Derrybrien Wind Farm Project

Gort Windfarms Ltd.

Remedial Environmental Impact Assessment Report
Chapter 13-Material Assets

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13.1 Introduction

13.1.1 Chapter Scope

This chapter provides an assessment of the impact of Derrybrien Wind Farm Project (the Project) with respect to material assets.

Impacts are considered for the three main constituents of the Project as outlined in Chapter 2: the wind farm site and associated discrete ancillary works locations, the grid connection site and associated discrete ancillary works locations together with locations where works were undertaken in response to the peat slide.

It should be noted that impacts relating to roads, traffic and transport are assessed separately, under Chapter 14 of this remedial Environmental Impact Assessment Report (rEIAR), while this chapter primarily deals with other material assets, including built services.

Other chapters relevant to this assessment area also include the following:

- Chapter 2 Project Description which describes the physical characteristics of the Project including those of natural and human origin.
- Chapter 3 Population & Human Health which considers population and employment trends and human health.
- Chapter 8 Aquatic Ecology which considers water quality.
- Chapter 9 Landscape which considers amenities in the Project area.
- Chapter 10 Lands, Soils and Geology which considers impacts on lands.
- Chapter 11 Hydrology and Hydrogeology which considers impacts on water quality and drainage.
- Chapter 12 Air and Climate which consider the Project in relation to effects on air and climate.

All of the above chapters should also be considered where they interact with Material Assets, including their figures as appropriate.

It should be noted that the following material assets are not considered in detail in this chapter as they are not considered to be associated with any potential significant effects as a result of the Project, for reasons outlined below:

1. **Airports and navigation**
   The Project is not within any of the zones for which guidelines are laid down by the Irish Aviation Authority (IAA). The airports in closest proximity to the project are Galway, approximately 31 km away, and Shannon, approximately 45 km away. However, the Project location is outside both the aviation exclusion zone for Galway Airport and other airfields in the County. The Project does not affect the safe operation of these airport / airfield facilities.

As required, on the completion of development, the IAA were provided with the as-constructed co-ordinates of turbines and maximum elevation of each turbine. The wind farm is marked on the relevant Aeronautical chart with low-intensity aviation lights installed on T1, T47, T52, T65, T44, T46, T71, T18 and T62 (9 in total).

The aeronautical lighting and positional data requirement specified by the Authority at the planning stage has been installed and no significant impacts are identified with respect to this area of consideration.

2. **Cities, towns, villages and settlements**
   The location of the Project relative to population centres is illustrated in Chapter 2, which clearly demonstrates its rural setting. The Project is located approximately 11 km due south of Loughrea, 12.7 km north east of Gort, 25 km west of Portumna and 35 km south east of Galway city. The closest settlement to the wind farm site is the village of Derrybrien some 2 km to the south while the village of Peterswell is approximately 7.5 km west of the site. The nearest occupied houses are located approximately 2 km from the wind farm site.

   Although some of these settlements did experience short term impacts relating to the Project impacts were not generally significant and where required have been considered by other chapters of this rEIAR; e.g. impacts relating to accessibility due to transport impacts.

   As a result, this asset is not considered any further by this chapter aside from one instance, documented by Section 13.3.1.2.

3. **Agronomy**
   The growing of agriculture crops (other than forestry) is not a feature of the locality. Therefore, impacts do not arise. This topic is not considered herein.

4. **Commercial and Industrial Development**
   There are no impacts associated with the Project on commercial and industrial developments due to its location and the absence of any such developments in the Project area. This topic is not considered herein.

Figures are contained in A4 format as they are referenced within the chapter. Where necessary for clarity these are reproduced at A3 in Appendix 13-A.

13.1.1.1 Assessment Timeframes

Impacts are considered over a range of timeframes which have been broken down for clarity as follows:

Impacts which have occurred: Impacts associated with the construction of the project and its operation to date outlined by Section 13.3.1.

Impacts which are occurring: Ongoing impacts associated with the continued operation of the project outlined by Section 13.3.2.

Impacts which are likely to occur: Potential impacts associated with the operation of the project into the future, and ultimate decommissioning of the project, are outlined by Section 13.3.3.

13.1.2 Statement of Authority

This chapter has been prepared by Claire Whiteway, a Senior Civil Engineer with 10 years' experience.

Claire has an honours degree in Civil Engineering awarded by the National University of Ireland, Galway in 2007 and a Master of Science in Sustainable Energy Systems awarded by Edinburgh University in 2008.

Claire has over 10 years' experience in the area of engineering, project planning, development and environmental impact assessment, including experience on major infrastructure and energy projects.

Roisin O'Donovan is a contributing author in relation to the following:

- Airports and navigation
- Telecommunications

Paddy Kavanagh is also a contributing author in relation to the following:

- Tourism

Experience and qualifications for both Roisin and Paddy are outlined in Chapters 2 and Chapter 4 respectively.

13.1.3 Methodology

This chapter has been prepared having regard to:

- EPA Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (2017).
- EPA Advice Notes for Preparing Environmental Impact Statements (Draft 2015)

With regard to Material Assets, the EPA Draft Guidelines (2017) state:

> *"The meaning of this factor is less clear than others. In Directive 2011/92/EU it included architectural and archaeological heritage. Directive 2014/52/EU includes those heritage aspects as components of cultural heritage. Material assets can now be taken to mean built services and infrastructure. Traffic is included because in effect traffic consumes roads infrastructure. Sealing of agricultural land and effects on mining or quarrying potential come under the factors of land and soils."*

The relevant built services and natural resources identified for the purpose of material assets assessment are:

- Water supply
- Sewerage Schemes and Wastewater Infrastructure

- Energy Infrastructure
- Telecommunications
- Tourism & Recreational Infrastructure
- Land use

Cultural Heritage is addressed separately in Chapter 15 reflecting best practice in Ireland. Land use has also been assessed in more detail in Chapter 10, Land Soils and Geology with Roads, Traffic and Transport assessed in Chapter 14.

