m^3. The CAFÉ Directive stipulates that this limit should not be exceeded on more than 25 days per Calendar year, averaged over 3 years.

Table 10-17 Average Ozone Data for Zone D Sites in 2022.

Parameter	Measurement
Annual Mean	61.7µg/m^3
Median	62.2 µg/m^3
% Data Capture	89.5%
No. of days > 120	17 days

10.2.5.6 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 10.2.4 below

10.3 Likely and Significant Effects and Associated Mitigation Measures

The likely effects on the Air Quality are assessed using the criteria as set out in the *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports* (EPA, May 2022) and described in section 1.7 of Chapter 1

10.3.1.1 'Do-Nothing' Effect

If the Proposed Development 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 Development. This would result in an indirect, slight, negative impact on air quality nationally.

10.3.1.2 Construction Phase

10.3.1.2.1 *Exhaust Emissions: Removal of existing infrastructure and construction of new infrastructure*

Identification of Effect

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

The removal of the Existing Kilgarvan Wind Farm turbines and construction of the proposed turbines and associated foundations and hardstanding areas, meteorological mast, access roads, temporary construction compounds, underground cabling, site drainage, spoil management areas , forestry felling, and all ancillary works and apparatus, will require the operation of construction vehicles and plant on and off-site, and the transport of workers to and from the site, thereby giving rise to exhaust emissions. Therefore, this is considered a short-term slight, negative impact on air quality.

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 (on-site). 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 (on-site).
- 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 will be local to the site to reduce the emissions associated with vehicle movements. There are several licenced waste treatment facilities located outside of Killarney and Kenmare, approximately 14.2km northwest and 16km southwest respectively of the site.
- 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).

Residential Effect

With the implementation of the above measures for this phase construction phase, residual impacts on air quality from exhaust emissions associated with construction activities and machinery are considered to be a short-term imperceptible negative impact.

Significance of Effects

The effects on air quality from exhaust emissions during the construction phase of the Proposed Development are considered to be imperceptible.

10.3.1.3 Exhaust Emissions: Transportation to and from the site

Identification of Effect

The removal of the Existing Kilgarvan Wind Farm turbines and transport of proposed turbine components, supporting infrastructure materials, construction and staff vehicles, small volume of aggregate material, and waste removal vehicles to and from the site (which will occur on specified routes only, see in Chapter 4 Description of this EIAR), the departure of empty vehicles and/or minor waste volumes (please see accompanying CEMP Appendix 4-3) from the site and daily staff movements, will give rise to exhaust emissions associated with the transport vehicles.

Mitigation and Monitoring Measures for the Proposed Development

- Measures listed in Section 10.3.1.2.1 above pertaining to exhaust emissions will be implemented for the transportation of vehicles to and from the site.
- Aggregate materials for the construction of site access tracks and all associated infrastructure will all be locally sourced, where possible, which will further reduce potential emissions.
- Turbines and construction materials will be transported to the site on specified haul routes only.
- 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 amount of emissions associated with vehicle movements.
- A Construction and Environmental Management Plan (CEMP) will be in place throughout the construction phase (see Appendix 4-3).

Residual Effect

This constitutes a short term slight negative impact on air quality brought about by the exhaust emissions associated with the traffic movements to and from the site.

Significance of Effects

Based on this assessment there will be a slight significant effect on air quality from exhaust emissions due to traffic movements to and from the site.

10.3.1.4 Dust Emissions: Construction of Proposed Development Infrastructure

Identification of Effect

The removal of the Existing Kilgarvan Wind Farm turbines and construction of proposed turbines and associated foundations and hard-standing areas, Meteorological Mast, Access Roads, Temporary Construction Compounds, Underground Cabling, Site Drainage, Forestry Felling, and all ancillary works and apparatus will give rise to dust emissions.

All construction materials for the Proposed Development will be sourced on site or imported to the site from local quarry facilities.

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.

This is considered a short-term, slight, negative impact on air quality.

