

10. AIR QUALITY

10.1 Introduction

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

10.1.1 Background

For the purposes of this EIAR:

- > The **'Proposed Wind Farm'** refers to the 9 no. turbines and supporting infrastructure which is the subject of this Section 37E application.
- > The **'Proposed Grid Connection'** refers to the 110kV substation and supporting infrastructure which will be the subject of a separate Section 182A application.
- > The **'Proposed Project'** comprises the Proposed Wind Farm and the Proposed Grid Connection, all of which are located within the EIAR Study Boundary (the **'Site'**) and assessed together within this EIAR.

Please see section 1.1.1 of this EIAR for further details. A detailed description of the Proposed Project is provided in Chapter 4 of this EIAR.

The Proposed Project is located within a rural setting in north Tipperary, approximately 11km south of Roscrea Town and approximately 2.5km northeast of Templemore town centre. Landuse currently comprises a mix of pastoral agriculture and private forestry. The surrounding landuse predominantly comprises pastoral agriculture, and commercial and residential use along local roads and within Templemore town.

Due to the non-industrial nature of the Proposed Project and the general character of the surrounding environment, air quality sampling was deemed to be unnecessary for this EIAR. It is expected that air quality in the existing environment is good, since there are no major sources of air pollution (e.g., heavy industry) in the vicinity of the Site.

The production of energy from wind turbines has no direct emissions as is expected from coal or oil-based power stations. Harnessing more energy by means of wind farms will reduce dependency on oil, gas and coal power stations, thereby resulting in a reduction in harmful emissions that can be damaging to human health and the environment. Some minor indirect emissions associated with the construction of the Proposed Project include vehicular and dust emissions.

10.1.2 Statement of Authority

This chapter of the EIAR has been prepared by Karen Mulryan and reviewed by Michael Watson, of MKO. Karen is an Environmental Scientist with MKO with over 7 years' experience in the private consultancy sector. Karen holds a BA and a MSc in archaeology. Karen has a wide range of experience in the commercial sector including watching briefs, surveys and desk-based assessments for a wide range of projects including wind farms, solar farms, energy storage facilities, grid routes, mixed use and residential developments. Karen coordinates environmental assessments and site work for a wide range of developments such as solar, residential, energy storage, small wind projects. Karen has experience coordinating and managing Environmental Impact Assessment Reports and producing Air and Climate

chapters for EIARs including wind farms, feasibility studies and screening reports. Michael Watson, CENV, PGeo, MCIWM, is a Project Director and head of the Environment Team with over 20 years professional consultancy experience, most recently as project director and lead coordinator of environmental impact assessments for large-scale infrastructure and industrial projects. His areas of expertise include Project Management, Environmental Impact Assessment (EIA), Industrial Emissions, Waste and IPPC Licensing, Contaminated Land Assessment, Environmental Regulatory Compliance, Waste Management Planning and Environmental Monitoring. Michael has extensive experience as project strategy advisor & coordinator on large multi-disciplinary project teams on complex projects which includes Air and Climate Impact Assessments. Michael has a BA in Geography and Economics and a MSc in Environmental Resource Management and Geography.

10.1.3 Relevant Guidance and Legislation

The air quality and climate section of this EIAR is carried out in accordance with the 'EIA Directive' as amended by Directive 2014/52/EU and having regard, where relevant, to guidance listed below.

- > Air Quality Assessment of Proposed National Roads – Standard PE-ENV-01107' (Transport Infrastructure Ireland, December 2022).
- > Guidelines on the Information to be contained in Environmental Impact Assessment Reports – June 2022' (EPA, 2022).
- > Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report' (EC, 2017)
- > Environmental Protection Agency (2023) Air Quality in Ireland Report 2022.
- > Environmental Protection Agency (2021) Best Practice Guidelines on the Preparation of Resource and Waste Management Plans for Construction & Demolition Projects.
- > Environmental Protection Agency
- > Guidance on the Assessment of Dust from Demolition and Construction V1.1 (IAQM 2016);
- > Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes (TII 2011);
- > Guidelines for Assessment of Ecological Impacts of National Roads Schemes (TII 2009);
Rialtas na Éireann Clean Air Strategy for Ireland (April 2023)
- > UK Department of Environment Food and Rural Affairs (DEFRA) Part IV of the Environment Act 1995: Local Air Quality Management, LAQM.TG (16) (DEFRA 2018);
- > UK Highways Agency (UKHA) Design Manual for Roads and Bridges (DMRB) – LA
- > 105 Air Quality (UKHA 2019);
- > World Health Organization (WHO) Air Quality Guidelines for Particulate Matter, Ozone, Nitrogen Dioxide and Sulfur Dioxide Global Update 2005 (WHO 2005).

10.1.3.1 Air Quality Standards

In 1996, the Air Quality Framework Directive (96/62/EC) was published. This Directive was transposed into Irish law by the Environmental Protection Agency Act 1992 (Ambient Air Quality Assessment and Management) Regulations 1999. The Directive was followed by four Daughter Directives, which set out limit values for specific pollutants:

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

- > The third Daughter Directive, Council Directive (2002/3/EC) relating to ozone was published in 2002 and was transposed into Irish law by the Ozone in Ambient Air Regulations 2004 (SI No. 53 of 2004).
- > The fourth Daughter Directive¹, published in 2004, relates to polyaromatic hydrocarbons (PAHs), arsenic, nickel, cadmium and mercury in ambient air and was transposed into Irish law by the Arsenic, Cadmium, Mercury, Nickel and Polycyclic Aromatic Hydrocarbons in Ambient Air Regulations, 2009 (S.I. No. 58 of 2009).

