



Chapter 10 Air Quality

Ballinlee Wind Farm

Ballinlee Green Energy Ltd.

September 2025

Contents

10. Air Quality..... 10-1

10.1 Introduction 10-1

10.1.1 Project Summary 10-1

10.1.2 Competency of Assessor 10-2

10.1.3 Study Area 10-2

10.1.4 Policy, Guidelines and Legislation 10-3

10.1.4.1 Air Quality 10-3

10.1.4.2 Local Policy 10-3

10.2 Methodology 10-5

10.2.1 Scope of Assessment..... 10-5

10.2.2 Assessment Criteria..... 10-5

10.2.2.1 Air Quality Standards..... 10-5

10.2.2.2 Dust Deposition Guidelines 10-7

10.2.2.3 Construction Phase 10-7

10.2.2.4 Operational Phase 10-9

10.2.2.5 Decommissioning Phase..... 10-10

10.2.3 Statement on Limitations and Difficulties Encountered..... 10-10

10.3 Baseline Environment..... 10-11

10.3.1 Meteorological Data..... 10-12

10.3.2 Existing Environment Air Quality 10-13

10.3.3 Dust Sensitivity of the Receiving Environment 10-15

10.4 Likely Significant Effects of the Proposed Development 10-23

10.4.1 Do Nothing 10-23

10.4.2 Construction Phase 10-24

10.4.2.1 Air Quality – Dust Emissions..... 10-24

10.4.2.2 Vehicle Emissions 10-29

10.4.3 Operational Phase 10-30

10.4.4 Decommissioning Phase 10-30

10.5 Mitigation Measures..... 10-33

10.5.1 Construction Phase 10-33

10.5.1.1 Dust Generation 10-33

10.5.1.2 Construction Traffic Emissions..... 10-33

10.5.2 Operational Phase 10-34

10.5.3 Decommissioning Phase 10-34

10.6 Monitoring 10-34

10.7 Residual Effects..... 10-35

10.8 Cumulative Effects 10-36

10.8.1 Construction Stage 10-36

10.8.2 Operational Stage..... 10-36

10.8.3 Decommissioning Stage 10-37

10.9 Conclusion..... 10-37

References 10-38

Tables

Table 10-1: Characteristics of the Proposed Project 10-1

Table 10-2: Ambient Air Quality Standards..... 10-6

Table 10-3: EPA Annual Monitoring Data and Ambient Air Quality Limits 10-14

Table 10-4: Sensitivity of the Area to Dust Soil Effects on People and Property (Source: IAQM 2024) 10-19

Table 10-5: Sensitivity of the Area to Human Health Effects (Source: IAQM 2024) 10-21

Table 10-6: Sensitivity of the Area to Ecological Impacts 10-22

Table 10-7: Do Nothing Assessment of Air Quality Effects 10-23

Table 10-8: Criteria for Rating Risk of Dust Effects – Earthworks (Source: IAQM 2024)..... 10-24

Table 10-9: Risk of Dust Effects- Wind Farm Earthworks 10-25

Table 10-10: Risk of Dust Effects – Grid Connection Earthworks 10-25

Table 10-11: Criteria for Rating of Dust Effects – Construction (Source: IAQM 2024) 10-26

Table 10-12: Risk of Dust Effects – Wind Farm Construction 10-26

Table 10-13: Risk of Dust Effects – Grid Connection Construction 10-26

Table 10-14: Criteria for Rating of Dust Effects – Trackout (Source: IAQM 2024) 10-27

Table 10-15: Risk of Dust Effects – Wind Farm Trackout..... 10-28

Table 10-16: Risk of Dust Effects – Grid Connection Trackout 10-28

Table 10-17: Summary of Wind Farm Construction Phase Dust Effect Risk Used to Define Specific Mitigation .. 10-28

Table 10-18: Summary of Grid Connection Construction Phase Dust Effect Risk Used to Define Site Specific Mitigation 10-29

Table 10-19: Construction Effect 1 Wind Farm Dust Emissions on Sensitive Receptors 10-29

Table 10-20: Construction Effect 2 Grid Connection Dust Emissions on Sensitive Receptors..... 10-29

Table 10-21: Construction Effect 3: Traffic Emissions on Air Quality10-30

Table 10-22: Operational Phase Air Quality Effects10-30

Table 10-23: Criteria for Rating Risk of Dust Effects – Decommissioning (Source: IAQM 2024)10-31

Table 10-24: Risk of Dust Effects – Decommissioning10-31

Table 10-25: Decommissioning Effect 1: Dust Emissions on Sensitive Receptors10-32

Table 10-26: Construction Phase: Residual Effect on Air Quality10-35

Table 10-27: Decommissioning Phase: Residual Effect on Air Quality10-36

Figures

Figure 10-1: Site Location10-11

Figure 10-2: Existing Air Quality Index for Health (AQIH) (www.epa.ie)10-13

Figure 10-3: Wind Turbines and nearest dwellings10-17

Figure 10-4: Other Dust Emission Areas in Wind Farm and nearest dwellings10-18

Figure 10-5: Grid Connection (Section 1) and Nearest Dwellings10-19

Figure 10-6: Grid Connection (Section 2) and Nearest Dwellings10-20

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10. Air Quality

10.1 Introduction

This chapter describes the likely significant effects the construction, operation and decommissioning of the proposed development will have on air quality.

10.1.1 Project Summary

Table 10-1 sets out the characteristics of the project elements for which development consent is being sought and all other associated project components.

For a full description of the proposed development, refer to **Volume II, Chapter 02** Description of the Proposed Development of this EIAR.

Table 10-1: Characteristics of the Proposed Project

Proposed Development for which consent is sought	Core Wind Farm Components - Seventeen (17) No. wind turbines (turbine tip height of 160m, and 150m (T6 only)) with associated foundations and crane hardstand areas. - One (1) No. Permanent Meteorological Mast (92m height) and associated foundation, hardstand area and ancillary main crane hardstand area. - One (1) No. Electrical Substation (110kV) including Eirgrid compound, IPP, maintenance compounds, ancillary building, security fencing and all associated works. - Nine (9) No. site entrances. - New and upgraded internal site service tracks (approximately 10.8km of new internal access tracks to be constructed). - New clear span bridge over the Morningstar River. - Underground electric collector cable systems between turbines within the wind farm site. - Underground electric cabling systems between the wind farm site and connection point at existing Killonan 220/110kV substation.
	Associated Components of the Proposed Development - New temporary access track via R516 to facilitate turbine delivery route located in the townland of Tullovin. - Three (3) No. temporary construction site compounds (one approximately 95m x 50m and two approximately 55m x 25m). - Two (2) No. borrow pits to be used as a source of stone material during construction and for storage of excess excavated materials. - Nine (9) No. permanent and two (2) temporary deposition areas. - Associated surface water management systems. - Tree felling required for wind farm infrastructure.
Other Associated Project Components	- Whooper Swan Management area works. - Habitat Enhancement areas works. - Landscaping, fencing and all associated works.

10.1.2 Competency of Assessor

The chapter and assessment was prepared by Kieran Barry BEng (Civil/Structural Engineering), PgDip (Environmental Protection), CEnv. Kieran is an experienced Environmental Consultant at Malachy Walsh and Partners (MWP), having worked for 9 years in the environmental sector. Kieran works on a variety of infrastructure projects conducting environmental assessments and supporting the delivery of a number of environmental deliverables including Environmental Impact Assessment (EIA) Screening Reports, feasibility and constraints studies, route option assessments and Environmental Impact Assessment Reports (EIAR). Kieran has worked on Air Quality Chapters for the following EIARs.

- Ballycar Wind Farm, Co.Clare
- Brittas Wind Farm, Co.Tipperary
- Inis Cealtra Visitor Experience, Co.Clare
- Rinn Rua Hotel and Leisure Park, Co. Kerry

This assessment has been reviewed by Maura Talbot. Maura is a Chartered Environmentalist (IES/SocEnv) with 25+ years of experience working as a Senior and Principal Environmental and Socio-Economic Specialist Consultant and joined MWP in April 2022. Maura has managed and contributed to environmental impact assessments for a wide variety of development and infrastructure projects including wind farms in Southern Africa and Ireland.

10.1.3 Study Area

The air quality study area includes the area which encompasses the proposed development boundary. Outside of the proposed development boundary, the study area varies dependent on the source of emissions being considered.

Fugitive dust dispersion has the potential to cause local impacts through dust disturbance to the nearest dust sensitive receptors. The potential for dust generation associated with the various components of the proposed development was assessed on the basis of proposed construction activities and proximity of these activities to receptors.

The Institute of Air Quality Management (IAQM) 'Guidance on the assessment of dust from demolition and construction' states that a dust assessment is typically required where there is:

- A 'human receptor' within:
 - 250m of the boundary of the site; and/or
 - 50m of the route(s) used by construction vehicles on the public highway, up to 250m from the site entrances(s)
- An 'ecological receptor' within:
 - 50m of the boundary of the site; and/or
 - 50m of the route(s) used by construction vehicles on the public highway, up to 250m from the site entrance(s)

To ensure a robust assessment, the Zone of Influence (Zoi) for the construction phase dust impacts is set at 500m.

In addition to dust, the study area considers general air quality conditions. Baseline ambient air quality has been characterised using Environmental Protection Agency (EPA) monitoring data for Zone D, which encompasses rural areas outside of major cities and large towns in Ireland. Zone D data provides a representative baseline for the receiving environment, against which potential impacts from construction, operational traffic, and decommissioning emissions (e.g. from machinery and vehicles) have been assessed in relation to sensitive human and ecological receptors.

With respect to vehicle emissions specifically, the TII guidance Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106 (TII, 2022a), considers the study area to be 200m of “affected” road links. The criteria for scoping a detailed air quality assessment of these areas are considered in **Section 10.2.2.3**, **Section 10.2.2.4** and **Section 10.2.2.5**.

10.1.4 Policy, Guidelines and Legislation

The assessment has been prepared in accordance with the below guidance as well as guidelines and legislation outlined in **Section 10.1.4.1** to **Section 10.1.4.2**.