The IAQM methodology for *the Assessment of Dust from Demolition and Construction* as discussed in section 10.2.4.2 is used to predict the likely risk of dust impacts as a result of the construction works. 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). As discussed in Section 10.2.4.2.1, Sensitive Properties were derived from the constraint's identification and mapping process, and a detailed and updated planning search which informed the sensitive property dataset. The sensitive receptors located within the appropriate distance from potential dust emission sources, provided by the 2024 IAQM Guidance, are detailed below.

- There are no sensitive receptors within 20m of the Proposed Development;
- There is 1 no sensitive receptor located within 50m of the Proposed Development;
- There is 1 no sensitive receptor located within 100m of the Proposed Development;
- There are 2 no. sensitive receptors located within 250m of the Proposed Development; where construction works with the potential to generate dust can occur.

As per the criteria in Table 10-18 below, the overall sensitivity of the area to dust soiling impacts is **Low**. For the construction phase, the impact is considered to be a short term, slight negative impact.

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, 2014)

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 10-9 below identifies the sensitivity of people in the area surrounding the development footprint of the Proposed Development to the health effects of PM_{10}, as described in Section 10.2.4.2.1 above. The overall sensitivity of the area to human health effects of PM_{10} is considered to be Low.

Table 10-19 below identifies the sensitivity of people in the area surrounding the development footprint of the Proposed Development to the health effects of PM_{10}, as described in Section 10.2.4.2 above. The overall sensitivity of the area to human health effects of PM_{10} is considered to be **Low**. As indicated in section 10.2.3.1 above, the Proposed Development is situated in Zone D. According to the 2021 EPA baseline air quality data[9]; the average PM_{10} for Zone D is 14µg/m^3. Therefore, the only annual PM_{10} concentration categorised in the IAQM (2024) guidance relevant to the Proposed Development is the minimum concentration of <24µg/m^3 (<14 µg/m^3 in Scotland).

Table 10-19 Sensitivity of the Area to Human Health Impacts from wind farm site construction works. Guidance on the Assessment of Dust from Demolition and Construction (IAQM, 2014)

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

As identified in Section 10.2.4.2. above, the Proposed Development is classified as 'Large' for Earthworks, Construction and Trackout activities. Therefore, when combined with the sensitivity of the area, using Tables 10-18 and 10-19 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 Risk			
	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	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 Development is **Low**. Therefore, the potential effects of dust from the construction phase of the Proposed Development are considered to be equivalent to a short-term, moderate negative effect.

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

[9] https://www.epa.ie/resources/charts-data/air/air-quality--pm10.php

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 or 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 will be covered by tarpaulin where necessary.
- If necessary, excavated material will be dampened prior to transport to the spoil management areas.
- 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 Impact

With the implementation of the above, impacts on air quality brought about by dust emissions generated during the construction activities of the Proposed Development are considered to be short-term imperceptible negative impacts.

Significance of Effects

The effects on air quality from dust emissions during the construction phase will be imperceptible.

10.3.1.5 Dust Emissions: Transport to and from the site

Identification of Effects

The removal of the Existing Kilgarvan Wind Farm turbines and transport of proposed turbine components, supporting infrastructure materials, construction and staff vehicles, small volume of aggregate material and waste removal vehicles to/from the site (which will occur on specified routes only, see in Chapter 4 Description of this EIAR), the departure of empty vehicles and/or minor waste volumes (please see accompanying CEMP Appendix 4-3) from the site and daily staff movements will also give rise to some localised dust emissions during periods of dry weather.

All aggregate materials needed for the Proposed Development will be imported into the site from local quarry facilities. This has the potential for effects arising related to dust.

The Institute of Air Quality Management Construction Dust Guidance (IAQM 2014) states that the trackout (the spreading of dust onto roads from the wheels of vehicles leaving construction sites) related construction dust impact increases with respect to the number of movements of HGVs per day, length of unpaved road, distance to receptors and the sensitivity of local receptors.

The construction phase timeframe for the Proposed Development is 18–24 months which equates to a max. total of 510 working days. The total additional HGV numbers generated on public roads during the construction phase will be greater than 50+ HGVs per day. Please see Chapter 15 Material Assets for details on traffic volumes. Based on the methodology detailed in Section 10.2.4.6, this is considered

a large level of dust emissions from trackout. Combined with the established sensitivity of the area as **Low** (Table 10-9, Table 10-10 and Table 10-11 above), the dust emission magnitude for the transportation of materials to and from site is **Low** which is assessed as a short-term slight negative effect. Mitigation measures to reduce the significance of this effect are presented in Table 10-21 below.