The Air Quality Framework Directive and the first three Daughter Directives have been replaced by the Clean Air for Europe (CAFE) Directive (Directive 2008/50/EC on ambient air quality), which encompasses the following elements:

- > The merging of most of the existing legislation into a single Directive (except for the Fourth Daughter Directive) with no change to existing air quality objectives.
- > New air quality objectives for particulate matter less than 2.5 micrometers (μm) referred to as $\text{PM}_{2.5}$ including the limit value and exposure concentration reduction target.
- > The possibility to discount natural sources of pollution when assessing compliance against limit values.
- > The possibility for time extensions of three years for particulate matter less than $10\mu\text{m}$ (PM_{10}) or up to five years (nitrogen dioxide, benzene) for complying with limit values, based on conditions and the assessment by the European Commission.

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

The CAFE Directive was transposed into Irish legislation by the Air Quality Standards Regulations 2011 (S.I. No. 180 of 2011). These Regulations supersede the Air Quality Standards Regulations 2002 (S.I. No. 271 of 2002), the Ozone in Ambient Air Regulations 2004 (S.I. No. 53 of 2004) and the Ambient Air Quality Assessment and Management Regulations 1999 (S.I. No. 33 of 1999).

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

Pollutant	Limit Value Objective	Averaging Period	Limit Value ($\mu\text{g}/\text{m}^3$)	Limit Value (ppb)	Basis of Application of Limit Value	Attainment Date
Sulphur dioxide (SO_2)	Protection of Human Health	1 hour	350	132	Not to be exceeded more than 24 times in a calendar year	1st Jan 2005
Sulphur dioxide (SO_2)	Protection of human health	24 hours	125	47	Not to be exceeded more than 3 times in a	1st Jan 2005

¹ IEEP Fourth Daughter Directive 2004. Available at: <https://ieep.eu/publications/the-fourth-air-quality-daughter-directive-impacts-and-consequences-of-mandatory-limits/>

Pollutant	Limit Value Objective	Averaging Period	Limit Value ($\mu\text{g}/\text{m}^3$)	Limit Value (ppb)	Basis of Application of Limit Value	Attainment Date
					calendar year	
Sulphur dioxide (SO_2)	Upper assessment threshold for the protection of Human Health	24 hours	75	28	Not to be exceeded more than 3 times in a calendar year	1st Jan 2005
Sulphur dioxide (SO_2)	Lower assessment threshold for the protection of human health	24 hours	50	19	Not to be exceeded more than 3 times in a calendar year	1st Jan 2005
Sulphur dioxide (SO_2)	Protection of vegetation	Calendar year	20	7.5	Annual mean	19th Jul 2001
Sulphur dioxide (SO_2)	Protection of vegetation	1st Oct to 31st Mar	20	7.5	Winter mean	19th Jul 2001
Nitrogen dioxide (NO_2)	Protection of human health	1 hour	200	105	Not to be exceeded more than 18 times in a calendar year	1st Jan 2010
Nitrogen dioxide (NO_2)	Protection of human health	Calendar year	40	21	Annual mean	1st Jan 2010
Nitrogen dioxide (NO_2)	Upper assessment threshold for the protection of human health	1 hour	140	73	Not to be exceeded more than 18 times in a calendar year	1st Jan 2010
Nitrogen dioxide (NO_2)	Lower assessment threshold for the	1 hour	100	52	Not to be exceeded more than 18 times in	1st Jan 2010

Pollutant	Limit Value Objective	Averaging Period	Limit Value ($\mu\text{g}/\text{m}^3$)	Limit Value (ppb)	Basis of Application of Limit Value	Attainment Date
	protection of human health				a calendar year	
Nitrogen monoxide (NO) and nitrogen dioxide (NO ₂)	Protection of ecosystems	Calendar year	30	16	Annual mean	19th Jul 2001
Particulate matter 10 (PM ₁₀)	Protection of human health	24 hours	50	-	Not to be exceeded more than 35 times in a calendar year	1st Jan 2005
Particulate matter 10 (PM ₁₀)	Upper assessment threshold for the protection of human health	24 hours	30	-	Not to be exceeded more than 7 times in a calendar year	Based on the indicative limit values for 1 January 2010
Particulate matter 10 (PM ₁₀)	Lower assessment threshold for the protection of human health	24 hours	20	-	Not to be exceeded more than 7 times in a calendar year	Based on the indicative limit values for 1 January 2010
Particulate matter 2.5 (PM _{2.5})	Protection of human health	Calendar year	40	-	Annual mean	1st Jan 2005
Particulate matter 2.5 (PM _{2.5}) Stage 1	Protection of human health	Calendar year	25	-	Annual mean	1st Jan 2015
Particulate matter 2.5 (PM _{2.5}) Stage 2	Protection of human health	Calendar year	20	-	Annual mean	1st Jan 2020
Lead (Pb)	Protection of human health	Calendar year	0.5	-	Annual mean	1st Jan 2005

Pollutant	Limit Value Objective	Averaging Period	Limit Value ($\mu\text{g}/\text{m}^3$)	Limit Value (ppb)	Basis of Application of Limit Value	Attainment Date
Carbon Monoxide (CO)	Protection of human health	8 hours	10,000	8,620	-	1st Jan 2005
Benzene (C_6H_6)	Protection of human health	Calendar Year	5	1.5	-	1st Jan 2010

The Ozone Daughter Directive 2008/50/EC is different from the other Daughter Directives in that it sets target values and long-term objectives for ozone rather than limit values. Table 10-2 presents the limit and target values for ozone.

Table 10-2 Target values for Ozone Defined in Directive 2008/50/EC.

