

# ENVIRONMENTAL IMPACT ASSESSMENT REPORT (EIAR) FOR THE PROPOSED COOM GREEN ENERGY PARK, CO. CORK

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## VOLUME 2 – MAIN EIAR

## CHAPTER 16 – TELECOMMUNICATIONS AND AVIATION

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Prepared for: Coom Green Energy Park Limited



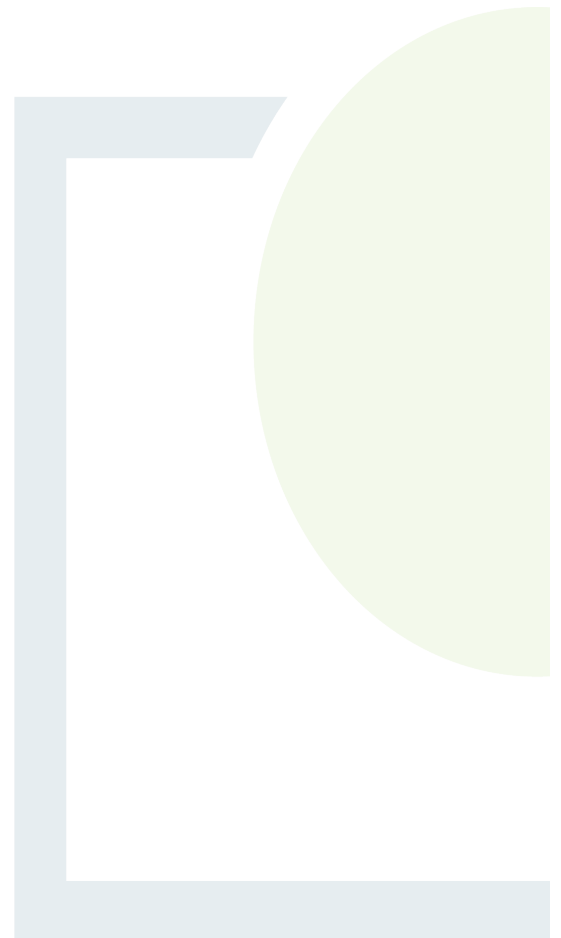
**Date:** November 2020

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## 16. TELECOMMUNICATIONS AND AVIATION

### 16.1 Introduction

This chapter has been prepared to assess the likely potential impact of the proposed Coom Green Energy Park, Co. Cork, on local telecommunications services and aviation. The effects of the proposed project are considered, taking account of mitigation measures to eliminate any anticipated or residual impacts.

### 16.2 Statement of Authority

This chapter of the EIAR was completed by Elaine Bennett and Crystal Leiker. Elaine is a Senior Scientist with Fehily Timoney and holds a PhD in Ecology, with a BSc in biological Science from UCC. Crystal is a project planner with Fehily Timoney & Company with 5 years of experience. Crystal holds an M.A. (Hons) in Planning and Sustainable Development from UCC, Cork.

### 16.3 Methodology and Guidance

This section of the assessment focuses particularly on the scoping and consultation exercise conducted with telecommunications operators and aviation authorities. Scoping was carried out in line with the above EPA guidelines, and the '*Best Practice Guidelines for the Irish Wind Energy Industry*'<sup>1</sup>, which provides a recommended list of telecommunications operators for consultation.

A full description of the scoping and consultation exercise is provided in Section 3.5.1 of Chapter 3 of this EIAR. Consultation with the telecommunications operators and aviation bodies informed the constraints mapping process, which in turn informed the layout of the proposed development, as described in Chapter 5 of the EIAR.

#### 16.3.1 Background

##### 16.3.1.1 *Electromagnetic Interference*

In the context of wind farm development, electromagnetic interference is the impact of a wind farm on existing telecommunication services resulting in an unacceptable negative impact. The rotating blades of a wind turbine can occasionally cause interference to electro-magnetically-propagated signals. Such interference could, in theory, affect all forms of electromagnetic communications including:

- Satellite communications
- RADAR
- Cellular radio communications
- Aircraft instrument landing systems
- Air traffic control

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<sup>1</sup> Irish Wind Energy Association, 2012



- Terrestrial telecommunication links
- Television broadcasts.

For the purposes of the telecommunications impact assessment, point-to-point and point-to-multipoint signals are considered, both are used extensively throughout Ireland.

Point to point (or line of sight) is a wireless telecommunications transmission link between two nodes located at specified fixed points. The term telecommunications link relates to the wireless transmission of data via radio frequencies between two fixed points. Telecommunications towers are generally used to transmit and receive signals over large distances. Radio frequency bands above 1 GHz are referred to as microwave radio links and are commonly used by telecommunications operators. These 'links' are used mainly by mobile phone operators, broadcasters and utilities or emergency service providers, to provide transmission networks that are flexible and cost effective.

Point to multipoint refers to the situation where a central node transmits to, and receives from, a number of independent locations. This includes television and radio broadcasting and reception, mobile phones (to the mobile phone mast) and land mobile systems. It is possible that houses in the immediate vicinity of the turbines could require some remedial measures in relation to television reception.

Section 5.10 of the DoEHLG Planning Guidelines on Wind Energy Developments (2006) [the guidelines] states that:

*“wind turbines, like all electrical equipment, produce electromagnetic radiation, and this can interfere with broadcast communications. The interference with broadcast communication can be overcome by the installation of deflectors or repeaters. Planning authorities should advise the developer to contact the individual broadcasters, both national and local, and inform them of the proposals. A list of the licensed operators is available on the ComReg website at [www.comreg.ie](http://www.comreg.ie). Mobile phone operators should also be advised of the proposed development.”*

Section 7.15 of these guidelines state

*“Conditions regarding measures to be taken to minimise interference with the transmission of radio and television signals, air and sea transport communications and other transmissions systems in the area may be necessary. Where electromagnetic interference is difficult to predict, conditions may require the developer to consult with the service provider concerned and undertake remedial works to rectify any interference caused.”*

On that basis, consultation was carried out with all known telecommunications operators (TOs) that could potentially be affected by the proposed wind farm.

