ÚDARÁS EITLÍOCHTA NA hÉIREANN
IRISH AVIATION AUTHORITY

IAA - National Aviation Safeguarding Framework

Consultation Document

September 2025

Table of Contents

1. National Aviation Safeguarding Framework Objectives 7
2. Aviation Regulatory Requirements 8
3. Safeguarding of Aerodromes and their Surroundings 10
4. Safeguarding of Air Navigation Service Provider Technical Facilities 16
5. Planning Authorities 18
6. Obstacles to Aircraft in Flight 21
7. Wind Turbine Developments 24
8. Solar Photovoltaic (PV) Developments / Solar Energy Systems 30
9. Unmanned Aircraft Systems (UAS) 32
10. Stakeholder Communication 34
11. Appendix A – Shielding Principles 35
12. Appendix B – Marking and Lighting of Obstacles 37
13 Appendix C – Dangerous Lights 40
14. Definitions 41
15. Glossary 44
16. References 46

Irish Aviation Authority National Aviation Safeguarding Framework

Stakeholder Consultation

The Irish Aviation Authority (IAA) invites stakeholders and members of the public to a consultation on the proposed National Aviation Safeguarding Framework.

In line with the Irish Aviation Authority's (IAA) Statement of Strategy on Stakeholder Engagement, the organisation is committed to consulting with its stakeholders, civil society and the public on policy-making matters. This involves undertaking a systematic process of meaningful engagement and knowledge sharing with those outside the policy-making process who have a clear interest in a particular policy area, in order to better inform that process.

Effective consultation allows the IAA to make informed decisions on matters of policy, to improve the delivery of public services, and to improve accountability.

Comments on the Safeguarding Framework document should be submitted using the **comment response document**.

The closing date for this Stakeholder consultation is 30th September 2025.

Please note:

- All submissions will be published on our website.
- Personal details are requested in case we need to clarify your comments.
- If a submission contains confidential material, it should be clearly marked as confidential and a redacted version suitable for publication should also be provided.
- We do not edit submissions. Any party making a submission has sole responsibility for its contents and indemnifies us in relation to any loss or damage of whatever nature and howsoever arising suffered by us as a result of publishing or disseminating the information contained within the submission.

The table below lists the amendment record of the Irish Aviation Authority's National Aviation Safeguarding Framework. It is used to record updates or amendments to the document which may be required in light of developments in the subject matter.

Amendment Record:

Issue No.	Issue Date	Source / Entered by	Comments
-	01/09/2025	Manager – Aerodromes Division	Issued for Consultation.

Executive Summary

Background

The Irish Aviation Authority (IAA) is a commercial semi-state company (Designated Activity Company) and the single civil aviation regulator for Ireland. The IAA is responsible for the regulation of safety, security and consumer interests.

The IAA is required to exercise its functions in accordance with the standards laid down by the International Civil Aviation Organisation (ICAO), European Union legislation and regulatory requirements and national regulations. A key safety objective of the IAA is to provide a safe airspace environment for the operation of aircraft. In this regard, the IAA publishes aeronautical information including aeronautical charts containing, inter alia, topographical and man-made obstacle data to enable aircraft operators and pilots to plan and conduct flights in a safe and orderly manner.

The IAA's regulatory functions and responsibilities include but are not limited to the issuance of licences, certificates, approvals, permits governing activity in the civil aviation sector.

Compliance with the relevant requirements must be met in order to obtain and / or continue to exercise the privileges of the certificate/licence or other form of approval issued by the IAA.

For instance, an aerodrome operator is required to monitor their aerodrome and its surroundings with regard to human activities and land use. In many cases, other legislation, including legislation which is not specifically directed at aviation also applies to this activity and Government departments or other State agencies (e.g. local government authorities) have statutory responsibility in the area. For example, whereas the IAA grants a certificate or licence to operate as an aerodrome, it has no regulatory powers to approve or reject a planning application for an aerodrome. This power is vested in the relevant Local Planning Authority (LPA) and An Coimisiún Pleanála (the agency formally known as An Bord Pleanála (ABP)) which have statutory responsibility for land use planning in the State.

Regulations made pursuant to the Planning & Development Act 2024 (as amended) take account of the IAA's role by according it 'Prescribed Body' status which requires that it will be consulted by the relevant LPA where it appears that a proposed development may endanger or interfere with the safety of, or the safe and efficient navigation of aircraft.

Any development (e.g. building, antenna, mast, wind turbine developments, crane, solar photovoltaic array development, landfill, excavation and spoil including vegetation, sustainable urban drainage scheme (SuDS) / attenuation pond, etc.) near an aerodrome or its Communications, Navigation and Surveillance equipment (CNS) facilities may require assessment by a specialist aviation consultant for its potential to affect the safe operation of aircraft. Developments outside the vicinity of an aerodrome may also be relevant if they are located in the vicinity of CNS facilities and/or are 45 metres or higher above ground or water level.

Government policy on energy from renewable sources has seen an increase in the construction of onshore wind turbine developments with associated distribution networks which may constitute obstacles to air navigation and / or adversely affect the technical facilities (e.g. en-route surveillance radar installations) operated by the Irish Air Navigation Service Provider, Air Nav Ireland which is the designated air navigation service provider in the State.

Plans for an increase in offshore wind turbine developments are at an advanced stage. Offshore wind turbine developments are excluded from the provisions of the Planning & Development Act 2000 (as amended) but are administered by the Maritime Area Regulatory Authority (MARA) under the aegis of the Department of Environment, Climate and Communications. Refer to section 7.2 for further information.

Solar photovoltaic (PV) developments are increasing in number as the energy industry moves towards greener methods of energy production. These are of varying size and type, ranging from roof mounted panels on residential / industrial developments, to large scale solar farm type developments that can occupy in the order of 130 hectares of land. The geometry of an aerodrome is such that there can be relatively large open spaces which give opportunity for the installation of solar photovoltaic energy developments. Such developments may require an evaluation in the form of a 'Glint and Glare' assessment conducted by a specialist consultant to ensure the proposal has no adverse effects on the safety of aviation activities at, or within the vicinity of an aerodrome.

All of these developments may be assessed from the perspective of aviation safety. This document sets out the IAA's National Aviation Safeguarding Framework in this regard. Other entities within aviation other than the IAA may however be interested in reviewing a development that may have a consequential impact on their present and future activities.

1. National Aviation Safeguarding Framework Objectives

The IAA's National Aviation Safeguarding Framework is developed with the objective of:

(a) Providing a consistent and effective state framework to safeguard both aerodromes and local communities from inappropriate developments on an aerodrome and the areas around an aerodrome which may affect the safety and regularity of aviation activities; and;

(b) Safeguarding aviation infrastructure required for the enroute navigation of aircraft located away from aerodromes.

For other developments that do not fall within the boundaries of the obstacle limitation surfaces (OLS)[1] established for a certificated or nationally licensed aerodrome, the IAA will assess whether such developments constitute an obstacle to air navigation, consistent with Area 1 2 requirements and as defined in S.I. 215 of 2005 (Obstacle to Aircraft in Flight) Order. For further information on terrain and obstacle data collection areas refer to section 6.2.

As stated heretofore, this National Aviation Safeguarding Framework recognises that responsibility for land use planning and zoning objectives[3] rests primarily with State and Local Government Agencies, but stakeholder consultation can assist in improving planning outcomes near aerodromes and associated aircraft flight paths. Responsibility for the regulation of flight safety however rests with the IAA and so this framework document aims to encourage a consultative and collaborative approach to effective land use planning in the vicinity of aerodromes. This is to align with the requirements established by ICAO and EASA, as applicable.

Agencies at both State and Local Government level should engage with aerodrome operators to achieve a satisfactory conclusion for local communities while ensuring safe aerodrome operations.

The National Aviation Safeguarding Framework includes information to guide State and Local Government agencies in regulating and managing the following, as applicable:

1) Intrusions into the protected operational airspace of aerodromes;
2) Wildlife strikes in the vicinity of aerodromes;
3) Building generated windshear and turbulence at, or in the vicinity of aerodromes;
4) Protection of on-aerodrome and off-aerodrome CNS equipment;
5) Distraction to pilots from lighting or sources of glint and / or glare both on and in the vicinity of aerodromes;
6) Wind turbine developments as physical obstacles to air navigation, interference with performance of CNS equipment and potential for wind turbulence;
7) Protection of strategically important aerodromes used by helicopters operating SAR and HEMS operations;
8) Unauthorised drones affecting aviation activities at aerodromes.

[1] Obstacle Limitation Surfaces means a series of imaginary surfaces in space with specific dimensions and gradients which define the limits to which objects may project vertically into the airspace surrounding an aerodrome so as to permit aircraft to be operated safely.
[2] Area 1: obstacles affecting air navigation in Area 1 (the entire State territory), An obstacle whose height above the ground is 100 metres and higher is considered an obstacle for Area 1 in Irish Airspace.
[3] "Zoning objectives" means objectives for the zoning of land for a particular use or mixture of uses included in a development plan.

2. Aviation Regulatory Requirements

The safeguarding methodology described within this framework document meets International Civil Aviation Organisation (ICAO) Standards and Recommended Practices (SARPs), European Union (EU) legislation and regulations and national regulations which state the following:

a) ICAO Annex 14, Chapter 4, Obstacle Restriction and Removal, Volume 1 - Aerodromes

The objectives of the specifications in this chapter are to define the airspace around aerodromes to be maintained free from obstacles so as to permit the intended aeroplane operations at the aerodromes to be conducted safely and to prevent the aerodromes from becoming unusable by the growth of obstacles around the aerodromes. This is achieved by establishing a set of obstacle limitation surfaces (OLS) that define the limit to which objects may project into the airspace.

Objects which penetrate the obstacle limitation surfaces may in certain circumstances cause an increase in the obstacle clearance altitude/height for an instrument approach procedure or any associated visual circling procedure or have other operational impact on flight procedure design.

Action shall be taken to decrease the risk to aircraft operations by adopting measures to minimise the likelihood of collisions between wildlife and aircraft.

b) ICAO Annex 14, Chapter 4, Obstacle Environment, Volume 2 - Heliports

The objectives of the specifications in this chapter are to define the airspace around heliports so as to permit intended helicopter operations to be conducted safely and to prevent, where appropriate, heliports from becoming unusable by the growth of obstacles around them.

c) European Regulation (EU) 2018/1139 Article 38

Member States shall take the necessary measures to ensure that aerodromes located in their territory are safeguarded against activities and developments in their surroundings which may cause unacceptable risks to aircraft using the aerodrome.

The aerodrome operator shall monitor activities and developments which may cause unacceptable safety risks to aviation in the surroundings of the aerodrome for the operation of which they are responsible. The operator shall take the necessary measures to mitigate those risks in as far as this lies within their control and, where that is not the case, bring those risks to the attention of the competent authorities of the Member State where the aerodrome is located.

In order to ensure the uniform application of this Article, the Commission shall, on the basis of the principles set out in Article 4 and with a view to achieving the objectives set out in Article 1, adopt implementing acts laying down detailed provisions. Those implementing acts shall be adopted in accordance with the examination procedure referred to in Article 127(3)

d) European Regulation (EU) 139/2014, Article 8

Member States shall ensure that consultations are conducted with regard to safety impacts of constructions proposed to be built within the limits of the obstacle limitation and protection surfaces as well as other surfaces associated with the aerodrome.

Member States shall ensure that consultations are conducted with regard to safety impacts of constructions proposed to be built beyond the limits of the obstacle limitation and protection surfaces as well as other surfaces associated with the aerodrome, and which exceed the height established by Member States.

