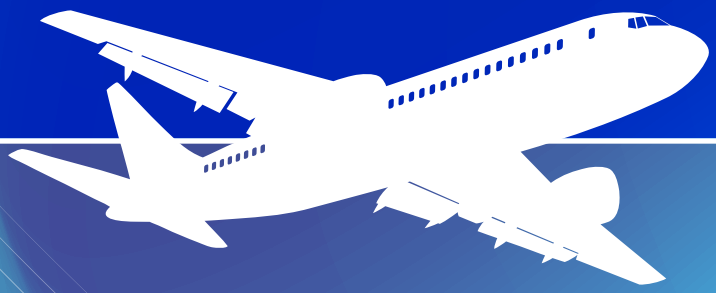
An tÚdarás Inniúil um Thorann Aerárthaí

Aircraft Noise Competent Authority

ANCA
Regulatory Decision Report

20th June 2022



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Aircraft Noise Competent Authority

The services of Noise Consultants Ltd were retained by ANCA to support the work of the authority by undertaking technical assessments and providing expert advice in the areas of acoustics, aviation, and environmental assessments.

Noise CONSULTANTS

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Glossary of Terms

Term	Definition
ABP / An Bord Pleanála	Ireland's national independent planning body that decides appeals on planning decisions made by local authorities as well as direct applications.
Act of 2019	The Aircraft Noise (Dublin Airport) Regulation Act of 2019 which ratifies the Aircraft Noise Regulation into Irish Law
Aircraft Noise Regulation	Regulation (EU) No. 598/2014 of the European Parliament on the establishment of rules and procedures with regard to the introduction of noise-related operating restrictions at Union airports within a Balanced Approach and repealing Directive 2002/30/EC.
ANCA	The Aircraft Noise Competent Authority – the Designated Competent Authority for the purposes of aircraft noise regulation at Dublin Airport.
The Applicant	The airport authority for Dublin Airport – who submitted planning application F20A/0668.
Application	Means the application made by the Applicant for the taking of a "relevant action" only within the meaning of Section 34C of the Act of 2000 bearing Planning Register Reference No: F20A/0668
ATM	Air Traffic Movement – the movement of an aircraft in or out of an airport.
The Balanced Approach	ICAO Balanced Approach – consists of identifying a noise problem at a specific airport and analysing various measures available to reduce noise. The Balanced Approach aims to address noise problems on an individual airport basis and identify the noise related measures that achieve maximum environmental benefit most cost effectively using objective and measurable criteria.
CEA	Cost-effectiveness analysis.
daa	The airport authority for Dublin Airport.
dB	Decibels – a common unit of measuring sound.
DRD	A draft regulatory decision, for the purpose of public consultation, outlining the proposed noise mitigation measures and operating restrictions (if any) to be introduced in order to address any identified noise problem at the airport.
EASA	The European Union Aviation Safety Agency.
ECAC	The European Civil Aviation Conference – a European intergovernmental organisation that seeks to standardise civil aviation policies and practices amongst its Member States.
EMRA	The Eastern and Midlands Regional Assembly – part of the regional tier of governance in Ireland, primarily focused on strategic planning.
ENG18	The World Health Organization's Environmental Noise Guidelines for Europe 2018.
END / Environmental Noise Directive	Directive (EC) 2002/49/EC of the European Parliament relating to the assessment and management of Environmental Noise.

Term	Definition
ENR / Environmental Noise Regulations 2018	Statutory Instrument No. 549/2018 European Communities (Environmental Noise) Regulations 2018 – gives effect to Directive (EC) 2002/49/EC relating to the assessment and management of Environmental Noise, as amended by Directive 2015/996 establishing common noise assessment methods.
EPA	The Environmental Protection Agency.
EPNdB	Effective Perceived Noise in Decibels.
FCC	Fingal County Council.
HA	Highly Annoyed – Metric used to describe the number of people calculated to be Highly Annoyed by Aircraft Noise.
HSD	Highly Sleep Disturbed – Metric used to describe the number of people calculated to be Highly Sleep Disturbed by Aircraft Noise
HSIP	Home Sound Insulation Programme – a home Insulation scheme for dwellings most impacted by current operations at Dublin Airport.
IAA	Irish Aviation Authority – the body responsible for the management of Irish controlled airspace, the safety regulation of Irish civil aviation, and the oversight of civil aviation security in Ireland.
ICAO	The International Civil Aviation Organization – a specialised division of the United Nations which works with Member States and industry groups to agree on international civil aviation standards and recommended practices and policies in support of a safe, efficient, secure, economically sustainable, and environmentally responsible civil aviation sector.
LAP	The Dublin Airport Local Area Plan.
L_{night}	The long-term average sound level at night determined over all the night-time periods of a year as defined by ENR.
L_{den}	The long-term average sound level determined across all of the day-evening-night (24-hour) periods of a year as defined by ENR.
MPPA	Millions of Passengers per Annum that travel through an Airport.
NAO	The Noise Abatement Objective – this is a policy objective for managing the long-term future of aircraft noise.
NAP	The Noise Action Plan developed by Dublin Airport.
NNG09	The World Health Organisation Night Noise Guidelines of 2009.
NIS	Natura Impact Statement – a report required to be produced as part of the Appropriate Assessment of Plans and Projects.
NTK	Noise and Track Keeping System – this is the system used by an airport to record aircraft noise.

Term	Definition
NQS	Noise Quota Scheme – a 'Noise Budget' for Dublin Airport that allocates a certain number of 'points' to be spent on the night time period across the year. Each aircraft carries a Quota Count ('points') depending on how noisy they are – the lounder the plane the higher the points. Each flight takes points off the total noise quota for the year.
The planning authority	The planning authority of Fingal County Council.
RD	The regulatory decision - this is the set of conditions proposed by ANCA for the planning authority to consider in the making of their decision on planning application F20/0668. It also supports the implementation of the Noise Abatement Objective.
Relevant Action	Refers to the proposed changes to planning permission applied for under F20A/0668.
RNIS	Residential Noise Insulation Programme – an Insulation programme that applies to homes based on their location in relation to the planning permission granted for Dublin Airport's north runway under current planning conditions.
RSIGS	Residential Sound Insulation Grant Scheme – the sound insulation grant scheme proposed for homes who will be affected by night time noise due to changes to the planning conditions as proposed by ANCA under the RD.
Runway 10L/28R	The Dublin Airport north runway.
Runway 10R/28L	The Dublin Airport south runway.
Runway 16/34	The Dublin Airport crosswind runway.
SEA	Strategic Environmental Assessment – the formal, systematic evaluation of the likely significant effects of implementing a plan or programme before a decision is made to adopt the plan or programme.
Section 34C	Section 34C of the Planning and Development Act 2000, as amended by the Aircraft Noise (Dublin Airport) Regulation Act of 2019. This allows the Applicant to make an application to the planning authority for the taking of a 'Relevant Action' (as is the case in planning application F20A/0668).
Terminal Passenger Capacity Limit	The maximum capacity of Dublin Airport in terms of passenger numbers.
WHO	World Health Organization.
Very Significant	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment. (This definition is used to remain consistent with the definition stated in the EIAR, provided with the Application.)

01

Non-Technical Summary

01 Non-Technical Summary

1.1 Introduction

The Aircraft Noise Competent Authority (ANCA) is the designated competent authority for the regulation of aircraft noise at Dublin Airport.

In December 2020, the airport authority for Dublin Airport, the Applicant, lodged a planning application (Ref. F20A/0668) that seeks to change aircraft operating restrictions at Dublin Airport.

Following a preliminary noise assessment of the application, ANCA determined that it would lead to a noise problem at Dublin Airport. This triggered the process of aircraft noise regulation through the adoption of the International Civil Aviation Organization (ICAO) Balanced Approach.

ANCA has developed a Noise Abatement Objective (NAO) to reduce noise from Dublin Airport in the long-term. This is supported by the regulatory decision (RD), which sets out mitigation measures and operating restrictions to be used to achieve the objective. A Strategic Environmental Assessment and an Appropriate Assessment were carried out on these plans.

A draft regulatory decision (DRD) and related report was published and made available for submissions and observations through a public consultation process from 11 November 2021 to 28 February 2022, in accordance with Section 34C(12) of the Planning and Development Act (Act of 2000). Having had regard to all submissions and observations received during this consultation, ANCA has made a RD that it will direct the planning authority (Fingal County Council) to include in its decision on the planning application.

1.2 The Noise Abatement Objective

A Noise Abatement Objective (NAO) is a plan for managing the effects of aircraft noise on the surrounding communities and the environment.

It may guide future decisions that are needed to manage aircraft noise aspects of aircraft operations at an airport.

An NAO has been developed specifically for Dublin Airport.

Having regard to expected development at Dublin Airport, the NAO should be seen as a long-term objective for the reduction of aircraft noise.

The NAO for Dublin Airport has 5 constituent parts:

- Policy Objective
- Explaining the Objective
- Measurable Criteria
- Expected Outcomes
- Monitoring

1.2.1 Measuring the Impact of the NAO

A series of required outcomes are to be achieved against the NAO in order to reduce the number of people 'highly annoyed' (HA) and 'highly sleep disturbed' (HSD) by aircraft noise, particularly at night.

These are measured using World Health Organization (WHO) standards describing those chronically affected by aircraft noise.

The NAO aims to reduce the number of people highly sleep disturbed and highly annoyed so that compared to 2019 conditions, the number of people in these categories will reduce by:

- 30% by 2030
- 40% by 2035
- 50% by 2040

It also aims to reduce the number of people exposed to annual averaged aircraft noise above 55 decibels (dB) during the night time and 65 dB across a full 24-hour period compared to 2019.

ANCA will monitor the implementation of the NAO by requiring the Applicant to produce regular reports.

1.2.2 Achieving the NAO

In order to successfully achieve the NAO, ANCA identified three conditions that it will give to the planning authority (Fingal County Council) to include in their decision on the planning application submitted by the Applicant.

The RD contains three conditions.

1.3 Particulars of any Proposed Noise Mitigation Measures and Operating Restrictions to be Introduced – the Regulatory Decision

Details of the noise mitigation measures and operating restrictions are contained in the RD.

The making of a RD is a statutory function of ANCA. The RD outlines the noise mitigation measures and operating restrictions to be introduced in order to address the noise problem at Dublin Airport.

The three conditions are:

1. The introduction of a Noise Quota Scheme (NQS).
2. No use of the north runway for take-off or landing between 00:00 and 05:59 except in limited circumstances.
3. A voluntary Residential Sound Insulation Grant Scheme (RSIGS).

1.3.1 The Regulatory Decision – the Three Conditions

1.3.1.1 First Condition – The Introduction of a Noise Quota Scheme

This condition places a limit on night time aircraft noise at Dublin Airport through the introduction of a 'Noise Quota Scheme' between 23:00 and 06:59. This works like a 'noise budget' that Dublin Airport will have to operate within.

When the north runway becomes operational, there will be a limit of 65 flights that can arrive or depart from Dublin Airport during the night, regardless of the sound level emitted from the planes concerned.

This limit is to be replaced by the Noise Quota Scheme (NQS).

Aircraft are allocated a number of points at production relating to the amount of noise they make. These points are called the Quota Count, or QC. The noisier the plane, the higher the QC. As planes take off and land at the airport at night time, their QC contributes to the total that is permitted for Dublin Airport. The total is 16,260 points per year.

This system will promote the use of quieter aircraft at night, as they will have a lower QC.

1.3.1.2 Second Condition – Operational Restrictions on the North Runway

This condition will allow for flights to take off and land on both of Dublin Airports parallel runways between 06:00-23:59. Night flights on the north runway will be prohibited between 00:00-05:59 other than in limited circumstances, such as in the case of an emergency.

1.3.1.3 Third Condition – the Voluntary Residential Sound Insulation Grant

Communities who will be newly affected by noise above a certain level at night time have been identified and will be eligible for a new grant scheme called the Residential Sound Insulation Grant Scheme (RSIGS).

This scheme will provide grant support in the sum of €20,000 to households for noise insulation in bedrooms.

The scheme will not apply to properties who have already availed of measures under the two existing insulation schemes – the Residential Noise Insulation Scheme (RNIS) or the Home Sound Insulation Programme (HSIP) – or to properties who had planning permission lodged after 9 December 2019.

1.3.2 How the Regulatory Decision Compares to the Applicant's Planning Application and the 2007 Planning Conditions

2007 Conditions	daa Planning Application	ANCA Regulatory Decision
Condition 3(d) prohibits the use of north runway between 11pm and 7am.	Use of North Runway from 6am to midnight[1], rather than 7am to 11pm as set out in the current planning conditions.	Runway 10L/28R [the north parallel runway] shall not be used for take-off or landing between 00:00 and 05:59 (local time) except in cases of safety, maintenance considerations, exceptional air traffic conditions, adverse weather, technical faults in air traffic control systems or declared emergencies at other airports or where Runway 10L/28R length is required for a specific aircraft type.
Condition 5 limits the number of aircraft movements (ATMs) at the entire airport to 65 between 11pm and 7am.	Seeks a Noise Quota Count system from 11.30pm to 6am, rather than an airport-wide 65 ATM limit from 11pm to 7am as set out in the current planning conditions; The airport would be subject to an annual noise quota of 7990 'points' between the hours of 2330hrs and 0600hrs. Introduce an enhanced noise monitoring framework.	The introduction of a Noise Quota Scheme (NQS), with an annual limit of 16,260 between the hours of 23:00-06:59 (local time) with noise-related limits on the aircraft permitted to operate at night. Details of reporting metrics and frequency required are specified.
	Introduce a noise insulation grant scheme for those most impacted by the proposed amendments.	A voluntary residential sound insulation grant scheme (RSIGS) for residential dwellings shall be provided as detailed in Schedule B, for all homes forecast in 2025 to be exposed to aircraft noise at or above 55 dB L_{night} contour and experience a 'very significant' effect. Dwellings exposed to levels at or above 55 dB L_{night} shall be reviewed every two years commencing in 2027 and if applicable become eligible for the scheme. This scheme shall not apply to properties where works were undertaken under the existing Residential Noise Insulation Scheme (RNIS) or Home Sound Insulation Programme (HSIP) or to properties where a planning application was lodged after 9 December 2019, the date being the adoption of Variation No. 1 to the Fingal Development Plan 2017 – 2023 incorporating policies relating to development within Aircraft Noise Zones.

1 Except in cases of safety, maintenance considerations, exceptional air traffic conditions, adverse weather, technical faults in air traffic control systems, declared emergencies at other airports, or where the extra runway length is required for a specific aircraft.

1.4 The Reasons for the Proposed Introduction of Noise Mitigation Measures and Operating Restrictions

1.4.1 Noise Quota Scheme

The Noise Quota Scheme will limit the impact of aircraft noise at Dublin Airport on communities surrounding the airport. This measure is being introduced in the interests of achieving the Noise Abatement Objective.

1.4.2 Operational Restrictions on the North Runway

The proposed measure will facilitate the operation of runways at Dublin Airport in a manner that minimises the impact of night time noise on communities. The noise assessment determined that retaining Condition 3(d) and allowing aircraft to only use the south runway at night would lead to increases in the number of people exposed to aircraft noise above the night time priority. In this respect, single south runway operations would fail to achieve the NAO.

1.4.3 Residential Sound Insulation Grant Scheme

The Residential Sound Insulation Grant Scheme is designed to reduce the impact of night time aircraft noise in the vicinity of Dublin Airport. This is in the interests of communities surrounding the airport and having regard for proper planning and sustainable development.

1.5 The Application of the Balanced Approach

The process of Aircraft Noise Regulation required ANCA to make a Noise Abatement Objective, apply the Balanced Approach, and make a regulatory decision.

The Balanced Approach is international guidance developed by the International Civil Aviation Organization (ICAO). It is an approach to managing noise at an airport.

It is given its legal basis in Europe through Regulation (EU) 598/2014 (the Aircraft Noise Regulation), and in Ireland through the Aircraft Noise (Dublin Airport) Regulation Act of 2019 (the Act of 2019).

In applying the Balanced Approach, ANCA considered the various measures available to manage aircraft noise at the airport. These measures are broadly categorised into the four principal elements of the Balanced Approach. These are:

- Reduction of Noise at Source.
- Land-Use Planning and Management.
- Operational Procedures.
- Operating Restrictions.

ANCA approached the application of the Balanced Approach as follows:

1. Prepared list of available mitigation measures.
2. Reviewed available measures and considered potential impact and feasibility.
3. Evaluated and analysed feasible measures against the Noise Abatement Objective and the Noise Problem Aspects.
4. Identified the cost-effectiveness of measures.

1.6 The Identification of Additional or Alternative Measures that have been Considered

ANCA has used the Balanced Approach to identify and select mitigation measures and operating restrictions. ICAO guidance recommends additional or alternative measures to consider when applying the process of aircraft noise regulation. ANCA considered these in the process of making its decision.

1.7 Measures Considered to Address any Noise Problem

ANCA considered the available measures under the Balanced Approach. The process and application of the Balanced Approach requires that measures which fall under each element of the Balanced Approach be used to achieve the NAO.

The tables below provide an overview of the measures considered by ANCA. Further detail on ANCA's consideration of these measures is outlined in the RD report.

1.7.1 Reduction of Noise at Source

The ICAO guidance states that in relation to reduction of noise at source, consideration should be given to:

- integration into aircraft fleets, over time, of technology improvements meeting the latest standards;
- specific fleet modernization plans of airlines operating at an airport;
- national plans to adopt the latest noise standard;
- adoption by Contracting States of the latest ICAO noise recommendations.

As such, any measures which are available to reduce noise at source need to have regard for whether they facilitate, encourage, or incentivise a greater proportion of aircraft meeting the latest noise standards to operate at Dublin Airport.

ANCA has undertaken an analysis of the fleet mix for the forecast supplied by the Applicant for its assessment of relevant action in 2025 and more broadly. This work is presented in Appendix G.

The RD also proposes a phased prohibition on the noisiest aircraft operating to and from Dublin Airport at night as part of the Noise Quota Scheme. Full details of this measure are detailed within the RD.

1.7.2 Noise Abatement Operating Procedures

Measure	Part of Current measures	Proposed new / additional measure
Use of Noise Preferential Routes	Yes	No
Route Alternation	No	No
Use / Mandate of Noise Abatement Departure Procedures (NADP) and / or Thrust Managed Climb	Yes	No
Continuous Climb Operations	Yes	No
Continuous Descent Approaches	Yes	No
Steeper / Segmented Approach Procedures / GBAs	Yes	No
Automated (RNAV) Procedures / Performance Based Navigation	Yes	No
Preferential Runway Use	Yes	Yes – Second Condition
Landing Displaced Thresholds	Yes	No
Runway Use Respite / Alternate Runway Use	No	No

1.7.3 Land Use Planning and Management

Measure	Part of Current measures	Proposed new / additional measure
Planning Measures and Noise Zoning	Yes	No
Encroachment Management	Yes	No
Sound Insulation Schemes	Yes	Yes – Third Condition
Relocation Assistance Scheme	Yes	No

1.7.4 Operating Restrictions

Measure	Part of Current measures	Proposed new / additional measure
Aircraft Movement Cap (replace)	Yes	No (proposed to replace)
Runway Use Restriction	Yes	Yes – Second Condition
Aircraft Curfew	No	No
Aircraft Type Restriction	No	Yes – First Condition
Noise Quotas	No	Yes – First Condition
Noise Contour Area and Shape		
Restriction	No	No

1.8 An Evaluation of the Cost-Effectiveness of the Various Methods Considered

ANCA has undertaken evaluation of the cost effectiveness of the proposed and alternative noise mitigation measures and operating restrictions. This is in order to determine the most cost-effective measure (or combination of measures) for achieving the NAO.

ANCA carried out the cost-effectiveness analysis in order to better understand the measures which could be introduced as a replacement for existing operating restrictions.

ANCA selected two 'effectiveness metrics' to evaluate how different measures perform against the NAO. The two metrics chosen by ANCA were:

- The number of people Highly Sleep Disturbed in 2025.
- The number of people exposed to a high noise impact in 2025 (i.e., noise levels over 55 dB on average at night).

These two metrics were used across the entire cost-effectiveness analysis.

Other than the measures considered by ANCA or proposed by the Applicant, no further measures were identified following this analysis.

1.9 The Relevant Technical Information in Relation to any Proposed Noise Mitigation Measures and Operating Restrictions to be Introduced

The relevant technical information pertaining to the proposed noise mitigation measure and operating restrictions are set out in the conditions within the RD.

1.10 Summary of the Data Examined

In the making of its regulatory decision, ANCA considered the data submitted on 18th December 2020 in support of the application for planning permission (ref. F20A/0668). ANCA issued a direction to provide information on 24 February 2021. This information was sought to facilitate detailed analysis of the measures being proposed by the Applicant and to explore potential cost-effective alternatives to the options considered including the existing noise measures being relied on by the Applicant.

ANCA also requested and examined data in relation to Appropriate Assessment (AA) and Strategic Environmental Assessment (SEA). An overview of the key documents and data which has been considered by ANCA as provided by the Applicant with the Application and in response to the Direction to Provide Information is summarised in Appendix A. The process of AA and SEA involved preparation of a Natura Impact Statement (NIS) and an SEA Draft Environmental Report, which were provided for public consultation along with the NAO and DRD and associated DRD report.

1.11 Summary of Public Consultation

ANCA facilitated a public consultation on the NAO, DRD, with associated DRD report, and environmental assessments for a period of 14 weeks, from 11 November 2021 to 28 February 2022. ANCA has had regard to all submissions and observations submitted to the consultation prior to making the RD and associated report.

Following public consultation, ANCA updated the environmental documents to take into account relevant matters raised in submissions and observations received. ANCA has now adopted the final NIS and made an AA determination. ANCA has also adopted the SEA final environmental report and SEA statement.

In making the RD, and having had regard to all submissions and observations, ANCA amended the DRD and associated report. These amendments are detailed in Section14 of this report.

02

Introduction to the Regulatory Decision Report

02 INTRODUCTION TO THE REGULATORY DECISION REPORT

2.1 Introduction to ANCA

Fingal County Council (FCC) was designated as competent authority for the purposes of aircraft noise regulation at Dublin Airport by the Aircraft Noise (Dublin Airport) Regulation Act of 2019.

