


Technical Appendix 13-2 Aviation Review Statement

EIAR – Volume 3

Muingmore Wind Farm

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	Procedure: 001	Rev: 4.0
Muingmore Wind Farm – Aviation Review Statement	Approved: KH	Date: 24/03/2026

Report

Muingmore Wind Farm Aviation Review Statement

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

- Annex 14 - Obstacle Limitation Surfaces (OLS)
- Annex 15 – Aerodrome Surfaces
- 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
- Aeronautical Obstacle Warning Light Scheme
- Irish Air Corps / Department of Defense 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 Obstacle Limitation Surfaces for the runway at Ireland West Airport, as defined in ICAO (International Civil Aviation Organization) Annex 14.

As the proposed wind farm is situated outside the Outer Horizontal Surfaces 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 the aerodromes.

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 45 km. 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 45 km 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 50 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 Muingmore.

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, therefore, it is highly unlikely that there would be any impacts to these flight procedures.

Communications and Navigation Systems


As the proposed wind farm is approximately 60 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.

Primary Surveillance Radar (PSR)

For PSR Radar Surveillance Systems, EUROCONTROL Guidelines require a 15 km safe distance from the surveillance radar system (PSR), for a “Zone 4 - No Assessment” condition. It has been highlighted in the analysis that the proposed wind farm is located more than 170km from the nearest PSR radar site, which is located at Shannon Airport. At this distance there would be impacts to the PSR system and a detailed assessment would not be required by the IAA.

Secondary Surveillance Radar (SSR)

For SSR Radar Surveillance Systems, EUROCONTROL Guidelines specify that turbines that are further than 16 km, or not in radar line-of-sight do not require a detailed SSR radar assessment.

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Although, nine of the proposed turbines at Muingmore are within 16 km of the SSR radar Station at Dooncarton, radar Line-of-Sight (RLoS) analysis indicates that RLoS conditions do not exist between the SSR and any of the proposed turbines. Therefore the turbines would be in EuroControl Radar Assessment Zone 4 and a detailed SSR radar should not be required by the IAA.

It should also be noted that there is an existing wind farm in operation which is considerable nearer to Dooncarton, than the proposed development at Muingmore. The turbines at this wind farm (Bunnahowen Wind Farm) are just 9.6 km from the SSR at Dooncarton and are operating without causing any issues to the SSR radar system.

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).

Aeronautical Obstacle Warning Light Scheme


In the event of a grant of planning consent the IAA 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.

Irish Air Corps (IAC) / Department of Defence (DoD) 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 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.

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
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
RLoS	Radar Line-of-Sight
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 Muingmore 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 Mayo approximately 73 km northwest of Ireland West Airport.


The boundary for the study area was supplied to Ai Bridges in geo-referenced shapefiles format and part of the initial aviation constraint mapping process. This shapefile was used during the aviation screening process.

This study area boundary, together with the aeronautical surfaces and surrounding airspace, constitutes the assessment area used within this report. As part of the review, the aeronautical network infrastructure (aerodromes, radar sites, NAVAIDs, etc.) that is used to manage aviation activities in the vicinity of the proposed development has also been considered.

The study area for the proposed wind farm development is shown below in Figure 1 which includes the proposed location of the wind farm site with respect to Ireland West Airport and the IAA radar station at Dooncarton. The coordinates and dimensions of the proposed turbines are provided in Appendix A.



Figure 1. Location of proposed wind farm at Muingmore

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It should be noted that the original turbine numbering used in this Aviation Assessment Report is different to the final numbering scheme used in the finalized wind turbine layout. However, the turbine locations and dimensions remain the same, and therefore any changes in the turbine numbering scheme will have no impact on the overall findings of this report.

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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) Flight rules.


Location	Installation	Description	Airport Ref. Point ARP	ARP Distance to Proposed Wind Farm
Ireland West Airport, Charlestown, Co Mayo	International Airport	Single Asphalt Runway Airspace: Class C	53 54 37 N 08 49 06 W (Mid-point of Runway 08/26).	73.7 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 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 Wind Farm
- Communications, Navigation Systems
- Radar Surveillance Sensors
- Flight Inspection and Calibration
- Aeronautical Obstacle Warning Light Scheme
- Irish Air Corps / DoD Safeguarding
- Garda Air Support Unit (GASU) and Emergency Aeromedical Service (EAS)

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2.1 Annex 14 Obstacle Limitation Surfaces (OLS)

A review of the Annex 14 Obstacles Limitation Surfaces (OLS) was first 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 Muingmore wind farm. 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 73.7 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.

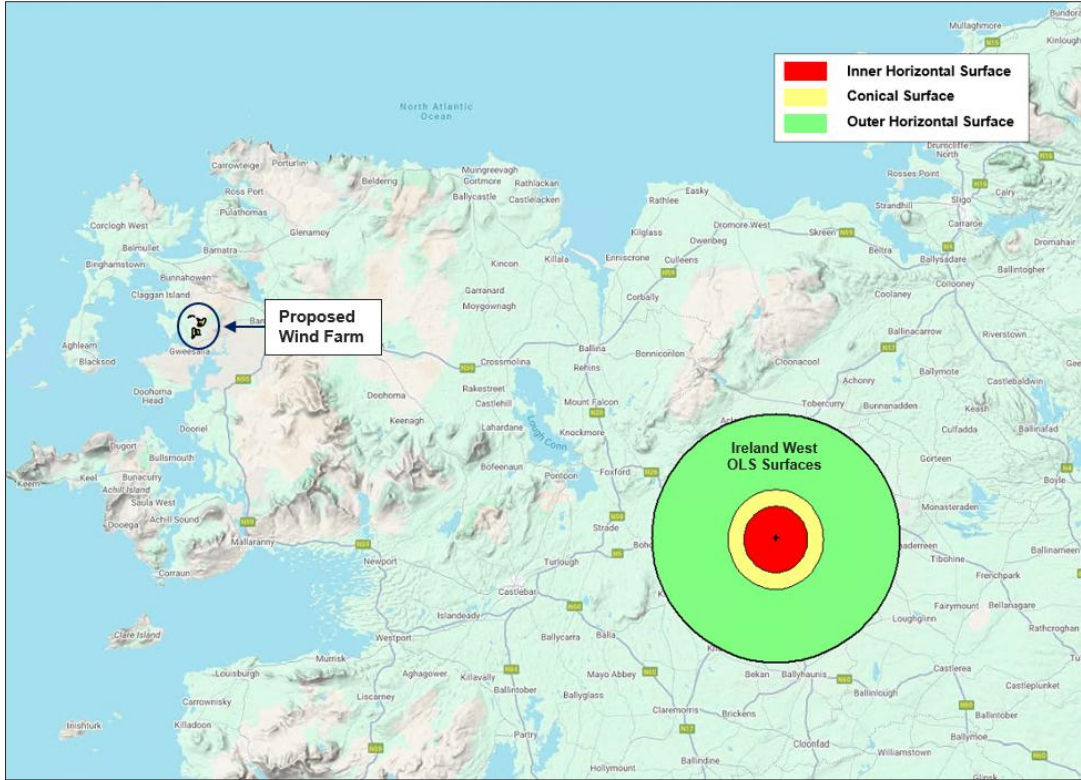



Figure 3. Muingmore Wind Farm in relation to Ireland West Airport OLS.

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 may potentially 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 45km from the Aerodrome ARP. (An illustration of ICAO Annex 15 Area 1 and Area 2 Surface is provided in Appendix B).

As the nearest turbine at the proposed wind farm would be more than 60 km from the ARP at Ireland West Airport, there will be no penetration of the Annex 15 surface for the Aerodrome. All obstacles, if they are more than 100 meters above terrain for a distance of up to 45 km from the ARP, need to be registered in the IAA Electronic 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.

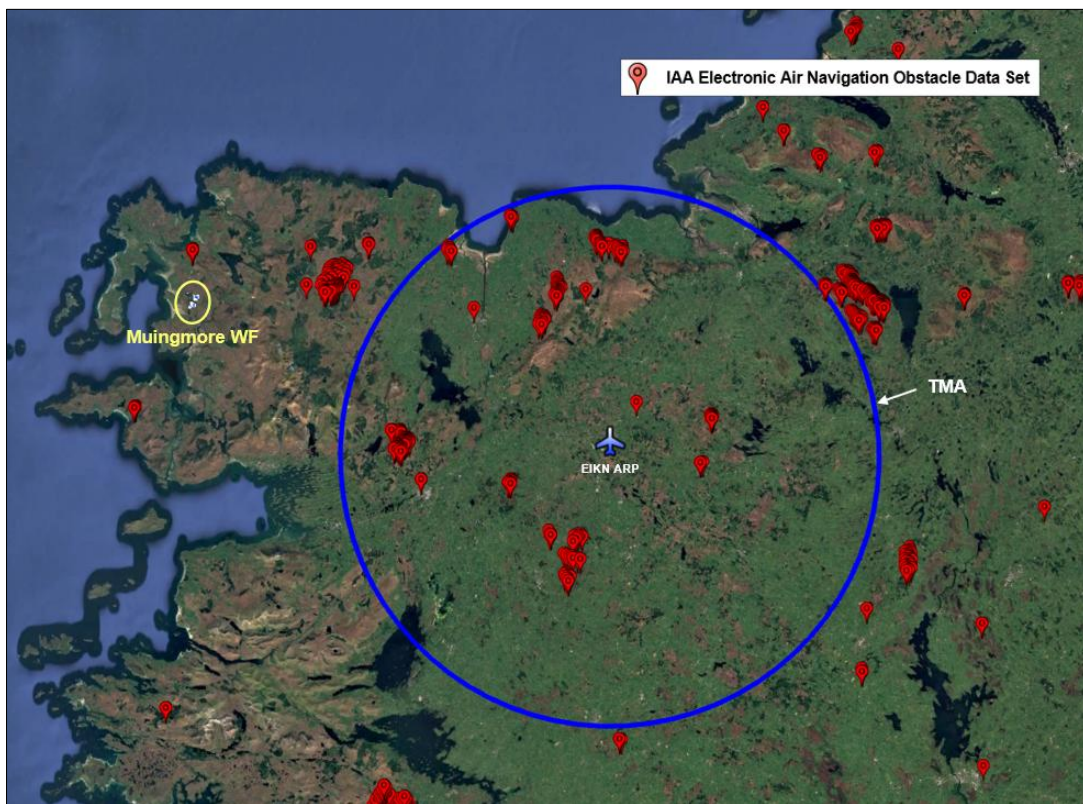



Figure 4. Annex 15 Aerodrome Surface and IAA Electronic Air Navigation Obstacle Data Set

It should also be noted that there are other existing tall structures (obstacles) nearer to the airport, e.g. the turbines at the operational wind farms at Oweninny, Raheen Barr, Derrynadivva, Bunnyconnellan and Carrowleagh.

