

15 MATERIAL ASSETS AND OTHER ISSUES

15.1 INTRODUCTION

This Material Assets chapter evaluates the likely significant direct and indirect effects of the Project on physical and economic resources, including infrastructure, buildings, natural resources, and cultural heritage, while outlining mitigation measures to avoid or reduce those effects. This chapter specifically assesses the impacts of the Project, which refers to all elements of the application for the construction of the Moanmore Lower Wind Farm (**Chapter 2: Project Description**). The assessment will consider potential effects during the following phases:

- Construction of the Project
- Operation of the Project
- Decommissioning of the Project

Common acronyms used throughout this EIAR can be found in **Appendix 1.4**. This chapter of the EIAR is supported by Figures provided in Volume III and by the following Appendix documents provided in Volume IV of this EIAR:

- **Appendix 15.1: Ai Bridges Telecommunications Impact Assessment Report**
- **Appendix 15.2: Aviation Review Statement**
- **Appendix 15.3: Forestry Report**

15.2 STATEMENT OF AUTHORITY

This Material Assets Chapter has been prepared by Ms. Sarah Moore, with assistance from Mr. Padraig O'Dowd and Ms. Siobhan Roddy of Jennings O'Donovan & Partners Limited (JOD). The final review was conducted by Managing Director Mr David Kiely. **Appendix 15.1 and Appendix 15.2** was carried out by Mr. Kevin Hayes and Mr. Patrick Tinney in Ai Bridges Ltd. **Appendix 15.3: Forestry Report** was carried out by Mr Joe Codd, Mr Martin Murphy and Ms. Gráinne Murphy from Veon Ltd.

All contributors to this EIAR chapter have contributed their expertise to EIAR's for other renewable energy projects, including commercial sized wind farms.

Detailed biographies/CVs of those who contributed to the preparation of this EIAR have been included in **Appendix 1.1: Author Qualifications**.

Mr. David Kiely is Managing Director of JOD and holds a BE in Civil Engineering from University College Dublin and MSc in Environmental Protection from IT Sligo. He is a Fellow

of Engineers Ireland, a Chartered Member of the Institution of Civil Engineers (UK). David has over four decades of experience in the preparation of EIARs and EISs for environmental projects including Wind Farms, Solar Farms, Wastewater Projects, and various commercial developments. David has also been involved in the construction of over 60 wind farms since 1997.

Ms. Sarah Moore is an Environmental Scientist in JOD with over 17 years of environmental consultancy experience. She has obtained a MSc in Environmental Engineering from Queens University, Belfast, and a BSc in Environmental Science from University of Limerick. Since joining JOD, Sarah has been involved as a Project Environmental Scientist on a range of renewable energy, wastewater, structures and commercial projects. She has experience in the preparation of Appropriate Assessments, Ecological Impact Assessments, Environmental Impact Assessments and Geographic Information Systems.

Mr. Pdraig O' Dowd is a Junior Environmental Scientist with one years' experience. He holds a BA (Hons) in Creative Design, an MSc in Design Innovation, and a GradDip in Design Thinking for Sustainability. As a Graduate Member of IEMA, his expertise includes EIAR report writing, grant-funded research applications, and data analysis, with a focus on the environmental and renewable energy sectors. He also has research experience with Wind Energy Ireland.

Ms. Siobhan Roddy is a Graduate Environmental Scientist with one years' experience and holds a BSc (Hons) in Environmental Science and Technology from Dublin City University. Siobhan's key capabilities are in report writing, and ArcGIS. She forms part of the Environmental team responsible for preparing the EIAR Chapters and Appropriate Assessments.

Kevin Hayes is an Engineering Manager at Ai Bridges Limited. He has a B.Eng. Hons. - Electronic Eng, M.Eng. Hons. Communications Engineering and Aviation OLS Assessment Training, 2020. Kevin has over 20 years' experience in Telecommunications Network Design and Project Management. He also managed and designed the software prediction model for the TVI & Broadband EMI Interference Studies for Wind Farms. Kevin had input into **Appendix 15.1: Telecommunications Impact Assessment Report** and **Appendix 15.2: Aviation Review Statement**. His main role as part of these reports is Project and Client Management.

Patrick Tinney is a Telecoms Engineer at Ai Bridges Limited. Patrick has a B.Sc. Computer & IT Systems and achieved a Radio Planning Pathloss & ATDI in 2019. Patrick has a B.Eng. in Electronics, Occupational First Aid and 3 years' experience as a Health and Safety representative. Patrick has experience in conducting site surveys and RF. He provides on-site support for the roll-out of fixed wireless access in Ireland. Patrick had input into **Appendix 15.1: Telecommunications Impact Assessment Report** and **Appendix 15.2: Aviation Review Statement**. Patrick's main role in the Material Assets Chapter of this EIAR is Telecoms Field Network Engineering.

Martin Murphy is a Technical Support Forester for Veon with a MSc (Agr) by research (2023), a BSc (Hons) in Land Management in Forestry (2020) and a BSc in Forestry (2019). Martin's main roles include assisting with assessment and report writing for a number of developments (including wind farms) in Ireland. Joe's role in the Material Assts chapter of this EIAR is the preparation of **Appendix 15.3: Forestry Report**.

Gráinne Murphy is a GIS Technician with Veon. Gráinne achieved a MSc in Geospatial Data Analysis in 2021 and a BA in Geography and Music in 2018. Gráinne has over 4 years of experience in academia and industry. She is responsible for creating and analysing ArcGIS Field Maps projects, conducting survey training, and ensuring quality control for the maintenance and monitoring of GPS field technology and geospatial data processes. Gráinne had input into the preparation of **Appendix 15.3: Forestry Report**.

15.3 ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

Site visits and field surveys were undertaken following preliminary consultations with key consultees during the scoping process and desk-based assessments. In line with the EIA Directive and current EIAR Guidelines (EPA, 2022)¹, this chapter of the EIAR assesses those elements likely to have a significant effect on the environment.

The Project was assessed for potential effects as well as cumulative effects.

Economic assets of natural heritage include non-renewable resources such as minerals or soils, and renewable resources such as wind and water. These assets are addressed in **Chapter 8: Soils and Geology**, **Chapter 9: Hydrology and Hydrogeology**, and **Chapter 12: Air and Climate**. Peat and spoil are assessed in **Chapter 8: Soils and Geology**. Amenity resources and tourism are addressed in **Chapter 5: Population and Human**

¹ Guidelines on the information to be contained in Environmental Impact Assessment Reports, EPA. 2022.

Health. The cultural assets of Archaeology and Cultural Heritage are addressed in **Chapter 14: Archaeology and Cultural Heritage** and traffic is addressed in **Chapter 16: Traffic and Transport**. Utilities such as water, wastewater and waste services are described in this chapter and in **Chapter 2: Project Description**.

The material assets considered in this chapter include:

- Land Use – Agriculture & Forestry
- Telecommunications
- Electricity Networks
- Air Navigation
- Quarries
- Utilities (gas, water, waste)

15.3.1 Evaluation of Potential Effects

Following on from the identification of the baseline environment, the available data was utilised to identify and categorise any potential impacts likely to give rise to significant effects to identified material assets as a result of the Project.

The descriptors used in this EIAR are those set out in EIAR Guidelines, 2022 (as described in Section 1.9 of **Chapter 1: Introduction**).

15.4 LAND USE - AGRICULTURE & FORESTRY

15.4.1 Baseline Environment

The Site is located 3km north-west of Kilrush, Co. Clare, 6.8km south-west of Cooraclare village, and 7.1km north of the county boundary between counties Clare and Kerry. The Site is located on relatively level ground, at elevations ranging from 11m AOD in the northern side of the Site, where the site access track is proposed, to 9m AOD towards the middle of the Site.

The majority of the Site is characterised by a combination of agricultural grassland and cutover peatland bog. The Site also contains 3.065ha of commercial forestry.

15.4.2 Assessment of Potential Effects

15.4.2.1 Construction & Operational Phases

Agriculture

The total permanent land-take of the Project, including the site access tracks, Turbine Hardstands, Turbine Foundations, Grid Connection Route cabling, permanent Turbine

Delivery Route works and Electrical Substation is 5.3ha (53,192m²). The area within the Redline Boundary is 36.77ha therefore the total land take is 14.4% of the Redline Boundary. The construction of new internal site access tracks and upgrade of existing site track will improve access for surrounding agricultural use.

The immediate surrounding agricultural grasslands will remain in agricultural use. There will be 3 no. turbines located on or partly on agricultural lands. This will result in the change of use from agricultural use to wind farm use. This will have a **temporary, slight negative** impact on agricultural land use due to the land use change for the duration of the lifetime of the Development during construction and operational phases. Therefore, it is considered that there will no likely significant effects on agricultural use during the construction and operational phases.

Forestry

Tree felling in the townland of Tullabrack East will be required as part of the Development. To facilitate the construction of the Blade Transfer Area, 0.845 ha of coniferous forestry will need to be permanently clearfelled. The felling area proposed is the minimum necessary to construct the Development. The immediate surrounding forestry area (2.22 ha) will not be felled and will not have a likely significant effect on the surrounding environment.