Following this, the FCC Chief Executive proceeded to establish the unit as a separate Directorate – the Aircraft Noise Competent Authority (ANCA).

2.1.1 Legal Origin

Regulation (EU) No. 598/2014 of the European Parliament and of the Council of 16 April 2014 (the Aircraft Noise Regulation) establishes the rules and procedures which govern the introduction of noise-related operating restrictions at European Union airports.

The Aircraft Noise Regulation requires EU Member States to define a Competent Authority responsible for the execution of the International Civil Aviation Organization (ICAO) Balanced Approach and the adoption of any noise-related operating restrictions at airports.

The Aircraft Noise Regulation states that:

"The competent authority responsible for adopting noise-related operating restrictions should be independent of any organisation involved in the airport's operation, air transport or air navigation service provision, or representing the interests thereof and of the residents living in the vicinity of the airport. This should not be understood as requiring Member States to modify their administrative structures or decision-making procedures."[2]

The Aircraft Noise (Dublin Airport) Regulation Act 2019 (the Act of 2019) gives further effect to the Aircraft Noise Regulation on the establishment of rules and procedures with regard to the introduction of noise-related operating restrictions for Dublin Airport.

The Aircraft Noise Regulation and the Act of 2019 apply only to airports with more than 50,000 civil aircraft movements[3] per calendar year, with Dublin Airport the only airport in Ireland meeting this criterion.

2 This requirement is formalised under Article 3(2)

3 Where a movement is a take-off or landing (The Aircraft Noise Regulation Article 2(2))

2.1.2 ANCA Roles and Responsibilities

ANCA is responsible for ensuring that noise generated by aircraft activity at Dublin Airport is assessed in accordance with national and European legislation. ANCA is required to apply the Balanced Approach to manage any identified noise problem at Dublin Airport within the wider context of sustainable development.

ANCA's roles and responsibilities as described by the Act of 2019 are to:

- Regulate aircraft noise at Dublin Airport.
- Assess the noise situation at Dublin Airport and adopt the Balanced Approach where a noise problem is identified.
- Set a Noise Abatement Objective (NAO) for Dublin Airport where a noise problem has been identified.
- Assess for potential impacts of aircraft noise through the planning process to determine whether a noise problem may arise.
- Amend existing or impose new noise mitigation measures and / or operating restrictions to address aircraft noise from Dublin Airport as appropriate.
- Monitor the implementation of noise mitigation measures and operating restrictions at Dublin Airport.

ANCA is also a public authority for the purposes of the European Commission (EC) (Birds and Natural Habitats) Regulations 2011 and a Competent Authority for the purposes of the EC (Environmental Assessment of Certain Plans and Programmes) Regulations 2004. As such its functions also include:

- Appropriate Assessment Screening and Appropriate Assessment of any proposed NAO or regulatory decision.
- Strategic Environmental Assessment of any proposed NAO or regulatory decision.

2.1.3 ANCA's Role in the Planning and Development System

Under the Act of 2019 and through amendments to the Act of 2000 under Section 34C, the planning authority of Fingal County Council (FCC) refers any planning applications for development at Dublin Airport to ANCA to assess potential aircraft noise impacts. These referrals may include proposed new developments. ANCA reviews planning applications and decides as to whether a more detailed assessment is required. This determination is based on a screening exercise which seeks to identify whether the proposed development may give rise to a 'noise problem'. Where ANCA considers this to be the case, the process of aircraft noise regulation as described by the Act of 2019 is carried out.

In addition, the planning authority must refer to ANCA, any application for permission to revoke, amend or replace an operating restriction at Dublin Airport, in which case the process of aircraft noise regulation as described by the Act of 2019 must be carried out in relation to the proposed changes.

The ultimate responsibility for deciding whether a planning application for development at Dublin Airport should be granted or refused is the function of the planning authority of FCC. ANCA can only direct refusal of planning permission if inadequate provision has been made to deal with any noise problem identified and associated with the proposed development. Otherwise, it must identify the operating restrictions and / or noise mitigation measures that should be included in any decision to grant permission by FCC.

2.2 Introduction to Aircraft Noise

This section provides information on sound and noise to assist in the interpretation of the report. It addresses the technical aspects of sound and noise, whilst providing information as to how aircraft noise is measured and quantified.

2.2.1 Principles of Sound

Sound is the transfer of energy through the air resulting in changes in air pressure which are detected by our ears as sound. As the magnitude of sound energy that is transferred to the air particles increases, this results in the sound detected by our ears being perceived as being louder.

The rate at which these changes occur is called the 'frequency' of the sound and different frequencies of sound are detected by our ear as 'pitch'.

2.2.1.1 Sound Pressure Level

Sound pressure waves are measured in Pascals (Pa). However, the human ear can perceive a wide range of sound pressures, with typical sounds ranging from one 0.00002 Pa to 20,000 Pa. This range makes it difficult for the average person to relate the Pascal scale to real life events.

For this reason, the intensity of a sound is frequently expressed on a logarithmic (compressed) scale as a sound pressure level[4] which is measured in decibels (dB). Table 2.1 provides examples of sound pressure levels (dB) as described by the decibel scale, the equivalent RMS[5] sound pressure (Pa) and a description of an environment or event that is typical of each sound pressure level.

Table 2.1: Example sound pressure levels. Source: Bies & Hansen[6]

Sound Pressure Level (dB)	Sound pressure (Pa)	Description
0	0.00002	Threshold of hearing for a young person with normal hearing
20	0.0002	Recording studio, ambient level
40	0.002	Quiet residential room, ambient level
60	0.02	Department store or restaurant ambient level; conversational speech
80	0.2	Near to a busy highway (dual carriageway); shouting
100	2	Blender; factory machinery operating
120	20	Rock concert
140	200	Fireworks at close range

4 The term 'level' indicates that the quantity is expressed in decibels.

5 Root-mean-squared is the method of averaging used to obtain a positive average value for sound pressure. This method is required because sound pressure is a time-varying quantity which can have positive and negative values.

6 Engineering Noise Control: Theory and Practice (4th ed., Abington: Spon Press, 2009), pp. 39-40

Table 2.2 shows how changes in sound pressure level are perceived as changes in 'loudness'[7] by the human ear. These changes and their apparent perceptible change relate to conditions where two sounds occur immediately following one another. Table 2.2 also equates the change in sound pressure level to the increase or decrease in sound energy (or power[8]).

Table 2.2: Subjective effect of changes in sound pressure level. Source: Bies & Hansen[9]

Change in sound pressure level (dB)	Sound pressure (Pa)		Change in apparent loudness
	Decrease	Increase	
3	1/2	2	Just perceptible
5	1/3	3	Clearly noticeable
10	1/10	10	Half or twice as loud
20	1/100	100	Much quieter or louder

2.2.1.2 Frequency

Although the ear can detect frequency as 'pitch', this term is often more useful in a musical context where a single note has a dominant frequency. In environmental situations however, sounds tend to be made up of a complex combination of frequencies and this combination of frequencies influences the character and 'quality' of the sound.

The ear responds to sound across a range of frequencies (20 Hertz (Hz)[10] – 20,000 Hz) but is more sensitive to some frequencies than others. Human response to frequency has been observed through equal loudness experiments. The experiments show that the human ear is most sensitive to sounds in the region between the 1,000 Hz and 10,000 Hz region and becomes less sensitive to sounds outside of this region.

When sound is measured by a microphone, this human response is not captured as microphones have a more uniform response over frequencies. To compensate for this, a number of 'frequency weightings' have been developed from research to allow sound levels as measured by microphones to better represent human hearing.

The most common weighting is the 'A-weighted' sound level. This weighting is used to consider environmental sound and is applied to the measurement of transportation noise, including aircraft noise.

The A-weighting may be written as dBA, i.e., decibels that have been A-weighted, or LA i.e., L is the sound level that has been A-weighted. The A-weighting, like the human ear, effectively tapers off the lower and higher frequencies that the average person cannot hear as easily.

2.2.2 Human Exposure to Sound

Sound is what we hear, whereas noise is unwanted sound. Sounds that are perceived as pleasing to some can be considered unpleasant by others, thereby perceived as 'noise'. The magnitude and context are also relevant - sounds, such as music, that are considered pleasant at one loudness may cause annoyance at higher levels or a dog barking may be regarded as more annoying at night than during the day.

This difference depends upon who is experiencing the sound, their attitudes towards it and other characteristics of the sound.

7 The quantity which describes how loud a sound is in terms of human perception.

8 Power is defined as rate of change of energy.

9 Engineering Noise Control: Theory and Practice (4th ed., Abington: Spon Press, 2009), p. 85

10 Hertz (Hz) is a measure of the number of oscillations that occur every second and used use to measure the frequency of an individual sound wave.

How people experience sound and noise depends on three aspects:

- Its magnitude, i.e., how loud it is.
- The frequency content i.e., the pitch of the sound.
- The duration and occurrence i.e., how long it lasts for and how often it occurs.

These descriptors are used to help quantify and describe sound and noise. In combination, these aspects can be used to help describe how a noise may have an impact.

Whilst these characteristics are measurable, as outlined above, the way in which sound is perceived is subjective, and differs between people. Noise therefore has both objective (physical) and subjective (perception) components and subjective response to noise varies and is difficult to quantify.

2.2.3 Aircraft Noise Metrics

For aircraft there are a range of metrics which are used to describe noise. These may be used to describe the level of noise arising from certain aircraft events, such as a take-off or a landing.

Additionally, other metrics can be used to describe relative levels of impact or 'exposure' to aircraft noise. These metrics usually express aircraft noise as an average level of noise.

It is important to understand what information is contained within each metric and the purposes for which it is most appropriate.

2.2.3.1 Describing Noise from a Single Aircraft Event

Maximum Sound Pressure Level - LA_{max}

The LA_{max} is the simplest descriptor of an aircraft noise event and relates to the event's maximum sound level. The LA_{max} is the maximum sound level that is measured[11] during an aircraft noise event. It is measured in dBA which means that its frequency content has been adjusted to have regard for the 'A-weighting'[12].

The LA_{max} has been used in a range of studies examining the relationship between aircraft noise events and potential interference with conversation and night time noise impacts such as sleep disturbance. In general, the higher the LA_{max} level, the higher the likelihood that the event will lead to disturbance or intrusion.

Sound Exposure Level

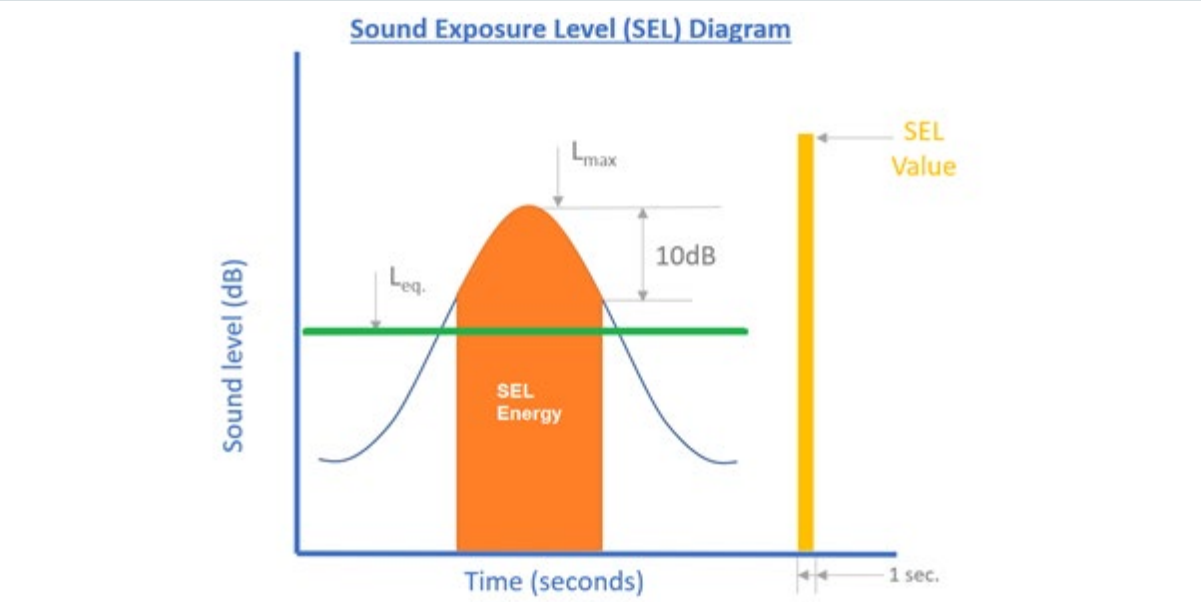
The Sound Exposure Level (SEL or LAE) is a means of describing the total amount of sound energy associated with an aircraft noise event.

An event is defined as any occurrence which results in the total ambient sound level to increase by more than 10 dB over the prevailing ambient sound level. The magnitude of sound energy associated with that event is determined, as is the duration of the sound event. The sound energy is then normalised in the time-domain to one second to determine the equivalent sound energy should that event have occurred for one-second.

In simple terms, the SEL is a measure of the total amount of sound energy from the entire aircraft noise event if it were to last for one second. The figure below presents an illustration of this against the LA_{max} and the noise level experienced during an aircraft noise event.

11 Although L_{max} may not represent the largest magnitude of sound which occurred, it is the largest sound pressure level measured by the instruments RMS detector. The RMS detector has a built-in response delay (known as a time-weighting) to incoming signals. The fast time-weighting is commonly used for environmental sound measurements and has a time constant of 100ms. This is the same as the biological time constant of the human ear

12 A-weighting is the most commonly used family of frequency curves defined within International Standard IEC 61672 and other national standards with regards to the measurement of sound pressure levels. The A-weighting curve has been widely adopted for environmental noise measurement and assessment.



For aircraft overflights, the SEL is always higher than the LA_{max}. It is usually the case that the numerical difference between SEL and LA_{max} is around 10 dB for aircraft on departure, and 8 dB for aircraft on arrival.

Like the LA_{max}, the SEL can be used to identify the relative difference in sound level between different aircraft events and to indicate interference with task and / or other impacts from aircraft noise events such as risk of awakenings.

Although the human ear does not perceive sound at the SEL level, it is a common metric that allows sound exposures of different durations to be related to one another in terms of total acoustic energy.

2.2.4 Averaged Noise Exposure Metrics

Not all aircraft noise events are the same. They can vary depending upon aircraft type being flown and the procedures being followed in that flight. Furthermore, the locations that surround airports may not always be affected by aircraft noise in the same way. For example, some locations may be affected mainly by departing aircraft but only those using a certain route or runway, which may only occur at particular times of the day.

Metrics are required to describe how much noise may be experienced at a location, considering the magnitude of the individual noise events, their duration and occurrence, and the period of interest. This is best described using equivalent continuous sound levels.

2.2.4.1 Equivalent Continuous Sound Level

The most common metric used to describe noise exposure from environmental sources is the equivalent continuous sound level (L_{eq}). This metric has been used extensively since the mid-1970s and uses the SEL of individual aircraft events along with their occurrence for each event and the period over which they occur (T) to provide an overall equivalent continuous sound level ($L_{eq,T}$) for the period (T). Therefore, when the $L_{eq,T}$ is considered, it is important that the circumstances and time for which it has been calculated are clearly understood and presented.

Table 2.3 below presents common examples of L_{eq} measures relied on for aircraft noise assessment purposes.

Table 2.3: Examples of equivalent continuous noise exposure metrics

Metric	Description
L_{day}	Annual average daytime equivalent sound level. Representative of day period (07:00-19:00).
$L_{evening}$	Annual average evening equivalent sound level. Representative of evening period (19:00-23:00).
L_{night}	Annual average night time equivalent sound level representative of night period (23:00-07:00). Used as an indicator linking noise exposure to sleep disturbance by the EU for the definition of the Exposure Response Function (ERF) between noise and health effect.
L_{den}	Annual average day-evening-night level. The L_{den} unit is a level for the whole 24-hour period, however, depending on the period of the day the noise occurs, a different weighting is applied. If the noise occurs during the first 12 hours of the day (07:00-19:00), no weighting is applied. If it occurs during the evening (19:00-23:00) a weighting of +5 dBA is added and if the noise occurs during the night time period (23:00-06:00) a weighting of +10 dBA is added. Each L_{Aeq} period is calculated / measured separately, and respective weighting is applied to the evening and night L_{Aeq} values before the L_{den} can be calculated. This metric is used by the EU for the definition of the ERF between noise and health effect.
$L_{Aeq,8hr}$	16-hour daytime noise indicator for a period 07:00-23:00. This metric is used within the UK as a measure of aircraft noise exposure and has been used previously for assessment purposes at Dublin Airport. The metric is the equivalent sound level of aircraft noise in dBA for the 16-hour annual day. The UK metric is based on a 'summer average' which is based on the daily average movements that take place between 07:00 and 23:00 local time during a 92-day period 16 June to 15 September inclusive.
$L_{Aeq,8hr}$	8-hour night time noise indicator for a period 23:00-07:00. This metric is used within the UK as a measure of aircraft noise exposure. The metric is the equivalent sound level of aircraft noise in dBA for the 16-hour annual day. The UK metric is based on a 'summer average' which is based on the daily average movements that take place between 23:00 and 07:00 local time during a 92-day period 16 June to 15 September inclusive.

As indicated by the Table 2.3, L_{eq}-based noise exposure metrics correlate with describing long-term health effects. They are also used to inform noise intervention policies. This is the case with the L_{den} and L_{night} metrics. These have relevance to the management and assessment of aircraft noise under the regulatory framework.

In addition to single aircraft noise event and L_{eq}-based noise exposure metrics, aircraft noise can be described using alternative metrics. These are explored in the following chapters.

2.3 Use of L_{night} and L_{den} to Present the Impact of Aircraft Noise at Dublin Airport

This section describes the metrics used by ANCA to describe the impact of aircraft noise at Dublin Airport.

The European Communities (Environmental Noise) Regulations 2018 (ENR) requires noise exposure from Dublin Airport to be mapped every five years. Under the ENR, aircraft noise exposure must be reported using the annual average night time metric (L_{night}) and annual average day-evening-night metric (L_{den}). These metrics are also prescribed by the Aircraft Noise Regulation and are used as part of research and guidance in relation to impact of aircraft noise on health and quality of life.

Contour maps relating to situations or assessments carried out in accordance with these legislative standards will be in this format.

Many historical planning conditions relating to Dublin Airport (those relating to insulation schemes for example), relate to the 92-day day-evening summer period metric ($L_{Aeq,16hr}$). Legislation permits the use of additional metrics such as this where they are relevant to local circumstances.

A-weighting:

Noise can be measured and evaluated objectively but humans have a different response to different frequencies. A-weighting is an industry agreed adjustment that is made to sound measurements to replicate the response of a human ear. It is generally represented as dBA.

Noise Contours

Noise contours are lines on a map that connect points of the same levels of noise exposure. Contours are a standardised industry method of presenting the average aircraft related noise experienced (or projected to be experienced) by people living around an airport. They were traditionally calculated over a 16-hour period (07:00-23:00) during the busiest 92-day airport summer period from 16 June to 15 September for planning consents at Dublin Airport. Contours may present information on what occurred in the past or depict projected future conditions.

The use of average noise contours facilitates:

- An examination of noise exposure trends over time and the effects of aircraft noise.
- A comparison of different operating scenarios.
- An examination of the predicted impact of development proposals.

2.3.1 The Effects of Aircraft Noise

There is growing evidence to show a relationship between aircraft noise exposure and public health concerns.

The evidence base used in the regulatory framework for the assessment of environmental noise and its effects on health and quality of life is described by the World Health Organization (WHO) in its publication 'Environmental Noise Guidelines for the European Region 2018' (ENG18). The ENG18 is provided in support of the WHO publication 'Night Noise Guidelines for Europe 2009' (NNG09).

Both the ENG18 and NNG09 set health-based recommendations on average environmental noise exposure. In the case of the ENG18, these recommendations are provided for five relevant sources of environmental noise,

including aircraft noise. Between the WHO publications, an evidence base is presented for several key health outcomes, including:

- Noise annoyance.
- Sleep disturbance.
- Cardiovascular health.
- Mental health, wellbeing, and quality of life.
- Children's learning.

2.3.1.1 Noise Annoyance

Noise annoyance may be considered the most widespread response across a population to aircraft noise.

Annoyance and the methods which may be used to describe it, are used throughout European policy to measure the impact of aircraft noise exposure on communities living around airports. These responses are described as Exposure Response Functions (ERF) and can be used to indicate the percentage of the population Highly Annoyed (% HA) by aircraft noise. The same approach is used for all sources of environmental noise such as road traffic and railway noise.

Acoustic factors, such as the character of the sound source and its sound level, account for some of the annoyance responses presented within ERFs. Other factors are also known to contribute towards annoyance responses and are thought to explain some of the differences which may occur in reported annoyance around different airports. These factors are often referred to as 'non- acoustic' factors and include aspects such as a person's attitude associated with the noise source, their ability to cope, sensitivity to noise, as well as personal factors including age and status.

The WHO ENG18 reports an ERF for aircraft noise measured against the L_{den} metric which is summarised in Table 2.4 below.

Table 2.4: WHO ENG18 Exposure response function for annoyance

L_{den} (dB)	%HA
40	1.2
45	9.4
50	17.9
55	26.7
60	36.0
65	45.5
70	55.5

Alongside the ERF for aircraft noise annoyance, the ENG18 makes the following recommendation with regards to aircraft noise exposure. It states that:

"For average noise exposure, the Guideline Development Group strongly recommends reducing noise levels produced by aircraft below 45 dB L_{den}, as aircraft noise above this level is associated with adverse health effects."

"To reduce health effects, the Guideline Development Group strongly recommends that policy-makers implement suitable measures to reduce noise exposure from aircraft in the population exposed to levels above the guideline values for average and night noise exposure. For specific interventions the GDG recommends implementing suitable changes in infrastructure."

These recommendations are described as 'strong' recommendations. A strong recommendation is described as a recommendation which *"… can be adopted as policy in most situations".*

This recommendation, and its strength, has not been without criticism with the approach taken in establishing guidelines being the subject of scrutiny. For example, the recommendation and guideline are based on an idealised situation where nobody would ever be exposed to a level of aircraft noise which would affect a person's health and / or quality of life.