Objective	Parameter	Target Value for 2010	Target Value for 2020
Protection of human health	Maximum daily 8-hour mean	120 mg/m^3 not to be exceeded more than 25 days per calendar year averaged over 3 years	120 mg/m^3
Protection of vegetation	AOT ₄₀ * calculated from 1-hour values from May to July	18,000 $\text{mg}/\text{m}^3\cdot\text{h}$ averaged over 5 years	6,000 $\text{mg}/\text{m}^3\cdot\text{h}$
Information Threshold	1-hour average	180 mg/m^3	-
Alert Threshold	1-hour average	240 mg/m^3	-

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

On the 26th of October 2022 the EU Commission announced a proposed review of Air Quality Standards. The proposed revision will set interim 2030 EU air quality standards, seeking to align more closely with WHO recommendations, while putting the EU on a trajectory to achieve zero pollution for air at the latest by 2050, in synergy with climate-neutrality efforts. To this end, regular reviews of the air quality standards are proposed to reassess them in line with latest scientific evidence as well as societal and technological developments. The first review is proposed to take place by the end of 2028, with the objective of ensuring full alignment with WHO recommendations.²

² [1] https://environment.ec.europa.eu/topics/air/air-quality/revision-ambient-air-quality-directives_en

10.1.3.2 Air Quality and Health

In September 2023, the Environmental Protection Agency (EPA) published 'Air Quality in Ireland 2022' which reports that although air quality in Ireland is generally good, there are concerning localised issues. Fine particulate matter (PM_{2.5}) from solid fuel combustion and nitrogen dioxide (NO₂) from vehicle emissions are the main pollutants. People's health and the health of our environment is impacted by these pollutants. Ireland's ambition in the 'Clean Air Strategy for Ireland' (discussed below) is to move towards the World Health Organisation (WHO) Air Quality guidelines, this will be challenging but will have a significantly positive impact on health.

The European Environmental Agency (EEA) Report, 'Air Quality in Europe – 2022 Report' highlights the negative effects of air pollution on human health across the EU. The report assessed that poor air quality accounted for premature deaths of approximately 238,000 people in the 27 EU Member States in 2021 and in 2020 in the European Union, 96% of the urban population was exposed to levels of fine particulate matter above the health-based guideline level set by the World Health Organization. Furthermore, in 2020, damaging levels of nitrogen deposition to ecosystems were exceeded in 75% of the total ecosystem area in the EU-27. This represents a fall of 12% since 2005.

These emissions, along with others including sulphur oxides, carbon monoxide, benzene and lead are produced during fossil fuel-based electricity generation and traffic in various amounts, depending on the fuel and technology used. Whilst there is the potential of such emissions to be generated from the site operations, several mitigation measures will be implemented at the Site to reduce the impact from dust and vehicle emissions, which are discussed in Section 10.2 below.

10.1.3.2.1 Clean Air Strategy for Ireland 2023

Ireland's Clean Air Strategy 2023³ sets out the detail of seven strategic frameworks that will be used to ensure that air quality continues to improve. The aims of these key strategic frameworks are:

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

³ *Rialtas na hÉireann Clean Air Strategy April 2023. Available at: <https://www.gov.ie/en/publication/927e0-clean-air-strategy/#:~:text=The%20Clean%20Air%20Strategy%20provides,delivering%20on%20wider%20national%20objectives.>*

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



Chapter 11 of the Clean Air Strategy discusses Air Quality Policy Development. The chapter discusses energy policy and acknowledges how the States accelerated transition to renewable electricity will be critical to successfully meeting the ambitious renewable energy and greenhouse gas emission reduction targets outlined in the European Green Deal and Ireland’s Climate Action Plan 2023, as well as to protecting against security of supply risks and removal of fossil fuels from power generation. Wind (offshore and onshore) and solar energy will be the leading cost-effective technologies to achieve our energy and emissions targets, as well as displacing emissions in other sectors, including household heating and vehicle transport, including household heating and vehicle transport.

10.1.4 Methodology

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

10.1.4.1 Air Quality Zones

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

- > Zone A: Dublin
- > Zone B: Cork
- > Zone C: Other cities and large towns including Limerick, Galway, Mullingar
- > Zone D: Rural Ireland, i.e., the remainder of the State excluding Zones A, B and C.

These zones were defined to meet the criteria for air quality monitoring, assessment and management described in the Cafe Directive 2008/50/EC, and Daughter Directives. The Site lies within Zone D which represents rural areas located away from large population centres.

10.1.4.2 Air Quality Data Review

The EPA publishes Air Monitoring Station Reports for monitoring locations in all four Air Quality Zones. The most recent report on air quality in Ireland, ‘Air Quality in Ireland 2020’ was published by the EPA in 2021. The EPA reports provide SO₂, PM₁₀, NO₂ and O₃ concentrations for areas in Zone D. These are detailed in the Baseline Air Quality section.

10.1.4.3 Dust

The Institute of Air Quality Management in the UK (IAQM) guidance document ‘*Guidance on the Assessment of Dust from Demolition and Construction*’ (2014) was considered. The Guidance document outlines an assessment method for predicting the impact of dust emissions from construction activities based on the scale and nature of the works and the sensitivity of the area to dust impacts. This methodology has been used to predict the likely risk of dust as a result of the construction phase works, operational phase activities and decommissioning phase. The use of UK guidance is considered best practice in the absence of applicable Irish guidance. The major dust generating activities are divided into four types within the IAQM guidance (2014) to reflect their different potential impacts. These are:

- > Demolition (There are no demolition works required for any phase of the Proposed Project)
- > Earthworks.
- > Construction.
- > Trackout. The transport of dust and dirt from the construction / demolition site onto the public road network, where it may be deposited and then re-suspended by vehicles using the network. This arises when Heavy Goods Vehicles (HGVs) leave the construction / demolition site with dusty materials, which may then spill onto the road, and/or when HGVs transfer dust and dirt onto the road having travelled over muddy ground on site.