Public Road Infrastructure

The construction of the Grid Connection Route and Turbine Delivery Route will only require relatively localised excavation and enabling works within the curtilage of the public road network, with no excavation or enabling works envisaged in private lands outside of the Redline Boundary. Full reinstatement will occur where such excavation or enabling works are undertaken. Effects on the public road infrastructure will be temporary in nature. There will be no likely long-term significant effects as a result of the Project.

Access

Chapter 16: Traffic and Transport outlines the proposed works and deliveries along the Turbine Delivery Route, aiming to avoid undue impacts on adjacent land uses. Removal of components during the decommissioning phase will use the Construction Haul Route. Therefore, there will be no likely significant effects on access to lands and furthermore no likely significant effects on land use during the construction and decommissioning phases as a result of the Project.

During the operational phase, the Turbine Delivery Route will no longer be necessary, except when replacing a blade or other major component. Details on turbine delivery and maintenance requirements are provided in **Chapter 2: Project Description**.

All existing access points (i.e., to domestic premises, businesses, farms) will remain accessible during temporary road closures and diversions enacted as part of the traffic management plans associated with the construction of the Project. This will maintain local access and avoid impacts on various land uses. The effects on land use due to access during the operational phase are considered not significant as a result of the Project.

15.4.2.2 Decommissioning Phase

The approach proposed for decommissioning is one of minimal intervention:

- Decommissioning works will be limited to action necessary to remove the wind farm structures, i.e., removal of turbines and monitoring mast, extraction of cables but leaving ducting in-situ.
- Tracks and associated drainage systems will remain in place to serve ongoing agriculture activity in the area.
- Hardstanding areas will be allowed to revegetate naturally.
- Turbine plinths will be removed, and the hardcore covering Turbine Foundations will be allowed to revegetate naturally.
- Soil disturbance will be avoided as much as possible.

The current land use within the Site is primarily agricultural and peat land. The land is presently used for farming and was historically used for peat cutting. Therefore, the effects of the decommissioning phase on land use will be **less significant** than those during the construction phase.

15.4.3 The 'Do-Nothing' Impact

If the proposed development does not proceed, the lands within the redline boundary and in the vicinity of the site will continue to be used for agricultural and forestry purposes, resulting in a neutral effect.

15.4.4 Mitigation Measures and Residual Effects

Agriculture and Forestry

The Project has been carefully designed to minimise its construction and operational footprint, thereby preventing disruptions to the area's existing land use. Although a

temporary reduction in agricultural and forestry productivity is expected due to the use of approximately 2.51ha of agricultural land and 0.845ha of forestry during construction, these lands will be restored to their original condition (in the case of agriculture) or replanted elsewhere (in the case of forestry), allowing activities to resume. See details of compensatory afforestation in **Appendix 15.3**.

A "*Mitigation by Avoidance*" strategy has been integrated into the design to minimise impacts on land use. The Development footprint has been kept to the necessary minimum, utilising existing tracks wherever possible to avoid affecting existing land uses. These measures will prevent unnecessary ground disturbance, land use changes, and soil compaction.

To minimise the need for new site access tracks, the design incorporates existing tracks. Underground Grid Connection will be installed alongside site access tracks to avoid and minimise negative impacts. The construction and decommissioning works will be governed by a Construction and Environmental Management Plan (CEMP) (**Appendix 2.1**), detailing daily operations and methodologies. As part of these efforts, the public and other stakeholders will receive updates on construction activities affecting access to surrounding lands, for the duration of the construction period.

The residual effects on agriculture and forestry as a result of the Project are considered to be negligible during construction, operation, and decommissioning.

There will no likely significant residual effects on agriculture and forestry as a result of the Project.

Access

All existing access points (i.e., to domestic premises, businesses, farms) will remain accessible during temporary road closures and diversions enacted as part of the traffic management plans associated with the Project. This will maintain local access and avoid impacts on various land uses.

Conclusion

Overall, these measures will ensure that the residual effects on land use remain Slight Negative to Neutral throughout the lifetime of the Project. No significant residual impacts on land use are expected during the lifetime of the Project.

15.4.5 Cumulative Effects

A list of projects and plans for cumulative assessment has been included as **Appendix 1.2** of this EIAR.

The nearest significant development proposed is the in planning Ballykett Wind Farm, which is 0.96km northeast and involves the erection of three wind turbines. The closest operational wind farms are Moanmore wind farm (1.7km northwest) and Tullabrack wind farm (2.75km northeast).

As the works associated with the Development are localised and confined to the Site, they will not have a significant effect on land use, and therefore no other projects (i.e. the Development, the two operational wind farms, minor domestic and agricultural developments and ongoing forestry activities) are capable of combining with the Development's works to produce cumulative effects on land use.

Agricultural activities in the surrounding area will continue during all phases of the Project once fencing is fully established. Forestry activities adjacent to the Development will proceed with their regular maintenance, felling, and replanting schedules throughout the operational life of the Project. Minor domestic and agricultural developments are not expected to contribute to cumulative effects as their impacts will be localised and not significant.

15.4.6 Statement of Significance

No significant effects are predicted on agricultural or forestry land use within the Site, nor are any significant effects expected on commercial forestry outside the site.

15.5 TELECOMMUNICATIONS

Microwave links need an unobstructed line of sight from end to end because blocked links will perform inadequately. It is therefore necessary to ensure tall wind turbines will not interrupt links. Impacts can include reflection, diffraction, blocking and radio frequency interference.

During operation, wind turbines have the potential to interfere with electromagnetic signals passing above the ground due to the nature and size of the wind farm.

Ireland saw the roll out of Digital Terrestrial Television, locally known as Saorview TV, in October 2010, incorporating the switchover from analogue to digital television. According to Ofcom (a regulatory UK body) (2009), *digital television signals are much better at coping*

with signal reflections, and digital television pictures do not suffer from ghosting². Ghosting is the replica of a transmitted image which is offset in position and is superimposed on top of the main image.

Since digital switchover, there have been very few reported cases of wind turbine interference with domestic analogue reception. Modern turbine blades are also typically made of synthetic materials which have a minimal impact on the transmission of electromagnetic radiation. Therefore, potential effects on television and radio signals from the Development will be negligible and are not considered further, given the advancements in technology.

15.5.1 Guidance

Potential telecommunication effects generated by the Development have been assessed in accordance with relevant guidance and best practice with reference to the following documents.

- Clare County Development Plan 2023 – 2029.
- ‘Best Practice Guidelines for the Irish Wind Energy Industry’, published by the Irish Wind Energy Association (2012).
- Information about Electric & Magnetic Fields and the Electricity Transmission System in Ireland, EirGrid³.
- Wind Energy Development Guidelines: Planning Guidelines, Department of Environment, Heritage and Local Government (DHPLG) 2006.
- Draft Revised Wind Energy Development Guidelines (DHPLG) 2019.

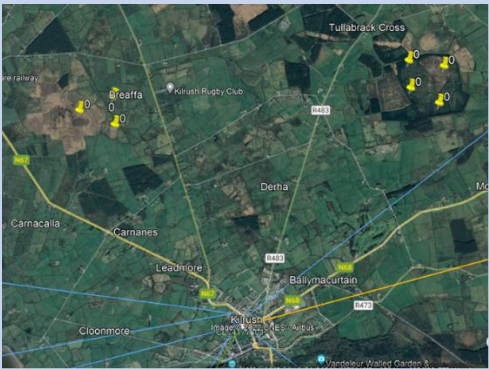
Telecommunications providers were consulted about the Project. A summary of responses is outlined in **Table 15.1** and **Appendix 1.3** outlines full consultation responses.

Table 15.1: Summary of Consultations

Consultee	Response Date	Response's	Potential Impact
Eir, Mobile Network TXN	Response 1	<i>"We have no transmission links within either of the proposed areas and it has no risk to the network".</i>	No Impact

²Ofcom (2009) *Tall Structures and Their Impact on Broadcast and Other Wireless Services*, OFCOM, United Kingdom. Available online at: https://www.ofcom.org.uk/_data/assets/pdf_file/0026/63494/tall_structures.pdf [Accessed: 08/08/2024]

³Eirgrid (2014) *Information on Electric and Magnetic Fields*. Available online at : <http://www.eirgridgroup.com/site-files/library/EirGrid/Information%20on%20Electric%20and%20Magnetic%20Fields.pdf> [Accessed on: 08/08/2024]

Consultee	Response Date	Response's	Potential Impact
			
Tetra Ireland	Response 1	<i>"We anticipate no impact from the development as proposed, can you ensure the development is also reviewed by eir".</i>	No Impact
Vodafone	Response 1	<i>"I see NO issue with either. There is a decent distance from proposed developments, so plenty of room for movement".</i>	No Impact
Three	Response 1	<i>"I have reviewed the turbine locations for the Ballykett and Moanmore windfarms and 3Ireland have no Microwave transmission links that could potentially be affected".</i>	No Impact
RTE	Response 1	<i>"Both of the sites detailed in your email will have no impact on our fixed linking.</i>	No Impact
Enet	Response 1	Appendix 15.1 Ai Bridges Telecommunications Impact Assessment Report Consultation Response – <i>"See analysis attached and potential impacts below:"</i> TC Knockanore – Clonanbeg National School Band MHz/GHz: 8GHz <u>Site A</u> Lat: 52°31'24.75"N Long:9°36'18.83"W Ant Height: 16m <u>Site B</u> Lat: 52°45'42.60"N Long:9°23'25.30"W Ant Height: 7m	No Impact
Broadcast Authority of Ireland (BAI)	Response 1	AI Bridges EMI Impact Assessment Report 2022 Consultation Response – <i>"The BAI does not perform an in-depth analysis of the effect of wind turbines on FM networks. However, we are not aware of any issues from existing windfarms into existing FM networks. Also, the proposed windfarms are not</i>	No Impact