Academics have also raised concerns regarding the sampling approach used to gather data for the purposes of the systematic reviews underpinning the guidelines, whereas others point out that the guidelines themselves have not been the subject of a cost-benefit analysis. The regulatory framework surrounding environmental noise is underpinned by ENG18. European Directive 2020/367 describes the establishment of methods for harmful effects of environmental noise, stating:

"At the time of adoption of this Directive, the high quality and statistically significant information that could be used was that of the World Health Organization (WHO) Environmental Noise Guidelines for the European Region, presenting dose-effect relations for harmful effects induced by the exposure to environmental noise. Consequently, the dose-effect relations introduced in Annex III to Directive 2002/49/EC should be based on those guidelines. In particular concerning the statistical significance, the WHO studies were based on representative populations, and the results of these assessment methods are consequently considered relevant when applied to representative populations."

2.3.2 Sleep Disturbance

The effects of aircraft noise on sleep have been considered in a range of studies. These studies used several methods to evaluate the impact of noise on sleep using approaches such as self-reported sleep disturbance through to measurement of increased bodily movement using polysomnography.

Table 2.5, which is reproduced from the NNG09 describes the effect of night time noise exposure and the associated health effects as may be observed within the population.

Table 2.5: Effects arising from night time noise exposure (L_{night})

Average night noise level over a year (L_{night})	Description
Up to 30 dB	Although individual sensitivities and circumstances may differ, it appears that up to this level no substantial biological effects are observed. $L_{night, outside}$ of 30 dB is equivalent to the no observed effect level (NOEL) for night noise.
30 to 40 dB	A number of effects on sleep are observed from this range: body movements, awakening, self-reported sleep disturbance, arousals. The intensity of the effect depends on the nature of the source and the number of events. Vulnerable groups (for example children, the chronically ill and the elderly) are more susceptible. However, even in the worst cases the effects seem modest. $L_{night, outside}$ of 40 dB is equivalent to the lowest observed adverse effect level (LOAEL) for night noise.
40 to 55 dB	Adverse health effects are observed amongst the exposed population. Many people have to adapt their lives to cope with noise at night. Vulnerable groups are more severely affected.
Above 55 dB	This situation is considered increasingly dangerous for public health. Adverse health effects occur frequently, a sizable portion of the population is HA and HSD. There is evidence that the risk of cardio-vascular disease increases.

ENG18 makes the following recommendation with regards to aircraft noise in relation to sleep disturbance. It states that:

"For night noise exposure, the GDG strongly recommends reducing noise levels produced by aircraft during nighttime below 40 dB Lnight, as aircraft noise above this level is associated with adverse effects on sleep."

And;

"As the evidence was rated moderate quality, the GDG made the recommendation strong."

The WHO ENG18 recommendations are based on evidence provided by the review of six studies which included a total of 6,371 participants. The outcome of these studies has been used to produce the ERF that can be used to indicate the percentage of the population Highly Sleep Disturbed (%HSD) at different levels of aircraft noise exposure. The model was based on outdoor L_{night} levels between 40 dB and 65 dB only; the lower limit of 40 dB set because of inaccuracies in predicting lower noise levels. The WHO ENG18 ERF have now been adopted by the EC as the common approach for determining health effects under the revision of Annex III of the END.

The evidence reported from these studies has been rated as moderate quality. Table 2.6, which is reproduced from ENG18, shows the reported association between exposure to aircraft noise (L_{night}) and sleep disturbance (%HSD).

Table 2.6: Association between exposure to aircraft noise (L_{night}) and Sleep Disturbance (%HSD) as reported by WHO ENG18

(L_{night}) dB	%(HSD)	95% CL
40	11.3	4.72-17.81
45	15.0	6.95-23.08
50	19.7	9.87-29.60
55	25.5	13.57-37.41
60	32.3	18.15-46.36
65	40.0	23.65-56.05

Having regard to the impact on human health, management of aircraft noise should include measures to limit noise at the source where possible, protect noise sensitive locations, and give priority to the prevention of noise, prior to the implementation of measures to mitigate the impact of noise.

2.4 Noise Modelling

Airport noise assessments and the quantification of its impacts rely mainly on noise modelling. Noise modelling allows the metrics described above to be presented at individual locations or graphically using maps.

Figure 2.1: Sample noise contour for Dublin Airport (2016 L_{den})

Modelling can be used to calculate the noise situation at an airport based on data relating to current and historic conditions. Alternatively, it can be used to forecast a noise situation in the future having account for a development proposal or noise-related action.

Airport noise models are underpinned by noise calculation methodologies. The aircraft noise calculation methodology to be used in the context of the regulatory framework is essentially a version of the European Civil Aviation Conference-CEAC Doc. 29 4th Edition (ECAC Doc. 29) calculation methodology.

ECAC Doc. 29 brings together recommended practices for aircraft noise modelling as published by the following aviation bodies:

- International Civil Aviation Organisation (ICAO).
- European Civil Aviation Conference (ECAC).
- Society of Automotive Engineers (SAE).

Each of these bodies provide guidance on how noise modelling should be undertaken using data supplied by aircraft manufacturers. The detail provided by the bodies differs, however there is a consensus on how noise modelling shall be carried out. This is reflected in ECAC Doc. 29.

ECAC Doc. 29 is a standard method used for computing noise levels around civil airports. Its Fourth Edition was adopted by ECAC-DGCA/147 on 7 December 2016 and allows for consistent computation of noise contours throughout ECAC States. Under the regulatory framework, it is the methodology used for the establishment of airport noise action plans, and under the Aircraft Noise Regulation.

ECAC Doc. 29 can be implemented within a software environment and there are specific tools which are commercially available to carry out airport noise calculations. In general terms, the calculation methodology can be used to calculate the SEL and / or LA_{max} at a given receiver point for a combination of aircraft types, flight performance and flight paths. This is illustrated in Figure 2.2 below.

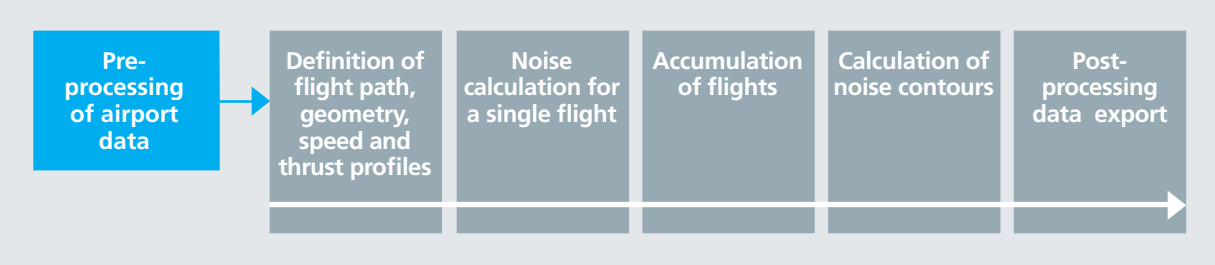


Figure 2.2: General process for calculating aircraft noise level

As indicated in Figure 2.2 the calculation of aircraft noise levels requires airport data to be made available to the calculation. This includes the location of flight paths and the number and type of aircraft and their respective operations by time of day, which can be provided either as a record of activity or as a forecast.

Under the regulatory framework and the guidance provided by the three bodies set out above, it is recommended that aircraft noise modellers utilise the Aircraft Noise and Performance Database[13]. This database provides an international resource for noise modellers and marries aircraft flight performance and aircraft Noise Power Distance data for use with ECAC Doc. 29 and associated guidance[14].

The aircraft performance data which is held within the Aircraft Noise and Performance Database describes how aircraft typically approach and take-off from an airport in the form of 'procedure profiles'. For arrivals, these profiles describe information such as speeds, flaps, and landing gear configurations, along with descent angles. For departures, similar information is held alongside engine power settings and rates of climb.

The Aircraft Noise and Performance Database therefore contains 'default' profiles and associated Noise Power Distance data which may or may not reflect the conditions at an airport. Under the regulatory framework, there is scope for competent authorities to use profiles and Noise Power Distance data which better reflect conditions at an airport.

In the UK, the UK Civil Aviation Authority (CAA) has established minimum standards for aircraft noise modelling[15] which describe the circumstances where it is necessary to adjust the noise and profile data for modelling purposes. This discusses and recommends the use of local noise monitoring terminals and local track keeping data to modify the Noise Power Distance and flight profile data.

Under the regulatory framework as it applies to the Aircraft Noise Regulation, the accuracy of noise modelling is also a consideration.

13 https://www.easa.europa.eu/aircraft-noise-and-performance-anp-data

14 ICAO 9911

15 CAP 2091 'CAA Policy on Minimum Standards for Noise Modelling'

2.4.1 Noise and Track Keeping Systems and Community Engagement Tools

Day-to-day noise impacts from airport operations are often captured using Noise and Track Keeping systems (NTK). An NTK system works by matching radar data describing the flight paths of aircraft arriving and departing Dublin Airport with measurements from the Noise Monitoring Terminal (NMT) that are located around it.

Data obtained from NTK systems can be used for a variety of purposes. At Dublin Airport, the primary purpose of the NTK system is to monitor aircraft noise and aircraft track keeping in support of complaint handling. The data obtained from an NTK system can also be used to improve the quality and accuracy of a noise model by providing measurements of aircraft noise events and flight paths as part of a validation exercise.

More modern systems are used to support community engagement. Such systems are accessible to the public via the internet and allow noise and aircraft track information to be viewed and queried. Some systems can provide reports of how many and at what height aircraft have been operating over certain areas.

03

The Airport Authority for Dublin Airport Planning Application

03 The Airport Authority for Dublin Airport Planning Application

This section outlines the application by the airport authority for Dublin Airport (daa) to amend some of the existing conditions in the North Runway Planning Permission.

3.1 The Application

Planning application F20A/0668 (the Application) was submitted by daa (the Applicant) to FCC, as the planning authority, on 18 December 2020.

The Application is for relevant action under Section 34C of the Act of 2000 to amend/replace operating restrictions set out in Conditions 3(d) and 5 of the North Runway Planning Permission (Fingal County Council Reg. Ref. No. F04A/1755, ABP Ref. No.:PL06F.217429) which was extended until 28 August 2022 by FCC (Reg. Ref. No. F04A/1755/E1) and amended by FCC (F19A/0023, ABP Ref. No. PL06F.305298) as well as proposing new noise mitigation measures.

3.2 The North Runway Planning Permission

Permission for Dublin Airport's north runway was granted in 2007 following an Oral Hearing and was subject to a total of 31 planning conditions.

Two of these conditions place restrictions on night flights and come into force upon completion of the construction of the north runway. These are:

- Condition 3(d) *"On completion of the runway hereby permitted … Runway 10L-28R (the 'North Runway') shall not be used for take-off or landing between 2300 hours and 0700 hours except in cases of safety, maintenance considerations, exceptional air traffic conditions, adverse weather, technical faults in air traffic control systems or declared emergencies at other airports."*
- Condition 5 *"On completion of construction of the runway hereby permitted, the average number of night time aircraft movements at the airport shall not exceed 65/night (between 2300 hours and 0700 hours) when measured over the 92 day modelling period"*

The origins of these operating restrictions are based on the Environmental Impact Statement (EIS) and other information that was supplied to the planning authority in the application for the North Runway Planning Permission and the Applicant's response to an An Bord Pleanála (ABP) Request for Further Information.

Conditions 3(d) and 5 reflect the basis upon which the effects of the north runway and the wider operation of Dublin Airport were reported and assessed by ABP at the time of their decision in 2007.

The wider parts of Condition 3 of the North Runway Planning Permission introduce a form of preferential runway use during daytime periods (07:00-23:00). Condition 3(a) to 3(c) state that:

a) the parallel runways (10R-28L and 10L-28R) shall be used in preference to the cross runway, 16-34,

b) when winds are westerly, Runway 28L shall be preferred for arriving aircraft. Either Runway 28L or 28R shall be used for departing aircraft as determined by air traffic control,

c) when winds are easterly, either Runway 10L or 10R as determined by air traffic control shall be preferred for arriving.

This form of preferential use is known as 'Option 7b' as reported within the EIS and additional information as submitted to ABP.

No such restrictions currently exist at Dublin Airport. In its current form as a two-runway operation, there are no operating restrictions relating to the use of Dublin Airport's runways or the numbers or types of aircraft which can fly. Dublin Airport is however restricted by virtue of the combined capacity of Terminal 1 and Terminal 2 and shall not exceed 32 million passengers per annum (mppa)[16]. This cap applies to both the current operation and the operation of the north runway. One of the effects of the terminal passenger capacity limit is to limit the number of passenger flights that can be operated from Dublin Airport.

A comparison of Dublin Airport's current form of runway operations and the form of runway operations which will be permitted once the conditions of the North Runway Planning Permission apply (i.e., on completion of the construction of the northern runway) and their respective constraints are presented in Table 3.1.

Table 3.1: Overview of current and future (i.e., upon completion of the construction of the north runway) runway operations

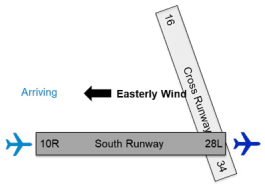
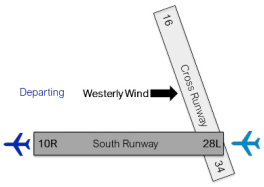
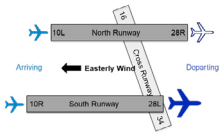
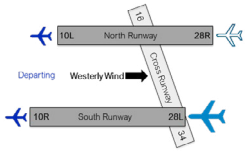
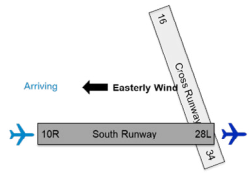
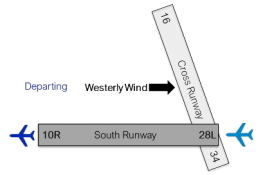
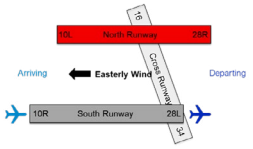
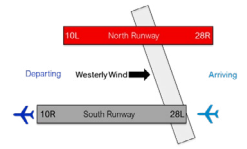
All operations subject to a Terminal Passenger Capacity Limit of 32 mppa				
	Current Two Runway Operations		Consented Three Runway Operations	
	Easterly	Westerly	Easterly	Westerly
Daytime 07:00-23:00				
Night time 23:00-07:00			 65/night movement cap	 65/night movement cap

Figure Notes:

- **Larger aircraft indicates preferential use whereas smaller aircraft indicates non-preferential use.**
- **No aircraft indicates prohibited use save for exceptions such as emergencies.**

3.3 Summary of the Application

The construction of Dublin Airport's north runway commenced in December 2016. Following the granting of the North Runway Planning Permission in 2007 Dublin Airport has experienced strong growth. The Applicant states that[17]:

"The above referenced operating restrictions were imposed through Conditions 3(d) and 5 of the 2007 determination of An Bord Pleanála (ABP). Since then, further evidence and understanding on the impact of the

16 This passenger capacity limit is set through the combined effect of Condition 3 of the Terminal 2 Planning Permission (FCC Reg Ref No F06A/1248; ABP Ref. No. PL06F.220670); and Condition 2 of the Terminal 1 Extension Planning Permission

17 Section 1.2, Planning Report – Planning Application for a Proposed Relevant Action (S.34C of P&D Acts) to Amend/Replace Operating Restrictions set out in Conditions No 3(d) and No 5 of the North Runway Planning Permission FCC Reg Ref No F06A/1843; ABP Ref. No. 06F.223469 as well as Proposing New Noise Mitigation Measures at Dublin Airport, Co. Dublin.

restrictions has become available and it is evident that they will impact significantly on Dublin Airport's ability to meet the foreseeable need for aviation travel and safe expansion of air traffic at the airport. As such, it is considered that the operating restrictions are particularly limiting and will have the effect of unduly hindering growth of the Airport in line with the relevant Strategic Objectives of National, Regional and Local policies."

The Proposed Development therefore seeks to amend Conditions 3(d) and 5 of the North Runway Planning Permission. This is to remove the limit of 65 aircraft movements per night under Condition 5 and amend Condition 3(d) to allow aircraft to utilise the north runway during part of the night, subject to the night aircraft movements complying with a Noise Quota System.

The Applicant's Planning Report[18] states that changing the currently drafted planning conditions is:

"…imperative to the airport's ability to:

- *rebound post Covid-19;*
- *grow in line with government wide strategic direction which seeks to develop the airport as a hub, thereby enhancing Ireland's connectivity with key tourism and export markets;*
- *meet the demands of multi-trip passengers which in turn requires early morning and late evening flights;*
- *meet the operational demands of the predominantly short haul service based airline fleet at Dublin Airport and cargo operations at the airport;*
- *maintain existing flight slots and connectivity to mainland Europe by facilitating early morning/late evening arrival and departures;*
- *facilitate the ability to attract high-value transatlantic and long-haul services; and*
- *maintain and facilitate growth in jobs and economic activity."*

The Application has been accompanied by a series of reports providing assessments of the potential noise impacts of the Proposed Development along with other environmental effects.

3.4 Overview of the Application Documents

The Application was made on 18 December 2020. Following ANCA's initial assessment of the Application, a direction to provide information and assessments for the purposes of an assessment of the noise situation at Dublin Airport was made by ANCA on 24 February 2021 ('Direction to Provide Information')[19].

This Direction to Provide Information sought to help ANCA analyse the measures being proposed by the Applicant, to explore potential alternatives to the options considered, and to confirm the details of the existing noise measures being relied on by the Applicant.

Information was also requested in relation to Appropriate Assessment, Strategic Environmental Assessment, the forecasts relied on by the Applicant, and the cost-effectiveness assessments.

An overview of the key documents and data which have been considered by ANCA, as provided by the Applicant with the Application and in response to the Direction to Provide Information, is summarised in Appendix A.

18 Planning Report – Planning Application for a Proposed Relevant Action (S.34C of P&D Acts) to Amend/Replace Operating Restrictions set out in Conditions No 3(d) and No 5 of the North Runway Planning Permission (ABP REF NO: PL06F.217429) as well as Proposing New Noise Mitigation Measures at Dublin Airport, Co. Dublin.

19 Appendix A, ANCA Direction to Tom Phillips

At a high level, the approach taken by the Applicant and their consultants has been assessment work to help identify the measures available as part of the Application and to then conduct a series of screening, feasibility, effectiveness and cost-effectiveness exercises to determine measures available[20].

To facilitate these assessments the Applicant prepared a 'Candidate' Noise Abatement Objective (cNAO). The summary objective of this cNAO prepared by the Applicant is:

"To limit and reduce the adverse effects of long-term exposure to aircraft noise, including health and quality of life, so that long-term noise exposure, particularly at night, does not exceed the situation in 2018. This should be achieved through the application of the Balanced Approach."

The Applicant has undertaken their own cost-effectiveness assessment[21] of the measures available which has been used to determine the measures that are proposed under the Application.

The Applicant has submitted an Environmental Impact Assessment Report (EIAR) with the Application[22] and in response to the planning authority's Additional Information Request[23]. The EIAR assesses the likely significant effects arising from the relevant action under Section 34C of the Act of 2000 as proposed by the Applicant. While the EIAR is provided for the purposes of the FCC Planning Authority's EIA, ANCA has taken the information it contains into account for the purposes of this Report, as well as its Natura Impact Statement (NIS) and SEA Environmental Report.

3.5 Summary of the Relevant Action proposed by the Application

The relevant action and the measures proposed by the Applicant are summarised in the following section of this chapter. A relevant action is a provision of Section 34C of the Planning and Development Act to amend or replace an operating restriction at Dublin Airport including the introduction of new noise mitigation measures.

It should be noted from the outset that the Application seeks changes to operating conditions which will affect future levels of night time aircraft noise following the commencement of north runway operations. The Application does not seek to change operating conditions during daytime periods i.e., 07:00-23:00.

Further details and discussion in relation to the Applicant's proposals are detailed in this report as part of ANCA's own assessment of the measures available.

3.5.1 Noise Quota Scheme

The Application proposes that Condition 5 be replaced with a Noise Quota Scheme.

Noise Quotas are restrictions which are designed to limit aircraft noise and encourage the use of quieter aircraft. Rather than restricting aircraft movements, a Noise Quota Scheme is designed to restrict the total amount of aircraft noise by setting a 'noise budget'. Noisier aircraft contribute more towards the noise budget than quieter ones therefore providing the incentive to Dublin Airport and airlines to operate quieter aircraft to allow more flights.

20 Reported in Ricondo, Dublin Airport North Runway, Regulation 598/2014 (Aircraft Noise Regulation) Forecast Without New Measures and Additional Measures Assessment Report (Revision 1 – July 2021

21 Ricondo, Dublin Airport North Runway, Regulation 598/2014 (Aircraft Noise Regulation) Cost Effectiveness Analysis Report (Revision 1 – July 2021)

22 Dublin Airport North Runway Relevant Action Application Environmental Impact Assessment Report, Main Report, December 2020 and associated appendices

23 Dublin Airport North Runway Relevant Action Application Environmental Impact Assessment Report, Main Report, September 2021 and associated appendices

More details of the Applicant's proposals for the scheme were provided in response to the Direction to Provide Information.

The Applicant's proposal is that the Noise Quota Scheme be modelled based on the system adopted by the United Kingdom (UK) Department for Transport (DfT) in restricting night time aircraft noise at Stansted Airport. Under the approach taken by the UK DfT at Stansted Airport, a quota period is defined (the Noise Quota Period), aircraft performing take-offs and landings are each allocated a Quota Count and a total Noise Quota is set for the Noise Quota Period.

Under this system, the Quota Count of each aircraft is based on its certified noise levels. Aircraft noise certification is a requirement of all commercial aircraft. The procedure for noise certifying an aircraft is set out in Chapter 3 of ICAO Annex 16[24] and is standardised. A key consideration to a Competent Authority such as ANCA is that under the Aircraft Noise Regulation decisions on noise-related operating restrictions shall be based on the noise performance of aircraft as based on this certification procedure[25]. Certified noise levels are published routinely by the European Union Aviation Safety Agency (EASA)[26]. Using certified noise levels, a 'noise classification' can be assigned from which its Quota Count can then be determined. Table 3.2 below sets out the Noise Classification and associated Quota Count used in the UK at Stansted Airport as referenced by the Applicant in their proposals.

