16 MATERIAL ASSETS AND OTHER ISSUES

16.1 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 Garrane Green Energy Project (the Project) as detailed in **Chapter 2: Project Description** on Material Assets and Other Issues.

The assessment will consider the potential effects during the following phases of the Project:

- 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.** Glossary of Common Acronyms.

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 16.1 Ai Bridges Telecommunications Impact Assessment**
- **Appendix 16.2 Ai Bridges Aviation Review Statement**

16.2 STATEMENT OF AUTHORITY

This Material Assets chapter has been prepared jointly by Ms. Sarah Moore, with the assistance of Ms. Kathlyn Feeney of Jennings O'Donovan & Partners Limited. All contributors to this EIAR chapter have contributed their expertise to EIAR's for other renewable energy projects, including commercial sized wind farms. The final review was conducted by Managing Director Mr David Kiely. **Appendix 16.1** was carried out by Mr. Kevin Hayes and Mr. Patrick Tinney in Ai Bridges Ltd.

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

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.

Kathlyn Feeney is a Junior Environmental Scientist with a BSc (Hons) in Environmental Science from ATU Sligo. Kathlyn assists the environmental team by carrying out EIAR Chapters, Feasibility Studies, Appropriate Assessments and GIS works.

Kevin Hayes is the Founding Director and Engineering Contracts Manager in Ai Bridges Ltd. Kevin has over 20 years' experience in Telecommunications Network Design and Project Management. Kevin has a B.Eng Hons in Electronic Engineering – Communications & Industrial Automation and M.Eng Hons in Electronic Engineering- Communications & Communications Engineering. He also managed and designed the software prediction

Patrick Tinney is a Communications Engineer in Ai Bridges Ltd. with a B.Eng. in Electronics, Occupational First Aid and 3 years' experience as a Health and Safety representative. He has received a B.Eng. in Computer and IT Systems. Patrick has experience in conducting site surveys and RF. He provides on-site support for the roll-out of fixed wireless access in Ireland.

16.3 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 9: Soils and Geology**, **Chapter 10: Hydrology and Hydrogeology**, and **Chapter 13: Air and Climate**. Peat and spoil are assessed in **Chapter 9: Soils and Geology**.

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

Amenity resources and tourism are addressed in **Chapter 5: Population and Human Health**. The cultural assets of Archaeology and Cultural Heritage are addressed in **Chapter 15: Archaeology and Cultural Heritage** and traffic is addressed in **Chapter 17: Traffic and Transport**. Utilities such as water, wastewater and waste services are addressed in this chapter and in **Chapter 2: Project Description.**

The material assets assessed includes in this chapter are:

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

To establish the baseline conditions of the receiving environment, the following methods/ approaches were used:

Land use (Agricultural):

- Review of the Site and Site layout in ArcGIS Pro version 3.1
- Review of Site Habitat Maps and available aerial imagery
- Review of Environmental Protection Agency Maps; CORINE Land Cover (Copernicus)

Telecommunications:

- All telecommunications operators were contacted to identify any potential microwave or telecommunication links (ESB telecoms, Virgin Media, Three Ireland, Tatra Ireland, RTE/ 2rn, Eir Limited)

Electricity:

- ESB networks was contacted to identify all electricity cables in the area
- Suir Engineering mapped the electricity networks for the proposed Grid Connection

Aviation:

- Irish Aviation Authority (IAA), Department of Defence and Shannon airport were contacted during the consultation process
- ICAO (International Civil Aviation Organization) Aeronautical Chart were examined

Quarries:

- Review of licensed quarries and suppliers in the area was undertaken http://facilityregister.nwcpo.ie/

Utilities:

- Gas Networks Ireland (GNI) and Uisce Éireann were contacted to identify all gas and water/ wastewater infrastructure in the area of the Project.

Waste:

- review of licenced waste facilities in the surrounding area was undertaken: https://facilityregister.nwcpo.ie/
- identification all waste facilities in the locality was undertaken: https://gis.epa.ie/EPAMaps/

16.3.1 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**).

16.4 LAND USE - AGRICULTURE

16.4.1 Baseline Environment

The Redline Boundary extends to 158.75ha (392 acres) which is owned by private third-party landowners. The general area is comprised of agricultural pasture grazing, farmland. The Site is located 2.5km (closest turbine) north of Charleville Co. Cork, 22.9km south of Limerick City and 46.9km north of Cork City. The Site is located within the townlands of Ballynagoul, Creggane and Garrane. The Site is located on relatively level ground, at elevations ranging from 58-61m AOD in the northern side of the Site, to 63-73m AOD in the southern portion of the Site. The Site location map showing the Redline Boundary is appended as **Figure 1.1** and a map which comprises of all elements of the Project is outlined as **Figure 1.2.**

Land cover at the Site is mapped by Corine (2018) as agricultural pastures (www.epa.ie). No significant land use changes have been recorded by historic Corine mapping (1990-

2018). The Site is comprised of agricultural pastures with fields typically separated by hedgerows and stonewalls. Local pockets of forestry and hedgerows are also located within the Site.

16.4.2 Assessment of Potential Effects

The total land-take of the Project is as follows:

11.256Ha (7.1% of total Site 158.75Ha) – Construction Phase (all infrastructure excluding cabling)

5.095Ha (3.2% of total Site 158.75Ha) – Operational phase (new Access Tracks, reduced Hardstands, Substation, Met Mast, Permanent Spoil Area and Met Mast)

1.598 Ha (1.0% of total Site 158.75Ha) – Decommissioning Phase (new Access Tracks and Substation)

The Project Access Tracks and upgrade to existing tracks will improve access for surrounding agricultural use.

The Project will result in a change of agricultural land use, in areas where new Access Tracks, wind turbine foundations, hardstanding areas, Met Mast, the Substation, and associated drainage infrastructure will be located. The immediate surrounding agricultural grasslands will remain in agricultural use.

The construction of the Turbine Delivery Route will only require relatively localised temporary accommodation requirements 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 temporary accommodation requirements are undertaken.

The Project will have a **temporary, slight, adverse** effect on agricultural land use due to the removal of grazing lands during the construction phase and operational phases and a **long-term, slight, adverse** effect on agricultural land use for the duration of the operation phase of the Project.

The approach proposed for decommissioning is one of minimal intervention as detailed in the Decommissioning Plan – **Appendix 2.1** – **CEMP MP6** and includes:

- 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.