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

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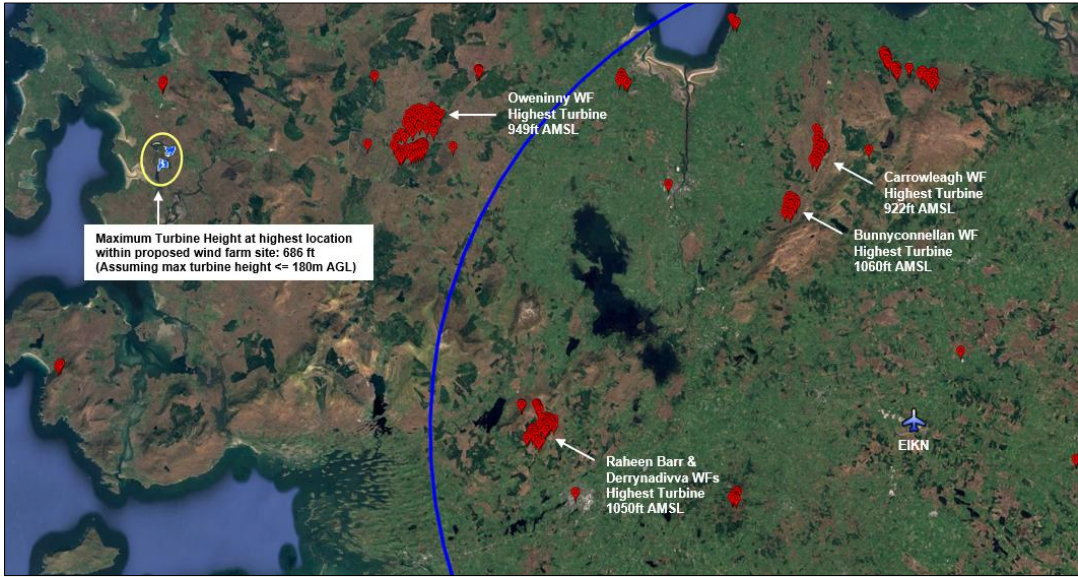


Figure 5. Permitted Obstacles in vicinity of Ireland West Airport

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 West Airport are the ILS Localisers, Glidepaths and DMEs that provide guidance for aircraft landing on runways 08 and 26. 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 C of this report.


Figure 6 below illustrates that the proposed wind farm at Muingmore is over 65 km from the Ireland West BRA. At this distance turbines at the proposed wind farm will have no impact on the navigation facilities associated with the Building Restricted Area for Ireland West Airport.



Figure 6. Proposed Wind Farm relative to Ireland West Airport BRA (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 the proposed wind farm is not within 25 nautical miles from 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 site is located more than 25 NM from the VOR/DME as shown in Figure 7. Therefore, the MSAs will not be affected and there will be no impact on the published MSA altitude figures.

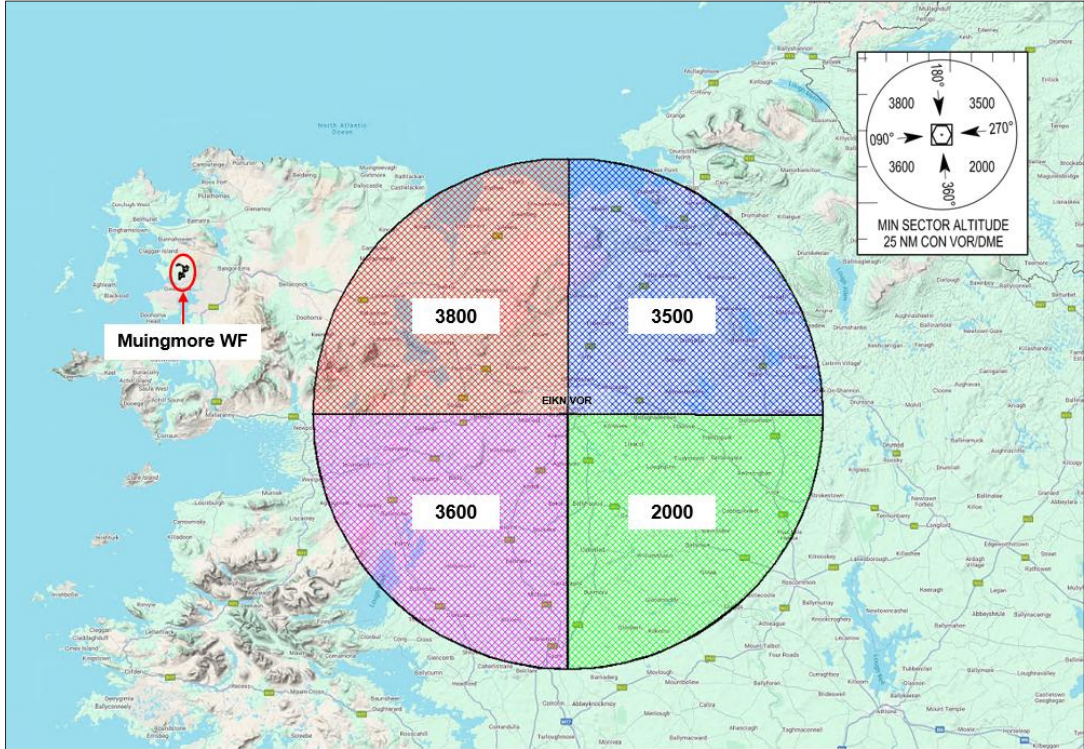



Figure 7. Ireland West Airport (EIKN) Minimum Sector Altitudes

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.

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 1and 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

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

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

The Planning References for the permitted wind farms in the vicinity of the proposed wind farm are shown below in Table 8. None of these wind farms required a Full Assessment of Instrument Flight Procedures.

Wind Farm	Planning Reference	Description
Bunnahowen	https://www.eplanning.ie/mayocc/	Operational Wind Farm
Oweninny	https://www.eplanning.ie/mayocc/	Operational Wind Farm
Seskin South	https://www.eplanning.ie/mayocc/	Permitted Wind Farm
Raheen Barr	https://www.eplanning.ie/mayocc/	Operational Wind Farm
Derrynadivva	https://www.eplanning.ie/mayocc/	Operational Wind Farm
Bunnyconnellan	https://www.eplanning.ie/mayocc/	Operational Wind Farm
Carrowleagh	https://www.eplanning.ie/mayocc/	Operational Wind Farm

Table 8. Permitted Wind Farms in vicinity of 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. The table below 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	118MHz –131MHz	110KHz – 330MHz	73 km	No impacts

Table 9. Impacts on Communications and Navigation Systems

As the proposed wind farm is approximately 70 km 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

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


There are two types of radar systems used by the IAA; Primary Surveillance Radar (PSR) and Secondary Surveillance Radar (SSR).

The nearest PSR radar station to the proposed wind farm is located at Shannon Airport, Co Clare. The nearest SSR radar station to Muingmore is the SSR Radar Station at Dooncarton, Co Mayo. Both radar stations are shown relative to Muingmore in Figure 8.



Figure 8. Nearest IAA Radar Surveillance Sites (SSR and PSR) shown relative to proposed wind farm development.

A brief description of the radar stations at Shannon Airport (PSR) and Dooncarton (SSR) is provided in Sections 2.8.1 and 2.8.2 that follow.

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2.8.1 Shannon Airport - Primary Surveillance Radar Sensor (PSR)

The primary surveillance radar sensor (PSR) at Shannon Airport consists of a Thales STAR 2000 radar system. The PSR antenna is installed on the structure shown below in Figure 9. The PSR is 171 km from the proposed wind farm at Muingmore.




Figure 9. Shannon Airport – Primary Surveillance Radar (PSR)

2.8.2 Dooncarton - Secondary Surveillance Radar Sensor (SSR)

The radar surveillance site at Dooncarton consists of a SSR system located in the six-story circular reinforced concrete communications tower shown in Figure 10. The SSR antennas are housed in the dome-shaped structure at the top of the tower. The SSR is 14.2 km from the proposed wind farm at Muingmore.



Figure 10. Dooncarton - Secondary Surveillance Radar (SSR)

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2.9 EuroControl Guidelines – Radar Surveillance Sensors

The Eurocontrol Guidelines for Assessing the Potential Impact of Wind Turbines on Surveillance Sensors specify different requirements for both types of radar systems (PSR and SSR). The recommended Eurocontrol Zone arrangements are described below in Section 2.9.1 and 2.9.2.

2.9.1 EuroControl Guidelines - PSR Assessment

For Primary Surveillance Radar systems, the EUROCONTROL Guidelines specify four assessment zones, as shown below in Table 12. The guidelines recommend that for a detailed radar assessment is required for wind turbines that are within 15 km of the PSR and are in radar line of sight.

Zone	Description	Assessment Requirements
Zone 1	0 - 500m	Safeguarding
Zone 2	500m – 15 km and in radar line of sight	Detailed Assessment
Zone 3	Further than 15 km but within maximum instrumented range and in radar line of sight	Simple Assessment
Zone 4	Not in radar line of sight	No Assessment

Table 11. PSR Zone Arrangements

2.9.2 EuroControl Guidelines – SSR Assessment


For Secondary Surveillance Radar systems, the EUROCONTROL Guidelines specify three assessment zones, as shown below in Table 13. The guidelines recommend that for a detailed radar assessment is required for wind turbines that are within 16 km of the SSR and in radar line of sight.

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

Table 12. SSR Zone Arrangements

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.”

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2.10 PSR Assessment / Analysis – Shannon Airport

As specified by the EuroControl guidelines*, a detailed radar assessment is not required for PSR if the propose turbines are more than 15 km away and are not in Radar Line-of-sight (RLoS). As all of the proposed turbines at Muingmore would be more than 170 km from the nearest PSR station at Shannon airport, and would not be in RLoS, there would be no impacts and a detailed assessment for PSR would not be required.

ID	Distance from PSR (km)	< 15 km of SSR (Yes/No)	In Radar LOS (Yes/No)	Radar Assessment Zone (EuroControl Guidelines)
T01	> 170	No	No	Zone 4 - Detailed Assessment Not Required
T02	> 170	No	No	Zone 4 - Detailed Assessment Not Required
T03	> 170	No	No	Zone 4 - Detailed Assessment Not Required
T04	> 170	No	No	Zone 4 - Detailed Assessment Not Required
T05	> 170	No	No	Zone 4 - Detailed Assessment Not Required
T06	> 170	No	No	Zone 4 - Detailed Assessment Not Required
T07	> 170	No	No	Zone 4 - Detailed Assessment Not Required
T08	> 170	No	No	Zone 4 - Detailed Assessment Not Required
T09	> 170	No	No	Zone 4 - Detailed Assessment Not Required
T10	> 170	No	No	Zone 4 - Detailed Assessment Not Required
T12	> 170	No	No	Zone 4 - Detailed Assessment Not Required
T13	> 170	No	No	Zone 4 - Detailed Assessment Not Required

Table 13. EuroControl Safeguarding Guidelines – Shannon Primary Surveillance Radar (PSR)

Aviation Impact Review	Mitigation Measure Action	Residual Impact
Primary Surveillance Radar	No action	None.

Table 14. Aviation Impact Review - Primary Surveillance Radar

* EUROCONTROL Guidelines on assessing the potential impact of wind turbines on surveillance sensors, EUROCONTROL 9 September 20

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2.11 SSR Assessment / Analysis – Dooncarton

An initial review of the SSR Radar Surveillance Sensor Station at Dooncarton has been conducted based on the EuroControl Guidelines and is presented below.

As shown in Figure 11, part of the proposed wind farm is located within 16 km of the SSR at Dooncarton. A close-up Plan View shown is in Figure 12 and shows that nine of proposed turbines (T01, T02, T03, T04, T05, T06, T07, T08 & T09) would be located within 16 km of the SSR.