Table 3.2: Noise classifications and Quota Count in use by the UK Department of Transport (October 2021)

Noise Classification	Quota Count
Below 81 EPNdB	0
81 – 83.9 EPNdB	0.125
84 – 86.9 EPNdB	0.25
87 – 89.9 EPNdB	0.5
90 – 92.9 EPNdB	1
93 – 95.9 EPNdB	2
96 – 98.9 EPNdB	4
99 – 101.9 EPNdB	8
Greater than 101.9 EPNdB	16

Under the UK system the setting of noise quotas and any associated movement limits typically occurs every five years and involves a consultation. Under the UK system the period for which the noise quota applies is 23:30-05:59 local time with total noise quota and associated aircraft movement restrictions set for summer and winter seasons.

24 Annex 16 – Environmental Protection, Volume I – Aircraft Noise, ICAO, Eighth Edition, July 2017

25 Article 7(1)

26 Available here: https://www.easa.europa.eu/domains/environment/easa-certification-noise-levels

The Applicant has proposed a Noise Quota Scheme (NQS) which would apply over the period 23:30-05:59 local time with a total annual noise quota for this period of 7,990. In response to the Direction to Provide Information, the Applicant has indicated that a series of exemptions would apply to aircraft movements counted towards the annual noise quota along with the ability to 'carry over' unused quota allowances from one year to the next. In the case of exemptions, these are circumstances where an aircraft operation is not to be counted towards the noise quota. This may be a situation where a landing takes place where there is a threat to life onboard the aircraft during the quota period.

The primary impact of these proposals would be to allow Dublin Airport to operate more than the 65 aircraft per 8-hour night (i.e., 23:00-06:59) as is currently provided for in the North Runway Planning Permission and in line with their forecasts. Dublin Airport has provided evidence in response to the Direction to Provide Information demonstrating how its proposed annual noise quota has been calculated[27].

Such restrictions are not currently in place at Dublin Airport and at present there are no restrictions on the number/type of aircraft or amount of noise which can be produced by Dublin Airport.

3.5.2 Amendment of Condition 3(d)

The Application proposes that Condition 3(d) of the North Runway Planning Permission be revised to allow the use of the north runway between the hours of 23:00-23:59 and 06:00-06:59. This means that during the hours of 00:00-05:59 only the south runway would be available for aircraft taking off or landing.

The proposal by the Applicant constitutes an extension to the hours that apply to the runway operating preference described by Condition 3(a)-(c), i.e., the operating preference described in Conditions 3(a)-(c) would apply between 06:00-23:59 rather than 07:00-22:59.

3.5.3 Night Time Residential Sound Insulation Grant Scheme (RSIGS)

There are currently two sound insulation schemes in place at Dublin Airport, both of which are based on daytime noise exposure using the $L_{Aeq,16hr}$ metric.

One of the measures proposed by the Application is a night time noise insulation grant scheme. Detail relating to the scheme was provided in response to the Direction to Provide Information[27].

The proposed scheme is called the Residential Sound Insulation Grant Scheme (RSIGS). It is proposed that under the scheme a grant of €20,000 will be made available to eligible properties for noise insulation measures. The proposal is that the RSIGS covers bedrooms only. This is due to the impact and effects of the Application being on night time noise exposure.

Under the proposed scheme eligible dwellings are identified if they meet either of the following noise-related criteria:

Criteria 1 - dwellings forecast to be exposed to night time noise levels of at least 55 dB L_{night} in 2025.

Criteria 2 - dwellings with a 'very significant'[28] rating arising from forecast noise levels of at least 50 dB L_{night} in the first full year when the relevant action comes into operation, with a change of at least +9 dB when compared with the current permitted operation in the same equivalent year.

27 Appendix A, Dublin Airport North Runway Relevant Action Application, Draft – Initial Response to ANCA Further Information, June 2021

28 An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment. as determined using the methodology documented in Chapter 13 of the Dublin Airport North Runway Relevant Action Application Environmental Impact Assessment Report main chapter, December 2020

Under the Applicant's proposal, eligibility for inclusion within the scheme under Criteria 1 would be reviewed every two years.

In response to the Direction to Provide Information, the Applicant has provided details of the types of sound insulation measures that could be made available under the RSIGS scheme. The Applicant has also indicated the typical cost of these measures and their performance. This information has been considered by ANCA in its own assessments.

3.5.4 Noise Reporting Framework

The Applicant has proposed a 'Noise Reporting Framework' as a new measure under the Application. The proposed Framework is intended to report associated compliance with the NAO developed for Dublin Airport and the noise mitigation measures and operating restrictions that are proposed in ANCA's regulatory decision.

The Applicant's proposals for the Framework were summarised in response to the Direction to Provide Information[29]. The proposed framework as proposed includes:

- Monitoring and reporting of the effects of aircraft noise as measurable under Directive 2002/49/EC.
- Aircraft noise exposure contours for the L_{den} and L_{night} metrics for the previous calendar year.
- Performance and compliance with the proposed Noise Quota Scheme.
- The number of eligible dwellings and grants made under the proposed RSIGS.
- Performance reporting against the NAO.

29 Section 3, Appendix A, Dublin Airport North Runway Relevant Action Application, Draft – Initial Response to ANCA Further Information, June 2021

04

Policy and Legislation Overview

04 Policy and Legislation Overview

This section outlines the Irish and international policy and legislation relevant to aircraft noise regulation at Dublin Airport.

4.1 Regulatory and Policy Framework

The management and assessment of aircraft noise is addressed in legislation as it applies to Dublin Airport. This legislation originates from several European regulations and directives which describe the processes and methods for the management and assessment of aircraft noise. These have been transposed into or given further effect by Irish law and are effective at Dublin Airport. The Act of 2019 also makes additional provision for the regulation of aircraft noise at Dublin Airport.

All of the above legislation has been collectively described in this Report as the Regulatory Framework.

4.1.1 International Aviation Policy

The International Civil Aviation Organization (ICAO) is a specialised division of the United Nations that works with Member States and industry groups to reach consensus on international civil aviation standards and recommended practices and policies in support of a safe, efficient, secure, economically sustainable and environmentally responsible civil aviation sector.

Resolution A33/7 of ICAO introduces the concept of a Balanced Approach to address aircraft noise. The Balanced Approach is considered as the foundation of noise regulation for aviation as a global industry setting international rules and standards implemented in the EU under The Aircraft Noise Regulation[30]. While Resolution A33/7 is not, of itself, binding in Irish law, the Balanced Approach is an integral part of the Aircraft Noise Regulation, which is binding in Irish law.

Under the Balanced Approach, when noise-related actions are taken the combination of measures must reflect the most cost-effective measure or combination of measures[31]. In particular, these measures should not be more restrictive than necessary to achieve the environmental noise abatement objectives set for that airport[32].

4.1.2 European Policy and Legislation

Policy and legislation in respect of aviation noise has been established by the European Commission (EC). Various European Union directives and regulations seek to define a common aviation policy in Europe and implement international regulations set by ICAO.

4.1.2.1 EU Council Directive 2002/34/EC (the Environmental Noise Directive)

EU Council Directive 2002/49/EC[33] (commonly referred to as the Environmental Noise Directive or the END) relates to the assessment and management of environmental noise. It is the main instrument of the EU to quantify noise pollution levels and trigger action within both Member States and at EU level. The END has the aim of establishing a common approach to avoiding, preventing or reducing the harmful effects due to exposure to environmental noise within the EU.

30 Recital 3 of the Regulation 598

31 Article 5(3) of Regulation 598

32 Article 5(6) of Regulation 598

33 The European Parliament and the Council of the European Union, Directive 2002/49/EC of the European Parliament and of the Council of 25 June 2002 relating to the assessment and management of environmental noise - Declaration by the Commission in the Conciliation Committee on the Directive relating to the assessment and management of environmental noise [online]. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32002L0049

The aim of the END is to:

"… define a common approach intended to avoid, prevent or reduce on a prioritised basis the harmful effects, including annoyance, due to exposure to environmental noise."

The END focuses on three action areas:

- The determination of exposure to environmental noise.
- Ensuring that information on environmental noise and its effects is made available to the public.
- Preventing and reducing environmental noise where necessary and preserving environmental noise quality where it is good.

It should be noted that the END only applies to environmental noise to which humans are exposed.

Aircraft noise is a matter considered by the END which requires that Member States prepare and publish, at least once every five years, strategic noise maps and noise action plans for 'major airports', which are defined as those with more than 50,000 movements a year (including small aircraft and helicopters).

The END is supported by six annexes which describe the approaches and methods in support of delivering the aims and objectives of the END.

- **Annex I** describes the noise indicators for which noise exposure must be reported. These are the L_{night}, which is the A-weighted long-term average sound levels as defined in ISO 1996-2, determined over all of the night periods of a year; and the L_{den} which is calculated from the A-weighted long-term average sound levels determined over all the day, evening and night periods of a year. The Annex describes these metrics which should be formulated along with their reference periods. Annex I states that in addition to these metrics, where appropriate it *"may also be advantageous to use special noise indicators and related limit values"* suggesting alternative metrics such as, for example, where appropriate the $L_{day,}$ $L_{evening}$, and the L_{Amax} and SEL, in the case of night period protection from noise peaks.
- **Annex II** describes the assessment methods that shall be used to establish the noise indicators set out in Annex I. Section 2 of Annex II sets out the noise calculation methodologies which shall be used. Annex II of the END was replaced by the Annex of Directive 2015/996, which was subsequently amended by a Corrigenda in January 2018 and a Commission Delegated Directive in December 2020. The latest version of the END Annex II assessment method for aircraft noise is a duplicate of ECAC Doc. 29 4th Edition.
- **Annex III** describes the assessment methods for harmful effects. Annex III was replaced by the Annex to Directive 2020/367 in March 2020. Annex III sets out methodologies for the assessment of the number of people HA and the number of people HSD due to aircraft noise. The methodology is based on the dose-response curves from WHO ENG18.
- **Annex IV** sets out the minimum requirements for strategic noise mapping required under the END. Annex IV clarifies that a strategic noise map is *"a presentation of data of an existing, previous or predicted noise situation in terms of a noise indicator"*. It states that strategic noise maps may be presented to the public as graphical plots or numerical data in tabular or electronic form. Under Annex IV and having regard for the wider contents of the END, it states that strategic noise maps are to be reported for the L_{den} and L_{night} metrics in 5 dB bands from 55 dB L_{den} and 50 dB L_{night}.
- **Annex V** sets the minimum requirements for noise action plans. Noise action plans are to include: the results of the strategic noise mapping; any noise reduction measures in place or under preparation; actions intended to be taken in the next five years; long-term strategy; financial information on budgets, cost-effectiveness and cost-benefits assessments, if available; and provisions on evaluation of results of the action plans.
- **Annex VI** describes the data which is to be sent to the European Commission.

The implementation of the END in Ireland is discussed below.

4.1.2.2 Commission Directive (EU) 2015/996

Commission Directive (EU) 2015/996 replaces Annex II of the END and describes the common noise assessment methodology for the END. The Directive describes methodology of calculation for noise from roads, railway, industry, and aircraft.

Directive 2015/996 has subsequently been amended by a Corrigenda in January 2018, and a Commission Delegated Directive in December 2020. The latest version of the END Annex II assessment method for aircraft noise is a duplicate of ECAC Doc. 29 4th Edition. The calculation method is described in Section 2.7 of the Directive and is supported by a set of appendices.

Appendix I of the Directive describes what is in effect a version of the ANP database. This sets out the fundamental components which underpin the computation of aircraft noise levels. This information effectively constitutes 'default' aircraft performance and noise emission data and as such may lead to calculated noise levels which deviate from their true values. Directive 2015/996 recognises this and states that:

"In cases where input data provided in Appendix F to Appendix I are not applicable or cause deviations from the true value that do not meet the conditions presented under 2.1.2 and 2.6.2, other values can be used, provided that the values used and the methodology used to derive them are sufficiently documented, including demonstrating their suitability. This information shall be made publicly available."

This statement cross-references the Directive's 'Quality Framework'. This sets a tolerance for the accuracy of the input values as they affect the noise emission levels at source i.e., the level of noise produced by aircraft and at a specific location, when performing a specific procedure. The Quality Framework requires that all input values affecting the emission level of a source shall be determined with at least the accuracy corresponding to an uncertainty of ± 2 dBA in the emission level of the source (leaving all other parameters unchanged). Regarding the use of default data, it is stated that input data shall reflect the actual use, and in general there will be no reliance on default input data values or assumptions, unless the collection of real data is associated with disproportionately high costs. Specifically for flight paths it is stated they should be derived from radar data whenever they exist of sufficient quality.

4.1.2.3 Commission Directive (EU) 2020/367

Commission Directive (EU) 2020/367 of 4 March 2020 replaces Annex III of Directive 2002/49/EC in describing the assessment of health effects under the END. Directive 2002/367 adopts the Exposure Response Functions (ERF) published within the WHO ENG18.

Directive 2020/367 reproduces the ERFs for the number of people HA and HSD from aircraft noise.

4.1.2.4 Regulation (EU) No. 598/2014 (the Aircraft Noise Regulation)

The Aircraft Noise Regulation concerns the establishment of rules and procedures with regards to the introduction of noise-related operating restrictions at European Union airports.

The Aircraft Noise Regulation applies where a 'noise problem' has been identified at an airport and sets procedures which must be followed for the introduction of noise-related operating restrictions at qualifying EU airports. Member States must ensure that where a noise problem has been identified that the Balanced Approach is adopted for the purposes of noise management at an airport.

The Balanced Approach originates from international practice through Resolution A33/7 of ICAO. The Balanced Approach is considered as the foundation of noise regulation for aviation as a global industry setting international rules and standards implemented in the EU under the Aircraft Noise Regulation.

The Aircraft Noise Regulation states that:

"The Balanced Approach should remain the foundation of noise regulation for aviation as a global industry. The Balanced Approach recognises the value of, and does not prejudge, relevant legal obligations, existing agreements, current laws and established policies. Incorporating the international rules of the Balanced Approach in this Regulation should substantially lessen the risk of international disputes in the event of third-country carriers being affected by noise-related operating restrictions."

When noise-related actions are taken, the combination of measures must reflect the most cost- effective measure or combination of measures. In particular, these measures should not be more restrictive than necessary to achieve the environmental noise abatement objectives set for that airport. Noise abatement objectives include health aspects, at the level of individual airports, while respecting relevant EU rules, in particular those laid down in the END, and the legislation within each Member State. One of the two objectives of the Aircraft Noise Regulation is to facilitate the achievement of such noise abatement objectives.

According to the Aircraft Noise Regulation competent authorities have to ensure that an assessment of the noise situation at airports for which they are responsible is conducted. Additional noise indicators may also be used providing these have an objective basis. If an assessment conducted under the END concludes that a new noise-related operating restriction may be required, the Aircraft Noise Regulation is triggered.

4.1.3 Irish Legislation

4.1.3.1 European Communities (Environmental Noise) Regulations 2018

These regulations (ENR) give effect to the European Union (EU) Directive 2002/49/EC, relating to the assessment and management of environmental noise, by transposing it into Irish law for matters relating to the assessment and management of environmental noise. The Regulations provide for the implementation in Ireland of a common approach within the European Community to avoid, prevent or reduce, on a prioritised basis, the harmful effects, including annoyance, due to exposure to environmental noise.

The ENR set out the approach to meeting the requirements of the END in Ireland and Dublin Airport is the only designated major airport in Ireland that currently falls under the scope of the END.

The ENR allocates the roles of preparing noise maps and noise action plans for Dublin Airport to the Applicant and FCC respectively. The Applicant is therefore the competent Noise Mapping Body for the production of strategic noise maps, and FCC is the Competent Action Planning Authority responsible for the preparation of the Noise Action Plan.

Under the Regulation, the Environmental Protection Agency (EPA) is the designated national authority and shall exercise general supervision over the functions of Noise Mapping Bodies and Action Planning Authorities and provide guidance or advice to such bodies or authorities, where necessary. The EPA also submits information to the European Commission (EC) as required under the END on strategic noise mapping and noise action planning under the Regulations.

4.1.3.2 The Aircraft Noise (Dublin Airport) Regulation Act 2019

The Balanced Approach is given legal effect in the EU through the Aircraft Noise Regulation and in Ireland through the Act of 2019 which also makes additional provision for the regulation of aircraft noise at Dublin Airport. In addition to requiring ANCA to adopt the Balanced Approach where a noise problem is identified at Dublin Airport, the Act of 2019 amends the Act of 2000 to cater for a situation where development at Dublin Airport may give rise to an aircraft noise problem.

Fingal County Council (FCC) was designated as the competent authority for the purposes of aircraft noise regulation at Dublin Airport by the Act of 2019. Following this, the FCC Chief Executive established the authority as a separate Directorate – the Aircraft Noise Competent Authority (ANCA).

4.1.4 Relevant National Policy

4.1.4.1 A National Aviation Policy for Ireland 2015

Aviation policy for Ireland is established at national level through the 'National Aviation Policy for Ireland 2015'.

The primary objective of the National Aviation Policy is to facilitate and enhance Ireland's air connectivity in a safe, competitive, cost-effective and sustainable manner, in the wider context of supporting Ireland's economic and social goals. Section 4.5 of the Policy concerns the future capacity needs of Ireland's airports and states:

"Air transport requires a specific level of airport infrastructure, both in terms of quantity and quality, to facilitate the optimum level of air services for Ireland. This includes terminal and runway capacity as well as surface access to airports, and is particularly relevant to the development of Dublin Airport as a secondary hub."

"Existing capacity at State airports should be optimised in conjunction with timely planning to enable expansion of air service connections in all relevant markets delivering wider economic benefits for Ireland."

Specifically, regarding Dublin Airport, Action 4.5.1 states:

"The process to develop the second runway at Dublin Airport will commence, to ensure the infrastructure necessary for the airport's position as a secondary hub and operate to global markets without weight restrictions is available when needed."

The policy defines the specific policy positions and actions to demonstrate Ireland's commitment to working with its EU and international partners to mitigate the impacts of aviation on the environment and facilitate the sustainable growth of the sector with actions that support the implementation of the Aircraft Noise Regulation.

The National Aviation Policy sets out a need for technology improvements in aircraft and engine design to help combat aviation emissions; for effective land-use planning to balance the operational needs of airports with protection for residents and amenities; and for implementation of the Balanced Approach to noise management at Irish airports.

4.1.4.2 Project Ireland 2040 – National Planning Framework 2017

In Ireland, the National Planning Framework and The National Development Plan combine to form Project Ireland 2040. The Project Ireland 2040 National Planning Framework[34] recognises high-quality international connectivity as crucial for overall international competitiveness and addressing opportunities and challenges from Brexit through investment in our ports and airports. This is in line with sectoral priorities already defined through National Ports Policy and National Aviation Policy and signature projects such as the north runway for Dublin Airport.

The Project Ireland 2040 National Planning Framework recognises the importance of proactive noise management which is implemented through the following objectives 52 and 65:

34 Government of Ireland. Project Ireland 2040 – National Planning Framework [online]. Available at: https://npf.ie/wp- content/uploads/Project-Ireland-2040-NPF.pdf (accessed 8 April 2021)

National Policy Objective 52

"The planning system will be responsive to our national environmental challenges and ensure that development occurs within environmental limits, having regard to the requirements of all relevant environmental legislation and the sustainable management of our natural capital."

National Policy Objective 65

"Promote the pro-active management of noise where it is likely to have significant adverse impacts on health and quality of life and support the aims of the Environmental Noise Regulations through national planning guidance and Noise Action Plans."

4.1.4.3 National Policy Statement on Airport Charges Regulation (2017)

The Policy Statement seeks to ensure (amongst other things) that continued economic development/airport capacity is in the best interests of the customer/consumer and in the national interest. In terms of environmental requirements, the Policy Statement requires the regulator to have regard to Government policy on climate change and sustainability as part of the regulatory determination process. This is to ensure that future airport capacity development is advanced in accordance with the broad objectives of the National Mitigation Plan, which aims to enable transition to a low carbon, climate-resilient and environmentally sustainable economy by 2050.

4.1.4.4 Policy Statement on Runway Development at Dublin Airport (2018)

This repeats the aims of the National Aviation Policy, i.e., that the Irish Government supports the building of a second runway at Dublin Airport and the development of Dublin Airport as a hub airport. In terms of environmental requirements, the Policy Statement outlines that the Government is required to ensure full compliance with the Aircraft Noise Regulation which governs the imposition of noise-related operating restrictions at airports. It additionally states that Fingal County Council must set out noise mitigation measures or abatement objectives for Dublin Airport to follow (in accordance with the Balanced Approach) and oversee the implementation of any such measures by the Applicant.

4.1.4.5 National Development Plan 2021-2027

The National Development Plan supports the implementation of the NPF and also the National Aviation Policy, with particular reference to the importance of significant investment in the north runway.

4.1.5 Relevant Regional and Local Policy

This section describes regional and local policy as it relates to Dublin Airport.

The Eastern and Midland Regional Assembly (EMRA) is part of regional governance in Ireland, established under local government reform in January 2015. The Fingal and Dublin City regions fall within the Eastern & Midland Regional Assembly (EMRA) region and, therefore, EMRA Regional Spatial and Economic Strategies are implemented for the area. The Regional Spatial and Economic Strategies (RSES) 2019 – 2031[35] set out the strategic plan and investment framework for the EMRA region and include specific policies relating to Dublin Airport. These are summarised in Table 4.1: EMRA RSES Policy objectives relevant to Dublin Airport.

35 Eastern & Midland Regional Assembly (EMRA). Regional Spatial & Economic Strategy (RSES) 2019 – 2031 [online]. available at: https://emra.ie/final-rses/ (accessed 8 April 2021)

Table 4.1: EMRA RSES policy objectives relevant to Dublin Airport.