- Guidelines on the Information to be contained in Environmental Impact Assessment Reports (EPA 2022)
- European Commission Guidance on the preparation of the EIAR 2017
- 2018 Department of Housing Guidance

10.1.4.1 Air Quality

The statutory ambient air quality standards in Ireland are set out in the Ambient Air Quality Standards Regulations 2022, which incorporate the ambient air quality limits set out in Directive 2008/50/EC of the European Parliament and of the Council (21st May 2008) on ambient air quality and cleaner air for Europe (hereafter referred to as the CAFÉ Directive) (as amended by Directive EU 2015/1480), for a range of air pollutants. These are discussed further in **Section 10.2.2.1**.

In addition to the specific statutory air quality standards, the assessment has been prepared in accordance with national guidelines and policy documents where available, in addition to international standards, policies and guidelines. These are summarised below:

- *Clean Air Strategy (Government of Ireland 2023);*
- *Guidance on the assessment of dust from demolition and construction (IAQM 2024);*
- *Air Quality Assessment of Proposed National Roads - Standard (TII 2022a);*
- *Limerick County Development Plan 2022-2028 (background Paper: Energy, Climate Change, Flooding and Transition to a low Carbon Economy);*
- *Limerick City and County Council's Climate Change Adaption Strategy 2019-2024;*
- *Air Quality Assessment of Specified Infrastructure Projects – Overarching Technical Document (TII 2022b);*
- *Guidelines for Assessment of Ecological Impacts of National Roads Schemes (TII 2009);*
- *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 Sulphur Dioxide Global Update 2005 (WHO 2005); and*
- *German TA-Luft standard for dust deposition (non-hazardous dust) (German VDI, 2002).*

10.1.4.2 Local Policy

The Limerick Development Plan 2022-2028 has set out policy in terms of air quality as follows:

EHP6: *It is a policy of the Council to ensure that water and air quality shall be of the highest standard, to ensure the long term economic, social and environmental well-being of Limerick's resources. The World Health Organisation Air Quality Guidelines will be the basis for the air quality guidance in Limerick.*

The Limerick Development Plan 2022 sets out the following objectives to achieve the above policy and other policies of the development plan:

Objective EH026 Air Pollution: It is an objective of the Council to implement the provisions of national and EU Directives on air pollution and other relevant legislative requirements in conjunction with other agencies as appropriate.

Objective EH027 Improvement of Air Quality: It is an objective of the Council to improve air quality and help prevent people being exposed to unacceptable levels of pollution in Limerick, through the support of sustainable modes of transport, renewable energy, promotion of energy efficient buildings and homes and urban greening.

Objective EH028 Air Quality Monitoring: It is an objective of the Council to monitor and provide access to the public on the air quality in Limerick and support the EPA in the expansion and management of the national air quality monitoring network.

Objective EH029 Air Quality during Construction: It is an objective of the Council to protect environmental quality and implement site appropriate mitigation measures during construction and demolition phases of a development, with respect to air quality, including dust.

10.2 Methodology

The methodology applied in this assessment accords with guidance and best practice outlined in **Section 10.1.4**.

The existing air quality was characterised at a local level to establish a baseline. The nature, scale and duration of the construction, operational and decommissioning phases were examined and its potential to affect local air quality assessed. Mitigation measures are proposed to minimise the potential effects.

10.2.1 Scope of Assessment

This chapter assesses whether the proposed project would be likely to result in significant air quality effects. The cumulative effect of the proposed development in combination with other existing, permitted and proposed developments is also considered to assess any likely significant cumulative air quality effects.

The air quality impacts from the construction phase will mainly consist of emissions and particulates from construction activity including carbon dioxide (CO₂), sulphur dioxide (SO₂), nitrogen oxides (NO_x), nitrogen dioxide (NO₂), carbon monoxide and (CO) and particulate matter (PM₁₀).

Once operational, there will be no air emissions from the wind farm development, including turbines, grid connection, and substation, apart from those associated with occasional maintenance vehicles. A detailed air quality assessment was not deemed necessary for the operational phase of development, given the low levels of projected vehicle movements in the area during this phase. Therefore, there is no likelihood of a significant effect on air quality during the operational phase.

The potential effects of the decommissioning phase will be of similar but of lower magnitude to the construction phase effects. Therefore, the outcome of the construction phase assessment should be taken as representative of the worst-case decommissioning phase effects.

10.2.2 Assessment Criteria

10.2.2.1 Air Quality Standards

The EPA manages the ambient air quality monitoring network. In order to protect our health, vegetation and ecosystems, EU directives set down air quality standards in Ireland and the other member states for a wide variety of pollutants. These rules include how we should monitor, assess and manage ambient air quality.

The Ambient Air Quality and Cleaner Air for Europe (CAFE) Directive (2008/50/EC) was published in May 2008 and was originally transposed into Irish legislation by the Air Quality Standards Regulations in 2011 (S.I. No. 180 of 2011). Since the transposition, Air Quality Standards Regulations 2011 (S.I. No. 180 of 2011) has been replaced and revoked by S.I. No. 739/2022 - Ambient Air Quality Standards Regulations 2022.

Air quality significance criteria are assessed on the basis of compliance with the appropriate standards or limit values, refer to **Table 10-2**.

Table 10-2: Ambient Air Quality Standards

Pollutant	Regulation ¹	Limit Type	Limit Value ²
Nitrogen Dioxide (NO ₂)	S.I. 180 of 2011	Hourly limit for protection of human health – not to be exceeded more than 18 times per year	200 µg/m ³
		Annual limit for protection of human health	40 µg/m ³
Nitrogen Oxides (NO + NO ₂)	S.I. 180 of 2011	Critical limit for the protection of vegetation and natural ecosystems	30 µg/m ³
Lead	S.I. 180 of 2011	Annual limit for protection of human health	0.5 µg/m ³
SO ₂	S.I. 180 of 2011	Hourly limit for protection of human health - not to be exceeded more than 24 times per year	350 µg/m ³
		Daily limit of protection of human health – not to be exceeded more than three times per year	125 µg/m ³
		Critical limit for the protection of vegetation and natural ecosystems (calendar year and winter)	20 µg/m ³
Particulate Matter PM ₁₀	S.I. 180 of 2011	24 hour limit for protection of human health – not to be exceeded more than 35 times per year	50 µg/m ³
		Annual limit for protection of human health	40 µg/m ³
Particulate Matter PM _{2.5}	S.I. 180 of 2011	Annual limit for protection of human health	25 µg/m ³
Benzene	S.I. 180 of 2011	Annual limit for protection of human health	5 µg/m ³
Carbon Monoxide (CO)	S.I. 180 of 2011	8-hour limit (on a rolling basis) for protection of human health	10 mg/m ³

¹ CAFE Directive replaces the previous Council Directive 96/62/EC of 27 September 1996 on ambient air quality assessment and management and daughter directives, Council Directive 1999/30/EC of 22 April 1999 relating to limit values for sulphur dioxide, nitrogen dioxide and oxides of nitrogen, particulate matter and lead in ambient air and Directive 2000/69/EC of the European Parliament and of the Council of 16 November 2000 relating to limit values for benzene and carbon monoxide in ambient air

² µg/m³ (micrograms per cubic metre); mg/m³ (milligrams per cubic metre)

10.2.2.2 Dust Deposition Guidelines

The EU ambient air quality standards outlined in **Table 10-2** have set ambient air quality limit values for PM₁₀ and PM_{2.5}. The concern from a health perspective is focused on particles of dust which are less than 10µm in size.

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

However, the German TA-Luft standard for dust deposition (non-hazardous dust) (German VDI, 2002) sets a maximum permissible emission level for dust deposition of 350mg/m²/day averaged over a one month monitoring period at any receptor outside the site boundary.

Dust is commonly measured using the Bergerhoff Method. This method is described in the standards *BS1747 Part 1: Methods for the measurement of air pollution. Deposit gauges*, and *VDI 4320 Part 2 Measurement of atmospheric depositions - Determination of the dust deposition according to the Bergerhoff method* (the latter published by the German Engineering Institute). Recommendations from the *Department of the Environment, Health and Local Government (DOEHLG, 2004)* apply the TA Luft limit of 350mg/m²/day to the site boundary for quarries. This limit value will be implemented with regard to dust impacts generated during the construction phase of the proposed development.

This limit value of 350 mg/m²/day has also been incorporated into *Environmental Management in the Extractive Industry (Non-Scheduled Minerals) (EPA, 2006)* and the *Irish Concrete Federation Environment Code (ICF, 2005)*.

10.2.2.3 Construction Phase

Dust Assessment

The UK Institute of Air Quality Management (IAQM) guidance document, '*Guidance on the assessment of dust from demolition and construction*' (IAQM 2024) outlines an assessment method for predicting the impact of dust emissions from demolition, earthworks, construction and haulage activities based on the scale and nature of the works and the sensitivity of the area to dust impacts. The IAQM methodology has been applied to the construction phase of this development to predict the likely risk of dust impacts in the absence of mitigation measures and to determine the level of site specific mitigation required. Transport Infrastructure Ireland (TII) recommends the use of IAQM guidance in the TII guidance document *Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106* (TII, 2022a).

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

- Demolition;
- Earthworks;
- Construction; and
- Trackout (movement of heavy vehicles).

The magnitude of each of the four categories is divided into Large, Medium or Small scale depending on the nature of activities as follows:

Demolition:

- Large: Total building volume $>75,000\text{m}^3$, potentially dusty construction material (e.g. concrete), on-site crushing and screening, demolition activities $>12\text{m}$ above ground level;
- Medium: Total building volume $12,000\text{m}^3 - 75,000\text{m}^3$, potentially dusty construction material, demolition activities $6-12\text{m}$ above ground level; and
- Small: Total building volume $<12,000\text{m}^3$, construction material with low volume for dust release (e.g. metal cladding or timber), demolition activities $<6\text{m}$ above ground, demolition during wetter months.