Member States shall ensure coordination of the safeguarding of aerodromes located near national borders with other Member States.

e) European Regulation (EU) 139/2014, Article 9

Member States shall ensure that consultations are conducted with regard to human activities and land use such as:

a. *any development or change in land use in the aerodrome area.*
b. *any development which may create obstacle-induced turbulence that could be hazardous to aircraft operations.*
c. *the use of hazardous, confusing and misleading lights.*
d. *the use of highly reflective surfaces which may cause dazzling.*
e. *the creation of areas that might encourage wildlife activity harmful to aircraft operations.*
f. *sources of non-visible radiation or the presence of moving or fixed objects which may interfere with, or adversely affect, the performance of aeronautical communications, navigation and surveillance systems.*

f) National Regulation S.I. 215 of 2005 (Obstacles to aircraft in flight) Order

S.I. 215 of 2005 (Obstacles to aircraft in flight) provides for appropriate notification to aerodrome operators and the IAA with regard to developments greater than 45m above ground or water surface level or that will penetrate an aviation related surface. It provides for the undertaking of an aeronautical study if deemed necessary, to assess the potential implication of a development and the marking and / or lighting of an object established as an obstacle impacting on the safe operation of aircraft.

3. Safeguarding of Aerodromes and their Surroundings

3.1 General Requirements

The surroundings of an aerodrome have unique characteristics that impact on land use. Specific requirements for the operation of aircraft, including aerodrome design and airspace management are defined in European Regulations (EU) 2018/1139, 139/2014, 2017/373 and national regulation (S.I. 355 of 2008), as applicable. The regulatory oversight of these requirements in the State is undertaken by the IAA under the Irish Aviation Authority Act 1993 and the Air Navigation and Transport Act 2022.

The objective of aerodrome safeguarding is to assess the implications of any development being proposed at, and within the vicinity of an aerodrome to ensure, as far as practicable, that the aerodrome and its surrounding airspace is not adversely impacted by the proposal, thus ensuring the continued safety of aircraft while taking off, landing or flying in the vicinity of the aerodrome.

Operators of public use aerodromes[4] holding a certificate under European (EU) regulation or a licence under national regulation are required by the IAA to have in place a procedure for safeguarding their aerodrome against the growth of obstacles, or activities that may present a hazard to safe aircraft operations (e.g. wildlife activity, glint and glare, hazardous and confusing lighting, building induced turbulence, sources of non-visible radiation, unauthorised drones).

The operator of such an aerodrome is obligated by the IAA to prepare a safeguarding map and submit it to the relevant LPA. The purpose of an aerodrome safeguarding map is to identify those areas at, or within the vicinity of the aerodrome which should be protected and where development should be restricted to ensure the continued safe and regular operation of the aerodrome. This is achieved by a process of assessing proposed developments so as to:

1) Implement land-use zoning that encourages compatible land-uses in the vicinity of the aerodrome;
2) Protect the airspace around the aerodrome through which aircraft fly to ensure no buildings or structures cause danger to aircraft in the air and on the ground. This is achieved through the establishment of an OLS and for aerodromes for which Instrument Flight Procedures (IFPs) are published, PANS-OPS surfaces;
3) Protect the integrity and availability of ground weather radar installations, surveillance radar, radio communications and other electronic aids to navigation by preventing reflections and diffractions of the radio signals caused by harmful interference. This is achieved through defined Building Restricted Areas (BRA)[5] for CNS equipment;
4) Protect aeronautical lighting such as runway approach and runway pavement lighting, by preventing them from being obscured by any proposed development and also that any proposed lighting, either temporary or permanent in nature, could not be confused for aeronautical ground lighting;
5) Eliminate light pollution and sources of glint / glare effects (e.g. solar photovoltaic panels) that might affect a pilot's interpretation/view of visual navigational aids, or air traffic control tower personnel's ability to visually monitor aircraft at or operating in the vicinity of the aerodrome;

[4] A list of certificated and licensed aerodromes is contained in the Aeronautical Information Publication (AIP – Ireland, Part 3 – Aerodromes (AD).
[5] ICAO Eur Doc 015: European Guidance Material for Managing Building Restricted Areas.

6) Avoid any increase in the risk to aircraft of a bird or other wildlife strike by preventing any land use such as water features, landfill sites, gravel extraction and landscaping / plantation, Sustainable Urban Drainage Systems (SuDS), afforestation and racing pigeon activity that may cause an increase in wildlife hazards in the vicinity of the aerodrome;
7) Manage habitat and solid waste facilities on which wildlife may feed and thus could cause a hazard to aircraft operating at, or in the vicinity of the aerodrome;
8) Prevent construction activities from interfering with aerodrome operations through the erection of cranes, generation of dust / smoke, temporary lighting or construction equipment impacting on radar, radio communications and other navigational aids;
9) Protect aircraft from the risk of collision with obstacles by the provision of appropriate obstacle marking and / or lighting;
10) Minimise the impact of wind induced turbulence from buildings/structures in the vicinity of a runway and its approach / departure flight paths;
11) Protect approach and departure flight paths to minimise the effects of vertical plumes emitted from smokestacks at power plants or other industrial facilities.

All the above shall be considered by the aerodrome operator, in coordination with Air Nav Ireland where applicable, when assessing a proposed development either before or when a planning application has been submitted to the LPA through the formal planning process.

Furthermore, the aerodrome operator shall monitor and assess Local Authority planning applications to identify any proposed objects within a radial distance of approximately 15 kilometres from the Aerodrome Reference Point (ARP)[6] where such objects have the potential to infringe areas of the OLS appropriate to the classification and code of runway(s) either existing or planned and / or penetrate airspace protected for arriving and departing aircraft or negatively affect the performance of aeronautical Communication, Navigation or Surveillance (CNS) equipment used by aircraft and for the provision of air navigation services. It should be noted that this distance can vary from aerodrome to aerodrome. It is therefore recommended that the LPA and developer contact the aerodrome operator concerned in order to obtain further information as required. This distance may extend to approximately 50km with respect to wind turbine developments.

In addition, the aerodrome shall be safeguarded against any land use development which is likely to attract wildlife or birds into an area within approximately 13 kilometres radius from the ARP for a large public use aerodrome (e.g. runway greater than 1800 metres in length) and which may pose a risk to aircraft as a result of a bird strike[7]. Any person intending to make changes to land use must ensure that they comply with applicable aviation regulations, LPA requirements and engage with the aerodrome operator.

When not subject to the requirements of IAA Aeronautical Notice R.03 (VFR flights at night in the Shannon FIR), Aeronautical Notices AN T.15 (Use of an unlicenced aerodrome by aircraft engaged in instruction in flying) and AN T.16 (Requirements for the use of an aerodrome at night in the Shannon FIR) as applicable, national aviation regulations permit the operation of unlicensed aerodromes/helipads (e.g. airstrip at a private residence or farm, a surface mounted hospital or private helipad). It is the responsibility of the pilot using this category of aerodrome

[6] the relevant extent of safeguarding is determined in relation to the runway code length, e.g. a national licenced private aerodrome with less than 800 metres in runway length should carry out safeguarding within a radius of 3 kilometres from the ARP.
[7] A bird strike is strictly defined as a collision between a bird and an aircraft which is in flight or on a take-off or landing roll.

to be satisfied that it is suitable for use. The IAA recommends that the aerodrome owner / occupier safeguards such a facility to protect it against the effects of adverse developments with regard to potential obstacles or hazardous activities that would pose a risk to the safety of aircraft operations. In this regard, the aerodrome owner/occupier of an unlicensed aerodrome/helipad is recommended to monitor the relevant LPA's Planning website to review planning applications in the vicinity of their facility and engage with their respective LPA, as necessary. It should be noted that the IAA has no responsibility with regard to the safeguarding of unlicensed aerodromes or surface mounted helipads when not falling within the scope of the above aeronautical notices.

As stated heretofore, the IAA is designated as a 'Prescribed Body' in Article 28 of the Planning & Development Regulation 2024 (as amended) and will provide observations independently to planning proposals where appropriate. In the context of aerodrome safeguarding, the operator of a certificated or licensed public use aerodrome is responsible to assess the impact of any proposed development on their aerodrome. While there is no aviation regulatory requirement for a planning applicant (e.g. developer) to engage with an aerodrome operator prior to lodging a planning application, the IAA encourages early engagement at the scoping, pre-planning or outline planning stage, and in the case of a 'State airport', the air navigation service provider, Air Nav Ireland, as necessary. Refer to section 4.0 for ANSP safeguarding requirements. Such early engagement can assist in resolving potential aviation safety related issues associated with a proposed development to the satisfaction of all parties.

If difficulties arise, or there is disagreement between the aerodrome operator and the planning applicant, the IAA may provide guidance independently either to the aforementioned parties or the LPA / An Coimisiún Pleanála, if requested.

3.2 Aerodrome Operator Assessment of a Proposed Development (Pre-planning / Outline planning / Planning Application)

For an aerodrome operator to conduct a safeguarding assessment for a particular development or planning application, it is important that a planning applicant provides the following information, as a minimum:

1) Copy of the planning application;
2) An accurate site plan of the proposed development in a suitable scale on an ordnance survey map in relation to the nearest aerodrome or CNS equipment in the vicinity of the aerodrome clearly outlined and WGS-84 eastings and northings grid references. (additional grid references may be required to assist in an assessment);
3) The ground level of the site to an accuracy of 0.25m Above Ordnance Datum (AOD);
4) The layout, dimensions, materials type (e.g. type of structure and façade), extent of glazing and in particular, the heights of the proposed development or works above ground level (AGL) and above mean sea level (AMSL);
5) Any landscaping and / or SuDS proposals to ensure that the development does not increase bird and other wildlife strike risk at, or within the vicinity of the aerodrome;
6) Details of renewable energy schemes;
7) Any associated construction or development lighting details;
8) In some instances, the aerodrome operator may request that the applicant commissions a specialist aeronautical study in order to assess any potential impact the development may have on published IFPs and / or aeronautical CNS equipment;
9) Any other information that may be deemed necessary to assess the application.

The aerodrome operator should submit observations to the LPA / An Coimisiún Pleanála on such planning application, to register any potential negative impact(s) of the proposed development/construction on the safety or efficiency of air navigation at the aerodrome as identified in point 8 above. The aerodrome operator is required to inform the IAA of such observations. Additional details may be requested depending on the nature of the application. If the aerodrome operator believes a detailed aeronautical study is required in relation to specialist aviation aspects such as CNS equipment, IFPs, wind turbulence effect or bird / wildlife hazard, it may advise the applicant that a competent aviation consultant be engaged so that their assessment report can be included with any subsequent planning application, and preferably this should be completed prior to the applicants formal planning application submission.

3.3 Obstacle Limitation Surfaces (OLS)

All public use aerodromes certificated under Regulation (EU) 139/2014 or licensed under S.I. 355 of 2008 must have in place OLS for the aerodrome. These are defined surfaces in the airspace above and adjacent to the aerodrome. Their purpose is to enable aircraft to maintain an acceptable level of safety while manoeuvring at low altitude in the vicinity of the aerodrome. These surfaces should be free of obstacles and subject to control so that the erection of structures such as buildings, masts and tower cranes are prohibited or do not penetrate an obstacle limitation surface. The aerodrome operator depicts these surfaces on an aerodrome safeguarding map.

The safeguarding map for certificated / licenced public use aerodromes can be obtained directly from the aerodrome operator. The aerodrome operator is responsible for lodging the safeguarding map with the Local Authority(s) responsible for land use planning in the vicinity of the aerodrome concerned. See Figure 1 below for a depiction of Obstacle Limitation Surfaces.