Consultee	Response Date	Response's	Potential Impact						
		<i>located close to any existing or planned FM transmission sites."</i>							
BT Ireland	Response 1	AI Bridges EMI Impact Assessment Report 2022 Consultation Response – <i>"We only have a network presence in Louth and Waterford."</i>	No Impact						
ESB Networks	Response 1	AI Bridges EMI Impact Assessment Report 2022 Consultation Response – <i>"To date no response has been received"</i> .	No Response						
Eir	Response 1	<table><tr><th>Site No.</th><th>Wind Farm Site</th><th>Potential Impact (Y \ N)</th></tr><tr><td>1</td><td>Moanmore, Co Clare</td><td>N</td></tr></table>	Site No.	Wind Farm Site	Potential Impact (Y \ N)	1	Moanmore, Co Clare	N	No Impact
Site No.	Wind Farm Site	Potential Impact (Y \ N)							
1	Moanmore, Co Clare	N							
Imagine Broadband	Response 1	<table><tr><th>Site No.</th><th>Wind Farm Site</th><th>Potential Impact (Y \ N)</th></tr><tr><td>1</td><td>Moanmore, Co Clare</td><td>N</td></tr></table>	Site No.	Wind Farm Site	Potential Impact (Y \ N)	1	Moanmore, Co Clare	N	No Impact
Site No.	Wind Farm Site	Potential Impact (Y \ N)							
1	Moanmore, Co Clare	N							
Virgin Media	Response 1	<table><tr><th>Site No.</th><th>Wind Farm Site</th><th>Potential Impact (Y \ N)</th></tr><tr><td>1</td><td>Moanmore, Co Clare</td><td>N</td></tr></table>	Site No.	Wind Farm Site	Potential Impact (Y \ N)	1	Moanmore, Co Clare	N	No Impact
Site No.	Wind Farm Site	Potential Impact (Y \ N)							
1	Moanmore, Co Clare	N							

15.5.2 Assessment Methodology

AI Bridges was commissioned to evaluate the possible impacts that the Development could have on existing telecommunications operator networks. The study area was set as the Redline Boundary. The scope of work included field and desktop surveys to determine telecommunications network infrastructure that could be impacted by the Development. Consultations with telecom operators were also undertaken to assist in identifying network infrastructure that could be impacted by the Development.

Two telecommunications mast-sites were identified as sites with network infrastructure that could potentially be impacted by the Development and a field survey of each of these mast-sites was carried out. During the field surveys, radio antennas with bearings in the direction of the wind farm were recorded. The findings are provided in **Appendix 15.1**.

This methodology is in line with best practice and guidance (Section 15.5.1).

15.5.3 Assessment of Potential Effects

All potential effects, which are associated with the operational phase of the Development, are classified as long-term effects.

15.5.3.1 The 'Do-nothing Impact'

If the Project does not proceed, there will be no effects on telecommunications. This 'do-nothing' scenario would result in no interference in electromagnetic signals subject to the

continuation of current activities and practices. No adverse significant effects would be likely.

15.5.3.2 Construction Phase

During the construction phase, there are likely to be several sources of temporary electromagnetic emissions. Chief among these will be the brief use of electrical power tools and the use of electrical generators which may be brought onsite before mains electricity is provided. These devices are required by Irish and European law to comply with the EMC Directive 2014/30/EU, as amended. Compliance with this Directive will mean that the electromagnetic emissions from these devices will not cause interference to other equipment and therefore no significant effects are likely.

Other potential effects during the construction phase are likely to be as a result of tall cranes used for erecting the turbines. These cranes will be beside the proposed turbines on the Turbine Hardstands. There is potential for cranes operating to interfere with signals which pass through the area. However, any effect will be temporary in nature as it will only last whilst turbines are being erected (approximately 2-3 days). The effect can be classed as moderate negative, but short-term in nature.

To facilitate the transport of turbine components, a number of telegraph poles along the L2034 and L6132 local roads to the Site will likely need to be temporarily removed. This will cause **temporary, short-term** disruptions to telecommunications in the area, but these effects are expected to be minimal.

15.5.3.3 Operational Phase

Appendix 15.1 identified two microwave radio links that could potentially be affected by the Development (Enet and ESB Networks). One of these is the Enet-licensed 8 GHz point-to-point (PTP) microwave radio link from Knockanore to Clohanbeg N.S.

The licensed PTP microwave radio link near Moanmore Lower Wind Farm is located 1.3km from the Site. At this distance, the wind farm will have an **imperceptible effect** on the radio link.

- *“Results from the telecom operator consultations and desktop survey analysis indicate that there one Licensed PTP microwave radio link in the vicinity of the proposed wind farm site”.*

- “The Licensed PTP radio link in the vicinity of the Moanmore wind farm development is listed below in **Table 15.2**. The results from the network analysis indicates that this PTP radio link is 1.29km from the proposed wind farm Site. At this distance there will be no impact to the radio link due to the wind farm development”.

Table 15.2: Radio Links in vicinity of proposed Moanmore Lower Wind Farm

Operator	Licensed PTP Link Description	Impact of Wind Farm
Enet	8 GHz PTP microwave radio link from Knockanore to Clohanbeg N.S.	No Impacts. (Clearance distance of 1.29 km between wind farm site boundary and the 2nd Fresnel Zone of radio link).

15.5.3.4 Decommissioning Phase

When decommissioning of the Project takes place, effects associated with this phase on telecommunications will be similar to those at the construction phase. No significant effects are likely.

15.5.4 Mitigation Measures

Mitigation measures were integrated during the design phase by avoiding known routes of telecommunication links. Specifically, the routes were mapped, and a buffer zone was established to ensure that the proposed turbines were located outside these areas, including the identified Fresnel zones.

Residual effects on any PTP radio link due to the Development are considered not significant. Additionally, compliance with the EMC Directive 2014/30/EU (as amended) ensures that electromagnetic emissions from the devices used will not interfere with other equipment.

15.5.5 Cumulative Effects

A list of projects and plans for cumulative assessment has been included as **Appendix 1.2** of this EIAR.

The nearest significant development proposed is the Ballykett Wind Farm, which is 0.96km northeast and involves the erection of three wind turbines. The closest operational wind farms are Moanmore wind farm (1.7km northwest) and Tullabrack wind farm (2.75km northeast).

During the development of any large project that holds the potential to effect telecoms, the Developer is responsible for engaging with all relevant Telecoms Operators to ensure that the proposals will not interfere with television or radio signals by acting as a physical barrier. In the event of any potential impact, the Developer for each individual project is responsible for ensuring that the necessary mitigation measures are in place. Each Developer is therefore responsible for ensuring their proposals will not interfere with television or radio signals by acting as a physical barrier.

There will therefore be no cumulative effects relating to the Project and surrounding projects in relation to telecommunications.

15.5.6 Statement of Significance

The implementation of mitigation measures will ensure no interference with communication links. Therefore, no significant effects are predicted on telecommunications or radio reception as a result of the Project.

15.6 ELECTRICITY NETWORKS

15.6.1 Introduction

This section describes the transmission network and the anticipated connection option. It is not proposed to utilise any elements of the distribution network.

The nationwide electricity transmission system allows for the transport of large volumes of electricity from generation stations, including wind farms, to bulk supply points near the main population centres where it interconnects with the distribution system.

The existing 110kV overhead transmission line runs approximately 2.4km to east of the nearest turbine, connecting the Tullabrack 110kV substation to the Booltiagh-Moneypoint 110kV transmission line. The proposed wind turbines are spaced as follows: T1 is 380m from T2 and 441m from T3, with T2 located 482m from T3. The nearest point to the local road L-2034 is approximately 600m. The clearance between the overhead transmission line and the proposed wind turbines meets the requirements specified in EirGrid's "Policy on Wind Turbine Clearance to Overhead Lines (OHLs), Rev 1⁴."

The following Grid Connection Route was assessed as part of the Development:

- The on-site 20kV Electrical Substation will connect via 1 no. 38kV underground cable to the existing Tullabrack 110kV substation. At the existing Tullabrack 110kV substation, the cable will connect into existing infrastructure within the confines of the Electrical Substation and its compound. An update of the existing transformer in Tullabrack substation is likely to be required.

This Grid Connection Route will be located entirely along public roads/verges. and constructed and installed according to the requirements and specifications of EirGrid and ESB Networks.

15.6.2 Assessment Methodology

The study area was set to the extent of the Project which includes all lands within the Redline Boundary and the TDR.

Greensource Sustainable Developments undertook a grid study in October 2024 (**Appendix 2.2**). This found that the most likely connection method for the proposed

⁴ [Wind Turbine Clearance Policy | Eirgrid](https://cms.eirgrid.ie/sites/default/files/publications/2-Policy Statement Wind Turbine Clearance v1.0.pdf). Available at: <https://cms.eirgrid.ie/sites/default/files/publications/2-Policy Statement Wind Turbine Clearance v1.0.pdf>. Accessed at: 25/09/2024

Moanmore Lower Wind Farm would be a 38 kV connection to the existing Tullabrack 110 kV substation via a 110/38 kV transformer upgrade from 31.5 MVA to 63 MVA.