Earthworks:

- Large: Total site area $>110,000\text{m}^2$, 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 $>6\text{m}$ in height;
- Medium: Total site area $18,000\text{m}^2 - 110,000\text{m}^2$, moderately dusty soil type (e.g. silt), $5-10$ heavy earth moving vehicles active at any one time, formation of bunds $3-6\text{m}$ in height; and
- Small: Total site area $<18,000\text{m}^2$, soil type with large grain size (e.g. sand), <5 heavy earth moving vehicles active at any one time, formation of bunds $<3\text{m}$ in height.

Construction:

- Large: Total building volume $>75,000\text{m}^3$, on-site concrete batching, sandblasting;
- Medium: Total building volume $12,000\text{m}^3-75,000\text{m}^3$, potentially dusty construction material (e.g. concrete), on-site concrete batching; and
- Small: Total building volume $<12,000\text{m}^3$, construction material with low likelihood of dust release (e.g. metal cladding or timber).

Trackout:

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

The magnitude of each of the above activities is combined with the overall sensitivity of the area to Human Health Effects (refer to **Table 10-5**) and Ecological Impacts (refer to **Table 10-6**) to determine the risk of dust impacts using the criteria for rating risk of dust effects tables (refer to **Table 10-8**, **Table 10-11**, **Table 10-14** and **Table 10-23**). This allows the level of site-specific mitigation to be determined.

Construction Phase Traffic

Construction phase traffic also has the potential to impact air quality. The *TII guidance Air Quality Assessment of Specified Infrastructure Projects* – PE-ENV-01106 (TII, 2022), states that road links meeting one or more of the following criteria can be defined as being ‘affected’ by a proposed development and should be included in the local air quality assessment. While the guidance is specific to infrastructure projects, the approach can be applied to any development that causes a change in traffic as follows:

- 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 10kph or more,
- Peak hour speed change by 10 kph or more; or
- A change in carriageway alignment by 5m or greater.

The construction stage traffic for the proposed development does not meet the above scoping criteria and therefore, has been scoped out from any further assessment as there is no potential for significant effects.

10.2.2.4 Operational Phase

During the operational phase, there will be no adverse impacts as a result of dust. Emissions to air will result mainly from traffic caused by workers who occasionally visit the site for maintenance works.

Operational Phase Traffic

As is the case with the construction phase, the TII guidance considers road links meeting one or more of the following criteria 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 10kph or more,
- Peak hour speed change by 10 kph or more; or
- A change in carriageway alignment by 5m or greater.

The operational phase traffic has been reviewed and none of the impacted road links meet the above criteria that would indicate the potential for an effect. Therefore, a detailed assessment of the impact of operational traffic emissions on ambient air quality is not necessary for the proposed development. There is no likelihood of a significant effect on air quality as a result of traffic during the operational phase.

10.2.2.5 Decommissioning Phase

Dust Assessment

The IAQM methodology has been applied to the decommissioning phase of this development to predict the likely risk of dust impacts in the absence of mitigation measures and to determine the level of site specific mitigation required.

As is the case with methodology outlined for dust assessment of construction activity in **Section 10.2.2.3**, the magnitude of each of the four categories is divided into Large, Medium or Small scale depending on the nature of activities involved. The magnitude of activity is combined with the overall sensitivity of the area to determine the risk of dust impacts from site activities. This allows the level of site-specific mitigation to be determined.

Decommissioning Phase Traffic

Traffic associated with the decommissioning phase will be less than construction stage traffic but also has the potential to impact air quality. As with construction and operational phase traffic, criteria from *The TII guidance Air Quality Assessment of Specified Infrastructure Projects* – PE-ENV-01106 (TII, 2022) is used to assess whether the proposed development decommissioning phase traffic requires a detailed 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 10kph or more,
- Peak hour speed change by 10 kph or more; or
- A change in carriageway alignment by 5m or greater.

The decommissioning stage traffic for the proposed development does not meet the above scoping criteria and therefore, has been scoped out from any further assessment as there is no potential for significant effects.

10.2.3 Statement on Limitations and Difficulties Encountered

No limitations or difficulties were encountered during the preparation of the Air Quality Chapter of the EIAR.

10.3 Baseline Environment

The proposed development is located in a rural area of east Limerick approximately 18km south of Limerick City and approximately 3km southwest of Bruff. **Figure 10-1** outlines the location of the proposed development and indicates the proposed wind farm development site boundary included in the planning application. The area within this boundary is approximately 255.12ha.

The wind farm site is located on privately-owned predominantly agricultural lands within the townlands of Ballincurra, Ballinlee South, Ballingayrou, Ballinrea, Knockuregare, Ballinlee North, Carrigeen and Camas South. The site is situated in a rural area characterised by agricultural holdings and one-off residential dwellings. Some patches of forestry plantation occur within the proposed site boundary and some on neighbouring properties.

The underground grid connection route is approximately 27.6km and is located along road networks within the townlands of Milltown, Ballysimon Commons, Coolyhenan, Knockananty, Ballybrennan, Drombanny, Carrigmartin, Cahernarry (Cripps), Scart, Ballyogartha, Ballyneety, Knockbrien, Glen, Ballymacreese, Ballynagarde, Stonepark, Carriganattin, Rochestown, Friarstown, Rockstown, Skool, Friarstown South, Grange, Ballynagallagh, Rockbarton, Cahirguillamore, Ballynanty, Ballybane, Ballyreesode and Camas North.

The turbine components will be delivered to site via the following existing roads from the Foynes Port on the River Shannon: N69, N18, M20, N20 and R-516. To facilitate the turbine delivery a new temporary access track is proposed on privately-owned predominantly agricultural lands within the townland of Tullovin approximately 3.3km southeast of Croom, Co. Limerick.

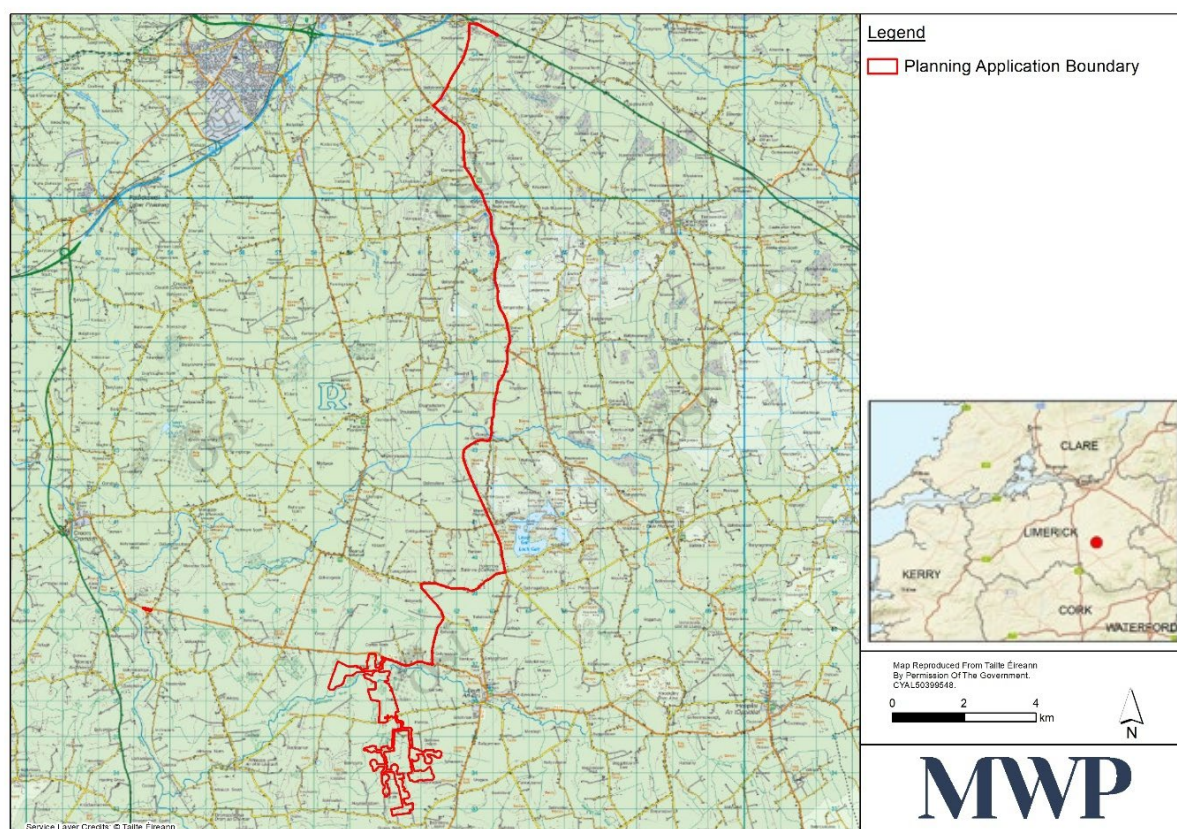


Figure 10-1: Site Location

There are several urban centres and villages within 25km of the proposed development site, including Bruff (population 887, CSO 2022), which is located approximately 3km to the north east of the proposed development boundary, Charleville (population 3,970, CSO 2022) which is located ca. 14km southwest of the proposed development, Limerick City (population 102,287, CSO 2022), ca. 20km north of proposed development, Adare (population 1,224, CSO 2022) is approximately 18km to the north west and Hospital (674, CSO 2022) is ca. 9km east of the proposed development. Along with local traffic (CO₂, NO_x), agricultural practices on nearby farmland (CH₄) and forestry operations (CO₂, Nox) i.e. from machinery used for tree felling, these urban centres are the largest nearby potential sources of pollution.

Representative Environmental Protection Agency (EPA) ambient air quality data has been used to characterise the existing air quality in the area.

Baseline traffic as well as predicted proposed development traffic has been summarised in **Volume II, Chapter 16 Material Assets** Traffic and Transportation of this EIAR and is referenced in **Section 10.4.2.2, Section 10.4.3 and Section 10.4.4** as part of the assessment of air quality from vehicle emissions.

10.3.1 Meteorological Data

A key factor in assessing temporal and spatial variations in air quality are the prevailing wind conditions. Depending on wind speed and direction, individual receptors may experience very significant variations in pollutants under the same source strength (i.e. traffic levels) (WHO, 2021). Wind is of key importance in dispersing air pollutants, and for ground level sources such as traffic emissions, pollutant concentrations are generally inversely related to wind speed. Thus, concentrations of pollutants derived from traffic sources will generally be greatest under very calm conditions and low wind speeds when the movement of air is restricted.