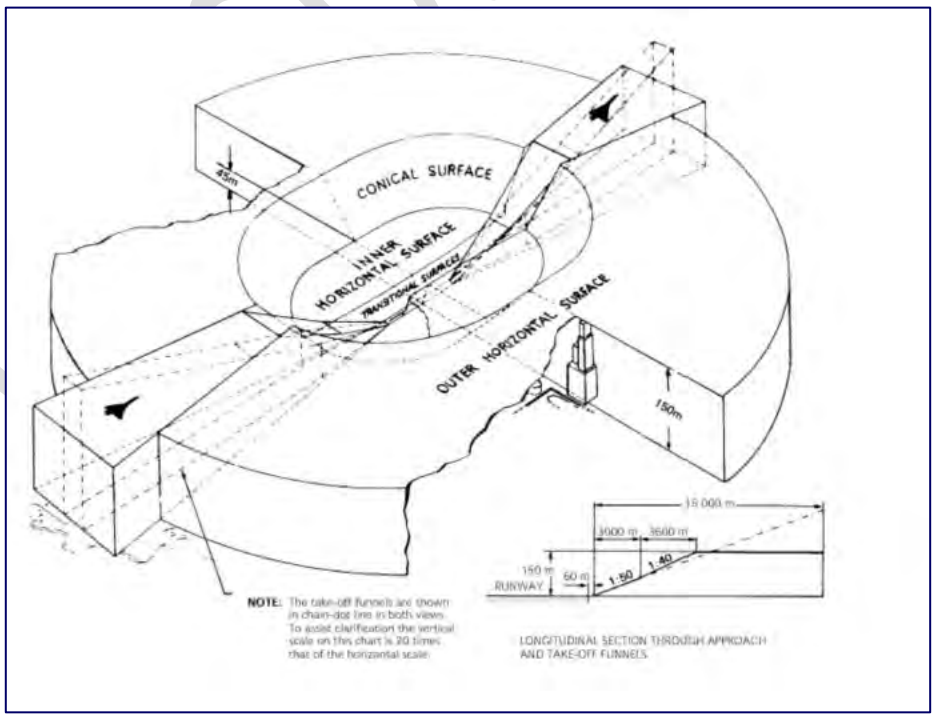


Figure 1– Aerodrome Obstacle Limitation Surfaces (OLS)

3.4 Safeguarding Aerodrome Instrument Flight Procedures (IFP)

While the OLS are established to protect an aerodrome's surroundings from developments that may create a hazard to aircraft operations, it cannot be presumed that these surfaces will provide sufficient protection at an aerodrome with IFPs. It will be necessary for an aerodrome operator to ensure a proposed development does not negatively impact on the IFPs which are used for arriving and departing aircraft.

The protection surfaces for IFPs are complex. Therefore, to ensure a proposed development is appropriately assessed for impact on flight procedure minima and associated elements, a Procedure Design Organisation approved by EASA should be engaged to provide the assessment.

PANS-OPS approach surfaces are used in the design of Instrument Approach Procedures which are designed to safeguard an aircraft from collision with obstacles during an instrument flight (i.e. an aircraft relying on ground and/or space based technical facilities and aircraft-based instruments for vertical and / or horizontal guidance). For non-precision approaches (two-dimensional guidance only) these surfaces are easily defined. For precision approaches (three-dimensional guidance) the obstacle free airspace is more complex. Two methods of assessing the obstacle environment for the determination of minimum safe altitudes including obstacle clearance altitude / height (OCA/H)[8] are currently used for precision approaches by trained and certified flight procedure designers. The specific procedures are not relevant to this framework document albeit that they are informed by it.

Objects which penetrate an OLS may in certain circumstances cause an increase in the obstacle clearance altitude / height (OCA/H) for an instrument approach procedure or any associated visual circling procedure for an aerodrome. Criteria for evaluation of obstacles are contained in Procedures for Air Navigation Services – Aircraft Operations (PANS-OPS) (ICAO Doc 8168). The IAA has published Aeronautical Services Advisory Memorandum (ASAM) No. 015 – 'Guidance Material on Instrument Flight Procedure Obstacle Surfaces' which contains a complete description of the surfaces concerned.

IFPs have been designed for all certificated aerodromes in the State and can be found in the AIP section AD 2. Aerodromes.

A detailed examination of the effect of a proposed development on IFPs should typically consider the following:

1) Departure routes including Standard Instrument Departures (SID);
2) Standard Instrument Arrival Routes (STAR);
3) Area Navigation (RNAV) routes;
4) Sector Entry and Exit points;
5) Holding points (including the holding areas);
6) Missed Approach Routes;
7) Minimum Radar Vectoring Altitudes;
8) Final Approach Tracks;
9) Visual Reporting Points;
10) Published IFPs for the aerodrome;

[8] Obstacle Clearance Altitude/Height is described as the lowest altitude or height above the aerodrome elevation or the elevation of the relevant runway threshold at which a missed approach must be initiated to ensure compliance with applicable obstacle clearance criteria.

11) Navigation aids and surveillance systems;
12) Minimum en-route altitude (MEA);
13) Future airspace and operational requirements where aerodrome growth is anticipated.

Any construction which constitutes an obstacle affecting the above can influence a proposal for such construction. Developers and planning applicants are therefore recommended to consult with the aerodrome operator of the nearest public use aerodrome at the earliest opportunity to establish whether a detailed examination, IFP assessment or aeronautical study may be necessary.

3.5 Flight Inspections

ANSPs ensure that navigation aids are routinely checked on the ground and have ground-based monitoring systems in place to safeguard against invalid signals being transmitted. However, beyond these monitors, the performance of the radiated signal can be adversely affected by external and harmful interference or obstructions. When a pilot is relying on a signal to guide him / her through the clouds and a safe distance from obstructions on the ground, the radiated signal must perform within internationally established tolerances for continuity, integrity and accuracy. In the same way, each IFPs, be it for the departure, enroute or arrival phase of flight, is carefully developed and flight checked against a stringent set of criteria to ensure it is safe and efficient for pilots to fly. The process of checking the performance of navigation aids and associated flight procedures against applicable standards, with aircraft equipped specifically for the purpose is known as flight inspection and is carried out periodically in accordance with international guidelines (standards). Pilots of aircraft conducting flight inspections may be required to fly at altitudes below that at which routine flights are conducted. If obstructions preclude this and the flight inspection cannot be completed in accordance with defined flight checking schedules, the navigation aid and / or the procedures it supports may be subject to restrictions or, in a worst case, withdrawn from service. This could have a negative safety and commercial impact on the operation of the aerodrome concerned.

It follows that aerodrome operators and ANSPs should consider, and developers need to be aware of flight inspection requirements particularly with regard to proposed developments / constructions in the vicinity of public use certificated and licensed aerodromes and associated CNS installations. In such scenarios, the IAA recommends that a developer / applicant directly engages with the aerodrome operator and the ANSP prior to the lodging of a planning application.

4. Safeguarding of Air Navigation Service Provider Technical Facilities

4.1 General

Ireland applies a two-step approach for the consideration of proposed developments that may adversely affect Communication, Navigation and Surveillance (CNS) facilities. The approach is based upon the application of the International Civil Aviation Organisation (ICAO) document EUR DOC 015: European Guidance Material on Managing Building Restricted Areas (BRAs):- Link to: EUR DOC 015

Where the planning proposal / planning query does not infringe the BRA surfaces as described in ICAO EUR DOC 015 then the LPA / An Coimisiún Pleanála should be advised that there are no objections to the proposal.

Where the BRA surfaces are infringed then further expert engineering analysis is required. This analysis is the responsibility of the planning applicant or developer. The planning applicant or developer is responsible for providing assurance evidence that any proposed development will not have the potential to cause interference or adverse effects to any CNS facilities within the State.

There is a statutory process to safeguard certain ATS sites which are integral to the provision of en-route ATS. Radar and radio stations, navigation beacons and some microwave communications links are subject to such arrangements.

ICAO EUR DOC 015 provides guidance on protecting CNS facilities from adverse effects on the availability and / or quality of signal in space that may be caused by the construction of buildings in, or close to a Building Restricted Area (BRA). LPAs / An Coimisiún Pleanála have an obligation to consult the operators of such sites. Developers may also request discussion with site operators in order to provide necessary mitigation. The guidance in EUR Doc 015 provides a basis for such discussion.

The procedure applies to the following facilities/systems:

1) Distance Measuring Equipment (DME);
2) VHF Omni Range (VOR/DVOR);
3) Direction Finder (DF);
4) Non-Directional Beacons (NDB);
5) Ground Base Augmentation Systems;
6) Instrument Landing Systems (Localiser, Glide-path & Markers, LDMEs), Satellite based Augmentation Systems (Ground monitoring elements);
7) VHF Communications;
8) Primary surveillance Radar;
9) Secondary Surveillance Radar.

Though the development of the guidance material is targeted primarily at buildings, other objects, mobile or stationary, temporary or permanent which may interfere with CNS facilities are also included. These could include, building machinery, cranes, meteorological masts (anemometers), excavation and spoil, including vegetation. Permanent structures with rotational elements (wind turbines) are also included.

A complete list of radar, en-route navigation and aerodrome navigation aid locations is provided in the State's Aeronautical Information Publication (AIP) in the following sections:

1) ENR 1.6 RADAR SERVICES AND PROCEDURES for a complete list of radar locations within Ireland - https://www.airnav.ie/getattachment/fd220a85-a1f3-4c2a-8344-15b5df95238a/EI_ENR_1_6_EN.pdf?lang=en-IE
2) ENR 4.1 RADIO NAVIGATION AIDS – EN-ROUTE for a complete list of En-route Navigation Aid locations within Ireland - https://www.airnav.ie/getattachment/bb1e2b51-639f-48d9-b347-c32efc158012/EI_ENR_4_1_EN.pdf?lang=en-IE
3) AD 2 AERODROMES for a complete list of aerodrome Navigation Aid locations within Ireland - https://www.airnav.ie/air-traffic-management/aeronautical-information-management/aip-package#Part_III_-_Aerodromes_(AD).

ANSPs providing CNS service to support aircraft operations either at a certificated or licensed aerodrome or during the en-route phase of flight within the State controlled airspace are responsible for appropriately safeguarding their associated CNS equipment. Similar to aerodrome operators, these ANSPs should establish a safeguarding procedure in line with ICAO Eur Doc 015.

Figure 2 - Monopulse Secondary Surveillance Radar (MSSR) Installation at Dooncarton, Co. Mayo

The ANSP safeguarding procedure should address coordination measures with the planning applicant, as necessary. This procedure should also include a requirement to engage with the LPA / An Coimisiún Pleanála to raise awareness of any particular requirements or safeguarding zones established at these sites to ensure the provision of the Air Navigation Service (ANS).

5. Planning Authorities

5.1 General

In Ireland, the Minister for Housing, Local Government and Heritage is responsible for planning legislation and policy. The planning system in Ireland is operated variously by LPAs including, County Councils and City Councils. Applications for planning permission for major infrastructure developments termed Strategic Infrastructure Development (SID) such as airports are lodged directly to An Coimisiún Pleanála. Decisions of the planning authorities can, for the most part, be appealed to An Coimisiún Pleanála, the planning appeals board. The Department Housing, Local Government and Heritage is precluded from any interference in these decisions. The main features of the Local Planning Authority system are:

1) Preparing development plans (e.g. County Development Plan, Local Area Plan);
2) Planning Policy;
3) Planning decisions;
4) Exempted development;
5) Strategic Infrastructure;
6) Appeals against planning decisions; and
7) Planning enforcement.

In the context of safeguarding aviation activities in compliance with the requirements of European and national regulations as described heretofore in section 2.0, LPAs and An Coimisiún Pleanála should have regard to ensuring appropriate notification to aerodrome operators, air navigation service providers and operators of any other significant civil aviation facility such as a helipad located on hospital grounds with regard to any development that may have a potential negative impact on aviation safety. LPAs should seek to integrate and regularly update Local Area Plans / County Development Plans and other strategic documentation with the most recent safeguarding maps provided to them by the relevant aerodrome operator / air navigation service provider, operator of enroute CNS equipment and management of hospitals provided with helipad facilities.