Appendix 2.2 assesses the impacts based on desktop study, consultation and site visit.

15.6.3 Assessment of Potential Effects

All on-site internal cabling will be underground, as will the Grid Connection Route from the Electrical Substation to the Tullabrack 110 kV substation.

The Development will contribute directly and in the long term to the electricity network by strengthening it through additional renewable energy generation.

If connected to the Tullabrack 110 kV substation the underground cable will connect into existing structures within the confines of the Electrical Substation and its compound. Based on assessment by Mullan Grid, an upgrade of the existing transformer at the Tullabrack substation is likely to be required, which will result in a **slight, positive short-term** effect in terms of enhancing critical infrastructure.

No significant negative impacts on the Grid Connection Route are anticipated. The installation of new infrastructure will result in a long-term, slight positive impact on transmission infrastructure, with no impact on distribution. The distribution network will not be used, and the energy produced, being carbon neutral, will offset local carbon emissions from fossil fuel energy production, providing a slight positive local impact.

The Project will not have any likely adverse significant effects on the electricity network.

15.6.4 The 'Do-nothing' Impact

If the Project were not to proceed, the opportunity to generate renewable energy and electrical supply to the national grid would be lost, as would the opportunity to further contribute to meeting Government and EU targets for the production and consumption of electricity from renewable sources and the reduction of greenhouse gas emissions and compliance with the Climate Change and Low Carbon Emissions Act 2015-21 would be impeded.

15.6.5 Mitigation Measures

Mitigation by design and avoidance has minimised impacts on existing electricity networks.

- Confirmatory drawings for all existing services will be sought upon consultation with ESB Networks.
- Immediately prior to construction taking place, the area where excavation is planned will be surveyed by CAT scan (sub-surface survey technique to locate any below-ground utilities) and all existing services will be verified. Temporary warning signs will be erected.
- The as-built location of the installed ducts will be surveyed and recorded using a total station/GPS before the trench is backfilled to record the exact location of the ducts. The co-ordinates will be plotted on as-built record drawings for the Grid Connection cable operational phase.
- Clear and visible temporary safety signage will be erected all around the perimeter of the live work area to visibly warn members of the public of the hazards of ongoing construction works.

15.6.6 Cumulative Effects

The assessment considered all existing and approved projects listed in **Appendix 1.2**.

Each Developer is responsible for engaging with all relevant energy operators (ESB/EirGrid) to ensure their proposals will not interfere with other developments. Therefore, as each project is designed and built to avoid adverse effects arising, an adverse cumulative effect cannot arise.

Potential negative cumulative effects on electricity networks as a result of the Project are unlikely. Mitigation by design and avoidance, as detailed in **Section 15.6.5**, will be implemented.

15.6.7 Statement of Significance

No significant adverse effects on the electricity network are anticipated. There will be a long-term slight positive residual impact on transmission infrastructure in the area (due to the installation of new infrastructure and provision of additional renewable electricity) and no impact on distribution. It is not proposed to utilise any elements of the distribution network.

15.7 AIR NAVIGATION

15.7.1 Introduction

Operating wind farms have the potential to cause a variety of adverse effects on aviation. Rotating wind turbine blades may have an impact on certain aviation operations, particularly those involving radar. The physical height of turbines can cause obstruction to aviation and the overall performance of communications, navigation and surveillance equipment. According to the Irish Aviation Authority (IAA) Guidance Material Annex 14, *Structures that extend to a height of 150m or more above ground elevation should be regarded as an obstacle*⁵. The IAA requires that all structures over 150m in height require lighting of an obstacle⁶ to warn aviation traffic. The proposed turbines at Development will have a maximum overall tip height of 150m above ground level, during operation.

The closest international airport to the Development is Shannon Airport, located approximately 35km to the east. Kerry Airport, the nearest regional airport, is 53km to the south. The closest aerodrome is Abbeyfeale Airfield, situated 31.5km to the south-southeast.

15.7.2 Assessment Methodology

Consultation with Air Navigation stakeholders was initiated during the scoping phase of this EIA to identify any obstacles to air navigation that could be caused by the Development (within 45 km from an ARP (Aerodrome Reference Point)). Details of the Development were shared with Shannon Airport, and Irish Aviation Authority. A summary of responses is shown in **Table 15.3** and in Chapter 1 **Table 1.7**.

A detailed Aviation Review is included as **Appendix 15.2**.

⁵ Irish Aviation Authority (2015) *Guidance Material on Aerodrome Annex 14 Surfaces*. Available online at: [https://www.iaa.ie/docs/default-source/publications/advisory-memoranda/aeronautical-services-advisory-memoranda-\(asam\)/guidance-material-on-aerodrome-icao-annex-14-surfaces.pdf?sfvrsn=e2ae0df3_6](https://www.iaa.ie/docs/default-source/publications/advisory-memoranda/aeronautical-services-advisory-memoranda-(asam)/guidance-material-on-aerodrome-icao-annex-14-surfaces.pdf?sfvrsn=e2ae0df3_6) [Accessed:15/08/2024]

⁶ Irish Aviation Authority (2005) Statutory Instrument No. 215 of 2005, *Obstacles to Aircraft in Flight Order*, 2005. Available online at: [https://www.iaa.ie/docs/default-source/publications/legislation/statutory-instruments-\(orders\)/irish-aviation-authority-\(obstacles-to-aircraft-in-flight\)-order.pdf?sfvrsn=fc70df3_4](https://www.iaa.ie/docs/default-source/publications/legislation/statutory-instruments-(orders)/irish-aviation-authority-(obstacles-to-aircraft-in-flight)-order.pdf?sfvrsn=fc70df3_4) [Accessed:15/08/2024]

Table 15.3: Summary of Consultation Response

Consultee	Response Date	Response
AirNav Ireland	12/08/2024 14/08/2024	<i>'I can confirm that the location of the proposed development at 22nm from Shannon Airport, combined with a maximum elevation of c.165m Above Mean Sea Level (AMSL: Site elevation + Height of turbines) does not constitute an issue for AirNav Surveillance (radar) systems.'</i> <i>'For the purposes of the planning application process as referenced above and in my capacity as AirNav Ireland Air Navigation Service Provider (ANSP) Manager Airspace and Navigation, I have reviewed the Moanmore Lower Wind Farm, Moanmore, Co. Clare. General Scoping Document received which was accompanied by your letter: Request for Scoping Opinion on information to be included in the preparation of an Environmental Impact Assessment (EIA) for Moanmore Lower Wind Farm, Moanmore Lower, Co. Clare.</i> <i>There are three areas of interest for AirNav Ireland, in regard to safeguarding of:</i> <i>• Instrument Flight Procedures (IFPs) serving Shannon Airport</i> <i>• Navigation Aids located at the airport</i> <i>• Surveillance (Radar) system managed by AirNav</i> <i>The relevant teams have also reviewed the General Scoping Document to assess any potential impacts by this proposed Wind Farm.</i> <i>In all cases above, no issues have been identified with this proposed development.'</i>
Irish Aviation Authority The Times Building 11-12 D'Olier Street Dublin 2	07/09/2024	Response received on 7/09/2024 states: <i>'I note this proposal consists of 3 x turbines with a blade & p height of 150m above ground level. Given the proposed position of T3 is within 39kms of Shannon Airport, it is imperative that this scoping report and details of the proposal be shared with Shannon Airport Authority and Air Nav Ireland as soon as practicable. Given the nature of the proposal and its relative position to Shannon Airport, it is likely that significant technical assessments will be required to determine whether there is any potential adverse impact on the safety of aircraft operations at Shannon Airport and also with regard to the enroute communication, navigation and surveillance equipment that is positioned in the region and operated by Air Nav Ireland.</i> <i>The technical assessments will have to be prepared in coordination with both Shannon Airport Authority and Air Nav Ireland and where necessary, by approved technical experts for either Flight Procedure Design review or Communications, Navigation and Surveillance / Navigational Aids impact. The technical assessments will need to review not only the proposed wind farm turbine positions, but any cranes necessitated during the construction, if planning consent were to be granted. As such, and given that Shannon Airport Authority and Air Nav Ireland have the primary responsibility for safeguarding Shannon Airport and terminal / enroute navigational aids respectively, please forward the scoping report to the following contacts:</i>