Table 10-21 Risk of Dust Impacts from Trackout. Guidance on the Assessment of Dust from Demolition and Construction (IAQM, 2014)

Sensitivity of Area	**Dust Emission Magnitude**		
	Large (50+ HGVs)	Medium (10-50 HGVs)	Small (less than 10HGVs)
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible Risk

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.
- Turbines and construction vehicles will be transported to the site on specified haul routes only.
- The agreed haul route roads 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 or damage/potholes and repaired as necessary.
- The transport of construction materials around the site from the nearby quarry facilities will be covered by tarpaulin where necessary.
- 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 volume of emissions associated with vehicle movements.
- A Construction and Environmental Management Plan (CEMP) will be in place throughout the construction phase (see Appendix 4-3).

Residual Effect

Following implementation of mitigation measures as outlined above, residual effects on air quality from dust emissions from traffic movements to and from the site during the construction phase will have a short-term imperceptible negative effect.

Significance of Effects

Based on the assessment above the effects on air quality from dust emissions generated by traffic movements to and from the site during the construction phase will be imperceptible.

10.3.2 Operational Phase

10.3.2.1 Exhaust Emissions: Proposed Development Infrastructure

The operational phase of the Proposed Development will generate additional traffic to the area 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. The addition of a LGV to the area 1-2 times per day during the operational phase will give rise to a long-term imperceptible negative effect on air quality. The addition of several HGVs on occasion over the 35-year lifetime of the Proposed Development will give rise to a long-term imperceptible negative effect on air quality due to exhaust emissions.

Mitigation & Monitoring Measures for the Proposed Development

- 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.
- 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 impact.

Significance of Effects

Based on this assessment above the effects on air quality from exhaust emissions generated at the site during the operational phase will be imperceptible.

10.3.2.2 Dust Emissions: Proposed Development Infrastructure

Identification of Effect

As discussed above in Section 10.3.2, the operational phase of the Proposed Development will generate additional traffic to the area in the form of LGVs 1-2 visits per day and on occasion, daily LGVs and HGVs for short periods if maintenance or component replacement is required. This additional traffic may give rise to dust emissions. This will be a long-term imperceptible negative impact on air quality due to dust emissions.

Mitigation & Monitoring Measures for the Proposed Development

- Maintenance vehicles brought onsite during the operational phase will be maintained in good operational order, thereby minimising any dust emissions that arise.
- 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 effect on air quality from dust emissions during the operational phase is a long-term imperceptible negative effect.

Significance of Effects

Based on this assessment above the effects on air quality from dust emissions generated at the site during the operational phase will be imperceptible.

10.3.3 Overall Effect on Air Quality

10.3.3.1 Operational Phase: Carbon Offsetting

Although a long term negative imperceptible impact on air quality is expected during the operational phase due to exhaust and dust emissions from maintenance vehicles, 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 significant positive impact on air quality due to the offsetting of approximately 69,982 tonnes of Carbon Dioxide (CO_2) per annum. Please see Chapter 11 Climate for further details on carbon displacement calculations.

Residual Effect

The overall impact will be a Long-term Moderate Positive Impact on air quality due to the offsetting of approximately 69,982 tonnes of Carbon Dioxide (CO_2) per annum (see Chapter 11 for details), due to the provision of renewable energy in the range of approximately 56,026 Irish households with electricity per year.

Significance of Effects

Based on the assessment above there will be long-term, moderate, positive effect on air quality.

10.3.4 Decommissioning Phase

The Proposed Development is seeking permission for an operational life of 35 years. 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 with a new set of turbines, subject to planning permission being obtained, or the Proposed Development may be decommissioned fully.

A Decommissioning Plan is included as Appendix 4-5 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 impacts and consequential effects 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 projects and plans in the vicinity of the site, as set out in Chapter 2 of this EIAR. Please see Section 2.8 of Chapter 2 for cumulative assessment methodology.

