

## Ballyfeeny Green Energy Project



### Environmental Impact Assessment Report Volume III

### Appendix 14.2 - Aviation Review Statement September 2025

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## Report

### *Ballyfeeny Green Energy Project*

### *Aviation Review Statement*

**Document Number:** 002/BY/0125

**Author:** KH

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## Executive Summary

Ai Bridges Ltd have been commissioned to review the possible impacts of the proposed wind farm on aviation systems in the vicinity of the proposed wind farm development at Ballyfeeny.

As part of the review, the following subjects were considered:

- Annex 14 - Obstacle Limitation Surfaces (OLS)
- Annex 15 – Aerodrome Surfaces
- Building Restricted Areas (BRA)
- Minimum Sector Altitudes (MSA)
- Instrument Flight Procedures
- Permitted Wind Farms in vicinity of Proposed Wind Farm
- Communications, Navigation and Radar Surveillance Systems Safeguarding
- Flight Inspection and Calibration
- IAA - Aeronautical Obstacle Warning Light Scheme
- Department of Defence Aeronautical Safeguarding
- Garda Air Support Unit (GASU) and Emergency Aeromedical Service (EAS)

### Annex 14 - Obstacles Limitation Surfaces (OLS)

A review shows that the proposed wind farm would be located outside the Outer Horizontal Surface of the Ireland West Runway Obstacle Limitation Surfaces (OLS), as defined in ICAO (International Civil Aviation Organization) Annex 14.

As the proposed wind farm is situated outside the Outer Horizontal Surface and there is no penetration of the take-off or approach surfaces, it is unlikely that there will be any impacts to the OLS surfaces for Ireland West Airport.

### Annex 15 - Aerodrome Surfaces

Following a review of “Terrain and Obstacle Requirements” as defined in ICAO Annex 15, turbines at the proposed development would need to be registered if they are more than 100 meters above terrain. The distance from the centre point (ARP – Airport Reference Point) of Ireland West Airport to the boundary of Area 1 of the Annex 15 Aerodrome Surface is 45km. This area encloses the TMA area i.e. Total Maneuvering Area and this is used for circling and maneuvering by aircraft. Should the proposed windfarm be permitted, the turbines would be outside 45km of Ireland West Airport’s ARP and would not cause an impact on the Annex 15 Aerodrome Surface. However, the proposed turbines would be required to be included in the IAA Electronic Air Navigation Obstacle Dataset.

|                                                                                   |                |                |
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### **Building Restricted Areas (BRA)**

A Building Restricted Area is the airspace surrounding an aviation facility that needs to be clear from physical intrusions. The purpose of the safeguarded areas is to identify developments with the potential for causing unacceptable interference to navigation facilities. A review shows that the proposed wind farm is over 45 km from the BRA surfaces at Ireland West Airport. At this distance there will be no impacts to the BRAs due to the proposed wind turbines at the proposed wind farm.

### **Minimum Sector Altitudes (MSA)**

The Minimum Sector Altitudes (MSA) is the lowest altitude which may be used that will provide a minimum obstacle clearance of 1000 ft above all obstacles within a sector of 25 nautical miles (46km) from the VOR/DME at Ireland West Airport. As the proposed wind farm is located outside the MSA Sectors for Ireland West Airport, there should be no impact on the published MSA altitudes.

### **Instrument Flight Procedures**

There are 16 published Instrument Flight Procedures for flights to/from Ireland West Airport. Due to the distance of the proposed wind farm from the airport, and as there are existing obstacles nearer to the airport than the proposed development, there should be no impacts to these flight procedures.

### **Communications and Navigation Systems**

As the proposed wind farm is approximately 53 km from the Localizer and transmitting antennas at Ireland West Airport, it is very unlikely that wind turbines at the proposed development will have any impact on these ATS communications and radio navigational aids.

### **Radar Surveillance Sensors**

For Radar Surveillance Systems, EUROCONTROL Guidelines require a 16 km safe distance from the surveillance radar system (SSR), for a “Zone 4 - No Assessment” condition. It has been highlighted in the analysis that turbines located at the proposed farm would be located at a minimum distance of 122 km from the radar stations at Dooncarton, Shannon, Woodcock Hill and Dublin Airport and in Assessment Zone 4 of the EUROCONTROL Guidelines. As turbines at the proposed development would be located in Assessment Zone 4, a detailed impact assessment on Radar Surveillance Systems will not be required by the IAA.

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### **Flight Inspection and Calibration**

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

### **IAA - Aeronautical Obstacle Warning Light Scheme**

In the event of a grant of planning consent the IAA and IAC are likely to request lighting of the proposed wind turbines in the interest of aviation safe-guarding as the proposed development would be considered as an en-route obstacle. The IAA-ANSP will require wind turbine obstacles to be fitted with an Obstacle Warning Light System.

### **Department of Defence (DoD) Aeronautical Safeguarding**

The Irish Air Corps position on wind farms / tall structures are outlined in the paper which was published in 2014: “Air Corps Wind Farm/ Tall Structures Position Paper”. In the position paper the Irish Air Corps (IAC) outlines restricted areas where they would object to the installation of wind turbines /tall structures. The areas defined by the Air Corps have been mapped and analysis shows that proposed wind farm site is located outside the restricted areas. As the proposed wind farm is not located in a restricted area it should have no impacts on the Irish Air Corps activities. However, the DoD have made specific observations regarding an Aeronautical Obstacle Warning Light Scheme for the IAC. The Aeronautical Obstacle Warning Light Scheme is subject to agreement with DoD. Following agreement with the DoD the details would be submitted to the Planning Authority prior to construction.

### **Garda Air Support Unit (GASU) and Emergency Aeromedical Service (EAS)**

The standard concerns that are being raised in recent consultations with the Irish Air Corps also highlight the potential for obstacles that could impact the operations of the Garda Air Support Unit (GASU) and the Emergency Aeromedical Service (EAS). An assessment of GASU and EAS operations indicates that they are unlikely to be impacted by the proposed wind farm development.

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## Abbreviations

|      |                                           |
|------|-------------------------------------------|
| AGL  | Above Ground Level                        |
| AMSL | Above Mean Sea Level                      |
| ARP  | Airport Reference Point                   |
| BRA  | Building Restricted Area                  |
| DME  | Distance Measuring Equipment              |
| DoD  | Department of Defence                     |
| EAS  | Emergency Aeromedical Service             |
| GASU | Garda Air Support Unit                    |
| GP   | Glide Path                                |
| HLS  | Helicopter Landing Site                   |
| IAA  | Irish Aviation Authority                  |
| IAC  | Irish Air Corps                           |
| ICAO | International Civil Aviation Organization |
| IFP  | Instrument Flight Procedure               |
| ILS  | Instrument Landing System                 |
| OLS  | Obstacle Limitation Surface               |
| PSR  | Primary Surveillance Radar                |
| RWY  | Runway                                    |
| SID  | Standard Instrument Departure Route       |
| STAR | Standard Arrival Route                    |
| SSR  | Secondary Surveillance Radar              |
| NATS | National Air Traffic Services (UK)        |
| NM   | Nautical Miles                            |
| VOR  | VHF Omni-directional Range Station        |

|                                                                   |                |                |
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## 1. Introduction

This section provides a brief summary of the proposed wind farm development at Ballyfeeny and of the nearest significant aviation installation at Ireland West Airport.

### 1.1 Wind Farm Site Information

The proposed wind farm development is located in County Roscommon approximately 53 km southeast of Ireland West Airport. Figure 1 shows the proposed wind farm site with respect to Ireland West Airport and the IAA radar stations at Dooncarton, Shannon, Woodcock Hill and Dublin Airport.



Figure 1. Location of proposed wind farm at Ballyfeeny

|                                                             |                |                |
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## 1.2 Ireland West Airport

Table 2 below shows the co-ordinates of Ireland West Airport and the distance from the Airport reference Point (ARP) to the proposed wind farm site. Ireland West Airport operates in Class C controlled airspace with Instrument Flight Rules (IFR) and Visual Flight Rules (VFR).

| Location                                   | Installation          | Description                                | Airport Ref. Point ARP                                | ARP Distance to Proposed Wind Farm |
|--------------------------------------------|-----------------------|--------------------------------------------|-------------------------------------------------------|------------------------------------|
| Ireland West Airport, Charlestown, Co Mayo | International Airport | Single Asphalt Runway<br>Airspace: Class C | 53 54 37 N 08 49 06 W<br>(Mid-point of Runway 08/26). | 53.1 km                            |

**Table 1. Ireland West Airport Details**

The aeronautical navigation aids at the aerodrome include DVOR/DME, NDB, ILS LOC and ILS GP.



**Figure 2. Ireland West International Airport**

|                                                                   |                |                |
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## 2. Aviation Review

In this section a review of the following Aviation topics is provided.

- Annex 14 - Obstacle Limitation Surfaces (OLS)
- Annex 15 – Aerodrome Surfaces
- Building Restricted Areas (BRA)
- Minimum Sector Altitudes (MSA)
- Instrument Flight Procedures
- Permitted Wind Farms in vicinity of proposed Project
- Communications, Navigation and Radar Surveillance Systems Safeguarding
- Flight Inspection and Calibration
- IAA - Aeronautical Obstacle Warning Light Scheme
- Department of Defence Aeronautical Safeguarding
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## 2.1 Annex 14 Obstacle Limitation Surfaces (OLS)

A review of the Annex 14 Obstacles Limitation Surfaces (OLS) was carried out by first plotting the proposed wind farm location and the airport obstacle surfaces. The obstacle limitation surfaces for Ireland West Airport are plotted based on the following:

- Annex 14 to the Convention on International Civil Aviation Aerodromes Volume I - Aerodrome Design and Operations Seventh Edition July 2016"
- Certification Specifications and Guidance Material for Aerodromes Design CS-ADR-DSN Issue 4, 8th of December 2017

Figure 3 below shows the OLS in relation to the proposed Ballyfeeny wind farm site. The distance from the ARP at Ireland West Airport (i.e. the runway centre-point), to the nearest point of the proposed wind farm is 53.1 km. The analysis of the OLS plots indicates that turbines at the proposed wind farm would not penetrate the Outer Horizontal Surface which extends to 15 km from the Airport Reference Point (ARP) or runway centre-point.