The assessment documented by this chapter has been undertaken with input from members of the construction team who were on site during construction of the works.

In addition, a number of data sources have been used to inform the mapping considered as part of this assessment:

- Gas Networks Ireland records of existing gas pipeline infrastructure.
- Ordnance Survey Ireland Prime Data for records relating to airports.

13.1.3.1 Categorisation of Impact & Effect

Figure 2.1 of the EPA Draft Guidelines (2017) demonstrates how the identification of impacts leads to effects which should be classified and addressed accordingly.

Table 3.3 of the same EPA Draft Guidelines (2017) provides defined terms for the description of effects. Where relevant, throughout this chapter, effects have been described using these terms as they relate to quality of effect, degree of significance, extent, context, probability, duration and frequency.

Throughout this chapter, following the characterisation of impacts, an assessment of the environmental significance of their effects, as they relate to material assets, is made.

In that regard significance is a concept related to the weight that should be attached to effects. For the purpose of this assessment 'significant effect' is an effect that either supports or undermines the integrity of the material assets (both man-made and natural).

Table 13-1 Classification of Significance

Significance Level	Criteria
Profound	Profound impact occurs where there is permanent disruption to a utility service (Electricity, Water, Sewerage) or valued resource (Tourism and Recreational Infrastructure) or to a natural resource (Land)
Major	Major impact occurs where there is long-term disruption to a utility service (Electricity, Water, Sewerage) or valued resource (Tourism and Recreational Infrastructure) or to a natural resource (Land)

Significance Level	Criteria
Moderate	Moderate impact occurs where there is medium-term disruption to a utility service (Electricity, Water, Sewerage) or valued resource (Tourism and Recreational Infrastructure) or to a natural resource (Land)
Slight	Slight impact occurs where there is short-term disruption to a utility service (Electricity, Water, Sewerage) or valued resource (Tourism and Recreational Infrastructure) or to a natural resource (Land)
Imperceptible	Imperceptible impact occurs where there is temporary disruption to a utility service (Electricity, Water, Sewerage) or valued resource (Tourism and Recreational Infrastructure) or to a natural resource (Land)

13.1.3.2 Site Visit

A site visit was undertaken on 5th November 2019 by the author of this chapter. The visit included Derrybrien Wind Farm site, Agannygal Substation, various locations along the Project overhead line (OHL) and the location of the peat slide.

13.1.4 Difficulties Encountered

In assessing impacts which have occurred, by its nature, this rEIAR is assessing those impacts many years after the project construction. As a result, there may be both undocumented instances of minor impacts which are not captured by this rEIAR in addition to gaps in the historical data available.

However, despite the above no significant difficulties were encountered in relation to material assets when undertaking this assessing.

13.2 Baseline / Receiving Environment

The baseline for assessment of environmental effects represents the position prior to the commencement of development.

The following sections identify the key features of the receiving environment in its baseline condition.

13.2.1 Water Supply

As described in Chapter 11 Derrybrien village is identified as requiring water supply while a number of private dwellings are part of groups schemes, with others having private well / rainwater harvesting systems.

There were no known water supplies within the Project site and no existing water services in the vicinity of the Project had to be altered, reinforced or relocated as a result of the Project.

As outlined by Chapter 2 there are a number of schemes in the wider area which include the Gort Water Supply Scheme. Potential cumulative impacts with this scheme are considered by Section 13.4.

13.2.2 Sewerage Schemes and Wastewater Infrastructure

There were no known main drainage or sewerage schemes within the Project site. No existing schemes in the vicinity of the Project had to be altered, reinforced or relocated as a result of the Project.

13.2.3 Energy infrastructure

The following electricity distribution/ transmission lines were within the Project area prior to project development:

- The existing 110kV Ennis – Shannonbridge OHL which runs in an east-west direction, located to the south of the wind farm in line with the now operational Agannygal Substation. As described by Chapter 2 some modifications were made to this OHL in support of the Project.

- The existing 400kV Moneypoint – Woodlands OHL which is located to the south of the Project. During the construction of the Project works were undertaken at the crossing of the Project Derrybrien – Agannygal 110kV OHL with the existing 400kV OHL. These works comprised lowering of the ground beneath the 400kV OHL to facilitate the construction of the Derrybrien – Agannygal 110kV OHL which crosses beneath.

In addition to the above there are existing Low Voltage (LV) power supplies in the surrounding area, primarily serving residential properties. No existing LV power supply connections in the vicinity of the Project had to be altered, reinforced or relocated as a result of the Project.

In its baseline condition the Project area did not encompass any other significant energy infrastructure aside from the above.

The closest gas pipeline to the project is approximately 5.9 km north-east of the site at Loughrea.

13.2.4 Telecommunications

There are 2 meteorological masts (anemometer) belonging to ESB in the western part of the site. Vodafone placed a cell at the central mast to assist with improved phone signal at the site. The mast was installed in 2005 with the cell added at a later date to boost signal.

There is also an existing telecoms mast in the east of the site which is in-situ since the 1980’s. This mast is in the ownership of Line Partnership (formerly Cellcom) and includes equipment for broadband, fire service, gardai and ambulance as well as radio transmitter. This mast is unrelated to the Project and pre-dates the presence of the wind farm by a significant period. No alterations to this mast took place as a result of the Project.

The Maghera transmission site is located approximately 14.1 km south west of the Derrybrien site in County Clare at a site elevation of approximately 400 m high. It is one of RTE Transmission Networks Ltd (2RN) network of radio and television transmitters. The Maghera television transmitter was one of the five original Telefís Éireann main transmitters and started operation in 1963. The service area for the Maghera site is the West of Ireland, covering counties Clare and Galway, as well as parts of counties Limerick, Kerry, Cork, Tipperary and Mayo.