Consultee	Response Date	Response								
		<table><tr><th>Aerodrome Operator – Shannon Airport:</th><th>Air Nav Ireland</th><th>Shannon Tower Business Unit</th><th>Air Nav Ireland Engineering</th></tr><tr><td>Mr. Paul Hennessy Safety Compliance and Environment Manager Shannon Airport Authority DAC t: +353-61-712471 m: +87-2382453 e: paul.hennessy@shannonairport.ie</td><td>Mr. Cathal Mac Criostail Airspace & Navigation Manager Air Nav Ireland The Times Building, 11-12 D'Olier Street, Dublin 2, D02 T449, Ireland cathal.maccristail@airnav.ie & planning@airnav.ie +353 (0)1 6031173 +353 (0)86 0527130</td><td>Mr. Jonathan Byrne Operations Manager STBU/CTBU Air Traffic Control Air Nav Ireland jonathan.byrne@airnav.ie +353 61 703704 +353 87 9375486</td><td>Mr. Charlie O'Loughlin Manager Surveillance M&E Systems AirNav Ireland P: +353 61 366161 M: +353 877995218 E: charlie.oloughlin@airnav.ie A: Shannon ATCC, Ballycasey Cross, Shannon. Co. Clare, Ireland.</td></tr></table> At this time, the Irish Aviation Authority has no particular requirements for incorporation into the scoping report beyond the essential consultation and coordination to be undertaken with Shannon Airport Authority and Air Nav Ireland by the consultants and the developer in relation to this proposal in advance of any planning application. If a planning application were to be lodged and subject to no negative impacts being shown to either the aircraft operations at Shannon Airport or enroute navigational aids, then at that time, the Authority would offer the usual general observations concerning the marking and lighting of wind turbines, the requirement for the notification of any crane operations with at least 30 days' notice to Shannon Airport Authority and Air Nav Ireland and the requirement for surveying of as constructed coordinates and elevations and the promulgation of aeronautical data.'	Aerodrome Operator – Shannon Airport:	Air Nav Ireland	Shannon Tower Business Unit	Air Nav Ireland Engineering	Mr. Paul Hennessy Safety Compliance and Environment Manager Shannon Airport Authority DAC t: +353-61-712471 m: +87-2382453 e: paul.hennessy@shannonairport.ie	Mr. Cathal Mac Criostail Airspace & Navigation Manager Air Nav Ireland The Times Building, 11-12 D'Olier Street, Dublin 2, D02 T449, Ireland cathal.maccristail@airnav.ie & planning@airnav.ie +353 (0)1 6031173 +353 (0)86 0527130	Mr. Jonathan Byrne Operations Manager STBU/CTBU Air Traffic Control Air Nav Ireland jonathan.byrne@airnav.ie +353 61 703704 +353 87 9375486	Mr. Charlie O'Loughlin Manager Surveillance M&E Systems AirNav Ireland P: +353 61 366161 M: +353 877995218 E: charlie.oloughlin@airnav.ie A: Shannon ATCC, Ballycasey Cross, Shannon. Co. Clare, Ireland.
Aerodrome Operator – Shannon Airport:	Air Nav Ireland	Shannon Tower Business Unit	Air Nav Ireland Engineering							
Mr. Paul Hennessy Safety Compliance and Environment Manager Shannon Airport Authority DAC t: +353-61-712471 m: +87-2382453 e: paul.hennessy@shannonairport.ie	Mr. Cathal Mac Criostail Airspace & Navigation Manager Air Nav Ireland The Times Building, 11-12 D'Olier Street, Dublin 2, D02 T449, Ireland cathal.maccristail@airnav.ie & planning@airnav.ie +353 (0)1 6031173 +353 (0)86 0527130	Mr. Jonathan Byrne Operations Manager STBU/CTBU Air Traffic Control Air Nav Ireland jonathan.byrne@airnav.ie +353 61 703704 +353 87 9375486	Mr. Charlie O'Loughlin Manager Surveillance M&E Systems AirNav Ireland P: +353 61 366161 M: +353 877995218 E: charlie.oloughlin@airnav.ie A: Shannon ATCC, Ballycasey Cross, Shannon. Co. Clare, Ireland.							
Shannon Airport Authority DAC Shannon Airport Co. Clare V14EE06	13/09/2024	'In general terms, the siting of wind turbines at this location may have implications for the operations of the communication, navigation and surveillance systems used by Air Nav Ireland for the separation and safety of aircraft. The geographical siting of these turbines may also have implications for the flight paths of aircraft. Shannon Airport Authority DAC has specific responsibility to define the airspace around its aerodrome which must be maintained free from obstacles to permit the intended aircraft operations at the aerodrome to be conducted safely and to prevent the aerodrome from becoming unusable by the growth of obstacles around it. This is achieved by establishing a series of obstacle limitation surfaces (OLS) that define the limits to which objects (temporary or permanent) may project into the airspace. These surfaces may extend many kilometres outwards from the active runway strip at the aerodrome.								

Consultee	Response Date	Response
		With specific reference to the Moanmore geographical location, and arising from our own in-ternal assessment, this development of three turbines will have no impact on the aerodrome OLS. The development is not within the protection areas as per our safeguarding maps. As there is no penetration of the aerodrome OLS surfaces, it is unlikely that there will be any Annex 14 OLS impacts due to the proposed wind farm. Shannon Airport does, however, also note and share the concerns of our colleagues in Air Nav Ireland specifically relating to potential impacts on IFP's and NAVAIDS/radar systems. In this instance we are already aware of correspondence made to you directly by the Air Nav Ireland, Airspace and Navigation Manager (dated 14th Aug) indicating that no issues have been identified with this development in respect of the above systems. Please note: For developments of this type the following conditions/requirements must be considered: • If the turbines are within 45km of Shannon Airport's ARP (Aerodrome Reference Point) and are greater than 100m in height they would be required to be included in the IAA Electronic Air Navigation Obstacle Dataset. • Also, standard: Chapter Q (Visual Aids for Denoting Obstacles) of the Certification Specifications for Aerodrome Design – Current Issue, contained in the EASA aerodrome rules must be applied to the turbines as they would be regarded as an extensive object. During the construction phase of any development, any crane activity on the site must be pre-approved by the completion of the Shannon Airport Crane Operations application form (at least 30 days in advance) of any crane erection taking place in order for assessments to be carried out by the Airport, IAA and Air Nav Ireland against possible interferences by cranes against communication, navigation and surveillance systems.

15.7.3 Assessment of Potential Effects

AI Bridges Ltd carried out a review of the possible impacts of Development on aviation systems (**Appendix 15.2**). Potential impacts were analysed on the nearest significant aviation installation at Shannon Airport. A review of Annex 14 Obstacle Limitation Surfaces (OLS) shows the proposed wind farm would be located outside the Outer Horizontal Surface of the Shannon OLS, as defined in the International Civil Aviation Organization (ICAO) Annex 14. As the proposed wind farm is situated outside the Outer Horizontal Surface and there is no penetration of the take-off or approach surfaces, it is unlikely that there will be any impact to the OLS surfaces for Shannon Airport⁷.

A review of "3Terrain and obstacle requirements Area 1" as defined in ICAO Annex 15, wind turbines need to be registered if they are more than 100 meters above terrain. From the centre point (ARP – Airport Reference Point) of Shannon Airport to the boundary of the Area 1 of the Annex 15 Aerodrome Surface is 45km. This area encloses the TMA area i.e. Total Manoeuvring Area and this is used for circling and manoeuvring by aircraft. Should the proposed wind farm be permitted, the turbines would be within 45km of Shannon Airport's ARP and would be greater than 100m in height. Therefore, the turbines would be required to be included in the IAA Electronic Air Navigation Obstacle Dataset, in line with Shannon Airport's requirement in their scoping response.

The Minimum Sector Altitudes (MSA) is the lowest altitude which may be used that will provide a minimum obstacle clearance of 1000 ft above all obstacles within a sector of 25 nautical miles (46km) from the VOR/DME at Shannon Airport. The maximum turbine tip-height at the Site is up to 567ft above mean sea level (AMSL). There is over 1000 ft from the maximum height of the wind farm to the MSA altitude and therefore there would appear to be no impact on the published MSA altitudes for Shannon Airport. No significant adverse effects are likely to occur on air navigation as a result of the Project.

There are nine Instrument Flight Procedures for flights to/from Shannon Airport. Due to the distance of the Site from the airport, and as there are existing obstacles nearer to the airport than the Development, there will be no likely significant effects to these flight procedures.

From the desktop assessment conducted (**Appendix 15.2**) it is envisaged that the MSA heights will not be required to be adjusted and the Air Navigation Service Provider (ANSP)

⁷ International Civil Aviation Organization (2004), Aerodromes – Annex 14 of the Convention on International Civil Aviation, Volume I Aerodrome Design and Operations. Available at: <https://skylibrarys.files.wordpress.com/2016/07/annex-14-aerodromes.pdf> [Accessed on:08/08/2024]

at Shannon Airport is unlikely to require a detailed assessment on the impact of the proposed turbines on flight procedures. Should permission be granted for this Development, any and all planning conditions relating to aviation will be complied with as well as further consultation with the Irish Aviation Authority.

As the Development is approximately 38km from the Localiser and transmitting antenna at Shannon Airport, it is very unlikely that the proposed wind turbines will have any impact on these ATS communications and radio navigational aids.

For Radar Surveillance Systems, EUROCONTROL Guidelines require a 16km setback distance from the surveillance radar system (SSR), for a "Zone 4 – No Assessment" condition. It has been highlighted in the analysis that turbines located at the proposed farm would be located at a minimum distance of 38km from the PSR/SSR radar station at Shannon Airport and in Assessment Zone 4 of the EUROCONTROL Guidelines. As the turbines are located in Assessment Zone 4, a detailed impact assessment on Radar Surveillance Systems will not be required by the IAA.