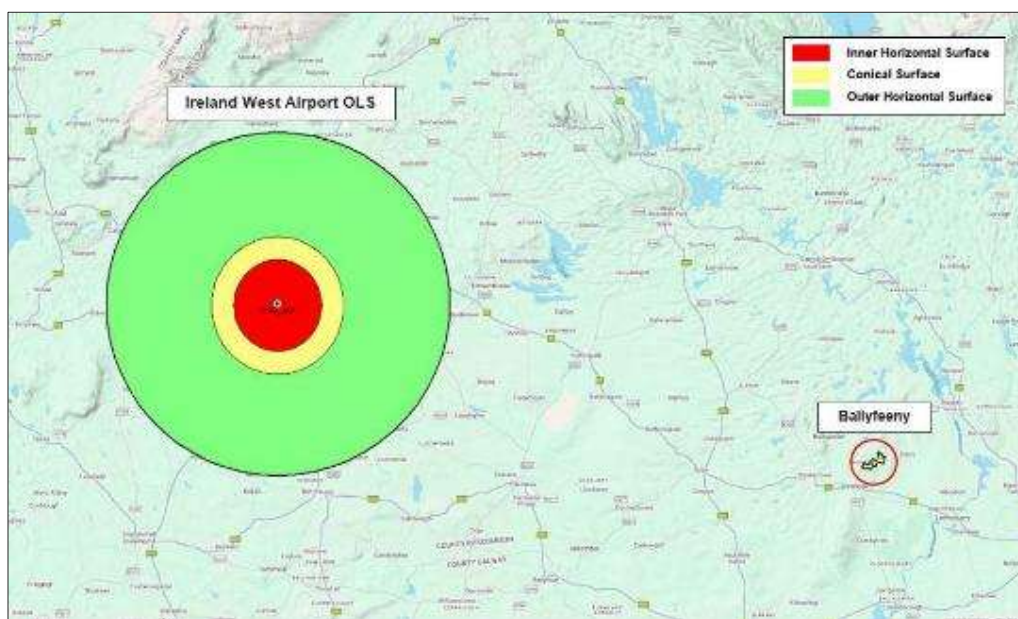


Figure 3. Ballyfeeny Wind Farm site in relation to Ireland West Airport OLS surfaces.

| Aviation Impact Review                | Mitigation Measure Action | Residual Impact |
|---------------------------------------|---------------------------|-----------------|
| Annex 14 Obstacle Limitation Surfaces | No action                 | None            |

Table 2. Aviation Impact Review - Annex 14 Obstacle Limitation Surfaces

|                                                             |                |                |
|-------------------------------------------------------------|----------------|----------------|
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## 2.2 Annex 15 Aerodrome Surfaces

Turbines at the proposed wind farm would not penetrate the ICAO Annex 15 Aerodrome Surface as shown in Figure 4. The “Terrain and Obstacle Requirements Area” is defined in ICAO Annex 15 as an area of up to 45 km from the Aerodrome ARP. (An illustration of ICAO Annex 15 Area 1 and Area 2 Surface is provided in Appendix A).

As the nearest turbine at the proposed wind farm would be more than 45km from the ARP at Ireland West Airport, there will be no penetration of the Annex 15 surface for the Ireland West Aerodrome. All obstacles, if they are more than 100 meters above terrain for a distance of up to 45km from the ARP, need to be registered in the IAA Air Navigation Obstacle Data Set. This area is known as the TMA area i.e. Terminal Maneuvering Area and is used for en-route circling and maneuvering and is shown in Figure 4.



**Figure 4. Annex 15 Aerodrome Surface and IAA Electronic Air Navigation Obstacle Data Set**

It should also be noted that there are other existing tall structures (obstacles) nearer to the airport, e.g. the operational wind farms at Sliabh Bawn, Largan Hill, Roosky, Ballykinava, Cloontoa, Magheramore, Cuillilea, and Lenavavea.

These existing obstacles would shield any potential impacts from the proposed wind farm at Ballyfeeny. The IAA Electronic Air Navigation Obstacle Data Set permitted obstacles are shown relative to the proposed wind farm in Figure 5.

|                                                                   |                |                |
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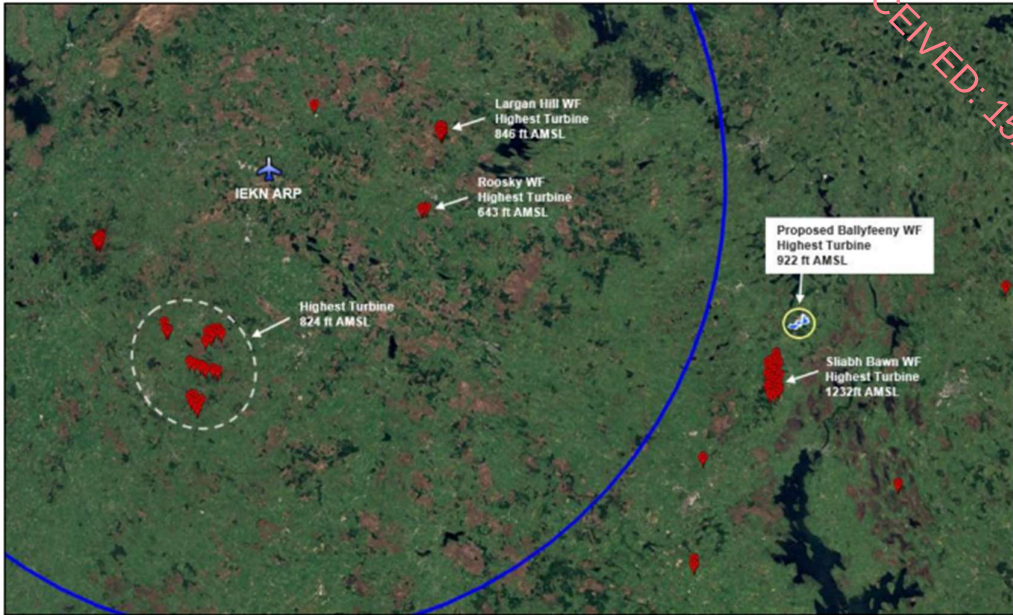


**Figure 5. Permitted Obstacles in vicinity of Ballyfeeny Wind Farm**

Although there are other obstacles closer to the airport than the proposed wind farm, all new obstacles must be considered and assessed to see if they cause a “hazard to air navigation” and all Terrain Obstacle Data (including man-made obstacles) have to be considered by the relevant Aviation Authorities.

| Aviation Impact Review      | Mitigation Measure Action                                                                 | Residual Impact |
|-----------------------------|-------------------------------------------------------------------------------------------|-----------------|
| Annex 15 Aerodrome Surfaces | The proposed wind turbines would be required to be included in the IAA Obstacle Data Set. | None            |

**Table 3. Aviation Impact Review - Annex 15 Aerodrome Surfaces**

|                                                             |                |                |
|-------------------------------------------------------------|----------------|----------------|
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## 2.3 Building Restricted Areas (BRA)

A Building Restricted Area is the airspace surrounding an aviation facility that needs to be clear from physical intrusions. The purpose of the safeguarded areas is to identify developments with the potential for causing unacceptable interference to navigation facilities.

The navigation facilities to be considered at Ireland Airport include the ILS Localisers, Glidepaths and DMEs that provide guidance for aircraft landings. The minimum safeguarded areas for these facilities are defined by the International Civil Aviation Organisation (ICAO) in the document ICAO EUR DOC 015, Section 7. The BRA parameters as specified by the ICAO are provided in Appendix B of this report.

Figure 6 below illustrates that the proposed wind farm at Ballyfeeny is over 45 km from the nearest BRA at Ireland West Airport. At this distance, turbines at the proposed wind farm will have no impact on the navigation facilities associated with the Building Restricted Areas for Ireland West Airport.



**Figure 6. Proposed Wind Farm relative to Ireland West Airport BRAs (RWY 08 and RWY 26)**

| Aviation Impact Review    | Mitigation Measure Action | Residual Impact |
|---------------------------|---------------------------|-----------------|
| Building Restricted Areas | No action.                | None            |

**Table 4. Aviation Impact Review - Building Restricted Areas**

|                                                             |                |                |
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## 2.4 Minimum Sector Altitudes

A review of the Minimum Sector Altitudes (MSA) shows that turbines at the proposed wind farm would not be inside 25 nautical miles of the VOR/DME at Ireland West Airport. The MSA provides a minimum obstacle clearance of 1000 ft above the highest obstacle within specified sectors.

The proposed wind farm is located outside the MSA Sectors for Ireland West Airport as shown in Figure 7. Therefore, there will be no impact on the published MSA altitude figures.

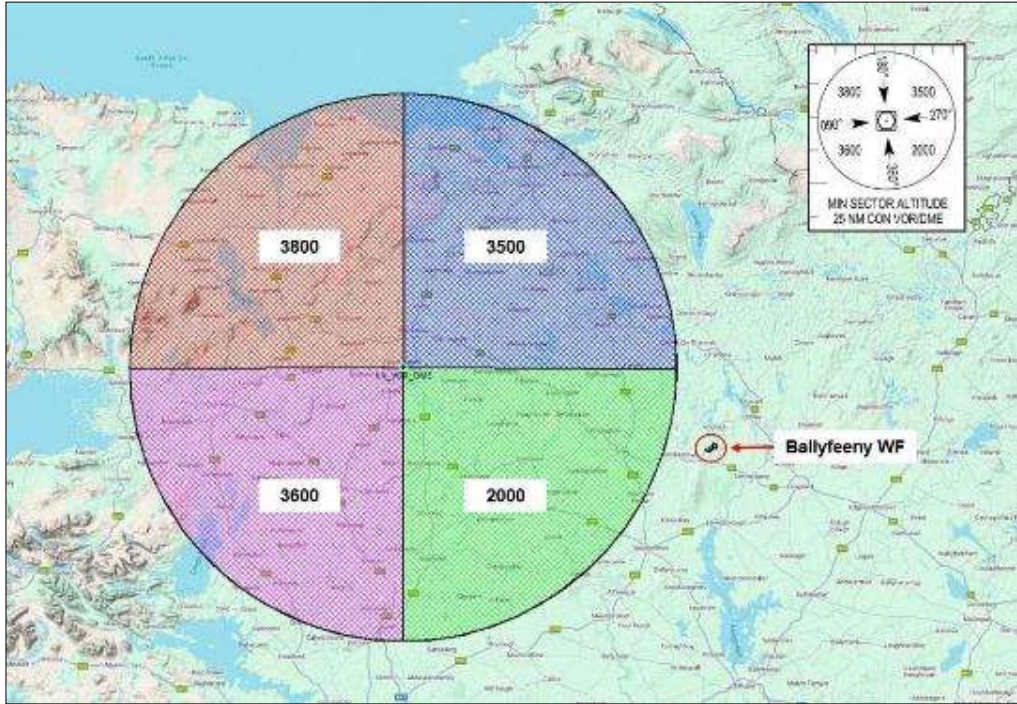


Figure 7. Ireland West Airport (EIKN) Minimum Sector Altitudes

| Aviation Impact Review   | Mitigation Measure Action | Residual Impact |
|--------------------------|---------------------------|-----------------|
| Minimum Sector Altitudes | No action                 | None            |

Table 5. Aviation Impact Review - Minimum Sector Altitudes

|                                                                                                                               |                |                |
|-------------------------------------------------------------------------------------------------------------------------------|----------------|----------------|
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## 2.5 Instrument Flight Procedures

There are 16 published Instrument and Visual Flight Procedures for arrivals to and departures from Ireland West Airport.