- Roads 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 footprint is agricultural, and presently used primarily for agricultural related activities. Therefore, the effects of the decommissioning phase on agriculture will be less than those during the construction phase and not significant.

16.4.3 The 'Do-Nothing' Impact

If the Project does not proceed, lands within in the Redline Boundary will continue to be used for agricultural purposes. In this case, the likely evolution of the baseline environment may progress towards less optimal farming practices due to a reduction in soil fertility. Research from Teagasc[2] has shown that most soils in Ireland have been degraded (both chemically and physically) and have reduced levels for pH, Phosphate and Phosphorus which may lead to a drop in farming practices over time. This may have a **slight adverse long-term** effect.

16.4.4 Mitigation Measures

The Project has been designed to avoid or minimise impacts on agricultural land, implementing a 'Mitigation by Avoidance' strategy. The Project footprint has been kept to the minimum necessary, utilising existing tracks wherever possible to avoid impact on existing land uses.

These mitigation measures will allow for the prevention of unnecessary or inappropriate ground works or land use alterations to occur and will avoid unnecessary soil compaction.

16.4.5 Residual Effects

Implementation of the mitigation measures, outlined in **Section 16.5.4**, at the design stage will ensure that residual effects on agricultural land use will be **slight, adverse** and **temporary** for the duration of the construction and negligible for the operational lifespan of the Project.

[2] Teagasc, 2023, Soil, Forests and Biochar, Available at: https://www.teagasc.ie/news--events/daily/forestry/soil-forests-and-biochar.php [Accessed 18/11/2024]

For decommissioning phase, the residual effect will be **slight, adverse** and **temporary** for the duration of the phase.

All existing access points (i.e., to domestic premises, business, farms) are accessible during temporary road closures and diversions. This is to maintain local access and avoid impacts on other various land uses. **Chapter 17: Traffic and Transport** refers to all proposed works and deliveries along the turbine delivery route to avoid undue impact to adjacent land uses. This is also considered for the decommissioning phase for which traffic will be required along the Haul Route. The Turbine Delivery Route will no longer be needed. This is further detailed in **Chapter 2: Project Description**.

Thus, the residual impact on surrounding agricultural land uses is **slight** during construction and decommissioning and **negligible** during the operational phase.

16.4.6 Cumulative Effects

Land management practices in the wider area which are considered to have potential for cumulative effects with the Project are primarily agriculture and forestry. All existing and approved projects in **Chapter 2 Project Description -Table 2.2** were considered. There are no applications for large-scale commercial or industrial activities near the Site. Minor domestic and agricultural development will not introduce potential for cumulative effects during the construction, operational or decommissioning phases as the impacts will be **localised** and **not significant**.

The nearest wind farm is located 5.9km to the southwest of the Project (Rathnacally Wind Farm). Surrounding agricultural activities can and will continue during the construction, operational and decommissioning phases of the Project when fencing around the Site has been fully established.

Due to the localised nature of the proposed construction/decommissioning works, there is no potential for significant cumulative effects in-combination with other local developments on the agricultural land use as all effects are directly within the Site.

Other projects outside the Site do not have the potential to reduce or increase the magnitude of effects of the Project on agricultural land use within the Site. Therefore, this will not contribute to any significant cumulative effects during the construction/decommissioning or operational phases.

16.4.7 Statement of Significance

No significant effects are predicted on agricultural land use within or outside of the Site.

16.5 TELECOMMUNICATIONS

Microwave is a line-of-sight wireless communication technology that uses high frequency beams of radio waves to provide high speed wireless connections. 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. For this reason, the potential impact of wind turbines on electromagnetic signals during the operational phase is assessed.

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 ghosting*[3]. 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.

16.5.1 Guidance

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

- Limerick City and County Development Plan 2022 – 2028.
- 'Best Practice Guidelines for the Irish Wind Energy Industry', published by the Irish Wind Energy Association (2012).

[3] Ofcom (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 09/07/2025]

- Information about Electric & Magnetic Fields and the Electricity Transmission System in Ireland, EirGrid[4]
- Wind Energy Development Guidelines: Planning Guidelines, Department of Environment, Heritage and Local Government (DHPCLG) 2006[5]

  and with regard to

  Draft Revised Wind Energy Development Guidelines, Department of Housing, Local Government and Heritage 2019[6]

16.5.2 Scoping and Consultation

Telecommunications providers were consulted about the Project. A summary of responses is outlined in **Table 16.1** and **Appendix 1.3** outlines full consultation responses.

Table 16.1: Summary of Consultations

Consultee	Response Date	Response
RTÉ Donnybrook Dublin 4 (*2RN is the trading name of RTÉ Transmission Network DAC*)	23/05/2024	*"*2rn have no fixed linking that would be affected by the proposed windfarm. There is risk of interference to broadcast services in the area. We would therefore ask that a protocol be signed between 2rn and the developer should the site go ahead.*"*
Virgin Media Television Westgate Business Park Ballymount Dublin 24	12/07/2024 24/07/2024	'Virgin Media have Critical Fibre cabling at this location We will be in touch when the drawing is completed.*'* *'Please see attached, VM only have network where circled in red below'*

[4] Eirgrid (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 09/07/2025]
[5] Department of Housing, Planning, Community and Local Government (2006) Planning Guidelines. Available online at: https://www.gov.ie/en/publication/f449e-wind-energy-development-guidelines-2006/ [Accessed 09/05/2025]
[6] Department of Housing, Local Government and Heritage (2019) Draft Revised Wind Energy Development Guideline. Available online at: https://www.gov.ie/en/department-of-housing-local-government-and-heritage/publications/draft-revised-wind-energy-development-guidelines-december-2019/ [Accessed 09/07/205]

Consultee	Response Date	Response
		
Tetra Ireland	22/07/2024	*"We anticipate no impact from the development as proposed."*
Broadcasting Authority of Ireland	03/07/2024:	'Coimisiún na Meán does not perform an in-depth analysis of the effect of wind turbines or electrical sub stations on FM networks. However, we are not aware of any issues from existing windfarms or electrical sub stations into existing FM networks. Also, the proposed sub station is not located close to any existing or planned FM transmission sites.'
Eir Limited	No response received	
ESB Telecoms	No response received	
Three Ireland (Hutchison) Limited	No response received	

Additionally, AI Bridges carried out a report into the potential effects of the Project on the existing telecommunications networks in the area. As part of this, they contacted 16 operators to determine the existence of telecoms links in the area. This report can be found in **Appendix 16.1**. The report found that four licensed microwave radio links could potentially be affected by the Project depending on the final turbine layout. These links are as follows:

- Licenced PTP microwave radio link from Kilmallock to Ballyagran operated by Eir.
- Licenced PTP microwave radio link from Ballyagran to Glenbrohane operated by Eir.
- Licenced PTP microwave radio link from Effin to Kilmacanearla South operated by Eir.
- Licenced PTP microwave radio link from Charleville to Howardstown operated by Vodafone Ireland.