The magnitude of the three remaining categories is divided into Large, Medium or Small scale depending on the nature of the activities involved. The magnitude of each activity is combined with the overall sensitivity of the area to determine the risk of dust impacts from site activities. For the purposes of this assessment, high sensitivity receptors are regarded as properties where people are likely to spend most of their time and are referred to as ‘Sensitive Properties’. Commercial properties and places of work are regarded as medium sensitivity while low sensitivity receptors are places where people are present for short periods or do not expect a high level of amenity. Dust deposition impacts can occur for a distance of 350m from works areas, but the majority of deposition occurs within the first 50m (IAQM, 2014).

Table 10-3 Sensitivity of the Area to Dust Soiling Effects on People and Property. *Guidance on the Assessment of Dust from Demolition and Construction (IAQM, 2014)*

Receptor Sensitivity	Number Of Receptors	Distance from source (m)			
		<20	<50	<100	<350
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

The IAQM categorises of dust emissions from HGVs into three groups relating to the volume of HGV movements:

- > Large: 50 HGV outward (offsite) movements or more per day, moderately dusty surface material, unpaved road greater than 100m
- > Medium: 10-50 HGV outward movements per day, surface material with low potential for dust release, unpaved road length 50 m – 100 m;
- > Small: less than 10 HGV outward movements per day, unpaved road length of less than 50m.

The category is combined with the sensitivity of area established from the dust soiling effect assessment in Table 10-3 above to determine the impact from dust emissions through the transportation of HGVs to and from the construction site in Table 10-4.

Table 10-4 Risk of Dust Impacts from Trackout. Guidance on the Assessment of Dust from Demolition and Construction (IAQM, 2014)

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible Risk

As current activities at the Site and surrounding landscape area non-industrial in nature, air quality sampling was deemed to be unnecessary for this EIAR. The potential impact and significance of effects on air quality from emissions listed above during the construction, operation and decommissioning of the Proposed Project is assessed.

10.1.5 Baseline Air Quality

The air quality in the vicinity of the Proposed Project is typical of that of rural areas of Ireland, i.e., Zone D. Prevailing south-westerly winds carry clean, unpolluted air from the Atlantic Ocean onto the Irish mainland. The EPA publishes Air Monitoring Station Reports for monitoring locations in all four Air Quality Zones. The most recent report on air quality in Ireland, 'Air Quality in Ireland 2022' was published by the EPA in 2023. The EPA reports provide SO₂, PM₁₀, NO₂ and O₃ concentrations for areas in Zone D. These are detailed in the following tables.

10.1.5.1 Sulphur Dioxide (SO₂)

Sulphur dioxide data collected in 2022 at Cork Harbour, Kilkitt, Co. Monaghan, Askeaton in Co. Limerick and Letterkenny i.e. representative values for the State, is presented in Table 10-5.

Table 10-5 Average Sulphur Dioxide Data for Zone D Sites in 2021

Parameter	Measurement (ug/m ³)
Annual Mean	5.0
Hourly values > 350	0.0
Hourly max	83.6
Daily values > 125	0
Daily max	22.8

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

10.1.5.2 Particulate Matter (PM_{10})

Sources of particulate matter include vehicle exhaust emissions, soil and road surfaces, construction works and industrial emissions. The 2023 EPA report provide annual mean PM_{10} concentration for sixteen Zone D towns: Tipperary Town, Carrick-on-Shannon, Enniscorthy, Birr, Askeaton, Macroom, Castlebar, Cobh Carrignafof, Claremorris, Kilkitt, Cavan, Edenderry, Mallow, Longford, Cobh Cork Harbour and Roscommon Town. Particulate matter (PM_{10}) data for 2022 is presented in Table 10-6.

Table 10-6 Average Particulate Matter (PM_{10}) Data for Zone D Sites in 2021

Parameter	Measurement ($\mu\text{g}/\text{m}^3$)
Annual Mean	12.7
% Data Capture	93.2
Values > 50 $\mu\text{g}/\text{m}^3$	Max 10
Daily Max	56.5

The daily limit of 50 $\mu\text{g}/\text{m}^3$ for the protection of human health was exceeded on 40 days which is greater than the PM_{10} daily limit for the protection of human health of a max 35 days >50 $\mu\text{g}/\text{m}^3$ applicable from 2005. The greatest number of exceedances occurred at Edenderry where the PM_{10} daily limit was exceeded on 10 occasions. In the EPA 2022 report, it notes that there were EPA were breaches in the levels of particulate matter (PM) which in Ireland mainly comes from the burning of solid fuel, such as coal, peat, and wood to heat our homes.”

10.1.5.3 Nitrogen Dioxide (NO_2)

Nitrogen dioxide data for Emo Court, Birr, Castlebar, Carrick-on-Shannon and Kilkitt in 2022 is presented in Table 10-7.

Table 10-7 Average Nitrogen Dioxide Data for Zone D Sites in 2021

Parameter	Measurement ($\mu\text{g}/\text{m}^3$)
Annual Mean	7.5
NO_2 Values >200	0
Values > 140 (UAT)	1
Values >100 (LAT)	4
Hourly Max.	87.3

The annual NO_2 value was below the annual mean limit value for the protection of human health of 40 $\mu\text{g}/\text{m}^3$. The lower and upper assessment thresholds of 100 and 140 $\mu\text{g}/\text{m}^3$ were exceeded a total of 5 times across all stations during the monitoring period. The average hourly max. NO_2 value of 87.3 $\mu\text{g}/\text{m}^3$ measured during the monitoring period was below the hourly max threshold of 200 $\mu\text{g}/\text{m}^3$. It would be

expected that NO₂ values at the Site would be similar or lower than those recorded for the Zone D sites above.

10.1.5.4 Carbon Monoxide (CO)

The 2023 EPA report provide rolling 8-hour carbon monoxide concentrations for Birr a zone D site. Carbon Monoxide data for 2021 is presented in Table 10-8.