The telecommunications network is constantly evolving and the potential impact of Coom Green Energy Park on local telecommunications signals is difficult to accurately predict for the following reasons:

- The network topology is likely to change significantly over time as a result of technological advances including migration towards 4G and the impending 5G networks
- Network operators are beginning to share services and consolidate the existing network which is likely to lead to an increase in the number of redundant and decommissioned services.



A key objective of the assessment process is to identify turbines in close proximity to existing masts and telecommunication links with a view to relocating turbines that could potentially impact on local telecommunication operations and by designing the development to avoid telecommunications links. If a turbine could not be relocated due to other site constraints, further consultation was carried out with the affected TO's to consider the potential impact and agree an appropriate mitigation strategy if required. On that basis, obtaining the cooperation of the TO's was a key aspect of the process to enable the wind farm to be developed without adversely affecting existing telecommunications services.

While we have endeavoured to consult with operators in the area to identify and discuss potential impacts, it is possible that telecommunication services in the immediate vicinity of the turbines could require mitigation measures to negate any potential impact. Accordingly, the Developer has given an undertaking to cover the cost of implementing the necessary mitigation measures to prevent any degradation of service that is currently provided, should the result of the pre-construction study to confirm the conditions predicted in this EIAR establish their necessity. The relevant TO's that could potentially be affected by Coom Green Energy Park, based on consultation responses are shown in Table 16.1.

#### *16.3.1.2 Broadcast Communications*

Wind turbines, like all large structures, have the potential to interfere with broadcast signals, by acting as a physical barrier or causing a degree of scattering to microwave links. The most significant effect at a domestic level relates to a possible flicker effect caused by the moving rotor, affecting, for example, radio signals. The most significant potential effect occurs where the wind farm is directly in line with the transmitter radio path.

#### *16.3.1.3 Domestic Receivers*

Depending on local topography, a domestic receiver may receive broadcast signals from more than one location. The strength of the signals varies with distance from the transmitter, and the receiver's antenna is generally always directed towards the most local, and usually strongest, broadcasting station.

There are two types of potential electromagnetic interference to domestic receivers, depending on the location of the receiver in relation to a wind farm. 'Shadowed' houses are located directly behind a wind farm, relative to the location from where the signal is being received. In this case, the main signal passes through the wind farm and the rotating blades can create a degree of signal scattering. In the case of viewers located beside the wind farm (relative to the broadcast signal direction), the effects are likely to be due to periodic reflections from the blade, giving rise to a delayed signal.

In both cases, i.e. shadowed houses located behind the wind farm and those located to the side of it, the effects of electromagnetic interference may depend to some degree on the wind direction, since the plane of rotation of the rotor will affect both the line-of-sight blockage to viewers located behind the wind farm and the degree of reflection to receivers located to the side.

#### *16.3.1.4 Other Signal Types*

Wind turbines have the potential to affect other signal types used for communication and navigational systems, for example tower-to-tower microwave communication links, and airborne and ground radar systems. Interference with radar systems occurs when wind turbines are located close to an airport or directly in line with the instrument landing approach. The nearest such operational airport to the Proposed Development site is Cork Airport, located approximately 24 kilometres south of the site.



Potential effects on broadcast communications are generally easily dealt with by detailed micro-siting of turbines in order to avoid alignment with signal paths or by the use of repeater relay links out of line with the wind farm.

#### 16.3.1.5 Relevant Guidance

A review of relevant planning and policy documents was undertaken to identify relevant objectives relating to telecommunication. The following documents have been reviewed:

- ‘Wind Energy Development Planning Guidelines’ (WEG2006), published by the Department of the Environment, Heritage and Local Government (2006).
- ‘Best Practice Guidelines for the Irish Wind Energy Industry’, published by the Irish Wind Energy Association (2012).
- Carlow County Development Plan 2017-2022
- ‘Tall structures and their impact on broadcast and other wireless services’, published by Ofcom, a regulatory body independent from UK Government (2009).
- ‘RF Measurement Assessment of Potential Wind Farm Interference to Fixed Links and Scanning Telemetry Devices’, published by ERA on behalf of Ofcom (2009).

#### 16.3.2 Telecommunications Methodology

This section presents the methodology used in assessing the potential impact from the wind farm on local telecommunications services. The following sources of information were considered in this assessment:

- The design layout of the proposed development
- Published literature as described below
- A desk-based assessment of the existing telecommunications network.

The following assessment methodology was applied in this assessment:

- Wide ranging **consultation** with all known telecommunications operators (TO’s) that could potentially be affected by the proposed wind farm.
- Comprehensive **data gathering** exercise to establish all known telecommunications links in the area
- Preparation of **constraint mapping** using data collected from the TO’s, to identify turbines within specified separation distance from existing telecommunications links and masts.
- Preliminary **Telecommunications Impact Assessment (TIA)** including the following:
  - Design review to relocate turbines away from existing telecommunications services, where possible.
  - Further consultation with affected TO’s to discuss residual impacts, identify critical telecommunications links and agree mitigation strategy.
  - Finalise turbine layout avoiding critical telecommunications links and incorporate concerns raised by the TO’s.





- Undertaking by the Developer to implement an appropriate **mitigation strategy**, in conjunction with the relevant TO, to eliminate any anticipated or residual impacts.