There are also existing telecommunications services in the surrounding area, primarily serving residential properties. No existing telecommunications services in the vicinity of the Project had to be altered, reinforced or relocated as a result of the Project.

13.2.4.1 Electromagnetic Interference

All large structures have the potential to interfere with television or radio signals with some evidence suggesting that in certain circumstances, wind turbines, more specifically the rotation of the blades, can adversely affect communication systems that use electromagnetic waves as the transmission medium, e.g. television, radio and microwave links.

13.2.5 Tourism & Recreational Infrastructure

The Project is located in a remote area and not in an area of significant tourism importance, near any of the region's major tourism attractions or in an area with existing recreational infrastructure in its own right. There are no designated walking routes within or in the immediate vicinity of the Project.

There are however a number of local tourism and recreational locations of interest in the general region surrounding the site (the general Gort Region); including a number of walking trails, nature reserves and individual amenities such as wellbeing / recreational centres and horse-riding centres. Some of the attractions in closest proximity are listed on the tourism website (http://gort.galway-ireland.ie/attractions.htm) as follows:

- Coole Park; the former residence of Lady Augusta Gregory a co-founder of the Abbey Theatre.
- Kiltartan Gregory Museum; a local award-winning museum.
- Thoor Ballylee; a four story 16th century keep contains a museum with mementos of the poet W. B. Yeats.
- Kilmacduagh Monastery; monastery on the site of an old monastic settlement.
- Ardamullivan Castle; a five-storey tower dating back to the 16th century.
- Lough Cutra Castle; built in 1811 with 500 acres of parkland and the 1000-acre Lough Cutra.
- Fiddaun Castle; a fortified stronghold constructed in the 15th century.
- Slieve Aughty Mountains; described as a mountain range spread over both County Galway and County Clare.

Figure 13-1 illustrates the locations of some of the key amenities of both regional and national significance, including those specifically listed above It should be noted that this figure is not exhaustive and other locations utilised for tourism and recreational purposes are likely to be present in the region surrounding the site.

The location of key amenity features is shown on Figure 13-1 and distances of some of the closest features to the Project are listed in Table 13-2 below.

Table 13-2 Key Amenity Features and Distances from Project

Feature	Approximate Distance to Project (km)
Cahermurphy Loop Walk	8
Lough Cutra Loop	9
Thoor Ballylee	9.6
Coole Park Nature Reserve	13.3
Lough Cutra Demesne	13.7
Slieve Aughty Centre	8

Additional information is provided in Chapter 4 Population and Human Health, in relation to potential impacts of the Project as they relate to the tourism and socio-economic aspects on population and trends in tourism numbers/employment in the region.

Assessment in relation to impacts and effects as they relate to visual amenity are described in Chapter 9.

PLACEHOLDER FOR:

Figure 13-1 – Locations of Significant Amenities

13.2.6 Land Use

Prior to the construction of Derrybrien Wind Farm, the site had been historically used for commercial conifer forestry over the central and western parts of the site and turf cutting in turbary plots on the eastern side. Land use along the grid connection route and at Agannygal substation was also dominated by commercial forestry.

This can be seen from the Ordnance Survey historic aerial views of the area (http://map.geohive.ie/mapviewer.html) dating 1995 to 2012. The 1995 and 2000 series aerial views show forest plantation and turbary on the wind farm site and peat slide area as the main land use at that time; representing the baseline receiving environment and the receiving environment just prior to construction.

Prior to the peat slide and response works the upper slopes of Cashlaundrumlahan Mountain, where the slide originated, were used for forestry which extended downslope to above the Black Road Bridge where some agricultural grass land is present. Below the Black Road Bridge there is a mix of forestry and agricultural land. The mix of forestry and agricultural land is typically classed as transitional woodland (scrub) by the EPA Corine mapping dataset.

13.3 Impact of the Development

13.3.1 Impacts which have Occurred

This section outlines the impacts of the project which have occurred between the baseline of 1998 and mid- 2020. Impacts are assessed in three phases.

13.3.1.1 Construction Phase – Circa June 2003 – March 2006

This section identifies the impacts on material assets which occurred during the construction of the project between circa June 2003 and March 2006.

Water Supply

During construction potable water was supplied by a proprietary bottled water supplier.

Non-potable water was supplied via wells established on-site. During early mobilisation to site non-potable water was temporarily provided through the use of a bowser with water imported to site. However, this was only for a short duration in the context of the overall construction period.

There was no connection to public water services during construction and accordingly no impact on public water services as a result of the construction of the project. Impacts on the ground water resource as a result of the extraction of water from wells during construction are considered to have been **short-term, not significant, negative.**

Sewerage Schemes and Wastewater Infrastructure

During construction temporary toilet facilities were provided at the construction compound in the form of a self-contained toilet block with a temporary holding tank for managing sewage and waste water discharges. In addition, various temporary

portaloo facilities were distributed around the site. These toilet facilities were removed upon completion of the works.

There was no connection to public sewer network during construction and accordingly **no impact** on public sewer network as a result of the construction of the project.

Energy Infrastructure

During construction diesel powered electrical power generator(s) were utilised on-site to facilitate construction.

There was no connection to the electricity network during construction and accordingly no impact on the network as a result of the construction of the project. Additionally, no known significant impacts occurred in relation to energy infrastructure, including gas pipelines, as a result of the Project.

Connection of the project to the exiting Ennis-Shannonbridge OHL is considered to have resulted in a **short-term, not significant, negative** impact. The use of natural non-renewable fuel in diesel fuelled generators is considered to have been a **short-term, not significant, negative** impact.