Policy ID	Policy Objective
RPO 8.17	Support the National Aviation Policy for Ireland and the growth of movements and passengers at Dublin Airport to include its status as a secondary hub airport. In particular, support the provision of a second runway, improved terminal facilities and other infrastructure.
RPO 8.18	Improved access to Dublin Airport is supported, including Metrolink and improved bus services as part of BusConnects, connections from the road network from the west and north. Improve cycle access to Dublin Airport and surrounding employment locations. Support appropriate levels of car parking and car hire parking.
RPO 8.19	Spatial planning policies in the vicinity of the airport shall protect the operation of Dublin Airport in respect to its growth and the safe navigation of aircraft from non-compatible land uses. Policies shall recognise and reflect the airport noise zones associated with Dublin Airport. Within the Inner Airport Noise Zone, provision of new residential and / or other noise sensitive development shall be actively resisted. Within the Outer Noise Zone, provision of new residential and / or other noise sensitive development shall be strictly controlled and require appropriate levels of noise insulation in all cases.
RPO 8.20	Spatial planning policies for areas located within the Public Safety Zones shall reflect the guidance set out in the ERM Report "Public Safety Zones, 2005" (or any update thereof) commissioned by the then Department of Transport and the Department of Environment, Heritage and Local Government, in assessing proposals for development falling within Airport Public Safety Zones.

The strategy recognises Dublin Airport as a key national asset to Ireland's economic success, which is linked with its global connectivity to trade and tourism markets and requires support to ensure it continues as an economic driver. This is balanced with a recognition that consideration of continued growth of Dublin Airport must include the environmental and safety considerations.

4.1.5.1 Fingal County Council Dublin Airport Central Masterplan (2016)

This Masterplan refers to a study on future aviation demand growth which suggests a doubling of aviation demand by 2050. As such it promotes and supports the role of Dublin Airport as the primary gateway to Ireland, and as an important employment hub and business location in the region. It does this through proposing land use planning which facilitates future airport capacity needs as well as improved transport linkages to the city and region. The Masterplan also comprises a framework for the future development of lands located adjacent to Dublin Airport (for commercial purposes), covering an area of 21.7 hectares.

4.1.5.2 Fingal Development Plan 2017-2023

The Fingal Development Plan 2017 - 2023[36] identifies the need to minimise the adverse impact of noise without placing unreasonable restrictions on development, and to avoid future conflicts between the community and the operation of Dublin Airport. It is a Strategic Policy Objective of the Development Plan to:

"Safeguard the current and future operational, safety, and technical requirements of Dublin Airport and provide for its ongoing development within a sustainable development framework of a Local Area Plan. The plan shall take account of any potential impact on local communities and shall have regard to any wider environmental issues."

36 Fingal County Council (March 2017). Fingal Development Plan 2017 – 2023 – Written Statement [online]. Available at: https://www.fingal.ie/sites/default/files/2019-03/Fingal%20Development%20Plan%202017-2023%20-%20Written%20Statement_compressed_compressed.pdf (accessed 8 April 2021)

A number of specific Policy Objectives relate directly to Dublin Airport and these are stated in Table 4.2.

Table 4.2: Summary of relevant Fingal Development Plan 2017-2023 policy objectives

Policy ID	Policy Objective
ED11	Maximise sustainable economic opportunities associated with the presence of key infrastructural assets within the County including Dublin Airport, the national motorway network, railway services, and the close proximity to Dublin City and Dublin Port via the Port Tunnel.
ED30	Engage and collaborate with key stakeholders, relevant agencies and sectoral representatives to ensure that Dublin Airport is developed and promoted as a secondary hub to capitalise on the associated wider economic benefits for Fingal and the wider region.
ED31	Ensure that the required infrastructure and facilities are provided at Dublin Airport so that the aviation sector can develop further and operate to its maximum sustainable potential, whilst taking into account the impact on local residential areas, and any negative impact such proposed developments may have on the sustainability of similar existing developments in the surrounding area, and the impact on the environment, including the climate.
ED33	Balance the impact of expansion of aviation and the important strategic issue of reducing carbon emissions.
ED97	Prepare the Dublin Airport Local Area Plan within the lifetime of the Development Plan in collaboration with key stakeholders, relevant agencies, sectoral representatives and local communities.
DA01	Facilitate the operation and future development of Dublin Airport, in line with Government policy, recognising its role in the provision of air transport, both passenger and freight.
DA02	Prepare and implement a new Local Area Plan for Dublin Airport which will accommodate the future sustainable growth and development of the airport lands while also facilitating the efficient and effective operation of Dublin Airport in accordance with the requirements of the Local Area Plan and proper planning and sustainable development.
DA03	Safeguard the current and future operational, safety, technical and developmental requirements of Dublin Airport and provide for its ongoing development within a sustainable development framework, having regard to both the environmental impact on local communities and the economic impact on businesses within the area.
DA09	Ensure that aircraft-related development and operation procedures proposed and existing at the Airport consider all measures necessary to mitigate against the potential negative impact of noise from aircraft operations (such as engine testing, taxiing, taking off and landing), on existing established residential communities, while not placing unreasonable, but allowing reasonable restrictions on airport development to prevent detrimental effects on local communities, taking into account EU The Aircraft Noise Regulation/2014 (or any future superseding EU regulation applicable) having regard to the 'Balanced Approach' and the involvement of communities in ensuring a collaborative approach to mitigating against noise pollution.

Regarding Policy Objective DA02, the new Dublin Airport Local Area Plan provides the principal development management tool for the Dublin Airport area and will specify the long-term composition and mix of uses within the designated area together with the infrastructural development necessary to support these uses. On foot of this objective, the Dublin Airport Local Area Plan 2020 was adopted.

4.1.5.3 Fingal County Council Dublin Airport Noise Action Plan 2019-2023

This is the first Noise Action Plan (NAP) specifically prepared for Dublin Airport, and replaces the Dublin Airport section of the Dublin Agglomeration Noise Action Plan 2013-2018. This plan is required under the Environmental Noise Regulations 2006[37] (the 'Regulations') Statutory Instrument 140 of 2006 and therefore the END.

The NAP is primarily a tool for reporting the findings of the strategic noise maps, as produced by the Applicant, the competent Noise Mapping Body (NMB). The NAP is prepared by FCC as the designated Action Planning Authority (APA) under the Environmental Noise Regulations.

Prior to this NAP, noise action planning in relation to Dublin Airport was addressed within the Dublin Agglomeration Noise Action Plan 2013-2018. This NAP sets the management of transportation noise as a key objective:

"to avoid, prevent and reduce, where necessary, on a prioritised basis the harmful effects, including annoyance, due to long term exposure to environmental noise from road traffic, rail and aircraft."

The Dublin Agglomeration Noise Action plan states that this key objective would be achieved by:

"taking a strategic approach to managing environmental noise and undertaken a balanced approach in the context of sustainable development."

The Dublin Airport Noise Action Plan 2018-2023 builds on this objective and presents a key objective specific to Dublin Airport. This is:

"to avoid, prevent and reduce, where necessary, on a prioritised basis the effects due to long term exposure to aircraft noise, including health and quality of life through implementation of the International Civil Aviation Organisation's 'Balanced Approach' to the management of aircraft noise as set out under EU Regulation 598/2014"

The NAP was subject to consultation. It presents the results of the strategic noise mapping which was reported in 2017 and is based on a relevant year of 2016. It summarises trends in the noise-related aircraft activity at Dublin Airport along with existing measures available and in place to reduce and manage noise.

Section 7 of the NAP describes the proposed actions to be taken, along with the long-term strategy. The long-term strategy presented in the NAP is linked to Objective DA09 of the Fingal Development Plan. With regards to noise from Dublin Airport, this states:

"Ensure that aircraft-related development and operation procedures proposed and existing at the Airport consider all measures necessary to mitigate against the potential negative impact of noise from aircraft operations (such as engine testing, taxiing, taking off and landing), on existing established residential communities, while not placing unreasonable, but allowing reasonable restrictions on airport development to prevent detrimental effects on local communities, taking into account EU Regulation 598/2014 (or any future superseding EU regulation applicable) having regard to the 'Balanced Approach' and the involvement of communities in ensuring a collaborative approach to mitigating against noise pollution."

37 Repealed and replaced by the European Communities (Environmental Noise) Regulations 2018

The NAP includes thirteen actions in relation to noise. The extract from the NAP with these actions is shown in Table 4.3 below.

Table 4.3: Actions set out in Table 10 of the Noise Action Plan for Dublin Airport 2018-2023

Reduction of Noise at Source				
Actions	**Description**	**KPI**	**How Action Fulfils ICAO Requirement**	**When**
1	Encourage daa to work with airline partners to introduce quieter aircraft, particularly at night – including consideration of incentives.	Report issued.	Reduction of noise at source through use of quieter aircraft.	Annually
2	Encourage daa to promote quieter aircraft through incentives such as FlyQuiet programmes.	Report issued.	Reduction of noise at source by encouraging quieter operations such as pilots and air traffic controllers using preferential runways and flight tracks.	Annually
Land Use Planning and Management				
Actions	**Description**	**KPI**	**How Action Fulfils ICAO Requirement**	**When**
3	Keep under review land-use policies in relation to aircraft noise through the review of existing land use planning frameworks in so far as they relate to Dublin Airport.		Enable proactive management of noise through appropriate sensitive development.	
4	Monitor noise encroachment associated with Dublin Airport to ensure that airport noise policy is appropriately informed through land use planning frameworks in so far as they relate to Dublin Airport.	Encroachment Analysis Report.	Land use planning and management to avoid encroachment of sensitive development in relation to Dublin Airport.	2019 Onwards

Nosie Abatement Operating Procedures				
Actions	**Description**	**KPI**	**How Action Fulfils ICAO Requirement**	**When**
5	Request daa to undertake a review of Departure Noise Abatement Procedures and to publish the findings.	Progress report issued.	Endeavour to achieve lower noise operating procedures through review of current Departure Noise Abatement Procedures.	Q3 2019
6	Request daa to monitor and publicly report key performance with respect to Dublin Airport's existing Noise Abatement Procedures.	Report issued.	Sustain noise operating procedures through monitoring and managing the current Departure Noise Abatement Procedures.	Annually
Monitoring and Community Engagement				
Actions	**Description**	**KPI**	**How Action Fulfils ICAO Requirement**	**When**
7	Request daa to produce annual noise contours and metrics and to share this information with interested parties.	Annual noise contour report.	Monitoring and community engagement through production of annual report.	2019 Onwards
8	Encourage daa to continue to operate noise complaining management systems and respond to all aviation-related noise complaints in a timely manner.	Submission of progress report using target of 95% of aircraft noise complaints responded to within 28 days.	Monitoring and community engagement through adequate response times to all aviation related noise complaints.	Ongoing
9	Promote the introduction of live (or near live) flight reporting software (such as Webtrak).	Submission of progress report on status of publicly accessible flight tracing platform.	Monitoring and community engagement through community facing platform for reviewing airport flights and noise.	2020
10	Engage proactively with communities through the Dublin Airport Environment Working Group (DAEWG) and the St. Margaret's Community Liaison Group.	Quarterly meeting and agreed minutes.	Monitoring and community engagement through quarterly meetings.	Ongoing
11	Promote the enhancement of the Noise Flight Track System to include where appropriate additional fixed and / or mobile noise monitoring terminals.	Submission of progress report outlining number of new locations.	Noise abatement operating procedures & monitoring and community engagement.	2019 Onwards

All				
Actions	**Description**	**KPI**	**How Action Fulfils ICAO Requirement**	**When**
12	Review any updates in advice from bodies such as the WHO and the European Environment Agency in relation to aircraft noise and its health and quality of life effects.	Internal Policy Development Report.	All	
13	Request the submission of an annual report by daa outlining measures undertaken to achieve actions listed in this table.	Report.		Annually

4.1.5.4 Variation No. 1 of the Fingal Development Plan 2017-2023

Variation No.1 of the Fingal Development Plan 2017-2023 (effective from 9 December 2019) includes key policy in relation to how aircraft noise from Dublin Airport will be managed through the planning system. This is addressed through the revision of the noise zones around Dublin Airport.

The noise zones are established by FCC with reference to wider policy as described in the Government of Ireland's National Planning Framework 2040. National Policy Objective 65 of the Framework set out the following:

"Promote the pro-active management of noise where it is likely to have significant adverse impacts on health and quality of life and support the aims of the Environmental Noise Regulations through national planning guidance and Noise Action Plans".

The Variation cites the Aircraft Noise Regulation, referring to the key objective set by the Dublin Airport NAP.

The Variation states that having regard for this policy:

"There is a need to minimise the adverse impact of noise without placing unreasonable restrictions on development and to avoid future conflicts between the community and the operation of the airport."

Four noise zones are set out by the Variation, each with their own separate objectives. These are reproduced in Table 4.4 with Figure 4.1 presenting the respective extents of the zones.

Table 4.4: Aircraft Noise Zones as defined under Variation No. 1 of the Fingal Development Plan

Zone	Indication of Potential Noise Exposure During Aircraft Operations	Objective
D	≥ 50 and < 54 dB $L_{Aeq, 16hr}$ and ≥ 40 and < 48 dB L_{night}	To identify noise sensitive developments which could potentially be affected by aircraft noise and to identify any larger residential developments in the vicinity of the flight paths serving the Airport in order to promote appropriate land use and to identify encroachment. All noise sensitive development within this zone is likely to be acceptable from a noise perspective. An associated application would not normally be refused on noise grounds, however where the development is residential-led and comprises non-residential noise sensitive uses, or comprises 50 residential units or more, it may be necessary for the applicant to demonstrate that a good acoustic design has been followed. Applicants are advised to seek expert advice.
C	≥ 54 and < 63 dB $LA_{eq, 16hr}$ and ≥ 48 and < 55 L_{night}	To manage noise sensitive development in areas where aircraft noise may give rise to annoyance and sleep disturbance, and to ensure, where appropriate, noise insulation is incorporated within the development. Noise sensitive development in this zone is less suitable from a noise perspective than in Zone D. A noise assessment must be undertaken in order to demonstrate good acoustic design has been followed. The noise assessment must demonstrate that relevant internal noise guidelines will be met. This may require noise insulation measures. An external amenity area noise assessment must be undertaken where external amenity space is intrinsic to the development's design. This assessment should make specific consideration of the acoustic environment within those spaces as required so that they can be enjoyed as intended. Ideally, noise levels in external amenity spaces should be designed to achieve the lowest practicable noise levels. Applicants are strongly advised to seek expert advice.
B	≥ 54 and < 63 dB $L_{Aeq, 16hr}$ and ≥ 55 dB L_{night}	To manage noise sensitive development in areas where aircraft noise may give rise to annoyance and sleep disturbance, and to ensure noise insulation is incorporated within the development. Noise sensitive development in this zone is less suitable from a noise perspective than in Zone C. A noise assessment must be undertaken in order to demonstrate good acoustic design has been followed. Appropriate well-designed noise insulation measures must be incorporated into the development in order to meet relevant internal noise guidelines. An external amenity area noise assessment must be undertaken where external amenity space is intrinsic to the developments design. This assessment should make specific consideration of the acoustic environment within those spaces as required so that they can be enjoyed as intended. Ideally, noise levels in external amenity spaces should be designed to achieve the lowest practicable noise levels. Applicants must seek expert advice.

Zone	Indication of Potential Noise Exposure During Aircraft Operations	Objective
A	≥ 63 dB LAeq, 16hr and / or ≥ 55 dB L_{night}	To resist new provision for residential development and other noise sensitive uses. All noise sensitive developments within this zone may potentially be exposed to high levels of aircraft noise, which may be harmful to health or otherwise unacceptable. The provision of new noise sensitive developments will be resisted.

Notes:

- 'Good Acoustic Design' means following the principles of assessment and design as described in *ProPG: Planning & Noise – New Residential Development, May 2017.*
- Internal and External Amenity and the design of noise insulation measures should follow the guidance provided in British Standard BS8233:2014 *'Guidance on sound insulation and noise reduction for buildings'.*

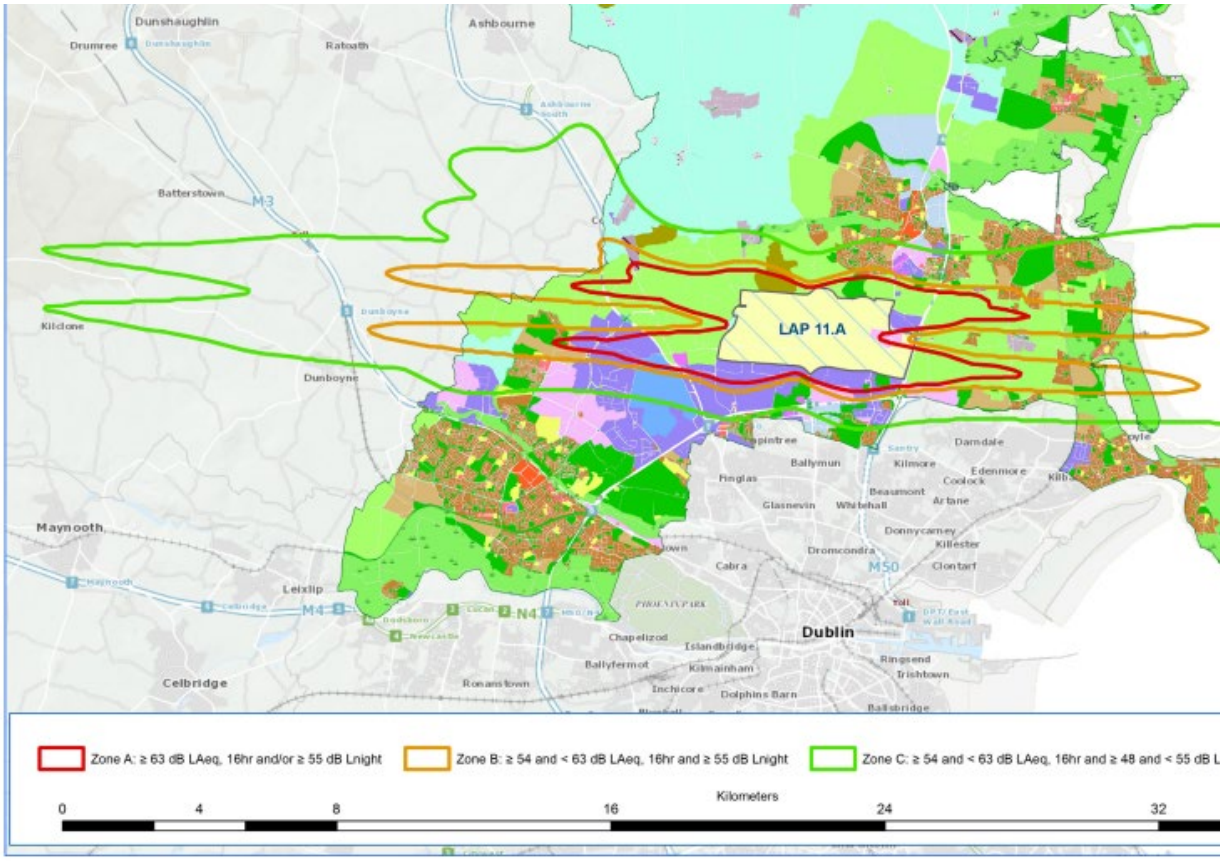


Figure 4.1: Dublin Airport Noise Zones 2019

The Variation includes wider objectives with regards to the management of airport noise from Dublin Airport. These are:

Objective NP-06

Developments for noise sensitive uses shall have regard to any future national planning guidance, or in the interim any local planning guidance developed under the Noise Action Plan.

Objective NP-07

Developments for noise sensitive uses shall have regard to the noise exposure maps contained within the Fingal Noise Action Plan 2018-2023 or any supplementary mapping prepared by Fingal County Council, and developers shall be required to produce a noise impact assessment and mitigation plans, where necessary, for any new noise sensitive development within these areas.

4.1.5.5 Dublin Airport Local Area Plan (LAP) (2020)

The strategic aims of the Dublin Airport LAP include supporting the continued sustainable growth of Dublin Airport, as well as timely delivery of required infrastructure to facilitate airport growth. In addition, the LAP sets the baseline passenger and Air Traffic Movements (ATM) forecasts for Dublin Airport at 40 million passengers per annum (mppa) and 265,000 ATMs by 2030, and 54 mppa and 365,000 ATMs by 2050 (the same figures as those in the Review of Future Capacity Needs at Ireland's State Airports). This document was published in 2018 for the Department of Transport, Tourism and Sport and considers the capacity of the existing infrastructure at Dublin Airport, and the priorities for development. It highlights the potential for a new terminal at Dublin Airport to satisfy demand.

The LAP also refers to the Review's identification of the need for a third terminal to facilitate growth beyond 40 mppa and suggests a target date of 2031 for the delivery of such. Achieving the passenger and ATM forecasts is dependent on the following key infrastructure, as outlined in the LAP:

"Improved surface access; Expanded terminal capacity by way of reconfiguration and augmentation of existing facilities (at T1 and T2); Completion of the North Runway; [and] Additional aircraft parking stands supported by accompanying boarding gate and aircraft piers, particularly in the context of growing the hub function of the Airport."

The key strategic sustainability and environmental objectives of the LAP are as follows:

- Adopt a sustainable approach to airport development which responds to important environmental constraints associated with future development and includes mitigation where necessary and appropriate.
- To accelerate a transition to a low carbon economy by providing a reduction in CO_2 emissions.
- Reduce environmental impacts, build climate resilience and promote quality of life for neighbouring communities.
- All development proposals at Dublin Airport shall have regard to the requirement for environmental assessment including screening for Appropriate Assessment, Environmental Impact Assessment and Flood Risk Assessment in accordance with relevant legislation and guidelines.
- All proposals for development shall demonstrate compliance with relevant Fingal Development Plan provisions relating to sustainable development and the protection of the environment.
- Maintain and improve surface water quality at Dublin Airport.

4.1.5.6 Dublin Airport Capital Investment Programme 2020+

The Dublin Airport Capital Investment Programme (CIP) responds to the capacity constraint issues highlighted through the Review of Future Capacity Needs. In particular it refers to the following operational processes as critically requiring immediate enhancement.

The CIP states that "Ireland will implement a 'Balanced Approach' to noise management at Irish airports in accordance with The Aircraft Noise Regulation on the establishment of rules and procedures with regard to the introduction of noise-related operating restrictions at Union airports".

4.2 Section 34C of the Planning and Development Act 2000

The Act of 2019 provides for ANCA to discharge its functions under the Aircraft Noise Regulation on its own initiative or in response to any planning application by the Applicant relating to:

"any noise problem that would arise from the carrying out of the development as proposed"

(Section 34B) or

"any noise problem that would arise from taking [a] relevant action as proposed" (Section 34C), whereby the 'relevant action' consists exclusively of the revocation, amendment or replacement of an operating restriction contained in an existing planning permission, with or without the introduction of new noise mitigation measures and / or other conditions of the planning permission.