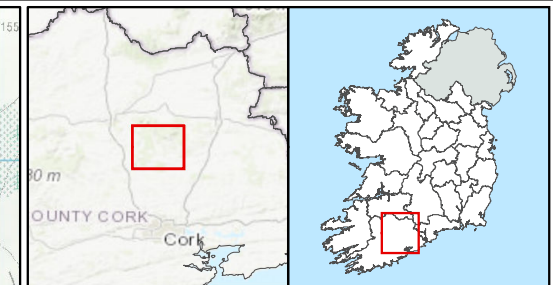
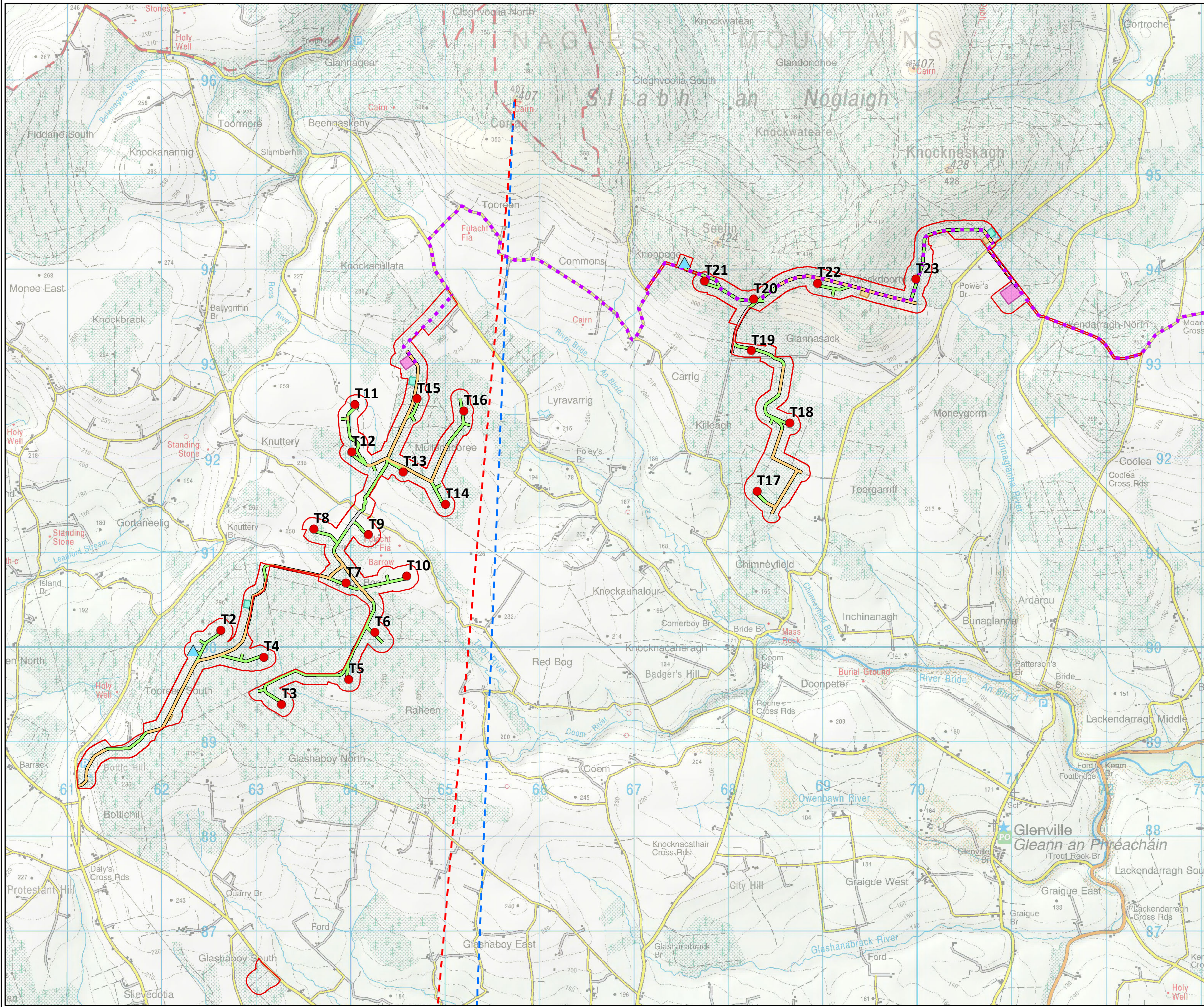
#### *16.3.2.1 Telecommunications – Existing Environment*

Baseline studies were carried out to establish the location of existing telecommunications links and masts relative to the proposed turbine locations, to assess the potential for interference. GIS was used to map and process available in-house telecommunications data. This allowed turbines in close proximity to existing masts and links which could potentially impact on existing telecommunication services to be identified for further assessment.

Following desktop analysis, the existence of several links have been identified and confirmed following consultation with the various TOs.

In many cases, impacts can be sufficiently characterised and mitigated by implementing a separation distance and ensuring the area is free from wind turbines. The separation distance required depends on the specific parameters of each telecommunication signal. Following detailed discussion with the TO's, a required separation distance to each telecommunications link was requested from each TO. Turbines that achieve this separation distance are considered unlikely to cause interference. Turbines situated within this area were either relocated or identified for further assessment.





- Proposed Turbine Layout
  - ▲ Proposed Permanent Met Masts
  - - - Proposed Cable Route
  - Proposed Development Boundary
  - Existing Road
  - Proposed Existing Road Upgrade
  - Proposed New Road
  - Proposed Borrow Pit
  - Proposed Temporary Compound
  - Proposed Substation
- Telecommunications Links**
- - - Ripplecom
  - - - Vodafone

<b>TITLE:</b>	Telecommunications Links	
<b>PROJECT:</b>	Coom Green Energy Park, Co. Cork	
<b>FIGURE NO:</b>	16.1	
<b>CLIENT:</b>	Coom Green Energy Park Ltd.	
<b>SCALE:</b>	1:40000	<b>REVISION:</b> 0
<b>DATE:</b>	30/11/2020	<b>PAGE SIZE:</b> A3







### 16.3.3 Relevant Guidance

A review of relevant planning and policy documents was undertaken to identify relevant objectives relating to telecommunication. The following documents have been reviewed:

- ‘Wind Energy Development Planning Guidelines’, published by the Department of the Environment, Heritage and Local Government (2006).
- ‘Best Practice Guidelines for the Irish Wind Energy Industry’, published by the Irish Wind Energy Association (2012).
- Cork County Development Plan 2014-2020
- ‘Tall structures and their impact on broadcast and other wireless services’, published by Ofcom, a regulatory body independent from UK Government (2009).
- ‘RF Measurement Assessment of Potential Wind Farm Interference to Fixed Links and Scanning Telemetry Devices’, published by ERA on behalf of Ofcom (2009).

## 16.4 Scoping and Consultation

In line with the Planning and Best Practice Guidelines, consultation was undertaken to provide information on the proposed development to all relevant telecommunications and broadcasting service providers and all relevant aviation authorities to discuss concerns and the potential for benefits of the proposed wind farm. A Scoping Report was sent as part of this consultation. The service providers were provided with the locations of the proposed turbines and asked to advise whether any impact could occur to their networks. A copy of the letter issued by Fehily Timoney (FT) is provided in Appendix 16.1. A similar letter was sent to the other consultees.