The other plans and projects considered as part of this cumulative effect assessment are presented in Appendix 2-4 of this EIAR. Forestry operations in the neighbouring townlands have also been considered as part of this cumulative assessment. The cumulative project list was prepared following a review of planning files (An Bord Pleanála and Local Authority files), EPA search engines, development plans and National Roads Office/Transport Infrastructure Ireland road projects. Relevant developments with potential cumulative effects on Air Quality, within 1km of the Proposed Development are presented below in Table 10-22 below. This is in line with the Transport Infrastructure Ireland (TII) Publication Air Quality Assessment of Proposed National Roads – Standard PE-ENV-01107, December 2022.

Table 10-22 Other Plans and Projects with the potential to cause cumulative effects on air quality alone and in combination with the Proposed Development

Planning Ref	Description	Decision
KCC Ref: 16458	Rock armour existing river bank together with all other ancillary works	Conditional Permission
KCC Ref 171252	Import soil and stone for the raising of an agricultural field in order to improve the agricultural output of the field, the construction of a new entrance and a new haul road to link with the existing farm road	Conditional Permission
KCC Ref 18496	Retain an existing development at this site, the development consists of an existing 30 metre high telecommunications support structure carrying telecommunications equipment, together with existing equipment, container and associated equipment within a fenced compound as previously granted under local authority ref. no. 11/990. The development will continue to form part of the meteor mobile communications Ltd Existing and future telecommunications and broadband network	Conditional Permission
KCC Ref. 18794	(1)Retain existing dwelling house and shed within revised site boundaries and (2) permission to construct side and proch extensions on to existing dwelling house and all associate site works	Conditional Permission
KCC Ref 191325	The installation of battery arrays, located within container units (18 number units, each 30m2 by c.2.6m tall), a control building (c.160.5m2 by c.6.4m tall) and transformer (c.5m tall). the development will include for ancillary infrastructure including security fencing, lighting, cctv, internal access roads and drainage. the overall development site is c.1.6ha. the application includes a natura impact statement (nis)	Conditional Permission

Planning Ref	Description	Decision
KCC Ref 21887	Construct a new garage and greenhouse, including all associated site works to facilitate their construction, which will be ancillary to the existing dwelling	Conditional Permission
CCC Ref 116225	Completion of erection of 1 no. wind turbine of 80m hub height and 90m diameter rotor blade, on site tracks, cabling and hard standing as permitted under Planning Reg. No. 06/8273	Unconditional Permission
CCC Ref 174167	A solar photovoltaic panel array consisting of up to 37,800 m2 of solar panels on ground mounted steel frames, 2 no. electricity control cabins, underground cables & ducts, inverter units, hardstanding area, boundary security fence, CCTV, all associated site works and services	Conditional Permission
CCC Ref 068273	Erection of 1 no. wind turbine of 80m hub height and 90m diameter rotor blade, on site tracks, cabling and hardstanding	Conditional Permission

10.3.5.1 Construction Phase

Air Quality

As established above in Section 10.3.1.2, there are temporary to short-term, imperceptible to slight negative effects on air quality during the construction phase from:

- Exhaust emissions during the construction of turbines, spoil placement areas, substation and all other supporting infrastructure;
- Exhaust emissions through vehicle transit to and from the site;
- Dust emissions during the construction of turbines and all other supporting infrastructure;
- Dust emissions through vehicle transit to and from the site.

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 owing to the Proposed Development. Therefore, it is considered there 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

As established above in Section 10.3.2, there will be a long-term imperceptible effect on air quality from:

- Exhaust emissions from maintenance LGV vehicles visiting the site 1-2 times per day.
- Dust emissions from maintenance LGV vehicles visiting the site 1-2 times per day and on occasion more frequent LGV and HGV visits during component or substation infrastructure replacement.

As established above in Section 10.3.2, there will be an overall long-term Moderate Positive effect on Air Quality from:

- The provision of 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 significant positive impact on air quality due to the offsetting of approximately 69,982 tonnes of Carbon Dioxide (CO_2) per annum. Please see Chapter 11 Climate for further details on carbon displacement calculations.

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 owing to the Proposed Development. Therefore, it is considered there 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.