None of the Telecoms Operators contacted during the consultation process raised any concerns regarding telecommunications networks operating in the licence-exempt frequency bands. Additionally, there was no impacts reported by any of the operators regarding GSM Radio Access, Mobile Broadband Data Access, Tetra, Telemetry or TV/Radio Transmission networks.

16.5.3 Assessment Methodology

Ai Bridges was commissioned to evaluate the possible impacts that the Project at Garrane, Co. Limerick 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 Project.

Two telecommunications mast-sites were identified as sites with network infrastructure that could potentially be impacted by the Project 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 16.1**.

This methodology is in line with best practice and guidance (**Section 16.5.1**).

16.5.4 Assessment of Potential Effects

All potential effects, which are associated with the operational phase of the Project, are classified as **long-term** effects. Potential effects were highlighted as shown in **Table 16.1** by Virgin Media Television.

16.5.5 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.

16.5.6 Construction Phase

During the construction phase, there are likely to be several sources of temporary electromagnetic emissions (1) TV/radio (2) microwave (3) telecommunications. 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. The likely sources of electromagnetic emissions from the Project will have low strength and will be located at such a distance from potential receptors that any likely effect will be imperceptible.

Other potential effects during the construction phase are likely to be as a result of tall cranes used for constructing the turbines. These cranes will be located close to the proposed turbines. Any interference effects will be temporary and are likely to be similar to those arising during the operational phase of the Project, resulting in interruption to telecommunications links by reflection, diffraction, blocking and interfering with radio frequency.

The impact of the use of cranes to erect turbines may have a **temporary, slight, adverse** effect on telecommunications during the construction phase.

Virgin media responded on 27/07/24 and shared a drawing showing they had a cable running along the western Redline Boundary. If planning permission is granted, prior to construction the Developer with liaise with Virgin Media to ensure there will be no adverse effects on the underground cable as a result of the Project.

16.5.7 Operational Phase

No telecommunication links were identified during the scoping and consultation process. All responses received from telecommunications consultees have stated that the Project will have no effect on their telecommunications services. The impacts on 4 No. Radio links by the Project were assessed in **Appendix 16.1**. Although no impacts were predicted on the radio links mitigation was proposed for 1 No. Link – PTP microwave link from Kilmallock to Ballyagran as the clearance distance is 17.9m. Full details of the assessment of the effects of the Project on telecommunications can be found in **Appendix 16.1: Telecommunications Impact Study**.

16.5.8 Decommissioning Phase

The electromagnetic emissions levels likely to be generated during the decommissioning phase are well below those specified in the ICNIRP 1998 Guidelines on the limit of exposure to radio frequency electromagnetic fields and electronic and magnetic fields at 50/60 Hz and in the EU Council Recommendation 1999/519/EC.

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.

16.5.9 Mitigation Measures

All electrical elements of the Project are designed to ensure compliance with Electro-Magnetic Fields (EMF) standards for human safety. The effects on human health are assessed in **Chapter 5: Population and Human Health**.

Mitigation measures were undertaken in the design phase through mitigation by avoidance i.e., the known routes of the telecommunication links were plotted, and a buffer was applied to them, outside of which the proposed turbines were located during the design process and located outside the identified fresnal zones.

16.5.10 Residual Effects

The impact on telecommunications during construction/decommissioning is likely to have a **temporary slight neutral** effect.

Following the implementation of the mitigation measures outlined in **Section 16.5.9** the Project is likely to have a **not-significant** and **long-term neutral effect** during the operational phase.

The effect on telecommunications during the construction and decommissioning phase of the Project due to electromagnetic emissions from the Site is likely to have an **imperceptible** effect and will not have a significant effect on telecommunications.

Residual effects on any PTP radio link due to the Project 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.

16.5.11 Cumulative Effects

There are 10 No. proposed, consented or operational wind farms within 20km of the Project (**Appendix 1.2**) which have been considered for potential cumulative effects in line with the Wind Energy Development Guidelines (2006/2019 revision). In line with the Draft Wind Energy Guidelines 2019 each developer is responsible for engaging with all relevant telecommunications operators to ensure their proposals will not interfere with television or 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 proposed developments in the area other than wind farms were evaluated not to impose a cumulative effect as they will not interfere with telecommunication links due to size and scale.

The cumulative effects on telecommunications are anticipated to be **not-significant** during the operational and decommissioning phases. The cumulative effects on telecommunications are anticipated to remain at **not-significant** during the construction phase.

16.5.12 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.

16.6 ELECTRICITY NETWORKS

16.6.1 Introduction

This section describes the transmission network and the anticipated Grid Connection. It is not proposed to utilise any elements of the existing 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.

An existing overhead 110kV transmission line runs through the south of the Site. The existing overhead line currently connects to the Charleville 110kV substation. Therefore a 500m buffer is applied between turbines and the existing high voltage overhead power line. The distance between the overhead line and T1 (850m) is in excess of the required clearance as calculated in the EirGrid policy document "*Policy on Wind Turbine Clearance to OHL's Rev 1*".

The following grid connection route was assessed as part of the Site:

- Overhead Grid Connection from the on-site 110kV substation with a 'loop in' grid connection to the existing 110kV OHL between Charleville substation and Killonan substation.

In order to connect the Project and provide the 'loop in/loop out' infrastructure, it is proposed to install c. 350m of underground 110kV electricity transmission line between the Substation and the 'loop-in' connection point. The underground line (UGL) will be located fully within the Redline Boundary, across agricultural lands. Constructed and installed according to the requirements and specifications of EirGrid and ESB Networks.

