11.0 AIR QUALITY

11.1 INTRODUCTION

This chapter examines the existing environment and assesses the potential effects on air quality arising from the proposed development (see Chapter 3 (Description of the Proposed Development)).

The potential effects on air quality from the construction, operational and decommissioning phases of the proposed development have been assessed, and appropriate mitigation measures have been prescribed to minimise potential effects.

11.1.1 Statement of Authority

This chapter was prepared by Serena Byrne. Serena Byrne is a Project Scientist at TOBIN Consulting Engineers, with over 12 years' of multidisciplinary experience in engineering and environmental consulting, including assisting in the co-ordination of EIARs and drafting of chapters, including air quality assessments. She has recently completed a MSc in Environmental Sustainability in University College Dublin.

This chapter has been reviewed by Orla Fitzpatrick, Chartered Environmentalist and Technical Director in TOBIN. Orla has 20 years' experience working in the delivery of EIA projects in environmental consultancy. She holds a BSc in Geophysics and MSc in Environmental Consultancy and has considerable experience as a technical approver of environmental deliverables for major infrastructure projects including air quality assessments and chapters.

11.1.2 Relevant Legislation and Policy

11.1.2.1 Ambient Air Quality Standards

Since the 1980s, the European Union (EU) has implemented policies on air quality. The current EU Ambient Air Quality Directives have inherited many provisions over time, including numerous air quality standards from previous legislation. These policies have contributed to the reduction of exceedances for most air pollutants over the past decade (European Commission, 2024)[1]. The current EU Ambient Air Quality legislation are as follows:

- 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 (the CAFE Directive);
- 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;
- Commission Directive (EU) 2015/1480 amending several annexes to Directives 2004/107/EC and 2008/50/EC of the European Parliament and of the Council laying down the rules concerning reference methods, data validation and location of sampling points for the assessment of ambient air quality; and
- Directive 2011/850/EU: Commission Implementing Decision of 12 December 2011 laying down rules for Directives 2004/107/EC and 2008/50/EC of the European Parliament and of the Council as regards the reciprocal exchange of information and reporting on ambient air quality.

[1] https://environment.ec.europa.eu/topics/air/air-quality_en

The EC states that the main purpose of the EU Ambient Air Quality Directive is to *"define common methods to monitor, assess and inform on ambient air quality in the EU" and "establish objectives for ambient air quality to avoid, prevent or reduce harmful effects on human health and the environment"* (European Commission, 2024). The Directives set EU air quality standards for twelve air pollutants (sulphur dioxide (SO_2), nitrogen dioxide (NO_2) / nitrogen oxides (NO_X), particulate matter (PM_{10}, $PM_{2.5}$), ozone (O_3), benzene, lead, carbon monoxide (CO), arsenic, cadmium, nickel, and benzo(a)pyrene), and take into account the relevant World Health Organization (WHO) standards, guidelines and programmes (European Commission, 2024). The Directives also guide the assessment of air quality for Member States, through the establishment of a high-quality monitoring network of over 4,000 monitoring stations across the EU. Where levels exceed the limit or target values set by the Directives[2] (see Table 11-1). Member States are required to prepare an air quality plan or programme to address the sources responsible, ensure compliance, limit exceedance periods to as short as possible, and information on air quality should be available and accessible to the public (European Commission, 2024).

The Directives have been transposed into Irish legislation by:

- The Air Quality Standards Regulations, 2022 (S.I. No. 739 of 2022)[3] (came into effect on 31 of December 2022 and revokes Air Quality Standards Regulations, 2011 S.I. No. 180 of 2011 (as amended by S.I. No. 659/2016);
- The Arsenic, Cadmium, Mercury, Nickel and Polycyclic Aromatic Hydrocarbons in Ambient Air Regulations 2009 (S.I. No. 58 of 2009) (As amended by S.I. No. 659/2016)[4].

The Air Quality Standards Regulations, 2022 (S.I. No. 739 of 2022) provide for the implementation of Directive 2008/50/EC on ambient air quality and cleaner air for Europe (as amended) and set the limit values and alert thresholds for air pollution for particular pollutants and also specify the requirements for monitoring and reporting air quality data (see Table 11-1). In Ireland, the Environmental Protection Agency (EPA) is the competent authority for the purpose of the Directive 2008/50/EC and these Regulations (Irish Statute Book, 2022)[5].

Planned revision of the Ambient Air Quality Directives

In October 2022, the EC proposed to revise the Ambient Air Quality Directives as part of the European Green Deal[6]. The revision aligns the air quality standards more closely with the recommendations of the latest WHO Air Quality Guidelines (published September 2021)[7], including updates such as, the annual limit value for fine particulate matter ($PM_{2.5}$) reducing by more than half. The EC states that the proposed revision[8] to the Directives will:

- *"Puts the EU on track to achieve zero pollution for air by 2050;*
- *Foresees a regular review of the air quality standards, in line with latest scientific evidence;*
- *Further improves the legal framework, providing more clarity on access to justice, damage redress, effective penalties, and better public information on air quality;*

[2] https://environment.ec.europa.eu/topics/air/air-quality/eu-air-quality-standards_en
[3] Ambient Air Quality Standards Regulations 2022 (S.I. No. 739 of 2022) - https://www.irishstatutebook.ie/eli/2022/si/739/made/en/print#:~:text=These%20Regulations%20provide%20for%20the,and%20reporting%20air%20quality%20data
[4] https://www.irishstatutebook.ie/eli/2016/si/659/made/en/print#:~:text=S.I.,Air%20(Amendment)%20Regulations%202016.
[5] https://www.irishstatutebook.ie/eli/2022/si/739/made/en/print
[6] https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal_en
[7] https://www.who.int/publications/i/item/9789240034228
[8] Revision of the Ambient Air Quality Directives - European Commission

- *Will better support local authorities in achieving cleaner air by strengthening air quality monitoring, modelling, and air quality plans; and*
- *Merges the current two Directives into one and streamlines provisions to clarify and simplify the rules (European Commission, 2024).*

Table 11-1: EU Air Quality limit / target values as set by the CAFE Directive (2008/50/EC) and Air Quality Standards Regulations, 2022 (S.I. 739 of 2022)

Pollutant		Limit Type	Value
Nitrogen dioxide (NO_2)		Hourly limit for protection of human health - not to be exceeded more than 18 times / year	200 µg/m^3
		Annual limit for protection of human health	40 µg/m^3
Nitrogen Oxides (NO & NO_2)		Critical limit for the protection of vegetation and natural ecosystems	30 µg/m^3
Particulate Matter as PM_{10}		24-hour limit for protection of human health - not to be exceeded more than 35 times / year	50 µg/m^3
		Annual limit for protection of human health	40 µg/m^3
Fine Particulate Matter as $PM_{2.5}$	Stage 1	Annual limit for protection of human health	25 µg/m^3
	Stage 2	Annual limit for protection of human health	20 µg/m^3
Sulphur dioxide (SO_2)		Hourly limit for protection of human health - not to be exceeded more than 24 times / year	350 µg/m^3
		24-hour limit for protection of human health - not to be exceeded more than 3 times / year	125 µg/m^3
		Annual mean (calendar year)	20 µg/m^3
		Winter mean (1 October to 31 March)	20 µg/m^3
Carbon monoxide (CO)		Limit for protection of human health - maximum daily 8 hour mean not to be exceeded	10,000 µg/m^3
Ozone (O_3)		Maximum daily 8-hour mean - not to be exceeded on more than 25 days per calendar year averaged over three years	120 µg/m^3

In April 2023, the Clean Air Strategy for Ireland[9] was published, providing the high-level strategic policy framework needed to identify and encourage the integrated measures across government policy required to promote cleaner ambient air and reduce air pollution, while delivering on broader national objectives.

The Strategy sets out how air quality will be protected and enhanced in the State, so that the full environmental and health benefits of cleaner air may be realised. Implementation of the Strategy began immediately upon publication with progress reports on its delivery to be published annually.

The strategy commits Ireland to achieving the 2021 WHO Air Quality Guidelines Interim Targets '3' by 2026, Interim Targets '4' by 2030 and the final target AQG Levels by 2040 (shown in Table 11.2). The strategy notes that a significant number ofEPA monitoring stations observed air pollution levels in 2021 above the WHO targets; 80% of

[9] Clean Air Strategy For Ireland (published April 2023) - https://www.gov.ie/en/publication/927e0-clean-air-strategy/

these stations would fail to meet the final $PM_{2.5}$ target of 5 µg/m^3. The strategy also acknowledges that "*meeting the WHO targets will be challenging and will require legislative and societal change, especially with regard to both $PM_{2.5}$ and NO_2".* Ireland has revised its air quality legislation (Air Quality Standards Regulations, 2022 (S.I. 739 of 2022)) in line with the proposed EU revisions to the CAFE Directive, which sets interim 2030 air quality standards and align the EU more closely with the WHO targets.

Table 11-2: WHO Global Air Quality Guidelines 2021 - Recommended AQG levels and interim targets

WHO Global Air Quality Guidelines (2021) - Recommended AQG levels and interim targets*				
Pollutant	Limit Type (Averaging time)	Interim Target 3 (2026)	Interim Target 4 (2030)	Final Target (AQG Level) (2040)
NO_2	24-hour limit [a]	50 µg/m^3	50 µg/m^3	25 µg/m^3
	Annual limit	30 µg/ m^3	20 µg/ m^3	10 µg/m^3
PM (as PM_{10})	24-hour limit [a]	75 µg/ m^3	50 µg/m^3	45 µg/m^3
	Annual limit	30 µg/ m^3	20 µg/m^3	15 µg/m^3
PM (as $PM_{2.5}$)	24-hour limit [a]	37.5 µg/m^3	25 µg/m^3	15 µg/m^3
	Annual limit	15 µg/m^3	10 µg/m^3	5 µg/m^3
Sulphur dioxide (SO_2)	24-hour limit [a]	-	-	40 µg/m^3
Carbon monoxide (CO)	24-hour limit [a]	-	-	4 µg/m^3
Ozone (O_3)	Peak season [b]	-	-	60 µg/m^3
	8-hour limit [a]	-	-	100 µg/m^3
Note [a] - 99th percentile (i.e. 3–4 exceedance days per year).				
Note [b] - Average of daily maximum 8-hour mean O_3 concentration in the six consecutive months with the highest six-month running-average O_3 concentration.				
* Table cells with a dash denote where no interim target 3 or 4 is set for this pollutant within the WHO Global Air Quality Guidelines (2021).				