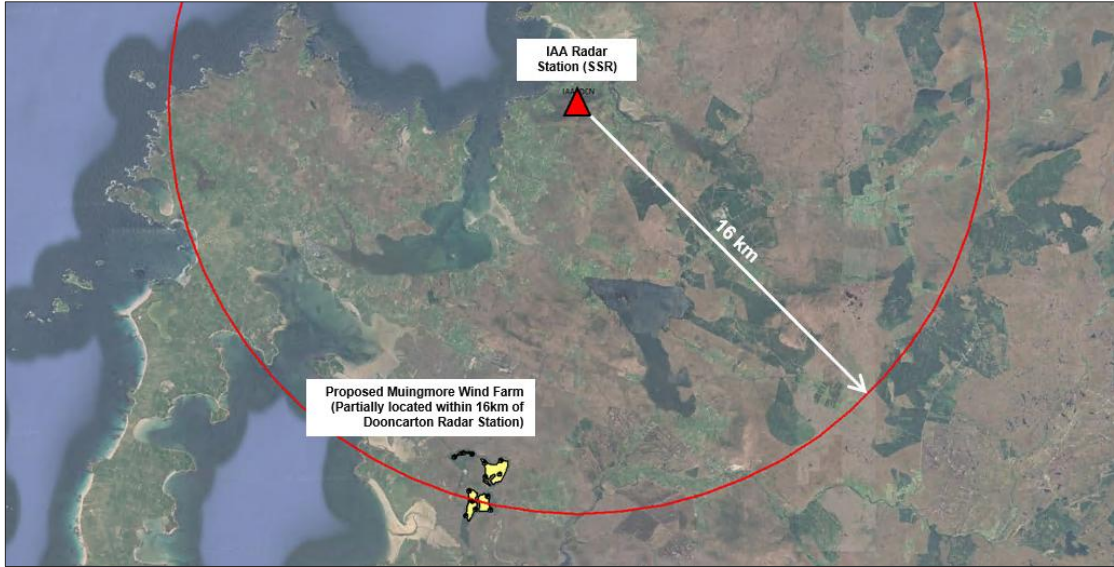


Figure 11. Proposed wind farm is partially located within 16 km of Dooncarton SSR

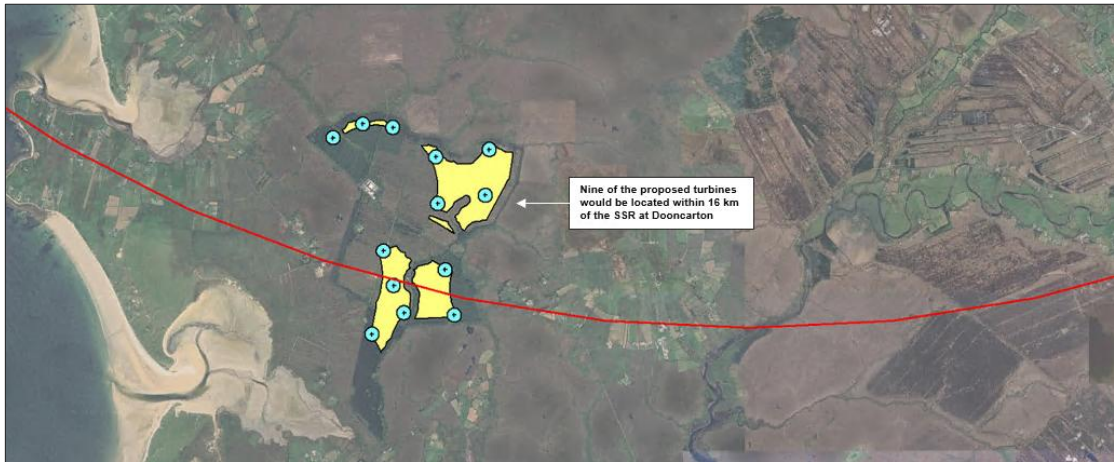



Figure 12. Close-up Plan View showing turbines within 16 km of Dooncarton SSR

To determine if there would be Radar Line-of-Sight (RLoS) between the SSR and these nine turbines, radio path profiles were generated. The SSR radar path profiles show that RLoS conditions do not exist for any of the nine turbines that are located within 16 km of the SSR at Dooncarton. Figure 13 shows the SSR Path Profile for Turbine T01. The radar path profiles for all of the proposed wind turbines can be found in Appendix D of this report.

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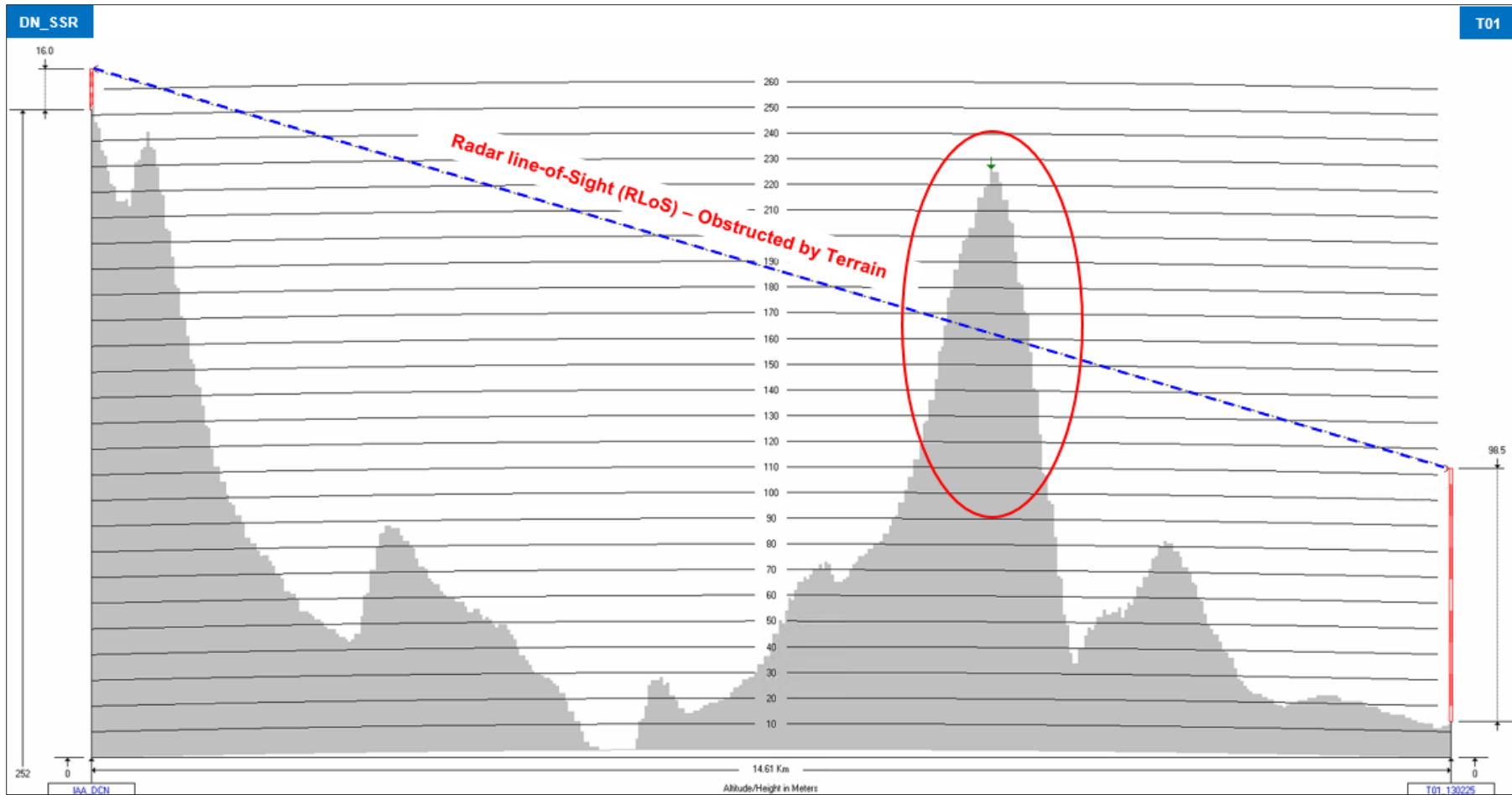


Figure 13. SSR Radar Path Profile T01


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Table 15 below shows the (EuroControl) SSR Assessment Zone applicable to each of the proposed turbines, which have been based on distance from the SSR at Dooncarton and whether a radar line-of-sight condition exists. As the table shows, the EuroControl Guidelines indicate that a detailed SSR radar assessment would not be required for any of the proposed turbines, as RLoS conditions to the SSR do not exist.

ID	Distance from SSR (km)	<16 km of SSR (Yes/No)	In Radar LOS (Yes/No)	Radar Assessment Zone (EuroControl Guidelines)
T01	14.6	Yes	No	Zone 4 - Detailed Assessment Not Required
T02	14.4	Yes	No	Zone 4 - Detailed Assessment Not Required
T03	14.3	Yes	No	Zone 4 - Detailed Assessment Not Required
T04	14.5	Yes	No	Zone 4 - Detailed Assessment Not Required
T05	14.2	Yes	No	Zone 4 - Detailed Assessment Not Required
T06	14.8	Yes	No	Zone 4 - Detailed Assessment Not Required
T07	15.0	Yes	No	Zone 4 - Detailed Assessment Not Required
T08	15.7	Yes	No	Zone 4 - Detailed Assessment Not Required
T09	16.1	No	No	Zone 4 - Detailed Assessment Not Required
T10	15.7	Yes	No	Zone 4 - Detailed Assessment Not Required
T12	16.2	No	No	Zone 4 - Detailed Assessment Not Required
T13	16.3	No	No	Zone 4 - Detailed Assessment Not Required

Table 15. EuroControl Safeguarding Guidelines – Dooncarton Secondary Surveillance Radar (SSR)

The findings of the above assessment indicate that the proposed turbines at Muingmore will not impact the SSR radar station at Dooncarton.

It should also be noted that there is an existing wind farm (Bunnahowen Wind Farm) in operation in the northwest of County Mayo which is considerable nearer to Dooncarton, than the proposed development at Muingmore. As shown in Figure 14, the turbines at Bunnahowen are just 9.6 km from the SSR at Dooncarton, and are operating without causing any issues to the SSR radar system.

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Figure 14. Existing wind turbines within 16 km of SSR Radar Station at Dooncarton

Aviation Impact Review	Observations	Mitigation Measure Action	Residual Impact
Secondary Surveillance Radar	<p>Although nine of the proposed turbines at Muingmore would be located within 16 km of the SSR at Dooncarton, RLoS conditions do not exist due to terrain shielding, and therefore a detailed SSR radar assessment is not required.</p> <p>It should also be noted that there are existing turbines (i.e. Bunnahowen wind farm), which are much nearer to the SSR than the proposed turbines at Muingmore.</p>	No action	None.

Table 16. Aviation Impact Review – Dooncarton Secondary Surveillance Radar

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2.12 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).