Telecommunications (including Electromagnetic Interference)

Communications during construction was primarily by way of mobile phones and two-way radios.

There was no fixed connection to private telecommunications services during construction and accordingly no impact on public telecommunications services as a result of the construction of the project.

Impacts associated with the minor increase in telecommunications demand as a result of mobile use during Project construction are considered to be **short-term, imperceptible, negative** impacts.

Tourism & Recreational Infrastructure

As described by Section 13.2.5 the Project is not located within any specifically designated tourism area nor does the Project overlap any recreational infrastructure. Accordingly, during construction, there were **no impacts** as a result of the Project on either tourism or recreational infrastructure.

Land Use

To facilitate construction of the wind farm, grid connection and Agannygal substation the commercial forestry present in the baseline period was felled and largely removed from site.

The OSI 2005 aerial view mapping shows the wind farm and grid connection footprint which is representative of the land use change which occurred during the construction period.

Large areas of forest plantation have been felled to accommodate the wind farm and grid connection. The change in land use from commercial forest to a commercial wind

farm, overhead line and grid connection is considered **significant, neutral** in nature as both are industrial land uses and of **long-term** in duration.

13.3.1.1.1 Summary of Construction Impacts

It is considered that there was **no impact** on either public sewer network or tourism and recreational infrastructure while impacts on telecommunications led to **short-term, imperceptible, negative** effects.

Further, impacts on water supply, energy infrastructure and through the use of natural non-renewable fuel in diesel fuelled generators led to **short-term, not significant, negative** effects.

Finally, the change in land use from commercial forest to a commercial wind farm, overhead line and grid connection is considered **significant, neutral** in nature as both are industrial land uses and of **long-term** in duration.

13.3.1.2 Offsite Peat Slide Works: Oct 2003 – end 2005

As detailed in Chapter 2 of this rEIAR construction works halted on 16th October 2003 when a peat slide occurred. This section identifies the impacts which occurred during the response to the peat slide between circa October 2003 and the end of 2005.

Impacts on Material Assets during this period were associated with the following:

- Temporary closure of local and regional roads, impacting on tourists, during the response to the peat slide.
- Impacts on the Gort Water Supply scheme.
- Land use changes as a result of the peat slide.

Timeframes for works undertaken in response to the peat slide are outlined by Chapter 2 of this rEIAR.

Temporary Road Closures

During the response to the peat slide temporary road closures and delays were experienced as described by Chapter 14 of this rEIAR. During those times it is possible that there were **temporary, negative, imperceptible** impacts on tourists accessing the local area via these roads.

Gort Water Supply Scheme

The Gort Water Supply Scheme is described by Chapter 2 with specific details and impacts relating to human health and aquatic ecology described by Chapters 4 and 8. The scheme is also considered here as it relates to material assets.

The Gort Water Supply Scheme was impacted in the period after the peat slide when the colour of the treated water increased, possibly due to an increase in suspended matter. Impacts lasts for several weeks, however, notably, at no time was supply of water impacted.

Impacts to the water supply where likely exacerbated by the basic treatment levels of the scheme at the time and by increasing treatment levels in response, the issues identified were addressed.

The impacts led to **significant, negative and temporary effects** on the local community however the response of the construction team (i.e. construction of barrages) significantly reduced the potential for longer term impacts.

It should be noted that no impact was reported on the Group water supply scheme in Derrybrien.

Land Use Impacts

As described in Chapter 2, a peat slide occurred during construction of the wind farm in 2003. Prior to construction, the site of the peat slide (approximately 25 ha) had been forested. The forestry was removed by the moving peat during the peat slide.

Land use in the area of the peat slide changed from commercial forest plantation to bare landscape, which can be seen on the OSI 2005 aerial view mapping which shows the physical area of the peat slide. This land use change can be considered to be **negative, moderate** in nature, given the scale of forest plantation in the general area and of **long-term**.

13.3.1.2.1 Summary of Offsite Peat Slide Works Impacts

In summary, as a result of the peat slide, the following effects were experienced.

Temporary, negative, imperceptible effects were experienced by tourists in the area.

Significant, negative and temporary effects on the local community occurred in relation to water supply.

Long-term, moderate, negative effects occurred specifically in relation to land use.

13.3.1.3 Operation Phase – March 2006 – Mid-2020

This section identifies the impacts which occurred during the operation of the Project between March 2006 and 2020.

Water Supply

As noted in Chapter 2 non-potable water supplies were sourced from wells at two locations for the project operational phase, one at Derrybrien Substation and the other at Agannygal Substation. These wells were established during construction, as referenced in Section 13.3.1.1.

There is no operational requirement for water associated with the Project aside from that related to site staff use. As described by Chapter 2 personnel attendance at the wind farm site is low, in the order of approximately 4-6 people on site on a given day, in addition to occasional requirements for personnel at Agannygal Substation and Gort Windfarms Ltd management staff or their representatives. Water demand is accordingly low.

At both Derrybrien Substation and the main wind farm site potable water is provided by a commercial supplier in the form of 10 litre drums. At Agannygal Substation potable water is brought by staff attending site at any given time.

There was no connection to public services during operation.

The extraction of ground water on ground water resource as a result of Project operation is minimal and impacts are considered to be **long-term, imperceptible, negative**.

Sewerage Schemes and Wastewater Infrastructure

Also described by Chapter 2 are the welfare facilities in the control building of Derrybrien Substation which consist of one toilet and two sinks. An Envirocare P6 sewage treatment plant unit caters for the wastewater generated in these facilities. Similar facilities are provided at Agannygal Substation.

There was no connection to public sewer services during operation and accordingly **no impact** on public sewerage and wastewater infrastructure arises.