Due to the distance of the proposed wind farm from the Airport (and as there are existing obstacles (e.g. telecom masts and existing wind farms)) it is unlikely that there will be any impacts on the Instrument Flight Procedures for flights to/from Ireland West Airport. Table 6 below lists the Instrument Flight Procedures for Ireland West Airport.

| Aerodrome    | Aerodrome Procedure                                                                         | Chart ID          | Likely WF Impacts |
|--------------|---------------------------------------------------------------------------------------------|-------------------|-------------------|
| Ireland West | Precision Approach Terrain Chart RWY 26– ICAO                                               | EIKN AD 2.24-3    | None              |
| Ireland West | RNAV Standard Departure Chart Instrument (SID) RWY 26 - ICAO                                | EIKN AD 2.24-4.1  | None              |
| Ireland West | RNAV Standard Departure Instrument (SID) Chart RWY 08 - ICAO                                | EIKN AD 2.24-5.1  | None              |
| Ireland West | RNAV Standard Arrival Chart Instrument (STAR) RWY 26 - ICAO                                 | EIKN AD 2.24-6.1  | None              |
| Ireland West | RNAV Standard Arrival Chart Instrument (STAR) RWY 08- ICAO                                  | EIKN AD 2.24-7.1  | None              |
| Ireland West | Instrument Approach Chart RNP RWY 26 (ACFT CAT A, B, C, D) - ICAO                           | EIKN AD 2.24-8    | None              |
| Ireland West | Instrument Approach Chart ILS A CAT 1 and CAT 11 or LOC RWY 26 (ACFT CAT A, B, C, D) – ICAO | EIKN AD 2.24-9.1  | None              |
| Ireland West | Instrument Approach Chart ILS B CAT 1 and 11 RWY 26 (ACFT CAT A, B, C, D) – ICAO            | EIKN AD 2.24-10.1 | None              |
| Ireland West | Instrument Approach Chart VOR RWY 26 (ACFT CAT A, B, C, D) - ICAO                           | EIKN AD 2.24-11.1 | None              |
| Ireland West | Instrument Approach Chart NDB RWY 26 (ACFT CAT A, B, C, D) - ICAO                           | EIKN AD 2.24-12.1 | None              |
| Ireland West | Instrument Approach Chart NDB RWY 26 (ACFT CAT A, B, C, D) - ICAO                           | EIKN AD 2.24-13.1 | None              |
| Ireland West | Instrument Approach Chart RNP RWY 08 (ACFT CAT A, B, C, D) - ICAO                           | EIKN AD 2.24-14   | None              |
| Ireland West | Instrument Approach Chart VOR RWY 08 (ACFT CAT A, B, C, D) - ICAO                           | EIKN AD 2.24-15.1 | None              |
| Ireland West | Instrument Approach Chart NDB RWY 08 (ACFT CAT A, B, C, D) - ICAO                           | EIKN AD 2.24-16.1 | None              |
| Ireland West | Instrument Approach Chart NDB RWY 08 (ACFT CAT A, B, C, D) - ICAO                           | EIKN AD 2.24-17.1 | None              |
| Ireland West | Visual Approach Chart – ICAO                                                                | EIKN AD 2.24-19   | None              |

**Table 6. Instrument and Visual Flight Procedures – Ireland West Airport**

A detailed instrument flight procedure analysis is outside of the scope of this report; however, from the desktop assessment conducted it is envisaged that it is unlikely that the Air Navigation Service Provider (ANSP) at Ireland West Airport will require a detailed assessment on the possible impact of the proposed wind farm on flight procedures.

| Aviation Impact Review       | Mitigation Measure Action | Residual Impact |
|------------------------------|---------------------------|-----------------|
| Instrument Flight Procedures | No action                 | None.           |

**Table 7. Aviation Impact Review - Instrument Flight Procedures**

|                                                                   |                |                |
|-------------------------------------------------------------------|----------------|----------------|
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## 2.6 Permitted Wind Farms in vicinity of Proposed Wind Farm

Operational wind farm in the proximity of the proposed project are shown below in Table 8. None of these wind farms required a Full Assessment of Instrument Flight Procedures.

| Wind Farm   | Planning Reference                                                                        | Description           |
|-------------|-------------------------------------------------------------------------------------------|-----------------------|
| Sliabh Bawn | <a href="https://www.eplanning.ie/roscommoncc/">https://www.eplanning.ie/roscommoncc/</a> | Operational Wind Farm |
| Largan Hill | <a href="https://www.eplanning.ie/roscommoncc/">https://www.eplanning.ie/roscommoncc/</a> | Operational Wind Farm |
| Roosky      | <a href="https://www.eplanning.ie/roscommoncc/">https://www.eplanning.ie/roscommoncc/</a> | Operational Wind Farm |
| Ballykinava | <a href="https://www.eplanning.ie/MayoCC/">https://www.eplanning.ie/MayoCC/</a>           | Operational Wind Farm |
| Cloontoa    | <a href="https://www.eplanning.ie/MayoCC/">https://www.eplanning.ie/MayoCC/</a>           | Operational Wind Farm |
| Magheramore | <a href="https://www.eplanning.ie/MayoCC/">https://www.eplanning.ie/MayoCC/</a>           | Operational Wind Farm |
| Lenanavea   | <a href="https://www.eplanning.ie/MayoCC/">https://www.eplanning.ie/MayoCC/</a>           | Operational Wind Farm |
| Skrine      | <a href="https://www.eplanning.ie/roscommoncc/">https://www.eplanning.ie/roscommoncc/</a> | Operational Wind Farm |
| Knockmeane  | <a href="https://www.eplanning.ie/roscommoncc/">https://www.eplanning.ie/roscommoncc/</a> | Operational Wind Farm |
| Derryadd    | <a href="https://www.eplanning.ie/longfordcc/">https://www.eplanning.ie/longfordcc/</a>   | Operational Wind Farm |
| Derrane     | <a href="https://www.eplanning.ie/roscommoncc/">https://www.eplanning.ie/roscommoncc/</a> | Operational Wind Farm |

**Table 8. Permitted wind farms in the vicinity of the proposed wind farm**

|                                                                   |                |                |
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## 2.7 Communication and Navigation Systems

The AIP document EIKN AD 2-18/19 provides the information for communication and navigation facilities for Ireland West Airport. Table 9. shows the channel frequencies for the ATS communications Facilities and the Radio Navigation and Landing Aids for the airport.

| Aerodrome    | ATS Communications Facilities Channel Frequency | Radio Navigation and Landing Aids Channel Frequency | Approximate Distance to Localizer and Transmitting antennas | Impacts of Wind Farm |
|--------------|-------------------------------------------------|-----------------------------------------------------|-------------------------------------------------------------|----------------------|
| Ireland West | 118 MHz –131 MHz                                | 110 kHz – 330 MHz                                   | 53 km                                                       | No impacts           |

**Table 9. Impacts on Communications and Navigation Systems**

As the proposed wind farm is approximately 53km from the Localizers and transmitting antennas, it is very unlikely that turbines at the proposed wind farm will have any impact on these ATS communications and radio navigational aids. Typically, interference to VHF communications systems will only occur when obstacles are in close proximity to the VHF transmitter (e.g. less than 500m). Table 10 outlines the Aviation Impact Review on communication and navigation systems.

| Aviation Impact Review               | Mitigation Measure Action | Residual Impact |
|--------------------------------------|---------------------------|-----------------|
| Communication and Navigation Systems | No action                 | None            |

**Table 10. Aviation Impact Review - Communication and Navigation Systems**

|                                                             |                |                |
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## 2.8 Radar Surveillance Sensors

Table 11 and 12 below show the Irish Aviation Authority Assessment Zone arrangement for the two types of aviation radar surveillance systems: Primary Surveillance Radar (PSR) and Secondary Surveillance Radar (SSR).

| Zone   | Description                                  | Assessment Requirements |
|--------|----------------------------------------------|-------------------------|
| Zone 1 | 0 - 500m                                     | Safeguarding            |
| Zone 2 | 500m - 15km and in radar line of sight       | Detailed Assessment     |
| Zone 3 | Further than 15km and in radar line of sight | Simple Assessment       |
| Zone 4 | Not in radar line of sight                   | No Assessment           |

**Table 11. PSR Zone Arrangements**

| Zone   | Description                                                                  | Assessment Requirements |
|--------|------------------------------------------------------------------------------|-------------------------|
| Zone 1 | 0 - 500m                                                                     | Safeguarding            |
| Zone 2 | 500m - 16km but within maximum instrumented range and in radar line of sight | Detailed Assessment     |
| Zone 4 | Further than 16km or not in radar line of sight                              | No Assessment           |

**Table 12. SSR Zone Arrangements**

The EUROCONTROL Guidelines require a 16km safe distance for a “Zone 4 - No Assessment” condition and detailed assessments are required for any proposed wind within 16km of a secondary surveillance radar.

It should be noted that in the UK, NATS (Air Traffic Control) safeguards SSR to a distance of 10 km. The guidelines used by NATS (*CAP 764: Chapter 2: Impact of wind turbines on aviation*) state that:

*“Wind turbine effects on SSR are traditionally less than those on PSRs but can be caused due to the physical blanking and diffracting effects of the turbine towers, depending on the size of the turbines and the wind farm. These effects are typically only a consideration when the turbines are located very close to the SSR i.e. less than 10 km.”*

A review of the potential impact of the proposed wind farm on Radar Surveillance Sensors is presented below in Section 2.8.1. The review shows that the IAA should not require a radar assessment, as turbines at the proposed development would be located in Assessment Zone 4 for all of their radar installations (PSR and SSR).

| Aviation Impact Review     | Mitigation Measure Action | Residual Impact |
|----------------------------|---------------------------|-----------------|
| Radar Surveillance Sensors | No action                 | None.           |

**Table 13. Aviation Impact Review - Radar Surveillance Sensors**

|                                                                   |                |                |
|-------------------------------------------------------------------|----------------|----------------|
| <b>AiBridges</b><br><small>Total Communications Solutions</small> | Procedure: 001 | Rev: Final     |
| Ballyfeeny Green Energy Project – Aviation Review Statement       | Approved: KH   | Date: 02/09/25 |

### 2.8.1 Irish Aviation Authority (IAA) Radar Surveillance Sensors

To determine which PSR/SSR Assessment Zones are applicable to the proposed wind farm, a desktop assessment was carried out. The nearest radar surveillance sites to the proposed wind farm development are at Dooncarton, Shannon, Woodcock Hill and Dublin Airport.



Figure 8. Radar Surveillance Sites relative to Ballyfeeny wind farm site.

An assessment of the potential impact due to the proposed wind farm on these radar installations is provided in Sections 2.8.1.1 to Section 2.8.1.4.

|                                                             |                |                |
|-------------------------------------------------------------|----------------|----------------|
| <b>AiBridges</b><br>Total Communications Solutions          | Procedure: 001 | Rev: Final     |
| Ballyfeeny Green Energy Project – Aviation Review Statement | Approved: KH   | Date: 02/09/25 |

### 2.8.1.1 Dooncarton Radar Assessment

The radar surveillance site at Dooncarton consists of a SSR system located in the six-story circular reinforced concrete communications tower shown in Figure 9. The SSR antennas are housed in the dome-shaped structure at the top of the tower.