Consulted stakeholders include authorities with associated telecommunication infrastructure, wireless broadcasters, cellular network providers, broadband suppliers and wireless internet service providers (WISP).

The following stakeholders and TOs were contacted for information regarding existing telecommunication links in the area:

- RTE
- Virgin Media Ireland
- ESB Telecoms Ltd.
- ESB Network Telecoms Ltd
- Imagine
- Three
- Tetra
- An Garda Síochána
- Towercom
- Munster Broadband
- Eir
- Digiweb
- Magnet Networks Ltd.



- BT Ireland
- Netshare
- Skylink Communications
- Ripplecom
- Novatel
- Air Corps
- Department of Defence
- Irish Aviation Authority.

FT has undertaken a specific telecoms consultation with the various TOs to establish whether any telecommunication links or services in the vicinity of the proposed Coom turbines can be affected by it. Summarised responses are provided in Table 16.1.

**Table 16-1: Responses from Service Providers**

Telecommunications Operator	Response date	Impact Identified	Further comments
RTE (2rn – 2rn distribute and transmit services for RTE)	19.8.2019; 5.10.2020	No impact on microwave linking, may be tv interference	The development will have no impact on 2rn’s fixed microwave linking. It may however cause interference to television viewers, it is recommended that a protocol be signed (refer to Appendix 16.2) Second Consultation indicated that the change in turbine location has no impact to 2rn’s fixed linking. Risk of interference to DTT viewers
Virgin Media Ireland	No response	None identified	No further comments
ESB Telecoms Ltd.	No response	None identified	No further comments
ESB Network Telecoms Ltd	No response	None identified	No further comments
Imagine	No response	None identified	No further comments
Three	1.8.2019	None identified	the development will not adversely impact our services in the region. The buffer provided between all of the turbines and our closest links should be sufficient to ensure continued impact-free service.
Tetra	No response	None identified	No further comments
An Garda Síochána	Acknowledged receipt	None identified	No further comments



Telecommunications Operator	Response date	Impact Identified	Further comments
Towercom	No response	None identified	No further comments
Munster Broadband	No response	None identified	No further comments
Eir	21.08.2018; 22.7.2019		No transmission or radio services in the vicinity of proposed development (> 1.5 km away)
Digiweb	No response	None identified	No further comments
Magnet Networks Ltd.	No response	None identified	No further comments
BT Ireland	No response	None identified	No further comments
Netshare	24.09.2019		There is a Vodafone Microwave link within the site, however, there is sufficient buffering distance between T16 and the Vodafone link.
Skylink Communications	No response	None identified	No further comments
Ripplecom	17.09.2019		No impact on radio infrastructure. One link in the vicinity of T16, but there will be no impact.
Novatel	2.12.2019; 9.01.2020	Yes	20% of the coverage area will be lost from Novatel's Nagle Mountain base station
Air Corps	17.9.2018		Provided wind farm policy
Department of Defence	17.9.2018; 12.8.2019	None Identified	Corners of wind farm should be illuminated by high intensity obstacle strobe lights (red) incandescent / visible to night vision equipment (850 nanometres of wavelength)
Irish Aviation Authority	16.6.2019; 31.10.2019	yes	IAA Calibration issue: Separate liaison with IAA, including a meeting 26/7/19. Turbine quantity was reduced. Further correspondence indicated no further objections by IAA.

#### 16.4.1 Scoping Response

The scoping responses from the telecommunications and aviation consultees are described below. A copy of all scoping responses has been provided in Appendix 16.1.



### *Broadcasters*

RTÉ Transmission Network (operating as 2rn) has stated that the development will have no impact on 2rn's fixed microwave linking. It may however cause interference to television viewers, it is recommended that a protocol be signed. A second consultation with RTÉ in October 2020 was conducted once the turbine locations were altered. RTÉ indicated that the change in turbine location has no impact to 2rn's fixed linking, however there was still a risk of interference to DTT viewers who were receiving from Mullaghanish. RTÉ requested that Protocol was signed should the site go ahead. A copy of this is found in Appendix 16.2.

No response was received from Virgin Media Ireland.

### *Other Operators*

Of the scoping responses received from telephone, broadband and other telecommunications operators, those who highlighted an initial potential interference risk are addressed below.

- **Three Ireland:** A scoping response was received from Three Ireland which indicated that the development will not adversely impact Three services in the region. The buffer provided between all of the turbines and Three's closest links should be sufficient to ensure continued impact-free service.
- **Eir:** A scoping response was received from Eir / Eircom which indicated that the development will not adversely impact the transmission or radio services in the vicinity of proposed development as the nearest of these is greater than 1.5 km away.
- **Netshare:** A scoping response from Netshare indicated that there is a Vodafone Microwave link within the site. However, Netshare noted that there is sufficient buffering distance between T16 and the Vodafone link and no further concerns were articulated.
- **Ripplecom:** A scoping response from Ripplecom indicated that there is a link in the vicinity of T16. However, it was noted that there would be no impact caused to this link, and that there were no impacts on radio infrastructure.
- **Novatel:** FT engaged with Novatel between 13 January and 6 March 2020 and again in October and November 2020 along with a Telecommunication specialist AI bridges to ascertain what impact if any would result from the proposed development. Novatel indicated that a small percentile of customers will be affected particularly south facing. . Standard mitigation options were presented which would involve a detailed pre-construction study and design of a bespoke technical solution in agreement with Novatel. Mitigation measures include the installation of a relay base station that will be deployed at a suitable location in the vicinity of the proposed development that would provide additional coverage to service subscribers from one of Novatels Primary Transmitters in the area. Relay Base station infrastructure has already been deployed in the vicinity of the proposed development area. All mitigation works will be carried out in consultation with the service provider to ensure any interruption to service will be mitigated against.

All other operators did not provide a scoping response. No impacts on other operators are anticipated, however if an issue does arise CGEP will work with the service provider to resolve and provide appropriate mitigation measures. .

### *Aviation*

As noted above in Table 16-1, scoping responses were received from the Department of Defence, Air Corps and the Irish Aviation Authority.





Pertinent information has been summarised below, however the scoping responses should be referenced for further detail. response to a request for a scoping response was received from the Department of Defence on two separate occasions: 17 September 2018 and 12 September 2019.