Energy Infrastructure

During operation electrical power on the wind farm site is provided by way of a house load connection from Derrybrien Substation. A backup supply is provided to both Derrybrien Substation and Agannygal Substation by way of a diesel generator.

There was no connection to electricity network during operation and accordingly no impact on electricity network as a result of project site operations. Impacts related to on-site electricity use are considered **neutral.**

During operation of the wind farm significant impacts did occur in relation to energy infrastructure, as a result of the Project. These impacts were associated with the increased level of renewable generation (circa 121,800 MWh of electricity annually) as a direct consequence of the operation of the wind farm and resulted in **long-term, significant, positive effects**.

Telecommunications Services

Communications during operation were primarily by way of mobile phones. However, in addition Agannygal Substation is fitted with an Eir phone line. At Derrybrien Substation services are by way of wireless broad band connection.

Impacts associated with the minor increase in telecommunications demand at both substations as a result of Project operation are considered to be **long-term, imperceptible, negative** impacts in this regard.

Television Reception & Signal Interference

In relation to the Maghera transmission site, the original 1963 mast was replaced in 2011 with a 147 m tall mast to enhance its service area for the start of digital terrestrial television (DTT) broadcasting. All analogue television transmissions from the site ended on 24th October 2012 and since then the Irish digital television service Saorview has been broadcast from the site, in addition to six national FM radio networks and a number of local radio services.

Scattering effects have previously been associated with television reception in the vicinity of wind turbines, causing double imaging on the television screen. The most significant effect, at a domestic level, is straightforward involving a possible flicker effect caused by the moving rotor, particularly on television signals; while the most significant potential effect in terms of numbers of households affected is where the

wind farm is directly in line with the transmitter radio path. In practice, the majority of these difficulties arise where structures such as wind turbines are located in a region where there is a relatively weak signal.

There are two potential effects depending on the location of the receiver to the wind farm:

- Shadowed houses: The majority of the issues are related to receivers 'shadowed' directly behind the wind farm where the main signal passes through the wind farm. In these locations the turbine rotor can create a degree of signal scattering which causes loss of picture detail, loss of colour and buzz on sound.
- Viewers to the side: The effects are likely to be periodic reflections from the blades, giving rise to a delayed image or ghost image on the screen which is liable to flicker as the blades rotate.

These problems are predominantly associated with turbines having metal or carbon-fibre blades. Turbines, such as those installed at Derrybrien Wind Farm, have blades manufactured from fibreglass composite materials and the problem of scattering are much less likely to arise.

As noted previously, analogue terrestrial television services have stopped with the Maghera site now providing digital terrestrial television (DTT) services. Digital signals are more robust to the interference effects created by moving wind turbines. The structure of the signal ensures that the data stream is much less susceptible to the interference mechanisms wind turbines can generate for analogue services and disruption to DDT services is normally caused by a poor-quality receiver antenna system or locally generated wideband electrical noise.

Digital satellite services are provided by geo-stationary earth orbiting satellites positioned above the equator. Disruption to satellite television reception services is normally caused by an obstruction in the line of sight from the satellite to the receiver antenna, e.g. a tall building or tall trees. Satellite television reception is not generally affected by the installation of wind turbines, since at a distance of 500 m from the receiver the interfering object would be required to be approximately 300 m tall.

Consent for the wind farm required that "Facilities shall be installed at the developer's expense to ensure that radio and TV transmissions in the area are not interfered with by the development. Details of the facilities to be installed shall be submitted to and agreed with the planning authority following consultation with the relevant authorities prior to the wind turbines being commissioned."

Gort Wind Farm has a protocol in place with RTE in relation to actions to be undertaken in the event of signal interference. However, there have been no complaints / records of impacts on television reception caused by Derrybrien Wind Farm. The development has not posed a threat to the quality of the signal feed to the nearby Maghera antenna due to both the location of the wind farm and the distance between the site and the Maghera transmitter.

During the operational phase of the wind farm no significant radio or television signal impacts have been experienced and effects in this regard are considered to be **neutral**.

Tourism & Recreational Infrastructure

During operation, there were no known impacts as a result of the Project on either tourism or recreational infrastructure.

Land Use

Some localised colonisation by conifer and deciduous tree growth (regrowth of previously felled area) has occurred during the operational phase of the project on the wind farm site itself.

This results in **long-term, negligible, positive** impacts.

In addition to the above between 2016 and 2018 tree felling occurred to the west of the wind farm site. This felling was completed on an area of 46.9 ha. However, replanting of the same areas was required and has been since undertaken, resulting in no overall impacts to land use in this area as it will remain as commercial forest plantation.

13.3.1.3.1 Summary of Operational Impacts (which have occurred)

In summary, during project operation, effects in relation to material assets as a result of the Project were primarily **long-term, imperceptible, negative** impacts.

However, in relation to energy supply, as noted above, **long-term, significant, positive effects** were experienced as a result of the Project.

13.3.2 Impacts which are Occurring: 2020 to date of Substitute Consent Decision

Impacts which are occurring relate to ongoing operation of the Project as described by Section 13.3.1.2.

13.3.3 Impacts which are Likely to Occur

13.3.3.1 2020 – End of Operational Phase

Potential impacts on material assets, between 2020 and the end of the operational phase (circa. 2040), are likely to occur in relation to the following:

- The ongoing maintenance of the Project and the presence of personnel on site undertaking these works.

13.3.3.1.1 Summary of Operational Impacts (which are expected to occur)

Operational impacts which are expected to occur during the continued future operation of the Project will be the same as those which have occurred during operations to date (2006-2020) as described by Section 13.3.1.3.

13.3.3.2 Decommissioning

This section identifies the impacts which are likely to occur as a result of the ultimate decommissioning of the Project, circa 2040.