16.6.2 Assessment Methodology

16.6.3 Assessment Methodology

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

The grid connection for the Project is proposed to be a loop-in Grid Connection onto the existing 110kV OHL between Charleville substation and Killonan substation. The Developer assessed possible connection options for the Project as detailed in **Chapter 3: Alternative Considered** and shown in **Figure 3.2**. Following the assessment, the Developer found that the 'loop in' grid connection to the existing 110kV OHL between Charleville substation and Killonan substation was the most viable option. The total length of the connection is circa 350m from the Substation to the Charleville 110kV OHL. See **Planning Drawing: 3337-SUIR-SS-DR-C-2411**

A new 110kV Onsite Substation and Control Building will be constructed to allow for the additional capacity and to meet the specification requirements of ESB Networks.

Transport Infrastructure Ireland (TII) were also consulted in the scoping process, all items raised have been addressed/ considered during the design process and is documented within **Chapter 16: Traffic and Transport**.

16.6.4 Assessment of Potential Effects

All on-site internal cabling will be underground, as well as 771m of the grid connection from the Substation to the 110kV OHL between Charleville and Killonan.

There will be a temporary outage while the connecting to the OHL. There is potential short-term inconvenience during the works associated with the 'loop in' connection to the Charleville and Killonan 110kV OHL and the development of the new infrastructure. Delivery of components and building materials along the Haul Route could potentially impact local residents.

The Project will contribute directly and in the long-term to the electricity network by strengthening it through the addition of electrical transmission infrastructure and through renewable energy generation. 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.

16.6.5 The 'Do-nothing' Impact

If the Project does not proceed, there will be no offset to fossil fuel usage, and no provision of additional electricity in the local area thus having a moderate adverse impact. The evolution of the baseline environment, which is mostly comprised of roads, is likely to be the development of existing roads and use of roads for additional services and utilities.

16.6.6 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.

16.6.7 Residual Effects

The residual impact on electricity during construction is likely to have a **slight, brief, adverse** effect.

The residual impact on electricity during the operational phase is likely to **moderate positive and long-term**

As the electrical transmission infrastructure will remain in place, the residual impact on electricity network during the decommissioning phase is likely to be **slight positive and long-term.**

16.6.8 Cumulative Effects

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

There are 10 No. proposed, consented or operational wind farms within 20km of the Site (see **Table 2.1, Chapter 2: Project Description**) which have been considered for potential cumulative effects in line with the Wind Energy Development Guidelines (2006/2019 revision). The grid connections will be individually connected to the grid network and not share cable trenches or Joint Bays. There will be no cumulative impacts relating to the Project and surrounding projects in relation to electricity networks during the construction phase.

The cumulative effects on electricity networks are anticipated to remain **slight (adverse)** during the construction phase, **positive** during the operational phase and **positive** during the decommissioning phase.

16.6.9 Statement of Significance

No significant adverse effects on the electricity networks are anticipated. There will be a long-term, slight, positive residual effect on transmission infrastructure in the area (due to the installation of new infrastructure). There will be a long-term, slight, positive residual effect on the distribution network, as it is proposed to include a distribution bay for utilisation and strengthening of the distribution network as detailed in Planning Drawing **3337-SUIR-SS-DR-C-2005-P04**. In addition, the energy produced will be from carbon neutral

technology which will offset carbon from fossil fuel energy production locally which will be a **slight positive local** impact.

16.7 AIR NAVIGATION

16.7.1 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*[7]. The IAA requires that all structures over 150m in height require lighting of an obstacle[8] to warn aviation traffic.

The blade tip height of the wind turbines stands at 170m during operation. This will necessitate the installation of aviation warning lighting for the Project.

Annex 15 to the Convention on International Civil Aviation Aeronautical Information Services

The following are the main aviation-related features (identified in ICAO Aeronautical Chart) with regards to distance from the Site in Garrane:

- Just over 36.3km south of Shannon Airport;
- 62.2km north-east of Kerry Airport
- 61.1km north of Cork Airport;
- 28.45km south-west of Brittas House Airstrip
- 29.5km south of Coonagh Aerodrome
- 19.63km south-east of Feohanagh Airstrip
- 44.7km east of Abbeyfeale Airfield
- 73.6km east of Ardfert Airstrip
- 37.6km north-east of Rathcoole Aerodrome

[7] 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 [Accessed:03/10/2024]

[8] 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=fcb70df3_4 [Accessed:03/10/2024]

The closest international airport is Shannon Airport, 36.3km to the northwest of the Site. The closest regional airport is Cork Airport, 61.1km to the south of the Site. The closest aerodrome is the Coonagh, 29.5km to the north of the Site.

16.7.2 Consultation

Consultation with the relevant aviation organisations was initiated during the scoping process, to identify any potential aviation issues that could be affected by the Project. The findings are summarised in **Table 16.2**.

Table 16.2: Summary of Consultation Response

Consultee	Response Date	Response
Irish Aviation Authority The Times Building 11-12 D'Olier Street Dublin 2	04/06/2024	1. *Agree an aeronautical obstacle warning light scheme for the wind farm development.* 2. *Provide as-constructed coordinates in WGS84 format together with ground and tip height elevations at each wind turbine location.* 3. *Notify the Authority of intention to commence crane operations with at least 30 days prior notification of their erection.*
Cork Airport	No response received	
Shannon Airport Authority	17/09/2024	*'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*

Consultee	Response Date	Response
		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. *With specific reference to the Garrane geographical location, and arising from our own internal assessment, this development of nine 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. We are not aware of any correspondence made by you directly to the Air Nav Ireland, Airspace and Navigation Manager advising them of this development in respect of the above systems. It would be advisable to reach out to them: (cathal.maccriostail@airnav.ie).* ***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*

Consultee	Response Date	Response
		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.'*
AirNav Ireland	16/08/2024	*'I can confirm that the proposed Garrane Wind Farm, Co. Limerick, is not a concern in relation to its impact on AirNav Ireland's Surveillance radar infrastructure.'*
Department of Defence	27/05/2024	*'Based on the information supplied and following consultations with the subject matter in the Irish Air Corps, the Department of Defence wishes to make the following observations:* *All turbines should be illuminated by Type C, Medium intensity, Fixed Red obstacle lighting with a minimum output of 2,000 candela to be visible in all directions of azimuth and to be operational H24/7 days a week. Obstacle lighting should be incandescent or, if LED or other types are used, of a type visible to Night Vision equipment. Obstacle lighting used must emit light at the near Infra- Red (IR) range of the electromagnetic spectrum, specifically at or near 850 nanometres (nm) of wavelength. Light intensity to be of similar value to that emitted in the visible spectrum of light.'*

16.7.3 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 Project. Details of the Project were shared with Cork Airport, Shannon Airport, Irish Aviation Authority and Air Nav Ireland. A summary of responses are shown in **Table 16.2**. No response was received from Cork Airport.