#### Department of Defence / Air Corps:

- On 12<sup>th</sup> August, a scoping response was received from the Department of Defence (DoD) which set out the lighting requirements for turbines as follows:
  - a) *Single turbines or turbines delineating corners of a wind farm should be illuminated by high intensity obstacle strobe lights (red).*
  - b) *Obstruction lighting elsewhere in a wind farm will be of a pattern that will allow the hazard be identified and avoided by aircraft in flight*
  - c) *Obstruction lights used should be incandescent or of a type visible to Night Vision Equipment. Obstruction lighting fitted to obstacles 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. Obstruction lights used should be incandescent or of a type visible to Night Vision Equipment.*
- On 12 September, the Department of Defence (Air Corps) sent out its Wind Farm Response guidance document, outlining the restricted airspaces that were of concern. The proposed development does not fall within these areas.

#### Irish Aviation Authority

- On 16 June 2019, a scoping response from the Irish Aviation Authority (IAA) indicated that while “it should be possible to support the development”, further detail and discussion was required. The applicant engaged with the IAA, attending meetings on 26 July 2019 and a teleconference on 2 August 2019 to discuss the IAA concerns related to flight calibration, risk assessment, and Flight Calibration Services Limited. The quantum of turbines for the proposed development was reduced and a Radar Vectoring Area Assessment was provided to the IAA.
- On 31 October 2019, it was indicated by the IAA that it posed no further objections to the proposed development.

## 16.5 Potential Impacts

### 16.5.1 Telecommunications –Potential Impacts

In many cases, impacts can be sufficiently mitigated by ensuring sufficient separation distance between the turbine and any telecommunications link or mast. On that basis, the developer designed a layout that met the agreed separation distances from known telecommunication links and masts.

Interference to a communication system can occur in the following:

- Signal scattering as a result of the obstruction presented by the blades, an effect that mimics the presence of a lower power source operating from the location of the wind turbine
- Signal obstruction as it passes through the area swept by the rotating blade or the tower
- Electromagnetic fields associated with the wind turbine generator.



### *Reflection and Signal Scattering*

Wind turbines can act as sources of re-radiation producing delayed ‘ghost’ signals that are modulated in amplitude by the rotation of the blades. Radio waves can be reflected by many surfaces including turbines, reflection can interfere with the quality of the signal.

The amount of interference caused is dependent on a number of different factors. These factors include the following:

- Material used to make the wind turbines;
- Angle of the blades in relation to the incoming signal;
- Direction in relation to the receiving antenna;
- Height;
- Distance from the transmitter;
- Distance from the receiving antenna;
- Meteorological conditions;
- Site topography; and
- Rotor rotation speed.

### *Signal Obstruction*

If an absorbing object such as a wind turbine is placed in the path of a radio wave, obstruction can occur, detrimentally affecting the signal detected at the receiver. This is an impact that needs to be avoided in the case of point-to-point links, unless appropriate mitigation measures are provided to negate the impact.

### *Electromagnetic Fields*

The operation of a wind turbine generator, and associated electrical transmission infrastructure, creates an electromagnetic field which can theoretically interfere with telecommunication signals. However, electromagnetic field levels in the vicinity of wind turbines are relatively low and diminish rapidly with distance.

Following consultation, details of links from service providers were mapped with buffer distances in order to identify any conflicts. This assessment found that there is sufficient separation distance between the turbines and all but one telecommunications links identified by the service providers. This singular exception is Novatel.

#### *16.5.1.1 Do Nothing Scenario*

If the proposed development were not to proceed, there would be no change to the existing telecommunications, broadcasting and aviation operations in the area.

#### *16.5.1.2 Construction Phase*

The potential for electromagnetic interference from wind turbines occurs only during the operational phase of the development. One Telecommunications operator, Novatel has indicated that there will be a small percentile of customers affected by the erection of turbines.



Mitigation measures will be put in place to ensure broadband service is not interrupted. There will be no significant effect on all other telecommunication operations due to the proposed development. There are no electromagnetic interference impacts associated with the construction phase of the proposed development on any other telecommunications and broadcasting in the area.

The TDR is to be utilised only during the construction phase and will require temporary works (trimming of trees, temporary removal of signs or street furniture) to facilitate the delivery of the turbines to the proposed development site. Once the delivery is complete, these areas will be reinstated. Impacts will be short term and insignificant.

As the proposed grid connection will be constructed underground in the public roadway, there are no construction related impacts on telecommunications and broadcasting interests in the area.

#### *16.5.1.3 Operational Phase*

Consultation regarding the potential for electromagnetic interference from the proposed development was carried out with the relevant national and regional broadcasters, fixed line and mobile telephone operators and other operators.

This consultation has confirmed that no turbines are proposed within the areas requested to be left clear of turbines. It also found that while there is existing telecommunications infrastructure within the proposed development, there is sufficient buffering distance between the nearest turbine and the location of this infrastructure in all instances.

According to the Comreg siteviewer<sup>2</sup>, the nearest telecommunication masts are located in the townland of Forgestown where 5 no. masts are located, approximately 3km northwest of the proposed development. There are 2 no. masts located in the townland of Killasseragh, approximately 3km southeast of the proposed development. One telecommunications operator, Novatel, has indicated that there will be a small percentile of customers that will be affected particularly south facing. Mitigation measures put in place during construction will ensure broadband service is not interrupted. There will be no significant effect on all other telecommunication operations due to the proposed development.

As the TDR will be reinstated following construction of the proposed development, there will be no impacts.

As the proposed grid connection will be operating underground, there are no operational related impacts on telecommunications and broadcasting interests in the area.

#### *16.5.1.4 Decommissioning Phase*

As stated in Section 16.3.1.1 above, the potential for electromagnetic interference from wind turbines occurs only during the operational phase of the development. There are no electromagnetic interference impacts associated with the construction or decommissioning phases of the proposed development, and therefore no mitigation required.

The proposed TDR will not be utilised for the decommissioning phase.

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<sup>2</sup> Comreg Siteviewer. <https://siteviewer.comreg.ie/#explore>



The proposed grid connection will be left in situ underground within the public roadway. There are no decommissioning related impacts on telecommunications and broadcasting interests in the area.