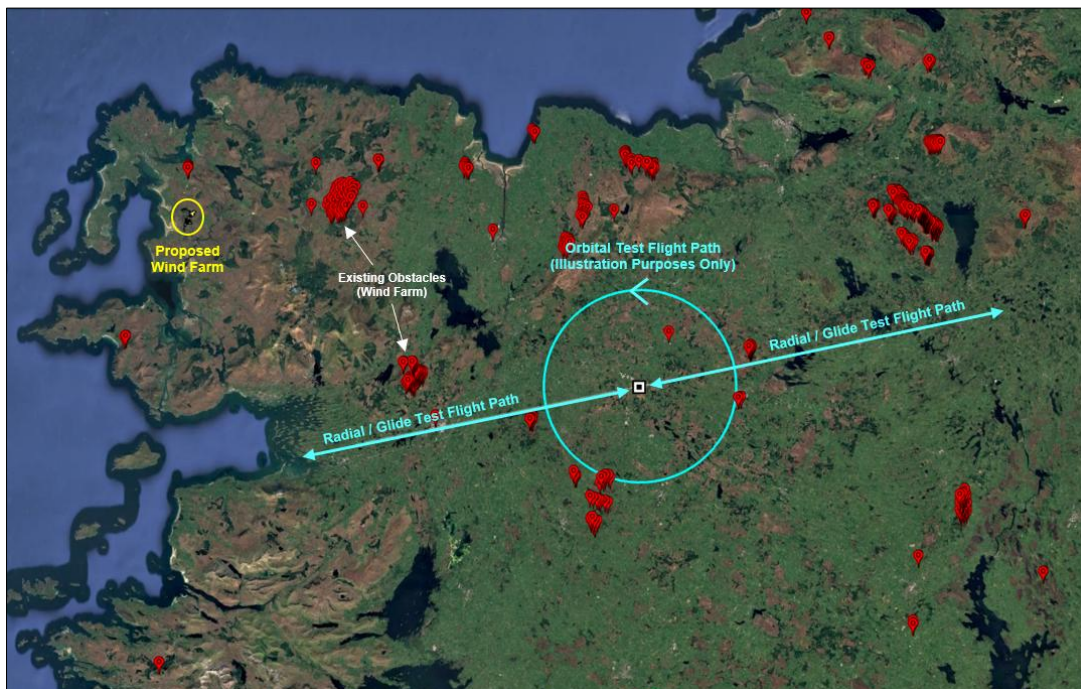


Figure 15. Flight Inspection and Calibration Test Procedures should account for existing obstacles (e.g. terrain and existing wind farms)

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

Table 17. Aviation Impact Review - Flight Inspection and Calibration

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2.13 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. 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	It is likely that the IAA would request that the wind farm, if permitted, would be fitted with Aeronautical Obstacle Warning Lights in accordance with industry standards. Subject to further consultation with the IAA.	None

Table 18. Aviation Impact Review - Aeronautical Obstacle Warning Light Scheme

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2.14 Irish Air Corps / Department of Defence Safeguarding

The Irish Air Corps (IAC) Position Paper “*Air Corps Wind Farm/ Tall Structures Position Paper*” published on 08th August 2014, 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. (Areas contained in Danger Areas EI-D1, EI-D5, EI-D6, EI-D13, EI-D14, Restricted Areas EI-R15, EI-R16 within 20 NM of Baldonnel, MOAs 3 and 4 within 20 NM of Baldonnel.
- Low Flying Training Areas within MOA 4 in the areas of; Blessington, Edenderry/Allenwood/Rathangan, Kilmeague/Newbridge.
- Low Flying Training Area West – LFTA WEST.
- A distance of 5 NM or less from military installations.
- Critical low level flying routes in support of Air Corps operation requirements as described in Figure 16 below.

<p>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.</p> <ul style="list-style-type: none"> (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. <p>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.</p>
--

Figure 16. Irish Air Corps – Critical Low Level Routes

The nearest of the IAC restricted areas to the proposed wind farm is the Low Flying Training Area (LFTA) in Connemara – LFTA WEST. As Figure 17 below shows, the proposed development is located outside all IAC restricted areas and should have no impact on the Irish Air Corps activities.

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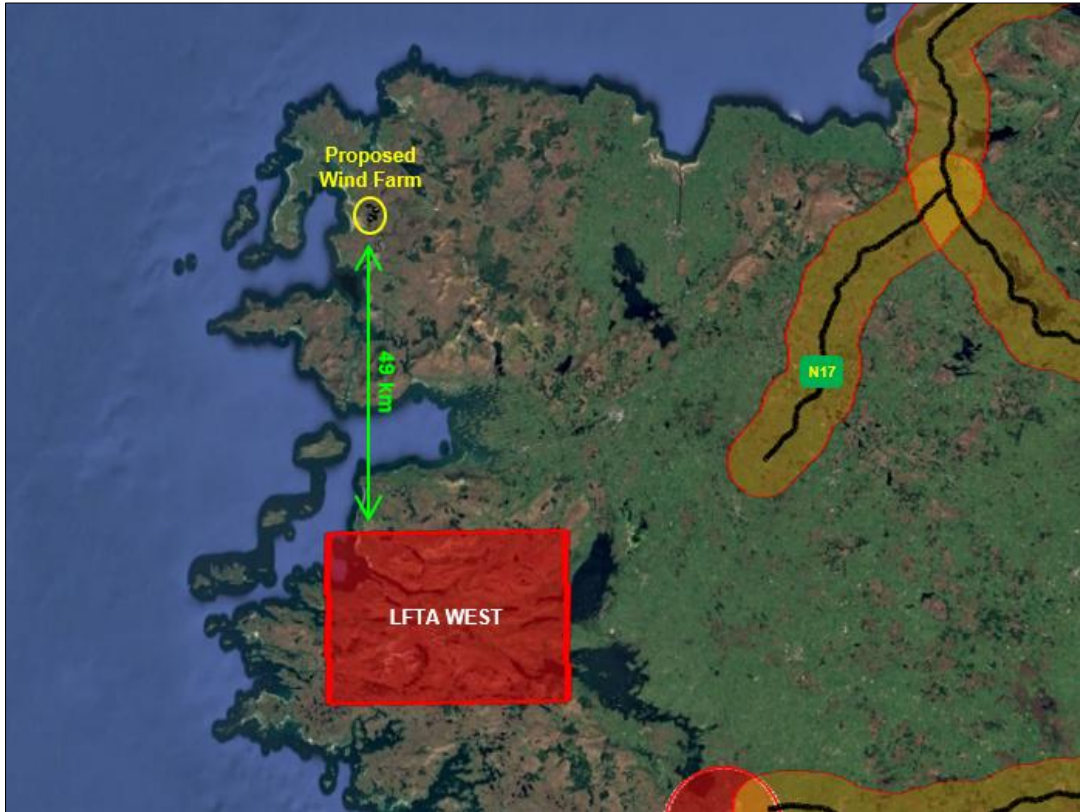



Figure 17. IAC Restricted Areas – LFTA WEST

Aviation Impact Review	Mitigation Measure Action	Residual Impact
Irish Air Corps / Department of Defence Safeguarding	The proposed wind turbines would be required to be included in the IAA Obstacle Data Set and fitted with Aeronautical Obstacle Warning Lights in accordance with industry standards	None.

Table 19. Aviation Impact Review - Irish Air Corps / Department of Defence Safeguarding

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2.15 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). The excerpt below is taken from a response received from the IAC in relation to a third-party wind farm project:

“Having consulted with the subject matter experts in the Irish Air Corps, the Department of Defence wishes to make the following observations:

- *The Department of Defence cannot support, based on military advises, the erection of wind farms or other tall structures within 3 NM of roads identified as critical low level routes in support of operational requirements. The erection of obstacles within low-level helicopter routes could affect the Irish Air Corps ability to access regional areas and to fulfil its role.*
- *If this proposed development was to go to the planning stage, the Department of Defence would be obligated to raise the following concerns and advise the planning authorities that the proposed windfarm*
 - a) *lies wholly within 3 nautical miles of the [Motorway/National Road] which is identified as a critical low level route used by state aircraft on operational taskings. A windfarm or any other tall structures within a low-level route will be an obstacle to state aircraft not operating within the civil rules of the air;*
 - b) *The [Motorway/National Road] low level route requires protection from obstacles for low level state aircraft on operational tasking’s such as:*
 - (i) The Garda Air Support Unit (GASU)*
 - (ii) 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.

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2.15.1 The Garda Air Support Unit (GASU)

The Garda Air Support Unit is based at Casement Aerodrome, Baldonnel 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 18. GASU - Pilatus Britten-Norman BN 2T-4S Defender 4000



Figure 19. GASU - Eurocopter EC135 T2


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The proposed wind farm is located in an area that is sparsely populated and on forested / boggy 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.

GASU Aircraft	Impact of proposed wind farms - Opinion
Fixed-wing Airplane (Pilatus Britten-Norman BN 2T-4S Defender 4000)	Low – Fixed-wing aircraft are unlikely to be deployed in low level activity in the subject areas. 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 (Eurocopter EC135 T2)	Low – Helicopter landings in the subject area would not occur as the proposed wind farm located in forested / boggy terrain. 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.

Table 20. Impact of proposed wind farm on GASU Operations

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2.15.2 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 Muingmore is the base in Athlone. The flight times from the EAS base at Athlone are shown in Figure 15.



Figure 20. EAS – Flying Times from Athlone

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Helicopter landings are highly unlikely to occur in the subject area due to the forested / boggy terrain of the proposed site.

Also, 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. 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 should have no impact on EAS flights from Athlone.

EAS Aircraft	Impact of proposed wind farms – Opinion
Helicopter (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 / boggy 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 and would be clearly marked in aviation charts.</p>

Table 21. Impact of proposed wind farm on EAS Operations

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3. Summary

A summary of the aviation review for the proposed wind farm at Muingmore is provided in Table 22 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	Turbines at the proposed wind farm would not penetrate the ICAO Annex 15 Aerodrome Surface for Ireland West Airport. 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. It should be noted that there are other existing tall structures nearer to Ireland West Airport (e.g. Oweninny, Raheen Barr wind farms) which are already listed in the IAA Aeronautical Electronic Obstacle Data Sets.
Building Restricted Areas	None	A review shows that Muingmore is more than 65 km from the BRAs 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 standard instrument flight procedures for Ireland West Airport are unlikely to be impacted for precision aircraft.
Communication and Navigation Systems	None	As the proposed wind farm is approximately 73 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.
Shannon PSR	None	A review of the Eurocontrol guidelines for PSR radar systems indicates that there will be no impacts to PSR radar due to the proposed wind farm development.
Dooncarton SSR	None	Radar Line-of-Sight (RLoS) analysis indicates that RLoS conditions do not exist between the SSR at Dooncarton and any of the proposed turbines at Muingmore. Therefore the turbines would be in EuroControl Radar Assessment Zone 4 and a detailed SSR radar should not be required by the IAA. It should also be noted that there is an existing wind farm in operation which is considerable nearer to Dooncarton, than the proposed development at Muingmore. The turbines at this wind farm (Bunnahowen WF) are just 9.6 km from the SSR at Dooncarton and are operating without causing any issues to the SSR radar system.
Flight Inspection and Calibration	None	A review of the Flight Inspection and Calibration Procedures indicates that there will be no impacts due to the proposed wind farm development.
Aeronautical Obstacle Warning Light Scheme	None.	It is possible that the IAA may request that the wind farm, if permitted, would be fitted with Aeronautical Obstacle Warning Lights in accordance to industry standards. Subject to further consultation with the IAA.
Irish Air Corps / DoD Safeguarding	None	An assessment of Air Corps Wind Farm/ Tall Structures Position Paper indicates that there would be no impact on IAC activities due to the proposed wind farm development.
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 22. Muingmore Wind Farm – Aviation Review Summary


AiBridges <small>Total Communications Solutions</small>	Procedure: 001	Rev: 4.0
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APPENDIX A – Wind Turbine Co-ordinates

The coordinates and dimensions of the wind turbines considered in this Aviation Review are provided in Table A1 below.