11.1.2.2 Gothenburg Protocol

In 1999, Ireland signed the Gothenburg Protocol to the 1979 UN Convention on Long Range Transboundary Air Pollution. The initial objective of the Protocol was to control and reduce emissions of SO_2, NO_X, Volatile Organic Compounds (VOCs) and Ammonia (NH_3). To achieve the initial targets Ireland was obliged, by 2010, to meet national emission ceilings of 42 kt for SO_2 (67% below 2001 levels), 65 kt for NO_X (52% reduction), 55 kt for VOCs (37% reduction) and 116 kt for NH_3 (6% reduction). A National Programme for the progressive reduction of emissions of these four transboundary pollutants has been in place since April 2005.

In 2012, the Gothenburg Protocol was revised to include national emission reduction commitments for the five main air pollutants to be achieved in 2020 and beyond and to include emission reduction commitments for $PM_{2.5}$. In December 2016, the Directive (EU) 2016/2284 "On the Reduction of National Emissions of Certain Atmospheric Pollutants and Amending Directive 2003/35/EC and Repealing Directive 2001/81/EC", commonly known as the NEC Directive (NECD) was published. The NECD applied the 2010 limits of the previous Directive 2001/81/EC until 2020, and established new national emission reduction commitments for which will be applicable from 2020 and 2030 for the five main air pollutants; SO_2, NO_X, NMVOCs, NH_3, and $PM_{2.5}$.

The 2020 and 2030 emission reduction commitments for Ireland for the five key pollutants are as follows and are set as percentage reductions on 2005 emission levels; SO_2 -65% by 2020 and -85% by 2030, NO_X -49% by 2020 and -69% by 2030, NH_3 -1% by 2020 and -5% by 2030,

NMVOCs -25% by 2020 and -32% by 2030, and $PM_{2.5}$ -18% by 2020 and -41% by 2030 (EPA, 2024). The latest data available from the Environmental Protection Agency (EPA) on Ireland's Air Pollutant Emissions (1990-2030)[10], for the period 1990 to 2022, published in May 2024, (EPA, 2024) indicated that Ireland is compliant with current and future emission reduction commitments for SO_2, NO_X and $PM_{2.5}$ emission reduction commitments in 2022. A lowering in NO_X emissions was driven largely by a decrease in the use of fuel oil and coal in electricity generation following increased use of these in 2021. Furthermore, the use of cleaner vehicles meant that NO_X emissions associated with transport remained at similar levels in 2022 despite an increase in activity following the lifting of pandemic restrictions (EPA, 2024). Reduced combustion of fossil fuels for heating in the residential sector, due to milder winter conditions than 2021, was the main reason for lower $PM_{2.5}$ emissions in 2022 (EPA, 2024).

In 2022, emissions of non-methane volatile organic compounds (NMVOCs) exceeded the 2020-2029 emission reduction commitment. The EPA state this is due to use of better scientific data which was unavailable when the emission reduction commitments were set. Ireland is now adjusting the emissions of non-methane volatile organic compounds to achieve compliance, as allowed under Article 5(1) of Directive (EU) 2016/2284 (EPA, 2024). The reduction in NMVOC emissions, down by approximately 1% in 2022 versus 2021, were driven largely by reduced combustion of fossil fuels in the residential sector. However, the EPA state that continued expansion in spirit production in the food and beverages industry partly offset the impact of this reduction in emissions (EPA, 2024). In 2022, NH_3 emissions were 1% below 2021 levels, however, Ireland has exceeded its emission reduction commitment for a third year in a row. The EPA stated that the implementation of key abatement measures are reducing ammonia emissions, however, compliance with 2030 reduction commitments will only be achieved through comprehensive implementation of the full suite of abatement measures (EPA, 2024).

In addition to the five key air pollutants for which emission reduction commitments apply, Ireland's Air Pollutant Emissions (1990-2030) annual report (EPA, 2024) also highlights the emissions trends for other pollutants such as CO, lead, dioxins, Heavy Metals and Polycyclic Aromatic Hydrocarbons (PAHs). The EPA note that emissions of most of these pollutants have greatly decreased since 1990 due to measures such as banning leaded fuel, catalytic converters, as well as the move away from solid fuel for residential heating (EPA, 2024).

11.1.2.3 Longford County Development Plan 2021-2027

The Longford County Development Plan (CDP) 2021-2027 refers to air quality protection when it lists as an objective (CPO 5.154) in relation to proposals for energy development and the protection of Human Health: "*Ensure that proposals for energy development demonstrate that human health has been considered and has regard to the forthcoming Draft Wind Energy Development Guidelines, including: Noise; Shadow Flicker (for wind turbine developments, including detailed Shadow Flicker Study); Ground Conditions/Geology (including landslide and slope stability risk assessment); Air Quality; Water Quality; and Assessment of impacts on collision risk species (bird and bats)".*

Furthermore, the Longford CDP outlines specific Air Quality County Policy Objectives including:

- CPO 12.104: *"Promote the preservation of best ambient air quality compatible with sustainable development in accordance with the EU Ambient Air Quality and Cleaner Air for Europe (CAFE) Directive (2008/5/0/EC) and ensure that all air emissions*

[10] https://www.epa.ie/publications/monitoring--assessment/climate-change/air-emissions/EPA-Air-Pollutant-Report-Final-May24.pdf

associated with new developments are within Environmental Quality Standards as out in the Air Quality Standards Regulations 2011 (SI No. 180 of 2011) (or any updated/superseding documents)";
- CPO 12.107: *"Seek to ensure in tandem with the EPA, that all developments are operated in a manner that does not contribute to deterioration in air quality"*;
- CPO 12.108: *"Promote the retention of trees, in-particular broad leaf-species, hedgerows and other vegetation where possible, and encourage afforestation and tree planting as a means of air purification and filtering".*

11.1.2.4 Roscommon County Development Plan 2022-2028

The Roscommon County Development Plan (CDP) 2022-2028 outlines Climate Action, Energy and Environmental Policy Objectives including the following:

- CAEE 8.1: Support European and national objectives for climate action, adaptation and mitigation which address land use planning, energy, sustainable mobility, flood risk management and drainage as detailed in the Climate Action Plan (2019), the National Climate Change Adaptation Framework (2018) and The Planning System and Flood Risk Management Guidelines (2009) and any subsequent versions of any of the aforementioned;
- CAEE 8.2: Support the National Climate Change Strategy by actively seeking to implement the policy objectives throughout this Plan which contribute to positive climate actions, including those related to renewable energy, sustainable transport, air quality, flooding and the promotion of urban and rural green initiatives.

11.1.2.5 Westmeath County Development Plan 2021-2027

The Westmeath County Development Plan (CDP) 2021-2027 outlines Air Quality Policy Objectives including the following:

- CPO 10.130: Promote the preservation of best ambient air quality compatible with sustainable development in accordance with the EU Ambient Air Quality and Cleaner Air for Europe (CAFE) Directive (2008/5/0/EC) and ensure that all air emissions associated with new developments are within Environmental Quality Standards as out in the Air Quality Standards Regulations 2011 (SI No. 180 of 201) (or any updated / superseding documents);
- CPO 10.131: It is a strategic aim of the county to reduce polluting emissions and support the implementation of measures to improve indoor and outdoor air quality by:
    - Participating in, and facilitating national programmes of air quality monitoring;
    - Support the development and promotion of the Air Quality Index for Health;
    - Support the development of Local Air Quality Management Plans that identify pollution 'hot spots' and aim to reduce pollution through local action on emissions;
    - Assessing radon levels in indoor settings in council properties and support the promotion of radon testing all indoor settings.

11.1.2.6 Air Quality Monitoring Guidance

With regards to larger dust particles that can give rise to nuisance dust, there are no statutory standards or guidelines regarding the maximum dust deposition levels that may be generated during the construction phase of a development in Ireland.

The German TA-Luft Air Quality standard sets a maximum permissible emission level for dust deposition of 350 mg/m^2/day, averaged over a one-year period, at any receptors outside a

project's boundary based on the Bergerhoff Method[11] of measuring dust deposition with dust nuisance. Based on this, the 2004 Planning Guidelines[12] (*Quarries and Ancillary Activities - Guidelines for Planning Authorities*) from the Department of the Environment, Heritage and Local Government (DEHLG 2004) recommend applying the Bergerhoff Method of measuring dust deposition and the limit of 350 mg/m^2/day at site boundaries near quarry developments[13]. Th Bergerhoff Method uses dust deposition gauges to measure the total PM / dust that is deposited into a collection container. The total amount of dust deposited in the container during the monitoring period is determined by laboratory analysis. The average monthly deposition is expressed as the weight of dust that has been collected per unit area per day. The guidance value 350 mg/m^2/day can be implemented with regard to dust impacts from the construction of the project.

In Ireland, Dublin City Council (DCC) has published a guidance document titled *Air Quality Monitoring and Noise Control Unit's Good Practice Guide for Construction and Demolition* however this guidance does not specify a guideline value (DCC, 2018). Similar guidance from other county councils within Ireland was not identified.

The appropriate limits for the construction and operational phase assessment of air quality effects from the proposed development are the Air Quality Regulations, which incorporate the CAFE Directive.

11.2 METHODOLOGY

This report has been prepared in accordance with the 'Guidelines on the Information to be contained in Environmental Impact Assessment Reports' (EPA, 2022). Potential effects have been described with regard to Table 3-4 of the guidelines. The assessment consists of the following components:

- Review of background ambient air quality in the vicinity of the proposed wind farm site using available baseline and reference data collected and published by the EPA and other referenced sources; and
- Assessment of potential air quality effects from the proposed development, such as from dust and vehicle emissions associated with construction activity, operational and maintenance activity, and decommissioning activity on sensitive receptors.

Dust deposition typically occurs in close proximity to work areas and therefore the study area will be limited to a 250 m radius from any dust generating activities and 250 m from the site entrance as per the Institute of Air Quality Management (IAQM) 2024 guidance. As the delivery of materials and turbines will be on the main road network up to the site entrance and will not result in a material change in traffic volumes to require a specific assessment with respect to air quality, no specific assessment has been undertaken for the haul routes or the Turbine Delivery Route (TDR).

11.2.1 Air Quality Guidance

The following standards and guidance documents were considered in this assessment:

- EPA Air Dispersion Modelling Guidance Note (AG4) (EPA, 2020);
- Institute of Air Quality Management (IAQM) *'Guidance on the assessment of dust from demolition and construction', (Version 2.2)* (IAQM, 2024);

[11] (Verein Deutscher Ingenieure (VDI)) - https://www.vdi.de/richtlinien/details/vdi-4320-blatt-2-measurement-of-atmospheric-depositions-determination-of-the-dust-deposition-according-to-the-bergerhoff-method
[12] https://www.opr.ie/wp-content/uploads/2019/08/2004-Quarries-and-Ancillary-Activities.pdf
[13] Total dust deposition (soluble and insoluble): 350 milligram per square metre per day (when averaged over a 30-day period).