The ultimate decommissioning of the project entails the removal of the above ground elements of the wind farm and grid connection together with the removal of Barrages 3 and 4.

Potential impacts on material assets as a result of decommissioning activities are likely to be similar to those experienced during the construction of the project.

Specifically, it is likely that impacts will be experienced in relation to the decommissioning aspects as outlined below.

Water Supply

During decommissioning it is anticipated that potable water will again be supplied using proprietary bottled water suppliers as per construction and operational periods. Non-potable water is expected to continue to be supplied via wells established on-site.

It is not anticipated that a connection to public water services will be required during decommissioning and accordingly no impact on public water services is anticipated. Impacts relating to the continued extraction of water from wells during decommissioning are considered to be **short-term, not significant, negative** impacts.

Sewage Schemes and Wastewater Infrastructure

During decommissioning it is anticipated that the welfare facilities in place during operation will be supplemented with additional temporary toilet facilities at the construction compound and with additional temporary portaloo facilities distributed around the site. In addition to routine emptying and removal of water / wastewater during use these toilet facilities will be removed upon completion of the decommissioning works. Chapter 11 of this rEIAR expands on the potential impacts associated with wastewater as a result of the Project.

There is no public sewerage network in the vicinity of the Project site and **no impacts** on sewerage or wastewater networks are anticipated.

Energy Infrastructure

During decommissioning electrical power generator(s) and diesel bowser(s) are expected to be utilised on-site to facilitate decommissioning activities.

It is not anticipated that a connection to public power supply will be required during decommissioning.

However, impacts are expected in relation to natural non-renewable fuel supplies as a result of the use of diesel fuelled generators during decommissioning. Impacts are expected to be **short-term, not significant, negative** impacts in this regard, as per the Project's construction phase.

During decommissioning the connection of the project to the exiting Ennis-Shannonbridge OHL will be removed resulting in temporary service outages on the Ennis-Shannonbridge OHL. These outages are anticipated to result in a **temporary, not significant, negative** impacts.

As a result of the decommissioning of the wind farm impacts will occur in relation to energy infrastructure whereby there will be a decreased level of renewable generation (approximately 59 MW) as a direct consequence of the removal of the wind farm, resulting in **long-term, significant, negative effects**.

Telecommunications Services

During decommissioning it is anticipated that telecommunications will continue to take place using mobile phones and two-way radios and the operational systems in place at the substations.

Impacts associated with the minor increase in telecommunications demand as a result of Project decommissioning are considered to be **short-term, imperceptible, negative**.

Tourism & Recreational Infrastructure

As per the Project construction phase there are no likely effects envisaged on either tourism or recreational infrastructure as a result of decommissioning phase works.

Land Use

After decommissioning the following elements of the windfarm will be left in place:

- The reinforced concrete turbine bases;
- All of the site access tracks including the floating roads on the peat;
- The crane hardstanding areas adjacent to the turbines;
- The hardstanding area for the substation and control building;
- The site drainage network;
- The on-site peat repository / storage areas from construction stage; and
- The borrow pits.

In terms of land use if alternative energy uses such as repowering, solar, battery energy storage systems or a synchronous condenser is considered in the future this would be subject to a new consent and Environmental Impact Assessment procedure and would be determined in the light of policy applicable at the time. It is not proposed to replant the wind farm site with trees; although natural regrowth of previously felled areas will likely continue.

In terms of land use impact, it will remain largely the same as that described during the construction phase of the project and will continue to be significant, neutral in nature of medium term in duration.

With respect to the peat slide area it is proposed that Barrages 3 and 4 will be removed, subject to the approval of Inland Fisheries Ireland but access tracks, Barrages 1 and 2 and peat repositories associated with the remedial works will

remain in place. The impact post decommissioning will remain moderate and medium term in duration.

13.3.3.2.1 Summary of Decommissioning Effects

In summary, during project decommissioning, effects in relation to material assets as a result of the Project are expected to be primarily **short-term, not significant, negative** effects.

However, in relation to energy supply, as noted above, **long-term, significant, negative effects** are anticipated.

13.4 Cumulative Impacts

13.4.1 Cumulative Impacts which have occurred

During all phases of the project, cumulative impacts may have occurred in association with other projects / works in the area, or projects with the same receiving environment as the Project.

The details provided below in relation to cumulative projects have been sourced primarily from planning files.

Projects / activities which are considered relevant to this chapter of the rEIAR are outlined in further detail below.

13.4.1.1 Gort Regional Water Supply Scheme

The public water supply for the Gort region is supplied from the Gort Regional Water Supply Scheme, sourced from the Gort / Cannahowna River within the Owendalulleegh River System. The scheme's water treatment plant is located in the townland of Rindifin to the east of Gort.

As noted by Chapter 11, Derrybrien Wind Farm, given its scale and remoteness from Rindifin, has no perceptible impact on this water supply from a hydrological or hydrogeological perspective. Accordingly, it is not considered likely that any significant cumulative impacts occurred as a result of the two projects in combination.

13.4.1.2 Sonnagh Old Wind Farm (2000)

Sonnagh Old Wind Farm ("Sonnagh Old"), including the associated 38kV OHL, is located within the Slieve Aughty Mountains, to the north of the Derrybrien Wind Farm. Sonnagh Old was commissioned a year before Derrybrien Wind Farm in 2004. It is understood that construction of the two projects did overlap in the years 2003 and 2004.

It is unknown whether the operation of the Sonnagh Old Wind Farm includes the extraction of water from wells. However, assuming that this is the likely arrangement for the operation of that wind farm, would result in some cumulative impacts on natural water resources, through their use by both Sonnagh Old Wind Farm and Derrybrien Wind Farm. However, as with Derrybrien Wind Farms operational water use, any ongoing cumulative operational uses are likely extremely small scale in nature and do not result in significant cumulative impacts.