16.7.4 Assessment of Potential Effects

Consultation with the Irish Aviation Authority and Shannon Airport revealed that the Project is not predicted to have any effect on the operations of Shannon Airport as the Project will have no impact on their *obstacle limitation surfaces (OLS).* The Project is over 67km from Cork Airport. No potential effects are predicted. The civil aviation guidelines for wind turbines covers a 30km radius. Therefore, no significant effects to air navigation were identified.

16.7.5 The 'Do-Nothing Impact'

If the Project were not to proceed, there will be no impact on aviation operations as proposed. The likely evolution of the baseline environment may be continued farming/ agricultural uses.

16.7.6 Mitigation Measures

The IAA will be consulted and upon request, the turbine with the highest elevation above sea level (mOD) or turbines at the extremities of the Project, and any obstacle 100m or greater, will be installed with a warning light system under direct specification and in accordance with ICAO Annex 15. It should be noted that infra-red lights are not visible to the naked eye.

The IAA and the Local Authority will be informed of the coordinates of the constructed positions of the turbines and the highest point of turbines or any infrastructure greater than 100m at least 30 days prior to erection. The IAA and Local Planning Authority will be notified at least 30 days in advance of intended crane erection.

An aeronautical lighting scheme for the Project will be agreed and installed in consultation with IAA and Shannon Airport.

The following data will be supplied to the IAA airspace team and Shannon Airport

- The WGS84 coordinates (In degrees, minutes and seconds) for each turbine

- Height above ground level (to blade tip) and elevation above mean sea level (to blade tip) in both meters and feet.
- Horizontal extent (rotor diameter) of turbines and blade length where applicable in both meters and feet.
- Lighting of the wind farm and turbines and the type of lighting.

16.7.7 Cumulative Effects

All existing and approved projects in **Appendix 1.2** have been considered for potential cumulative effects. There are 10 No. proposed, permitted or operational wind farms within 20km of the Project. Each Developer is responsible for engaging with the aviation authority 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 developments have also been assessed in terms of their potential to impose a cumulative effect on aviation assets in conjunction with the Project. No likely significant effects have been identified. Therefore, it is considered there will be no cumulative impacts relating to the Project and surrounding projects in relation to aviation during the construction phase.

The installation of aeronautical obstacle warning lighting as required by the Irish Aviation Authority will mitigate against potential aviation accidents in the surrounding area. Therefore, cumulative effects on aviation during the operational and decommissioning phases are considered not significant.

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**.

16.7.8 Statement of Significance

It is considered that the Project is not likely to have any significant effects on air navigation, with the implementation of the mitigation measures outlined above.

16.8 QUARRIES

16.8.1 Introduction

Crushed stone required for construction of the access tracks and hardstands will be imported as outlined in **Chapter 17: Traffic and Transport**. The crushed stone, estimated to be a volume of 74,200m^3 will come from a licenced quarry in the locality such as:

- Shane Foley Plant Hire Ltd.
- Ballyhea Ready mix
- Costello Quarry
- Ballyorgan Quarry
- Kilmeedy Sandstone Building Stone Quarry
- Liam Lynch (Quarries) Ltd
- Rockmills Limestone Quarry
- Croom Concrete Limited
- Granagh Concrete Products
- Ballyhea Readymix
- Ducon Concrete Limited
- White Rock Quarries
- Roadstone Mallow

These quarries will also be the source of crushed stone and concrete for widening works to the Turbine Delivery Route, turbine foundations and for Grid Connection works. The locations of these quarries in relation to the Site can be seen in **Figure 17.5**.

16.8.2 Assessment of Potential Effects

The construction of the Project will impact on natural resources such as aggregates which will be sourced from the quarries in proximity to the Project. This will have a **short-term, slight, adverse** effect on natural resources for the duration of the construction phase of the Project.

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 16.8.1). 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.

During the decommissioning phase of the Project stone will be imported to site to rebuild hardstands for turbines within the floodplain (T4, T5, T6, T7 and T8). There will impact on natural resources such as aggregates which will be sourced from the quarries in proximity to the Project. This will have a **short-term, slight, adverse** effect on natural resources for the duration of the decommissioning phase of the Project.

Overall, the use of imported material will have a **slight, permanent adverse** effect on the area's non-renewable resources due to the depletion of natural reserves. However, this effect is expected to be **imperceptible** and not **significant** in the long term.

16.8.3 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.

16.8.4 Mitigation Measures

Existing tracks have been used where possible and the layout was designed to minimise the length of new track required in order to reduce the requirement for additional stone material. Also if any material won on site is suitable it will be used. Local quarries have been identified to reduce impact on transportation (Please see **Chapter 17: Traffic and Transport**).

The source quarry will be chosen based on stone which is chemically similar to that occurring at the Site. This will reduce hydrogeochemical impacts. (Please see **Chapter 9: Soils and Geology**)

16.8.5 Residual Effects

The residual effects on quarry resources during construction is likely to have a **short-term, slight, adverse effect**. The residual effects on quarry resources during the operational phase is likely to **long-term, imperceptible adverse.** There will be no residual effects on quarry resources during the decommissioning phase.

16.8.6 Cumulative Effects

All existing and approved projects in **Chapter 1: Introduction** - **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 impacts relating natural quarry resources from the Project and smaller projects in the surrounds, such as one-off houses, extension to houses and housing development relation to quarries during the construction phase. The cumulative impact on quarry resources during construction is likely to have a **short-term, moderate, adverse** effect. The cumulative impact on quarry resources during the operational phase is likely to **long-term, imperceptible, adverse.** There will be no cumulative impact on quarry resources during the decommissioning phase.

16.8.7 Statement of Significance

No significant adverse effects on local quarries are anticipated. There will be a **slight, permanent, adverse residual** effect on natural resources in the area. This effect is considered to be **imperceptible** in the long-term and **not significant**.

16.9 UTILITIES

16.9.1 Introduction

In order to assess the potential for significant effects on built services gas, water and waste in the vicinity of the Project, scoping requests were made to Uisce Éireann, Limerick City and County Council and Cork 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.