- IAQM *'A Guide to The Assessment of Air Quality Impacts on Designated Nature Conservation Sites (Version 1.1)'* (IAQM, 2020);
- PE-ENV-01106: *'Air Quality Assessment of Specified Infrastructure Projects – Overarching Technical Document'*, Transport Infrastructure Ireland (TII) (2022) (hereafter the 2022 TII Guidance);
- Guidelines on the information to be contained in Environmental Impact Assessment Reports (EIAR), EPA May 2022; and
- Transport Infrastructure Ireland's (TII) *'Guidelines for Assessment of Ecological Impacts of National Road Schemes'* (TII, 2009).

11.2.2 Construction and Decommissioning Phase

Dust

The assessment of the potential for construction dust to impact the air quality environment focuses on identifying the existing baseline levels of PM_{10} and $PM_{2.5}$ in the region of the proposed development by an assessment of EPA monitoring data. Thereafter, the impact of the construction phase of the development on air quality was determined by a qualitative assessment of the nature and scale of dust generating construction activities associated with the proposed development based on the 2024 IAQM guidance.

The construction phase study area will focus on the potential for impacts arising from dust generated from construction activity. These impacts usually occur within 350 m of the dust generating activity as dust particles fall out of suspension in the air (IAQM, 2024). Dust impacts may arise during construction due to material handling activities, including excavation for the turbine foundations and borrow pits, storage and deposition of material onsite and backfill.

The proposed development earthworks is termed as being of a 'large' scale, according to the IAQM 2024 guidance due to the size of the proposed wind farm site (1,900 hectares) and the number of earth moving vehicles during peak construction which is 79 HV one way (month 3 of construction (refer to Section 15.3.4 of Chapter 15 (Traffic and Transportation) for further detail). As deposition typically occurs in close proximity to work areas the study area will be limited to a 250 m radius from any dust generating activities and 250 m from the site entrance, in line with IAQM 2024 guidance.

Traffic

Construction phase traffic, including the delivery of the turbines, has the potential to impact air quality. The 2022 TII guidance states that road links meeting one or more of the criteria below can be defined as being 'affected' by a proposed development and should be included in the local air quality assessment:

- Annual Average Daily Traffic (AADT) changes by 1,000 or more;
- Heavy Duty Vehicle (HDV) AADT changes by 200 or more;
- Daily average speed change by 10 kph or more;
- Peak hour speed change by 20 kph or more; and
- A change in carriageway alignment by 5m or greater.

11.2.3 Operational Phase

An assessment of baseline air quality in the region has been conducted to determine current levels of key pollutants relative to their limit values. The savings in NO_X emissions arising from the production of electricity using renewable sources were compared against those produced using non-renewable sources. The calculations were carried out using SEAI published emission

rates from non-renewable energy sources (SEAI, 2022). This total NO_X saving annually and over the lifespan of the project relative to NO_X emissions from non-renewable power generation was established.

Operational phase traffic has the potential to impact air quality. The scoping criteria, from the 2022 TII guidance, listed in the previous section was used to determine if any of the impacted road links required a detailed air quality modelling assessment.

11.2.4 Criteria for Rating Air Quality Effects

The 2022 TII guidance document details a methodology for determining air quality impact significance criteria for road schemes when considering impacts on sensitive receptors due to vehicle emissions on roads. The degree of impact is based on the percentage change in pollutant concentrations relative to the Do-Nothing scenario. TII significance criteria have been adopted for the proposed development to predict the impact of NO_2, $PM_{2.5}$ and PM_{10} and are detailed in Table 11-3. The significance criteria are based on PM_{10} and NO_2 as these pollutants are most likely to exceed the annual mean limit values (40µg/m^3). However, the criteria have also been applied to annual $PM_{2.5}$ concentrations for the purpose of this assessment. The 2022 TII Guidelines are applied to projects which have impacts due to traffic and therefore are applicable for any projects which result in traffic related impacts.

Table 11-3: TII Air Quality Limit Value (AQLV) Criteria as per Table 4.9 of Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106 (TII, 2022)

Long term average concentration at receptor in assessment year	% Change in concentration relative to Air Quality Standard Value (AQLV)			
	1%	2-5%	6-10%	>10%
75% or less of AQLV	Neutral	Neutral	Slight	Moderate
76 – 94% of AQLV	Neutral	Slight	Moderate	Moderate
95 – 102% of AQLV	Slight	Moderate	Moderate	Substantial
103 – 109% of AQLV	Moderate	Moderate	Substantial	Substantial
110% or more of AQLV	Moderate	Substantial	Substantial	Substantial
Source: TII (2022a) Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106.				

11.3 EXISTING ENVIRONMENT

11.3.1 Review of EPA Air Quality Monitoring Data

The EU Clean Air for Europe Directive requires Member States to categorise geographic areas in terms of Zones and Agglomerations for the purpose of managing Air Quality. As part of the implementation of the Framework Directive on Air Quality (1996/62/EC), four air quality zones (A, B, C and D)[14] have been defined in Ireland for air quality management and assessment purposes (EPA, 2024)[15] as follows:

- Zone A: Dublin;
- Zone B: Cork;
- Zone C: Other cities and large towns including Limerick, Galway, Mullingar; and

[14] The main areas defined in each zone are: Zone A: Dublin; Zone B: Cork; 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; and Zone D: Rural Ireland, i.e. the remainder of the State excluding Zones A, B and C.
[15] https://airquality.ie/information/air-quality-zones

- Zone D: Rural Ireland, i.e., the remainder of the State excluding Zones A, B and C.

Geographically, the proposed wind farm site is situated within the Midlands Region[16] (Longford, Offaly, Westmeath and Laois). In terms of air monitoring, the proposed development is located within Zone D (Rural Ireland). The proposed development site is also situated within the EPA's 'Rural East' Air Quality Index for Health (AQIH)[17] Region. The most recent reporting by the EPA indicates that the current air quality in the vicinity of the proposed development is classified as "Good" (according to EPA records accessed on 20/10/24)[18].

The most recent monitoring carried out by the EPA is summarised in the annual report 'Air Quality Monitoring Report 2023' published in September 2024[19]. The key messages[20] from the annual report were:

- *"Air pollution can be a major environmental risk to people's health, with approximately 1,600 premature deaths annually in Ireland due to poor air quality";*
- *Ireland's latest monitoring shows we are in compliance with current EU standards. Ireland is not on track to achieve its ambition, set out in the National Clean Air Strategy, to meet the health-based WHO air quality guideline limits in 2026. Achieving future targets will be very challenging";* and
- *Main pollutants of concern are fine particulate matter ($PM_{2.5}$) from solid fuel combustion and nitrogen dioxide (NO_2) from vehicle emissions/traffic".*

Emissions from traffic and industry are the main source of nitrogen oxides in Ireland (EPA, 2024). The EPA undertakes NO_2 testing at a number of designated air quality sites, in rural (Zone D) and urban areas, in order to fulfil the requirements of the Air Quality Standards Regulations, 2022 (S.I. No. 739 of 2022).

Over the past 5-year period (EPA Air Quality annual reporting from 2019 to 2023), NO_2 measurements were undertaken within Zone D at sites of Emo Court, County Laois (rural), Kilkitt, County Monaghan (rural), Briarhill, County Galway, Carrick-on-Shannon, and Birr and Edenderry, County Offaly (suburban). Of these sites, Birr and Edenderry are situated within the Midlands Region. Data from all these stations are likely to be representative of the typical background concentrations in the region and at the site of the proposed development, in particular those measured at rural locations such as Emo Court and Kilkitt. With the annual mean limit value[21], for the protection of human health being 40 µg/m^3 (per station)[22], the Zone D sites were all in compliance, falling well below the limit value.

The results as presented in Table 11-4 highlight a mean annual range of 1.7 – 16.1 µg/m^3 in 2023 for Zone D sites. The lowest annual mean figures were recorded at the rural locations of Kilkitt and Emo Court, at 1.7 and 2.3 µg/m^3 respectively.

[16] https://www.cso.ie/en/methods/informationnotefordatausersrevisiontotheirishnuts2andnuts3regions/
[17] https://airquality.ie/information/air-quality-index-for-health
[18] https://airquality.ie/
[19] https://www.epa.ie/publications/monitoring--assessment/air/air-quality-in-ireland-2023.php
[20] https://www.epa.ie/publications/monitoring--assessment/air/Air_Quality_Report_23_v14.pdf
[21] Annual mean limit values are set out within the CAFE Directive 2008/50/EC, transposed as the Air Quality Standards Regulations 2022.
[22] µg = Microgram

Table 11-4: NO_2 trends for air quality monitoring stations in Zone D over the 5-year period 2019-2023

Zone D Station	Proximity to site (km)[23]	NO_2 - Averaging Period Notes 1, 2	Year Note 3				
			2019	2020	2021	2022	2023
Zone D sites within the Midlands Region (Suburban)							
Birr, Co. Offaly	c. 60 km	Annual Mean ($\mu g/m^3$)	-	9	12.8	12.4	11.3
		Hourly Max ($\mu g/m^3$)	-	64	95.1	80.6	75.3
Edenderry, Co. Offaly	c. 60 km	Annual Mean ($\mu g/m^3$)	-	-	8.8	7.3	8.6
		Hourly Max ($\mu g/m^3$)	-	-	47.2	84.4	72.4
Other Rural Zone D site(s)							
Emo Court, Co. Laois	c. 80 km	Annual Mean ($\mu g/m^3$)	4	4	3.6	3.3	2.3
		Hourly Max ($\mu g/m^3$)	56	38	63.8	179.3	54.8
Kilkitt, Co. Monaghan	c. 80 km	Annual Mean ($\mu g/m^3$)	5	2	2.4	2.0	1.7
		Hourly Max ($\mu g/m^3$)	59	18.3	14.7	19.3	17.2

Note 1 NO_2 annual mean limit value for the protection of human health: 40 $\mu g/m^3$ applicable from 2010.
Note 2 NO_2 hourly limit value for the protection of human health: No more than 18 hrs > 200 $\mu g/m^3$ applicable from 2010.
Note 3 Table cells with a dash denote where no data was recorded at that monitoring site for the year noted.

SO_2 measurements were undertaken within Zone D at suburban sites of Edenderry, Co. Offaly, Shannon Estuary/Askeaton, Co. Limerick, Cork Harbour, Co. Cork, Letterkenny, Co. Donegal, and the rural site of Kilkitt, Co. Monaghan. Of these, two are representative of the proposed wind farm site; Edenderry and Kilkitt. Table 11-5 outlines the SO_2 trends for air quality for these monitoring stations in Zone D, i.e., within the Midlands Region and/or rural, over the past 5-year period (2019-2023). Latest measurements reported for this parameter in Zone D at the rural site (Kilkitt) were below the limit value for the protection of human health (i.e., 125 mg/m^3 per station) in 2023 and the preceding 4 years. Similarly, measurements reported for Edenderry, situated within the Midlands Region, were below the limit value for the protection of human health over the 3-year period for which monitoring of this parameter was undertaken (i.e., 2021-2023).