### 16.5.2 Aviation - Potential Impacts

The potential effects of wind turbines on aviation interests have been widely publicised. There are two dominant scenarios:

- Physical Obstruction: turbines can present a physical obstruction at, or close to, an aerodrome or other aviation activity site; and
- Radar/Air Traffic Services: turbine induced clutter appearing on a radar display can affect the safe provision of air traffic services as it can mask an unidentified aircraft from the air traffic controller and /or prevent the controller from accurately identifying aircraft under his control. In some cases, radar reflections can affect the performance of the radar itself.

Pager Power completed assessments of the proposed development with regard to the following:

- Aviation risk assessment
- ILS Calibration Flight Impact Assessment
- Radar Vectoring Area Assessment.

These reports are presented in Appendix 16.3 and are summarised in this section.

#### 16.5.2.1 *Aviation Risk Assessment*

The development consists of 22 wind turbines, with a maximum tip height of 169m. The development is located ca. 27.4km (14.8 nautical miles) from Cork Airport. Turbine 22 is the highest elevation with the tip height altitude being 543m or 1,780 feet. There is also a permanent meteorological mast with a maximum height of 100m with a maximum altitude of ca. 450m (1,476 feet). An additional mast is also proposed with a maximum height of 100m and a maximum altitude of ca. 395m (1,295 feet).

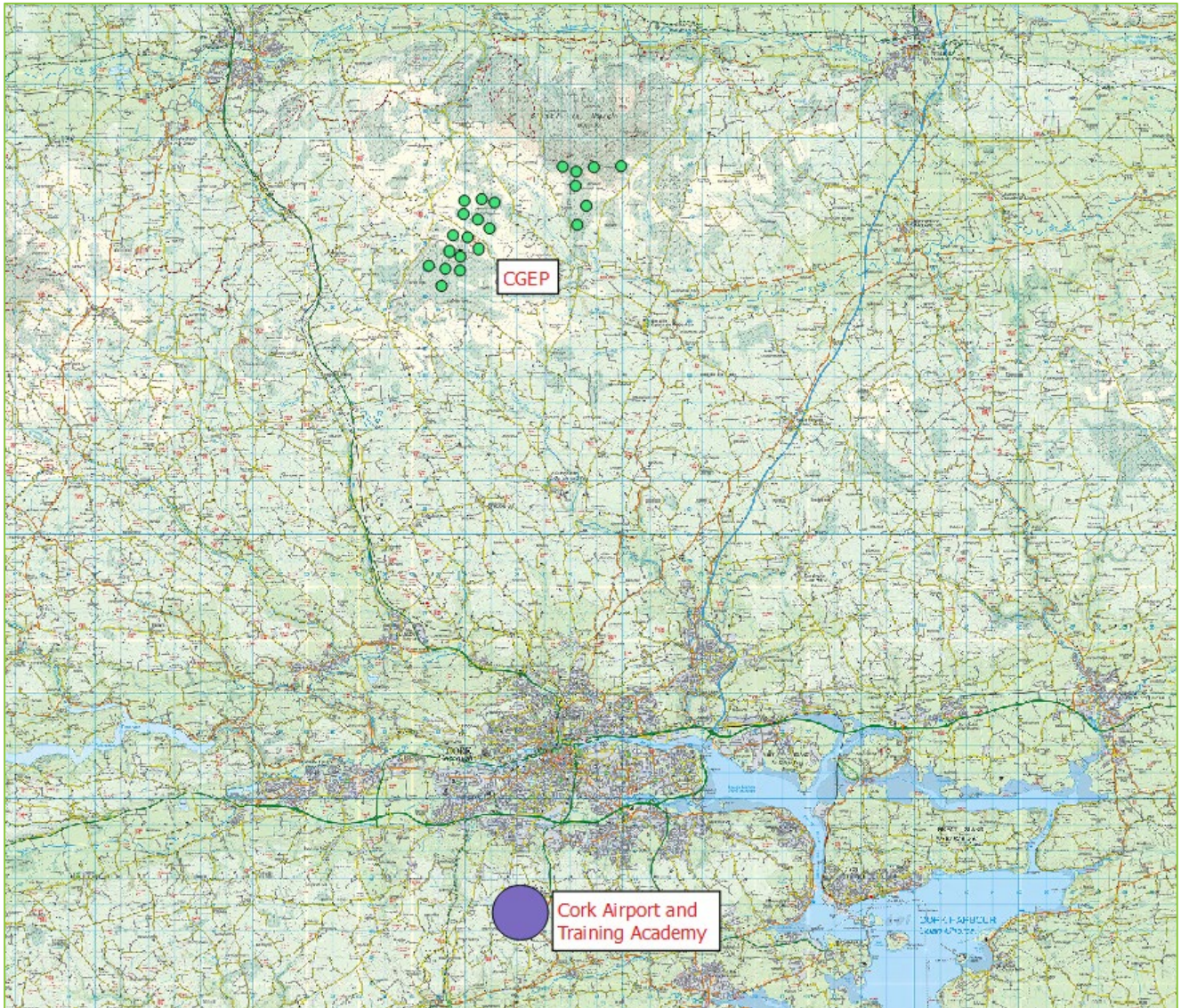


Figure 16-2: Location of Cork Airport and CGEP

#### 16.5.2.2 Potential Impacts

##### *Cork Airport – Physical Safeguarding*

The proposed development is 27 kilometres from Cork Airport and beyond its physical safeguarding Obstacle Limitation Surfaces (OLS) which extend 15 kilometres from the airport. The development does not therefore present a physical safeguarding risk.

##### *Cork Airport – Instrument Flight Procedures (IFPs)*

The Irish Aviation Authority (IAA) indicated that the proposed development will not affect IFPs. At this range from the airport IFPs have a minimum altitude of 3000 feet which is more than 1200 feet vertically clear of the highest turbine tip which has an altitude of approximately 1780 feet.



### *Fermoy Knock Airfield*

Minor airfields such as Fermoy are typically assessed when proposed wind farms lie within 5 kilometres. At a range of 18 kilometres the proposed wind farm will have no impact.