The planning process from an aviation safeguarding perspective should enable an aviation entity to seek an appropriate aeronautical study of a proposed development. This can range from a simple assessment of impact versus the established aerodrome OLS, to review the impact on IFPs and technical review of the potential impact on CNS equipment / flight checking activities. Ultimately, it may be that a proposed development is deemed by an aerodrome operator to have a negative impact on aviation safety and efficiency of aviation activities, consequently the aerodrome operator affected will most likely lodge an objection in this regard. The IAA is available to provide further guidance to LPAs where requested.

It is equally important that in addition to appropriate assessment of a proposed development, the construction methodology to be employed by the applicant should also be subject to such screening, i.e. the use of cranes such as mobile or tower and

other similar equipment. S.I. 215 of 2005 (Obstacles to aircraft in flight) Order provides requirements in relation to notification period and the marking and / or lighting of obstacles. This assessment of the construction methodology should be integrated into the totality of the application assessment as early as possible.

Development outside of the terms of the planning approval or not managed in line with the requirements of the above Statutory Instrument, will likely require enforcement action to be taken by the LPA. If such a case comes to the attention of the IAA, the IAA may seek an LPA enforcement action or if necessary, take enforcement action directly. It should be noted that offshore constructions such as wind turbine developments, which can have the same negative effects on aviation as those on land, are excluded from the provisions of the Planning & Development Act 2024 (as amended). Refer to section 7.2 for further information.

The aerodrome safeguarding process for the State aerodromes namely Dublin, Cork and Shannon is included in Irish legislation as an integral part of the Local Government planning process. It is set out in the Planning and Development Act 2000 (as amended). The statutory process relates to aerodromes licensed under national regulation and those certificated under European regulation.

Military aerodromes are not included within the statutory provisions. However, the IAA recommends that planning applicants and / or developers engage with the Property Management Branch of the Department of Defence in relation to proposed developments which may have an impact on the safety of activities at military aerodromes and facilities.

5.2 Developments Exempted Under Planning Regulations

S.I. No. 235 (Planning and Development Regulations) Order 2008 amended the 2001 Regulations (S.I. No. 600 of 2001) to provide for exemptions in respect to renewable technologies for certain conditions and limitations.
From an aviation perspective, two types of exempted development are considered here for guidance purposes only. S.I. 235 of 2008 should be consulted for the complete set of regulations including conditions and limitations not listed below:

1. The erection of a mast (anemometer) for mapping meteorological conditions (normally a mast which hosts a wind measuring device such as an anemometer and is usually associated with a wind turbine development).

   The following conditions and limitations apply to this type of construction:
   a) No such mast shall be erected for a period exceeding 15 months in any 24-month period;
   b) The total mast height shall not exceed 80 metres;
   c) Not more than one such mast shall be erected within the site.

2. The construction, erection or placing of a wind turbine within the site of an industrial building, light industrial building, business premises or agricultural holding.

The following conditions and limitations apply to this type of construction:

a) The total height of the turbine shall not exceed 20 metres;
b) The rotor diameter shall not exceed 8 metres;
c) Not more than one turbine shall be erected within the site or agricultural holding.

The turbine or mast shall not be located within 5 kilometres[9] of the nearest aerodrome, or any CNS facilities designated by an ANSP save with the consent in writing of the ANSP and compliance with any condition relating to the provision of aviation obstacle warning lighting / marking.

It is important to note that an exemption from planning requirements does not relieve a planning applicant from their obligation to comply with aviation regulations. In this respect, a proposal to erect a mast (anemometer) for mapping of meteorological conditions at a height not exceeding 80 metres while classified as an exempt development under planning and development regulations but which exceeds the height parameters set out in the IAA's S.I. 215 of 2005 is required to be notified to the IAA and/or the aerodrome operator as applicable.

5.3 IAA's Review of Planning Application Referrals

Currently, the IAA provides input to planning applications referred to it as follows:

1) Identification of aviation stakeholders that would potentially be affected;
2) Consideration of aviation regulatory requirements;
3) Consideration of whether all other known aviation issues have been taken into account (including other potential developments in proximity to the development to which the planning application pertains);
4) Consideration of comments / observations provided by aviation stakeholders in respect of any aviation-based safety concerns.

From time to time, the IAA is approached for expert aviation advice or opinion concerning the validity of an objection(s) to a planning application or the suitability of mitigations proposed. However, it is incumbent upon the applicant to liaise with the appropriate aviation stakeholder to examine and resolve or mitigate aviation related concerns without requiring further IAA input. If this engagement is unsuccessful or an impasse is reached, objective comment can be sought from the IAA. The IAA has no powers to prevent a development proceeding under the Planning and Development legislation, or to require an aviation stakeholder to remove an objection.

[9] S.I. 235 of 2008 https://www.irishstatutebook.ie/eli/2008/si/235/made/en/print

6. Obstacles to Aircraft in Flight

6.1 Determination of an Obstacle

The IAA's S.I. 215 of 2005 (Obstacle to Aircraft in Flight) Order defines obstacles to aircraft in flight for the purpose of airspace protection at, and in the vicinity of aerodromes and elsewhere in the State and specifies reporting and information requirements with respect therein.

In general, the Order provides that a person shall not erect or construct in the State, an object extending 45 metres or higher above ground or water surface level which may penetrate navigable airspace[10] without first notifying the IAA in writing at least 30 days prior to such erection or construction.

The Order also states that an object would be an obstacle to air navigation in the vicinity of an aerodrome if it would result in the vertical distance between any point on the object and the established minimum aircraft altitude or height for the type of approach being conducted to be less than the required obstacle clearance altitude or height. It also provides that the IAA may require the conduct of an aeronautical study to determine the significance of a proposed obstacle if it is in the vicinity of a certificated or licenced public use aerodrome. An aeronautical study is the investigation of a problem concerned with a particular phase of flight, identifying possible solutions and selecting the one most acceptable from the point of flight safety.

It is the policy of the IAA as stated heretofore to ensure that operators of certificated / licensed public use aerodromes and air navigation service providers where appropriate, have a system in place to monitor and assess planning applications for development in the vicinity of their aerodrome. The system consists of a process whereby planning applications in the vicinity of such aerodromes will be forwarded to the aerodrome operator and / or the air navigation service provider by the LPA for assessment as an obstacle.

In this regard, the elevations of the OLS or an approximation of the maximum permitted structure height AGL and AMSL should be clearly indicated on an aerodrome safeguarding map and lodged by the aerodrome operator with the LPA(s) responsible for land use planning in the vicinity of the aerodrome concerned. In the case of Cork, Dublin and Shannon Airports, AirNav Ireland as the provider of terminal air traffic control services at State airports, is responsible for the safeguarding of the established PANS-OPS surfaces.

The IAA will assess and comment on a planning application in respect of a structure/ object outside the established OLS of an aerodrome. This airspace is referred to as the 'en-route' area (eTOD Area 1).

6.2 Electronic Terrain and Obstacle Data (eTOD) Collection Areas

Electronic Terrain and Obstacle Data (eTOD) is the digital representation of terrain and obstacles.

The State is required to ensure the availability of eTOD, in accordance with stringent numerical requirements established for four distinct Areas of the State territory as follows:

1. Area 1: the entire territory of a State;

[10] Navigable airspace means airspace above the territory of the State which is available for the flight of aircraft.

2. Area 2: terminal control area (or limited to a 45km radius – whichever is smaller), sub-divided in 4 smaller sections;
3. Area 3: aerodrome/heliport area: area that extends from the edges of the runway to 90 m from the runway centre line and for all other parts of aerodrome/heliport movement areas, 50 m from the edges of the defined areas.
4. Area 4: Category II or III operations area (restricted to those runways intended for Category II or III precision approaches): the width of the area shall be 60 m on either side of the extended runway centre line while the length shall be 900 m from the runway threshold measured along the extended runway centre line.

The responsibility for e-TOD datasets for Area 1 and Area 2d rests with the State, while Areas 2a, 2b, 2c and Areas 3 and Areas 4 are the responsibility of the aerodrome operator. Refer to Figures 3 and 4 below.