Table 11-5: SO_2 trends for air quality monitoring stations in Zone D over the 5-year period 2019-2023

Zone D Station	Proximity to site (km)	SO_2 - Averaging Period Notes 1, 2,3	Year Note 4				
			2019	2020	2021	2022	2023
Zone D sites within the Midlands Region (Suburban)							
	c. 60 km	Annual Mean ($\mu g/m^3$)	-	-	1.8	4.2	2.7

[23] Distances are approximate estimates from Bord na Mona (Mount Dillon) as the crow flies.

Edenderry, Co. Offaly		Hourly Max (µg/m^3)	-	-	9.6	18.1	11.4
		Daily values > 125	-	-	0	0	0
Other Rural Zone D site(s)							
Kilkitt, Co. Monaghan	c. 80 km	Annual Mean (µg/m^3)	0.7	1.4	1.7	2.1	1.6
		Hourly Max (µg/m^3)	6.7	4.8	7.7	7.7	6.1
		Daily values > 125	0	0	0	0	0

Note 1 SO_2 annual mean limit value for the protection of ecosystems: 20 µg/m^3 per station.
Note 2 SO_2 hourly limit value for the protection of human health: No more than 24 hrs > 350 µg/m^3 per station.
Note 3 SO_2 daily limit value for the protection of human health: No more than 3 days in a year > 125 µg/m^3 per station.
Note 4 Table cells with a dash denote where no data was recorded at that monitoring site for the year noted.

For O_3, latest measurements reported for this parameter in Zone D at rural sites (Emo Court and Kilkitt) were below the limit value for the protection of human health (i.e., 120 mg/m^3 per station) in 2023 (EPA, 2024).

In terms of air quality, exposure to fugitive dust, PM emissions and other emissions can arise from use of equipment and machinery. In Ireland, the main sources of emissions to air are solid fuel burning and vehicular traffic, other sources can include soil, road surfaces, construction works and industrial emissions, as well as natural sources such as windblown salt, plant spores and pollens (EPA, 2024). High levels of PM_{10} occur predominately in cities and towns (EPA, 2024). PM particles in air are typically measured as PM_{10} and $PM_{2.5}$ with diameters of 10 µm[24] or 2.5 µm. Continuous PM_{10} and $PM_{2.5}$ monitoring has been carried out by the EPA at the Zone D Midlands Region (NUTS IE063) locations of Birr (Co. Offaly), Edenderry (Co. Offaly), and Longford (Co. Longford). It should be noted that each of the sites noted are more urban / suburban in nature compared to the site of the proposed development, where it would be expected that concentrations would be lower than such environments given its rural setting. As such, a fourth site representative of the rural environment was also reviewed in terms of PM_{10}. The site of Kilkitt in Co. Monaghan represents a rural environment similar to the proposed development.

Over the 5-year period (2019-2023) available EPA Air Quality annual reporting for PM_{10} monitoring show the annual mean concentrations of PM_{10} falling well below the annual average maximum value[25] of 40 µg/m^3 for the Zone D sites reviewed. Furthermore, the no. of days >50 µg/m^3 has been less than 35 days annually as per the limit value for PM_{10} for these monitoring sites over the 5-year period 2019-2023; ranging from 0 to 10 days over the period.

[24] µm = micron
[25] PM_{10} annual mean limit value for the protection of human health: 40 μ g/m^3 applicable from 2005 (EPA, 2024)

Table 11-6: PM_{10} trends for air quality monitoring stations in Zone D within the Midlands Region over the 5-year period 2019-2023

Station	Proximity to site (km)	PM_{10} - Averaging Period Notes 1,2	2019	2020	2021	2022	2023
Zone D sites within the Midlands Region (all suburban stations)							
Birr, Co. Offaly	c. 60 km	Annual Mean ($\mu g/m^3$)	-	10	12.2	14.5	13.1
		Daily Max ($\mu g/m^3$)	-	28	52.4	71.4	57.1
		No. Days Values > 50	-	0	2	3	1
Edenderry, Co. Offaly	c. 60 km	Annual Mean ($\mu g/m^3$)	-	-	17.8	17.7	16.3
		Daily Max ($\mu g/m^3$)	-	-	119.8	72.6	96.2
		No. Days Values > 50	-	-	4	10	6
Longford, Co. Longford	c. 10 km	Annual Mean ($\mu g/m^3$)	-	-	13.9	16.0	13.1
		Daily Max ($\mu g/m^3$)	-	-	77.5	90.0	52.8
		No. Days Values > 50	-	-	1	9	2
Other Rural Zone D site(s)							
Kilkitt, Co. Monaghan (Rural)	c. 80 km	Annual Mean ($\mu g/m^3$)	7	8	7.8	8.5	7.1
		Daily Max ($\mu g/m^3$)	63	34	38.6	41.2	33.9
		No. Days Values > 50	1	0	0	0	0

Note 1 PM_{10} annual mean limit value for the protection of human health: 40 $\mu g/m^3$ applicable from 2005.
Note 2 PM_{10} daily limit for the protection of human health: No more than 35 days >50 $\mu g/m^3$ applicable from 2005.
Note 3 Table cells with a dash denote where no data was recorded at that monitoring site for the year noted.

Over the 5-year period, the rural site of Kilkitt experienced the lowest measurements of the sites reviewed, with an annual mean of between 7 – 9 $\mu g/m^3$ and experienced only 1 day >50 $\mu g/m^3$. The PM data from the rural station is likely to be broadly representative of the typical background concentrations at the proposed wind farm.

In terms of $PM_{2.5}$, this is typically monitored at suburban/urban locations by the EPA. Latest results for 2023 at the Zone D sites within the Midlands Region, i.e., monitoring locations of Birr (Co. Offaly), Edenderry (Co. Offaly), and Longford (Co. Longford) all fell below the annual mean limit value for the protection of human health of 25 $\mu g/m^3$ per station (See Table 11-7). $PM_{2.5}$ was not monitored at the rural site of Kilkitt.

Table 11-7: $PM_{2.5}$ trends for air quality monitoring stations in Zone D Midlands over the 5-year period 2019-2023

Station	Proximity to site (km)	$PM_{2.5}$ - Averaging Period Notes 1, 2	2019	2020	2021	2022	2023
Zone D sites within the Midlands Region (all suburban stations)							
Birr, Co. Offaly	c. 60 km	Annual Mean (µg/m^3)	-	6	7.9	9.5	8.3
		Daily Max (µg/m^3)	-	22	45.5	68.3	54.4
Edenderry, Co. Offaly	c. 60 km	Annual Mean (µg/m^3)	-	-	17.8	13.4	12.4
		Daily Max (µg/m^3)	-	-	119.8	66.5	94.5
Longford, Co. Longford	c. 10 km	Annual Mean (µg/m^3)	9	9	9.4	10.9	9.2
		Daily Max (µg/m^3)	56	74	72.8	87.1	51.6
Note 1	$PM_{2.5}$ annual mean limit value for the protection of human health: 25 µg/m^3 per station.						
Note 2	Table cells with a dash denote where no data was recorded at that monitoring site for the year noted.						

Latest measurements report for CO in Zone D (measured at Birr, Co. Offaly) were below the maximum mean limit value for the protection of human health (i.e., 10 mg/m^3 per station) reported as 0.6 mg/m^3 in 2023 (EPA, 2024).

Overall, data from the stations reviewed were typically below the respective annual mean limit values set for each pollutant, in particular at the rural locations, the data from which is likely to be broadly representative of the typical background concentrations at the proposed development.

11.3.2 Air quality monitoring associated with IPC licence P0504-01 (Bord na Mona Energy Ltd (Mountdillon Group))

Condition 5 of the Integrated Pollution Control Licence Reg. P0504-01 issued to Bord na Móna Energy Limited in May 2000 is specific to Emissions to Atmosphere, including dust emissions. The following conditions apply:

- *5.1 Boiler Combustion Efficiency shall be tested annually and results reported on annually as part of the AER. Environmental Protection Agency IPC Licence Reg. No 504;*
- *5.2 The licensee shall ensure that all operations on-site shall be carried out in a manner such that air emissions and/or dust do not result in significant impairment of, or significant interference with amenities or the environment beyond the site boundary;*
- *5.3 Within three months of the date of grant of the licence, the licensee shall submit to the Agency for agreement, a proposal for the identification and monitoring of Dust Sensitive Locations (DSL's) on and off site for dust deposition. A report on this monitoring shall be submitted annually as part of the AER;*
- *5.4 Activities on-site shall not give rise to dust levels off site at any Dust Sensitive Location which exceed an emission limit of 350 mg/m^2/day. [The sampling method to be in accordance with German TA Luft Emission Standards for Particle Deposition (IW1)];*
- *5.5 In relation to Dust Control the licensee shall, within six months of date of grant of this licence, develop and implement procedures to ensure that:*
  - *Shelter belts are planted in sensitive areas;*
  - *Harvesting in sensitive areas is avoided during windy weather;*
- *Where possible machinery use grassed pathways;*

    - *Headlands are kept clean and free of excessive loose peat;*
    - *Stockpiles are sheeted where possible;*
- *Moving machinery maintains slow speeds when travelling along dusty headlands;*
- *When harvesting, the jib is maintained low to the stockpile;*
    - *Shelter belts are planted around out loading facilities;*
    - *Road transported peat is adequately covered (sheeted or similar);*
    - *Wind breaks are planted where-ever possible.*

Due to the cessation of peat production in 2019, it is no longer a requirement to monitor air emissions. Monitoring associated with Condition 5 of IPC Licence P0504-01 has not been undertaken since 2019. Dust monitoring results available for the period 2002 - 2019 indicated there were 4 exceedances of the emission limit value of 350 mg/m^2/day at the representative monitoring locations at the Mountdillon Bog Group site. There have been some historic dust complaint issues from nearby sensitive properties in the area indicating that at times there have been dust issues from site activities.

11.3.3 Review of Meteorological Data

Weather conditions can influence air quality and management of dust; periods of high winds and dry weather conditions can be significant sources of dust.

A desk-top assessment of available meteorological information from Met Éireann was undertaken to characterise the existing meteorological conditions and projections, as long term meteorological data is more suitable for this assessment. Site specific meteorological data is available for the site of the proposed development recorded by the onsite met mast (situated on Lough Bannow Bog); data from the met mast is further discussed in Chapter 12 (Noise and Vibration).

According to Met Éireann[26], in general terms, Ireland's climate can be described as follows:

"The dominant influence on Ireland's climate is the Atlantic Ocean. Consequently, Ireland does not suffer from the extremes of temperature experienced by many other countries at similar latitude. The warm North Atlantic Drift has a marked influence on sea temperatures. This maritime influence is strongest near the Atlantic coasts and decreases with distance inland. The hills and mountains, many of which are near the coasts, provide shelter from strong winds and from the direct oceanic influence. Winters tend to be cool and windy, while summers, when the depression track is further north and depressions less deep, are mostly mild and less windy".