**Figure 9. Dooncarton Radar Station**

Table 14 below shows the (EuroControl & NATS) assessment zone applicable to the nearest point where a turbine could potentially be located. The applicable assessment zone has been based on distance from the Radar Station and whether a radar line-of-sight condition exists.

| Wind Farm ID | Distance to PSR/SSR Radar Station | Radar LOS Assessment (EuroControl Guidelines) | Radar LOS Assessment (NATS Guidelines – UK) |
|--------------|-----------------------------------|-----------------------------------------------|---------------------------------------------|
| Ballyfeeny   | 129 km                            | Detailed Assessment Not Required              | Detailed Assessment Not Required            |

**Table 14. EuroControl / UK Safeguarding Guidelines – Dooncarton Radar Station**

As the table above show, the proposed wind farm is within Assessment Zone 4 as specified by the EUROCONTROL guidelines, which would indicate that a detailed technical assessment would not be required for the impact on the SSR radar station at Dooncarton.

|                                                             |                |                |
|-------------------------------------------------------------|----------------|----------------|
| <b>AiBridges</b><br>Total Communications Solutions          | Procedure: 001 | Rev: Final     |
| Ballyfeeny Green Energy Project – Aviation Review Statement | Approved: KH   | Date: 02/09/25 |

### 2.8.1.2 Shannon Airport Radar Assessment

The radar surveillance site at Shannon Airport consists of a PSR and a SSR. The PSR and the SSR antennas are co-located on the same structure at Shannon Airport (Figure 10).



**Figure 10. Shannon Airport Radar Station**

Table 15 below shows the (EuroControl & NATS) assessment zone applicable to the nearest point where a turbine could potentially be located. The applicable assessment zone has been based on distance from the Radar Station and whether a radar line-of-sight condition exists.

| Wind Farm ID | Distance to PSR/SSR Radar Station | Radar LOS Assessment (EuroControl Guidelines) | Radar LOS Assessment (NATS Guidelines – UK) |
|--------------|-----------------------------------|-----------------------------------------------|---------------------------------------------|
| Ballyfeeny   | 134 km                            | Detailed Assessment Not Required              | Detailed Assessment Not Required            |

**Table 15. EuroControl / UK Safeguarding Guidelines – Shannon Airport Radar Station**

As the table above show, the proposed wind farm is within Assessment Zone 4 as specified by the EUROCONTROL guidelines, which would indicate that a detailed technical assessment would not be required for the impact on the PSR/SSR radar station at Shannon Airport.

|                                                                   |                |                |
|-------------------------------------------------------------------|----------------|----------------|
| <b>AiBridges</b><br><small>Total Communications Solutions</small> | Procedure: 001 | Rev: Final     |
| Ballyfeeny Green Energy Project – Aviation Review Statement       | Approved: KH   | Date: 02/09/25 |

### 2.8.1.3 Woodcock Hill Radar Assessment

The radar surveillance site at Woodcock Hill consists of a SSR system housed in the dome-shaped structure shown in Figure 11.



**Figure 11. Woodcock Hill Radar Station**

Table 16 below shows the (EuroControl & NATS) assessment zone applicable to the nearest point where a turbine could potentially be located. The applicable assessment zone has been based on distance from the Radar Station and whether a radar line-of-sight condition exists.

| Wind Farm ID | Distance to PSR/SSR Radar Station | Radar LOS Assessment (EuroControl Guidelines) | Radar LOS Assessment (NATS Guidelines – UK) |
|--------------|-----------------------------------|-----------------------------------------------|---------------------------------------------|
| Ballyfeeny   | 126 km                            | Detailed Assessment Not Required              | Detailed Assessment Not Required            |

**Table 16. EuroControl / UK Safeguarding Guidelines – Woodcock Hill Radar Station**

As the table above shows, the proposed wind farm is within Assessment Zone 4 as specified by the EUROCONTROL guidelines, which would indicate that a detailed technical assessment would not be required for the impact on the SSR radar station at Woodcock Hill.

|                                                                                                                     |                |                |
|---------------------------------------------------------------------------------------------------------------------|----------------|----------------|
| <br>Total Communications Solutions | Procedure: 001 | Rev: Final     |
| Ballyfeeny Green Energy Project – Aviation Review Statement                                                         | Approved: KH   | Date: 02/09/25 |

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#### 2.8.1.4 Dublin Airport Radar Assessment

The radar surveillance site at Dublin Airport consists of two PSR/SSR (MSSR) radar stations as shown below in Figure 12 and Figure 13.



**Figure 12. Dublin Airport MSSR Radar Station #1**



**Figure 13. Dublin Airport MSSR Radar Station #2**

Table 17 below shows the (EuroControl & NATS) assessment zone applicable to the nearest point where a turbine could potentially be located. The applicable assessment zone has been based on distance from the Radar Station and whether a radar line-of-sight condition exists.

|                                                                   |                |                |
|-------------------------------------------------------------------|----------------|----------------|
| <b>AiBridges</b><br><small>Total Communications Solutions</small> | Procedure: 001 | Rev: Final     |
| Ballyfeeny Green Energy Project – Aviation Review Statement       | Approved: KH   | Date: 02/09/25 |

| Wind Farm ID | Distance to PSR/SSR Radar Station | Radar LOS Assessment (EuroControl Guidelines) | Radar LOS Assessment (NATS Guidelines – UK) |
|--------------|-----------------------------------|-----------------------------------------------|---------------------------------------------|
| Ballyfeeny   | 122 km                            | Detailed Assessment Not Required              | Detailed Assessment Not Required            |

**Table 17. EuroControl / UK Safeguarding Guidelines – Dublin Airport Radar (Station #1 and #2)**

As the table above show, the proposed wind farm is within Assessment Zone 4 as specified by the EUROCONTROL guidelines, which would indicate that a detailed technical assessment would not be required for the impact on the PSR/SSR at Dublin Airport.

|                                                             |                |                |
|-------------------------------------------------------------|----------------|----------------|
| <b>AiBridges</b><br>Total Communications Solutions          | Procedure: 001 | Rev: Final     |
| Ballyfeeny Green Energy Project – Aviation Review Statement | Approved: KH   | Date: 02/09/25 |

## 2.9 Flight Inspection and Calibration

Flight checks are conducted annually to ensure that flight procedures and associated navigational aids are safe and accurate. These flight checks are carried out by an IAA approved Flight Inspection Service Provider. The checks are carried out during annual inspections consisting of radial and orbital test flights around Ireland West Airport for calibration of instrument landing systems.

It is unlikely that the Flight Inspection Procedures will be impacted as the proposed wind farm is sufficiently far from the airport runways and the flight inspection procedures should already account for the existing obstacles (e.g. terrain and existing wind farms).

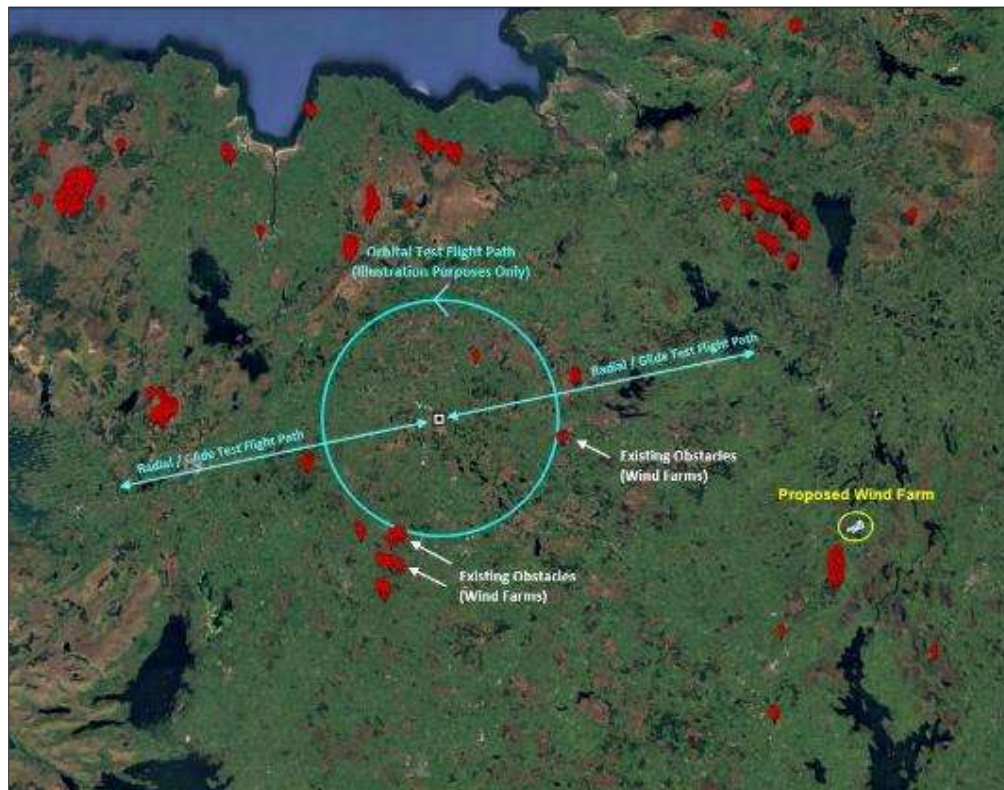


**Figure 14. Flight Inspection and Calibration Test Procedures should account for existing obstacles (e.g. terrain and existing wind farms)**

| Aviation Impact Review            | Mitigation Measure Action | Residual Impact |
|-----------------------------------|---------------------------|-----------------|
| Flight Inspection and Calibration | No action                 | None.           |

**Table 18. Aviation Impact Review - Flight Inspection and Calibration**

|                                                                   |                |                |
|-------------------------------------------------------------------|----------------|----------------|
| <b>AiBridges</b><br><small>Total Communications Solutions</small> | Procedure: 001 | Rev: Final     |
| Ballyfeeny Green Energy Project – Aviation Review Statement       | Approved: KH   | Date: 02/09/25 |

## 2.10 IAA - Aeronautical Obstacle Warning Light Scheme

In the event of a grant of planning consent the IAA-ANSP would require the lighting of the proposed wind turbines in the interest of aviation safe-guarding as the proposed development may be considered as an en-route obstacle. As part of the Scoping Consultation undertaken by Rowan Engineering consultants for the proposed wind farm, IAA responded with the following general observations on the 19<sup>th</sup> Nov 2024.

*"In the event of planning consent being granted, the applicant should be conditioned to contact the Irish Aviation Authority to:*

- (1) agree an aeronautical obstacle warning light scheme for the wind turbine development,*
- (2) provide as-constructed coordinates in WGS84 format together with ground and tip height elevations at each wind turbine location and*
- (3) notify the Authority of intention to commence crane operations with at least 30 days prior notification of their erection."*

The developers of the proposed turbines would intend to implement an aeronautical obstacle warning light.