16.9.2 Assessment Methodology

In order to assess the potential for impacts to gas and water infrastructure and waste services, a scoping exercise was carried out with a number of key consultees, including Gas Networks Ireland (GNI), Uisce Éireann and Local Authorities. Full details of the scoping exercise that was carried out is provided in **Chapter 1: Introduction**. These key consultees were also contacted directly and provided with electronic drawing of the design layout and were requested to provide infrastructure drawings/ layout of the utilities to inform design layout. A desk study of available information from the EPA was undertaken to identify all waste facilities in the area.

16.9.3 Assessment of Potential Effects - Gas, Water Utilities and Industrial Pipelines

There are no gas mains located within the Site, therefore there is no potential for significant effects to occur. 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 has been provided by Uisce Éireann in relation to water services within the Redline Boundary, it has been assumed that there is no potential to encounter local water services within the Site.

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

There is an existing industrial outflow pipeline through the Site from South to North, the pipeline is a pumped outfall pipeline for the conveyance of treated waste water from Kerry Ingredients (Ireland) Limited waste water treatment plant at Rathgoggan North, County Cork to a discharge point on the Maigue river located approximately 2km north of the waste water treatment plant site, details are available at the Limerick City and County Council website, planning reference: 17270. The proposed pipeline crossing points are located north of T3 and south-east of T9 as shown on **Drawing No. 6839-JOD-GGE-XX-DR-C-0404**. The pipeline will be crossed in 2no. locations by new access tracks. The pipe is 1.18m deep at Crossing 1 and 0.6m deep at Crossing 2 as shown on **Drawing No. 6839-JOD-GGE-XX-DR-C-0404**. In the absence of mitigation measures there is potential for the pipeline to be impacted during the construction phase. This would have a potential long-term, moderate adverse effect on soils and groundwater.

There will no excavation works during the operational phase and therefore no likely significant effects. The access tracks will be left in-situ during the decommissioning phase therefore there is no potential likely significant effects on the industrial pipeline during the decommissioning phase.

16.9.4 Assessment of Potential Effects - Waste

There are many potential waste types generated from the construction and operational phase of the Project. These are general office waste, bowser waste**,** portaloo waste**,** excavated soil**,** washings, concrete waste and wash-out water**,** chemicals, fuel and oils, packaging waste and hazardous waste. Waste generated on site will be managed as per the **Appendix 2.1,CEMP - Management Plan 5: Waste Management Plan**.

A desk study of available information from the EPA[9] carried out on 07 October 2024 did not identify any waste facilities, illegal waste activities, chemical monitoring points or industrial EPA licensed facilities within a 2km radius of the Site. The nearest licensed waste receiving facility to the Site is the Ballyguyroe Landfill Site (ID W0002-02) operated by Cork County Council and Ballyguyroe Residual Landfill (ID W0157-01) operated by Cork County Council. There are no EPA-licensed or local authority-authorised waste facilities or activities located within 2km of the EIAR Site Redline Boundary. A list of waste facilities within the vicinity of the Site has been included in **Appendix 2.1: CEMP - Management Plan 5: Waste Management Plan**. The closest authorised municipal waste facility is:

[9] EPA dataset of current Waste facility locations, Available at: https://gis.epa.ie/EPAMaps/ [accessed 11/09/2024]

- Ballyguyroe Landfill Site (ID W0002-02) operated by Cork County Council, located 16km southeast of the Site
- Ballyguyroe Residual Landfill (ID W0157-01) operated by Cork County Council, located 16km southeast of the Site
- Mr. Binman Ltd (ID W0061 – 03) located 22km northeast of the Site

15.1.1.1 Construction Phase Waste

During the construction phase, waste will be produced from surplus materials such as packaging materials, canteen and domestic waste. The appointed contractor will be required to ensure that oversupply of materials is kept to a minimum and opportunities for reuse of suitable materials is maximised.

The volume of excavation for construction of the wind farm site will be approximately 25,635m^3 of topsoil and 20,770m^3 of subsoil. Excavated materials will not be classified as waste, as all excavated materials during the construction phase will be re-used/ stored on site as outlined **Appendix 2.1: Spoil Management Plan, Management Plan No. 5**, thus removing the need for transport of excavated material from site and disposal at a waste facility. As such, the effect of material waste disposal during the construction phase will be **imperceptible** and **temporary**.

Where any material is removed from the construction works within the Site, its removal and reuse / recycling / recovery / disposal will be carried out in accordance with the Waste Management Act 1996 (as amended)[10] , the Waste Management (Collection Permit) Regulations 2007 (as amended)[11] and the Waste Management (Facility Permit & Registration) Regulations 2007 (as amended)[12]. The volume of waste requiring recovery / disposal will dictate whether a Certificate of Registration (COR), permit or licence is required for the receiving facility. Alternatively, the material may be classed as by-product under Regulation 15 (By-products) (an amendment to Article 27 of the European Communities (Waste Directive) Regulations 2011) of S.I. No. 323/2020 - European Union (Waste Directive) Regulations 2020[13]

In order to establish the appropriate reuse, recovery and / or disposal route for the waste materials, it will first need to be classified. Waste material will initially need to be classified

[10] Government of Ireland. 1996. Waste Management Act 1996 (as amended).
[11] Government of Ireland. 2007, S.I. No. 820/2007 - Waste Management (Collection Permit) Regulations 2007 (as amended).
[12] Government of Ireland. 2007. S.I. No. 821/2007 - Waste Management (Facility Permit and Registration) Regulations 2007 (as amended).
[13] Government of Ireland. S.I. No. 323 of 2020. European Union (Waste Directive) Regulations 2020.

as hazardous or non-hazardous in accordance with the EPA publication Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous. Waste which will be generated from construction phase workers is municipal waste, (e.g., organic / food waste, dry mixed recyclables such as wastepaper, newspaper, plastic bottles, packaging, aluminium cans, tins and Tetra Pak cartons), and mixed nonrecyclables and sewage sludge from temporary welfare facilities provided on-site during the construction phase. Waste printer / toner cartridges, WEEE and waste batteries may also be generated in small volumes from site offices.

The Project will generate a range of non-hazardous and hazardous waste materials during site excavation and construction. As mentioned, general housekeeping and packaging will also generate waste materials, as well as typical municipal wastes generated by construction employees, including food waste. Waste materials will be required to be temporarily stored in the temporary site compound or adjacent to it, onsite, pending collection by a waste contractor. If waste material is not managed and stored correctly, it is likely to lead to litter or pollution issues (e.g., water / ground pollution or risks to biodiversity) at the Site and in adjacent areas. In the absence of mitigation, the effect on the local and regional environment is likely to be **short-term**, **moderate** and **adverse**.