11.3.3.1 Weather Stations

There are approximately 500 rainfall stations across the country[27], strategically located as part of the National Observing Network (Met Éireann). These stations measure the daily rainfall in millimetres (mm). A number of these stations also measure additional parameters such as soil moisture, temperature, humidity, etc.

There are currently 25 synoptic stations[28] located across Ireland that continuously observe and record surface meteorological data. Parameters observed include rainfall, temperature, wind speed and direction, relative humidity, solar radiation, clouds, atmospheric pressure, sunshine hours, evaporation and visibility. They report a mixture of snapshot hourly observations of the

[26] https://www.met.ie/climate / https://www.met.ie/climate/climate-change
[27] https://www.met.ie/climate/the-national-observing-network/
[28] https://www.met.ie/latest-reports

weather known as synoptic observations and daily summaries of the weather known as climate observations[29].

The climate of the proposed development location is best described by measurements collected by the National Meteorological Service from the meteorological station at Mount Dillon, Co. Roscommon (approximately 3 km north), situated to the north of the proposed wind farm site. The Mount Dillon Met Éireann Weather Station has hourly, daily and monthly data available for this location. In terms of 30-year climate averages, the nearest station to the proposed development included in Met Éireann's 30-year average reporting is in Mullingar, Co. Westmeath.

The average monthly values for precipitation at Mount Dillon and Mullingar for the period 2020-2024 are summarised in Table 11-8 below, to provide a snapshot of current rainfall data and an indication of the long term averages (LTA) for recent years in the Midland Region of Ireland. Currently for both Mount Dillon and Mullingar, 2021 has seen the lowest annual mean for rainfall in the past five years at 1,016.0 mm and 980.8 mm respectively. The LTA for rainfall for the past five years for Mount Dillon was 1,047.1 mm, with Mullingar experiencing less rainfall over the period with an LTA of 970.9 mm.

Given the distance between the two stations (approximately 50 km), relative distance from the proposed development site (approximately 3 km northwest and 35 km southeast respectively) and these sites experiencing similar annual averages for 2020- 2023 and LTA, it may be interpreted that these rainfall levels would be similar across the Midland Region, and by extension, County Longford and the site of the proposed development, i.e., range of approximately 970-1,060 mm annually.

Table 11-8: Average Monthly Values (2020-2024) for Precipitation at Mount Dillon and Mullingar

Average Monthly Values – Precipitation													
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mount Dillon													
2024*	74.1	112.2	142.1	102.7	106.5	42.8	71.4	120.8	34.9	82.9	TBC	TBC	890.6
2023	102.9	21.7	169.8	89.4	48.6	74.9	206.0	120.7	121.8	115.9	106.1	159.3	1337.1
2022	52.4	140.0	33.5	59.4	76.9	103.7	33.7	66.3	85.9	182.8	122.1	104.6	1061.3
2021	129.0	88.3	102.0	24.2	105.1	25.7	57.8	96.9	78.0	143.0	49.6	116.4	1016.0
2020	100.7	225.3	80.6	41.5	23.2	103.0	110.0	112.7	73.8	159.7	110.2	116.8	1257.5
LTA	105.0	77.7	88.2	66.6	70.5	74.2	73.1	88.3	79.4	111.8	102.4	109.8	1047.1
Mullingar													
2024*	83.1	91.9	117.3	97.0	57.1	49.4	65.6	82.7	47.5	59.9	TBC	TBC	752.2
2023	81.1	29.8	141.4	82.8	36.4	53.3	178.8	114.3	132.9	104.5	71.2	132.0	1158.5
2022	47.6	131.8	46.2	48.7	53.4	100.6	31.6	35.2	104.1	208.8	109.3	84.5	1001.8
2021	126.9	80.3	80.9	25.5	107.4	17.4	74.9	142.1	58.1	97.7	41.6	128.0	980.8
2020	54.4	197.5	61.0	41.9	10.1	96.6	126.3	114.0	68.3	131.8	87.7	89.3	1078.9
LTA	92.5	70.3	76.6	65.9	69.2	73.8	71.1	86.1	78.3	104.3	88.1	94.7	970.9
*Note: 2024 data incomplete at time of writing (November 2024)													

Both Mount Dillon and Mullingar weather stations are located in the Midland Region and are located 101 m and 39 m above sea level respectively[30], while the elevation of the site of the proposed development ranges 34 to 59 mAOD. Although there may be a slight difference in precipitation locally as a result of this elevation difference (as well as the spatial difference), this is not anticipated to be significant.

Based on the 30-year averages for Mullingar, the number of days per year in which a mean rainfall of 5 mm is exceeded was 60 days. Furthermore, the 30-year average at Mullingar total

[29] https://www.met.ie/latest-reports/observations
[30] https://www.met.ie/climate/weather-observing-stations

for precipitation shows annual rainfall is highest during the winter period (October – January) (see Table 11-8). These levels of precipitation (including snow) are typically associated with more prolonged Atlantic frontal weather depressions passing over the region compared to the summer.

11.3.3.2 Wind

The Mullingar Met Éireann Station wind rose diagram (See Figure 11-1) shows that the prevailing winds, from October 2024, are from between the south-west (approximately 13-14%), south (approximately 11%) and south-east (approximately 16-17%). North-westerly (approximately 3-7%), north (approximately 6-7 %) and north-easterly (approximately 6-7%) winds are less frequent. Westerly and easterly winds tend to be most infrequent (approximately 3-4%).

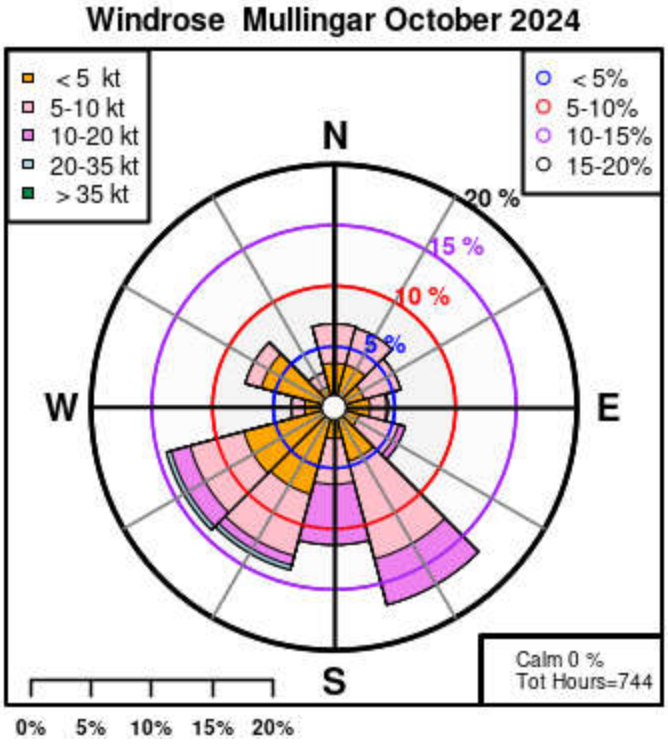

Figure 11-1 Wind Rose for Mullingar Weather Station (Source: Met Éireann Past Weather Statements, October 2024)[31]

Based on the 30-year averages[32], the mean annual wind speed at Mullingar is 7.6 knots (3.9 m/s)[33], while the maximum average monthly gust reached 58.2 knots (29.9 m/s) over the period. The mean number of days with gales during these years was 0.8 days.

This wind data provides some context for regional wind direction and speed but is not likely to be reflective of those at the proposed development site, due to differences in location and elevation. The SEAI Wind Atlas shows wind speed at the site of the proposed development is

[31] https://www.met.ie/climate/past-weather-statements
[32] The latest available Met Éireann 30-year averages for Mullingar cover the period 1979-2008 (Mullingar was not included in the latest Met Éireann 1991-2020 Averages - https://www.met.ie/cms/assets/uploads/2024/07/Mullingar-1979%E2%80%932008-averages.html
[33] Metres per second.

generally between 7.60 – 7.90 m/s at a height of 100 m[34]. This speed is likely to be more representative of the site conditions as it accounts for elevation.

Table 11-9: 30-year Average Monthly Wind Data at Mullingar, Westmeath (1979-2008)

30-year Average Monthly Wind – Mullingar, Westmeath													
Wind (knots)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Mean Monthly Speed	9.0	9.1	9.1	7.7	7.3	6.7	6.4	6.3	6.7	7.5	7.8	8.3	7.6
Max Gust	67	71	59	56	58	48	48	50	51	59	62	73	58.2
Mean num. of days with Gales	0.3	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.2	0.8

11.3.4 Sensitivity of the Receiving Environment / Receptors

The assessment will take account of sensitive receptors relevant to the proposed development. In terms of air quality, sensitive receptors include locations where people spend time and where property may be impacted by dust, such as domestic properties. Ecological receptors are habitats that might be sensitive to air quality pollutants, such as dust.

The locations of properties and buildings (referred to as receptors) in the vicinity of the proposed wind farm site have been identified using address data from the GeoDirectory database which is used to populate Eircodes. The validity of the GeoDirectory data has been confirmed by way of publicly available mapping, aerial imagery, street-level imagery and a ground truthing survey carried out in September 2024.

There are 60 no. property receptors recorded as present within 250 m of the proposed wind farm site boundary; a total of two are present within 50 m (one of which is within 20 m of the site boundary). A breakdown of the receptors identified is outlined in Table 11-10 below.

Table 11-10: Receptors Identified within 250 m of the proposed wind farm boundary and site entrances

Buffer distance (m)	No. of properties within 250 m of wind farm boundary	No. of properties within 250 m of all site entrances
0-20	1	0
20-50	1	0
50-100	5	0
100-150	11	1
150-200	18	0
200-250	24	1
Total	**60***	**2****

*Note: Total figure comprises 57 residential properties, 2 commercial properties (including BnM Mount Dillon), and 1 school.
**Note: Total figure comprises 1 residential property (c. 200-250 m of site entrance A), 1 commercial property (BnM Mount Dillon ca. 100-150 m of site entrance C). No receptors identified within 250 m of site entrances B or D.

[34] https://gis.seai.ie/wind/

In line with the 2024 IAQM guidance, prior to assessing the impact of dust from a proposed wind farm site, the sensitivity of the area must first be assessed as outlined below.

Both receptor sensitivity and proximity to proposed construction works areas are taken into consideration in terms of assessment for air quality impacts. For the purposes of this assessment the sensitivity criteria outlined in Table 11-11 has been established and adapted from the UK IAQM guidelines (2024).