In relation to PM₁₀, the situation is more complex, due to the range of sources of this pollutant. Smaller particles (less than PM_{2.5}) from traffic sources will be dispersed more rapidly at higher wind speeds. Thus, measured levels of PM₁₀ will be a non-linear function of wind speed.

The nearest representative weather station collating historic detailed long range weather records is Shannon Airport Weather Station, which is located approximately 33.7km northwest of the proposed development. Shannon Airport Weather Station met data has been examined to identify the prevailing wind direction. The predominant wind direction is from a south-westerly direction, with a mean wind speed of 4.7m/s over the 30 year period of 1990-2020 (<https://www.met.ie/climate/30-year-averages>). High rainfall provides natural dampening for potential dust emissions and construction work emissions tend also to be reduced during heavy rain. The opposite impact occurs in dry and windy months, when there is increased potential for dust to be mobilised. The month with the highest temperatures is July, whereas average rainfall was highest in the month of December, with lowest average rainfall occurring in the month of April.

10.3.2 Existing Environment Air Quality

The Environmental Protection Agency's Air Quality Index for Health (AQIH) is a number from 1 to 10 that indicates what the air quality currently is in the station nearest you. A reading of 10 means the air quality is very poor and a reading of one to three inclusive means that air quality is good.

The AQIH is based on measurements of five air pollutants all of which can harm health. The five pollutants are:

- Ozone gas;
- Nitrogen dioxide gas;
- Sulphur dioxide gas;
- PM_{2.5} particles; and,
- PM₁₀ particles.

In areas of Fair to Poor air quality i.e. AQIH ranking 4 to 10, certain types of outdoor activity should be restricted or avoided for at risk individuals and the general population depending on the AQIH ranking.

The nearest air quality station to the proposed development is at People's Park, Limerick city centre, which is located approximately 20km to the north west of the proposed development site.

This station monitors Particulate Matter (PM₁₀ and PM_{2.5}) and Nitrogen Dioxide (NO₂) and is located in an Urban Area. The average concentrations, recorded on 19th September 2025, for a 24 hour period are as follows: NO₂ – 6.2 µg/m³, PM₁₀ 5 µg/m³ and PM_{2.5} – 2.68 µg/m³.

The People's Park station updates daily with the calculated Air Quality Index for Health (AQIH). As shown in **Figure 10-2**, on 19th September 2025, the air quality index characterised by this station was classified as '2-Good'.

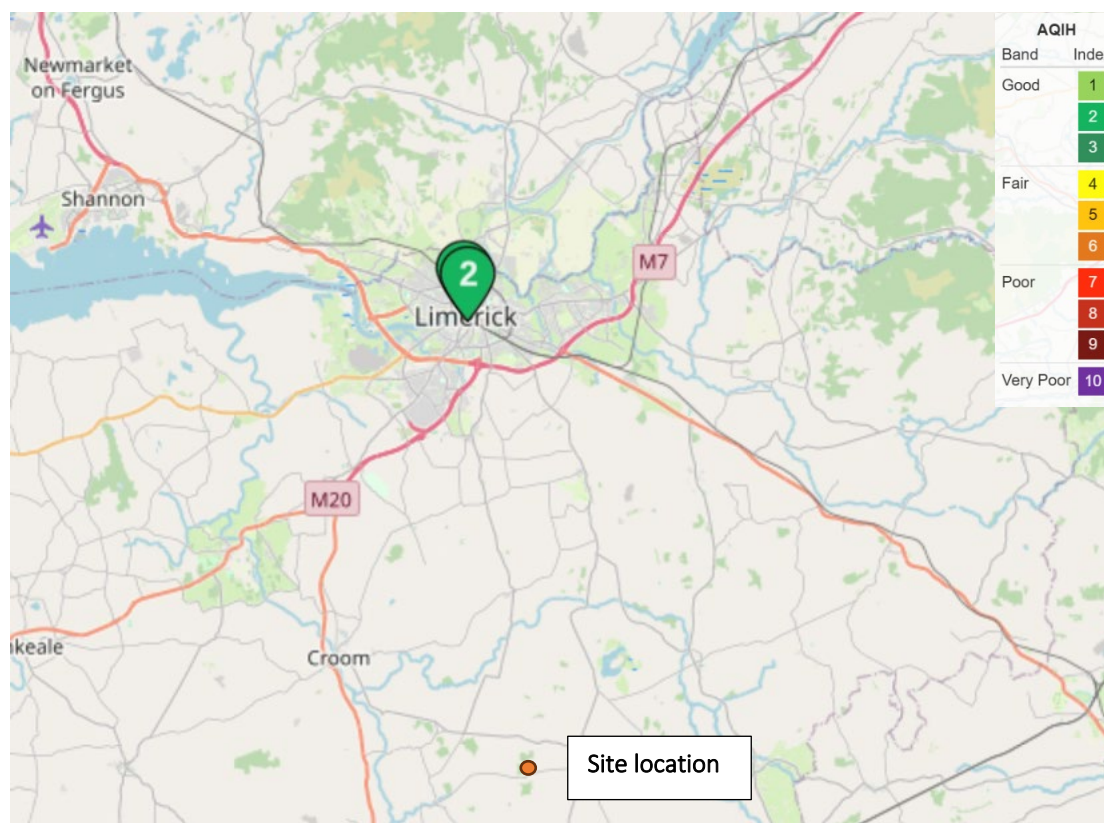


Figure 10-2: Existing Air Quality Index for Health (AQIH) (www.epa.ie)

Annual air quality monitoring programs have been undertaken in recent years by the EPA and Local Authorities. The most recent available annual report “Air Quality in Ireland 2023” (Published 2024) details the range and scope of monitoring undertaken throughout Ireland.

As part of the implementation of the Air Quality Standards Regulations (S.I. No. 739/2022), four air quality zones have been defined in Ireland for air quality management and assessment purposes. Zone A is defined as Dublin and its environs, Zone B is defined as Cork City, Zone C is defined as 23 urban areas with a population greater than 15,000 and Zone D is defined as the remainder of the country. The rural area in which the proposed development is located is classed as Zone D.

Long term monitoring results for Zone D, unless otherwise stated, for the following pollutants are shown in **Table 10-3**.

- Nitrogen Oxides (NO + NO₂);
- Nitrogen Dioxide (NO₂)
- Sulphur Dioxide (SO₂);
- Carbon Monoxide (CO)
- Particulate Matter (PM₁₀);
- Particulate Matter (PM_{2.5})

Table 10-3: EPA Annual Monitoring Data and Ambient Air Quality Limits

Pollutant	Limit Type	Limit Value	EPA Monitoring (Averaged in years 2018, 2019, 2020, 2021, 2022, 2023)
Nitrogen Oxides (NO + NO ₂)	Critical limit for the protection of vegetation and natural ecosystems	30 µg/m ³	6.7 to 16.2 µg/m ³ (Annual Mean)
Carbon Monoxide (CO)	Hourly limit for protection of human health – not to be exceeded more than 18 times/year	10 mg/m ³	1.2– 3.4 mg/m ³ (Max CO 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	14.7 – 179.3 µg/m ³ (Hourly Max)
Sulphur Dioxide (SO ₂)	Hourly limit for protection of human health – not to be exceeded more than 24 times/year	350 µg/m ³	2.9 µg/m ³ to 424.5 µg/m ³ (Hourly Max)
	Daily limit for protection of human health – not to be exceeded more than 3 times/year	125µg/m ³	0.1 µg/m ³ to 80.9 µg/m ³ (Daily Max)

Pollutant	Limit Type	Limit Value	EPA Monitoring (Averaged in years 2018, 2019, 2020, 2021, 2022, 2023)
	Critical limit for the protection of vegetation and natural ecosystems (calendar year and winter)	20µg/m ³	0.7 µg/m ³ to 11.8 µg/m ³ (Annual Mean)
Particulate Matter (PM ₁₀)	Annual limit for protection of human health	40µg/m ³	7 µg/m ³ to 28 µg/m ³ (Annual Mean)
	24-hour limit for protection of human health – not to be exceeded more than 35 times/year	50 µg/m ³	18 µg/m ³ to 102 µg/m ³ (Daily Max)
Particulate matter (PM _{2.5})	Annual limit for protection of human health	25µg/m ³	4 µg/m ³ to 17.8 µg/m ³ (Annual Mean)

10.3.3 Dust Sensitivity of the Receiving Environment

In line with the IAQM guidance document ‘*Guidance on the Assessment of Dust from Demolition and Construction*’, prior to assessing the effects of dust from a proposed development, the sensitivity of the area must first be assessed as outlined below. Both receptor sensitivity and proximity to proposed works areas are taken into consideration. For the purposes of this assessment, high sensitive receptors are regarded as residential properties where people are likely to spend the majority of their time. 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.

For the purpose of this assessment, the main area of the Wind Farm Site, including wind turbine areas, substation and borrow pits, are considered the main sources of dust during construction and are assessed separately to the grid connection. Wind turbines in relation to nearest dwellings are shown in **Figure 10-3**. In addition to wind turbine areas, other areas (deposition areas, borrow pits and temporary construction compounds) considered a main source of dust emissions are shown in **Figure 10-4**.

There will be some dust potential from temporary turbine delivery route accommodation works. The turbine components will be delivered to site via the following existing roads from the Foynes Port on the River Shannon: N69, N18, M20, N20 and R-516. To facilitate the turbine delivery a new temporary access track is also proposed on privately-owned predominantly agricultural lands within the townland of Tullovin approximately 3.3km southeast of Croom, Co. Limerick. Refer to **Volume II, Chapter 02** Description of the Proposed Development and **Volume II, Chapter 04** Civil Engineering of this **EIAR** for further details on turbine delivery route accommodation works.

As these works will be undertaken in short sections, will be small in scale and temporary in duration, no significant dust effects are expected. It was therefore considered that no detailed dust assessment was required for the turbine delivery accommodation works. Consequently, the dust sensitivity of the receiving environment at the locations of the turbine delivery accommodation works is not described in this section.