ANCA discharges its functions under the Aircraft Noise Regulation and the Act of 2019 by, among other things, making a 'regulatory decision' as is contained in this document.

The Applicant has made a planning application to modify Conditions 3(d) and 5 of the North Runway Planning Permission. These conditions limit access to or reduce the operational capacity of Dublin Airport and therefore constitute operating restrictions.

Section 34C of the Act of 2000, which was inserted by Section 11 of the Act of 2019, provides for planning applications that seek to modify noise-related operating restrictions contained in an existing planning permission. Such operating restrictions are regulated by the Aircraft Noise Regulation. In seeking to modify such operating restrictions, the Applicant can seek to have noise mitigation measures imposed in place of or in addition to operating restrictions. The Applicant can also seek to change any other condition of the existing planning permission. Section 34C requires the planning authority of FCC to refer such applications to ANCA, which must apply the Balanced Approach (discussed in Section 4) to the noise problem that would arise from taking the relevant action as proposed.

Section 34C describes a process within which the regulatory decision shall be made. This is presented in Figure 4.2 below.

The process starts with a preliminary assessment of the noise situation at Dublin Airport. This was reported in February 2021. The preliminary assessment has taken account of information presented within the NAP and as provided with the Application. Having regard for this information, ANCA has to determine whether a noise problem would arise from the relevant action as proposed by the Application.

Under the process, where a noise problem has been identified, the Balanced Approach shall be applied.

ANCA's assessment of the noise impact of the Application is presented in this report, and considers all relevant legislation and policy.

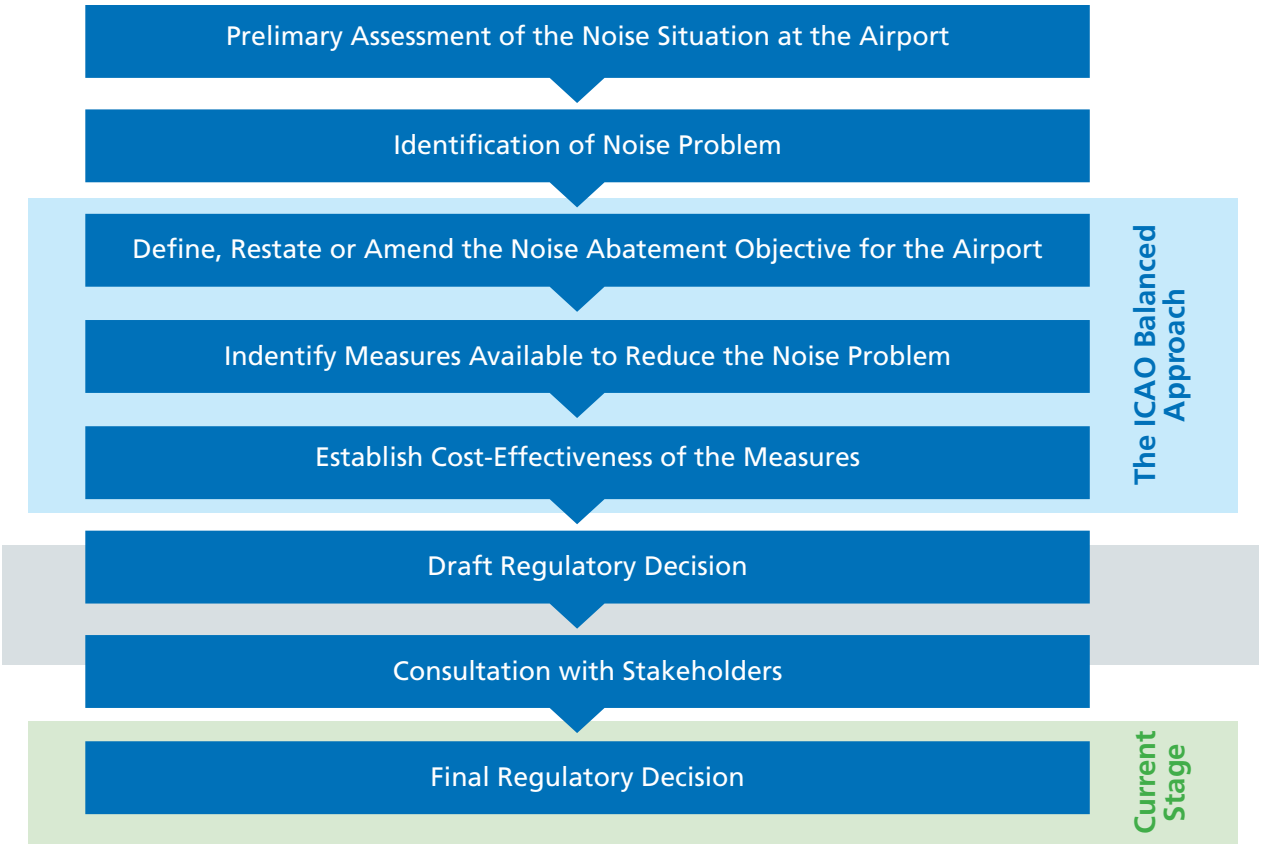


Figure 4.2: Process of Aircraft Noise Regulation as described under Section 34C

The process results in a regulatory decision, which sets out the proposed noise mitigation measures. The draft regulatory decision was subject to consultation with observations and submissions from consultees taken into account before the regulatory decision is made.

05

International Civil Aviation Organization and the Balanced Approach

5 International Civil Aviation Organization and the Balanced Approach

The Aircraft Noise Regulation and the Act of 2019 provide the basis for the implementation of the ICAO Balanced Approach to Aircraft Noise Management within the European Union and Ireland respectively.

The Balanced Approach is considered as the foundation for noise regulation of the aviation industry, setting international rules and standards.

This chapter discusses the Balanced Approach and provides examples of noise mitigation measures which can be identified and used under it.

5.1 Role and Function of ICAO

The International Civil Aviation Organization (ICAO) is a specialised division of the United Nations, operating as the aviation technical body of the UN.

It was created after the Chicago Convention on International Civil Aviation. This convention was signed by 52 countries in 1944 and ICAO was subsequently sanctioned and founded in 1947. The membership of ICAO now numbers 193 Member States across the world.

Ireland is a signatory to the Chicago Convention and the Convention was given effect in domestic law through the Air Navigation and Transport Act 1946.

ICAO's primary role is to provide a set of standards to help regulate aviation across the world. ICAO classifies the principles and techniques of international air navigation, as well as the planning and development of international air transport to ensure safety, security, efficiency, regularity and environmental protection.

The international aviation standards are provided to the 193 Member States through a global forum in which they are expected to adopt and implement these standards. However, ICAO only provides the fundamental guidelines or SARPs (Standards and Recommended Practices), and do not act as a global regulator for civil aviation.

It is the responsibility of the Member States to develop and enforce the necessary regulations, using guidance from ICAO. It is possible for each Member State / Country to modify and adjust these regulations, when necessary, under ICAO's approval.

5.2 The ICAO Balanced Approach

The Balanced Approach is a policy adopted by ICAO, which helps ICAO Member States to address aircraft noise problems at individual airports in an environmentally sensitive and economically responsible way.

The policy aims to respond to aircraft noise in such a way as to achieve the maximum environmental benefit in the most cost-effective way possible.

The Balanced Approach is designed to be flexible to allow for the identification of specific noise problems and the production of tailored solutions for individual airports. The Balanced Approach also allows for the maintenance of an open and transparent process.

The Balanced Approach provides a process for assessing a noise problem at individual airports. The process is constituted by the following steps as stated in ICAO Doc. 9829 – Guidance on the Balanced Approach to Aircraft Management[38]:

- Assessment of the current and future noise impact at an airport concerned, compared to the noise objective to be achieved.
- Evaluation of the likely costs and benefits of the various measures available.
- Selection of the measures aimed at achieving maximum environmental benefits most cost-effectively.
- Provision for dissemination of the evaluation results.
- Provision for consultation with stakeholders at different stages from assessment to implementation.
- Provision for dispute resolution.

The process under the Balanced Approach is described in more detail in the following chapters.

The process described in the Balanced Approach requires setting a noise objective to help facilitate assessment and evaluation of measures and, if any, operating restrictions. ANCA is responsible for setting a NAO for Dublin Airport under the Act of 2019.

5.3 Assessment of the Noise Situation at an Airport

ICAO guidance[39] requires that the evolution of the noise climate at Dublin Airport and its surrounding community must be evaluated and compared against noise objectives. It follows that a noise problem exists if the evolution of the noise climate does not meet the noise objective. If a noise problem is identified, noise mitigation measures are to be implemented having regard for the Balanced Approach.

The Balanced Approach requires that the noise situation at an airport should be assessed based on objective and measurable criteria. ICAO guidance could, for example, include criteria such as the number of people who fall within a certain noise contour. This requires the production of noise contours. On this, ICAO Doc. 9829, states the following:

"In light of the many factors contributing to the noise situation at a particular airport, it is customary in airport noise studies to model "noise contours" that are averaged over a long period of time."

And: *"(Circular 205 – Recommended Method for Computing Noise Contours Around Airports) describes the major aspects of the calculation of noise contours of constant value of noise exposure for air traffic at an airport and presents several methods for calculating contours that some ICAO contracting States have adopted."*

It also advises that the aircraft noise assessment should have regard for the location of flight paths, the number of flights, and time distribution of those flight paths. This is a matter which is addressed in the modelling of aircraft noise and, under regulatory framework, is addressed within European legislation.

38 ICAO 9829: Guidance on the Balanced Approach to Aircraft Noise Management https://global.ihs.com/doc_detail.cfm?&input_search_filter=ICAO&item_s_key=00507943&item_key_date=890221&input_doc_number =9829&input_doc_title=&org_code=ICAO

39 ICAO 9829: Guidance on the Balanced Approach to Aircraft Noise Management

There are a number of scenarios within ICAO guidance for consideration when applying the Balanced Approach. These are:

Noise Situation – The noise situation at an airport. It can be used to describe the current noise climate.

Forecast Situation – The noise situation in the future and presents the noise climate that would prevail without any changes being made i.e., without relevant action.

Forecast Without New Measures – A forecast where no measures are in place. This is described as the Forecast Without New Measures and best represents a scenario where there are no noise-related operating restrictions.

Forecast with New Measures – Once the noise situations and forecast without measures have been determined, these can be compared to the noise objective to determine if noise mitigation measures need to be implemented. It can also be compared to scenarios where potential measures are in place and to quantify any benefit/cost resulting from the application of a particular measure. These scenarios are described as a Forecast with New Measures.

5.4 Identification and Selection of the Measures

When the noise situation at an airport has been assessed, and it is determined that noise mitigation measures are required, the Balanced Approach is applied to help identify and select possible mitigation measures. These can be used to address any noise problem that has been identified and contribute towards meeting the noise objective.

The Balanced Approach divides the measures in four categories, or Principal Elements, which are, as follows:

Principal Elements of the Balanced Approach

- Reduction of Noise at Source
- Land-use Planning and Management
- Noise Abatement Operational Procedures
- Operating Restriction

Addressing or reducing the noise problem at an airport using the Balanced Approach may require a combination of these elements to achieve the noise objective. The Balanced Approach also requires that interdependencies between the Principal Elements must be considered during the assessment.

An example of this would be where one measure may affect the distribution of noise around an airport and therefore have an impact on the cost and / or effectiveness of another measure.

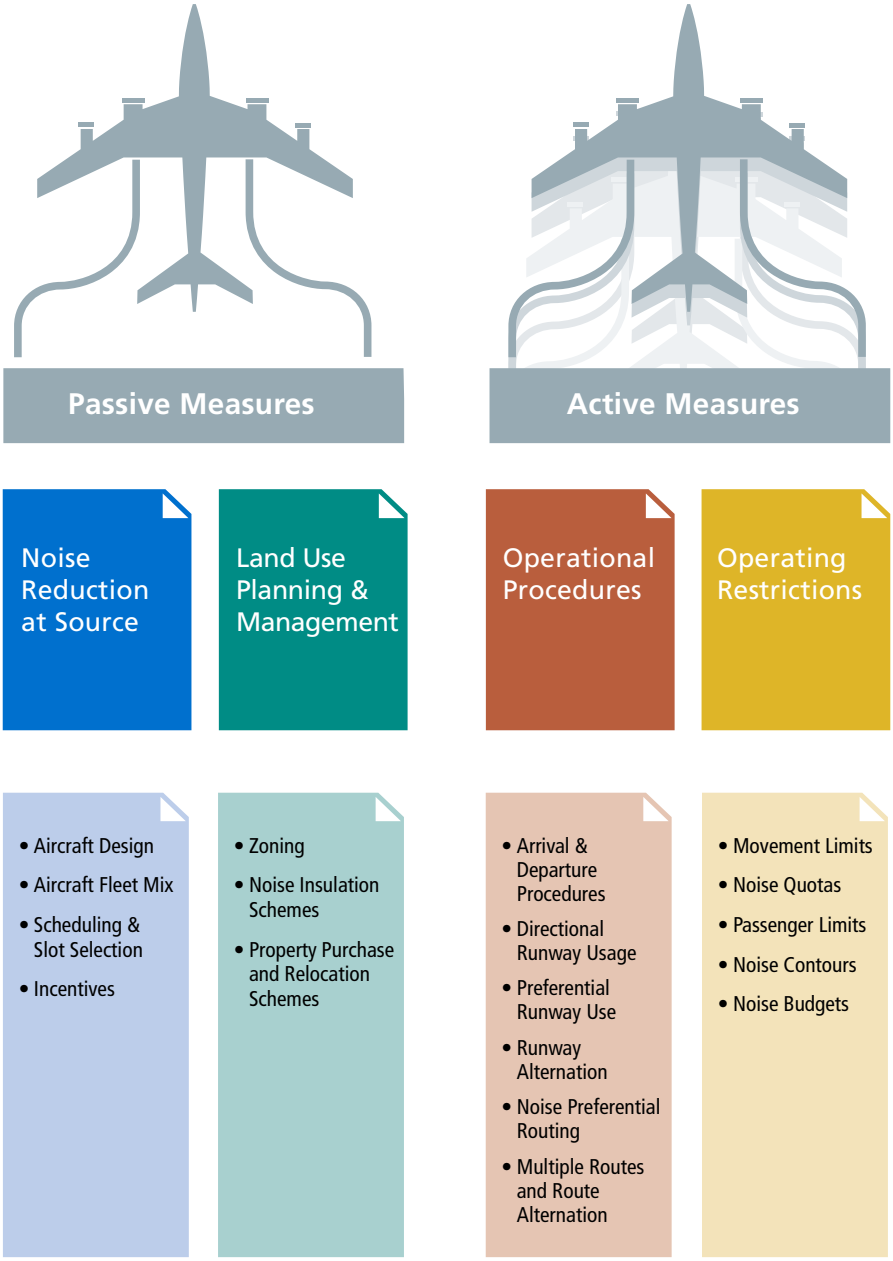


Figure 5.1: ICAO Balanced Approach

5.4.1 Reduction of Noise at Source

Since the 1970s, the control of aircraft noise has been undertaken by setting noise limits for aircraft. These limits are set out in the SARPs contained in Annex 16 of the Convention on International Civil Aviation – the Chicago Convention. These standards are also known as Chapters.

The aim of the Chapters is to ensure that the latest available noise reduction technologies are used for the design of new aircraft. This is achieved by creating procedures for the noise certification of the aircraft. The aircraft noise standards appear in Volume I of Annex 16 of the Chicago Convention.

The final purpose is to ensure that noise reductions offered by technology are reflected in reductions in aircraft noise around airports.

The Chapters set noise limits as a direct function of Maximum Take-off Mass (MTOM) in order to recognise that heavier aeroplanes produce more noise than lighter aeroplane types. Over time, and as aircraft noise reduction technology has improved, ICAO have introduced more stringent limits, with the introduction of the Chapter 3 noise standard in 1977 and the Chapter 4 standard in 2001. In 2014 a new more stringent standard was introduced called Chapter 14, which is applicable to new aeroplane types submitted for certification on or after 31 December 2017, and on or after 31 December 2020 for aircraft of less than 55 tonnes in mass.

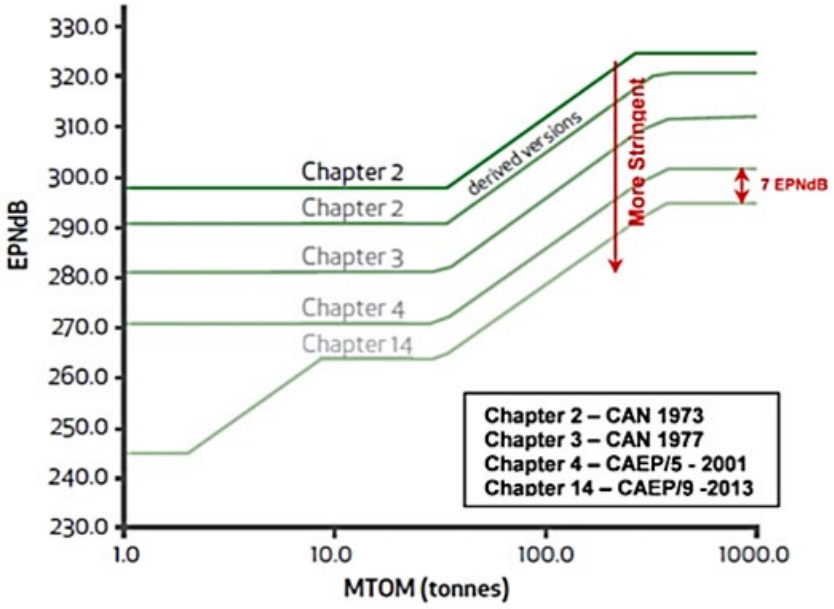


Figure 5.2: Progression of ICAO noise standards. The graphic represents the 'Effective Perceived Noise in decibels' against the Maximum Take Off Mass of an Aeroplane. It demonstrates the improvements in noise limits as ICAO standards have evolved.

The introduction of the Chapter 14 noise standard is expected to further reduce noise exposure into the future.

Under the Balanced Approach, when Reduction of Noise at Source is being implemented, ICAO Doc. 9829 states that the following considerations should be made:

- Integration into aircraft fleets, over time, of technology improvements meeting the latest standards.
- Specific fleet modernisation plans of airlines operating at an airport.
- National plan to adopt the latest noise standard.
- Adoption by contracting states of the latest ICAO noise recommendations.

The noise certification procedure which underpins the Chapters, as is discussed in Appendix B, is the only basis under the Aircraft Noise Regulation where decisions on noise-related operating restrictions take into account the noise performance of aircraft[40]. For this reason, the Chapters have become the basis of noise-related operating restrictions that seeks to limit or reduce airport noise through quotas or restrict certain types of aircraft landing and taking off due to their noise impact.

In the UK, the DfT has set restrictions on the type of aircraft which can operate at night based on their Quota Count. This approach classifies aircraft based on the results of noise certification to assign a Quota Count. An EU-wide ban on the noisiest aircraft (Chapter 2) has been in place since 2002.

Table 5.1: Noise classifications and Quota Count in use by the UK Department of Transport (October 2021)

Noise Classification	Quota Count
Below 81 EPNdB	0
81 – 83.9 EPNdB	0.125
84 – 86.9 EPNdB	0.25
87 – 89.9 EPNdB	0.5
90 – 92.9 EPNdB	1
93 – 95.9 EPNdB	2
96 – 98.9 EPNdB	4
99 – 101.9 EPNdB	8
Greater than 101.9 EPNdB	16

In recent years it has been common for airport noise assessments to refer to different types by their 'generation' of noise reduction technologies. This approach seeks to categorise aircraft based on whether they are designed and complying to the latest noise standards i.e., Chapter 14, or were designed to comply with a previous set of standards. For future types of aircraft these can also be described in terms of 'generation'. The latest consensus approach to this is as follows:

Generation 0: Aircraft designed to comply with ICAO Chapters prior to Chapter 14. These aircraft are most likely to have been in service before 2014.

Generation 1: The latest generation of aircraft designed to comply with ICAO Chapter 14 certification standard and are beginning to enter into service. These include the Airbus A319, A320 and A321 NEO (New Engine Option) variants and the Boeing 737-MAX family of aircraft.

Generation 2: Aircraft types that will ultimately replace Generation 1 types. These will most likely be designed to a new ICAO Chapter i.e., after Chapter 14. These types are unlikely to enter into service until the mid-2030s.

40 Article 7(1)

5.4.2 Land-Use Planning and Management

Land-use Planning and Management is an important tool to ensure that the activities near airports are compatible with aviation activity. This aims to minimise the population affected by aircraft noise by introducing **land-use zoning** around airports or to address issues through measures such as **sound insulation schemes.**

ICAO's main policies on land use planning and management are contained in Assembly Resolution A39-141, Appendix F. Through Resolution A39-1, ICAO set out a number of preventative measures to minimise aircraft noise problems, including:

- To locate new airports at an appropriate place, such as away from noise-sensitive areas.
- To take the appropriate measures so that land-use planning is taken fully into account at the initial stage of any new airport or development at an existing airport.
- To define zones around airports associated with different noise levels taking into account population levels and growth, as well as forecasts of traffic growth and to establish criteria for the appropriate use of such land, taking account of ICAO guidance.
- To enact legislation, establish guidance or other appropriate means to achieve compliance with those criteria for land use.
- To ensure that reader-friendly information on aircraft operations and their environmental effects is available to communities near airports.
- The Balanced Approach also includes noise charges (financial penalties) as a possible measure within the category of Land-Use Planning and Management. The policy relating to noise charges is included in ICAO's Policies on Charges for Airports and Air Navigation Services (Doc 9082)[42].

With respect to noise charges, ICAO states:

"The Council recognizes that, although reductions are being achieved in aircraft noise at source, many airports need to apply noise alleviation or prevention measures. The Council considers that the costs incurred may, at the discretion of [member] States, be attributed to airports and recovered from the users. In the event that noise-related charges are levied, the Council recommends that they should be levied only at airports experiencing noise problems and should be designed to recover no more than the costs applied to their alleviation or prevention; and that they should be non-discriminatory between users and not be established at such levels as to be prohibitively high for the operation of certain aircraft"

Therefore, under the Balanced Approach, while considering the land-use planning and management, consideration should be given to the preventative measures set out as above in Resolution 39A-1.