### *VFR Flights beneath Controlled Airspace*

The southern part of the proposed wind farm lies entirely within Controlled Airspace. The northern part of the wind farm lies in Uncontrolled Airspace – with Controlled Airspace above it. The base of this Controlled Airspace has an altitude of 2,500 feet which is more than 600 feet above the tip of the highest turbine which has an estimated maximum tip height of 1,890 feet.

The wind turbines may cause a minor restriction to VFR flights flying around the Cork Airport Control Zone in certain conditions; however, no significant overall impact is predicted because the airspace is Controlled to the south and is less restricted to the north.

### *Tullig More Secondary Surveillance Radar (SSR)*

Under Eurocontrol guidelines SSR are safeguarded against wind turbines to a range of 16 kilometres. The distance from the centre of the wind farm to the radar is 30 kilometres which is significantly more than this 16km safeguarding distance. Because of this no impacts are likely and no further assessment is recommended.

### *Tullig More Primary Surveillance Radar (PSR)*

The majority of the wind turbines will be at least partially visible to the PSR. This means that the turbines will generate false returns on air traffic control displays in the vicinity of the wind farm. Whilst the wind farm is likely to cause a local technical effect the resulting operational effect may well be acceptable because:

- Any effects will be limited to the wind farm area which is just 0.04% of the radar's coverage area;
- Commercial aircraft flying in this area will be flying in Controlled Airspace where any wind farm effects on PSR may be disregarded;
- Air traffic controllers see flights from SSR radar which will not be affected by the proposed development.

### *IAA Woodcock Hill Radar Station (SSR)*

Under Eurocontrol guidelines SSR are safeguarded against wind turbines to a range of 16 kilometres. The distance from the centre of the wind farm to the radar is 70 kilometres which is significantly more than this 16km safeguarding distance. Because of this no significant impacts are predicted.

### *Cork Airport Radio Navigation Beacons including ILS*

Safeguarding requirements for radio navigation beacons are defined by the International Civil Aviation Organisation (ICAO) in publication EUR DOC 015 *European Guidance Material on Managing Building Restricted Areas*.



All proposed wind turbines lie beyond the safeguarding distances specified for the radio navigation beacons at Cork Airport. Because of this no significant impacts are predicted.

### *ILS Test Flights*

The International Civil Aviation Organisation (ICAO) publishes its *Manual on Testing of Radio Navigation Aids* which defines how flight tests for ILS localizers should be undertaken. ILS coverage requirements are defined in *ICAO Annex 10 to the Convention on International Civil Aviation – Aeronautical Telecommunications – Volume 1 – Radio Navigation Aids*.

A review of the above documents, the Cork Airport AIP, the IAA's comments and the relative geometry of the proposed wind farm led to the assessment below:

There is unlikely to be any significant impact on ILS test flights and in the event that test flights were impacted it is likely that these impacts could be mitigated.

Overall impacts on ILS test flights are unlikely to be significant because:

- ILS coverage is already limited below 3000 feet meaning that requirements for test flights below this altitude will be limited;
- The exact paths of test flights are not defined with international (ICAO) flying regulations and can be amended to suit any limitations arising from terrain or structures;
- The majority of testing occurs within 5 degrees of the flight path and the proposed development lies beyond 5 degrees.

### *Obstruction Lighting*

All structures that are higher than 150 metres above ground level require aeronautical lighting in accordance with national and international legislation. The turbines' nacelles will have to be fitted with red aeronautical ground lighting.

#### *16.5.2.3 ILS Calibration Flight Impact Assessment*

Cork Airport has a range of radio transmitters which pilots use to navigate - one of these systems being an Instrument Landing System (ILS). The Irish Aviation Authority (IAA) has raised concerns that the wind farm could affect periodic test flights that are used to calibrate and check the ILS.

### *Test Flights*

These test flights fly a range of trajectories which either fly towards the airport or in an arc, or orbit, centred on the runway threshold. The IAA has provided a schedule of ILS checks and their associated flight trajectories.



### *Assessment*

The aircraft altitude (or height) has no impact on the horizontal separation between wind turbine and aircraft. Similarly the wind turbine altitude (or height) has no impact on horizontal separation.

In this analysis only the horizontal clearance between aircraft and the turbines has been considered as a worst cast scenario. This means that the results of this analysis apply for aircraft flying at any altitude profile on the specified horizontal trajectory. Similarly the results apply for any turbine height.

A software tool has been used to calculate the minimum horizontal separation between each specific (horizontally defined) trajectory and the nearest wind turbine or permanent meteorological masts.

### *Overall Impact*

The horizontal clearance between aircraft flying the test trajectories and the turbines is more than seven times the minimum horizontal clearance distance of 150 metres applicable for VFR flights in Ireland. The proposed turbines will therefore not affect aircraft flying ILS test trajectories and will therefore not have a significant impact on ILS test flights.

#### *16.5.2.4 Radar Vectoring Area (Cork) Assessment*

Aircraft using Cork Airport are controlled by radar. Air traffic controllers direct pilots to ensure that aircraft are separated with no risk of collision. Cork Airport will have a published Radar Vectoring Area Chart that shows the minimum altitude that pilots can be directed to fly in the vicinity of the airport. The proposed turbines will be located on high ground beneath airspace used to vector aircraft arriving and departing Cork. There have been ongoing discussions with the Irish Aviation Authority (IAA) regarding the proposed development's potential impact on operations at Cork Airport. Of specific concern is the potential impact of the wind turbines on aircraft under radar control.

### *Assessment*

The Minimum Altitude shown on the Radar Vectoring Area Chart is 3,000 feet. This is more than the maximum tip altitude of 1,784 feet. The vertical clearance is 1,216 feet.

The minimum actual vertical clearance of 1,216 feet exceeds the minimum required clearance of 984 feet by 232 feet. The proposed turbines will therefore not adversely affect aircraft flying under radar control.

#### *16.5.2.5 Construction Phase*

Before mitigation is employed, there is potential for aviation impacts during the late construction phase of the development and prior to the commissioning of the proposed development as the wind turbines are constructed and placed in situ. The turbines could be considered to be an obstacle to low flying craft. However, no scoping response was received by the IAA or DAA citing any concerns with the proposed development despite multiple attempts at engagement. It is considered therefore that there will be no significant effect on aviation from the proposed development.