Table 11-11: Receptor Sensitivity Criteria (as adapted from the UK IAQM 2024 Guidelines)

Receptor Sensitivity	Criteria
High	High sensitivity receptors are regarded as people or property that would reasonably be expected to be present continuously, and where users can: • Reasonably expect enjoyment of a high level of amenity; or • The appearance, aesthetics or value of their property would be diminished by soiling; or • At least regularly for extended periods, as part of the normal pattern of use of the land. Indicative examples include residential dwellings, hospitals, schools, residential care homes. In terms of ecological receptors, locations with an international or national designation and the designated features may be affected by dust soiling; or locations where there is a community of a particular dust sensitive species such as vascular species included in Ireland's Red List. Indicative examples include a Special Area of Conservation (SAC) designated for acid heathlands or a local site designated for lichens adjacent to the demolition of a large site containing concrete (alkali) buildings.
Medium	Medium sensitivity receptors are regarded as people or property that wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land, but where users can: • Expect to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home; or • The appearance, aesthetics or value of their property could be diminished by soiling. Indicative examples include commercial properties / places of work (e.g., offices and shops) and parks[35]. In terms of ecological receptors, locations would include: • Where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown; or • Locations with a national designation where the features may be affected by dust deposition. Indicative example is designated sites with dust sensitive features.
Low	Low sensitivity receptors are regarded as where exposure is transient and people or property would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land, and where: • The enjoyment of amenity would not reasonably be expected; • Property would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling.

[35] The IAQM 2024 Guidance notes indicative examples does generally not include workers occupationally exposed to PM_{10}, as protection is covered by Health and Safety at Work legislation.

Receptor Sensitivity	Criteria
	Indicative examples include playing fields, farmland (unless commercially-sensitive horticultural), footpaths, short term car parks and roads. public footpaths, playing fields, parks and shopping streets. In terms of ecological receptors, locations would include: • Locations with a local designation where the features may be affected by dust deposition; • Indicative example is a local Nature Reserve with dust sensitive features.

In terms of receptor sensitivity to dust soiling, there are 60 no. sensitive property receptors (See Table 11-10, figure comprises 57 no. residential properties, 2 no. commercial properties (including BnM Mount Dillon), and 1 no. school) located within 250 m of the site boundary, of which 58 are deemed to be of 'high' sensitivity based on the above criteria (see Table 11-11) (i.e., residential properties and school); the remaining two properties are considered 'medium' sensitivity as are commercial in nature. One of the identified commercial receptors (BnM Mountdillon Group) is situated within 20 m of the proposed wind farm site boundary. In relation to turbine locations, residential properties identified are beyond 250 m of the turbines, with the nearest identified being approximately 780 m of a turbine (i.e., over four times the tip height).

There are two receptors identified within 250 m of construction site entrances associated with the proposed wind farm site. The single residential property is situated off the R392, within 200-250 m from site entrance A, and the commercial property is situated within 100-150 m of site entrance C (for further detail on site entrances see Chapter 3 (Description of the Proposed Development) and Chapter 15 (Traffic and Transportation)). These receptors are a single residential property and a commercial property (BnM Mount Dillon) and therefore high and medium sensitivity respectively (Table 11-11). However, the residential property is located >200 m from the main site entrance therefore would have low sensitivity to dust from material transfer at site access during construction.

In summary, the sensitivity of the area to dust soiling during construction phase is considered to be Low as per Table 11-12, as most of the works will be a distance greater than 50 m from the site boundary and the nearest residential receptor. This sensitivity to dust soiling includes for the transport of materials to the site via the site entrances. Once the haul route is chosen by the Appointed Contractor at the commencement of construction the Heavy Vehicles (HV) will travel along the existing road network to the site, with approximately 95% of haul route movements coming from the west via Lanesborough (more detail in Chapter 15 (Traffic and Transportation)). No residential properties are located within 250 m of the Lanesborough site entrances.

Table 11-12: Sensitivity of the Area to Dust Soiling Effects on People and Property

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

Source: Source: IAQM Guidance on the Assessment of Dust from Demolition and Construction V2.2 (IAQM, 2024)

In addition to sensitivity to dust soiling, the IAQM guidelines also outline the assessment criteria for determining the sensitivity of the area to human health impacts.

The criteria take into consideration the current annual mean PM_{10} concentration, receptor sensitivity and the number of receptors affected within various distance bands from the construction boundary.

A conservative estimate of the current annual mean PM_{10} background concentration in the vicinity of the proposed development (rural environment within the Midland Region) is conservatively estimated to be 12.6 µg/m^3, based on the review of the latest EPA Air Quality Monitoring data (reporting year 2023) for the region (EPA, 2024)[36].

There are 60 no. sensitive receptors present within 250 m of the wind farm site boundary and works area. Therefore, the worst-case sensitivity of the area to human health impacts is considered to be Low as per Table 11-13.

The sensitivity of the area to human health impacts associated with the proposed wind farm is also considered Low due to the number of properties impacted at any one time and the low background concentrations of PM_{10}.

Table 11-13: Sensitivity of the Area to Human Health Impacts

Receptor Sensitivity	Annual Mean PM_{10} Concentration	Number Of Receptors	Distance from source (m)			
			<20	<50	<100	<250
High	>32 µg/m^3 (>18 µg/m^3 in Scotland)	>100	High	High	High	Medium
		10-100	High	High	Medium	Low
		1-10	High	Medium	Low	Low
	28-32 µg/m^3 (16-18 µg/m^3 in Scotland)	>100	High	High	Medium	Low
		10-100	High	Medium	Low	Low
		1-10	High	Medium	Low	Low
	24-28 µg/m^3 (14-16 µg/m^3 in Scotland)	>100	High	Medium	Low	Low
		10-100	High	Medium	Low	Low
		1-10	Medium	Low	Low	Low
	< 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

[36] Average of annual mean recorded across 16 monitoring sites (includes rural and suburban sites) in Zone D for the Air Quality Monitoring data for the 2023 reporting year published September 2024 – https://www.epa.ie/publications/monitoring--assessment/air/air-quality-in-ireland-2022.php (Accessed November 2024)

Receptor Sensitivity	Annual Mean PM_{10} Concentration	Number Of Receptors	Distance from source (m)			
			<20	<50	<100	<250
Medium	>32 µg/m^3 (>18 µg/m^3 in Scotland)	>10	High	Medium	Low	Low
		1-10	Medium	Low	Low	Low
	28-32 µg/m^3 (16-18 µg/m^3 in Scotland)	>10	Medium	Low	Low	Low
		1-10	Low	Low	Low	Low
	24-28 µg/m^3 (14-16 µg/m^3 in Scotland)	>10	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
	< 24 µg/m^3 (<14 µg/m^3 in Scotland)	>10	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
Low	-	>1	Low	Low	Low	Low

Source: IAQM Guidance on the Assessment of Dust from Demolition and Construction V2.2 (IAQM, 2024)

The IAQM guidelines also outline the assessment criteria for determining the sensitivity of the area to ecological impacts from dust. The criteria take into consideration whether the receiving environment is classified as a Special Area of Conservation (SAC), a Special Protected Area (SPA), a Natural Heritage Area (NHA) or a proposed Natural Heritage Area (pNHA) as dictated by the EU Habitats Directive or whether the site is a local nature reserve or home to a sensitive plant or animal species.

The IAQM guidance states there is potential for ecological impacts in relation to dust up to 50 m from the works and site entrance to the site. Chapter 7 (Biodiversity) of this EIAR identifies the nearest designated sites to the proposed wind farm. A review of this information indicates that no European designated sites (SAC or SPA) situated within 50 m of the proposed wind farm site, however there are two nationally designated pNHA (proposed Natural Heritage Area) sites within 20 m of the proposed wind farm site boundary.

Therefore, a Medium sensitivity to ecological dust impacts from the proposed wind farm development is considered (see Table 11-14).

Table 11-14: Sensitivity of the Area to Ecological Impacts

Receptor Sensitivity	Distance to Source	
	<20 m	<50 m
High	High	Medium
Medium	Medium	Low
Low	Low	Low

Source: Source: IAQM Guidance on the Assessment of Dust from Demolition and Construction V2.2(IAQM, 2024)

11.4 POTENTIAL EFFECTS

11.4.1 Do-Nothing Scenario

In relation to the air quality at the site, it is unlikely that there would be any significant local positive or negative effect in any future Do-Nothing scenario. Rehabilitation of Derryadd, Derryaroge and Lough Bannow bogs will continue in the Do-Nothing scenario, as part of the rehabilitation plans produced to address the requirements of Condition 10.2 of IPC License Ref. P0504-01.

In addition, there would be no exhaust emissions from the wind farm construction plant and vehicles, nor would there be dust emissions due to the movement of the same.

However, if the Proposed Development were not to proceed, the opportunity to capture part of Longford's valuable renewable energy resource would be lost, as would the opportunity to contribute to meeting Government and EU targets for the production and consumption of electricity from renewable resources and the reduction of greenhouse gas emissions. The opportunity to generate local employment and investment and to diversify the local economy would also be lost.

More specifically, the opportunity of this Proposed Development to contribute to the reduction of emissions of carbon dioxide (CO_2), oxides of nitrogen (NO_X), and sulphur dioxide (SO_2) to the atmosphere would be lost resulting in a continued dependence on electricity derived from fossil fuel, rather than renewable energy sources such as from the proposed wind farm.

There would be a negative long-term, adverse, effect on the wider air quality in Ireland, should fossil fuel generators continue to be used for energy supply.

11.4.2 Construction Phase

11.4.2.1 Construction Dust

In terms of air quality, the greatest potential impact during the construction phase will be from dust emissions associated with the construction works. Dust or pollutants generated from the proposed development construction phase will typically arise from the following:

- Movement of construction vehicles;
- Transportation of turbines and construction materials to and within the site;
- Earthworks and excavation activities;
- Construction of hardstanding areas;
- Breaking and crushing of rock;
- Movement and placement of stockpiles (excavated soils/fill materials); and
- Wind generated dust from stockpiles, any required excavation, and exposed unconsolidated soils.

The construction period is expected to last approximately 24-30 months and there will be approximately 100-120 persons involved in the construction.

The civil engineering works phase, during which the main truck movements will take place, is estimated to last 18 months, with the peak earthworks, and potentially dust generating activities, within the first 12 months. The majority of properties which border the site are a significant distance from the actual works areas around the turbine foundations and borrow pits; the closest property to a proposed turbine is approximately 780 m. Furthermore, the

closest borrow pit location is approximately 500 m or further from identified property receptors. The closest property receptor to the internal access road works is approximately 125 m; this receptor is located just off the N63, west of the wind farm site boundary.

Chapter 15 (Traffic and Transportation) presents the traffic assessment for the proposed development and any potential for effects on the local road network.

The assessment has concluded that during the peak construction period within the first year, the R392 will carry an additional 24 Annual Average Daily Traffic (AADT), with an additional 3% HV. As per Section 15.3.4 of Chapter 15 (Traffic and Transportation), the peak number of one-way HV movements per day is 79, and the average over the 2 year construction programme is 24 HV one-way.