5.4.3 Noise Abatement Operating Procedures

Noise Abatement Operating Procedures can be a cost-effective measure for the reduction and / or redistribution of noise around an airport. Such procedures effectively require the aircraft to operate in a certain way.

Examples of noise abatement operating procedures currently adopted in ICAO Member States include:

- Noise preferential routes.
- Preferential runway use.
- Continuous descent approach (CDA).

41 Resolution A39-1 – 'Consolidated statement of continuing ICAO policies and practices related to environmental protection – General provisions, noise, and local air quality' https://www.icao.int/environmental-protection/Documents/Resolution_A39_1.PDF

42 https://www.icao.int/publications/Documents/9082_8ed_en.pdf

5.4.4 Operating Restrictions

Operating Restrictions are defined under the Balanced Approach as *"any noise-related action that limits or reduces an aircraft's access to an airport".*

The Balanced Approach states that Operating Restrictions are only to be used as last resort, after consideration of the benefits gained from the other three Principal Elements. ICAO Doc. 9829 states:

"The assembly urges States not to introduce any operating restrictions at any airport on aircraft that comply with Volume I, Chapter 3 of Annex 16 before:

- *Completing the phase-out of aircraft which exceed the noise level in Volume I, Chapter 3 of Annex 16, at the airport concerned; and*
- *Fully assessing available measures to address the noise problem at the airport concerned in accordance with the balanced approach."*

Furthermore, ICAO Doc. 9829 states that restrictions:

- Should be tailored to the noise problem of the airport concerned in accordance with the Balanced Approach.
- Should be limited to those of a partial nature wherever possible, rather than the complete withdrawal of operations at the airport.
- Take into account possible consequences for air transport services for which there are no suitable alternatives.
- Should be introduced gradually over time, where possible, in order to take into account the economic impact on operators of the affected aircraft.
- Give operators a reasonable period of advance notice; and
- Inform ICAO, as well as the other States concerned, of all such restrictions imposed.

5.5 Examples of Measures Available Under the Balanced Approach

The tables below outline examples of the measures that are available under the Balanced Approach to manage aircraft noise. The numbers in the tables (e.g., [1]), refer to the documents listed in Table 5.2.

5.5.1 Reduction of Noise at Source

1. Quieter Aircraft Design	
Noise Mitigation Measure / Description of the measure	
Better aircraft design has led to significant reductions in aircraft noise. Over more than fifty years of the jet age, technology has significantly improved aircraft noise performance, and aircraft are significantly quieter today. At an international level, ICAO progressively sets more stringent aircraft noise performance criteria.	
How the measure may contribute towards noise management and reduction (Pros)	**Potential disadvantages and drawbacks associated with the measures (Cons)**
The design and use of the quietest aircraft improves aircraft noise performance and can reduce aircraft noise exposure.	Designing new aircraft types is a slow and typically cyclical process. As such, quieter aircraft design is progressive.

2. Environmental Charging Proposals and Incentives	
Noise Mitigation Measure / Description of the measure	
The ability to mitigate noise impacts is dependent upon the uptake of quieter aircraft by airlines and the use of these aircraft during times when it matters most. Incentives to use quieter aircraft at airports can also take the form of reduced landing charges for aircraft with better environmental performance. The financial incentives designed to encourage airlines to use the quietest aircraft vary from airport to airport. Generally, airports levy significantly higher runway charges on the noisier aircraft types, compared to the charges on the quieter types.	
How the measure may contribute towards noise management and reduction (Pros)	**Potential disadvantages and drawbacks associated with the measures (Cons)**
The use of the quietest aircraft improves the aircraft noise performance within an airport's fleet and potentially reduces the aircraft noise contour area around an airport.	Environmental charging can add additional costs to airlines.

3. Scheduling and Slot Selection	
Noise Mitigation Measure / Description of the measure	
The impact and effects of aircraft noise are not the same across the day. Effects during the day are different to those during the night. Under the ENR, penalties are given to noise made in the evening and the night compared to the 12-hour day. Scheduling can be used to prioritise quieter aircraft during times of the day where there is greater sensitivity to aircraft noise, such as during the night.	
How the measure may contribute towards noise management and reduction (Pros)	**Potential disadvantages and drawbacks associated with the measures (Cons)**
The use of the quietest aircraft during noise sensitive periods can reduce the impacts and effects of aircraft noise.	Such measures require coordination between airlines, airports and schedulers across the aviation network. Unless there are specific restrictions or other constraints then such measures can be overlooked.

5.5.2 Noise Abatement Operating Procedures

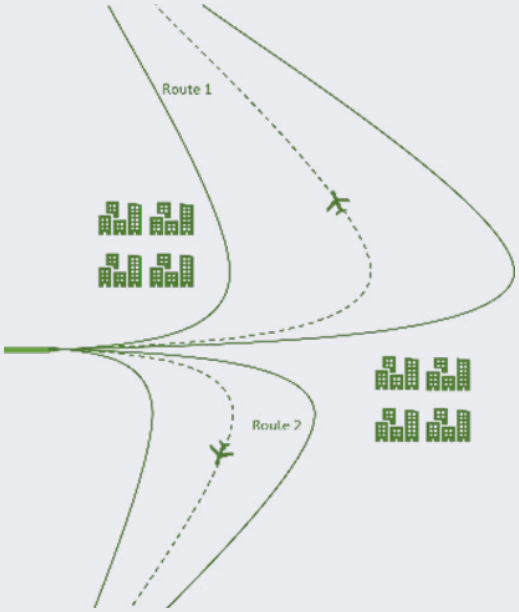
1. Preferential Runway Usage	
Noise Mitigation Measure / Description of the measure	
For airports with multiple and equally capable runways, preferential runway use can be used to reduce the overall noise impact of an airport [1]. This can include using certain runways for only arrivals or departures to avoid or reduce impacts on certain areas. [1] This can be extended into setting rules, quotas, or targets for the use of certain runways to help manage noise impacts. [1]	
Illustration(s) 	
How the measure may contribute towards noise management and reduction (Pros)	**Potential disadvantages and drawbacks associated with the measures (Cons)**
Preferred runway directions for take-off and landing, appropriate to the operation, are nominated for noise abatement purposes. The objective is to utilise, whenever possible, those runways that permit aircraft to avoid noise-sensitive areas during the initial departure and final approach phases of flights. [2] Flight safety should be the determining factor in runway selection when implementing noise abatement operational measures. Runways selected for preferential use should be equipped with suitable navigation aids. The use of a preferred runway according to quantity of traffic or aircraft performance criteria transfers the traffic from one direction to another. It reduces the length of the noise exposure contour in the first direction but then extends it in the second, thus re-shaping the noise contour, potentially resulting in a reduction in the number of people affected. [3].	Flight safety should be the determining factor in runway selection when implementing noise abatement operational measures. The Preferential Runway Usage is therefore not always achievable due to prevailing wind and runway conditions and would have to revert to conventional runway utilisation if: • The movement rate (intensity) required is too high to be supported by opposite direction operations. • The tailwind component is too high for landing or take-offs. Wet or contaminated runway conditions necessitate the use of reverse thrust, in which case it would have to operate on the into wind runway [3] [4].

2. Use of Noise Preferential Routes[43]

Noise Mitigation Measure / Description of the measure

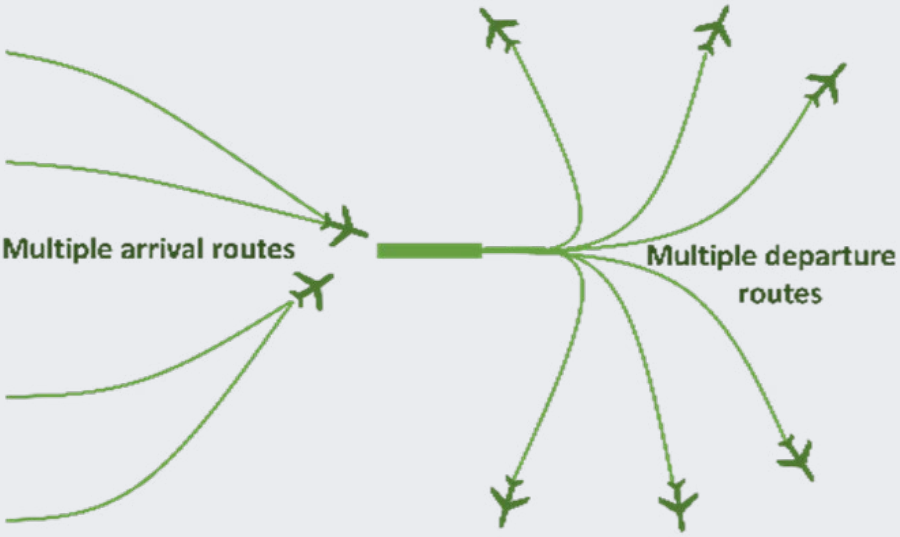
Sometimes known as 'minimum noise routes' these are specific flight paths which route aircraft to ensure that departing and arriving aircraft avoid overflying noise-sensitive areas in the vicinity of an airport [3] as far as practicable [6] in favour of areas which are considered to be less sensitive to noise, such as industrial and commercial land uses, or less populated areas. [1]

Illustration(s)



How the measure may contribute towards noise management and reduction (Pros)	Potential disadvantages and drawbacks associated with the measures (Cons)
Noise preferential routes are established to ensure that departing and arriving airplanes avoid over-flying noise-sensitive areas in the vicinity of the aerodrome as far as practicable. [3]	Noise preferential routes can potentially increase the length of routes thus increasing fuel consumption and emissions.

43 The following list provides examples in Europe of where the measure is used at other airports [5]: Athens International, Bilbao, Bordeaux-Merignac, Stockholm Bromma, Bucharest Henri Canada Intl, Helsinki-Vantaa, Luxembourg International, Marseille-Provence Intl, Naples International, Amsterdam Schiphol, Toulouse-Blanca

3. Route Alternation (and Multiple Routes)[44]	
Noise Mitigation Measure / Description of the measure	
Route alternation can be achieved by designing the local airspace to allow for multiple routes for noise management reasons.	
Illustration(s)	
	
How the measure may contribute towards noise management and reduction (Pros)	**Potential disadvantages and drawbacks associated with the measures (Cons)**
The routes are used to spread out aircraft - reducing the number of times certain locations are overflown. This provides communities with respite from aircraft noise. [1]	Route alternation can potentially increase the length of routes thus increasing fuel consumption, and emissions.

44 No specific examples of route alternation at European airports could be found.

4. Use / Mandate of Noise Abatement Departure Procedures (NADP) and / or Thrust Managed Climbs[45]

Noise Mitigation Measure / Description of the measure

Noise Abatement Departure Procedures (NADP) describe different ways in which an aircraft can climb away from an airport and are incorporated into the airlines' standard operating procedures. [1]

Airplane operating procedures for the take-off climb shall ensure that the necessary safety of flight operations is maintained while minimising exposure to noise on the ground. [2]

NAPD 1 [2]: This procedure involves a power reduction at or above the prescribed minimum altitude and the delay of flap/slat retraction until the prescribed maximum altitude is attained. At the prescribed maximum altitude, accelerate and retract flaps/slats on schedule while maintaining a positive rate of climb, and complete the transition to normal en-route climb speed.

- The noise abatement procedure is not to be initiated at less than 240 m (800 ft) above aerodrome elevation.
- The initial climbing speed to the noise abatement initiation point shall not be less than V2 + 20 km/h (10 kt).
- On reaching an altitude at or above 240 m (800 ft) above aerodrome elevation, adjust and maintain engine power/thrust in accordance with the noise abatement power/thrust schedule provided in the aircraft operating manual.
- Maintain a climb speed of V2 + 20 to 40 km/h (10 to 20 kt) with flaps and slats in the take- off configuration.
- At no more than an altitude equivalent to 900 m (3 000 ft) above aerodrome elevation, while maintaining a
- positive rate of climb, accelerate and retract flaps/slats on schedule.
- At 900 m (3 000 ft) above aerodrome elevation, accelerate to en-route climb speed. [2]

NAPD 2 [2]: This procedure involves initiation of flap/slat retraction on reaching the minimum prescribed altitude. The flaps/slats are to be retracted on schedule while maintaining a positive rate of climb. The power reduction is to be performed with the initiation of the first flap/slat retraction or when the zero flap/slat configuration is attained. At the prescribed altitude, complete the transition to normal en-route climb procedures.

- The noise abatement procedure is not to be initiated at less than 240 m (800 ft) above aerodrome elevation.
- The initial climbing speed to the noise abatement initiation point is V2 + 20 to 40 km/h (10 to 20 kt).
- On reaching an altitude equivalent to at least 240 m (800 ft) above aerodrome elevation, decrease aircraft body angle/angle of pitch while maintaining a positive rate of climb, accelerate towards VZF and either:
  a) reduce power with the initiation of the first flap/slat retraction; or
  b) reduce power after flap/slat retraction.
- Maintain a positive rate of climb and accelerate to and maintain a climb speed of VZF + 20 to 40 km/h (10 to 20 kt) to 900 m (3 000 ft) above aerodrome elevation.
- On reaching 900 m (3 000 ft) above aerodrome elevation, transition to normal en-route climb speed.
- An airplane should not be diverted from its assigned route unless:
  a) in the case of a departing airplane, it has attained the altitude or height which represents the upper limit for noise abatement procedures.
  b) It is necessary for the safety of the airplane (e.g., for avoidance of severe weather or to resolve a traffic conflict). [2]

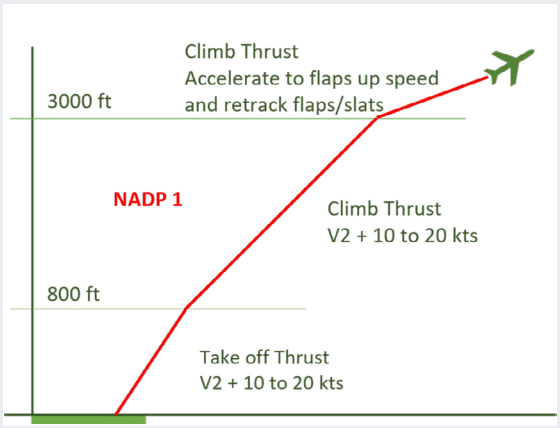
These procedures are designed by the operator in consultation with the airframe manufacturer, implemented in line with local airport practices and approved by the regulator authority of the operator. [3]

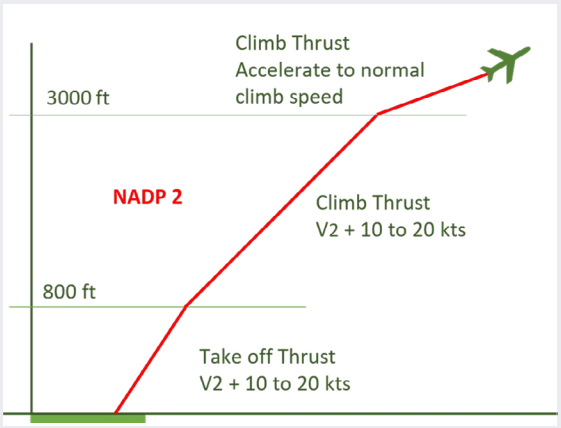
45 The following list provide examples in Europe of where the measure is used at other airports [5]: Albacete, Athens International, Barajas-Madrid, Barcelona, Bergamo Orio al Serio, Bilbao, Billund, Bologna G Marconi, Bordeaux-Merignac, Bromma, Brussels, Budapest, Ciampino, Copenhagen, Copenhagen – Roskilde, Dusseldorf, Fiumicino, Francisco Sá Carneiro-Porto, Helsinki-Vantaa, Koln-Bonn, Leipzig Halle, Linate, Lisbon International, Luxembourg International, Lyon Saint Exupery, Malpensa, Marseille-Provence Intl, Munich, Naples International, Palma de Mallorca, Paris Charles de Gaulle, Prague Ruzyne, Riga International, Sofia, Stockholm- Arlanda, Stuttgart , Tenerife Sur-Reina Sofia, Torino Caselle, Toulouse-Blagnac, Venice Marco Polo, Vienna International, Wroclaw - Strachowice

4. Use / Mandate of Noise Abatement Departure Procedures (NADP) and / or Thrust Managed Climbs[45]

Noise Mitigation Measure / Description of the measure

Illustration(s)





How the measure may contribute towards noise management and reduction (Pros)	Potential disadvantages and drawbacks associated with the measures (Cons)
NADP can reduce noise on communities close or further away from an airport depending upon which procedure is selected. It is now becoming common practice at EU airports for these procedures to be used for certain routes or runways. [1] The objective is to optimise the distribution of the exposure to noise at a particular location on the ground while maintaining the required levels of flight safety. [3]	Airlines can adopt their own NADP however they are limited to use two NADP for each type of aircraft by EU regulation [7]. Airport's operators, cannot, therefore, enforce any own NADP (which may be designed to achieve best results on that particular airport) on airlines as it could cause an airline to breach EU regulations if the procedure directed by an airport was not one of the two adopted by the airline on a given aircraft type. [8] One procedure does not necessarily have a better overall noise impact than another. Instead, changing from one procedure to another tends to redistribute noise from one location to another, resulting in both noise decreases and noise increases. [8]

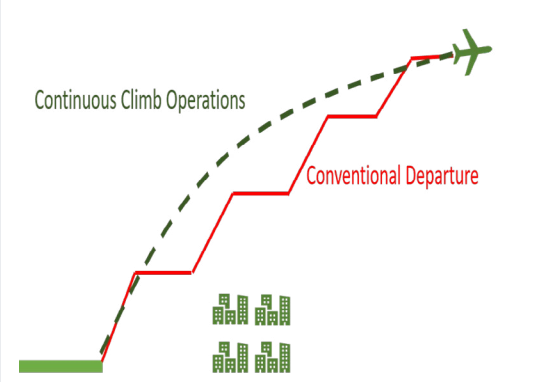
5. Continuous Climb Operations[46]

Noise Mitigation Measure / Description of the measure

Continuous Climbing Operations (CCO) allow departing aircraft to continuously climb without interruption to the greatest possible extent by employing optimum climb engine thrust at climb speed until reaching the cruise flight level. [1] [9]

CCO are facilitated by the airspace and associated procedures and are assisted by ATC by allowing the execution of a flight profile optimised to the performance of aircraft. This can lead to significant economy of fuel and environmental benefits in terms of noise and emissions reduction. [9]

Illustration(s)



How the measure may contribute towards noise management and reduction (Pros)	Potential disadvantages and drawbacks associated with the measures (Cons)
This procedure can be helpful in reducing noise on certain communities. [1] It is also possible for airspace to be designed to allow for 'high performance departures' allowing steeper climb gradients for aircraft which can perform these. [1] CCO may allow for potential authorisation of operations where noise limitations would otherwise result in operations being curtailed or restricted. [9] Environmental benefits can be achieved through reduced fuel burn and potential aircraft noise mitigation through thrust and height optimisation. [9]	It is not always possible to fly a fully-optimise CCO due to safety reasons. Depending on each situation, the CCO procedure may require a trade-off between different environmental requirements (i.e., noise, air quality, aircraft paths etc.) [9]

46 The following list provide examples in Europe of where the measure is used at other airports [5]: Brussels, Bucharest Henri Coanda Intl, Helsinki-Vantaa, Orly

6. Continuous Descent Approaches[47]

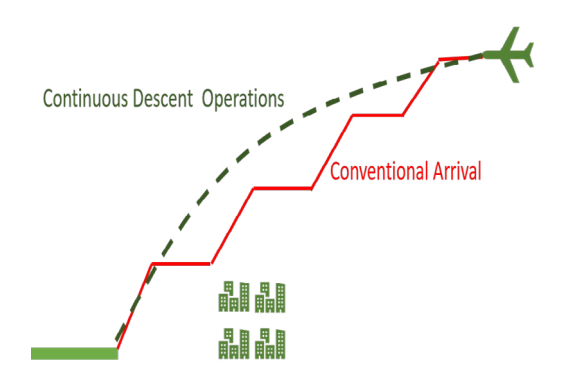
Noise Mitigation Measure / Description of the measure

Continuous Descent Approach (CDA) is an aircraft operation enabled by airspace design, procedure design and ATC facilitation [10] in which an arriving aircraft descends from an optimal position with minimum thrust [10], ideally in a low drag configuration and avoids inefficient periods of level flight to the extent permitted by the safe operation of the aircraft and compliance with published procedures and ATC instructions. [11]

An optimum CDA starts from the top of descent and uses descent profiles that reduce segments of level flight, noise, fuel burn, emissions and controller/pilot communications, while increasing predictability to pilots and controllers and flight stability. [10]

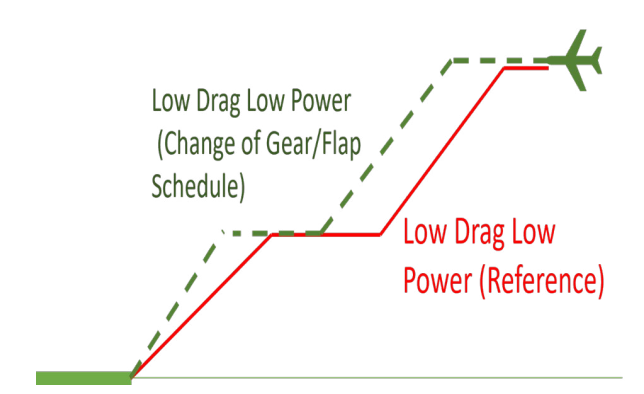
A CDA initiated from the highest possible level in the en-route or arrival phased of flight will achieve the maximum reduction in fuel burn, noise and emissions. [10]

Illustration(s)