Flight checks are conducted annually to ensure that flight procedures and associated navigational aids are safe and accurate. These flight checks are carried out by an IAA approved Flight Inspection Service Provider. The checks are carried out during annual inspections consisting of radial and orbital test flights around Shannon Airport for calibration of instrument landing systems. It is unlikely that the Flight Inspection Procedures will be impacted as the proposed wind farm is sufficiently far from the airport runways and the flight inspection procedures should already account for the existing obstacles (e.g. existing wind farms).

The Development is located within Assessment Zone 4, as per Euro Control guidelines, for Secondary Surveillance Radar (SSR) and Primary Surveillance Radar (PSR) systems. Based on this, a detailed impact assessment is not required.

In the event of a grant of planning consent the IAA are likely to request marking and lighting details of the proposed wind turbines in the interest of aviation safe-guarding as the Development would be considered as an enroute obstacle.

The airport is over 39km from the Development. The civil aviation guidelines for wind turbines covers a 30km radius⁸. Therefore, no likely significant effects to air navigation were identified.

The Development is over 30km from the extended centreline of Runway 06/24 (Shannon Airport) and over 30km from the Shannon Aerodrome Reference Point.

In addition, Shannon Airport responded to scoping with the following:

Shannon Airport does, however, also note and share the concerns of our colleagues in Air Nav Ireland specifically relating to potential impacts on IFP's and NAVAIDS/radar systems. In this instance we are already aware of correspondence made to you directly by the Air Nav Ireland, Airspace and Navigation Manager (dated 14th Aug) indicating that no issues have been identified with this development in respect of the above systems.

No potential effects are predicted. On this basis, no significant effects on Shannon Airport are likely.

15.7.4 The 'Do-Nothing Impact'

If the Development were not to proceed, the baseline would remain as is.

15.7.5 Mitigation Measures

Although no potential effects were identified, the following mitigation measures proposed by the Irish Aviation Authority (IAA), Shannon Airport and AirNav Ireland will be implemented:

- An aeronautical lighting scheme for the Development will be agreed with the IAA and will be installed.
- Details of 'as constructed' coordinates of turbines (WGS84 format), elevations and the promulgation of aeronautical data together with ground and tip height elevations at each wind turbine location will be provided to the IAA, Shannon Airport and AirNav Ireland.
- The IAA, Shannon Airport and AirNav Ireland will be notified of intention to commence crane operations with at least 30 days prior notification of their erection.

15.7.6 Cumulative Effects

All existing and approved projects in **Appendix 1.2** have been considered.

⁸ Safeguarding of Aerodromes, Safety and Airspace Regulation Group, UK Civil Aviation Authority, 2020. Available at: <https://www.caa.co.uk/our-work/publications/documents/content/cap-738/>. [Accessed online:08/08/2024]

For large-scale developments such as wind farms, each Developer is responsible for engaging with the IAA to ensure the proposals will not interfere with aviation radio signals by acting as a physical barrier. Therefore, as each project is designed and built to avoid impacts arising, a cumulative impact cannot arise. Other small-scale developments have also been assessed in terms of their potential to impose a cumulative effect on aviation assets in conjunction with Moanmore Lower Wind Farm. No likely significant effects have been identified.

No adverse significant effects on Air Navigation are likely to occur as a result of the Project in combination with the projects listed in **Appendix 1.2**.

15.7.7 Statement of Significance

It is considered that the Project is not likely to have any significant effects on air navigation, once the mitigation measures set out above are implemented.

15.8 QUARRIES

15.8.1 Introduction

The crushed stone (38,465m³) for construction of the Project will come from licenced quarries in the locality such as:

- Tullagower Quarry, Kilrush
- Derrynalecka Quarry, Derrynalecka
- Glenmore Quarry, Glenmore
- Hehir Quarry, Bollyneaska
- Letterkelly Quarry, Letterkelly
- Liscormick Quarry, Liscormick
- Nagle Stone Quarry, Liscannor
- Luogh and Lisacannor Stone Company Ltd. Luogh Quarry, Doolin
- Ryans Quarry (Roadstone Ltd), Ennis
- Bunratty Quarry (Roadstone Ltd), Bunratty
- Bobby O'Connell and Sons Ltd Ballycar Quarry, Ardnacrusha
- Esker Readymix, Athenry

Concrete for the Turbine Foundations will also be sourced from one of the local providers listed above. The locations of these quarries in relation to the Project can be seen in **Figure 16.5**.

15.8.2 Assessment of Potential Effects

Approximately 38,465 m³ of crushed stone will be required for the construction of the Project. All aggregates will be sourced from licensed quarries (Section 15.8.1). As these natural resources will be removed from its source quarry and not replaced, the Project will have a long term, adverse effect on the source quarry.

During the operation phase, a small amount of granular material will be needed to maintain site access tracks which will be sourced from a nearby quarry (Section 15.8.1). As these natural resources such as aggregates will be removed from its source quarry and not replaced, there will be slight adverse effects on the source quarry as a result of the Project.

However, materials will not be required during the decommissioning phase and therefore, the decommissioning phase will have no effects on quarries.

Overall, the use of imported material will have a slight, permanent negative effect on the area's non-renewable resources due to the depletion of natural reserves. However, this effect is expected to be imperceptible in the long term.

The Project will have a likely adverse significant effect on the source quarries.

15.8.3 The 'Do-Nothing Impact'

If the Project were not to proceed, there would be no likely significant effect on quarry operations in the area and quarrying activities would continue as normal.

15.8.4 Mitigation Measures

Existing tracks have been utilised wherever possible, and the Site layout has been carefully planned to minimise the length of new track required, thereby reducing the demand for additional stone material.

The selected source quarry will be chosen based on stone that is chemically similar to the material found at the Site. This approach helps to mitigate potential hydrogeochemical impacts.

Any useable material that is won during site excavations will be reused elsewhere onsite, where appropriate.

The residual effects of the Project on local quarries are considered to be adverse, long term and significant.

15.8.5 Cumulative Effects

All existing and approved projects in **Appendix 1.2** have been considered.

The very nature of a quarry is that it will be subjected to cumulative effects as it is the source of stone for almost all developments in the area.

Therefore, there will be cumulative effects relating to the Project and surrounding projects in relation to quarries during the construction phase. This will be in the form of depletion of existing natural resource reserves in the locality.

Potential negative cumulative effects on quarries are none / imperceptible during the operational and decommissioning phases.

15.8.6 Statement of Significance

As discussed in Section 15.8.4, the residual effects of the Project on local quarries are considered to be adverse, long term and significant.

15.9 UTILITIES

15.9.1 Introduction

In order to assess the potential for significant effects on built services gas, water and waste infrastructure in the vicinity of the Project, scoping requests were made to Uisce Éireann and Clare County Council including Water Services and Environment departments. Refer to **Chapter 1: Introduction** of this EIAR for details in relation to the EIA scoping exercise.

15.9.2 Assessment Methodology

A review of the Environmental Protection Agency (EPA) maps was conducted to assess the proximity of waste facilities and other relevant environmental features within the vicinity of the Development. The assessment focused on the following key elements within a 2km radius of the site: Waste facilities, Waste boundaries, Historic (closed) landfills, Active and inactive dump site boundaries, Chemical monitoring points, Industrial EPA-licensed facilities.

The review confirmed that there are no waste facilities, chemical monitoring points, or industrial EPA-licensed facilities within the 2km radius of the Site.

15.9.3 Assessment of Potential Effects - Gas, Water Utilities

There are no gas mains located within the Site. There is therefore no potential for significant effects to occur. No existing gas services have been identified along the Grid Connection Route. Areas along the Turbine Delivery Route and Construction Haul Route where gas infrastructure is present does not require any works and will remain undisturbed. Therefore, no significant effects are likely.

Given the detailed information provided by Uisce Éireann regarding water services within the Redline Boundary, it is reasonable to conclude that there is no potential for interference with local water services during the construction phase of the Development. Based on this information, the risk of encountering existing water infrastructure is considered imperceptible.

Appendix 2.2 includes a review of the locations of existing water services and separation distances were identified, in line with best practice.

Potential impacts arising from the Project relating to existing water services have been assessed and are detailed in **Chapter 9: Hydrology and Hydrogeology**.

15.9.4 Assessment of Potential Effects - Waste

15.9.4.1 A Circular Economy

The Waste Action Plan for a Circular Economy (Department of Environment, Climate and Communications, 2020) is Ireland's National Waste Policy 2020 – 2025 and is the roadmap for waste planning and management. This Plan shifts focus away from waste disposal and looks instead to how we can preserve resources by creating a circular economy.

The Plan outlines the contribution of the sector to the achievement of a number of other national plans and policies including the Climate Action Plan⁹. It also matches the level of ambition being shown across the European Union through the European Green Deal¹⁰, which encompasses a range of actions supporting circularity and sustainability. To support the policy, regulation is already being used (Circular Economy Legislative Package), or in the pipeline (Single Use Plastics Directive).

Goals of the Waste Action Plan for household and business include:

- Recycling targets for waste collectors
- Standardised bin colours across the State: green for recycling, black for residual and Brown for organic waste.
- Waste recovery levy to encourage recycling
- Waste oversight body to manage consumer rights
- Education and awareness campaign to improve segregation

Plastic, packaging and single use plastic goals include:

- Single use items banned from July 2021 include:
 - Cotton bud sticks
 - Cutlery
 - Plates
 - Stirrers
 - Chopsticks
 - Straws
 - Polystyrene containers
 - Oxo-degradable plastic products
- Significantly reduce single use plastics being placed on the market by 2026
- All packaging reusable or recyclable by 2030

⁹ Climate Action Plan 2024 (CAP24), Dept of the Environment, Climate and Communications, 2023.