Table 10-8 Carbon Monoxide Data for Birr - Zone D Site in 2022

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

The average concentration of carbon monoxide was 0.8 mg/m³. The carbon monoxide limit value for the protection of human health is 10,000 µg/m³ (or 10mg/m³). On no occasions were values in excess of the 10 mg limit value set out in Directives 2000/69/EC or 2008/69/EC.

10.1.5.5 Ozone (O₃)

The 2023 EPA report provide rolling 8-hour ozone concentrations for seven Zone D sites, Emo Court, Kilkitt, Carnsore Point, Mace Head, Castlebar, Valentia and Malin Head. Ozone (O₃) data for 2022 is presented in Table 10-9. As can be observed there were no exceedances of the maximum daily eight-hour mean limit of 120 µg/m³. The legislation stipulates that this limit should not be exceeded on more than 25 days.

Table 10-9 Average Ozone Data for Zone D Sites in 2022

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

10.1.5.6 Dust

There are no statutory limits for dust deposition in Ireland. The German TA-Luft standard for dust deposition sets a maximum permissible emission level for dust deposition of 350 mg/m²/day. Recommendations from the Department of the Environment, Health & Local Government⁴ apply the Bergerhoff limit of 350 mg/m²/day to the site boundary of quarries. This limit value can also be

⁴ DOEHLG (2004) Quarries and Ancillary Activities, Guidelines for Planning Authorities

implemented with regard to dust impacts from construction activities associated with the Proposed Project.

Existing Sensitive Receptors

According to the Institute of Air Quality Management in the UK (IAQM) guidance document ‘*Guidance on the Assessment of Dust from Demolition and Construction*’ (2014), dust deposition impacts can occur for a distance of 350m from works areas, but the majority of deposition occurs within the first 50m (IAQM, 2014). According to the IAQM guidance, residences are considered to *high sensitivity receptors* as these are places where people are likely to spend most of their time. For the purpose of this EIAR, residences are referred to as ‘Sensitive Properties’. Commercial properties and places of work are regarded as medium sensitivity while low sensitivity receptors are places where people are present for short periods or do not expect a high level of amenity.

As detailed in Chapter 3 of this EIAR, all sensitive properties within 2km of the Site boundary were identified and mapped as part of the constraint identification and mapping process. In addition, a planning history search to identify properties that may have been granted planning permission, but not yet been constructed, was carried out. These properties were also added to the sensitive properties’ dataset and used throughout this EIAR to determine the potential impacts on these sensitive properties during the construction, operation and decommissioning phases of the Proposed Project. This dataset indicates:

There is 1 no. Sensitive Property within 20m of the Proposed Project footprint;

- > There are 8 no. Sensitive Properties within 50m of the Proposed Project footprint (6 of which are within the 50m of the proposed grid route connection);
- > There are 10 no. Sensitive Properties within 100m of the Proposed Project footprint (6 of which are within the 100m of the proposed grid route connection);
- > There are 28 no. Sensitive Properties within 350m of the Proposed Project footprint (16 of which are within 350m of the proposed grid route connection and 3 of which are involved landowners, H004, H057 and H072); where construction activities with the potential to generate dust can occur.

10.2 Likely Significant Effects and Associated Mitigation Measures

10.2.1 ‘Do-Nothing’ Effect

If the Proposed Project were not to proceed, the current agricultural practises would likely to continue, and the air quality would likely remain similar to current status recorded for Zone D areas. However, the opportunity to reduce emissions of carbon dioxide, oxides of nitrogen (NO_x), and sulphur dioxide (SO₂) to the atmosphere would be lost due to the continued dependence on electricity derived from coal, oil and gas-fired power stations, rather than renewable energy sources such as the Proposed Project. This will result in an indirect negative impact on air quality nationally, regionally and locally.

If the Proposed Project were not to proceed, the opportunity to capture part of Tipperary’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.

If the Proposed Project were not to proceed, the opportunity to restore a segment of the Eastwood River by improving channel stability, instream habitat and establishing a natural wooded riparian buffer would be lost. Please see Appendix 6-4 Biodiversity Management and Enhancement Plan for details.

10.2.2 Construction Phase

10.2.2.1 Exhaust Emissions: Construction of Proposed Project Infrastructure

Identification of Impact

Proposed Wind Farm

Exhaust emissions associated with vehicles and plant such as NO₂, Benzene and PM₁₀ will arise as a result of construction activities.

The construction of turbines and associated foundations and hard-standing areas, Meteorological Mast, Access Roads, Temporary Construction Compound, Underground Cabling, Site Drainage, Tree Felling, and all ancillary works and apparatus, will require the operation of construction vehicles and plant on and off-site, and the transport of workers to and from the Site. Therefore, this is considered a short-term, slight, negative impact on air quality.

The proposed borrow pit located in the townland of Knockanroe will require the use of construction machinery and plant, thereby giving rise to exhaust emissions. The borrow pit location is approx. 250m from the nearest involved landowner and approx. 300m from the nearest non-involved landowners. The potential effect from exhaust emissions will not be significant and will be restricted to the duration of the construction phase and localised to works areas. Therefore, this is considered a short-term, slight, negative impact on air quality.

The construction of the spoil management areas will require the use of construction machinery and plant, thereby giving rise to exhaust emissions. Therefore, this is considered a short-term, slight, negative impact on air quality.

As part of the Proposed Wind Farm, it is proposed to restore a segment of the Eastwood River channel with a view to improving stability of the channel and restoring in stream habitat. Please see Appendix 6-4 Biodiversity Management and Enhancement Plan- for details. The construction of the new channel and backfilling of the old will require the use of an excavator thereby giving rise to exhaust emissions. Therefore, this is considered a short-term, slight, negative impact on air quality.