Turbine ID	Co-ordinates (ITM)		Hub-height (m)	Rotor Radius (m)
	Latitude	Longitude		
T01	475806	823891	98.5	81.5
T02	476156	824041	98.5	81.5
T03	476506	823991	98.5	81.5
T04	476998	823635	98.5	81.5
T05	477624	823705	98.5	81.5
T06	477564	823173	98.5	81.5
T08	477006	823091	98.5	81.5
T09	476357	822557	98.5	81.5
T10	476464	822151	98.5	81.5
T12	477072	822318	98.5	81.5
T13	477164	821788	98.5	81.5

Table A1 -Turbine Co-ordinates (Turbine Layout 13.02.25)

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APPENDIX B - ICAO Annex 15 Area 1 and Area 2 Surfaces.

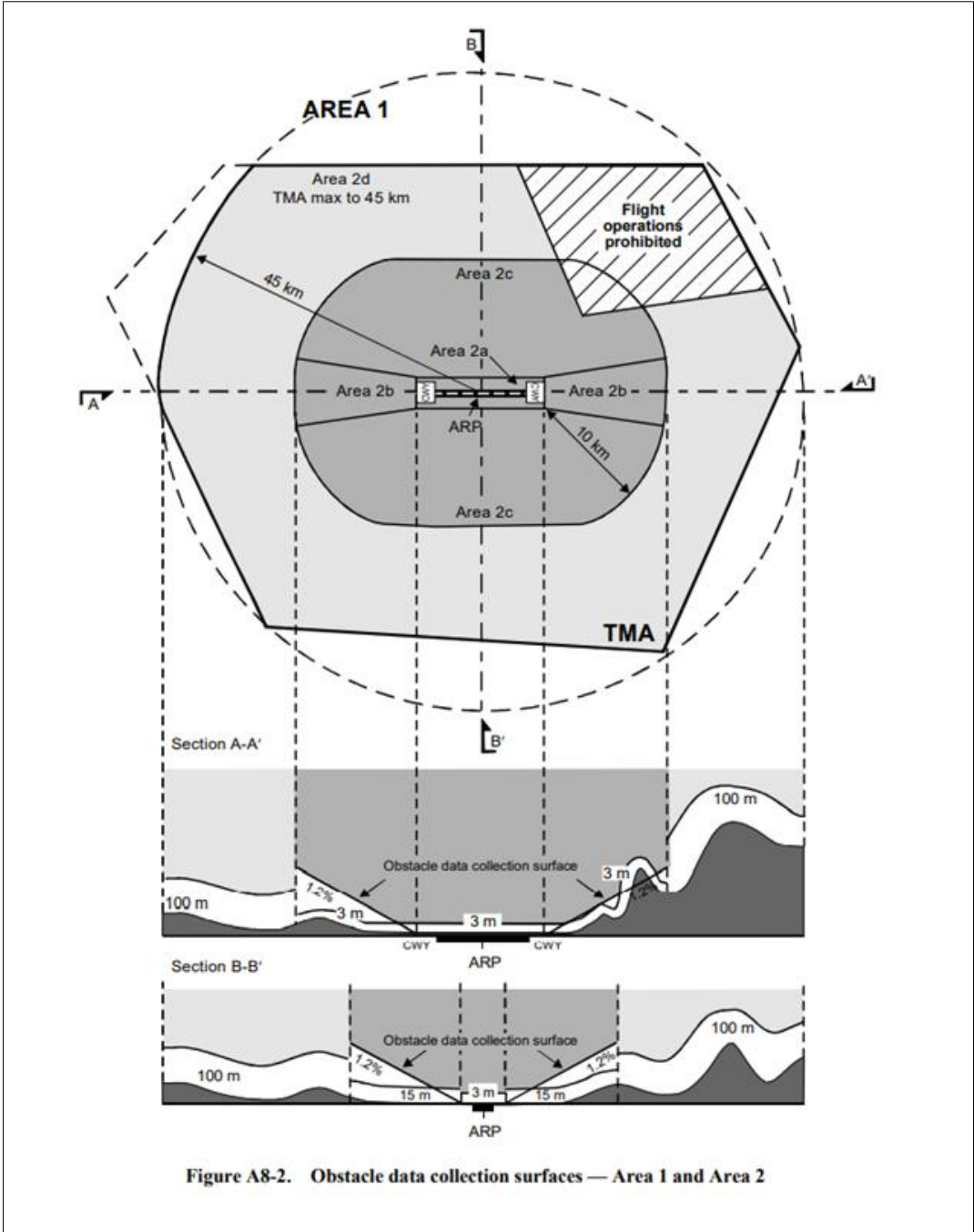


Figure B1. ICAO Annex 15 Area 1 and Area 2 Surfaces.

APPENDIX C - ICAO Building Restricted Areas

Figure C1 below shows an example BRA shape for directional facilities. Table C1 provides harmonized guidance figures for the directional navigational facilities in accordance with Figure C1.

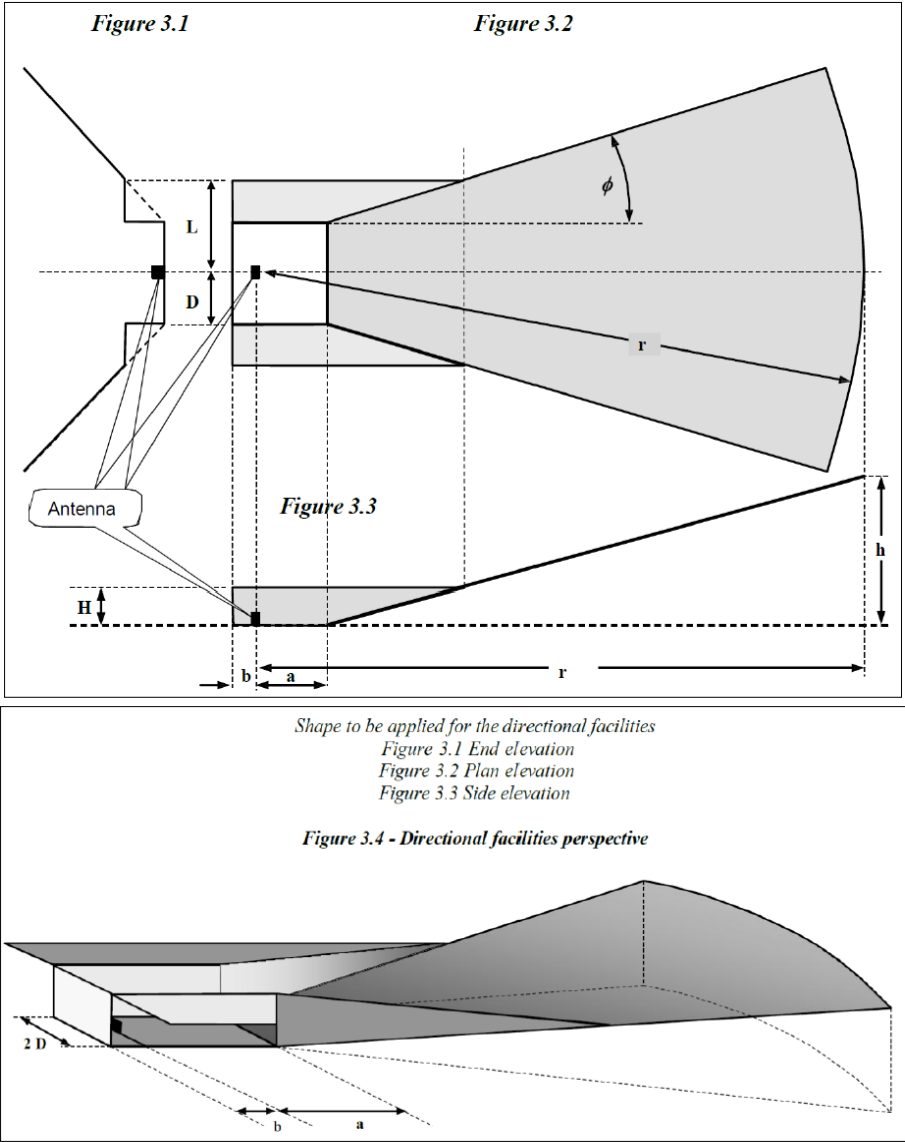



Figure C1 - Example BRA shape for directional facilities (ICAO EUR DOC 015 Figures 3.1-3.4)

Type of navigation facilities	A (m)	b (m)	h (m)	r (m)	D (m)	H (m)	L (m)	ϕ (°)
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 C1 - Harmonized guidance figures for the directional navigational facilities (ICAO EUR DOC 015 Table 2)

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APPENDIX D – Dooncarton SSR Path Profiles

Figures D1 to D13 below show the Radar Path Profile between the SSR at Dooncarton to each of the proposed turbines at Muingmore.