Other cumulative impacts as a result of the two projects relate to energy infrastructure and energy supply. As a result of the operation of both wind farms significant positive impacts occur due to the increased level of renewable generation, in addition to a **positive, cumulative** impact on national energy supply, as a result of the projects in combination.

13.4.1.3 Keeldeery Wind Farm (2000 & 2009 – 2010)

Keeldeery Wind Farm, located approximately 3 km to the west of Derrybrien Wind Farm, was granted planning permission in early 2000s. Circa. 2007 internal access roads were constructed on site. A later application for an extension to the planning permission was granted. In addition, a further application and subsequent appeal (in 2009 and 2010) for the redesign of the Keeldeery Wind Farm were ultimately refused and the project was never fully constructed.

The activities which were undertaken at Keeldeery Wind Farm would have coincided with the operational phase of Derrybrien Wind Farm.

It is not considered likely that any significant cumulative impacts occurred as a result of the two projects in combination.

13.4.1.4 Tynagh Power Station (2003 _ 2004)

Permission was granted in 2003 for the construction of the Tynagh Combined Cycle Gas Turbine Power Station, in a location at Tynagh Mines, east of Loughrea between Loughrea and Portumna in Co. Galway. In 2004 / 2005 construction of the power station took place, coinciding with the construction of the Derrybrien Wind Farm.

Cumulative impacts as they relate to traffic are considered by Chapter 14 of this rEIAR.

The EIS for the power station notes that “process water for the power station will be extracted from groundwaters and from the open pit and treated on site”. Cumulative impacts are possible in relation to extraction from natural water resources as a result of operation of both Tynagh Power Station and Derrybrien Wind Farm. However, given the extremely minor extractions undertaken at Derrybrien Wind Farm those cumulative impacts are not likely to be significant.

As a result of the combined power generation by both Derrybrien Wind Farm and the power station, there is a **positive, cumulative** impact on national energy supplies as a result of the projects in combination.

It is not considered likely that any other significant cumulative impacts occurred as a result of the two projects in combination.

13.4.1.5 Tynagh 220 kV Grid Connection (2004)

Permission was granted in 2004 for the construction of the Tynagh 220 kV Grid Connection, associated with the power station referenced in Section 13.4.1.4. The route of the grid connection was from the power station at Tynagh to the existing Oldstreet – Cashla OHL. The grid connection ran from the station in a north east direction.

Given the location of the grid connection and the resulting absence of overlap in this project and the OHL aspects of the Derrybrien Wind Farm project, it is not considered

likely that any significant cumulative impacts occurred as a result of the two projects in combination.

13.4.1.6 Beagh Bridge Repair Works (2005 / 2006)

In approximately 2005 / 2006 (exact date unknown) works were undertaken at Beagh Bridge (547806.9145, 700644.977 ITM). Works comprised remediation efforts to this privately-owned bridge, on private lands.

Works were minor and temporary in nature and did not result in themselves in significant impacts nor when considered cumulatively with the overall Derrybrien Wind Farm project.

13.4.1.7 Cloghvoley Sand Extraction (Approx. 2008 Onwards)

Cloghvoley sand extraction activities relate to a GCC permission (refer 08/1664) for sand extraction at a site located at Cloghvoley, to the south-east of Derrybrien Wind Farm. Permission was granted in May 2008.

From an assessment of aerial photos, it is evident that the permitted activities have commenced; although the date of commencement was unknown at the time of writing this chapter. The operational activities at Cloghvoley coincide with the operational phase of Derrybrien Wind Farm.

Cumulative impacts as they relate to traffic are considered by Chapter 14 of this rEIAR.

It is unknown whether operations at Cloghvoley include the extraction of water from wells. However, assuming that this is a possible arrangement for its operations would result in some cumulative impacts on natural water resources, through use both associated with Cloghvoley Sand Extraction and Derrybrien Wind Farm. However, any ongoing cumulative operational uses are likely extremely small scale in nature and do not result in significant cumulative impacts.

It is not considered likely that any other significant cumulative impacts occurred as a result of the two projects in combination.

13.4.1.8 Ballinakill Quarry Extension (2015)

In 2015 an extension was sought for the Ballinakill Quarry, located to the south east of the wind farm with access onto the R353. Impacts relating to quarry operations coincide with the operational phase of Derrybrien Wind Farm.

The EIS for the quarry extension states that water supply is via an on-site bored well. Water at the quarry is stated as being used for dust suppression and material whetting, while a local well supply is used for drinking water and wheel wash. Wastewater from the quarry is removed by permitted waste removal companies, with no discharge to public services.

Given the low volumes associated with the operational phase of the Derrybrien Wind Farm, for both water and wastewater discharge, it is not considered likely that any significant cumulative impacts occurred as a result of the two projects in combination.

13.4.1.9 Ballinakill Quarry Extension (2018)

In 2018 a further extension was sought for the Ballinakill Quarry. The EIAR for the 2018 quarry extension again reiterates the use of an on-site bored well, and a local well, in the supply of water to the quarry and the use of a permitted waste removal company for wastewater removal.

Similar to Section 13.4.1.8, given the low volumes associated with the operational phase of the Derrybrien Wind Farm, for both water and wastewater discharge, it is not considered likely that any significant cumulative impacts occurred as a result of the two projects in combination.

13.4.1.10 Moneypoint – Oldstreet 400 kV OHL (circa. 2020 / 2021)

At the time of writing the Moneypoint – Oldstreet OHL refurbishment works had commenced, although they halted in Q1 2020 due to construction workplace restrictions.

Refurbishment works coincide with the operational phase of Derrybrien Wind Farm. Given the relatively low levels of activity on the OHL refurbishment project, which primarily comprises maintenance activities (painting etc.), minor parts replacement and access provisions for same, but ultimately no significant replacement of overall structures, no cumulative significant effects are anticipated as a result of the two projects.