In terms of receptor sensitivity to dust soiling, **Figure 10-4** indicates that there is 1 residential property within 50m of a wind farm construction works area. The temporary deposition area at the northern section of the site is located approximately 41m away from a residential receptor. The northern borrow pit is approximately 114m from this receptor. There is also one receptor 55m south of the southern borrow pit. The closest receptors to all other major construction areas (turbine areas, substation, temporary compound, deposition area) of the wind farm area are at a distance of over 200m. The worst-case sensitivity of the area to dust soiling is therefore considered to be **Low** as per IAQM guidance criteria set out in **Table 10-4**.

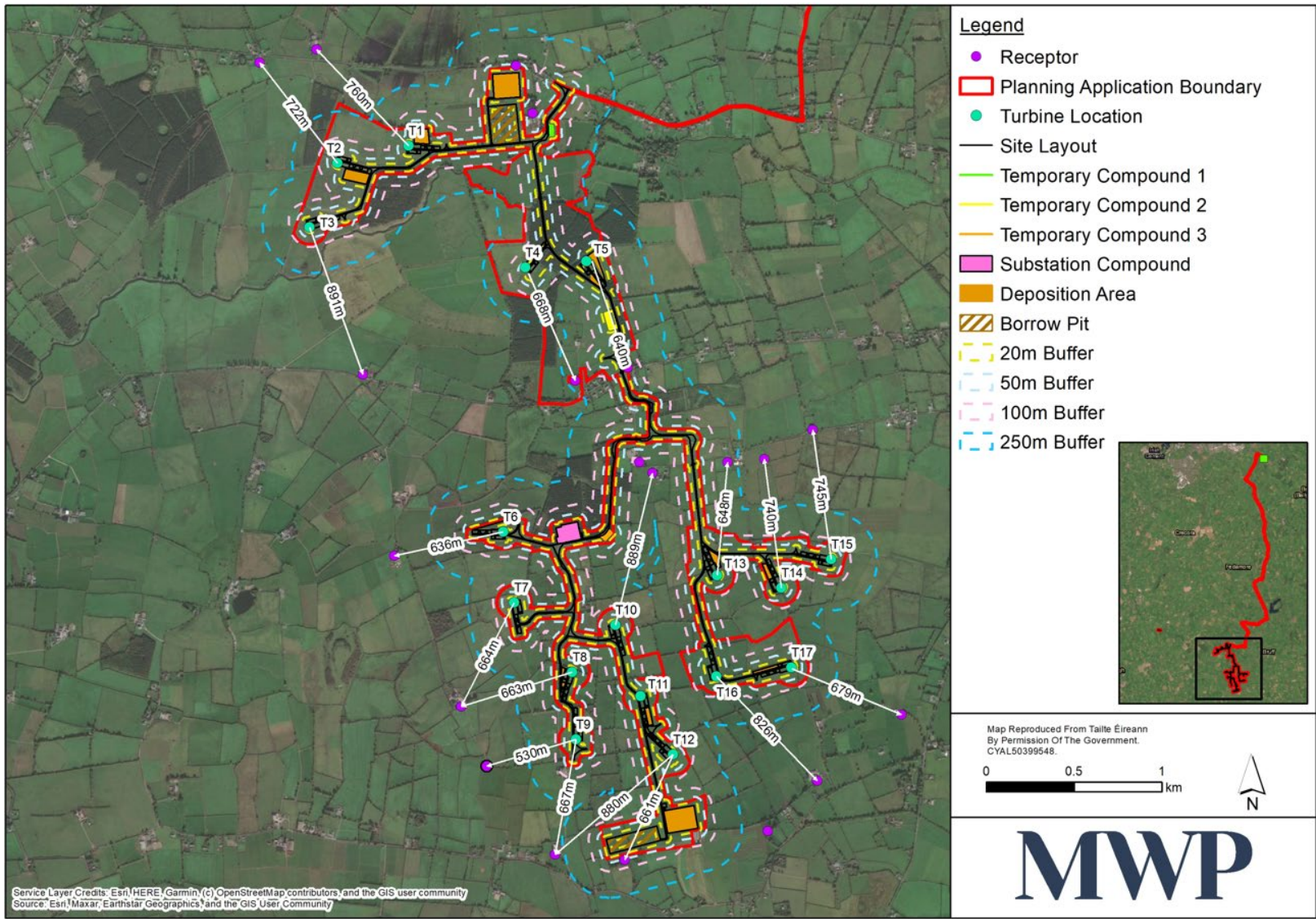


Figure 10-3: Wind Turbines and nearest dwellings

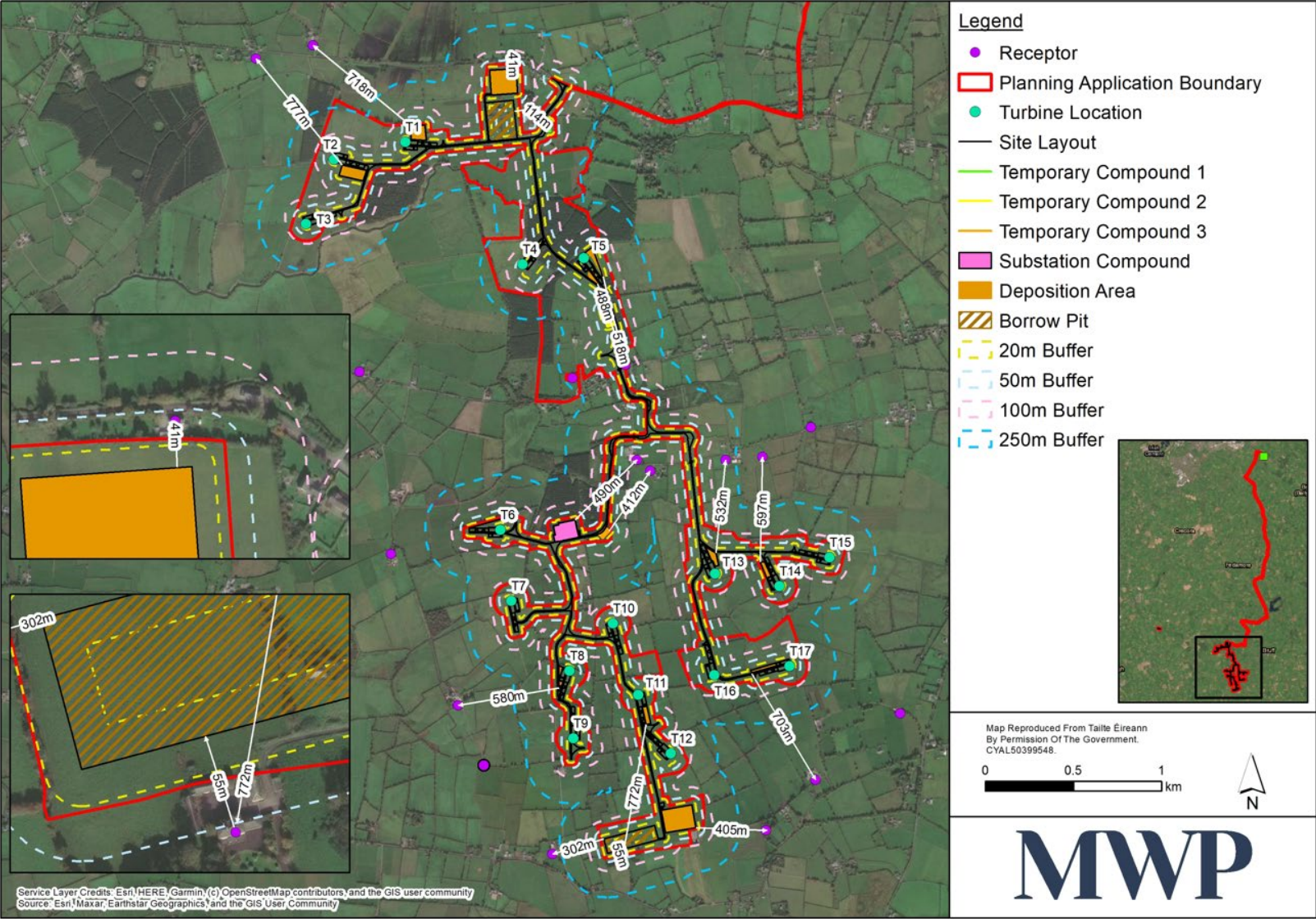


Figure 10-4: Other Dust Emission Areas in Wind Farm and nearest dwellings

Table 10-4: Sensitivity of the Area to Dust Soil Effects on People and Property (Source: IAQM 2024)

Receptor Sensitivity	Number of Receptors	Distance from source (m)			
		<20	<50	<100	<200
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

There are residential receptors along the roadside of the proposed grid connection route, as shown in **Figure 10-5** and **Figure 10-6**. Due to the linear nature of the grid connection works which will be completed in sections, with works at any point for a maximum of 1-2 days before progressing, therefore not all properties will be affected at any one time. No more than 1 to 10 no. receptors are expected to be affected at any one time. The worst-case sensitivity of grid connection to dust soiling is therefore considered to be **Medium** as per IAQM guidance criteria set out in **Table 10-4** given that no more than 1-10 receptors will be potentially affected at any one time.



Figure 10-5: Grid Connection (Section 1) and Nearest Dwellings



Figure 10-6: Grid Connection (Section 2) and Nearest Dwellings

Human Health Impact Sensitivity of the Receiving Environment

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 effects. The criteria take into consideration the current annual mean PM₁₀ concentration, receptor sensitivity, and the number of receptors affected within various distance bands from the construction works. The annual mean PM₁₀ concentration for Zone D was 7 ug/m³ to 28 ug/m³, refer to **Table 10-3**. Taking a conservative approach, the value of 28 ug/m³ is taken as the Annual Mean PM₁₀ concentration.

Wind Farm Area

Given the annual mean PM₁₀ concentration, the worst -case sensitivity of residential receptors to human health effects from the wind farm area dust, as per IAQM guidance set out in **Table 10-5** is considered to be **Low**, given that the number of receptors within 50m of an area of wind farm construction is below 10.