The TDR will not cause impacts on aviation interests during the construction phase of the proposed development.

As the proposed grid connection will be constructed underground within the public roadway, there are no construction related impacts on aviation interests in the area.

#### 16.5.2.6 Operational Phase

Before mitigation is employed, there is potential for aviation impacts during the operational phase of the development, once the erection of the proposed turbines have been completed

As the proposed grid connection will be operating underground within the public roadway, there are no operational related impacts on aviation interests in the area.

#### 16.5.2.7 Decommissioning Phase

Once the proposed CGEP has reached its decommissioning phase, there will be no significant effects on aviation.

The proposed grid connection will be left in situ underground within the public roadway. There are no decommissioning related impacts on aviation interests in the area.

## 16.6 Mitigation Measures

### 16.6.1 Telecommunications

Sections 5.10 of the Department of Environment Heritage and Local Government (DoEHLG) Planning Guidelines on Wind Energy Developments (2006) acknowledge that “electromagnetic interference can be overcome.” There are a number of mitigation options that can be explored to overcome any residual impacts. The following link mitigation measures will be implemented as necessary to overcome electromagnetic interference:

- **Technology Upgrade:** Replacement of the existing telecommunications service equipment with another less affected type
- **Diverting telecommunications links** - The possibility of diverting telecommunication links to another telecommunications tower in the vicinity can be investigated.
- **Relocation of telecommunications equipment** - The possibility of moving telecommunication equipment to another telecommunications tower in the vicinity can be investigated.
- **Wind Turbine Tower** – To mitigate interference the turbine tower could be utilised as a transmitter/receiver (hop point).
- **Relay Base Station** – a relay base station can be deployed at a suitable location in the vicinity of the proposed development that would provide additional coverage to impacted service subscribers from an existing primary transmitter in the area.
- **Combination** – The possibility of providing a mix of the above or an alternative could be explored.



The proposed grid connection will be left in situ underground within the public roadway. There are no telecommunications related mitigation measures proposed.

### 16.6.2 Television and Radio Reception

Consultation with RTE indicates that there will be no impact to any of their microwave telecoms links but there is potential of interference with TV reception. Mitigation of this potential interference could require some remedial measures in relation to television reception. In practice, such measures are not difficult to implement, are relatively inexpensive and if necessary will be undertaken by the developer in conjunction with 2rn/RTÉ.

A 2rn Protocol Agreement has been signed by the applicant and 2rn in relation to interference on viewers television sets and broadcast radio receivers. This protocol has been included in Appendix 16.2. The measures to be undertaken, as per the protocol agreement include:

- If a problem is identified by a customer, 2RN will undertake a preliminary assessment and if it is wind farm related, the developer will be notified and a local dealer will visit the viewer.
- Where reception interference affects a number of viewers in the same vicinity, it will be necessary for 2RN to develop an alternative or additional transposer site.
- Where 2RN detects interference with the reception of a receive and/or transmission signal at a transposer site, 2RN will investigate and determine if this is attributable in whole or in part to the development.
- The developer shall be entitled to retain its own engineer to inspect and report on the source of interference.
- Engineers representing 2RN and the developer will agree on remedial works and cost of same.

In the event that an additional or alternative installation is required, 2RN will identify a new location and the developer will be responsible for all costs associated with the development of the new installation.

The proposed grid connection will be left in situ underground within the public roadway. There are no television or radio reception related mitigation measures proposed.

### 16.6.3 Aviation

In line with standard practice with wind farm developments (in accordance with Air Corps policy on tall structures), the coordinates and elevations for built turbines will be supplied to the IAA and DAA. No other mitigation measures are required.

Whilst the proposed development will not impede aircraft flying the test trajectories it would nevertheless be prudent to ensure that pilots of test aircraft are fully aware of the presence of wind turbines, and any associated anemometry masts, before undertaking any test flights. The following mitigation measures are therefore recommended:

- All turbines and meteorological masts having a height of 100m or more are promulgated in the Irish Air Navigation Obstacle database



- The extremities of the wind farm are lit
- Meteorological masts are lit
- Locations of meteorological masts having a height of less than 100m are promulgated to the pilots of test aircraft
- Test aircraft are fitted with Terrain Awareness and Warning System (TAWS)
- Test aircraft TAWS obstacle databases are regularly updated.

The proposed grid connection will be left in situ underground within the public roadway. There are no aviation related mitigation measures proposed.

## 16.7 Cumulative Impacts

A number of significant projects and developments in close proximity to the proposed wind farm project have been chosen for their potential cumulative impact. These include:

- Bottlehill Landfill
- Castlepook Wind Farm
- Knocknatallig Wind Farm
- Boggeragh Wind Farm
- Esk Wind Farm
- Single Wind turbine
- M20 Motorway
- M28 Motorway
- Dunkettle Interchange
- Existing Forestry Activity
- Replant Lands at Moneygorm
- Replant Lands at Ballard.

During the development of any large project that holds the potential to effect telecoms or aviation, the Developer is responsible for engaging with all relevant Telecoms Operators and Aviation Authorities to ensure that the proposals will not interfere with television or radio signals by acting as a physical barrier. In the event of any potential impact, the Developer for each individual project is responsible for ensuring that the necessary mitigation measures are in place. Therefore, as each project is designed and built to avoid impacts arising, cumulative impacts are unlikely.



## 16.8 Residual Impacts

### 16.8.1 Telecommunications, Television and Radio – Residual Impacts

The implementation of a suitable mitigation strategy will ensure that local telecommunications are not adversely affected by the development. Following the implementation of measures in the 2rn protocol, no significant residual effects are likely with regard to television and radio.

### 16.8.2 Aviation – Residual Impacts

Due to the low risk of impacts associated with aviation, the residual impact is deemed to be not significant following the full implementation of mitigation measures. No response was received from the IAA or DAA regarding the proposed development. It is therefore considered that with the standard mitigation measures of providing both with the coordinates of turbines and the provision of red lighting, no residual impacts are anticipated.

## 16.9 References

IWEA. (2012). Best Practice Guidelines for the Irish Wind Energy Industry. (Online). Available at: <https://www.iwea.com/images/files/9660bdfb5a4f1d276f41ae9ab54e991bb600b7.pdf>

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