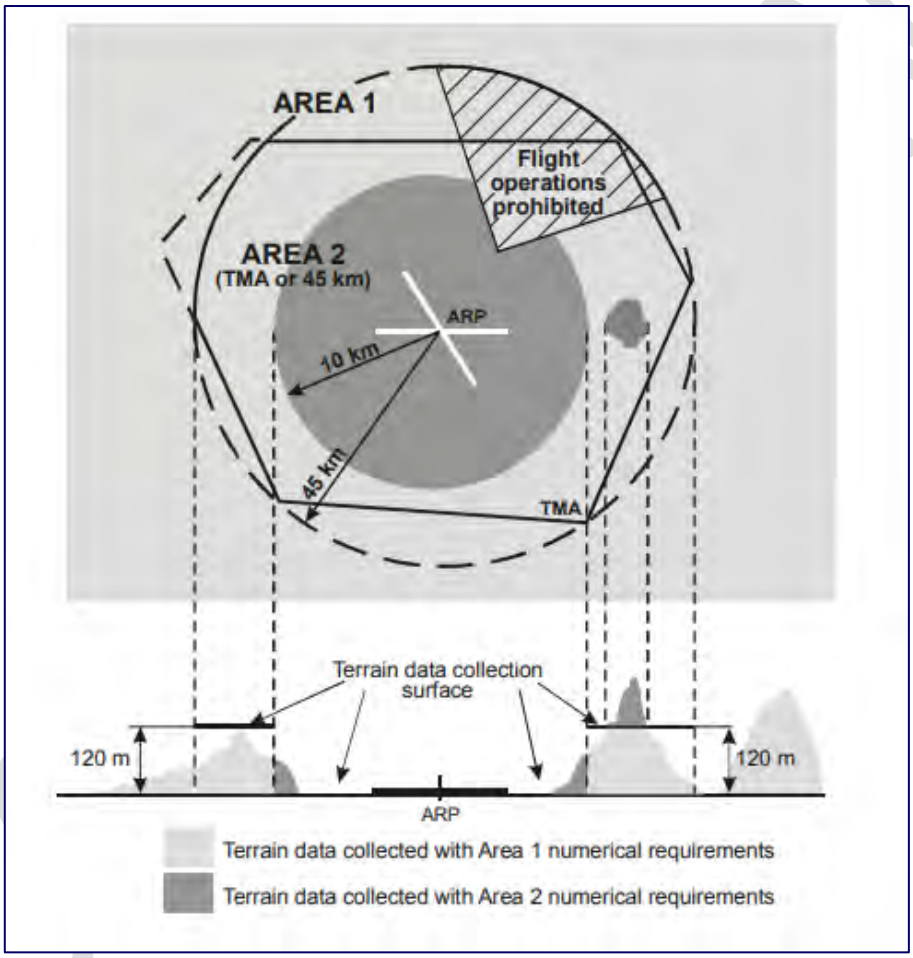


Figure 3 - Terrain data collection surfaces — Area 1 and Area 2

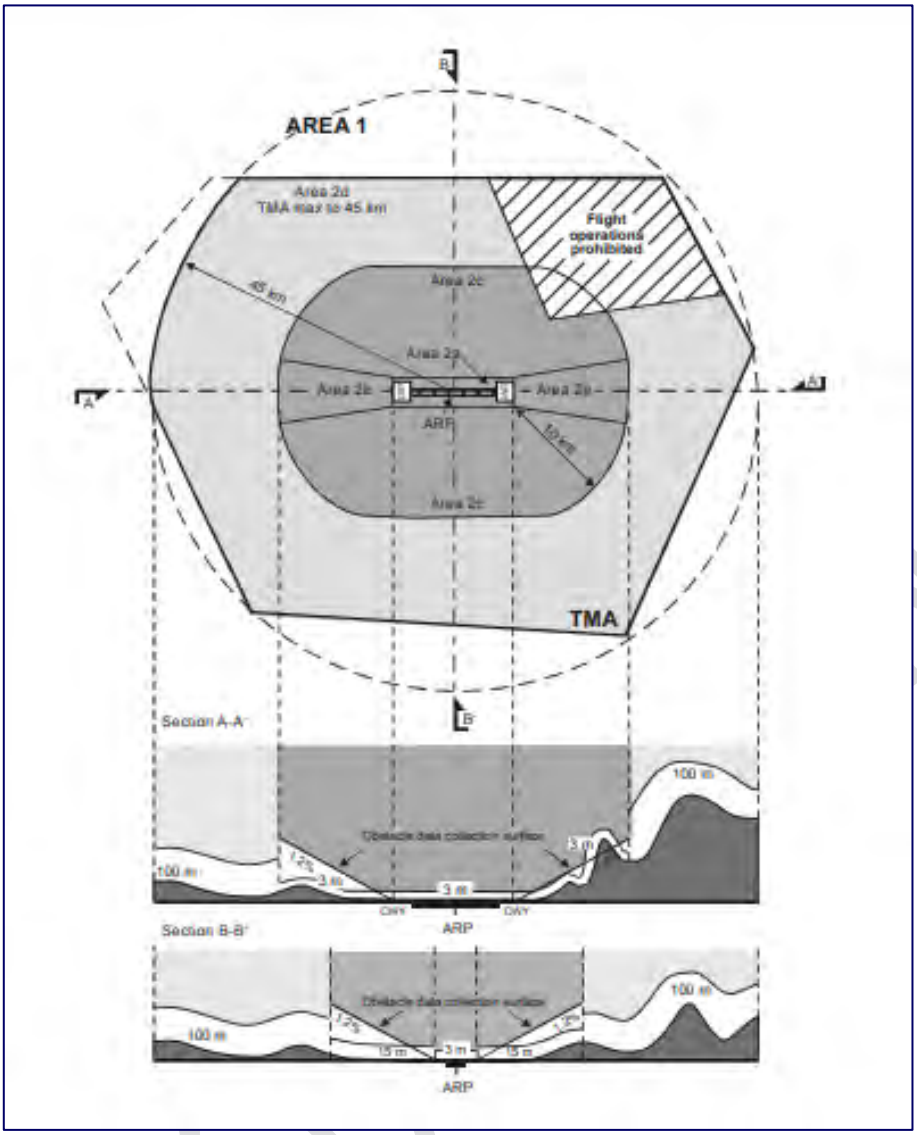


Figure 4 - Obstacle data collection surfaces — Area 1 and Area 2

7. Wind Turbine Developments

7.1 On-shore Wind Turbine Developments

Wind energy and aviation are important to Ireland's national interests and both industries have legitimate ambitions that must be carefully balanced. Therefore, it is important that the aviation community recognises the Government's policy for wind turbine developments to play an increasing role in the national economy and ensuring Ireland achieves binding EU 2030 targets for renewable energy and emissions reduction and reaching net zero by 2050. As such, the aviation community must engage positively in the process of developing solutions and ensuring productive cooperation between wind energy and aviation operations. Similarly, developers of wind turbine developments must understand the potential impact of their developments on aviation, both at a local and a national level, and fully engage with the aviation industry to develop suitable mitigation solutions for problem areas. Ireland's wind energy and aviation industries have co-existed and cooperated for circa 27 years with a good track record in aviation safety. As activity increases and technology develops in both areas it is expected that this framework document will contribute to continued productive cooperation.

Figure 5 - Castledockrell Wind Farm, Co. Wexford

The following sections provide a summary of the issues that aviation stakeholders, land use planners and developers should consider when assessing the impact of a proposed wind turbine development. It is not intended to be exhaustive because local circumstances may raise issues that are unique to a specific case. For this reason, the relevant aerodrome operator, air navigation service provider are best qualified to provide expert advice of what the impact may be and how it will affect the safety, efficiency and flexibility of their operations and the operation of aircraft at, and in the vicinity of their aerodrome.

Figure 6 - Wind Turbine Development at Night

Wind turbine developments have the potential to impact aviation in some of the following ways:

a) Physical obstruction. The closer a wind turbine development is to an aerodrome, radar station (sensor) or navigation or communication facility, and while within the line of sight (LOS) of the transmitting antennae, the greater the negative effect on the facility is likely to be. Additionally, there may be implications with regard to the necessary flight checking of navigational aids depending on the topographical environment;

b) The generation of false radar returns 'Clutter' on Primary Surveillance Radar (PSR) or false targets caused by signal reflections on Secondary Surveillance Radar (SSR). These false radar returns associated with other negative consequences such as

shadow regions[11] may interfere with the safe provision of air traffic control or flight information services;

c) Electromagnetic interference with and adverse effects on the overall performance of communication, navigation and surveillance equipment. A wide range of systems used by aircraft to navigate and by air traffic controllers to provide separation between them, together with air-ground communications facilities, can be affected by wind turbines developments. Wind turbines can interfere with the radiated signal from these systems because of their physical characteristics such as their location and orientation in relation to the facility. As a result, the integrity and performance of the systems can be degraded and introduce safety hazards to the services they provide;

d) Turbulence caused by the wake of the turbine blades as it rotates which extends downstream for a considerable distance behind the blades and the turbine tower. The dissipation of the wake intensity depends on the convection, the turbulence diffusion and local topography (terrain, obstacles etc.). Published research (ref. University of Liverpool – Wind Turbine Wake Encounter Study) shows measurements of approximately 16 rotor diameters downstream of the wind turbine indicating that turbulence effects are still noticeable. Smaller type aircraft, helicopters, hot air balloons and parachuting activity may be susceptible to this turbulence. In extreme cases, turbulence can cause loss of aircraft control from which it is impossible to recover. There are currently no Mandatory Occurrence Reports (MOR) or aircraft accident reports related to wind turbines in Ireland;

e) The creation of 'choke points' in uncontrolled airspace where aircraft operating under Visual Flight Rules (VFR) are forced into a reduced volume of airspace (Class G) and must maintain separation between themselves;

Clearly, large commercial wind turbines have the greatest impact on aviation, but the installation of other equipment may also affect the operation of aircraft, the provision of CNS services and air traffic control services. Smaller wind turbines, and the preliminary activities for larger wind turbines such as the erection of anemometers on potential development sites can impact aviation activities and therefore may require a safety assessment. Cranes used during the installation of wind turbines may be operated at a height greater than the structure being installed and therefore must be included when considering the development in question. The operation of such cranes will require their promulgation by way of a NOTAM.

When wind turbine developments are proposed to be constructed within 30 kilometres of a certificated or licensed aerodrome with a surveillance radar facility, the developer should consult with the aerodrome operator / air navigation service provider and if necessary, the IAA in the early stages of the project planning so as to avoid any costly redesign. This distance can be greater than 30 km depending upon a number of factors including the type and coverage of the radar and the particular operation at the aerodrome.

7.2 Anemometer (Meteorological) Masts

Wind turbine developers should be aware that anemometer masts are often difficult for pilots to acquire visually and so aviation stakeholders may assess that individual masts should be considered a significant hazard to air navigation and may request (either during the planning process, or post-installation) that masts be lit and / or marked. Typically, there is no legal mandate for structures smaller than 100 m to be lit, but the IAA would, if asked for comment, be likely to support reasonable requests for lighting and / or marking of anemometer masts

[11] The presence of a physical obstruction in the path of a radar beam creates a region behind the obstruction within which aircraft would be masked from detection. This is known as the shadow region.

sited in problematic locations. Where such obstacles affect operations on an aerodrome, it is the responsibility of the aerodrome operator to ensure appropriate publication in the AIP, and to ensure that they establish an effective working relationship with their LPA to ensure that they are consulted, when appropriate.

7.3 The Cumulative Effect

While developments with small numbers of wind turbines can have an adverse effect on aviation operations, it is the proliferation of developments and the cumulative impact that is of more significant concern to aviation. It may be possible to successfully mitigate the effects of a single turbine or small development of turbines. The combined effect of numerous individual turbines or multiple wind turbine developments may be more difficult to mitigate and the addition of wind turbines to an existing wind turbine development will require an assessment of the totality of the development.

The cumulative effect of geographically separated wind turbine developments may have more impact on aviation than if such developments were located in close proximity to each other. For example, individual areas of radar clutter separated by 10km could have more impact on the provision of air traffic control than one slightly larger area of clutter. This does not mean to suggest that large areas of clutter are always preferable, however, this should be taken into consideration in discussions between the developer and aviation parties.

For aerodrome operators or ANSPs, there may be difficulty in protecting aviation activity from these cumulative effects because LPA / An Coimisiún Pleanála planning applications are generally dealt with on a case-by-case basis. All approved applications must be taken into account when considering future applications, irrespective of the likelihood of a suitable technological mitigation being identified to resolve aviation safety concerns or enable aviation objections to be withdrawn. Moreover, the cumulative effects of wind turbines on aviation need to be assessed if developments proliferate in specific areas.

The rationale for an objection based on cumulative effect of wind turbine developments is likely to be that the safety and efficiency of the aerodrome or air navigation service provided may not be maintained or that the growth of an aerodrome or air navigation service may be constrained. The decision concerning how firm any future wind turbine proposals have to be in order to be considered would be within the remit of the planning authority. In any event, aerodrome operators of certificated/licenced public use aerodromes are encouraged to prepare aerodrome safeguarding maps which are adapted to take account of future development plans for the aerodrome as these may be taken into consideration by the planning authority when assessing a planning proposal.

It is recognised that from time-to-time potential developments fail to reach maturity within the formal planning stage. Nevertheless, it is in the interests of aviation stakeholders to take account of all developments of which they are aware until they have been formally notified that a proposal or elements of a proposal is not proceeding. Similarly, it is in the interest of a wind turbine developer to inform all involved parties when such developments do not proceed or are deferred.

7.4 Economic Issues

As a result of the role and responsibilities of the IAA and aviation stakeholders, action will be taken to maintain the high standards of safety, efficiency and flexibility. However, it is possible

that aviation activity might have to be constrained as a consequence of proposed wind energy developments. Even in circumstances where a proposed development may not affect a current activity, future expansion (for example, as listed in an Aerodrome Master Plan) may be restricted were it to proceed. This could eventually have an economic impact on the aerodrome, en-route service provider or activity, and this aspect should be taken into consideration when assessing the impact of any proposed wind turbine development. Therefore, it is considered entirely appropriate for an aerodrome to include an assessment of the economic impact that may arise from a proposed wind turbine development. However, it is important to note that comments made in this respect need to be unambiguous in order to allow an LPA / An Coimisiún Pleanála to ensure that this important aspect is taken into account appropriately.

7.5 Risk Assessment and Mitigations of Possible Hazards Introduced by Wind Turbines

Any new hazards should be identified and assessed to determine if mitigations are adequate to reduce risks to an acceptable level; this should be in accordance with the service provider's SMS risk assessment and mitigation process. Ultimately, failure to address such issues may result in withdrawal or variation of the approval / certification thereby preventing the provision of the air navigation service.

In assessing proposed developments and mitigations submitted by wind turbine developers, it is not unreasonable for an aviation stakeholder / ANSP to request sufficient technical information from the developer that would support the production of an adequate safety case. The responsibility for completing the safety case lies with the aviation stakeholder. However, its completion should be a co-operative effort between the developer and the aviation stakeholder with any necessary commercial considerations subject to agreement between the two parties.