Grid Connection

For the grid connection works, the sensitivity of the receptors, as per IAQM guidance criteria set out in **Table 10-5** are considered to be **Medium**, given that there will be 1-10 receptors within 20m of works during periods of grid connection works.

Table 10-5: Sensitivity of the Area to Human Health Effects (Source: IAQM 2024)

Receptor Sensitivity	Annual Mean PM10 Concentration	Number of Receptors	Distance from source (m)			
			<20	<50	<100	<250
High	>32µg/m ³	>100	High	High	High	Medium
		10-100	High	High	Medium	Low
		1-10	High	Medium	Low	Low
	28-32µg/m ³	>100	High	High	Medium	Low
		10-100	High	Medium	Low	Low
		1-10	High	Medium	Low	Low
	24-28µg/m ³	>100	High	Medium	Low	Low
		10-100	High	Medium	Low	Low
		1-10	Medium	Low	Low	Low
	>24µg/m ³	>100	Medium	Low	Low	Low
		10-100	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
Medium	<32 µg/m ³	>10	High	Medium	Low	Low
		1-10	Medium	Low	Low	Low
	28-32µg/m ³	>10	Medium	Low	Low	Low
		1-10	Low	Low	Low	Low
	24-28	>10	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
	<24	>10	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
Low	-	≥1	Low	Low	Low	Low

Ecological Impact Sensitivity of the Receiving Environment

The IAQM guidelines also outline the assessment criteria for determining the sensitivity area to ecological effects from dust. The criteria takes into consideration whether the receiving environment is classified as a Special Area of Conservation (SAC), a Special Protected Area (SPA), a Natura Heritage Area (NHA) or a proposed Natural Heritage Area (pNHA) as dictated by the EU Habitats Directive or whether the site is a local natura reserve or home to a sensitive plant or animal species. The IAQM guidelines designates areas within 50m of a dust source to be from medium to low sensitivity, refer to **Table 10-6**. No Annex I habitat was found during surveys of the study area. The nearest designated site is Glen Bog SAC which is located approximately 3.5km north east of the wind farm area of proposed development. The grid route comes within 2.2km of the Lower Shannon SAC at its closest point.

The IAQM guidance does not provide sensitivity designations for areas beyond 50 metres, refer to **Table 10-6**. However, for the purposes of this assessment, a precautionary approach has been adopted. As such, the area will be designated as having **Low** sensitivity to ecological impacts as a result of dust emissions.

Table 10-6: Sensitivity of the Area to Ecological Impacts

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

10.4 Likely Significant Effects of the Proposed Development

10.4.1 Do Nothing

If the proposed development were not to proceed, an opportunity to offset Greenhouse Gas Emissions (GHG) from fossil fuel-based energy sources would be lost.

Emissions of CO₂, NO_x and SO₂ from coal, oil and gas fired power plants that would otherwise have been displaced will continue, resulting in a continued deterioration in air quality.

Poor air quality in our urban centres is a growing concern. As stated on the EPA’s website: ‘The WHO estimates show that more than 400,000 premature deaths are attributable to poor air quality in Europe annually. In Ireland, the number of premature deaths attributable to poor air quality is estimated at 1,180 people and is mainly due to cardiovascular disease’. The World Health Organisation (WHO) has described air pollution as the ‘single biggest environmental health risk’.

In a Do Nothing scenario, there would be an **adverse, slight to moderate**, and **long term** effect should the proposed development not proceed, as emissions associated with the burning of fossil fuels will continue.

Table 10-7: Do Nothing Assessment of Air Quality Effects

Do Nothing Assessment of Air Quality Effects						
	Quality of Effect	Significance	Spatial Extent	Duration	Other Relevant Criteria	Likelihood
Do Nothing Scenario	Adverse	Slight to Moderate	Extensive	Long-Term	Indirect	Likely

10.4.2 Construction Phase

During the construction phase there will be emissions from vehicle exhausts. The movement of machinery, construction vehicles and the use of generators during the construction phase will generate exhaust fumes containing predominantly carbon dioxide (CO₂), sulphur dioxide (SO₂), nitrogen oxides (NO_x), nitrogen dioxide (NO₂), carbon monoxide and (CO) and particulate matter (PM₁₀).

There will also be dust generated from excavation, moving and transporting soil and materials in and around the construction site and on public roads. Weather conditions will play an important role in the quantity of dust generated. The potential for fugitive dust emissions is greatest during periods of prolonged dry weather.

10.4.2.1 Air Quality – Dust Emissions

In terms of air quality, the greatest likelihood of effects during the construction stage will be from dust emissions, associated with the construction works. The key works likely to be associated with dust emissions include earthworks and excavation activities, construction of hardstanding areas and movement of vehicles on and off site. Dust emissions during the decommissioning phase will be lower than the construction phase given that there is no need for excavations, refer to **Section 10.5.3**.

Earthworks

Earthworks will primarily involve excavation, haulage, tipping, landscaping and stockpiling. The dust emission magnitude from earthworks, as per IAQM guidance can be classified as small, medium or large and are described as follows:

- Large: Total site area > 110,000m², potentially dusty soil type (e.g. clay which will be prone to suspension when dry due to small particle size), >10 heavy earth moving vehicles active at any one time, formation of bunds > 6m in height;
- Medium: Total site area 18,000m² – 110,000m², moderately dusty soil type (e.g. silt), 5-10 heavy earth moving vehicles active at any one time, formation of bunds 3-6m in height; and
- Small: Total site area <18,000m², soil type with large grain size (e.g. sand), <5 heavy earth moving vehicles active at any one time, formation of bunds <3m in height.

The potential risk of dust effects as a result of earthworks can be determined with use of the IAQM guidance risk rating matrix, refer to **Table 10-8**. The potential risk is determined by combining the magnitude of works with the previously established sensitivity of the area, refer to **Section 10.3.3**.

Table 10-8: Criteria for Rating Risk of Dust Effects – Earthworks (Source: IAQM 2024)

Receptor Sensitivity	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

Wind Farm

For the Wind Farm construction works, the total area of site construction works is over 110,000m² therefore the dust magnitude for earthwork activities associated with the Wind Farm area can be classified as **Large**.

With respect to dust soiling, human health and ecological effects from the wind farm earthworks, (applying IAQM guidance risk rating matrix in **Table 10-8**), the risk of dust effects prior to mitigation is **Low** (**Table 10-9**).

Table 10-9: Risk of Dust Effects- Wind Farm Earthworks

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

Grid Connection

For the grid connection works, the total area of site works is over 19,872m², however work is undertaken in very small segments of around 100-200m at a time, therefore the dust magnitude for earthwork activities associated within grid connection works can be classified as **Small**.

With respect to dust soiling and human health effects (applying IAQM guidance risk rating matrix in **Table 10-8**), the risk of dust effects from earthworks, prior to mitigation is considered **Low** (see **Table 10-10**). With respect to ecological effects from grid connection works (applying IAQM guidance risk rating matrix in **Table 10-8**), the risk of dust effects from earthworks prior to mitigation is **Negligible** (see **Table 10-10**).

Table 10-10: Risk of Dust Effects – Grid Connection Earthworks

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

Construction

Dust emission magnitudes from the construction of buildings, as per IAQM guidance, can be classified as small, medium and large and are described as follows:

- Large: Total building volume >75,000m³, on-site concrete batching, sandblasting;
- Medium: Total building volume 12,000m³-75,000m³, potentially dusty construction material (e.g. concrete), on-site concrete batching; and
- Small: Total building volume <12,000m³, construction material with low likelihood of dust release (e.g. metal cladding or timber).

The potential risk of dust effects as a result construction works can be determined with use of the IAQM guidance risk rating matrix, refer to **Table 10-11**. The potential risk is determined by combining the magnitude of works with the previously established sensitivity of the area, refer to **Section 10.3.3**.

Table 10-11: Criteria for Rating of Dust Effects – Construction (Source: IAQM 2024)

Receptor Sensitivity	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

Wind Farm

For the Wind Farm works, construction volumes (aggregates, stone, steel, concrete) will be over 75,000m³ (see Construction magnitudes above) therefore the dust emission magnitude for the Wind Farm works is **Large**.

With respect to dust soiling, human health and ecological effects from the wind farm construction works, (applying IAQM guidance risk rating matrix in **Table 10-11**), the risk of dust effects prior to mitigation is **Low** (**Table 10-12**).

Table 10-12: Risk of Dust Effects – Wind Farm Construction

Receptor	Receptor Sensitivity	Dust Emission Magnitude – Construction	Risk of Dust Related Effects
Dust Soiling	Low	Large	Low Risk
Human Health	Low		Low Risk
Ecological	Low		Low Risk

Grid Connection

For the grid connection works, construction volumes over the entire grid route will be below 75,000m³ and above 12,000m³, however works are concentrated on small areas of 100m to 200m sections at any particular period with lower volumes of construction materials, therefore the dust emission magnitude for the grid connection is considered **Small**.

With respect to dust soiling and human health effects from grid connection works (applying IAQM guidance risk rating matrix in **Table 10-11**), the risk of dust effects from construction works, prior to mitigation is **Low** (see **Table 10-13**). With respect to ecological effects from grid connection works (applying IAQM guidance risk rating matrix in **Table 10-11**), the risk of dust effects from construction works, prior to mitigation is **Negligible** (see **Table 10-13**).

Table 10-13: Risk of Dust Effects – Grid Connection Construction

Receptor	Receptor Sensitivity	Dust Emission Magnitude – Construction	Risk of Dust Related Effects
Dust Soiling	Medium	Small	Low Risk
Human Health	Medium		Low Risk
Ecological	Low		Negligible

Trackout

Trackout refers to the movement of dust and dirt from a construction/demolition site onto the public road network, where it may be deposited and then re-suspended by vehicles using the network. The factors which determine the magnitude of dust emissions are vehicle size, vehicle speed, vehicle numbers, geology and duration. Dust emission magnitudes from trackout, as per IAQM guidance, can be classified as small, medium or large and have been described as follows:

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

During construction, the primary source of dust emissions with potential to affect sensitive receptors will be movement of vehicles on and off site. Materials with the highest potential for dust emissions will be concrete and aggregates for the construction of hardstanding areas and access tracks. However, 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.