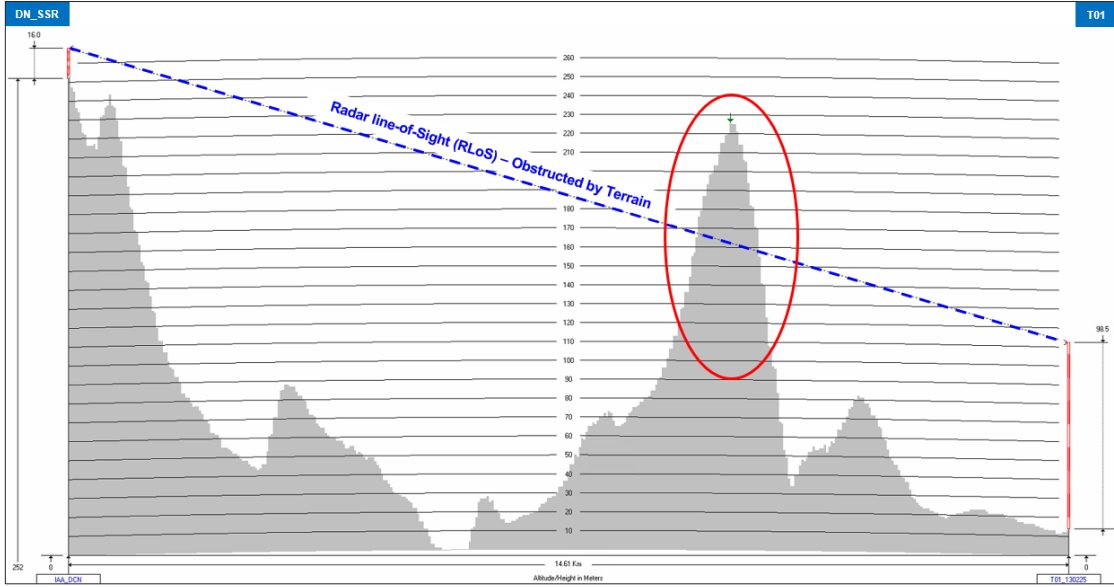


Figure D1. Dooncarton SSR RLOS – T01

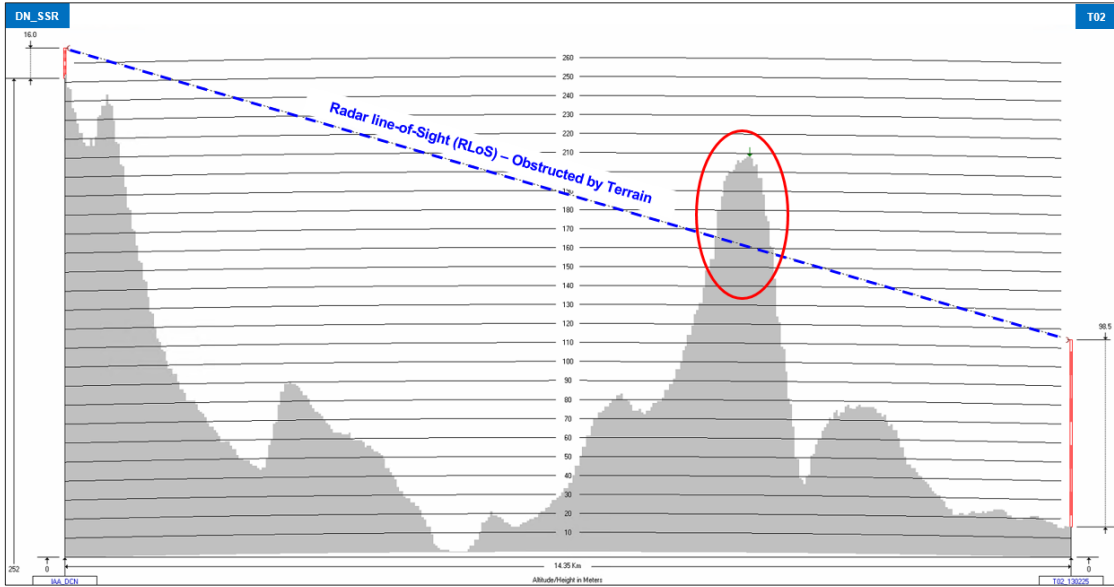



Figure D2. Dooncarton SSR RLOS – T02

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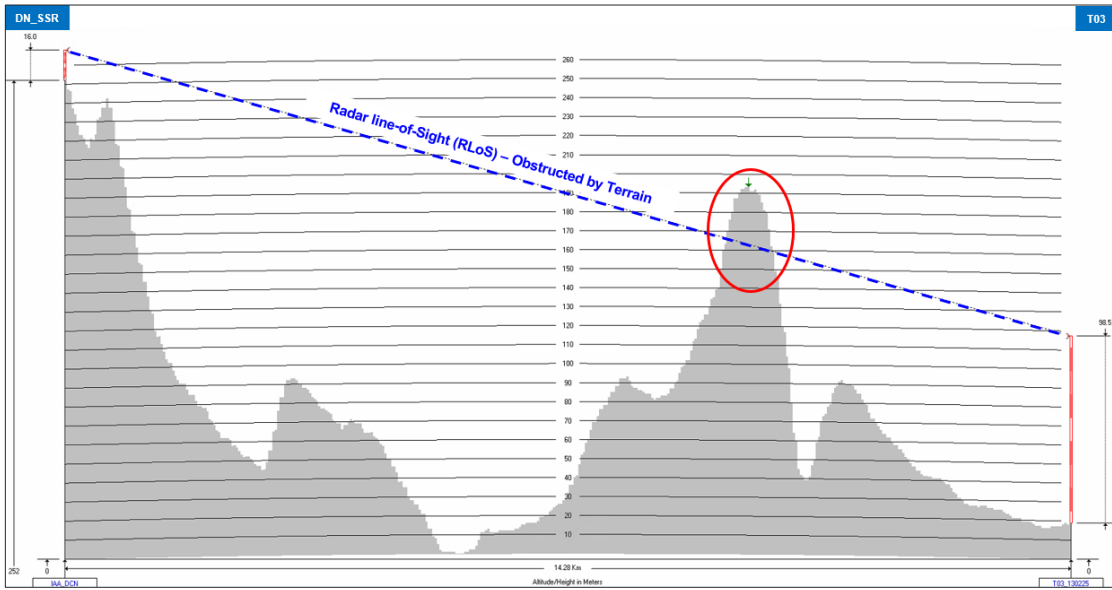


Figure D3. Dooncarton SSR RLOS – T03

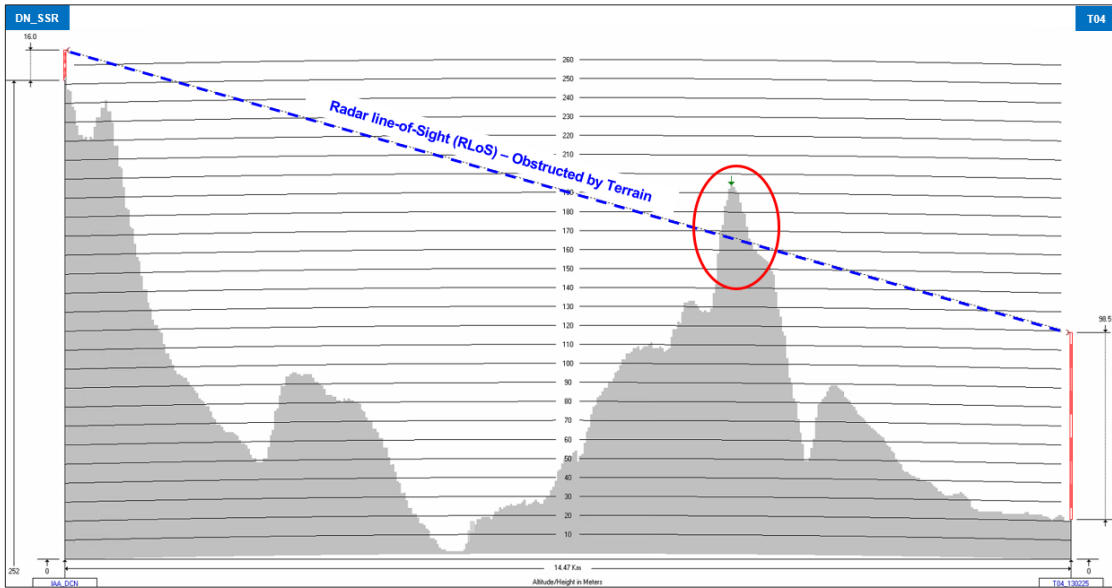



Figure D4. Dooncarton SSR RLOS – T04

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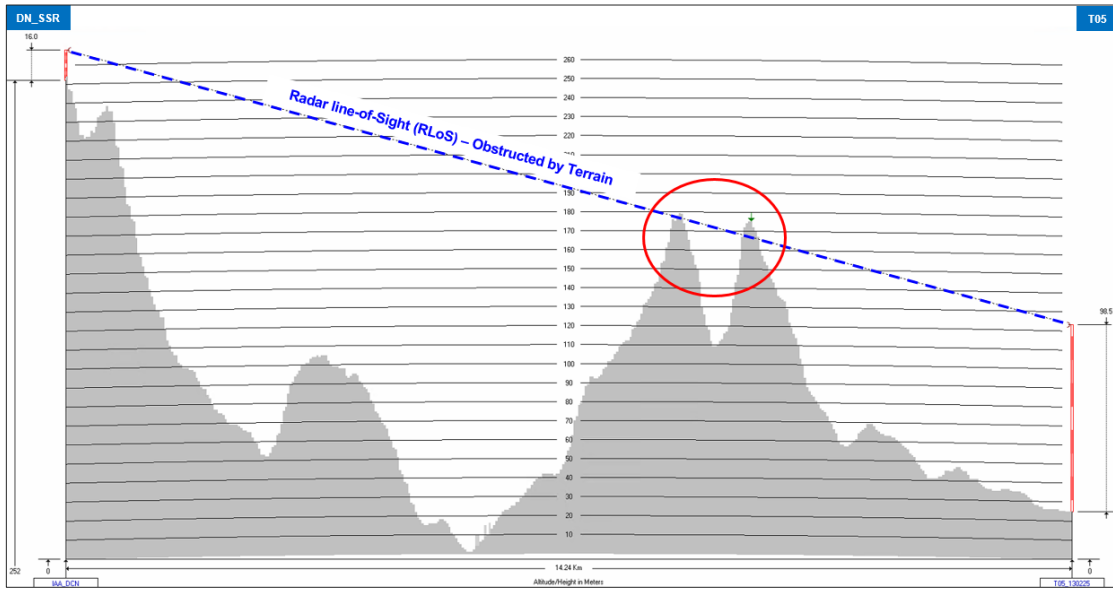