¹⁰ A European Green Deal, Striving to be the first climate-neutral continent, European Commission.

https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal_en [Accessed 15/04/2025]

Food waste goals include:

- Halve our food waste by 2030
- Waste segregation infrastructure for apartment dwellers
- Sustainable food waste management options for all homes and businesses

Extended Producer Responsibility goals include for:

- Mandatory extended producer responsibility for all packaging producers before 2024 EU Deadline.
- New rules for schemes to incentivise good practice in waste recycling and drive better product design.
- Producers liable for modulation fees.

In terms of construction and demolition wastes, the Plan aims to

- Streamline by-product notification and end-of-waste decision making.
- Revision of the 2006 best practice guidelines for Construction and Demolition Waste.
- Working group to develop national end-of-waste applications for priority waste streams.

Enforcement goals in the Plan include:

- Expanded role for Local Authorities to address priority waste enforcement challenges.
- Unauthorised sites action plan and anti dumping toolkit.
- Fixed penalty notices for breaches of waste law.

Treatment of wastes as part of the Plan include:

- Review state support for development of recycling infrastructure.
- Standardise waste streams accepted at civic amenity sites.
- Examine legislation and procedures for development of waste management infrastructure.

Government leadership on Circular Economy goals include:

- High level all of government circular economy strategy.
- Inclusion of green criteria and circular economy principles in all public procurement.
- Develop circular economy sectoral roadmaps.
- Explore how Ireland's digital sector can accelerate transition to a circular economy.

The Project

Excess material will be treated as a by-product as much as possible. A by-product is not waste. The Developer will comply with Circular Economy requirements where as possible, materials removed off-site will be re-used in accordance with the Article 27 notification procedure (under the European Union (Waste Directive) Regulations 2011 as amended) and other procedures to prevent and minimise waste.

Any materials containing invasive species will be appropriately managed and sent to authorised facilities.

The Circular Economy and Miscellaneous Provisions Act 2022 requires that soil and excavated material be treated as an Article 27 by-product (a non-waste) when possible and if that is not possible, will be recycled. When appropriate, the Developer will be comply with Article 28 notified materials which satisfy end of waste criteria at some future time when the EPA can give fast decisions.

Waste is further discussed in **Appendix 2.1 Construction Environmental Management Plan** and in its associated management plans.

15.9.4.2 A Resource Opportunity

In 2012, the Department of the Environment, Community and Local Government published the Waste Management Policy in Ireland (DoECLG, 2012). One of its guiding principles is to minimise waste.

Waste hierarchy



The Waste Hierarchy which contractors are obligated to apply: (Source: EC¹¹):

The waste management hierarchy applies to all waste, including hazardous waste. The top of the hierarchy indicates that the priority should be in preventing waste being produced in the first place.

The Contractor will:

- Ensure that the disposal and recovery of waste does not present a risk to water, air, soil, plants and animals.
- Not allow waste disposal to constitute a public nuisance through excessive noise levels or unpleasant odours, or to degrade places of special natural interest.
- Prohibit the dumping or uncontrolled disposal of waste.
- Prepare Waste Management Plans.
- Ensure that waste treatment operations are licensed.
- Require waste collectors to have special authorization and to keep records.
- Ensure that the waste which cannot be prevented or recovered is disposed of without causing environmental pollution.

The EU Integrated Pollution Prevention and Control Directive (Directive 96/61/EC) provides for a permit system for activities including waste management. In adherence with this Directive the Contractor must:

- Be in possession of a waste permit for waste disposal, and
- Be prepared at all times for inspection regarding monitoring of waste activities.

¹¹ European Commission [Accessed Online 15/04/2025]
https://ec.europa.eu/environment/topics/waste-and-recycling/waste-framework-directive_en

15.9.4.3 Staff Facilities

During the construction, operational and decommissioning phases of the Project, there will be the typical waste generated in an office such as left-over food and sandwich wrappers. This is a non-hazardous waste. All such waste will be stored appropriately and safely from wind, rain and wild animals that often tear apart rubbish bags and disposed of via a licensed waste handler. Due to the low volume of such waste anticipated to be generated through the construction phase of the Project the effects of this waste generation will be not significant as it will be of relatively small quantity and treated with residual residential waste at a licensed waste facility.

Waste Facility	Address	Distance
Lisdeen Recycling Centre & Transfer Station (ID W0170)	Cemetery Road, Lisdeen, Kilkee, Clare	6.46 km northwest
Central Waste Management Facility	Ballyduff Beg, Inagh, Clare	32.85km northeast
Ennis Recycling Centre	Gort Road, Industrial Estate, Ennis, Clare	41.65km northeast

The waste generated on-site is presented in specific quantities. Review if the estimations provided (0.005 kg to 0.189 kg of waste per person per day) are sufficient to support the conclusion that effects will be Not significant.¹²

15.9.4.4 Sewage

The self-contained welfare cabins or “port-a-loo” units installed at the construction/ decommissioning phase which will be managed and serviced regularly (by removal of the contents by tanker to a designated sewage treatment plant such as Kilrush Wastewater Treatment Plant and removed off site on completion of construction. The effects will be temporary in nature and comprise a limited land-take on Site and production of relatively small amounts of sewage waste, which will be removed for treatment at a municipal sewage treatment plant in the locality. Toilet waste is a non-hazardous waste, and effects will be a slight negative and short-term effect.

¹² Based on 1 hour a day within communal facilities. Worldwide, waste generated per person per day averages 0.74 kilogram but ranges widely, from 0.11 to 4.54 kilograms. (World Bank) Available Online: <https://datatopics.worldbank.org/what-a-waste/trends-in-solid-waste-management.html> [Accessed: 08/08/2024]

The maximum wastewater production during construction is estimated to be the same as the maximum water consumption (1,500 litres per day)¹³.

All wastewaters will be tankered off-site by a licensed waste collector to the nearest wastewater treatment plant, Kilrush Wastewater Treatment Plant. There will be no on-site treatment of wastewater and effects will be not significant.

15.9.4.5 Concrete

The volume of concrete required for each Turbine Foundation will be 650m³ (**Chapter 2: Project Description**). It is expected that a small volume of concrete washout will be produced during the construction phase.

Effects of concrete on water are discussed in **Chapter 9: Hydrology and Hydrogeology**.

There will be no need for the use of concrete during the operational phase and effects are imperceptible.

Concrete structures will be left in place during decommissioning and will be covered in peat/topsoil and allowed to naturally revegetate over time. This is the least impactful process of decommissioning. Leaving the turbine foundations in-situ is considered a more environmentally prudent option, as to remove that volume of reinforced concrete from the ground could result in significant environment nuisances such as noise, dust and/or vibration. As the Site will have already been altered, the impacts are imperceptible and permanent.

The use of concrete onsite during the lifetime of the Project will have slight and permanent effects in terms of waste.

15.9.4.6 Chemicals, Fuels and Oils

Oil waste and diesel are classified as hazardous waste/dangerous substance. There is no expected chemical/fuel/oil waste other than from rags and residual amounts in containers. Without mitigation, the effects would be Slight and Medium-term in duration. This would be in the form of leaching of chemical or fossil fuel contaminants into the soil, groundwater and/or surface waters on Site. However, through the implementation of the mitigation

¹³Table 3 of the EPA WW treatment Manual (Treatment systems for Small Communities, Business, Leisure Centres and Hotels), Environmental Protection Agency, 1999. Quarry (Excluding Canteen) best reflects a construction site. [Available online: https://www.epa.ie/publications/compliance--enforcement/waste-water/EPA_water_treatment_manual_small-comm_business.pdf]
Accessed at: 08/08/2024

measures set out in **Section 15.10.7**, the residual effects will be not significant in the construction/decommissioning phase. The storage/use of such liquids is not seen necessary on Site during the operational phase; thus, the effects are Imperceptible.¹⁴

15.9.4.7 Packaging

Packaging will be brought on Site during the construction, operational and decommissioning phases and can include cardboard, wood and plastics used to package turbine components. Packaging waste will be dealt with in accordance with the European Union (Packaging) Regulations 2014 to 2022.

'A producer who supplies to another producer packaging material, packaging or packaged products shall comply with any reasonable request from the latter producer for data on the weight of the material or packaging concerned sufficient to enable the latter producer to comply with these Regulations.'

The occurrence of 10kg of plastic per turbine blade, between 14 and 15 pallets and 17 to 18 cable drums are expected. This will be removed from Site for re-use by an authorised person(s).

This waste is non-hazardous, and the effects of this waste are not significant. This is on account of the fact the packaging waste will be of a low quantity and will be removed from the Site and recycled and/ or disposed of at a licensed waste facility with a reduced impact on the environment than if it were not mitigated for.¹⁵

15.9.4.8 Metals

During decommissioning, it is expected that some steel will be removed from surface level concreted plinths supporting the turbine tower sections. Steel can be reclaimed for re-use in future steel making production where required. However, steel enclosed in the reinforced concrete Turbine Foundation bases will remain in-situ. This waste is non-hazardous, and effects of leaching into the soil and water table are considered Not significant due to the differential placing of steel set within the concrete foundation formations as well as the gradual nature of any natural breakdown products.¹⁶

¹⁴ European Commission – Waste Oil. Available at: https://environment.ec.europa.eu/topics/waste-and-recycling/waste-oil_en. Accessed at 25/09/2024.