It is anticipated that wind energy will provide a significant contribution to renewable energy targets. In order to harness this energy supply, both onshore and offshore wind turbine developments are being constructed, which range in size from single structures to developments encompassing many hundreds of wind turbines. Moreover, the installation of Micro Wind Turbines (MWT) is becoming increasingly prevalent. The physical characteristics of wind turbines, coupled with the size and siting of the developments, can result in effects that can have a negative impact on aviation.

7.6 En-route Obstructions

It is possible that an existing or proposed wind turbine development that does not infringe an aerodrome's OLS may nevertheless have a potential impact upon local aviation activity. For example, a development beyond an OLS, but only marginally clear (laterally or vertically), of class C (controlled Airspace), might be assessed as having a potential adverse impact upon operations within Class G (uncontrolled) airspace due to the potential for the creation of 'choke points' where aircraft are forced into a reduced volume of available airspace (eTOD Area 1>100m).

Whilst the IAA will highlight such issues away from the immediate vicinity of aerodromes, aerodrome operators / licensees should be cognisant of these issues when engaging with other parties on wind turbine associated matters.

7.7 Aviation Support Units (ASU)

Due to their operating nature, it is difficult to predict the impact of wind turbine developments on emergency service operators such as Search and Rescue (SAR), Garda Air Support Unit (GASU) and Air Ambulance operator(s) (HEMS). The IAA recommends that ASUs and LPAs / land developers engage with each other to ensure appropriate consultation in relation to all relevant planning applications within their operating area, particularly given that ASUs, such as the SAR operator are permitted to fly below 500ft (AGL) or highest obstacle in close proximity to the aircraft in order to carry out their duties which may have to be undertaken in less than optimal weather conditions. It should be noted that an operator may need to land in non-designated aerodrome sites, such as a field or roadway. Furthermore, whilst pilots of some aviation support operators are equipped with NVG, it is not a mandatory requirement.

The IAA is supportive of requirements to mark and, or light turbines where there is a justifiable benefit to ensure the safety of aviation activities of this nature.

7.8 Impact on Military Activities

Wind turbine developments can have a detrimental effect on military operations. Military aviation operations can differ noticeably to civil operations, particularly with respect to operational low flying activities, and the sensitivity of military CNS facilities. The Department of Defence is to be consulted in all cases where a proposed wind turbine development may affect military operations.

7.9 Offshore Wind Turbines

Offshore wind turbine developments which can present the same negative effects to aviation as those on land, are excluded from the provisions of the Planning & Development Act 2000 (as amended) but are subject to a Maritime Area Planning Act 2021 which has evolved from the Foreshore Act 1933 (as amended). Under the MAP Act, Maritime Area Consent (MAC) (phase one of the planning process) for offshore renewable energy (ORE) development will be assessed and granted by the Maritime Area Regulatory Authority (MARA) which is under the aegis of the Department of the Environment, Climate and Communications.

From an aviation perspective, the rules of the air require that the minimum aircraft height when operating over sea is 500 feet. There may, however, be inaccuracies associated with aircraft altimetry. An aircraft attempting to fly 500 feet above the sea may, in certain circumstances, inadvertently be lower than 500 feet above mean sea level.

Figure 8 - Obstacle Lighting on Offshore Wind Turbines

Search and Rescue activity is exempted from the specified minimum height and flight visibility requirements and can be anticipated to operate at 500 feet or lower levels in adverse weather conditions for the purpose of saving life. Helicopters supporting exploration rigs, vessels, lighthouses and offshore production platforms are not subject to the above minimum height requirement while landing or taking off in accordance with normal aviation practice. Additionally, the operating minima applicable to civil aircraft do not apply to military aircraft which may frequently operate below 500 feet

over the sea. Within such areas specified above, marking, lighting and radar enhancing requirements and information required for promulgation will require to be assessed on an individual basis.

Lighting and marking requirements to protect air navigation safety consists of the same lighting and marking installed to protect marine navigation, supplemented as necessary for the protection of air navigation safety. The IAA has published Aeronautical Services Advisory Memorandum (ASAM No. 18) Guidance Material on Offshore Wind turbine developments setting out minimum requirements for the lighting, marking, radar enhancing and supply of information for promulgation to ensure the conspicuity of offshore wind turbine developments and associated structures.

8. Solar Photovoltaic (PV) Developments / Solar Energy Systems

The deployment of solar power and in particular, solar photovoltaic developments has expanded in Ireland in recent years as the energy industry moves towards greener methods of energy production. There are varying sizes and types of such developments ranging from roof mounted panels on residential or commercial/industrial developments to large scale solar farm type developments that can occupy in the order of 130 hectares of land. The geometry of an aerodrome is such that there can be relatively large open spaces in the vicinity of an aerodrome which give opportunity for the installation of solar energy developments. Aerodrome operators are also investing in this form of energy technology and are installing such systems at their aerodrome. The IAA seeks to ensure that the reflection from sunlight onto the systems' solar panels does not create ocular (i.e. glint or glare) impacts that would pose a safety hazard to aviation receptors including pilots on final approach to a runway, flying in a visual holding area and air traffic controllers in a control tower, rescue firefighting staff in a fire station watch tower. Therefore, such developments in the vicinity of, or at an aerodrome may require an evaluation in the form of an ocular ('Glint and Glare') assessment to ensure the proposal has no adverse effects on the safety of aviation activities at, or in the vicinity of the aerodrome.

Figure 9 – Solar Photovoltaic (PV) Panels on an Aerodrome

The IAA has not published guidance on solar photovoltaic (PV) developments as it has referred developers / planning applicants to guidance and research carried out by the Federal Aviation Authority (FAA) in the United States (reference: 2013 Interim Policy on Review of Solar Energy Systems at Federally

Obligated Airports) and guidance issued by the UK Civil Aviation Authority. Based on more recent experience and information, the FAA has reviewed their interim policy and has published a revised policy which became effective from 11th May 2021. The FAA has received reports/comments of potential glint and glare from on-airport solar energy systems on personnel working in Air Traffic Control Towers in particular, and has amended the scope of their policy to focus on the impact of on-airport solar energy systems, specifically air traffic control towers and therefore recommending aerodrome operators proposing on-airport solar photovoltaic (PV) developments to conduct a glint and glare assessment of potential impacts to aviation receptors at the aerodrome including air traffic control tower personnel and pilots of aircraft operating on, and in the immediate vicinity of the aerodrome.

Figure 10 - Solar Photovoltaic (PV) Panels

In relation to solar energy systems located within the vicinity of an aerodrome, the developer/planning applicant of such a system is recommended to consider the potential for glint and glare impact to aviation receptors at the aerodrome. The completion of a glint and glare assessment undertaken by a developer/planning applicant should be coordinated with the aerodrome operator and the air navigation service provider, as applicable.

Based on a review of a significant number of glint and glare assessments conducted to date in Ireland, the IAA has not found there to be any issues identified in the analysis that would likely pose a safety hazard to pilots or air traffic controllers. Furthermore, the IAA has not received any negative comments relating to existing solar photovoltaic (PV) installations in the vicinity of, or at an aerodrome thus far. However, aerodrome operators, air navigation service providers and pilots should remain alert. The aerodrome operator should conduct a risk assessment to identify any mitigations necessary and by whom, to ensure a proposed development will not adversely affect the safety of aviation activities at their aerodrome.

The FAA has withdrawn the recommended tool for ocular impact, the Solar Glare Hazard Analysis Tool (SGHAT). However, there are a number of glint and glare analysis tools available. It should be noted that the IAA does not mandate a specific methodology.

9. Unmanned Aircraft Systems (UAS)

The Department of Transport is developing a Policy Framework for Unmanned Aircraft Systems (UAS).

Unmanned Aircraft Systems, also known as drones, are contributing to innovation in several industries with the development of a wide range of new applications and services, delivering benefits to consumers and the wider public. The next few years will be pivotal for the UAS industry. The upcoming policy framework will set out the vision, strategy, and priorities for the development of the UAS sector in Ireland. The Policy Framework will aim to guide high-level strategic planning and development over the next decade by supporting growth and innovation in the UAS sector while managing safety, security, environmental and other aspects.

Three key areas are identified within the policy framework are as follows:

1) Innovation and Enterprise;
2) Planning and the use of airspace;
3) Compliance and enforcement.

9.1 Use of Airspace – UAS Geographical Zones

UAS geographical zones are portions of airspace where UAS operations are facilitated, restricted, or excluded. Under EU UAS rules (Regulation (EU) 2019/947) the IAA can establish UAS geographical zones for the purpose of:

1) Minimising safety risks;
2) Protecting privacy;
3) Addressing security issues;
4) Dealing with environmental concerns (including noise).

The IAA completed a full review of UAS Geographical Zones in relation to safety and security risks in January 2023 and continue to update them as required. These are detailed in Aeronautical Notice U04. To establish UAS geographical zones in respect of privacy and environmental protection, the Irish Aviation Authority needs input from relevant agencies, local authorities, and government departments.

A transparent process to allow state agencies, government departments and local government to determine and request UAS geographical zones be established by the IAA should be put in place. The development of these procedures would benefit from the input of all relevant stakeholders. A Working Group on UAS Geographical Zones, led by the IAA, in collaboration with the Department of Transport, will be established to ensure all stakeholders' views are considered and incorporated into a transparent procedure for establishing UAS geographical zones.

9.2 Use of Airspace – U Space

U-Space is defined as "U-Space, a bespoke, fully digital, and automated traffic management system that has been designed to enable the efficient and affordable scaling up of drone services" (Drone strategy 2.0).

The European Commission in conjunction with the European Union Aviation Safety Agency developed an enabling regulatory framework (Regulations (EU) 2021/664, 2021/665, and 2021/666) that allows for the safe development of UAS services market and the integration of UAS into our airspace. Regulation (EU) 2021/664, which became applicable in January 2023, provides for a digital system that aims to keep UAS operations safe, secure, and green. The concept of U-space emerged to support commercial operations with UAS, especially those entailing greater complexity and automation, to provide for the safe integration of a number of proximate UAS flights in a volume of airspace. Regulation (EU) 2021/664 outlines the service providers and services required to establish U-space.

Essentially, U-space is a UAS geographical zone designated by Member States where UAS operations may only occur with the support of U-space services. At a minimum these must include network identification, traffic management, flight authorisation and geo-awareness. The purpose of U-space is to achieve automated UAS management and integration, allowing for a large series of operations, many of them simultaneous. This must work alongside the current air traffic management (ATM) system. U-space will only be deployed in airspace with large volumes of complex BVLOS UAS operations. Implementation should enable a competitive U-space services market. U-space full services are not envisaged until 2030.

9.3 Unauthorised Drone Incidents at Aerodromes

The number of incidents involving drones has steadily increased worldwide over recent years. A large proportion of reported unauthorised drone incidents are at, or near airports[12], either inside or close to the perimeter, or in the arrival and departure paths of runways. Given the potentially significant consequences that a collision between a manned and unmanned aircraft could have, UAS are another activity which must be safeguarded against.

All certificated and licenced public use aerodromes should develop a Counter Unmanned Aircraft Systems (CUAS) plan to safeguard effectively. Where applicable, this should be developed in close coordination with the relevant air navigation service provider. To assist aerodrome operators, EASA have published Drone Incident Management Manual[13] in three parts:

- Part 1: The challenge of unauthorised drones in the surroundings of aerodromes (the present introductory document);
- Part 2: Drone Incident Management Manual for Aerodromes – Guidance material and recommendations;
- Part 3: Drone Incident Management Manual for Aerodromes - Resources and practical tools.