It is recommended that lighting requirements should be in accordance with Chapter Q – Visual Aids for denoting Obstacles; CS ADR.DSN.Q.851 and GM.ADR.DSN.Q.851 (Pages 729/730) of the EASA Easy Access Rules for Aerodromes (Reg (EU) No. 139/2014) where it states that

*"Applicability: When considered as an obstacle a wind turbine should be marked and/or lighted."*

| Aviation Impact Review                     | Mitigation Measure Action                                                                                                                                                                                                                                                                                                                                                                                                                         | Residual Impact |
|--------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| Aeronautical Obstacle Warning Light Scheme | As per the scoping response received from IAA. The Developer shall<br><br>(1) agree an aeronautical obstacle warning light scheme for the wind turbine development,<br>(2) provide as-constructed coordinates in WGS84 format together with ground and tip height elevations at each wind turbine location and<br>(3) notify the Authority of intention to commence crane operations with at least 30 days prior notification of their erection." | None            |

**Table 19. Aviation Impact Review - Aeronautical Obstacle Warning Light Scheme**

|                                                             |                |                |
|-------------------------------------------------------------|----------------|----------------|
| <b>AiBridges</b><br>Total Communications Solutions          | Procedure: 001 | Rev: Final     |
| Ballyfeeny Green Energy Project – Aviation Review Statement | Approved: KH   | Date: 02/09/25 |

## 2.11 Department of Defence Aeronautical Safeguarding

The standard concerns that are being raised by the Department of Defence, relate to the potential impact of wind turbines on the aviation activities of the Irish Air Corps (IAC). The Department of Defence highlights IAC Restricted Areas (for wind farms/ tall structures). They also request a specific Aeronautical Obstacle Warning Light Scheme for turbines that are permitted.

An assessment of the IAC Restricted Areas is provided in Sections 2.11.1 and a review of the IAC Aeronautical Obstacle Warning Light Scheme is provided in Sections 2.11.2.

### 2.11.1 Department of Defence – IAC Restricted Areas

The Irish Air Corps Position Paper “*Air Corps Wind Farm/ Tall Structures Position Paper*” published on 08<sup>th</sup> August 2014 (Ref. Appendix C), states that the Air Corps are likely to oppose any wind farm / tall structure in the following restricted areas:

- Lands underlying military airspace for flying activity.
- Low Flying Area – LFTA WEST.
- A distance of 5NM or less from military installations.
- Critical low level flying routes in support of Air Corps operation requirements.

Of the critical low level flying routes as listed in the Position Paper (Figure 15), the N4 is the nearest route to the proposed wind farm. The proposed wind farm site is 7.8 km (4.2 NM) from the N4 and is outside the 3 NM restricted area.

As the proposed wind farm is located outside the restricted area, there should be no impacts on Irish Air Corps activities.

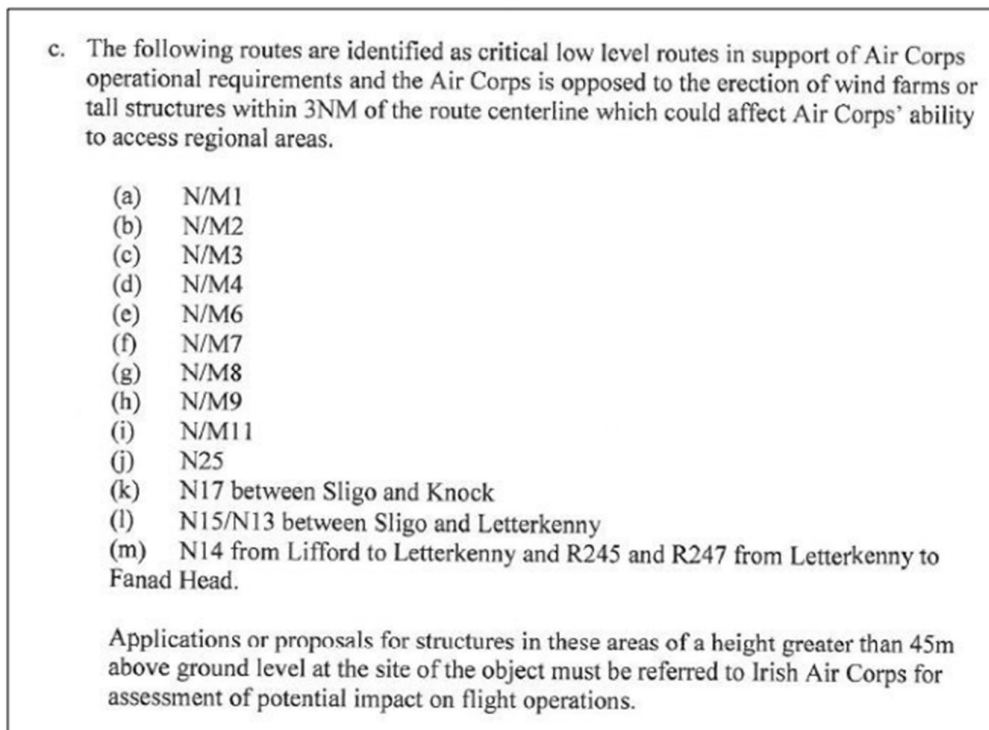


**Figure 15. Irish Air Corps – Critical Low Level Routes**

|                                                             |                |                |
|-------------------------------------------------------------|----------------|----------------|
| <b>AiBridges</b><br><i>Total Communications Solutions</i>   | Procedure: 001 | Rev: Final     |
| Ballyfeeny Green Energy Project – Aviation Review Statement | Approved: KH   | Date: 02/09/25 |

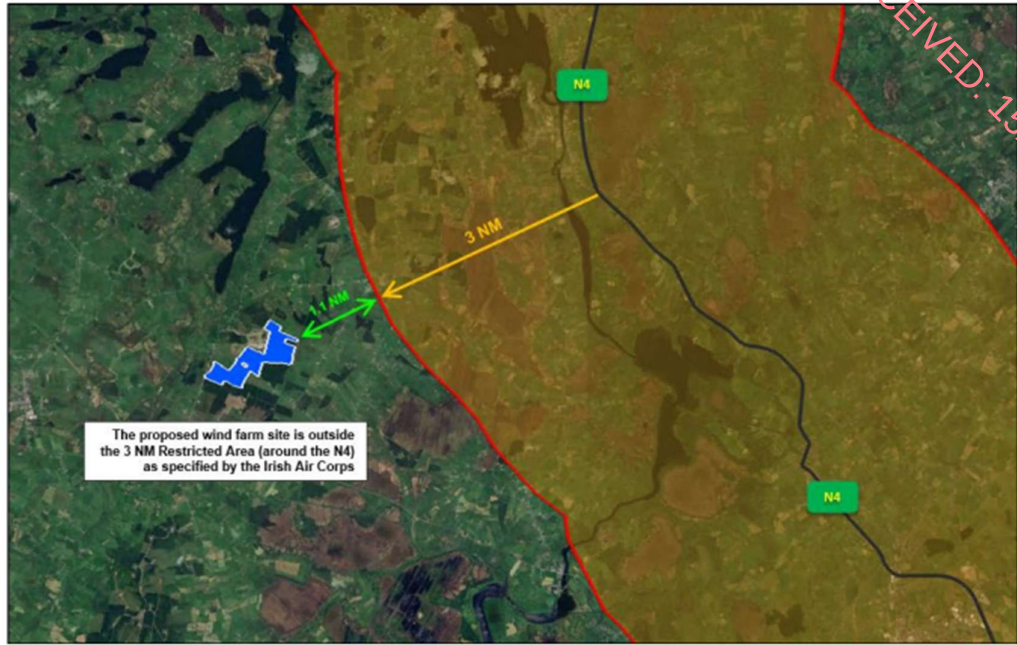


**Figure 16. Irish Air Corps - Critical Low Level Route (N4)**

| Aviation Impact Review                       | Mitigation Measure Action | Residual Impact |
|----------------------------------------------|---------------------------|-----------------|
| Department of Defence – IAC Restricted Areas | No action                 | None            |

**Table 20. Aviation Impact Review – IAC Restricted Areas**

|                                                                   |                |                |
|-------------------------------------------------------------------|----------------|----------------|
| <b>AiBridges</b><br><small>Total Communications Solutions</small> | Procedure: 001 | Rev: Final     |
| Ballyfeeny Green Energy Project – Aviation Review Statement       | Approved: KH   | Date: 02/09/25 |

## 2.11.2 Department of Defence – IAC Aeronautical Obstacle Warning Light Scheme

As part of the Scoping Consultation undertaken by Rowan Engineering consultants for the proposed wind farm, the Department of Defence provided general observations on the 16/10/2024, regarding the IAC Aeronautical Obstacle Warning Light Scheme, is described in the response provided below.

*"I wish to advise at the outset that any determination in relation to a planning consent is solely a matter for the planning authorities and/or ABP, as appropriate. Therefore, the following observations are made on a non-prejudicial basis, and are not intended to be used to rely on for a prospective planning application, nor are these observations to be relied on in the event of any commercial transaction pertaining to such lands and they are not to be relied on in the event of any contract exchange pertaining to same.*

*As a matter of practice, the Department of Defence does not provide observations or advice in the scoping process, except where the relevant parties have been directed by a planning authority to seek the Department's views.*

*Having consulted with the Military authorities, the Department of Defence wishes to make the following observations:*

- *The Minister for Defence is responsible for the regulation of military aviation, whereas the Irish Aviation Authority (IAA) is responsible for the safety regulation of civil aviation including aerodromes. The IAA does not have remit for military aviation or installations. Safeguarding of military flight operations and installations is intended to protect both current and future aircraft operations and also to take account of the security requirements associated with some of those operations.*
- *All turbines should be illuminated by Type C, Medium intensity, Fixed Red obstacle lighting with a minimum output of 2,000 candela to be visible in all directions of azimuth and to be operational H24/7 days a week.*
- *Obstacle lighting should be incandescent or, if LED or other types are used, of a type visible to Night Vision equipment. Obstacle lighting used must emit light at the near Infra-Red (IR) range of the electromagnetic spectrum, specifically at or near 850 nanometres (nm) of wavelength. Light intensity to be of similar value to that emitted in the visible spectrum of light*
- *Any Irish Air Corps (IAC) requirements for are separate to Irish Aviation Authority (IAA) requirements.*

*Nothing in the above observations shall be taken as a binding response by the Minister for Defence in the event that a planning application is made. The Minister reserves the right to comment on an actual planning application as and when it is submitted in accordance with the provisions of the planning regulatory code."*

A detailed assessment of the DoD\IAC Aeronautical Obstacle Warning Light Scheme is beyond the scope of this report. However, the appropriate lighting scheme for Ballyfeeny would depend on; the existing obstacle environment, airspace class (i.e. Class G for Ballyfeeny) and existing Irish/ EU lighting standards and regulations. The DoD\ IAC requirement for all turbines to be illuminated should also be reviewed to determine if cardinal or perimeter lighting could be implemented instead, and if infrared lighting could be designed to satisfy the IAC aeronautical lighting requirement.

|                                                                   |                |                |
|-------------------------------------------------------------------|----------------|----------------|
| <b>AiBridges</b><br><small>Total Communications Solutions</small> | Procedure: 001 | Rev: Final     |
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Further consultations with the DoD\IAC would be required to reach agreement on the details of the aeronautical lighting requirements. Following agreement with the DoD\IAC the details would be submitted to the Planning Authority prior to construction. Any agreements on aviation lighting would be designed to minimise cumulative visual effects.