Proposed Grid Connection

The construction of the permanent 110kV substation, temporary construction compound, underground grid connection cabling, and end masts will require the operation of construction vehicles and plant on and off-site, and the transport of workers to and from the Site. This potential effect will not be significant and will be restricted to the duration of the construction phase and localised to works areas. Therefore, this is considered an indirect short-term, slight, negative impact on air quality.

Mitigation & Monitoring Measures for the Proposed Project

1. Proposed Project Construction staff will be trained how to inspect and maintain construction vehicles and plant to ensure good operational order while onsite, thereby minimising any emissions that arise. The Site Supervisor/Construction Manager produce and follow a site inspection and machinery checklist which will be followed and updated if/when required.
2. All plant and materials vehicles shall be stored in dedicated areas (on-site). Machinery will be switched off when not in use.

3. Turbines and construction materials will be transported to the site on specified routes only, unless otherwise agreed with the Planning Authority. Please see Chapter 15 Material Assets for details.
4. All plant and materials vehicles shall be stored in dedicated areas (on-site).
5. Areas of excavation will be kept to a minimum, and stockpiling will be minimised by coordinating excavation, spreading and compaction.
6. The expected waste volumes generated onsite are unlikely to be large enough to warrant source segregation at the Site. Therefore, all wastes streams generated onsite will be deposited into a single waste skip which will be covered. This waste material will be transferred to a licensed /permitted Materials Recovery Facility (MRF) by a fully licensed waste contractor where the waste will be sorted into individual waste streams for recycling, recovery or disposal. The MRF facility will be local to the Site to reduce the emissions associated with vehicle movements. There are several licenced waste treatment facilities located outside of Thurles, approximately 18km to the south of the Site.
7. Aggregate materials for the construction of the Proposed Wind Farm infrastructure will be predominantly sourced onsite.
8. A Construction and Environmental Management Plan (CEMP) will be in place throughout the construction phase (see Appendix 4-3).

Residual Impacts

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

Significance of Effects

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

10.2.2.2 Exhaust Emissions: Transportation to and from the Site

Identification of Impact

Proposed Wind Farm

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

Proposed Grid Connection

The transport of substation infrastructure, construction vehicles, aggregate material, waste removal vehicles and construction staff to/from the site for the construction of the Proposed Grid Connection (which will occur on specified routes only, see in Chapter 4 Description of this EIAR), the departure of empty vehicles and/or minor waste volumes (please see accompanying CEMP Appendix 4-3) from the site and daily staff movements, will give rise to exhaust emissions associated with the transport vehicles.

Mitigation & Monitoring Measures for the Proposed Project

- > Measures listed in section 10.2.2.1 above pertaining to exhaust emissions will be implemented for the transportation of vehicles to and from the Site.
- > Aggregate materials for the construction of site access tracks and all associated infrastructure will all be locally sourced, where possible, which will further reduce potential emissions.
- > Turbines and construction materials will be transported to the site on specified haul routes only.
- > Waste material will be transferred to a licensed /permitted Materials Recovery Facility (MRF) by a fully licensed waste contractor where the waste will be sorted into individual waste streams for recycling, recovery or disposal. The MRF facility will be local to the Site to reduce the amount of emissions associated with vehicle movements.
- > A Construction and Environmental Management Plan (CEMP) will be in place throughout the construction phase (see Appendix 4-3).

Residual Impact

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

Significance of Effects

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

10.2.2.3 Dust Emissions: Construction of Proposed Project Infrastructure

Identification of Impact

Proposed Wind Farm

The construction of turbines and associated foundations and hard-standing areas, Meteorological Mast, Access Roads, Temporary Construction Compound, Underground Cabling, Site Drainage, Tree Felling, and all ancillary works and apparatus will give rise to dust emissions.

The majority of the construction materials for the Proposed Wind Farm will be won onsite from the temporary borrow pit where an estimated 70,000m³ of materials will be extracted.

The removal of the topsoil followed by its transportation and deposition at the spoil management area during the construction phase will give rise to dust emissions.

The construction of the new segment of the Eastwood River and the blocking of the old channel with stone materials as part of the Proposed Project enhancement proposal, will give rise to dust emissions. Therefore, this is considered a short-term, slight, negative impact on air quality.

Proposed Grid Connection

The construction of the Proposed Grid Connection (permanent 110kV substation, temporary construction compound, underground grid connection cabling, end masts) will give rise to dust emissions. It is proposed to provide construction grade materials (approx. 17,700m³) for the Grid Connection infrastructure from local licenced quarries. Please see Figure 4-18 for locations.

The IAQM methodology for *the Assessment of Dust from Demolition and Construction* as discussed in section 10.1.4.3 is used to predict the likely risk of dust impacts as a result of the construction works. Dust deposition impacts can occur for a distance of 350m from works areas, but the majority of deposition occurs within the first 50m (IAQM, 2014). As discussed in section 10.1.5.6, the above Sensitive Properties were derived from the constraints identification and mapping process, detailed and updated planning search which informed the project sensitive property dataset.

- > There is 1 no. Sensitive Property located approx. 20m of the Proposed Project footprint;
- > There are 8 no. Sensitive Properties within 50m of the Proposed Project footprint (6 of which are within the 50m of the proposed grid route connection);
- > There are 10 no. Sensitive Properties within 100m of the Proposed Project footprint (6 of which are within the 100m of the proposed grid route connection);
- > There are 28 no. Sensitive Properties within 350m of the Proposed Project footprint (16 of which are within 350m of the proposed grid route connection and 3 of which are involved landowners; H004, H057 and H072); where construction activities with the potential to generate dust can occur.