The potential risk of dust effects as a result of trackout activities can be determined with use of the IAQM guidance risk rating matrix, refer to **Table 10-14**. The potential risk is determined by combining the magnitude of works with the previously established sensitivity of the area, refer to **Section 10.3.3**.

Table 10-14: Criteria for Rating of Dust Effects – Trackout (Source: IAQM 2024)

Receptor Sensitivity	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

Wind Farm

The max amount of daily outward HGV movements for the wind farm development will be **142 HGVs**, refer to **Volume II, Chapter 16** Material Assets - Traffic and Transportation of this EIAR and therefore trackout activities can be considered of **Large** magnitude.

With respect to dust soiling, human health and ecological effects from the wind farm trackout activities, (applying IAQM guidance risk rating matrix in **Table 10-14**), the risk of dust effects, prior to mitigation is **Low** (see **Table 10-15**).

Table 10-15: Risk of Dust Effects – Wind Farm Trackout

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

Grid Connection

For the grid connection there will be less than 15 outward HGV movements predicted and therefore trackout activities are of **Small** magnitude.

With respect to dust soiling and human health effects from grid connection trackout activities (applying IAQM guidance risk rating matrix in **Table 10-14**), the risk of dust effects prior to mitigation is **Low** (see **Table 10-16**). With respect to dust emissions from grid connection trackout activities affecting ecological receptors, the risk of dust effects, from trackout activity, prior to mitigation is **Negligible** (see **Table 10-16**).

Table 10-16: Risk of Dust Effects – Grid Connection Trackout

Receptor	Receptor Sensitivity	Dust Emission Magnitude – Trackout	Risk of Dust Related Effects
Dust Soiling	Medium	Small	Low Risk
Human Health	Medium		Low Risk
Ecological	Low		Negligible

Summary of Dust Emission Risk

The magnitude of risk determined is used to prescribe the level of site-specific mitigation required for each activity to prevent significant effects occurring.

The pre-mitigation Dust Risk Summary Table for the Wind Farm construction phase is shown in **Table 10-17**. The Dust Risk Summary Table for the main grid connection construction works phase is shown in **Table 10-18**. Overall, to ensure that no dust disturbance occurs during the earthworks, construction and trackout activities, a range of dust mitigation measures associated with high risk of dust effects will be implemented. When the dust mitigation measures detailed in the mitigation section of this chapter in **Section 10.5** are implemented, fugitive emissions of dust from the site will be insignificant and pose minimal disturbance at nearby receptors.

Table 10-17: Summary of Wind Farm Construction Phase Dust Effect Risk Used to Define Specific Mitigation

Potential Effect	Risk		
	Earthworks	Construction	Trackout
Dust Soiling	Low Risk	Low Risk	Low Risk
Human Health	Low Risk	Low Risk	Low Risk
Ecological	Low Risk	Low Risk	Low Risk

Table 10-18: Summary of Grid Connection Construction Phase Dust Effect Risk Used to Define Site Specific Mitigation

Potential Effect	Risk		
	Earthworks	Construction	Trackout
Dust Soiling	Low Risk	Low Risk	Low Risk
Human Health	Low Risk	Low Risk	Low Risk
Ecological	Negligible	Negligible	Negligible

Table 10-19 shows the significance of wind farm construction phase dust effects in relation to dust soiling, human health and ecological receptors. **Table 10-20** shows the significance of grid connection construction phase dust effects in relation to dust soiling, human health and ecological receptors.

Overall, in the absence of mitigation, dust effects from the proposed development construction phase works are predicted to be **adverse, imperceptible to not significant, temporary to short-term** and **direct** on dust sensitive receptors.

Table 10-19: Construction Effect 1 Wind Farm Dust Emissions on Sensitive Receptors

Construction Effect 1: Wind Farm Dust emissions on Sensitive Receptors						
	Quality of Effect	Significance	Spatial Extent	Duration	Other Relevant Criteria	Likelihood
Dust Soiling	Adverse	Not Significant	Local	Temporary to Short-Term	Direct	Likely
Human Health	Adverse	Not Significant	Local	Temporary to Short-Term	Direct	Likely
Ecological	Adverse	Not Significant	Local	Temporary to Short-Term	Direct	Likely

Table 10-20: Construction Effect 2 Grid Connection Dust Emissions on Sensitive Receptors

Construction Effect 2: Grid Connection Dust emissions on Sensitive Receptors						
	Quality of Effect	Significance	Spatial Extent	Duration	Other Relevant Criteria	Likelihood
Dust Soiling	Adverse	Not Significant	Local	Brief to Temporary	Direct	Likely
Human Health	Adverse	Not Significant	Local	Brief to Temporary	Direct	Likely
Ecological	Adverse	Imperceptible	Local	Brief to Temporary	Direct	Likely

10.4.2.2 Vehicle Emissions

Traffic levels, summarised in **Volume II, Chapter 16** Material Assets – Traffic and Transportation of this EIAR, during the construction phase are below the TII criteria (refer to **Section 10.2.2.3**) and therefore a detailed quantitative assessment of construction traffic was not required.

Exhaust emissions from construction and delivery vehicles during the construction period of 24 months are unlikely to have an adverse effect on local air quality and will not have a significant effect on local, regional or national Air Quality Standards given the scale of the works, high levels of dispersion, and the limited duration of works.

Construction stage traffic will have an **adverse, imperceptible, local, short-term** and **direct** effect on air quality, refer to **Table 10-21**.

Consequently, there will be no significant effect on air quality at sensitive receptors for the short-term duration of the construction phase.

Table 10-21: Construction Effect 3: Traffic Emissions on Air Quality

Construction Effect 3: Traffic Emissions on Air Quality						
	Quality of Effect	Significance	Spatial Extent	Duration	Other Relevant Criteria	Likelihood
Pre - Mitigation	Adverse	Imperceptible	Local	Short-Term	Direct	Likely

10.4.3 Operational Phase

Once operational, there will be no direct emissions to the atmosphere from the development, except for vehicles which will periodically visit the proposed development site for maintenance. Emissions associated with this low level of vehicles are considered insignificant. The level of traffic is below the criteria outlined in **Section 10.2.2.4**, and therefore a detailed air quality assessment was not required.

The generation of electricity from the renewable energy wind farm will have a long-term positive effect on air quality, in terms of reducing the amount of GHG produced in the environment. The wind farm will save approximately 70,182 tonnes CO₂ per year with a total of 2,456,370 tonnes over the development lifetime (based on a 4.5MW turbine for 35 years). These figures are referenced from carbon savings calculations carried out in **Volume II, Chapter 11 Climate Section 11.4.2.1** of this EIAR.

The electricity generated will assist to displace electricity otherwise generated from coal, oil and gas fired power plants, thus reducing emissions which reduce air quality.

During the operational phase, there will be a **positive, slight, national, long-term** and **indirect** effect air on air quality, refer to **Table 10-22**.

Table 10-22: Operational Phase Air Quality Effects

Operational Effect 1: Air Quality Effects						
	Quality of Effect	Significance	Spatial Extent	Duration	Other Relevant Criteria	Likelihood
Pre - Mitigation	Positive	Slight	National	Long-Term	Indirect	Likely

10.4.4 Decommissioning Phase

The scale of works involved during the decommissioning phase will primarily involve the dismantling and removal of the wind turbines and other buildings. No significant earthworks are likely as the access tracks and underground cable ducts will likely be left in-situ and the substation will continue to form an operational part of the national grid. Consequently, the dust generating activities will be much lower than those for the construction phase.

Similarly, emissions from plant and machinery exhausts will be lower than anticipated for the construction phase. Where possible materials will be recovered and recycled.

Dust emission magnitudes from demolition/decommissioning works, as per IAQM guidance, can be classified as small, medium or large and have been described as follows:

- Large: Total building volume >75,000m³, potentially dusty construction material (e.g. concrete), on-site crushing and screening, demolition activities >12m above ground level;
- Medium: Total building volume 12,000m³ – 75,000m³, potentially dusty construction material, demolition activities 6-12m above ground level; and
- Small: Total building volume <12,000m³, construction material with low volume for dust release (e.g. metal cladding or timber), demolition activities <6m above ground, demolition during wetter months.

No demolition works are required for the grid connection during the decommissioning phase, however wind turbines will be decommissioned and dismantled after the turbines' operational life period.

The dismantling and removal of wind turbines is a specialist operation, which will be undertaken by the turbine supplier that completed the installation where possible. Turbine dismantling will be undertaken in reverse order to methodology employed during their construction

On the dismantling of turbines, it is not intended to remove the concrete foundation from the ground. It is considered that foundation removal would be the least preferred option in terms of effects to the environment. The turbine foundations will therefore be backfilled and covered with soil material. As there is no usable soil or overburden material on the site after construction, this material will be sourced locally and imported to site on heavy good vehicles. The imported soil will be spread and graded over the foundation using a tracked excavator and revegetation enhanced by spreading of an appropriate seed mix to assist in revegetation.

The exact details of the decommissioning phase will be detailed as part of a Decommissioning Plan which will be finalised with the local authority prior to decommissioning. Taking a conservative approach, the demolition phase dust magnitude is taken as **Large** for the purposes of this assessment.

Combining the magnitude of works with the previously established sensitivity of the area, refer to **Section 10.3.3**, the potential risk of dust effects as a result of decommissioning works can be determined with use of the IAQM guidance risk rating matrix, refer to **Table 10-23**.

With respect to dust soiling, human health and ecological effects due to decommissioning activities for the wind farm site the IAQM guidance criteria table for rating of risk, refer to **Table 10-23**, the risk of dust effects prior to mitigation is **Low** (see **Table 10-24**).