Figure D5. Dooncarton SSR RLOS – T05

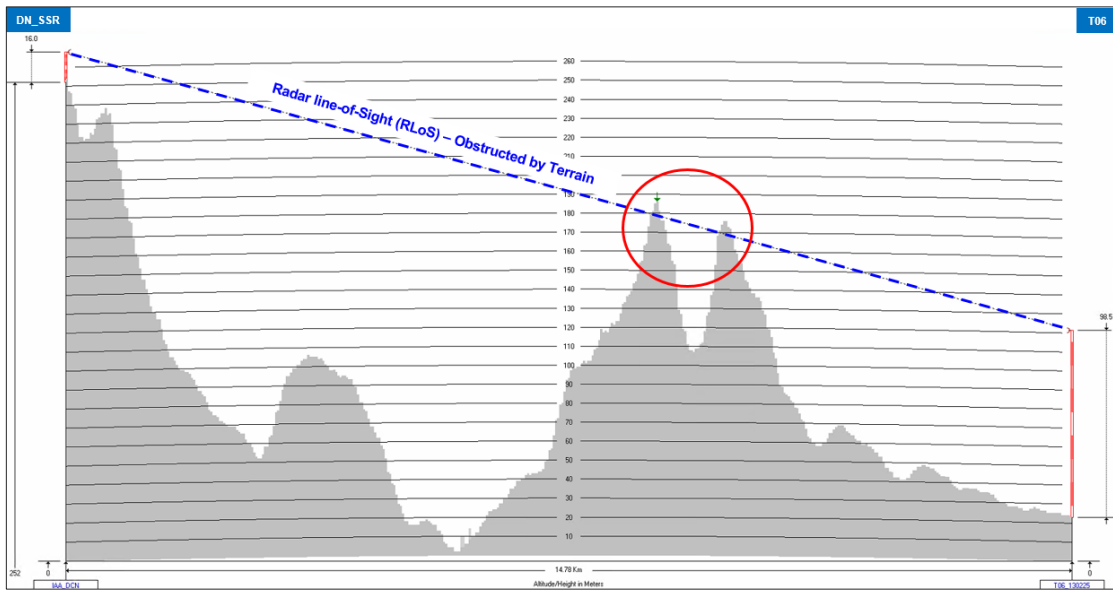



Figure D6. Dooncarton SSR RLOS – T06

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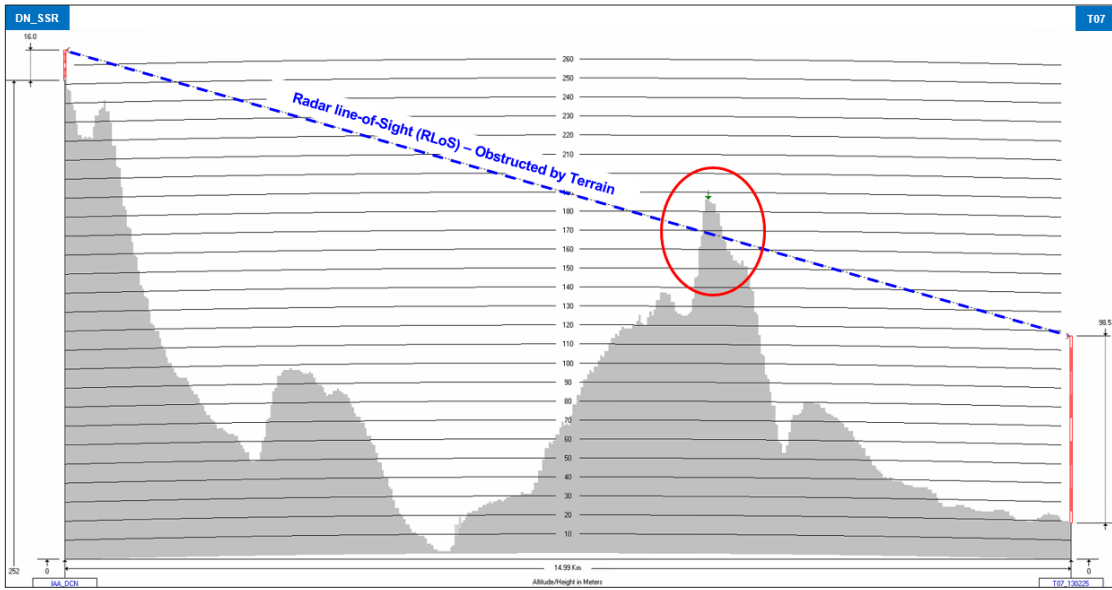


Figure D7. Dooncarton SSR RLOS – T07

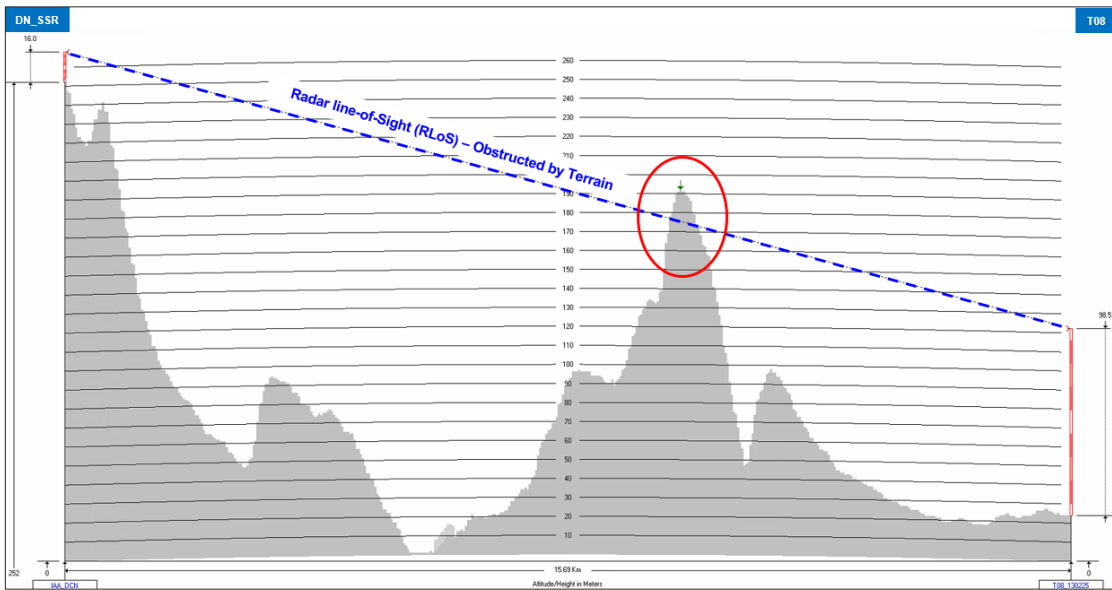


Figure D8. Dooncarton SSR RLOS – T08

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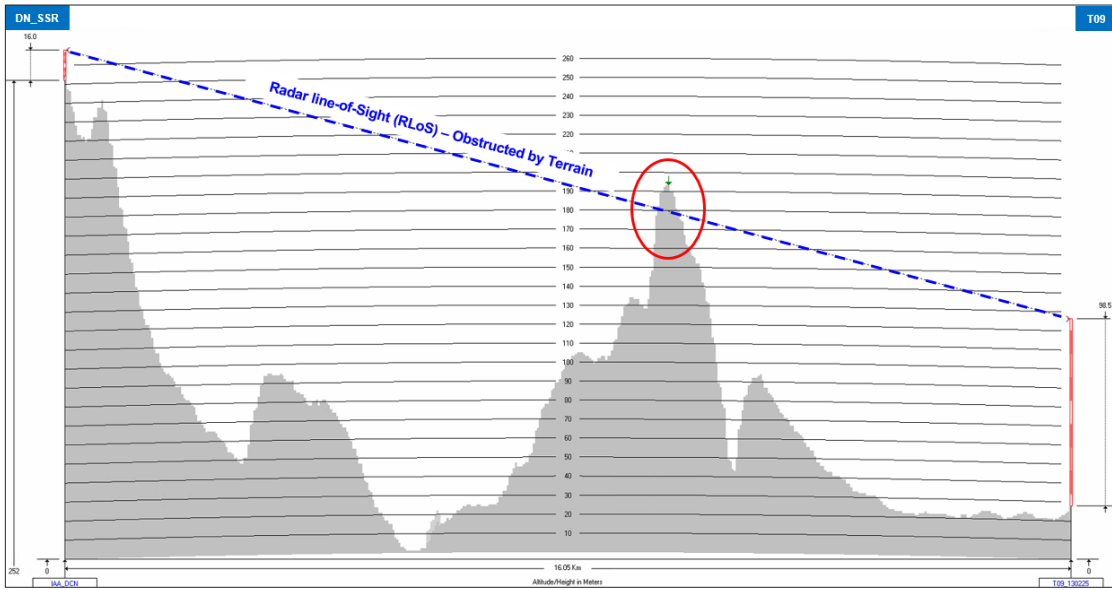


Figure D9. Dooncarton SSR RLOS – T09

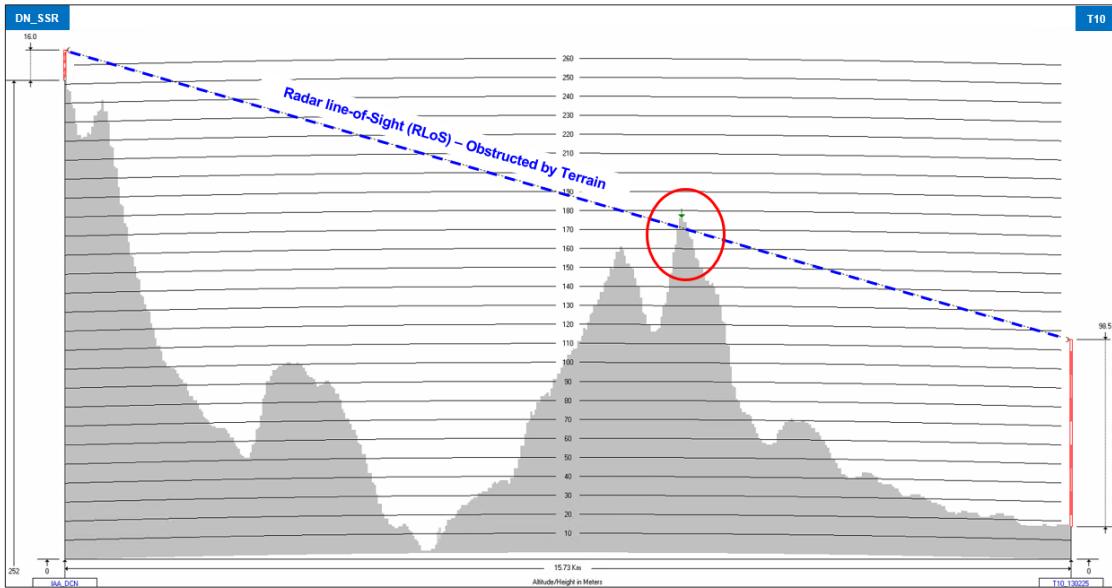


Figure D10. Dooncarton SSR RLOS – T10

	Procedure: 001	Rev: 4.0
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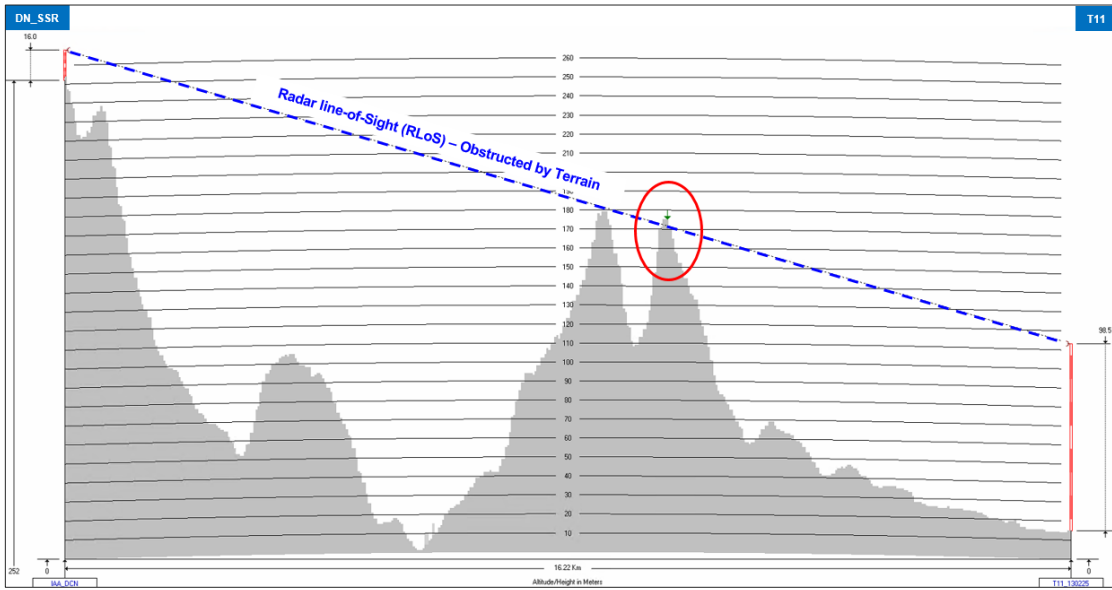