While Part 1 is freely available to the public, due to the sensitive nature of the subject matter, EASA decided that material found in Parts 2 and 3 of the manual should only be made available to the relevant stakeholders and the national competent authorities of the EASA Member States, so that they share it with the relevant aviation organisations under their oversight. Duly motivated requests for access to all parts of the manual may be sent to aerodromes@easa.europa.eu. All CUAS plans must be approved by the IAA.

[12] sesarju.eu/sites/default/files/documents/reports/European_Drones_Outlook_Study_2016.pdf
[13] https://www.easa.europa.eu/en/drone-incident-management-aerodromes-part-1.

10. Stakeholder Communication

The aviation, construction and wind energy industries are of significant importance to the Irish Government. A collaborative, proactive and consultative approach between these industries will ensure the safe and orderly development of each to the benefit of the State and its citizens. Therefore, this framework document is aimed primarily at providing assistance to all stakeholders in understanding and addressing areas of common interest, thereby ensuring greater consistency in the consideration of the potential negative impact of man-made developments on aviation safety. It outlines IAA requirements on a range of issues associated with man-made objects and their effect on aviation that will need to be considered by aviation stakeholders, construction companies, town planners, land developers, wind and solar energy developers and State and local government planning authorities when assessing the viability of proposed developments in the State and, where conflicts are identified, finding solutions and mitigations satisfactory to each entity.

The statutory remit of the State and local planning authorities, and in the case of offshore developments, the Foreshore section of the Department of the Environment, Community and Local Government, is well understood and it is not the intention of this framework document to provide instruction on the need or means to object to proposed developments. This decision rests with individual aerodrome operators, air navigation service providers and other aviation or non-aviation stakeholders as they see fit.

Furthermore, it should be noted that within this framework, specific issues will have to be addressed on a case-by-case basis, as it is not possible to prescribe a standard solution or mitigation for all situations where conflict between development and aviation activities arises. The IAA is confident that the publication of its framework document relating to aviation safeguarding, will provide for collaboration between the aviation, residential and commercial developers, construction and wind energy industries, support the planning authority function and enhance aviation safety as activity in these areas develops.

Further information on the National Aviation Safeguarding Framework document may be obtained from info@iaa.ie

The IAA will continually review and amend this National Aviation Safeguarding Framework document, as appropriate, to ensure its relevance in order to enhance aviation safety within the State. State and Local Government agencies are encouraged to identify opportunities for additional guidance.

Requests for further information or observations on this framework document should be forwarded to the above contact email address.

11. Appendix A – Shielding Principles

Shielding Principles

The principle of shielding is employed to permit a more logical approach to restricting new construction and prescribing obstacle marking and lighting. Shielding principles are applied when an object such as natural terrain already penetrates above one of the Obstacle Limitation Surfaces. If the IAA considers that the nature of the object is such that its presence may be described as permanent, then additional objects within a specified area around it may be permitted to penetrate the surface without being considered as obstacles. The original obstacle is considered as dominating or shielding the surrounding area. No obstacle can be considered as shielded if it is closer to a runway than the shielding obstacle. Unless specifically directed by the IAA, a shielded obstacle does not require removal, lowering, marking or lighting and should not impose any additional restrictions to aircraft operations.

Notwithstanding the principle of shielding, the entity with responsibility for safeguarding, such as the aerodrome operator or the ANSP, reserves the right to consider any new obstacle and to take appropriate action to protect the safety of aircraft.

The IAA will assess and determine whether an obstacle is shielded. An aerodrome operator shall notify the IAA of the presence of all obstacles and their detailed characteristics. Only existing permanent obstacles may be considered in assessing shielding of new obstacles.

In assessing whether an existing obstacle shields an obstacle, the IAA will be guided by the principles of shielding detailed below.

Obstacle penetrating the approach and take-off climb surfaces:

(a) An existing obstacle within the approach and take-off climb area is called the critical obstacle. Where a number of obstacles exist closely together, the critical obstacle is the one which subtends the greatest vertical angle measured from the appropriate inner edge.

(b) As illustrated in Figure below, a new obstacle may be assessed as not imposing additional restrictions if:

(i) When located between the inner edge end and the critical obstacle, the new obstacle is below a plane sloping downwards at 10% from the top of the critical obstacle toward the inner edge;

(ii) When located beyond the critical obstacle from the inner edge end, the new obstacle is not higher than the height of the permanent obstacle; and

(iii) Where there is more than one critical obstacle within the approach and tale-off climb area, and the new obstacle is located between two critical obstacles, the height of the new obstacle is not above a plane sloping downwards at 10% from the top of the next critical obstacle.

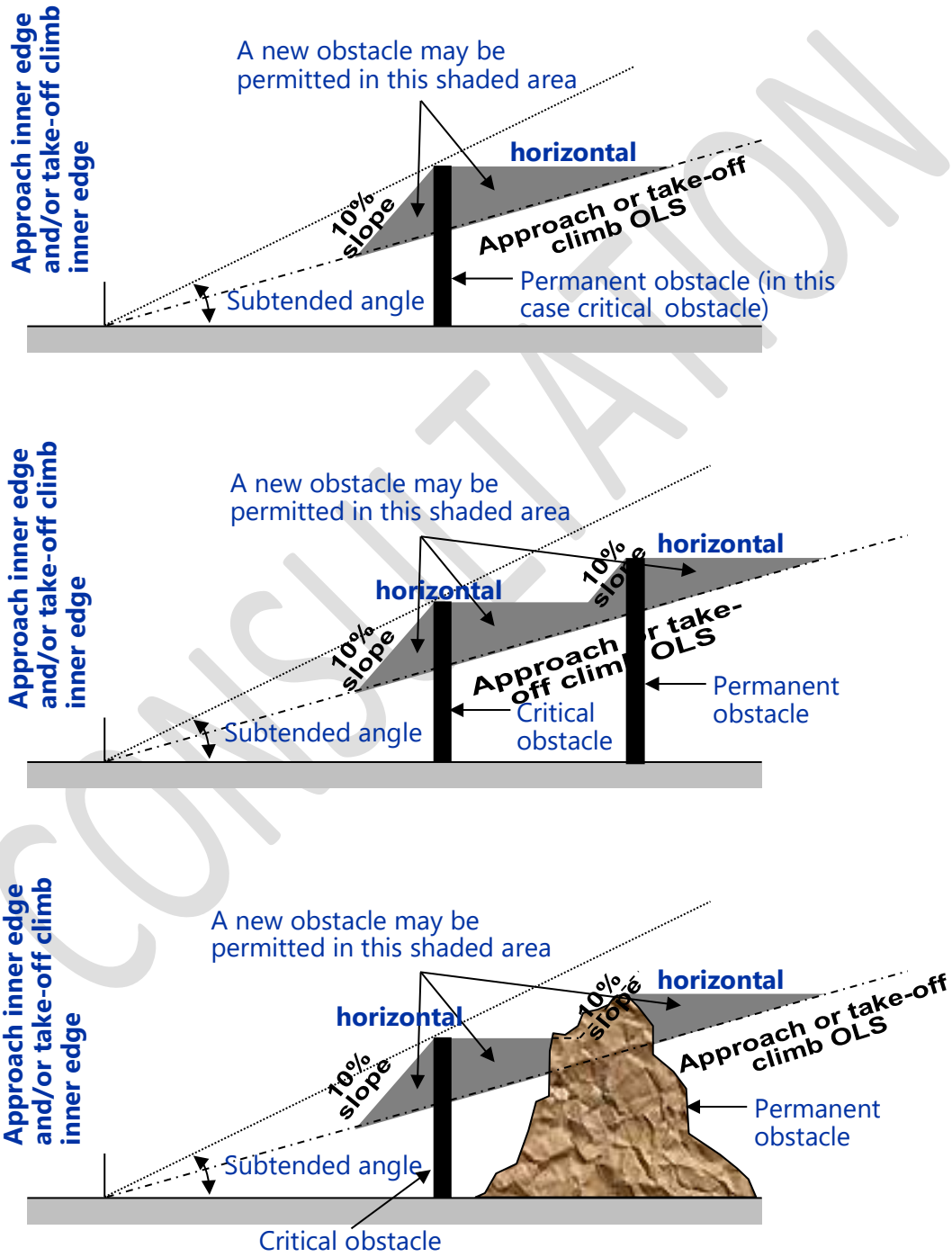
Take-off climb surfaces:

- Obstacle penetrating the inner and outer horizontal and conical surfaces.

A new obstacle may be accepted if it is in the vicinity of an existing obstacle, and does not penetrate a 10% downward sloping conical-shaped surface from the top of the existing obstacle, i.e. the new obstacle is shielded radially by the existing obstacle.

Obstacle penetrating the transitional surfaces:

A new obstacle may be assessed as not imposing additional restrictions if it does not exceed the height of an existing obstacle which is closer to the runway strip and the new obstacle is located perpendicularly behind the existing obstacle relative to the runway centre line.



12. Appendix B – Marking and Lighting of Obstacles

Marking and Lighting of Obstacles

General requirements for the marking and lighting of obstacles on or near aerodromes and objects which the IAA has determined to be en-route obstacles (e-TOD Area 1) should be in accordance with ICAO Annex 14, Volume 1 and European Regulation (EU) 139/2014.

The marking and / or lighting of an obstacle(s) is intended to reduce hazards to aircraft by indicating the presence of the obstacle. It does not necessarily reduce operating limitations that may be imposed by an obstacle. The IAA may require the marking and/or lighting of any object, depending on their height, location and nature in the interest of safety to aviation activity. S.I. No. 215 of 2005 (Obstacles to Aircraft in Flight Order) defines obstacles to aircraft in flight.

The responsibility for marking and / or lighting of an obstacle at an aerodrome must be determined by the aerodrome operator. For an obstacle away from an aerodrome, the marking and / or lighting requirements will be determined by the IAA through the application of S.I. 215 (Obstacles to aircraft in flight) Order. The IAA may impose operating restrictions on an aerodrome operator if the requirements for marking and / or lighting are not complied with.

Marking of Wind Turbines

During daylight hours, wind turbines are generally conspicuous due to their shape and size, provided the colour of the turbine(s) contrasts sufficiently with the background. The rotor blades, nacelle and upper 2/3 of the supporting mast shall have matt, non-reflective paint finish with colour within the RAL range 0910 (Pure White) or light grey (RAL 7035) which is darkest acceptable off-white paint permitted. An alternative colour can only be proposed if it has been supported by an aeronautical study. Note, the blades shall be of material that does not deflect telecommunications signals.

Permanent Lighting of Wind Turbines

When obstacle lighting has been recommended by an aerodrome operator or the IAA to reduce the safety risk to aviation activities, medium intensity obstacle lights should normally be used to identify the perimeter of the wind turbine development. A maximum spacing of 900 metres between turbines provided with obstacle lighting along the perimeter should be provided, unless an aeronautical study can demonstrate that a greater spacing can be used. Obstacle lighting should operate at all times and a second light serving as an alternate should be provided in case of failure of the operating light. The developer of a wind turbine development should establish a monitoring, reporting and maintenance procedure to ensure unserviceable lighting is detected, reported and rectified. The procedure should include notification to ANI AIS, so that any such unserviceability is promulgated to pilots.

It is important for aviation and non-aviation stakeholders to note that lighting emitting diode (LED) type lighting on obstacles may not be detected by a pilot's night vision goggle (NVG) equipment and in the case of wind turbines, the obstacle lighting on the nacelle may be a significant distance below the tips of the rotor blades. The IAA can advise on suitable lighting specifications where necessary.

When developing an obstacle lighting plan for a wind turbine farm, it is best to use site layout map depicting the positions of the turbines to assist with identifying the turbines which require lighting. This can also lead to a lower number of obstacle lights.