Construction Dust Assessment

The major dust generating activities are divided into four types within the IAQM (2024) guidance to reflect their different potential impacts. These are:

- Demolition;
- Earthworks;
- Construction; and
- Trackout (transport of dust and dirt from the construction site onto the public road network).

Demolition

There will be no demolition works within the proposed wind farm site.

Trackout

The dust emission magnitude from trackout can be classified as small, medium or large based on the definitions from the IAQM guidance as transcribed below:

- Large > 50 HDV (> 3.5 t) outward movements in any one day, potentially dusty surface material (e.g., high clay content), unpaved road length > 100 m;
- Medium 20 - 50 HDV (> 3.5 t) outward movements in any one day, moderately dusty surface material (e.g., high clay content), unpaved road length 50 – 100 m; and
- Small < 20 HDV (> 3.5 t) outward movements in any one day, surface material with low potential for dust release, unpaved road length < 50 m.

According to the IAQM guidance (IAQM, 2024), this maximum (>50 per day) number of outward truck/vehicle movements per day is classified as Large scale of magnitude in terms of dust from vehicles leaving the site. Therefore, the proposed earthworks can be classified as Large.

Table 11-15 illustrates the criteria for rating risk of dust impacts for trackout, as per the IAQM guidance.

When combined with the previously established sensitivity of the area (Medium sensitivity to dust soiling and Low sensitivity in terms of human health and Medium in terms of ecological impacts) the potential risk can be found in Table 11-16.

The risk of significant dust impacts as a result of trackout prior to mitigation is Low with respect to human health and nuisance dust. With respect to ecological receptors impacts, the potential risk is considered to be Medium. This is as a result of the proposed trackout activities in the absence of mitigation.

Table 11-15: Criteria for Rating Risk of Dust Impacts – Construction vehicles (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

Table 11-16: Risk of Dust Impacts – Construction vehicles (trackout)

Receptor	Receptor Sensitivity	Dust Emission Magnitude – Earthworks	Risk of Dust-Related Impacts
Dust Soiling	Low	Large	Low Risk
Human Health	Low		Low Risk
Ecological	Medium		Medium Risk

As noted in Section 11.3.4, there are two receptors identified within 250 m of construction site entrances associated with the proposed wind farm site. The single residential property is situated off the R392, within 200-250 m from site entrance A, and the commercial property situated within 100-150 m of site entrance C.

There will also be some exhaust emissions from construction activities onsite during the construction phase and during the delivery of construction material and turbine components to site giving rise to a localised short-term imperceptible negative effect on air quality on site.

Construction activities and earthworks taking place within the proposed wind farm site will result in some dust emissions, particularly during earthworks activities. However, the majority of properties which border the site are a significant distance from the actual works areas.

Earthworks

Earthworks primarily involve excavating material, loading and unloading of materials, tipping and stockpiling activities. The dust emission magnitude from earthworks can be classified as small, medium or large based on the definitions from the IAQM guidance as transcribed below:

- 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;
- Medium 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 3 – 6 m in height;
- Small 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.

In terms of earthworks, the potential magnitude of impact according to IAQM guidance (IAQM, 2024) is Large due to the size of the site area (1,900 hectares) and the number of earth moving vehicles during peak construction which is 79 HV one way (month 3 of construction (Refer to Section 15.3.4 of Chapter 15 (Traffic and Transportation) for further detail). Noting this is a worse-case scenario as the site area covers the full proposed wind farm site and earthworks will be required in certain areas for construction of the infrastructure including the borrow pits, turbine foundations, peat deposition areas, site access roads etc.

Table 11-17 illustrates the criteria for rating risk of dust impacts for earthworks as per the IAQM guidance.

When combined with the previously established sensitivity of the area (Medium sensitivity to ecological impacts and Low sensitivity in terms of dust soiling and human health) the potential risk can be found in Table 11-18.

The risk of significant dust impacts as a result of earthworks prior to mitigation is Medium with respect to nuisance dust and ecological receptors. With respect to human health and dust soiling impacts as per table 11-18, the potential risk is considered to be Low. This is as a result of the proposed earthwork activities in the absence of mitigation.

Table 11-17: Criteria for Rating Risk of Dust Impacts - Earthworks

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 11-18: Risk of Dust Impacts - Earthworks

Receptor	Receptor Sensitivity	Dust Emission Magnitude – Earthworks	Risk of Dust-Related Impacts
Dust Soiling	Low	Large	Low Risk
Human Health	Low		Low Risk
Ecological	Medium		Medium Risk

Construction

Dust emission magnitude from construction can be classified as small, medium or large based on the definitions from the IAQM guidance as transcribed below:

- Large Total building volume > 750,000 m^3, on-site concrete batching, sandblasting;
- Medium Total building volume 12,000 m^3 – 75,000 m^3, potentially dusty construction material (e.g., concrete), on-site concrete batching; and
- Small Total building volume < 12,000 m^3, construction material with low potential for dust release (e.g., metal cladding or timber).

In terms of the risk of dust impacts from construction activities, the potential magnitude of impact according to IAQM guidance (IAQM, 2024) is Small (based on the estimated volume of concrete per turbines as 95 m^3, the prefabricated nature of the turbines and the construction material and method for the substation and battery storage facilities having low dust potential).

Table 11-19 illustrates the criteria for rating risk of dust impacts for construction as per the IAQM guidance.

When combined with the previously established sensitivity of the area (Medium sensitivity to ecological impacts, Low sensitivity in terms of dust soiling and human health) the potential risk can be found in Table 11-20.

The risk of significant nuisance dust impacts as a result of construction prior to mitigation is low with respect to nuisance dust and ecology. With respect to human health impacts the potential risk is considered to be negligible.

Table 11-19: Criteria for Rating 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 11-20: Risk of Dust Impacts - Construction

Receptor	Receptor Sensitivity	Dust Emission Magnitude – Earthworks	Risk of Dust-Related Impacts
Dust Soiling	Low	Small	Negligible
Human Health	Low		Negligible
Ecological	Medium		Low Risk

Summary of Dust Risk

In addition, data provided in the Met Éireann 30-year averages for Mullingar shows the number of days per year in which a mean rainfall of 0.2 mm is exceeded as 209 days (See section 11.3.3.1 above). This further limits the impact of dust as the solid particulates dispersed in the air are captured into suspension by the water. With rainfall anticipated for over half the year, it is unlikely that significant nuisance will be caused by dust on these days, and that dust generated on dry days will be minimised in line with the measures outlined in the mitigation section below and also detailed in the Construction Environmental Management Plan (CEMP) (See Appendix 3-2 of this EIAR). Refer to Table 11.21 for the summary table of the risk of dust impacts during construction.

Table 11-21: Summary Table - Likelihood of Dust Effect

Sensitivity of Area	Risk of Dust Effects		
	Trackout	Earthworks	Construction
Dust Soiling	Low	Low	Negligible
Human Health	Low	Low	Negligible
Ecology	Medium	Medium	Low

Construction Traffic

Based on the traffic data, as presented as part of Chapter 15 (Traffic and Transportation) the construction phase traffic will not change sufficiently to meet the TII Scoping criteria detailed in Section 11.2. Chapter 15 (Traffic and Transportation) presents the traffic assessment for the proposed development and any potential for effects on the local road network. The assessment has concluded that during the peak construction period within the first year, the R392 will carry an additional 24 Annual Average Daily Traffic (AADT), with an additional 3% in HV trips.

The proposed development will not result in speed changes nor changes to the public road alignment sufficiently to meet the TII Scoping criteria. An assessment of air quality as a result of construction traffic has been scoped out of any further assessment. Effects are considered negative, temporary - short-term and imperceptible and do not require further assessment.

The study area with respect to impacts on air quality due to emissions from construction traffic (construction related vehicle and HDV movements) will be limited to sensitive receptors less than 200 m (TII, 2022) from road links which are affected by significant changes in traffic volume), including roads in the vicinity of Designated Sites of Nature Conservation Importance. As there are no affected roads, an assessment of construction traffic on designated sites has not been undertaken as significant effects are considered unlikely, negative, temporary - short-term and imperceptible and do not require further assessment.

11.4.3 Operational Phase

As discussed in Section 11.3, the existing environment at the site of the proposed development currently has a high standard in relation to air quality and current levels of key pollutants are significantly lower than their limit values.

Operational phase traffic has the potential to impact air quality. The 2022 TII scoping criteria outlined in Section 11.2 was used to determine if any of the impacted road links required a detailed modelling assessment.

The proposed amenity tracks and amenity car parks will also have a presence of vehicles during the operational phase while accessing and utilising the proposed amenity tracks. This vehicular activity will be intermittent and will have the potential to create nuisance dust and exhaust emissions locally.

The operational phase of the proposed development will involve occasional inspection and maintenance vehicles. By definition of the TII criteria referenced above, there are no road links deemed as affected as a result of the proposed development. Therefore, no further assessment using the 2022 TII guidance was required for the proposed development. Effects as a result of vehicle emissions are considered neutral, long-term and imperceptible and do not require further assessment.

The generation of electricity to the national grid will lead to a saving in terms of NO_X emissions. The wind farm will have an export capacity of approximately 132 MW and an assumed capacity factor of 29.2%[37] therefore the power generation from the development is expected to be approximately 337,645 MWh (Megawatt hours) of renewable electricity to the national grid per year

The supply of 337,645 MWh of electricity per year of renewable electricity to the national grid will lead to a net saving in terms of NO_X emissions which may have been emitted from fossil fuels to produce electricity. Results, outlined in Table 11-22, indicate that the impact of the wind farm on Ireland's target obligations under the Gothenburg Protocol and the Directive (EU) 2016/2284 is positive. The annual impact of the development is to decrease annual NO_X emission levels by 0.18% of the ceiling levels (relative to the NO_X emissions associated with power generation in Ireland 2020 (EPA, 2022d)). The total NO_X emissions savings over its 30-

[37]Energy in Ireland 2024 Report - seai.ie/sites/default/files/publications/energy-in-ireland-2024.pdf

year lifespan will amount to 3,789 tonnes of NO_X. This is considered a slight positive, long-term impact to air quality.

Table 11-22: Predicted Impact of the proposed development on Ireland's National Emissions Ceiling Obligations

Scenario	NOx (tonnes/annum)
Emissions Saved Due to Wind Farm [Note 1]	126.3
National Emission Ceiling for 2020-2029 (ceiling for 2030 onwards in parentheses) [Note 2]	68,410 (41,584)
Positive Impact of Wind farm (%) as a percentage of 2020-2029 National Emission Ceiling on an annual basis (figure for 2030 onwards ceiling also provided in parentheses)	0.18% (0.30%)

[Note 1] *For NO_X emissions associated with power generation in Ireland (taken from EPA (2021) Ireland's Air Pollutant Emissions 1990-2030*

[Note 2] *National Emission Ceiling (EU Directive 2016/2284) for 2020-2029 (68.41 kt)*

11.4.4 Decommissioning Phase

The wind turbines proposed as part of the proposed development are expected to have a lifespan of 30-years. Following the end of their lifespan, the wind turbines may be replaced with a new set of machines, subject to planning permission being obtained, or the site may be decommissioned fully, with the exception of the electricity substation.