¹⁵ European Union (Packaging) (Amendment) Regulations 2022. Available at: <https://www.irishstatutebook.ie/eli/2022/si/659/made/en/print>. Accessed at 25/09/2024

¹⁶ Science Direct - Life cycle assessment of the use of decommissioned wind blades in second life applications. Available at: <https://www.sciencedirect.com/science/article/pii/S0301479721020569>. Accessed at: 25/09/2024

Turbine components will be reused or recycled where appropriate at time of decommissioning.

15.9.4.9 Excavated Materials

Volumes are outlined in the Peat and Spoil Management Plan (**Appendix 2.1**). Whilst there will be significant volumes of soil to be excavated on site during the construction of the Development, excavated material will be used for reinstatement and restoration works. Where this is not possible, e.g., along the Grid Connection Route and Turbine Delivery Route where some soils contain hydrocarbons (hazardous material), the waste materials will be taken to a licenced facility by an authorised permit holder.

The Peat and Spoil Management Plan outlines the re-use proposals for excavated materials.

An estimated 2100m³ of material will be excavated along the Grid Connection Route to Tullabrack 110kV Substation. This material will be used as much as possible to backfill roads but where it cannot, it will be transported by an authorised waste permit holder to a local licensed waste disposal facility.

There will be a Slight to Moderate effect in terms of waste material volume generated and the need to send this material for suitable disposal at a waste reception facility licenced for disposal of hazardous bituminous materials.¹⁷ However, the effects are not likely to be significant.

15.9.4.10 Waste Facilities

The nearest waste management facility to the project is the Lisdeen Recycling Centre and Transfer Station, located approximately 6.5km west of the site. Additionally, Clean (Ireland) Refuse & Recycling Company Limited is situated approximately 9.3km to the north of the site.¹⁸

Consequently, it can be concluded that the proposed Project will not have any direct effects on existing waste activities, chemical monitoring points, or industrial licensed facilities.

¹⁷ Best Practice Guidelines - <https://www.epa.ie/publications/circular-economy/resources/CDWasteGuidelines.pdf>. Accessed at: 29/09/2024

¹⁸ EPA Maps. Available at: <https://gis.epa.ie/EPAMaps/>. Accessed at 25/09/2024

15.9.5 The 'Do-Nothing Impact'

If the Project were not to proceed, there would be no impact on the utilities or waste in the area.

15.9.6 Mitigation Measures - Utilities

Mitigation measures relating to existing water services have been assessed and are detailed in **Chapter 9: Hydrology and Hydrogeology**.

15.9.7 Mitigation Measures - Waste

Staff Facilities

Provision for separation of waste streams will be provided so that e.g., paper, and cardboard waste and bottles may be recycled.

Concrete

During the construction phase:

- Precast concrete will be used wherever possible i.e., formed offsite. Elements of the Project where precast concrete will be used have been identified and are indicated in the CEMP. Elements of the Project where the use of precast concrete will be used include structural elements of the watercourse crossing (Bridge) as well as cable joint bays associated with the Grid Connection Route. Elements of the Project where the use of precast concrete is not possible include Turbine Foundations and joint bay pit excavations. Where the use of precast concrete is not possible the following mitigation measures will apply.
- The acquisition, transport and use of any cement or concrete on Site will be planned fully in advance and supervised at all times.
- Vehicles transporting such material will be relatively clean upon arrival on Site, that is; vehicles will be washed/rinsed removing cementitious material leaving the source location of the material. There will be no excess cementitious material on vehicles which could be deposited on trackways or anywhere else on Site. To this end, vehicles will undergo a visual inspection prior to being permitted to drive onto the proposed Site or progress beyond the contractor's yard. Vehicles will also be in good working order.
- Any shuttering installed to contain the concrete during pouring will be installed to a high standard with minimal potential for leaks. Additional measures will be taken to ensure this, for example the use of plastic sheeting or other sealing products at joints.
- Concrete will be poured during meteorological dry periods/seasons. This will reduce the potential for surface water run off being significantly affected by freshly poured concrete. This will require limiting these works to dry meteorological conditions i.e. avoid foreseen

sustained rainfall (any foreseen rainfall event longer than 4-hour duration) and/or any foreseen intense rainfall event (>3 mm/hour, yellow on Met Éireann rain forecast maps), and do not proceed during any yellow (or worse) rainfall warning issued by Met Éireann. This also will avoid such conditions while concrete is curing, in so far as practical.

- Ground crew will have a spill kit readily available, and any spillages or deposits will be cleaned/removed as soon as possible and disposed of appropriately. All contractors will comply with the Machinery Directive (Directive 2006/42/EC).
- Pouring of concrete into standing water within excavations will be avoided. Excavations will be prepared before pouring of concrete by pumping standing water out of excavations to the buffered surface water discharge systems in place.
- Temporary storage of cement bound sand (if required) will be on hardstand areas only where there is no direct drainage to surface waters and where the area has been bunded e.g., using sand-bags and geotextile sheeting or silt fencing to contain any solids in run-off.
- No surplus concrete will be stored or deposited anywhere on Site. Such material will be returned to the source location or disposed of off-site appropriately.

Upon implementation of the above mitigation measures, the effects of waste during the construction of the Project are considered to be Not significant.

Chemicals, Fuels and Oils

All storage containers of over 200 litres will have a secondary containment of 110% capacity to ensure that any leaking oil is contained and does not enter the aquatic environment.¹⁹

A Chemical and Waste Inventory will be kept. This inventory will include:

- List of all substances stored on-site (volume and description).
- Procedures and location details for storage of all materials listed.
- Waste disposal records, including copies of all Waste Transfer Notes detailing disposal routes and waste carriers used.
- Any tap or valve permanently fixed to the mobile unit through which oil can be discharged to the open or when delivered through a flexible pipe which is fitted permanently to the mobile unit, will be fitted with a lock and locked shut when not in use.
- Sight gauges will be fitted with a valve or tap, which will be shut when not in use. Sight gauge tubes, if used will be well supported and fitted with a valve.
- Mobile units must have secondary containment when in use/out on Site.

¹⁹ European Agency for Safety and Health at Work. Available at: <https://osha.europa.eu/en/legislation/directives/directive-2008-68-ec>. Accessed at 25/09/2024.

Under the EU Directive 2008/68/EC/55/EC all such dangerous substances will be conveyed in a container that complies with the ADR. As such the manufacturer of each bowser will provide certification to contractors that the following:

- A leak-proof test certificate
- A copy of the IBC approval certificate
- An identification plate attached to the container

Where mobile bowsters are used on Site, guidelines will be followed so that:

- Any flexible pipe, tap or valve will be fitted with a lock where it leaves the container and be locked shut when not in use;
- Flexible delivery pipes will be fitted with manually operated pumps or a valve at the delivery end that closes automatically when not in use. Where possible, a nozzle designed to dispense oil is used;
- The pump or valve will have a lock and be locked shut when not in use.²⁰

Packaging

In accordance with the waste hierarchy, packaging will be returned to the originator ahead of re-use or recycling. Where this is not possible, waste will be separated as appropriate and safely stored on Site appropriately in anticipation of recycling.²¹

Metals

Waste metals from concrete reinforcing during construction and removal of metals during decommissioning etc. will have commercial value and will be re-used or recycled with the appropriate licensed waste contractor.²²

15.9.8 Statement of Significance

There is no gas mains located within the Site. There is therefore no potential for impact.²³

Given the detailed information provided by Uisce Éireann regarding water services within the Redline Boundary, it is reasonable to conclude that there is no potential for interference with local water services during the development. Based on this information, the risk of encountering existing water infrastructure is considered imperceptible.

²⁰ European Agency for Safety and Health at Work. Available at: <https://osha.europa.eu/en/legislation/directives/directive-2008-68-ec>. Accessed at 25/09/2024.

²¹ Waste Hierarchy – Gov.ie. Available at: <https://www.gov.ie/en/publication/c0771-waste-hierarchy/>. Accessed at 25/09/2025

²² EPA. Best Practice Guidelines. Available at: <https://www.epa.ie/publications/circular-economy/resources/CDWasteGuidelines.pdf>. Accessed at: 25/09/2024

²³ Gas Networks Ireland. Available at: <https://www.gasnetworks.ie/corporate/company/our-network/pipeline-map/>. Accessed at 25/09/2024.

Potential effects arising from the Project relating to existing water services have been assessed and are detailed in **Chapter 9: Hydrology and Hydrogeology**. These effects have been assessed as not significant.

There are no EPA-licensed or local authority-authorised waste facilities or activities located within the Site. The closest, authorised municipal waste facility is Lisdeen recycling centre and transfer station which is 6.5 km west of the Site and Clean (Ireland) Refuse & Recycling Company Limited which is 9.3 km north of the Site.²⁴

The residual effects of waste produced as a result of the construction, operational and decommissioning phases of the Project are considered to be not significant.

²⁴ EPA Maps. Available at: <https://gis.epa.ie/EPAMaps/>. Accessed at 25/09/2024.