Lighting of Wind Turbines During Construction

To ensure proper conspicuity of wind turbines at night during construction, all turbines should be lighted with temporary lighting once they reach a height of 328 feet (100 m) or greater until the permanent lighting configuration is activated. As the structure's height continues to increase, the temporary lighting should be relocated to the structure's uppermost height. The temporary lighting may be turned off for short periods if they interfere with the safety of construction personnel. A Low Intensity Type B (minimum 32 candela) steady red obstacle light shall be used to light the structure during the construction phase, if the permanent Low or Medium Intensity red lights are not provided. If power is not available, turbines should be lighted with a self-contained, solar-powered, LED, steady red light. The lights should be positioned to ensure a pilot has an unobstructed view of at least one light at each level. Using a NOTAM to justify not lighting the turbines until the entire installation is completed is prohibited.

Aircraft Detection Lighting System (ADLS)

An ADLS is a sensor-based system for monitoring airspace around a wind farm development which activates obstacle lights installed on wind turbines when an aircraft is detected within a pre-established radius of the development. This results in a reduction in the time period that the obstacles lights are operating, specifically at night, thus providing a mitigation to the visual impact of the obstacle lights in light sensitive areas / nearby communities. Currently, obstacle lighting systems on wind turbine developments generally operate continuously, contributing to light pollution and unnecessary energy use.

ADLS utilises advanced detection technologies, including:

1) Radar systems and aircraft transponder receivers to identify approaching aircraft.
2) Automated lighting control, which activates obstruction lights only when aircraft are within a defined range.
3) Failsafe mechanisms that ensure lights activate in the event of system failure.

ADLS may not be suitable in all locations due to:

1) Challenging terrain that may obstruct radar line-of-sight.
2) Proximity to airports, Visual Flight Rules (VFR) corridors, or military training areas where continuous lighting may still be required.
3) System reliability, which necessitates continuous monitoring by the operator of a wind turbine development.

Furthermore, ADLS will not be permitted for use with obstacle lighting within the obstacle lighting surfaces of a certificated / licensed aerodrome.

The IAA is aware of the implementation of this technology in other countries, both within Europe and elsewhere. However, there is currently no European or Irish national regulation or approval framework for ADLS. Notwithstanding this, recognising that traditional obstacle lighting systems generally operate continuously, contributing to light pollution and

unnecessary energy use, the IAA is aware of the benefits for which ADLS offers as a solution to reduce light pollution and energy consumption associated with obstacle lighting, particularly in wind turbine developments and is therefore open to engaging with industry stakeholders who are proposing the use of this technology either to retrofit existing wind turbine developments or provide in future developments.

13 Appendix C – Dangerous Lights

Dangerous Lights

In aviation, specific lights are established for the purpose of aiding air navigation. They comprise amongst others, lights marking obstructions which affect enroute navigable airspace, obstructions at or in the vicinity of aerodromes, lights to guide pilots navigating to and conducting an approach or departure at an aerodrome, and runway, taxiway and apron lights to aid manoeuvring on the aerodrome surface. Such lights are termed aeronautical ground lights (AGL) any light which may be confused with or mistaken for an aeronautical ground light has the potential to hazard an aircraft navigating in the air or on the ground.
The IAA's Aerodromes and Ground Visual Aids Order, S.I. No 355 of 2008 provides that:

a. by reason of its glare is liable to endanger aircraft taking off from or landing at an aerodrome; or
b. by reason of its liability to be mistaken for an aeronautical light is liable to endanger aircraft.

If any light which appears to the IAA to be such a light as included in point a) or b), the IAA may cause a notice to be served upon the person who is the occupier of the place where the light is exhibited or has charge of the light, directing that person to take such steps as may be specified in the notice for extinguishing or effectively screening the light and for preventing the exhibition thereafter of any similar light.

To protect the safety of aircraft against the hazardous effects of laser emitters (e.g. laser displays) laser beam free zones should be established around certificated/licensed aerodromes for public use.

Whereas it is not directly pertinent to land use and off-shore development, it is appropriate when considering the subject of dangerous lights, to refer to Section 44 of the State Airports (Shannon Group) Bill 2014 which makes it an offence to deliberately or recklessly dazzle or distract a pilot or other relevant personnel by directing a light in their direction This is intended to deal with incidents of persons using a laser to dazzle or attempt to dazzle the pilot of an aircraft or other aviation personnel. A person convicted of such an offence is liable to a fine or imprisonment or both.

14. Definitions

Term	Definition
Aerodrome	A defined area on land or water (including any buildings, installations and equipment) intended to be used either wholly or in part for the arrival, departure and surface movement of aircraft.
Aerodrome elevation	The elevation of the highest point of the landing area.
Aerodrome operator	An aerodrome whose operator has been granted an aerodrome licence or certificate.
Aeronautical Information Publication (AIP)	A publication issued by or with the authority of a State and containing aeronautical information of a lasting character essential to air navigation.
Aeronautical Information Services (AIS)	A service established within the defined area of coverage responsible for the provision of aeronautical data and aeronautical information necessary for the safety, regularity and efficiency of air navigation.
Aerodrome Reference Point (ARP)	The designated geographical location of an aerodrome and is measured and reported to the aeronautical information services in degrees, minutes, and seconds.
Authorised Drone	Any drone activity (in the aerodrome and its environment) with authority or permission to fly and not considered as a safety/security risk.
Aviation receptor	A receiver of glint and glare effects in aviation. Typically, pilots operating an aircraft, air traffic controllers located in the air traffic control tower.
Certificated aerodrome	An aerodrome whose operator has been granted an aerodrome certificate under the scope of European regulation.
Class C Airspace	Controlled airspace in which aircraft are subject to an Air Traffic Control service.
Class G Airspace	Uncontrolled airspace in which aircraft are not subject to an Air Traffic Control service.
Glare	A continuous source of bright light.
Glint	A momentary flash of bright light.
Glint and Glare	Used interchangeably with the term 'solar reflection' where the specific type of reflection is not necessary.
Instrument Flight Procedure (IFP)	An Instrument Flight Procedure is a published procedure used by aircraft flying in accordance with the instrument flight rules which is designed to achieve and maintain an acceptable level of safety in

Term	Definition
	operations and includes an instrument approach procedure, a standard instrument departure and a planned departure route and a standard instrument arrival.
Licenced Aerodrome	An aerodrome whose operator has been granted an aerodrome licence under national regulations.
Licensee	The licensee or the person or persons having charge of a Licensed Aerodrome.
Heliport	An aerodrome or a defined area on a structure intended to be used wholly or in part for the arrival, departure and surface movement of helicopters.
Obstacle	All fixed (whether temporary or permanent) and mobile objects or parts thereof that: a) are located on an area intended for the surface movement of aircraft; or b) extend above a defined surface intended to protect aircraft in flight; or c) stand outside those defined surfaces and have been assessed as being a hazard to air navigation.
Obstacle Limitation Surfaces (OLS)	A series of surfaces that define the volume of airspace at and around an aerodrome to be kept free of obstacles in order to permit the intended aircraft operations to be conducted safely and to prevent the aerodrome from becoming unusable by the growth of obstacles around the aerodrome.
NOTAM	A notice distributed by means of telecommunication containing information concerning the establishment, condition or change in any aeronautical facility, service, procedure or hazard, the timely knowledge of which is essential to personnel concerned with flight operations.
Promulgation	The act of formally notifying official information to the aviation community.
PANS-OPS Approach Surfaces	PANS-OPS approach surfaces are used in the design of instrument approach procedures (IAP's) which are designed to safeguard an aircraft from collision with obstacles during an instrument flight.
Runway	A defined rectangular area on a land aerodrome prepared for the landing and take-off of aircraft.
Unauthorised Drone	Any drone / UAS activity (in the aerodrome environment) without authority or permission, and which could result in safety/security risk and/ or have a negative impact on business continuity and/or reputation.
Wind Turbine development	A group of two or more wind turbines.

Term	Definition
WGS–84	World Geodetic System – 1984 – Geodetic reference datum Standard for air navigation latitude/longitude coordinates.

15. Glossary

Acronym	Full form
ACP	An Coimisiún Pleanála
AIP	Aeronautical Information Publication
AIS	Aeronautical Information Services
ANI	AirNav Ireland
ADLS	Aircraft Detection Lighting System
AOD	Above Ordnance Datum
AGL	Above Ground Level
AGL	Aeronautical Ground Light
ARP	Aerodrome Reference Point
ANSP	Air Navigation Service Provider
AMSL	Above Mean Sea Level
ASAM	Aeronautical Services Advisory Memorandum
ASU	Air Support Unit
ATM	Air Traffic Management
ATS	Air Traffic Service
BRA	Building Restricted Area
BVLOS	Beyond Visual Line of Sight
CAS	Controlled Airspace
CNS	Communications, Navigation & Surveillance
CUAS	Counter Unmanned Aircraft Systems
DZ	Drop Zone
EASA	European Aviation Safety Agency
eTOD	Electronic Terrain and Obstacle Database
EU	European Union
FIR	Flight Information Region
GASU	Garda Air Support Unit
HEMS	Helicopter Emergency Medical Services
IAA	Irish Aviation Authority
IFP	Instrument Flight Procedure
ICAO	International Civil Aviation Organisation
LED	Light Emitting Diode
LPA	Local Planning Authority
LOS	Line of Sight
MAC	Maritime Area Consent
MARA	Maritime Area Regulatory Authority
MEA	Minimum En-route altitude
MOR	Mandatory Occurrence Report
MWT	Micro Wind Turbine
NOTAM	Notice to Airmen
NVG	Night Vision Goggles
OCA/H	Obstacle Clearance Altitude/Height
OLS	Obstacle Limitation Surfaces
ORE	Offshore Renewable Energy
PLA	Parachute Landing Area
RAL	Reichs-Ausschuss für Lieferbedingungen und Gütesicherung
RNAV	Area Navigation
SAR	Search and Rescue
SGHAT	Solar Glare Hazard Analysis Tool
S.I.	Statutory Instrument
SID	Strategic Infrastructure Development

Acronym	Full form
SID	Standard Instrument Departure
STAR	Standard Instrument Arrival Route
SuDS	Sustainable Drainage System
UAS	Unmanned Aircraft Systems
VFR	Visual Flight Rules

16. References

1. ICAO Annex 14 Volume 1, Aerodromes.
2. ICAO Annex 14 Volume 2, Heliports.
3. ICAO Doc 9184 AN/902 Airport Planning Manual, Part 2 – Land Use and Environmental Management.
4. ICAO Doc 8168 PANS-OPS, Procedures for Air Navigation Services – Aircraft Operations.
5. ICAO EUR DOC 015, European Guidance Material on Managing Building Restricted Areas.
6. ICAO Doc 9137 Airport Services Manual - Part 6 - Control of Obstacles.
7. ICAO Doc 8168 PANS-OPS.
8. ICAO Doc 9905 RNP AR Procedure Design Manual.
9. ICAO Doc 9274 Collision Risk Model.
10. ICAO Doc 9643 Manual on SOIR.
11. ICAO Doc 8168 - Volume II - Construction of Visual and Instrument Flight Procedures.
12. ICAO EUR Doc 015 – Guidance Material on Managing Building Restricted Areas.
13. European Regulation (EU) 2018/1139.
14. European Regulation (EU) 139/2014.
15. EASA Drone Incident Management at Aerodromes Manual Part 1-3.
16. European Drone Outlook Study 2019.
17. EUROCONTROL Guidelines for Assessing the Potential Impact of Wind Turbines on Surveillance Sensors.
18. S.I. 355 of 2008 (Aerodromes and Visual Ground Aids) Order.
19. S.I. 215 of 2005 (Obstacles to Aircraft in Flight) Order.
20. IAA Aerodrome Licensing Memorandums 002 and 003.

Credits:

Photo – Dublin Airport (front cover) by Barrow Coakley