Upon decommissioning of the proposed wind farm, the wind turbines would be disassembled in reverse order to how they were erected. All above ground turbine components would be separated and removed off-site for recycling. Turbine foundations would remain in place underground and would be covered with earth and allowed to revegetate or reseed as appropriate. Leaving the turbine foundations in-situ is considered a more environmentally prudent option, as to remove that volume of reinforced concrete from the ground could result in potentially significant environment nuisances such as noise, dust and/or vibration. The majority of the site roadways will be in use for additional purposes to the operation of the wind farm (such as a mature amenity and recreational use) by the time the decommissioning of the project is to be considered, and therefore it will be more appropriate to leave the site roads in situ for future use.

The on-site substation will not be removed at the end of the useful life of the wind farm project as it will form part of the national electricity network and will be managed by EirGrid/ESB. Therefore, the substation will be retained as a permanent structure and will not be decommissioned.

The activities required to facilitate wind turbine decommissioning and removal from site will be similar to those outlined for the construction phase, albeit to a lesser extent and duration than during the construction stage. Therefore, for the purposes of the assessment, it is anticipated that the impacts on air quality associated with decommissioning phase will be no greater than those identified for the construction phase.

11.5 MITIGATION MEASURES

11.5.1 Construction Phase

Regarding mitigation, the potential effects are mainly linked to dust emissions resulting from construction activities within the proposed wind farm site. Mitigation measures will need to be implemented. Ongoing proactive control of fugitive dust, rather than an inefficient attempt to control it once it has been released, will ensure the prevention of significant emissions.

Best practice (including industry recognised dust suppression techniques/equipment) will be used to minimise the potential for dust production during construction including, but not limited to, IAQM (2024) and the Good Practice Guide for Construction and Demolition (Dublin City Council, 2018).

The main contractor will be responsible for the coordination, implementation and ongoing monitoring of dust management measures. Potential effects arising from dust and exhaust emissions will be minimised through the implementation of such mitigation measures which will also be incorporated into the CEMP (see Appendix 3-2 of this EIAR) and are set out below.

General Site Management

Good site management will also include the ability to respond quickly to adverse weather conditions through effective control measures or restricting operations on-site before the potential for nuisance occurs. During periods of high wind (gales) particular care should be taken as these are conditions are where potential for significant dust emissions is most high.

In general the prevailing meteorological conditions in the area of the proposed wind farm are favourable for dust suppression for significant part of the year. However, there will be times when care is needed to ensure no dust nuisance occurs.

The Principal Contractor will be responsible for adherence to all dust control measures contained here and ensure that any other contractors working onsite demonstrate full compliance. The following measures shall be taken to ensure no dust nuisance at the site and site entrances:

- Develop and implement a stakeholder communications plan that includes community engagement before works commence on site. Community engagement includes explaining the nature and duration of the works to local residents and businesses;
- The name and contact details of a person to contact regarding air quality and dust issues shall be displayed on the site boundary, this notice board should also include head/regional office contact details;
- A complaints register will be kept on site detailing all telephone calls and letters of complaint received in connection with dust nuisance or air quality concerns, together with details of any remedial actions carried out;
- Daily inspections by site personnel to identify potential sources of dust generation along with implementation measures to remove causes where found;
- Review of the measures across the site to ensure they are appropriate and working.

Site Activities

The movement and storage of materials are important aspects to consider when managing site activities with regard to potential source of dust nuisance. The moisture content of materials stored and moved within the wind farm site should also be considered. The following measures shall be taken during construction within the proposed wind farm site:

- Minimisation of the extent of working areas;
- Stockpiling of excavated materials will be limited to the volumes required to practically meet the construction schedule;
- Only ready-mix concrete will be used on site and all concrete will be delivered in enclosed trucks which will reduce the potential for dust emissions;
- Soil and rock excavation and rock breaking during periods of high winds and dry weather conditions can be a significant source of dust. During dry and windy periods, and when there is a likelihood of dust nuisance, a bowser will operate to ensure moisture content is high enough to increase the stability of the soil and rock and thus suppress dust. During

periods of very high winds (gales), construction activities likely to generate significant dust emissions should be postponed until the gale has subsided;
- Drop heights of excavated materials into haulage vehicles will be minimised to a practicable level;
- Provision of dust suppression measures (e.g., sweeps/covers/water bowsers) will be used on stockpiles and the road surface during periods of extended dry weather;
- Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods;
- Onsite borrow pits will be used to minimise quantities of stone material being brought to site;
- Sporadic wetting of loose stone surface in the borrow pits will be carried out during the construction phase to minimise movement of dust particles to the air;
- The transport of construction materials from the borrow pits around the site will be undertaken in tarpaulin or similar covered vehicles, where necessary;
- Vehicles and plant will be routinely serviced to minimise the exhaust emissions during construction;
- Machinery will be switched off when not in use;
- Vehicles will not be left running unnecessarily and low emission fuels will be used where possible; and
- 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.

Site Traffic on Public Road and Site Entrance

Movement of vehicles along the road network to the proposed wind farm site and on the site roads are considered a potential source of dust nuisance and the following measures are to be take:

- Hard surface roads will be swept to remove mud and aggregate materials from their surface while any unsurfaced roads will be restricted to essential site traffic;
- Any road that has the potential to give rise to fugitive dust must be regularly watered, as appropriate, during dry and/or windy conditions;
- Traffic coming to site will only use the specified haul routes;
- Vehicles using site access tracks will have their speed restricted, and this speed restriction must be enforced rigidly. On any unsurfaced site access track, this will be 20 kph, and on hard surfaced access tracks as site management dictates;
- The use of a wheelwash near the site entrance (will prevent the transfer of dust from the construction works onto public roads). Vehicles exiting the site shall make use of the wheel wash facility where appropriate, prior to entering public roads;
- Public roads outside the site will be regularly inspected for cleanliness and cleaned as necessary; and
- During movement of materials both on and off-site, trucks will be stringently covered with tarpaulin at all times. Before entrance onto public roads, trucks will be adequately inspected to ensure no potential for dust emissions.

At all times, these procedures and those outlined within the CEMP will be strictly monitored and assessed. In the event of dust nuisance occurring outside the site boundary, movements of materials likely to raise dust will be curtailed and satisfactory procedures implemented to rectify the problem before the resumption of construction operations.

11.5.2 Operational Phase

During the operation phase of the proposed development routine maintenance works will be required, during which all contractors/staff will travel to site to utilise machinery and maintenance vehicles. All machinery and vehicles are to be properly maintained and switched off when not in use to avoid unnecessary exhaust emissions from maintenance traffic. All Maintenance vehicles brought onsite during the operational phase will be maintained in good operational order, thereby minimising any emissions that arise.

11.5.3 Decommissioning Phase

The activities required to facilitate wind turbine decommissioning and removal from site will be similar to those outlined for the construction phase, albeit to a lesser extent and duration than during the construction stage. Therefore, it is anticipated that the impacts on air quality associated with decommissioning phase will be no greater than those identified for the construction phase.

No additional mitigation specific to the decommissioning phase is proposed in respect of effects on air quality other than those identified for the construction phase at this time.

11.6 RESIDUAL EFFECTS

11.6.1 Construction Phase

There is anticipated to be an imperceptible short-term negative effect on air quality through dust generation and exhaust emissions during the construction stage, following the application of mitigation measures outlined above and, in the CEMP, (see Appendix 3-2 of this EIAR).

11.6.2 Operational Phase

In the context of an operational lifetime of 30-years, emissions of a number of pollutants associated with burning fossil fuels including NO_X, sulfur oxides (SO_X), PM and secondary pollutants, such as O_3, will be avoided at energy production facilities elsewhere in the country through the generation of renewable energy. The avoided emissions, therefore, result in a potentially imperceptible long-term, positive effect on air quality at those locations.

It is anticipated that the site activity (i.e., vehicles for maintenance and amenity use) will have a very localised long-term imperceptible negative effect on air quality through dust generation and exhaust emissions during the operational phase.

11.6.3 Decommissioning Phase

The decommissioning phase of the proposed development will likely be similar to the construction phase, albeit at a smaller scale. There is anticipated to be a short-term imperceptible negative effect on air quality due to dust and exhaust emissions.

11.7 CUMULATIVE EFFECTS

A list of all other existing and approved plans/projects and projects pending a decision from the planning authority is provided in Chapter 5 (Policy, Planning and Development Context) of this EIAR (including other wind farms and infrastructure developments in the vicinity) and these were all considered as part of this cumulative assessment.

There have been several applications submitted over the last number of years in Longford and the surrounding counties for wind farm development. Currently, the closest operational wind farm identified to the proposed wind farm site is the Sliabh Bawn Wind Farm (ABP Ref. 20.239743) located approximately 8 km northwest of the proposed development in County Roscommon. The site was commissioned in 2016 and has a capacity of 64 MW. Chapter 5 (Policy, Planning and Development Context) includes a review of wind farm developments identified within 20 km of the proposed wind farm (see Table 5-2, Chapter 5). Wind farm developments identified include:

- Skrine Wind Farm (ABP Ref. No. 208733) – Located approximately 20 km from the proposed wind farm (Connected);
- Derrane (Roxborough)Wind Farm (PA Ref. 11/126) – Located approximately 14.1 km from the proposed wind farm (Contracted);
- Derrane (Roxborough)Wind Farm extension (ABP-317459-23) - Located approximately 19.3 km from the proposed wind farm (Proposed);
- Single turbine and substation building ((ABP Ref. 319800-24) - Located approximately 17 km from the proposed wind farm (Proposed);
- Single turbine (PA Ref. 11/4099) - Located approximately 15 km from the proposed wind farm (Connected); and
- New Wind Farm (ABP Ref. 313750) - Located approximately 21 km west of the proposed wind farm (Proposed).

Should any other works or construction projects occur (e.g., construction of residential/agricultural/commercial developments, agricultural activity, works associated with maintenance of the existing nearby wind farms, Solar PV energy developments and nearby quarry activity) in the wider area at the same time as the construction of the proposed development, there will also be emissions (including dust and exhaust emissions from plant and machinery) associated with those other projects. Once the mitigation measures described in Section 11.5 are implemented, negative, short-term, not significant effects on air quality during construction are predicted.

During the operational phase of the proposed development, there will be a long-term, slight positive effect on air quality.

11.8 REFERENCES

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