Also prior to construction the Department of Defence and the Planning Authority would be informed of the wind turbine tip heights and co-ordinates at least thirty days in advance of erection.

| Aviation Impact Review                                                 | Mitigation Measure Action                       | Residual Impact                              |
|------------------------------------------------------------------------|-------------------------------------------------|----------------------------------------------|
| Department of Defence - IAC Aeronautical Obstacle Warning Light Scheme | Aviation Lighting subject to agreement with DoD | No Impact<br>(Subject to agreement with DoD) |

**Table 21. Aviation Impact Review - IAC Aeronautical Obstacle Warning Light Scheme**

|                                                                                                                            |                |                |
|----------------------------------------------------------------------------------------------------------------------------|----------------|----------------|
| <br><i>Total Communications Solutions</i> | Procedure: 001 | Rev: Final     |
| Ballyfeeny Green Energy Project – Aviation Review Statement                                                                | Approved: KH   | Date: 02/09/25 |

## 2.12 Garda Air Support Unit (GASU) and Emergency Aeromedical Service (EAS)

The standard concerns that are being raised in recent consultations with the Air Corps also highlight the potential for obstacles that could impact the operations of the Garda Air Support Unit (GASU) and the Emergency Aeromedical Service (EAS).

An assessment of the possible impacts of the proposed wind farm on the Garda Air Support Unit and the Emergency Aeromedical Service operations is provided in Sections 2.12.1 and 2.12.2 that follow.

|                                                             |                |                |
|-------------------------------------------------------------|----------------|----------------|
| <b>AiBridges</b><br>Total Communications Solutions          | Procedure: 001 | Rev: Final     |
| Ballyfeeny Green Energy Project – Aviation Review Statement | Approved: KH   | Date: 02/09/25 |

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### 2.12.1 The Garda Air Support Unit (GASU)

The Garda Air Support Unit is based at Casement Aerodrome, Baldonnell and is typically deployed to incidents in the following cases:

- Immediate threat to life
- Incidents of a criminal, terrorist or other nationally important nature
- Immediate threat of serious public disorder
- Tasks leading to the prevention or detection of crime
- Evidence gathering
- Intelligence gathering
- Photographic tasks
- Traffic Management/Monitoring

The unit consists of one fixed-wing aircraft (a Pilatus Britten-Norman BN 2T-4S Defender 4000) and two helicopters (Eurocopter EC 135 T2).



Figure 17. GASU - Pilatus Britten-Norman BN 2T-4S Defender 4000



Figure 18. GASU - Eurocopter EC135 T2

|                                                                   |                |                |
|-------------------------------------------------------------------|----------------|----------------|
| <b>AiBridges</b><br><small>Total Communications Solutions</small> | Procedure: 001 | Rev: Final     |
| Ballyfeeny Green Energy Project – Aviation Review Statement       | Approved: KH   | Date: 02/09/25 |

The proposed wind farm is located in an area that is sparsely populated and on forested / agricultural terrain. For these reasons, it is highly unlikely that the proposed wind farm development would have any significant impacts on GASU operations.

In the unlikely event of GASU operations in the general area, it should be noted that all modern aircraft are equipped with a range of Global Navigation Satellite Systems (GNSS), e.g. GPS, GLNASS, Galileo, etc. These GNSS systems provide pilots with accurate navigation information including data to avoid obstacles during VFR operations. Should the proposed wind farms be permitted the associated turbine locations would be submitted to the IAA and aviation charts and GNSS databases would be updated accordingly.

| <b>GASU Aircraft</b>                                                      | <b>Impact of proposed wind farms - Opinion</b>                                                                                                                                                                                                                                                                                                                                                                                   |
|---------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Fixed-wing Airplane<br>(Pilatus Britten-Norman<br>BN 2T-4S Defender 4000) | Low – Fixed-wing aircraft are unlikely to be deployed in low level activity in the subject areas.<br><br>In addition, the aircraft would be equipped with modern communications systems and navigational equipment. Should the wind farm be permitted, the turbines would be fitted with aeronautical lighting and would be clearly marked in aviation charts.                                                                   |
| Helicopter<br>(Eurocopter EC135 T2)                                       | Low – Helicopter landings in the subject area would not occur as the proposed wind farm located in forested / agricultural terrain.<br><br>In addition, the aircraft would be equipped with modern communications systems and navigational equipment. Should the wind farm be permitted, the turbines would be fitted with aeronautical lighting (in agreement with IAA and IAC) and would be clearly marked in aviation charts. |

**Table 22. Impact of proposed wind farm on GASU Operations**

|                                                             |                |                |
|-------------------------------------------------------------|----------------|----------------|
| <b>AiBridges</b><br>Total Communications Solutions          | Procedure: 001 | Rev: Final     |
| Ballyfeeny Green Energy Project – Aviation Review Statement | Approved: KH   | Date: 02/09/25 |

## 2.12.2 The Emergency Aeromedical Service (EAS)

The air ambulance service in Ireland is known as the Emergency Aeromedical Service (EAS). The EAS crew (which include National Ambulance Service (NAS) paramedics) deal with time-critical emergency callouts to major emergencies such as road collisions and urgent medical events. The EAS currently operate two air ambulance helicopters operating from two bases:

- Custume Barracks, Athlone, Co Westmeath.
- Rathcoole Aerodrome, Rathcoole, Mallow, Co Cork.

The two helicopter borne emergency air ambulances consist of an Air Corps operated aircraft based at Custume Barracks in Athlone, and an aircraft located at Rathcoole Aerodrome in North County Cork. The nearest EAS base to the proposed wind farm at Ballyfeeny is the base in Athlone. The flight times from the EAS base at Athlone are shown in Figure 19.

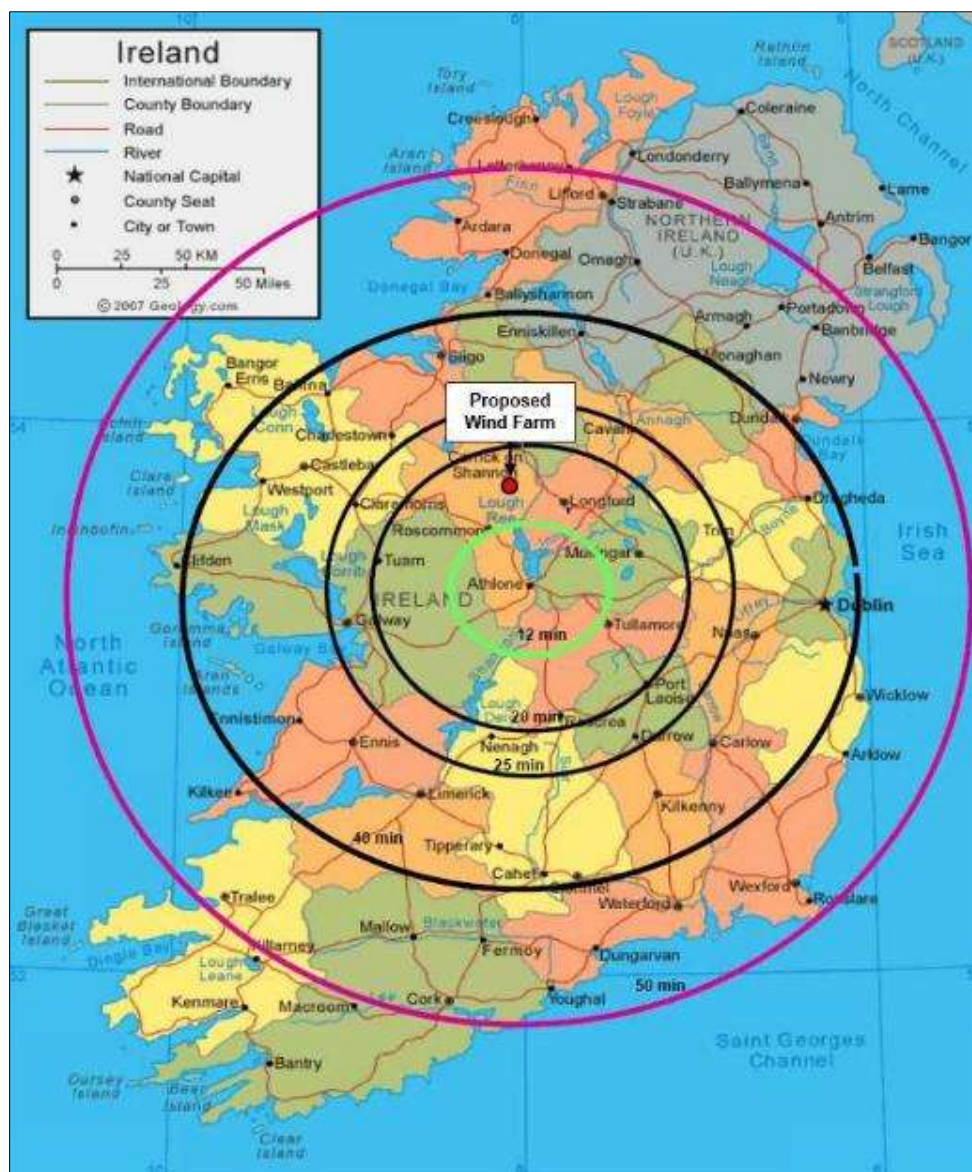


Figure 19. EAS – Flying Times from Athlone

|                                                                   |                |                |
|-------------------------------------------------------------------|----------------|----------------|
| <b>AiBridges</b><br><small>Total Communications Solutions</small> | Procedure: 001 | Rev: Final     |
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Helicopter landings are highly unlikely to occur in the subject area due to the forested /agricultural terrain of the proposed wind farm site and nearby operational quarry.

Also, should the proposed wind farm be permitted the associated turbine locations would be submitted to the IAA and aviation charts and GNSS databases would be updated accordingly. EAS helicopters would also be fitted with GNSS systems which would clearly identify any potential objects in the operational area (e.g. wind turbines).