Figure D11. Dooncarton SSR RLOS – T11

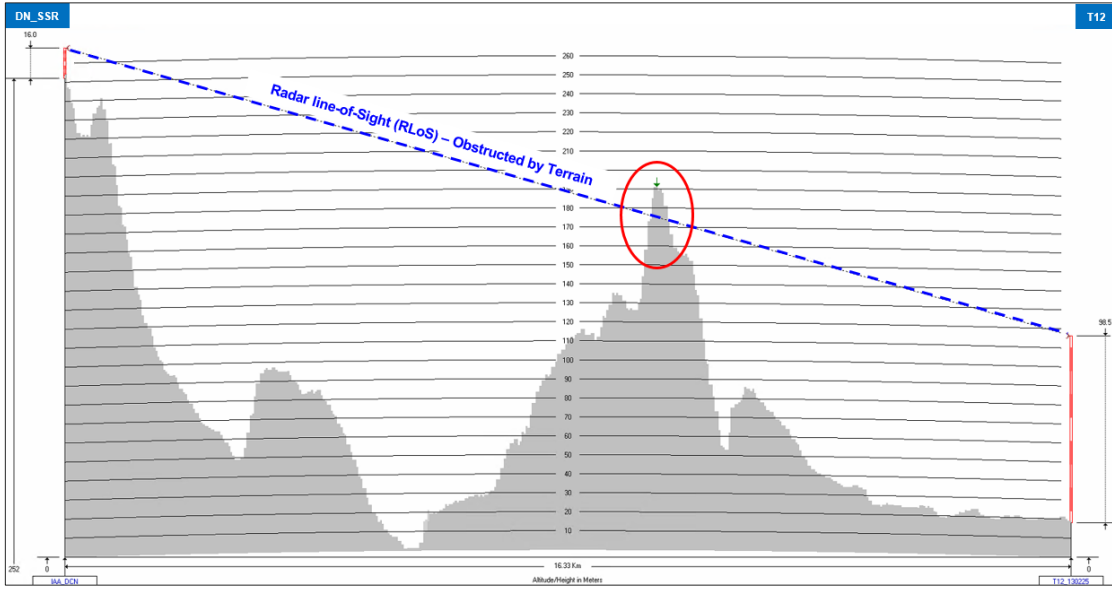



Figure D12. Dooncarton SSR RLOS – T12

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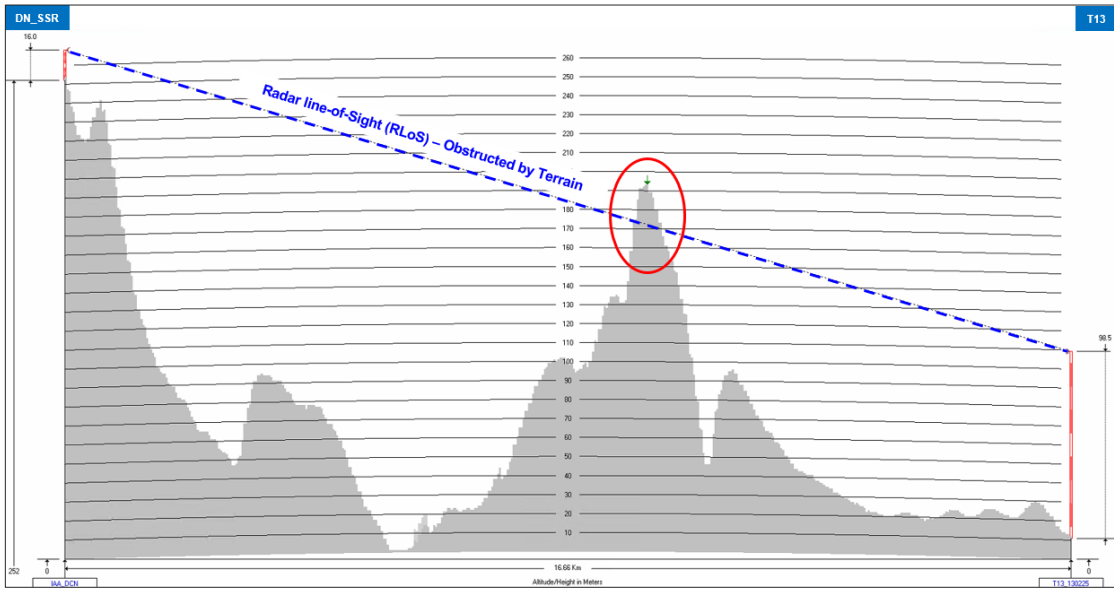


Figure D13. Dooncarton SSR RLOS – T13

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Ceanncheatru an Aer Chor
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.

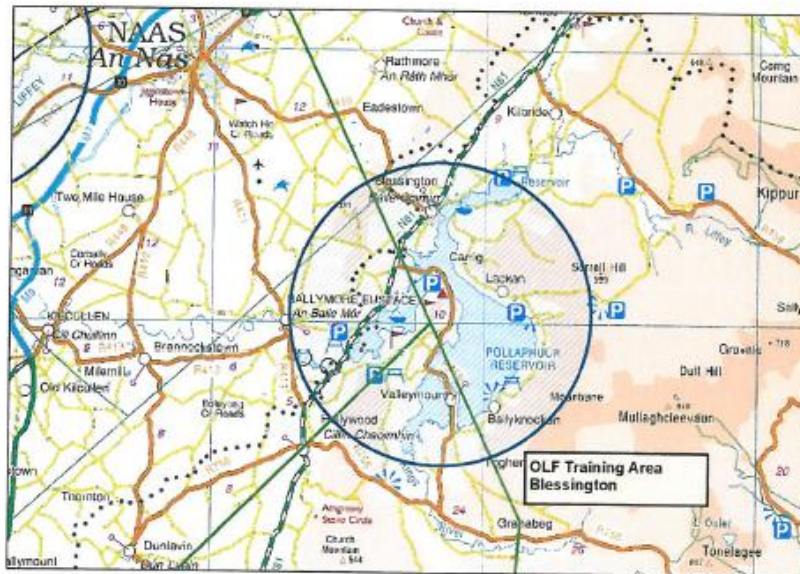
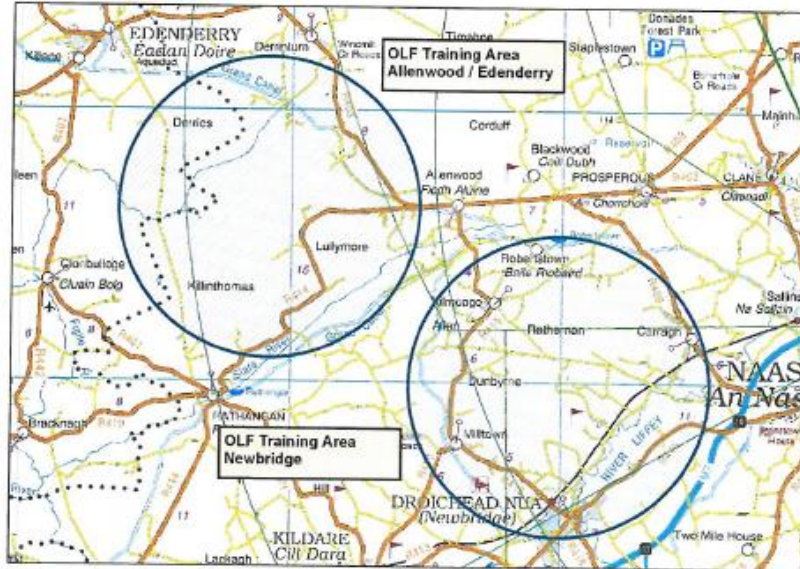
Applications or proposals for structures in these areas of a height greater than 45m above ground level at the site of the object must be referred to Irish Air Corps for assessment of potential impact on flight operations.


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.

Annex A
Low Flying Areas - MOA 4




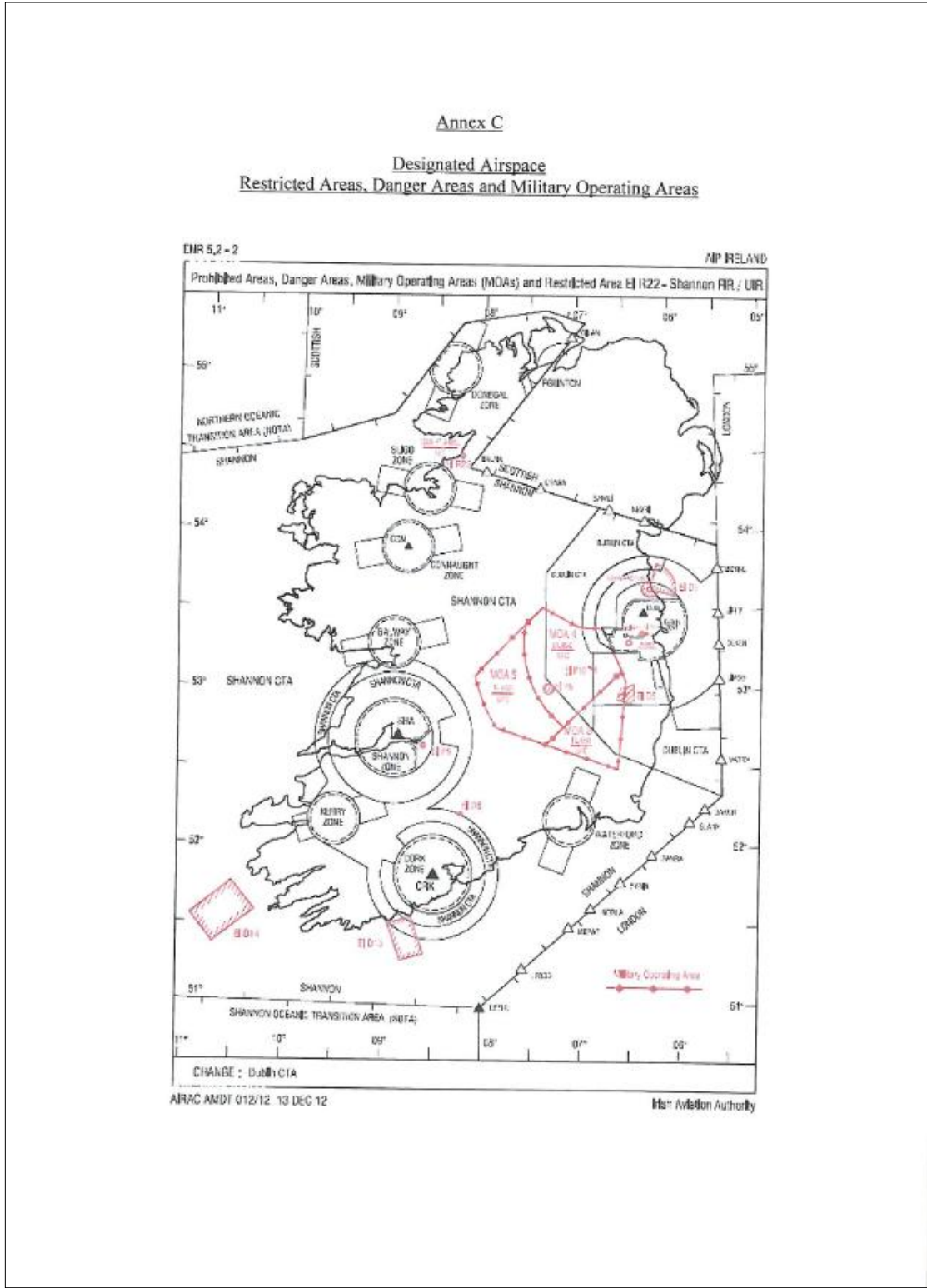
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Annex B

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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