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

Table 10-10 Sensitivity of the Area to Dust Soiling Effects on People and Property. Guidance on the Assessment of Dust from Demolition and Construction (IAQM, 2014)

Receptor Sensitivity	Number Of Receptors	Distance from source (m)			
		<20	<50	<100	<350
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

Mitigation & Monitoring Measures for the Proposed Project

- > Sporadic wetting of loose stone surface will be carried out during the construction phase to minimise movement of dust particles to the air. In periods of extended dry weather, dust suppression may be necessary along haul roads to ensure dust does not cause a nuisance. Water bowser movements will be carefully monitored to avoid, insofar as reasonably possible, increased runoff.
- > All plant and materials vehicles shall be stored in dedicated areas within the Site.
- > Areas of excavation will be kept to a minimum, and stockpiling will be minimised by coordinating excavation, spreading and compaction.
- > Turbines and construction traffic will be transported to the site on specified haul routes only.
- > The agreed haul route road adjacent to the Site will be regularly inspected for cleanliness and cleaned as necessary.

- > The roads adjacent to the site entrances will be checked weekly or damage/potholes and repaired as necessary.
- > The transportation of materials from the borrow pit around the Site will be covered by tarpaulin or similar covered vehicles where necessary.
- > The transportation of construction materials from locally sourced quarries for the Proposed Grid Connection infrastructure and a small volume for the Proposed Wind Farm to the Site will be covered by tarpaulin where necessary.
- > If necessary, excavated material will be dampened prior to transport to the spoil management areas.
- > A Construction and Environmental Management Plan (CEMP) will be in place throughout the construction phase (see Appendix 4-3). The CEMP includes dust suppression measures.

Residual Impact

With the implementation of the above, it is considered to be a short-term imperceptible negative impact on air quality brought about by dust emissions generated during the construction activities of the Proposed Project.

Significance of Effects

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

10.2.2.4 Dust Emissions: Transportation to and from the Site

Identification of Impact

Proposed Wind Farm

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

Proposed Grid Connection

The transport of substation infrastructure, construction vehicles, aggregate material, waste removal vehicles and construction staff to/from the site for the construction of the Proposed Grid Connection will also give rise to some localised dust emissions during periods of dry weather.

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

The construction phase timeframe for the Proposed Project is 18–24 months. The shortest construction period will give rise to higher volumes of construction traffic using the public road network at any one time. For assessment purposes a standard 255 working days per annum was adopted equating to 383 working days for over an 18-month construction period. The total additional HGV numbers generated on public roads during the construction phase will be greater than 50+ HGVs per day. Please see Chapter 15 Material Assets for details on traffic volumes. Based on the methodology detailed in section 10.1.4.3, this is considered a large level of dust emissions from trackout. Combined with the established sensitivity

of the area of as **Low** (Table 10-10, Table 10-11, Table 10-12 and Table 10-13 above), the dust emission magnitude for the transportation of materials to and from site is **Low** which is assessed as a short-term slight negative impact. Mitigation measures to reduce the significance of this effect are presented in Table 10-14 below.

Table 10-11 Risk of Dust Impacts from Trackout. Guidance on the Assessment of Dust from Demolition and Construction (IAQM, 2014)

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

Mitigation & Monitoring Measures for the Proposed Project

- > Sporadic wetting of loose stone surface will be carried out during the construction phase to minimise movement of dust particles to the air. In periods of extended dry weather, dust suppression may be necessary along haul roads to ensure dust does not cause a nuisance. Water bowser movements will be carefully monitored to avoid, insofar as reasonably possible, increased runoff.
- > All plant and materials vehicles shall be stored in dedicated areas within the Site.
- > Turbines and construction vehicles will be transported to the site on specified haul routes only.
- > Grid connection infrastructure will be transported to the site on specified haul routes only.
- > Construction materials for the Proposed Grid Connection and a small volume for the Proposed Wind Farm will be sourced locally from licenced quarries.
- > The agreed haul route roads adjacent to the site will be regularly inspected for cleanliness and cleaned as necessary.
- > The roads adjacent to the site entrances will be checked weekly or damage/potholes and repaired as necessary.
The transport of construction materials around the Site from the onsite borrow pit and to the Site for the Proposed Grid Connection will be covered by tarpaulin where necessary.
- > Waste material will be transferred to a licensed /permitted Materials Recovery Facility (MRF) by a fully licensed waste contractor where the waste will be sorted into individual waste streams for recycling, recovery or disposal. The MRF facility will be local to the Site to reduce the amount of emissions associated with vehicle movements
- > A Construction and Environmental Management Plan (CEMP) will be in place throughout the construction phase (see Appendix 4-3).

Residual Impact

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

Significance of Effects

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

10.2.3 Operational Phase

10.2.3.1 Exhaust Emissions: Proposed Project Infrastructure

Identification of Impact

Proposed Wind Farm

The operational phase of the Proposed Project will generate additional traffic to the area in the form of light goods vehicles (LGVs) visiting the Site 1-2 times per day for inspections but on occasion, daily visits by LGVs and HGVs may be required over short periods during maintenance/component replacement activities. The addition of a LGV to the area 1-2 times per day during the operational phase will give rise to a long-term imperceptible negative impact on air quality. The addition of several HGVs on occasion over the 30-year lifetime of the Proposed Project will give rise to a long-term imperceptible negative impact on air quality due to exhaust emissions.

Identification of Impact

Proposed Grid Connection

The permanent 110kV substation will be operated and maintained by Eirgrid. It is anticipated that substation operators will visit the site 1-2 times per day in LGVs but on occasion, HGVs may be required to visit the site for maintenance/substation component replacement. On occasion, the removal of hydrocarbons (transformer oil) and waste from substation welfare facilities will be removed from site by a licenced waste disposal company. The addition of a LGV to the area 1-2 times per day type during the operational phase will give rise to a long-term imperceptible negative impact on air quality. The addition of several HGVs on occasion over the 30-year lifetime of the Proposed Project will give rise to a long-term imperceptible negative impact on air quality.