In addition, the footprint of the proposed wind farm development is small and any flight diversions for EAS operations would have negligible time impacts. For these reasons, turbines at the proposed wind farm would have no impact on EAS flights from Athlone.

| EAS Aircraft                     | Impact of proposed wind farms – Opinion                                                                                                                                                                                                                                                                                                                                                                                                                      |
|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Helicopter<br>(Eurocopter EC135) | <p>Low – Helicopter landings at the subject area are highly unlikely to occur as the proposed wind farm site is located on forested / agricultural terrain.</p> <p>In addition, the aircraft would be equipped with modern communications systems and navigational equipment. Should the wind farm be permitted, the turbines would be fitted with aeronautical lighting (in agreement with IAA and IAC) and would be clearly marked in aviation charts.</p> |

**Table 23. Impact of proposed wind farm on EAS Operations**

|                                                             |                |                |
|-------------------------------------------------------------|----------------|----------------|
| <b>AiBridges</b><br>Total Communications Solutions          | Procedure: 001 | Rev: Final     |
| Ballyfeeny Green Energy Project – Aviation Review Statement | Approved: KH   | Date: 02/09/25 |

### 3. Summary

A summary of the aviation review for the proposed wind farm at Ballyfeeny is provided in Table 24 below.

| Item                                                     | Impact | Summary                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|----------------------------------------------------------|--------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Annex 14 - Obstacle Limitation Surfaces (OLS)            | None   | The proposed turbines are located outside the OLS Surfaces for Ireland West Airport.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Annex 15 - Aerodrome Surfaces                            | None   | <p>Turbines at the proposed wind farm would not penetrate the ICAO Annex 15 Aerodrome Surface for Ireland West Airport.</p> <p>All obstacles, if more than 100 meters above terrain for a distance of 45km from center point of Ireland West Airport, need to be registered in the IAA Air Navigation Obstacle Data Set. The IAA may request that the turbines be included in the IAA Aeronautical Electronic Obstacle Data Sets.</p> <p>It should be noted that other existing tall structures nearer to Ireland West Airport (e.g. existing turbines at Sliabh Bawn, Roosky, Largan Hill etc.) are also located within the ICAO Annex 15 Aerodrome Surface and are already listed in the IAA Aeronautical Electronic Obstacle Data Sets.</p> |
| Building Restricted Areas                                | None   | A review shows that Ballyfeeny is more than 45 km from the BRA for Ireland West Airport. At this distance there would be no impacts due to the proposed wind farm.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Minimum Sector Altitudes (MSA)                           | None   | A review of the Minimum Sector Altitudes (MSA) shows that the proposed wind farm is outside 25 nautical miles from the VOR/DME at Ireland West Airport. Therefore the MSA of the relevant sector will not be affected and there will be no impact on the published MSA altitude figures.                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Instrument Flight Procedures                             | None   | A review shows that the instrument flight procedures for RWY 08 and RWY 26 standard instrument departures are unlikely to be impacted for precision aircraft.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Communication and Navigation Systems                     | None   | As the proposed wind farm is over 50 km from the Localizer and transmitting antenna at Ireland West Airport, it is very unlikely that the proposed development will have any impact on these ATS communications and radio navigational aids.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Radar Surveillance Sensors                               | None   | The proposed wind turbines would be located in Assessment Zone 4 (EuroControl guidelines) for SSR and PSR instruments and a detailed Impact Assessment will not be required                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Flight Inspection and Calibration                        | None   | The annual Flight Inspection Procedures will not be impacted by the proposed wind farm as the proposed site is sufficiently far from the ARP at Ireland West Airport that there would be no impacts. In addition, the Flight Inspection Procedures should already account for existing obstacles.                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| IAA - Aeronautical Obstacle Warning Light Scheme         | None   | If permitted, the wind farm should be fitted with Aeronautical Obstacle Warning Lights in accordance with civil aviation industry and regulatory standards. Subject to further consultation with the IAA.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| DoD Aeronautical Safeguarding                            | None.  | The proposed wind farm is not located in an IAC restricted area and it is highly unlikely that turbines at the proposed site would have any impact on IAC aviation activity. The DoD have made specific observations regarding an Aeronautical Obstacle Warning Light Scheme for the IAC. If permitted, the wind farm should be fitted with Aeronautical Obstacle Warning Lights in accordance with military aviation industry and regulatory standards. Subject to further consultation with the IAC.                                                                                                                                                                                                                                         |
| Garda Air Support Unit and Emergency Aeromedical Service | None   | An assessment of GASU and EAS operations indicate that they are unlikely to be impacted by the proposed wind farm development.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

**Table 24. Ballyfeeny Wind Farm – Aviation Review Summary**

## APPENDIX A - ICAO Annex 15 Area 1 and Area 2 Surfaces.

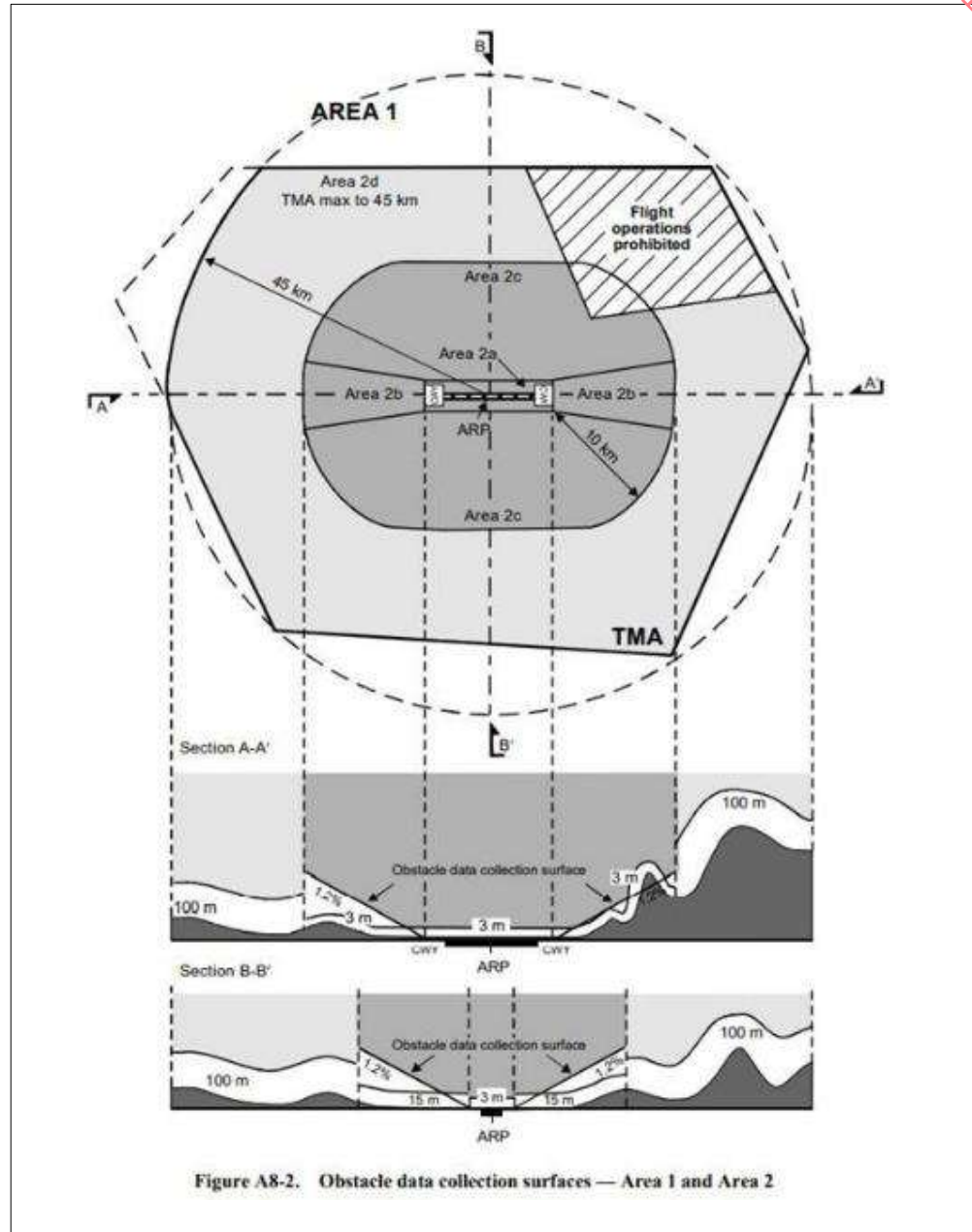


Figure A1 - ICAO Annex 15 Area 1 and Area 2 Surfaces.

## APPENDIX B - ICAO Building Restricted Areas.

Figure B1 below shows an example BRA shape for directional facilities. Table B1 provides harmonized guidance figures for the directional navigational facilities in accordance with Figure B1.

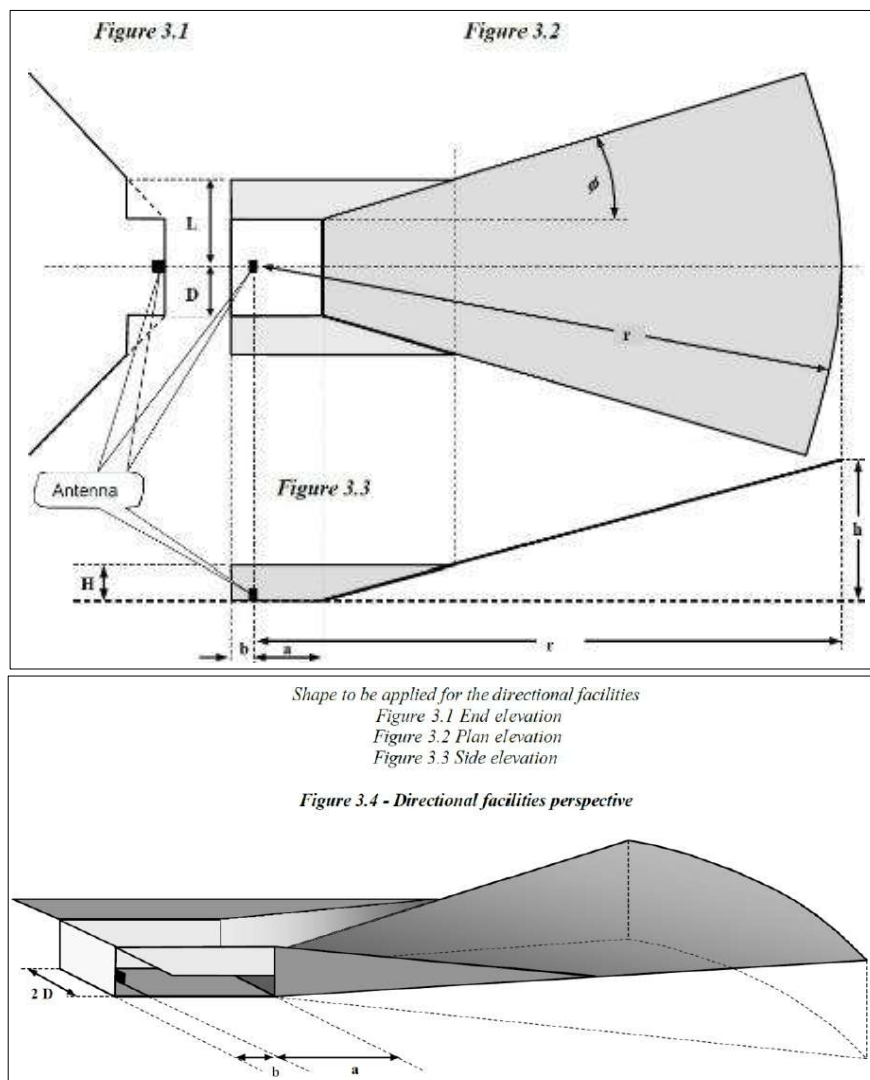


Figure B1 - Example BRA shape for directional facilities (ICAO EUR DOC 015 Figures 3.1-3.4)

| Type of navigation facilities              | A (m)                 | b (m) | h (m) | r (m)  | D (m) | H (m) | L (m) | $\phi$ (°) |
|--------------------------------------------|-----------------------|-------|-------|--------|-------|-------|-------|------------|
| ILS LLZ (medium aperture single frequency) | Distance to threshold | 500   | 70    | a=6000 | 500   | 10    | 2300  | 30         |
| ILS LLZ (medium aperture dual frequency)   | Distance to threshold | 500   | 70    | a=6000 | 500   | 20    | 1500  | 20         |
| ILS GP M-Type (dual frequency)             | 800                   | 50    | 70    | 6000   | 250   | 5     | 325   | 10         |
| MLS AZ                                     | Distance to threshold | 20    | 70    | a=6000 | 600   | 20    | 1500  | 40         |
| MLS EL                                     | 300                   | 20    | 70    | 6000   | 200   | 20    | 1500  | 40         |
| DME (directional antennas)                 | Distance to threshold | 20    | 70    | a=6000 | 600   | 20    | 1500  | 40         |