Wastes arising will need to be taken to suitably registered / permitted / licenced waste facilities for processing and segregation, reuse, recycling, recovery, and / or disposal, as appropriate. There are numerous permitted waste facilities in the area, as listed **Appendix 2.1: Spoil Management Plan, Management Plan No. 5,** which can accept hazardous and non-hazardous waste materials, and acceptance of waste from the Project would be in line with daily activities at these facilities. The majority of construction materials are either recyclable or recoverable. However, in the absence of mitigation to reduce waste generated and ensure waste management as high up the hierarchy as possible, the effect on the local and regional waste infrastructure is likely to be **short term**, **moderate** and **adverse**.

15.1.1.2 Operational Phase Waste

Once operational, it is anticipated that very small amounts of waste will be generated from staff during inspections and maintenance works. These wastes may include organic/food waste, dry mixed recyclables (waste paper, newspaper, plastic bottles, packaging, aluminium cans, tins, and Tetra Pak cartons) and non-recyclable waste. Waste fuels/oils, WEEE and waste batteries may also be generated infrequently. All such waste will be stored appropriately and safely from wind, rain and wild animals that often tear apart rubbish bags. Wastewater from the staff welfare facilities will be collected in a sealed storage tank. All

wastewater will be tankered off-site by an authorised waste collector to a wastewater treatment plant. The potential effects on waste infrastructure for the operational phase is **long term**, **neutral** and **imperceptible**.

15.1.1.3 Decommissioning Phase Waste

During decommissioning of the Project, effects will be similar to those assessed for the construction phase. Turbine foundation plinths will be dismantled to below existing ground level and covered over with topsoil, the underground sections will be left in place during decommissioning and allowed to naturally revegetate over time. This is the least impactful process of decommissioning. As the Site will have already been altered, the effects are **long term**, **neutral** and **imperceptible**. All infrastructure including turbine components will be separated and removed off-site for re-use and recycling where practicable or disposed of in accordance with waste legislation and best practice guidelines at the time of decommissioning. Waste produced during the decommissioning phase will likely have a **moderate, adverse effect** on the capacity of the licenced waste facilities used at the time of decommissioning.

A Circular Economy

The Waste Action Plan for a Circular Economy[14] 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 Plan 2025. It also matches the level of ambition being shown across the European Union through the European Green Deal[16], 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

16 14 Waste Action Plan for a Circular Economy – Ireland's National Waste Policy 2020-2025 (2020) Department of Climate, Energy and the Environment Available here: https://www.gov.ie/en/department-of-climate-energy-and-the-environment/publications/waste-action-plan-for-a-circular-economy/ [Accessed 15/04/2025]

[16] 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]

- 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

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.

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.

The Waste Hierarchy which contractors are obligated to apply: (Source: EC[17]):

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.

[17] European Commission [Accessed Online 06/06/2025]
https://ec.europa.eu/environment/topics/waste-and-recycling/waste-framework-directive_en

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.

16.9.5 The 'Do-Nothing Impact'

If the Project were not to proceed, there would be no impact on the utilities, industrial pipelines or waste in the area. The likely evolution of the baseline environment may be continued farming/ agricultural uses. It is also possible that future developments may be proposed in this region, that have the potential to impact waste services and may also require connection the existing utility (gas and water services) infrastructure.

16.9.6 Mitigation Measures – Gas, water Utilities and Industrial Pipelines

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

The risk of working in close proximity to the gas line was taken into consideration when designing the project, the required setback distances outlined by Gas Networks Ireland were adhered too for all site infrastructure[24].

A Management Plan has been developed for the crossing of the industrial pipeline and is attached as **Appendix 2.1: CEMP - MP7 Method Statement for Crossing Industrial Pipeline**. The as-built location of the pipeline was confirmed utilising ground penetrating radar (GPR) and the Project infrastructure has maintained a separation distance from the pipeline with the exception of 2 No. crossing points. There will be excavation works associated with the access tracks crossing the industrial pipeline. The access track will be built up at the 2 No. crossing to protect the pipeline as detailed in **Section 16.9.3** and as shown on **Drawing No. 6839-JOD-GGE-XX-DR-C-0404**.

16.9.7 Mitigation Measures - Waste

Staff Facilities

[24] Gas Networks Ireland: Code of Practice for Working in the Vicinity of the Transmission Network - Procedure No: AO/PR/127- Rev 3 Date: May 2021 [Accessed 06/06/2025]

Provision for separation of waste streams will be provided so that e.g., paper, and cardboard waste and bottles may be recycled. This waste will be appropriately stored to prevent exposure to wind, rain, and wildlife.

Sewage

It is proposed to install a rainwater harvesting system as the source of water for toilet facilities for the operational phase. Wastewater from the staff welfare facilities in the control building will be collected in a sealed storage tank, fitted with a high-level alarm. This is a device installed in a fuel storage tank that is capable of sounding an alarm, during a filling operation, when the liquid level nears the top of the tank.

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 **Appendix 2.1**, which includes structural elements of the watercourse crossings (2 no. Bridges). Elements of the Project where the use of precast concrete is not possible include Turbine Foundations. 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 the 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 Site or progress beyond the contractor's yard. Vehicles will also be in good working order.
- No batching of wet-cement products will occur onsite. Ready-mixed supply of wet concrete products and emplacement of pre-cast elements will take place.
- Where possible pre-cast elements for culverts and concrete works will be used.
- Vehicles will undergo a visual inspection prior to being permitted to drive into the wind farm Site to ensure that there is no excess cementitious material which could be deposited on site.
- Where concrete is delivered onsite, only the chute will be cleaned, using the smallest volume of water possible. No discharge of cement contaminated waters to the construction phase drainage system or directly to any artificial drain or watercourse will be

allowed. A dedicated bunded area will be created to cater for concrete wash-out and this will be located in the Temporary Construction Compound.

- The contractor will use weather forecasting to plan dry days for pouring concrete.
- The contractor will ensure pour site is free of standing water and plastic covers will be ready in case of a sudden rainfall event.
- No surplus concrete will be stored or deposited anywhere on Site.
- Raw or uncured waste concrete will be disposed of by removal from the Site and returned to the source location or disposed of appropriately at a suitably licensed facility.
- Where shuttering is required to be installed in order contain the concrete during pouring, it will be installed to a high standard with minimal potential for leaks. Additional measures will be taken to ensure minimal potential of leaking, these measures are the use of plastic sheeting and the use sealing products at joints.