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

Mitigation & Monitoring Measures for the Proposed Project

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

Residual Impact

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

Significance of Effects

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

10.2.3.2 Dust Emissions: Proposed Project Infrastructure

Identification of Impact

Proposed Wind Farm

As discussed above in section 10.2.3.1, the operational phase of the Proposed Project will generate additional traffic to the area in the form of LGVs 1-2 visits per day and on occasion, daily LGVs and HGVs for short periods if maintenance or component replacement is required. This additional traffic may give rise to dust emissions. This will be a long-term imperceptible negative impact on air quality due to dust emissions.

Identification of Impact

Proposed Grid Connection

As discussed above in section 10.2.3.1, the permanent 110kV substation will be operated and maintained by EirGrid who may be required to visit the Site 1-2 times per day but on occasion, HGVs maybe required to visit the site for maintenance/substation component replacement. This additional traffic may give rise to dust emissions. This will be a long-term imperceptible negative impact on air quality due to dust emissions.

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

Mitigation & Monitoring Measures for the Proposed Project

- > Maintenance vehicles brought onsite during the operational phase will be maintained in good operational order, thereby minimising any dust emissions that arise.
- > Waste material will be transferred to a licensed /permitted Materials Recovery Facility (MRF) by a fully licensed waste contractor where the waste will be sorted into individual waste streams for recycling, recovery or disposal. The MRF facility will be local to the Site to reduce the emissions associated with vehicle movements.

Residual Impact

Based on the above, the impact on air quality from dust emissions during the operational phase is a Long-term Imperceptible Negative Impact.

Significance of Effects

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

10.2.4 Overall Impact On Air Quality

10.2.4.1 Operational Phase: Carbon Offsetting

Although a long term negative imperceptible impact on air quality is expected during the operational phase due to exhaust and dust emissions from maintenance vehicles, there will be no net carbon dioxide (CO₂) emissions from operation of the Proposed Project. By providing an alternative to electricity derived from coal, oil or gas-fired power stations, the Proposed Project will result in emission savings of carbon dioxide (CO₂), oxides of nitrogen (NO_x), and sulphur dioxide (SO₂). The production of renewable energy from the Proposed Project will have a long-term significant positive impact on air quality due to the offsetting of approximately 58,808 tonnes of Carbon Dioxide (CO₂) per annum or 1,764,240 tonnes over its operational life. Please see Chapter 11 Climate for further details on carbon displacement calculations.

Residual Impact

The overall impact will be a Long-term Moderate Positive Impact on air quality due to the offsetting of approximately 58,808 tonnes of CO₂ per annum or 1,764,240 tonnes over its operational life (see Chapter 11 for details), due to the provision of renewable energy in the range of approximately 47,000 Irish households with electricity per year.

Significance of Effects

Based on the assessment above there will be long-term Moderate Positive effect on Air Quality.

10.2.5 Decommissioning Phase

The Proposed Wind Farm is seeking permission for an operational life of 30 years. Wind turbines are expected to have a lifespan of approximately 30-35 years. Following the end of their life, the wind turbines may be replaced with a new set of turbines, subject to planning permission being obtained, or the Proposed Wind Farm may be decommissioned fully. The Proposed Grid Connection onsite substation and underground electrical cabling will remain in place as it will be under the ownership of EirGrid.

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

10.3 Cumulative and In-combination Assessment

The potential for impact between the Proposed Project, and other relevant developments has been carried out with the purpose of identifying what influence the Proposed Project (Proposed Wind Farm and Proposed Grid Connection combined) will have on the surrounding environment when considered cumulatively and in combination with relevant existing permitted or proposed projects and plans in the vicinity of the Site, as set out in Chapter 2 of this EIAR. Please see Section 2.8 of Chapter 2 for cumulative assessment methodology.

During the construction phase of the Proposed Project and the construction of other permitted or proposed projects and plans in the area (please see Section 2.8 in Chapter 2 and **Appendix 2-1** of this EIAR), there will be emissions from construction plant and machinery and potential dust emissions associated with the construction activities. However, once the mitigation proposals, as outlined in the above assessment are implemented during the construction phase of the Proposed Project, there will be no cumulative negative effect on air quality.

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

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

10.3.1 Construction Phase

Air Quality

As established above in section 10.2.2, there are temporary to short-term, imperceptible to slight negative effects on air quality during the construction phase from:

- > Exhaust emissions during the construction of turbines, temporary borrow pit, spoil placement areas, river restoration works, substation and all other supporting infrastructure.
- > Exhaust emissions through vehicle transit to and from the Site.
- > Dust emissions during the construction of turbines, temporary borrow pit, spoil placement areas, river restoration works, substation and all other supporting infrastructure.
- > Dust emissions through vehicle transit to and from the Site.

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

10.3.2 Operational Phase

There will be no net carbon dioxide (CO₂) emissions from operation of the Proposed Project.

Air Quality

As established above in section 10.2.3, there will be a long-term imperceptible effect on air quality from:

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

As established above in section 10.2.3, there will be an overall long-term Moderate Positive effect on Air Quality from:

- > The provision of an alternative to electricity derived from coal, oil or gas-fired power stations. The Proposed Project will result in emission savings of carbon dioxide (CO₂), oxides of nitrogen (NO_x), and sulphur dioxide (SO₂). The production of renewable energy from the Proposed Project will have a long-term significant positive impact on air quality due to the offsetting of approximately 58,808 tonnes of CO₂ per annum or 1,764,240 tonnes over its operational life. Please see Chapter 11 Climate for further details on carbon displacement calculations.

Therefore, it is considered there will be no measurable negative cumulative effects on air quality should other proposed or consented plans and within the surrounding landscape be operational in parallel with the Proposed Project. However, once the Proposed Project is operational, there will be a long-term, moderate, positive impact on the air quality.