Table B1 - Harmonized guidance figures for the directional navigational facilities (ICAO EUR DOC 015 Table 2)

## APPENDIX C – Air Corps Wind Farm / Tall Structures Position Paper, August 2014



Ceanncheatru an Aer Chór  
Air Corps Headquarters

08 August 14

GOC AC 

### Air Corps Wind Farm/Tall Structures Position Paper

Sir,

1. The attached is the draft Air Corps Position Paper agreed and developed in concert with the flying units under the auspices of CAS Ops.
2. It is recommended that it be forwarded to the Directorate of Operations for transmission to the Department of Defence.
3. The AC position contained within this paper should be notified to planning authorities including An Bord Pleanála. It should also be forwarded to the Department of the Environment, Heritage and Local Government to inform its policies and guidance in respect of wind farms.

  
Raymond Martin, Lt Col  
CATSO

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Ceanncheatru an Aer Chór  
Air Corps Headquarters

Air Corps Wind farm/Tall Structures Position Paper.

**1. Objective:**

This position paper is intended to ensure that

- a. Air Corps operations and training may be accomplished in a safe and economical manner;
- b. Baldonnel remains a viable aerodrome for IFR and VFR traffic;
- c. The ability to train military flying skills is protected;
- d. Vital navigation routes to and from the regions to Baldonnel and the Dublin area are protected to safeguard the ability of the Air Corps to fulfill its role.

**2. Statement of position.**

- a. The Air Corps is opposed the erection of wind farms or other obstacles which will affect its ability to train and operate in a safe and economic manner.
- b. The Air Corps is opposed to any wind farms or tall structures in the following areas:

(1) Lands underlying military airspace used for flying activity

- (a) The area contained in Danger Area EI-D1.
- (b) The area contained in Danger Area EI-D5.
- (c) The area contained within Danger Area EI-D6.
- (d) The area contained within Danger Area EI-D13.
- (e) The area contained within Danger Area EI-D14.
- (f) The area contained within Restricted Area EI-R15.
- (g) The area contained within Restricted Area EI-R16 within 20NM of Baldonnel.
- (h) The area contained within Military Operating Areas, MOAs 3 and 4 within 20NM of Baldonnel.

(2) Areas wherein military flying occurs at low level as identified in the annexes listed below.

- (a) Annex A: Low flying training areas within MOA 4 in the areas of
  - a. Blessington
  - b. Edenderry/Allenwood/Rathangan
  - c. Kilmeague/Newbridge
- (b) Annex B: low flying training area West (LFTA WEST).

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(3) A distance of 5NM or less from military installations.

c. The following routes are identified as critical low level routes in support of Air Corps operational requirements and the Air Corps is opposed to the erection of wind farms or tall structures within 3NM of the route centerline which could affect Air Corps' ability to access regional areas.

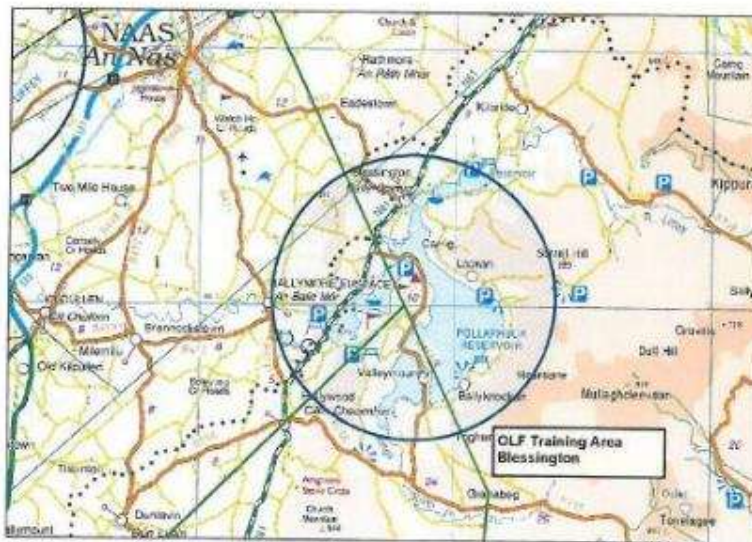
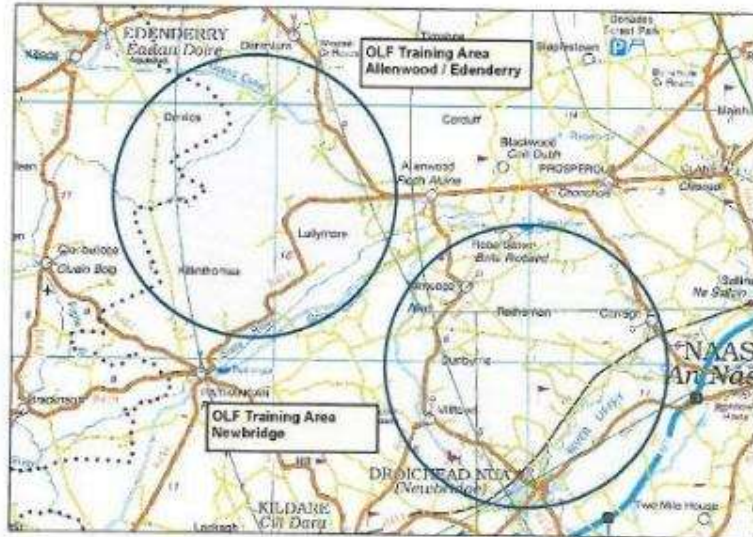
- (a) N/M1
- (b) N/M2
- (c) N/M3
- (d) N/M4
- (e) N/M6
- (f) N/M7
- (g) N/M8
- (h) N/M9
- (i) N/M11
- (j) N25
- (k) N17 between Sligo and Knock
- (l) N15/N13 between Sligo and Letterkenny
- (m) N14 from Lifford to Letterkenny and R245 and R247 from Letterkenny to Fanad Head.

Applications or proposals for structures in these areas of a height greater than 45m above ground level at the site of the object must be referred to Irish Air Corps for assessment of potential impact on flight operations.

- d. In MOA 4 outside of the areas identified in b.(1) (2) and (3), and in MOA 5, applications or proposals for objects of a height greater than 45m above ground level at the site of the object must be referred to the Irish Air Corps for assessment of potential impact on flight operations.
- e. In all locations where wind farms or masts are permitted it should be a condition that they meet the following lighting requirements
  - (1) Single turbines or structures, or turbines delineating corners of a wind farm, should be illuminated by high intensity strobe lights (Red).
  - (2) 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.
  - (3) 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 850nanometres (nm) of wavelength. Light intensity to be of similar value to that emitted in the visible spectrum of light.

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**Annex A**  
**Low Flying Areas - MOA 4**



Annex B

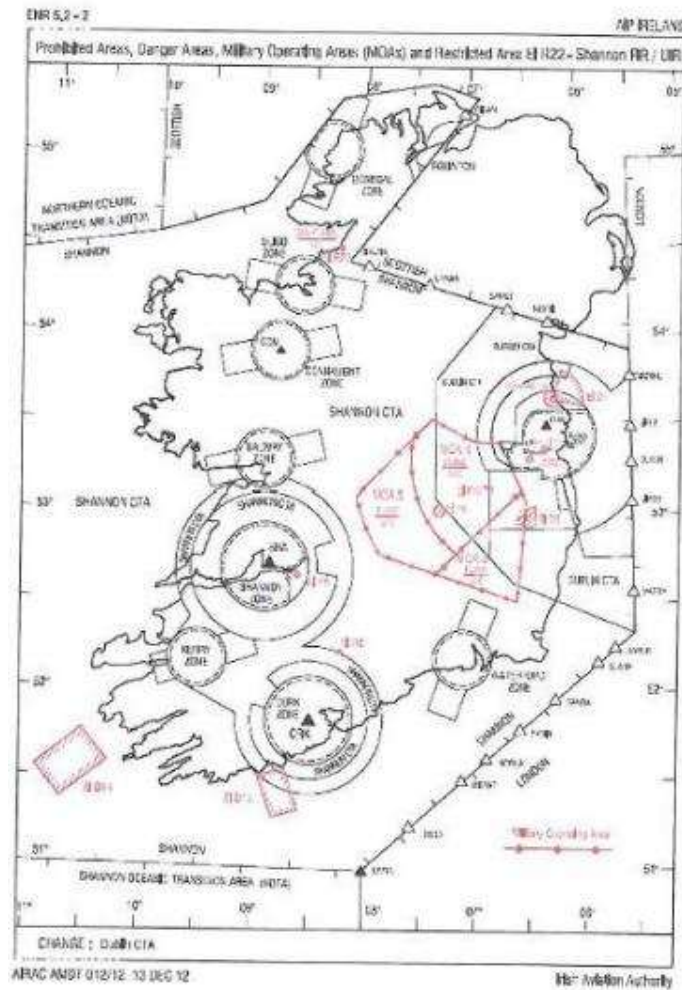
Low Flying Area – LFTA WEST

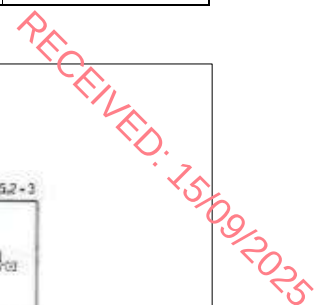
1. Area contained within the following grid L6972; L6945; M0745; M0772
2. Routes are primarily within valley areas.
3. Applications for wind farms/masts should be referred to Air Corps Operations for assessment against low flying routes.

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**Annex C**  
**Designated Airspace**  
**Restricted Areas, Danger Areas and Military Operating Areas**





|                                                             |                |                |
|-------------------------------------------------------------|----------------|----------------|
| <b>AiBridges</b><br><i>Total Communications Solutions</i>   | Procedure: 001 | Rev: Final     |
| Ballyfeeny Green Energy Project – Aviation Review Statement | Approved: KH   | Date: 02/09/25 |

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