Chemicals, Fuels and Oils

- During construction, where possible, all refuelling on site will be within the temporary compound within the dedicated re-fuelling area.
- All plant will be inspected and certified to ensure they are leak free and in good working order prior to use onsite.
- Site vehicles will be refuelled offsite where possible.
- Only essential refuelling will be completed outside of the dedicated re-fuelling area but not within 50m of any watercourses. Onsite re-fuelling of plant and machinery will be carried out using a mobile double skinned fuel bowser:
    - The fuel bowser, a double-axel custom-built refuelling trailer will be re-filled off site, and will be towed around the site by a 4x4 jeep to where machinery is located;
    - The 4x4 jeep will also carry fuel absorbent material and pads in the event of any accidental spillages.
    - The fuel bowser will be parked on a level area in the construction compound when not in use and only designated trained and competent operatives will be authorised to refuel plant on site.
    - Mobile measures such as drip trays and fuel absorbent mats will be used during all refuelling operations.
    - A non-permeable High-Density Polyethylene (HDPE) membrane will be provided beneath connection points to catch any residual oil during filling and disconnection. These membrane will be inspected and if there is any sign of oil contamination will be removed from the site by a specialist waste contractor.
- Onsite refuelling will be carried out by trained personnel only;
- A permit to fuel system will be put in place;

- Taps, nozzles or valves associated with refuelling equipment will be fitted with a lock system;
- All fuel storage areas will be bunded appropriately for the duration of the construction phase. Fuels will be stored in the Temporary Construction Compound and bunded to at least 110% of the storage capacity of fuels to be stored. All bunded areas will be fitted with a storm drainage system and an appropriate oil interceptor. Ancillary equipment such as hoses, pipes will be contained within the bunded area;
- Fuel and oil stores including tanks and drums will be regularly inspected for leaks and signs of damage;
- The electrical control building (at the substation) will be bunded appropriately to 110% of the volume of oils that will be stored, and to prevent leakage of any associated chemicals to groundwater or surface water. The bunded area will be fitted with a storm drainage system and an appropriate oil interceptor;
- The plant used during construction will be regularly inspected for leaks and fitness for purpose; and,
- An emergency plan for the construction phase to deal with accidental spillages is included within the Construction and Environmental Management. Spill kits will be available to deal with any accidental spillage in and outside the re-fuelling area.

A Chemical and Waste Inventory will be kept, as outlined in the **Appendix 2.1** (**Waste Management Plan No. 5**). 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 the Site.

All dangerous substances will be conveyed in a container that compiles with the ADR[25]. As such the manufacturer of each bowser will provide certification to contractors of the following:

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

Where mobile bowsers 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.

Refuelling

During construction/decommissioning, all refuelling on site will be within the temporary compound within the re-fuelling area (see **Drawing No. 6839-JOD-GGE-XX-DR-C-0801**). Only essential refuelling (e.g., cranes) will be carried out, outside of this area, but not within 50m of any watercourse. In such cases a non-permeable High-density Polyethylene (HDPE) membrane will be provided beneath connection points to catch any residual oil during filling and disconnection. This membrane will be inspected and if there is any sign of oil contamination, it will be removed from site by a specialist licensed waste contractor. All vehicles will be well maintained and free from oil or hydraulic fuel leaks.

Vehicles will be refuelled off-site where possible. For vehicles that require refuelling on-site, fuels will be stored in the Temporary Construction Compound and bunded to at least 110% of the storage capacity of fuels to be stored.

Refuelling will take place via a mobile double skinned fuel bowser. The bowser will be a double axel refuelling trailer which will be towed to the refuelling locations by a 4x4 vehicle. The 4x4 will carry, a drip tray, spill kit and absorbent mats in case of any accidental spillages. Only designated competent personnel will refuel plant and machinery on the Site.

[25] ADR, 2023 (European Agreement Concerning the International Carriage of Dangerous Goods by Road). https://unece.org/transport/standards/transport/dangerous-goods/adr-2023-agreement-concerning-international-carriage [Accessed 06/06/2025]

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 to be transferred offsite by a licensed contractor to a licenced facility.

Metals

Waste metals from concrete reinforcing etc, have a commercial value and therefore there is an additional economic incentive for the appropriate re-use or recycling with the licensed waste contractor.

16.9.8 Residual Effects

The residual impact on the water infrastructure and services during the construction phase will be imperceptible and not significant during the construction, operational and decommissioning phases.

The residual impact on the gas infrastructure and services during the construction phase will be imperceptible and not significant during the construction, operational and decommissioning phases.

The residual impact on the industrial outflow pipeline during the construction phase will be imperceptible and not significant during the construction, operational and decommissioning phases.

The residual impact on waste facilities is likely to have a **short-term not significant adverse** effect during construction, a **long-term imperceptible** effect during the operational phase and **short-term not significant** effect during the decommissioning phase.

16.9.9 Cumulative Effects

All existing and approved projects found in **Chapter 1: Introduction** – **Appendix 1.2** have been considered. All local waste facilities will be subjected to cumulative effects from any development in the source of stone for almost all developments in the area.

All wind farms in the area, apart from the proposed Annagh Wind Farm, are in operational phase therefore producing a very small amount of waste. These are likely to be in imperceptible quantities in terms of the cumulative effects on local waste facilities. The largest quantity of waste requiring, to be generated from the quarry extension, is anticipated

to be excavated soil. All excavated soil (with exception to bituminous materials) from the construction phase of the Project will be re-used on site as per the **Spoil Management Plan** (MP No. 4 to **Appendix 2.1**). Therefore, cumulative effect from excavated materials/ soils are not anticipated.

The cumulative impact on waste facilities during construction phase is likely to have a **temporary slight adverse effect**. The cumulative impact on waste facilities during the operational phase is likely to **long-term imperceptible and adverse** and likely to be **short-term not significant and adverse** during the decommissioning phase.

16.9.10 Statement of Significance

There is no gas mains located within the Site. Therefore, there is no potential for impact. 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.

It has been assumed that there is the potential to encounter local water services during excavation works of the Project. Potential impacts 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.

It has been assumed that without mitigation there is the potential to encounter the industrial outflow pipe during excavation works of the Project. However, there will be no significant effects to soil or groundwater.

There are no EPA-licensed or local authority-authorised waste facilities or activities located within the Site. The closest, authorised municipal waste facility is located approximately 16.0km northeast of the Project.

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.