13.4.1.11 Ennis – Shannonbridge 110 kV OHL (circa. 2023 / 2024)

The Derrybrien Wind Farm OHL from Derrybrien substation to Agannygal substation, connects into the Ennis – Agannygal OHL at the Agannygal substation. Potential cumulative impacts associated with the two relate to those associated with the decommissioning of the Derrybrien Wind Farm and any interruptions which would result on energy infrastructure. These are dealt with under Section 0.

13.4.1.12 Coillte Quarry

A Coillte owned quarry, located to the south-east of Derrybrien Wind Farm east of the junction of the R353 and Black Road, has been operating periodically for an unknown period.

Documents in relation to quarry registration were submitted to GCC in April 2005 by Coillte – the site owners. The overall extraction area of the quarry is relatively small (1.3 hectares) with activity described as ‘periodic’.

The operational activities at the quarry may have coincided with the both the construction and operational phases of Derrybrien Wind Farm to date. However, detailed information on the Coillte Quarry, with respect to material assets, are not available. Based on consideration of other larger quarries, and despite the absence of details on this specific quarry, it is not considered likely that any significant cumulative impacts occurred as a result of the two projects in combination given the small scale of the quarry activities.

13.4.1.13 Turbary within and Immediately Adjacent to Wind Farm Site

As described in Chapter 2 an area of approximately 83 ha of land occupies the eastern part of the wind farm site. Of this approximately 15ha had been converted to forestry lands having been planted prior to the project development and subsequently felled by Coillte. The remaining circa 67ha are drained turbary lands Turbary lands also extend immediately beyond the site to the east covering an area of approximately 15ha. Location and extent of these lands, in addition to number of plots, are described in further detail by Chapter 2.

Extents of activities at these sites are relatively unknown during the construction period for the project aside from evidence that activities were not intense.

Since 2012 mechanical cutting of the turn has been undertaken and there has been an increase in the number of plots where mechanical turf cutting has been carried out. in addition to continued traditional methods of turf cutting including the use of a sausage machine.

These activities are not associated with any industrial use of services include water, sewage etc., and in that regard no significant cumulative effects are considered to have taken place / expected which would alter the impact assessment as detailed by this chapter.

In relation to land use, turbary activities, as described herein, were ongoing during the baseline period. When considering cumulative impacts as a result of the project in combination with these activities, from the perspective of land use, the effects remain **significant, neutral and long-term** in nature.

13.4.1.14 Peat Extraction

As noted by Chapter 2 aside from activities associated with turbary rights (see Section 0) no other peat extraction activities subject to a development consent have been identified within the vicinity of the Project. Accordingly, no cumulative impacts are identified in this regard.

13.4.1.15 Adjacent Coniferous Forestry Plantations

As noted by Chapter 2 the extent of forestry in the area surrounding the Project has not changed appreciably since prior to Project construction. However, as noted in Chapter 2, based on the age profile of much of the forestry estate may be subject to felling in the coming decade. These activities are not expected to coincide with the anticipated Project decommissioning date of circa. 2040 and therefore no significant cumulative impacts are anticipated in that regard.

13.4.1.16 Planting in Lieu of Felling on Wind Farm Site

As described by Chapter 2 planting, in lieu of felling undertaken on the wind farm site, was carried out at lands in County Tipperary and Country Roscommon. The planting locations are over 50 km and 80 km respectively from the wind farm site and are not physically connected to the project site. The total area of the forestry was circa 150 ha, inclusive of roads, firebreaks, forest plantations and some open areas. The replanting requirement was 119.3ha of forest plantation comprising a mixture of Sitka Spruce, Lodgepole pine and Broadleaves.

Cumulative effects on land use, as a result of these activities, would have been **neutral**.

13.4.2 Cumulative Impacts which are occurring

There are no known significant cumulative impacts occurring.

13.4.3 Cumulative Impacts which are likely to occur

During the ultimate decommissioning of the Project cumulative impacts are anticipated in relation to potential ongoing land use changes associated with turbary activities and the land use change as a result of the removal of wind farm components (described by Chapter 2). Per Section 0 effects associated with the wind farm are expected to be significant, moderate and long term in effect while cumulative effects associated with the turbary activities, per Section 0, are expected to be significant, negative and long term.

13.5 Remedial (Mitigation) Measures and Monitoring

Significant effects associated with material assets relate to the aspects of the project described herein.

During construction of the project, land use changes led to **significant, neutral, long-term effects**.

Positive, significant effects are associated with the increased level of renewable generation as a result of the project, for which no mitigation is required.

During decommissioning stage, in relation to energy supply, **permanent, significant, negative effects** are anticipated as a result of the loss of renewable electricity generation.

No mitigation in relation to Material Assets is proposed.

13.6 Conclusion

There were no changes to major utilities or public services (e.g. water, sewer) as a result of the Project however there were changes to the energy infrastructure, electricity network and to land use.

The construction of the Derrybrien Wind Farm project has resulted in **significant, neutral, long-term effects** occurred in relation to material assets.

As a result of its operation to date the most notable impact is **long-term, significant, positive effects** as a result of increased levels of generation from renewable resources.

Impacts associated with the ultimate decommissioning of the wind farm are expected to be similar to those experienced in construction and again are likely to result in **short-term, not significant, negative effects** in relation to material assets. However, in relation to energy supply, as noted above, **permanent, significant, negative effects** are anticipated.

13.7 References

The following documents were referenced in the production of this rEIAR chapter:

- EPA Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (2017)
- EPA Advice Notes for Preparing Environmental Impact Statements (Draft, 2015)

Appendix 13-A – A3 Figures