Table 10-23: Criteria for Rating Risk of Dust Effects – Decommissioning (Source: IAQM 2024)

Receptor Sensitivity	Dust Emission Magnitude		
	Large	Medium	Small
High	High	Medium Risk	Low Risk
Medium	Medium	Medium Risk	Low Risk
Low	Low	Low Risk	Negligible

Table 10-24: Risk of Dust Effects – Decommissioning

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

As is the case with the construction stage, the exhaust emissions from decommissioning vehicles are unlikely to have an adverse effect on local air quality and will not have a significant effect on local, regional or national Air Quality Standards given the scale of the high levels of dispersion, and the limited duration of works.

The risk rating of dust effects from decommissioning is rated as low and therefore in the absence of mitigation, dust effects from the proposed development decommissioning phase works are predicted to be **adverse, not significant, temporary, local** and **direct** on dust sensitive receptors, refer to **Table 10-25**.

Table 10-25: Decommissioning Effect 1: Dust Emissions on Sensitive Receptors

Decommissioning Effect 1: Dust emissions on Sensitive Receptors						
	Quality of Effect	Significance	Spatial Extent	Duration	Other Relevant Criteria	Likelihood
Dust Soiling	Adverse	Not Significant	Local	Temporary	Direct	Likely
Human Health	Adverse	Not Significant	Local	Temporary	Direct	Likely
Ecological	Adverse	Not Significant	Local	Temporary	Direct	Likely

10.5 Mitigation Measures

As indicated in **Section 10.4** above, there is some potential for (not significant to moderate) adverse effects to air quality during the construction phase of the proposed development. To avoid any potential adverse effects the following mitigation measures will be implemented.

10.5.1 Construction Phase

10.5.1.1 Dust Generation

Construction phase generated dust will be minimised by the following measures that will be implemented in full, and which are also incorporated into the site-specific Construction Environmental Management Plan (CEMP) (EIAR **Volume III, Appendix 2A**):

- Water will be used as a dust suppressant where required e.g. a water bowser to spray access tracks and crane hardstanding areas during any extended dry periods when fugitive dust emissions could potentially arise;
- Public roads will be inspected regularly for cleanliness and cleaned as necessary;
- All loads entering and leaving the site will be covered during dry periods, to protect from dust;
- Vehicle speeds will be controlled when passing over access tracks and crane hardstanding areas within the site;
- Wheel wash facilities will be implemented at the site entrance from the public road to facilitate removal of any material collected by vehicles entering or leaving the site and preventing its deposition on public roads; and
- Site stockpiling of materials will be designed in accordance with a Stockpiling Management Plan which will be implemented at the construction stage by appointed contractor and laid out to minimise exposure to wind.

10.5.1.2 Construction Traffic Emissions

Construction traffic emissions will be reduced using the following measures that will be implemented in full:

- Ensure regular maintenance of plant and equipment. Carry out periodic technical inspection of vehicles to ensure they perform most efficiently;
- Implementation of the Traffic Management Plan (**Volume III, Appendix 16A**) to minimise congestion;
- All site vehicles and machinery will be switched off when not in use, and no idling of engines will be permitted;
- The majority of aggregate materials for the construction of the proposed development will be obtained from the on-site borrow pits. This will reduce the number of delivery vehicles to site, thereby reducing emissions associated with vehicle movements.

10.5.2 Operational Phase

It is not expected that any significant adverse effects to air quality will occur during the operational phase, therefore no mitigation measures are required.

10.5.3 Decommissioning Phase

Effects resulting from the decommissioning phase are expected to be similar in nature, however smaller in scale in comparison to the construction phase. A decommissioning plan will be agreed with the planning authority prior to the commencement of decommissioning. This plan will include the following measures:

- Water will be used as a dust suppressant where required e.g. a water bowser to spray access tracks and crane hardstanding areas during any extended dry periods when fugitive dust emissions could potentially arise;
- Public roads will be inspected regularly for cleanliness and cleaned as necessary;
- All loads entering and leaving the site will be covered during dry periods, to protect from dust;
- Vehicle speeds will be controlled when passing over access tracks and crane hardstanding areas within the site; and
- Daily site inspections will take place to examine dust measures and their effectiveness.

10.6 Monitoring

The appointed environmental/ecological clerk of works (ECoW) or environmental manager will perform daily visual site inspections of dust occurrence on site during construction, particularly during periods of dry weather and windy conditions. These will be noted as part of site environmental audits. The appointed contractor construction manager will be notified if dusty conditions are prevalent on site.

10.7 Residual Effects

No significant adverse residual effects are predicted during the construction, operation and decommissioning phases once all mitigation measures are applied.

Construction phase

During the construction phase, there will be emissions from construction vehicles, however no significant adverse effects to air quality are predicted. Although dust will arise from construction activities, dust sensitive receptors are located at sufficient distance from the works so that no significant effects will occur. Works along the grid connection route are smaller in scale to the wind farm works and will only pass roadside receptors for 1 to 2 days at a time.

Overall, with the implementation of mitigation measures, the construction phase of the proposed development will have a **neutral, imperceptible** and **temporary to short-term, local** effect on air quality, refer to **Table 10-26**.

Table 10-26: Construction Phase: Residual Effect on Air Quality

Construction Phase Residual Effect on Air Quality						
	Quality of Effect	Significance	Spatial Extent	Duration	Other Relevant Criteria	Likelihood
Whole Wind Farm Development	Neutral	Imperceptible	Local	Temporary to Short-Term	Direct	Likely

Operational Phase

Once operational, there will be no significant adverse residual air quality effects or GHG emissions. The operation of the proposed development will displace air pollutants that would otherwise have been produced by fossil fuel generated electricity. By displacing fossil fuel generated electricity, the proposed development operational phase will help to reduce GHG emissions and contribute to national decarbonisation targets.

Overall, provided mitigation measures are applied, the operational phase of the development will have a **positive, moderate** and **long-term** effect on air quality.

Decommissioning Phase

The decommissioning phase of the proposed development will be similar to the proposed construction stage however no excavations will be required, only dismantling of turbines and therefore less adverse effects, such as dust emissions are predicted. The decommissioning of the wind farm will have a slight adverse effect on air quality, given that the production of renewable energy from the proposed development will have ceased. Overall, provided mitigation measures are applied, the decommissioning phase of the proposed development will have **adverse, not significant** and **temporary to short-term, local** effect on air quality, refer to **Table 10-27**.

Table 10-27: Decommissioning Phase: Residual Effect on Air Quality

Decommissioning Phase Residual Effect on Air Quality						
	Quality of Effect	Significance	Spatial Extent	Duration	Other Relevant Criteria	Likelihood
Whole Wind Farm Development	Adverse	Imperceptible	Local	Temporary to Short-Term	Direct	Likely

10.8 Cumulative Effects

A planning search for other existing or approved projects within 20km of the proposed development was undertaken and is included in detail in **Section 1.4.4 of Volume II, Chapter 01** Introduction of this EIAR.

The predicted cumulative effects during the construction, operational and decommissioning phases are summarised below.

As discussed in this chapter, the main effects to air quality from construction of the wind farm will result from dust. For air quality, cumulative effects are only considered within the local zone of influence (typically up to 350 m from site works and 200 m from affected roads), as impacts beyond these distances are not significant.

10.8.1 Construction Stage

As discussed in this chapter, the main effects to air quality from construction of the wind farm will result from dust emissions. IAQM guidance states that cumulative dust effects are only likely to occur when projects are in close proximity to each other. The IAQM guidance also states that a detailed assessment is only required when human receptors are within 250m of a site boundary or if ecological receptors are within 50m. There are no significant, planned or consented developments in close proximity of the proposed development.

There is a 9 turbine wind farm site which is in the planning stage. Garrane Wind Farm is located approximately 8.2km south west of the proposed development. At such distances, there will be no cumulative effects on air quality during the construction phase.

Overall, there are no significant cumulative effects on air quality predicted during the construction stage of the proposed development.

10.8.2 Operational Stage

The proposed development is not expected to generate significant dust emissions during its operational phase, and planned developments in the surrounding areas are unlikely to contribute to cumulative dust emissions.

Maintenance activities at the wind farm will result in very minor exhaust emissions from vehicles involved in routine maintenance. Due to the limited scale of these maintenance works, the associated effects on air quality are predicted to be neutral and imperceptible.

Furthermore, the proposed development site is situated at an adequate distance from other proposed developments in the surrounding vicinity and therefore, there are no anticipated significant cumulative effects on air quality during operation, attributable to either dust or vehicle emissions.

Given the presence of other renewable energy projects in the wider area, such as solar farms and additional wind energy developments, a slight cumulative positive effect on air quality is anticipated, as these projects will contribute to the displacement of fossil fuel generated energy.

10.8.3 Decommissioning Stage

During the decommissioning phase, there is potential for cumulative effects if other developments in the vicinity were to occur simultaneously. However, as decommissioning is anticipated to take place in the future following the completion of the operational phase (approximately 35 years), the nature and timing of any other such future developments in the vicinity of the wind farm during decommissioning is currently unknown.

The decommissioning activities will primarily involve the dismantling and removal of wind turbines and associated infrastructure off-site. Dust-generating activities are expected to be substantially lower than those experienced during the construction phase.

As no significant effects on air quality are predicted during decommissioning, no significant cumulative effects arising from potential concurrent developments in the surrounding area are anticipated.

10.9 Conclusion

The assessment of air quality and dust emissions for the proposed development has determined that, in the absence of mitigation, potential effects during the construction and decommissioning phases will be **not significant to moderate, localised, and temporary-short-term** in nature. Key sources of construction emissions include dust from earthworks, trackout activities, and exhaust emissions from construction vehicles. However, the implementation of site-specific mitigation measures—including dust suppression, vehicle speed control, and regular road cleaning—will effectively minimise these effects, ensuring there are no significant effects on air quality during the construction phase.

During the operational phase, there will be no significant effects on air quality, as site activities will be limited to occasional maintenance. The project will contribute to overall air quality improvements by displacing fossil fuel-based electricity generation with renewable energy.

Similarly, decommissioning activities will be managed to ensure that dust and vehicle emissions remain within acceptable limits and are expected to be much lower than during the construction phase.

In conclusion, with the application of the proposed mitigation measures, the development is not expected to result in any significant adverse residual effects on air quality. The overall effect will be temporary, and well-controlled, ensuring compliance with relevant air quality standards and best practice guidelines.

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