How the measure may contribute towards noise management and reduction (Pros)	Potential disadvantages and drawbacks associated with the measures (Cons)
Continuous Descent Approaches allow aircraft to be kept as high as possible for as long as possible and generally requires less engine thrust to maintain the level flight, reducing noise levels on the ground. Without CDA, some pilots may descend earlier than they need to and may need to use their engines more which can result in increased noise. [1] CDA reduces the noise experienced on the ground by reducing the overall thrust required during initial descent and keeping the aircraft higher for longer. In addition to the noise reduction, CDA can provide emission benefits [3] The objective of a CDA is to reduce the environmental impact of the arrival phase of flying by both maintaining a fuel optimal profile (thereby minimising gaseous emissions) and keeping engine and aircraft noise to a minimum, prior to intercepting the approach glide path at an appropriate altitude for the distance to touchdown. [12] Work by the European CCO / CDA Task Force indicates noise impact on the ground may be reduced by around 1-5 dB per flight. [12] By keeping the aircraft as high as possible for as long as possible, this ensures that the aircraft spends the least amount of time at non-optimal lower intermediate cruising levels. It should be noted that keeping the aircraft as high as possible for as long as possible can be more effective at reducing noise impact on the ground than Low- Power/Low Drag (LP/LD) techniques alone even though they are complementary techniques: CDA will reduce the noise at intermediate distances from touchdown (8 to 25 NM) and LP/LD is applied on final approach.[12]	Introducing CDA may offer benefits in terms of reduced noise but may also change the nature or locations of noise impacts. Whilst the majority of the populated area may benefit from reduced noise, there might be a minority for whom the noise increases. External consultation with interested parties may therefore be required at the option selection stage and land-use planning zones may need to be altered. [10]

47 The following list provide examples in Europe of where the measure is used at other airports [5]: Brussels, Budapest, Frankfurt, Hamburg, Hannover-Langenhagen, Helsinki-Vantaa, Koln-Bonn, Munich, Nurnberg, Schiphol, Stockholm-Arlanda, Stuttgart, Toulouse- Blagnac

7. Use / Mandate of Low Power-Low Drag (LP/LD) Approach Procedures (including Gear and Flap Deployment Rules)[48]	
Noise Mitigation Measure / Description of the measure	
LP/LD is a noise abatement technique for arriving aircraft in which the pilot delays the extension of wing flaps and undercarriage until the final stages of the approach, subject to compliance with ATC speed control requirements and the safe operation of the aircraft. [12] The principle consists in delaying as much as possible wing flap extension and landing gear deployment, consistent with ATC speed, height clearance and safe operation. These techniques involve changes in engine power associated with changed aircraft configuration. [3]	
Illustration(s)	
	
How the measure may contribute towards noise management and reduction (Pros)	**Potential disadvantages and drawbacks associated with the measures (Cons)**
By delaying landing gear deployment and using a reduced landing flap both aerodynamic and engine noise for aircraft on approach can be reduced. [1]	This procedure may not be as effective as keeping the aircraft as high as possible for as long as possible, which may be more effective at reducing noise impact on the ground than LP/LD techniques alone even though they are complementary techniques. [12]

48 The following list provide examples in Europe of where the measure is used at other airports [5]: Schiphol, Vienna International

8. Steeper / Segmented Approach Procedures / GBAS[49]

Noise Mitigation Measure / Description of the measure

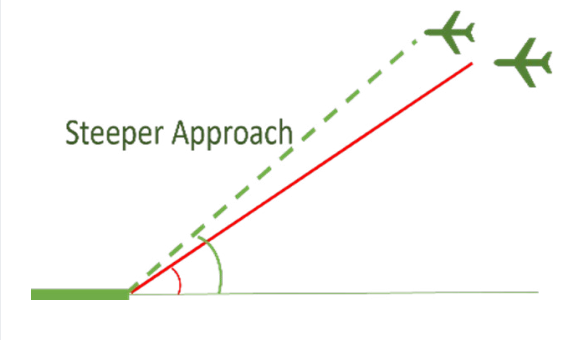
A steeper approach involves increasing the angle of aircraft on the final approach (from around 10 nautical miles before the landing threshold) resulting in aircraft being higher over the ground for longer. [13]

A segmented approach is where an aircraft descends at multiple angles. In most instances, a higher decent angle can be flown before final approach. [1]

The majority of approaches are flown at glideslope angles of 3.0°. Angles up to 3.5° are considered to be routine and within the capability of any certificated airplane. Approach angles greater than 3.5°, but less than 4.5°, are unlikely to produce significant problems in normal operations, and accordingly there are no specific requirements. Operators using these approach angles should consult the aircraft manufacturer and satisfy themselves that the performance and handling characteristics are acceptable. Approach angles of 4.5° or greater are defined as steep approaches. Any approach angle 4.5° or more requires specific approval. [14]

A Ground Based Augmentation System (GBAS) is one which provides differential corrections and integrity monitoring of Global Navigation Satellite Systems (GNSS) data using as input data either three or four GNSS satellite signals received at three of four antennae. The differential correction message computed from this data is then continually broadcast omni-directionally (twice every second) by a ground transmitter using a VHF frequency broadcast which is effective within an approximate 23 nm radius of the host airport. [15]

Illustration(s)



How the measure may contribute towards noise management and reduction (Pros)	Potential disadvantages and drawbacks associated with the measures (Cons)
Steeper Approach involves increasing the approach angle of the aircraft which can reduce noise. [1] A segmented approach procedure has high potential for noise reduction at communities further out and under the final approach because the aircraft stays at a higher altitude for a longer time. [1] Increasing an aircraft's glide path (angle of approach) reduces noise in two ways [13]: • It increases the height of the aircraft over the ground, increasing the distance over which sound travels before it reaches a population. • It increases an aircraft's rate of descent, reducing the amount of engine power required and helping to reduce the amount of noise emitted. GBAS is primarily used to facilitate GNSS-based precision approaches which are more flexible in design than is possible with Instrument Landing System (ILS). Whilst the main goal of GBAS is to provide signal integrity, it also increases signal accuracy, with demonstrated position errors of less than one meter in both the horizontal and vertical plane. One GBAS Ground Station at an airport supports aircraft approach and landing to multiple runway ends as well as departures from multiple runways and surface movement for all GBAS-equipped aircraft [15].	Under ICAO rules, steeper and segmented approaches are only meant to be used to avoid obstacles rather than for environmental management purposes. This can pose challenged in getting such procedures approved. Any approach angle of 4.5° or more requires specific approval. Approvals for steep approach and landing (SAL) operations are stated in the Operations Specifications certificate issued in accordance with the EU Air Operations Regulations. Steep approach clearance for a particular type of aeroplane will not automatically permit all individual aircraft of that type to operate to the maximum approved angle [14]. This means that if a steeper approach is implemented it may constrain the types of aircraft which can land at an airport.

49 Currently, GBAS is implemented on more than 100 airports [15]. Airports where such procedures are implemented include e.g.: Bremen (EDDW), Malaga (LEMG), Frankfurt (EDDF), Zurich (LSZH), Newark (KEWR), Houston's George Bush (KIAH), Moses Lake (KMWH), Charleston (KCHS), Sydney (YSSY), Chennai (VOMM)Saint Helena (FHSH)

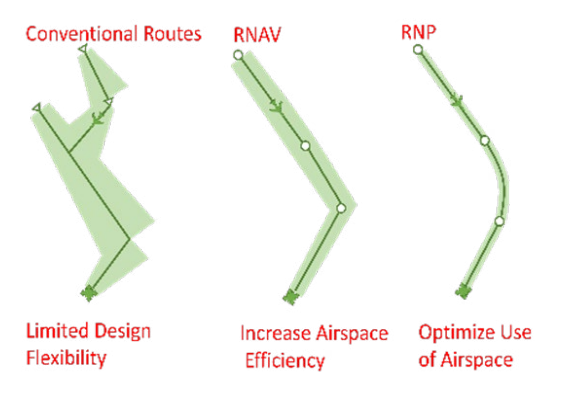
9. PBN Navigation[50]

Noise Mitigation Measure / Description of the measure

Performance Based Navigation is an area of navigation based on performance requirements for aircraft operating along an Air Traffic System route, on an instrument approach procedure or in a designated airspace. [1] [16]

Performance requirements are expressed in navigation specifications (Area Navigation (RNAV) specification, Required Navigation Performance (RNP) specification) in terms of accuracy, integrity, continuity, availability and functionality needed for the proposed operation in the context of a particular airspace concept. [16]

Illustration(s)



How the measure may contribute towards noise management and reduction (Pros)	Potential disadvantages and drawbacks associated with the measures (Cons)
PBN represents a fundamental shift from sensor-based to performance-based navigation and offers a number of advantages over the sensor-specific method of developing airspace and obstacle clearance criteria, i.e.: allows for more efficient use of airspace (route placement, fuel efficiency and noise abatement); PBN can potentially enable operational benefits in the areas of safety, flight efficiency and airspace capacity, as well as improved cost-efficiency and reduced environmental impact. [16]	There could be conflicts in achieving noise reduction and fuel efficiency at the same time as longer routes to avoid overflight will result in less efficiency in fuel used and vice versa. PBN also means that aircraft will fly routes more accurately than those which are flown using conventional navigation. This means that PBN has the potential to increase overflight rates at certain locations but increasing the concentration of the flight path.

50 The following list provide examples where the measure is used at other airports [17]: Toronto International, London Stansted, Amsterdam Schiphol, Santa Ana, John Wayne.

5.5.3 Land Use Planning and Management

1. Noise Zones and Planning Instruments[51]
Noise Mitigation Measure / Description of the measure
Land-use planning (and management) is an effective means to ensure that the activities nearby airports are compatible with both the current and future airport activities. [1] [18] Land and buildings surrounding airports can be planned and managed to mitigate aircraft noise at those locations. [1] It is also an instrument to ensure that the gains achieved by the reduced noise of the latest generation of aircraft are not offset by further residential development around airports. [18] Zoning can be used to ensure that aircraft noise is taken into account when planning decisions are made in areas around airports. Typically, zoning can help advise on the compatibility of a location for noise sensitive development. It can help to advise on, for example, what form of sound insulation is required for a development to be made compatible. [1]
Illustration(s) 

How the measure may contribute towards noise management and reduction (Pros)	Potential disadvantages and drawbacks associated with the measures (Cons)
The main goal of land-use planning is to minimise the population affected by aircraft noise by introducing measures, such as land-use zoning around airports. [18] Planning noise contours can be used to define noise zone around an airport. The structure of noise zones should be inherently related to the particular situation where they are applied. In many jurisdictions, two zones (e.g., medium an high noise zones) are used, but in some cases more zones might be used (e.g. medium to very high): [18] • In high-noise zones, new noise-sensitive developments, such as residences, hospitals and schools might be prohibited. Those which already exist might be subject to sound insulation and ventilation retrofits. [18] • In a medium-noise zone, new developments might be allowed but subject to maximum density limits or specific sound insulation and ventilation requirements. [18]	An airport may not have any control or influence over the planning regulation and noise zoning. The sizing and location of the zones may over or under constrain development.

51 The following list provide examples in Europe of where the measure is used at other airports [5]: Athens International, Barajas-Madrid, Barcelona, Bologna G Marconi, Bordeaux-Merignac, Bromma, Brussels , Bucharest Henri Coanda Intl, Budapest, Rome Fiumicino, Frankfurt, Hamburg, Helsinki-Vantaa, Koln-Bonn, Leipzig Halle, Milan Linate, Lyon Saint Exupery, Malaga, Milan Malpensa, Marseille- Provence Intl, Nurnberg, Paris Orly, Paris Charles de Gaulle, Prague Ruzyne, Amsterdam Schiphol, Sofia, Toulouse-Blagnac.

1. Noise Zones and Planning Instruments	
How the measure may contribute towards noise management and reduction (Pros)	**Potential disadvantages and drawbacks associated with the measures (Cons)**
Land-use planning and management measures can be categorised as [3]: • Planning instruments: comprehensive planning, noise zoning, subdivision regulations, transfer of development rights, and easement acquisition. • Mitigation instruments: building codes, noise insulation programmes, kind acquisition and relocation, transition assistance, real estate disclosure and noise barriers. • Financial instruments: capital improvements, tax inventive, and noise- related airport charges for revenue generation to assist in funding noise mitigation efforts. Noise problems can be addressed through preventive measures [19]: a) Location of new airports at an appropriate place, such as away from noise-sensitive areas. b) Taking the appropriate measures so that land-use planning is taken fully into account at the initial stage of any new airport or of development at an existing airport. c) Defining zones around airports associated with different noise levels taking into account population levels and growth as well as forecasts of traffic growth and establish criteria for the appropriate use of such land, taking account of ICAO guidance. d) Enacting legislation, establish guidance or other appropriate means to achieve compliance with those criteria for land use. e) Ensuring that reader-friendly information on aircraft operations and their environmental effects is available to communities near airports.	

2. Noise Insulation Schemes[52]

Noise Mitigation Measure / Description of the measure

Noise Insulation Schemes (NIS) measures offered by airports generally include uprated acoustic glazing (secondary glazing, standard thermal glazing, or high-performance acoustic glazing) and associated acoustic ventilation measures.

There are also examples of NIS which offer options for loft and roof insulation. [21]

Some schemes operate based on measures being provided without any cost to the owner / occupier of the property. Others may entail financial contributions towards the cost of the sound insulation.

Illustration(s)

How the measure may contribute towards noise management and reduction (Pros)	Potential disadvantages and drawbacks associated with the measures (Cons)
The objective of a NIS is to reduce the impact of airport noise on households, communities, and community facilities through the implementation of noise reduction measures installed within the building envelope. [21] This can help reduce the level of aircraft noise events inside a property which may reduce annoyance and sleep disturbance.	A NIS can therefore only reduce noise within a building. [21] The financial aspects and measures available through a NIS and its execution can all be important in achieving uptake i.e., the number of households participating the schemes.

52 The following list provide examples of where the NIS measure is used at other airports: Aberdeen, Adolfo Suárez Madrid–Barajas, Arlanda, Barcelona–El Prat, Belfast International, Birmingham, Bristol, Charles de Gaulle, East Midlands, Edinburgh, Frankfurt am Main, Gatwick, Glasgow, Heathrow, Humberto Delgado, Leeds Bradford, Liverpool, Luton, London City, Milan-Malpensa , Manchester, Munich, Orly, Schiphol, Shannon, Son Sant Joan, Stansted, Vienna International

3. Relocation schemes[53]

Noise Mitigation Measure / Description of the measure

Property purchase and relocation schemes roughly fall into three categories:

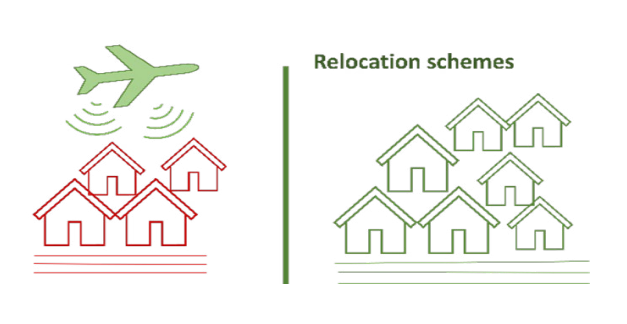
- Compulsory property purchase schemes.
- Voluntary property purchase schemes.
- Relocation schemes.

It is not uncommon for airports to offer variants of all three schemes, or combinations of relocation incentives and property purchase schemes.

Eligibility for the various schemes generally falls into one or more of the following categories:

- Threshold Criteria – related to a noise level, such as the likely level following a development at an airport.
- Temporal – where dependency is upon the date at which a property is constructed or occupied, and also the time period that an eligible property can make a claim.
- Geographical – where the scheme applies to land or properties within identified areas.
- Building Type – where the scheme applies to buildings with specific uses, such as schools, or specific parts of a property.
- Other – any airport specific eligibility criteria. [21]

Illustration(s)



How the measure may contribute towards noise management and reduction (Pros)	Potential disadvantages and drawbacks associated with the measures (Cons)
Compulsory property purchase can lead to a reduction in the number of people within areas with aircraft noise exposure deemed incompatible for residential development.	Compulsory property purchase can lead to long evaluation process of the values of the land/property and possible contestation from the land/property owners. [21].

53 The following list provide examples of where the NIS measure is used at other airports: East Midlands, Edinburgh, Gatwick, Heathrow, Liverpool, Manchester

4. Monitoring of encroachment[54]

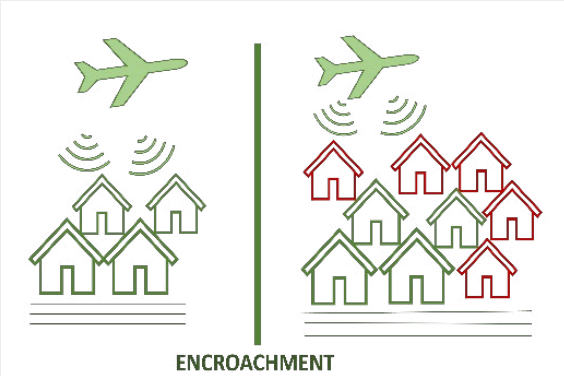
Noise Mitigation Measure / Description of the measure

The term "encroachment" is used to describe growth of residential development in areas that are incompatible or potentially incompatible with aircraft noise. [3]

Incompatibility is defined in terms of noise exposure criteria generally established locally or nationally. [3]

The analysis is straightforward when the boundary of a protected zone is demarcated to allow future airport growth. [3]

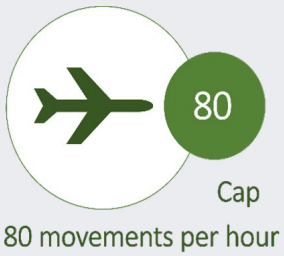
Illustration(s)



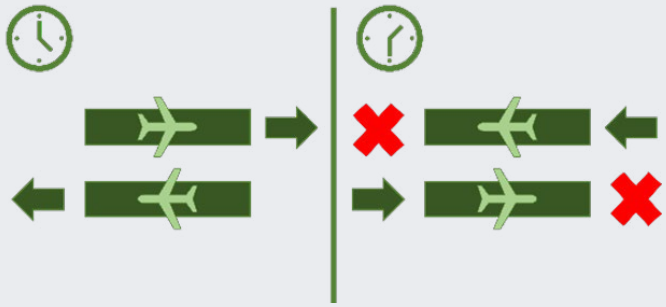
How the measure may contribute towards noise management and reduction (Pros)	Potential disadvantages and drawbacks associated with the measures (Cons)
Quantifying encroachment requires definition of an incompatibility zone. Such zones are usually established by defining noise exposure contours around an airport using a noise exposure metric known to correlate with health and welfare of people and a traffic forecast that anticipates some future growth scenario. [3] The boundary might be developed to reflect the planned ultimate capacity of an airport. [3]	Forecast capacity can change over time making the tracking of encroachment difficult. [3] Exact prediction of how growth will shape future contours is difficult because capacity enhancement plans can change over time. [3]

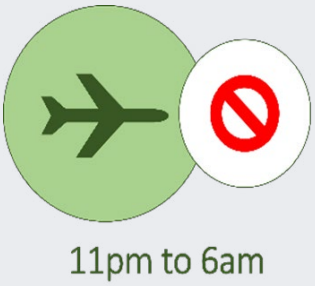
54 The following list provide examples of where the measure is used at other airports [3]: Bologna international airport, Auckland International Airport

5.5.4 Operating Restrictions

1. Aircraft Movement Cap[55]	
Noise Mitigation Measure / Description of the measure	
Aircraft movements are arrivals or departures at an airport. Introducing a limit to the number of movements over a specified time period can act as a proxy for noise. [22]	
Illustration(s)  	
How the measure may contribute towards noise management and reduction (Pros)	**Potential disadvantages and drawbacks associated with the measures (Cons)**
Movement limits can be set at an agreed amount corresponding to an equivalent level of noise exposure around an airport which is not to be exceeded. Movement caps are simple and transparent; and reports of actual movements against the limit are easy to compile and understand, thus allowing compliance to be measured in a straightforward manner. Provides confidence to communities with concerns regarding the growth of an airport. [22]	The aviation industry views such restrictions as a 'blunt instrument'. Difficult to determine how high or low the movement cap should be set to. A movement limit does not take into account the noise being generated by aircraft, which means it cannot provide incentives for operators to introduce quieter aircraft. If the aim is to balance noise control; and sustainable development and growth at an airport, a movements cap may not provide for long-term operational flexibility, as it would not enable quieter aircraft to be used more frequently with an equivalent noise exposure. [22]

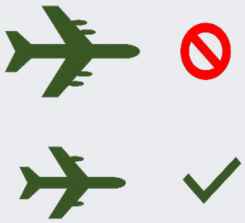
55 The following list provide examples of where the measure is used at other airports [22]: Frankfurt am Main, Paris Charles de Gaulle Airport, Amsterdam Airport Schiphol, Sydney Airport, London Heathrow Airport, London City Airport

2. Runway Use Restrictions[56]	
Noise Mitigation Measure / Description of the measure	
Runway use restrictions are generally a combination of Preferential Runway Usage and Aircraft Curfew.	
Illustration(s) 	
How the measure may contribute towards noise management and reduction (Pros)	**Potential disadvantages and drawbacks associated with the measures (Cons)**
See Preferential Runway Usage and Aircraft Curfew sections.	See Preferential Runway Usage and Aircraft Curfew sections

3. Aircraft Curfew[57]	
Noise Mitigation Measure / Description of the measure	
An aircraft curfew is a global or aircraft-specific partial operating restriction that prohibits take- off and / or landing during an identified time period. [3]	
Illustration(s) 	
How the measure may contribute towards noise management and reduction (Pros)	**Potential disadvantages and drawbacks associated with the measures (Cons)**
Can provide clear breaks and respite from aircraft noise, and can be used to manage noise exposure. [22]	Can result in significant costs on airports and airlines. Airports Council International (ACI) released a 2015 report entitled 'Managing the Impacts of Aviation Noise' states: *"curfews and restrictions are a 'blunt instrument' and can severely impact the efficiency of operations such as the movement of freight".*

56 The following list provide examples of where the measure is used at other airports [22]: Frankfurt am Main, Paris Charles de Gaulle Airport, Amsterdam Airport Schiphol, O'Hare International Airport, Sydney Airport

57 The following list provide examples of where the measure is used at other airports [22]: Frankfurt am Main, Amsterdam Airport Schiphol, Sydney Airport, London City Airport

4. Aircraft Type Restrictions[58]	
Noise Mitigation Measure / Description of the measure	
Operating restriction that prohibits take-off and / or landing of aircraft-specific type on the basis of certified noise level [22]	
Illustration(s) 	
How the measure may contribute towards noise management and reduction (Pros)	**Potential disadvantages and drawbacks associated with the measures (Cons)**
Can be used to manage the amount of noise experienced per aircraft event and help reduce noise exposure. [22]	If set incorrectly, can potentially discriminate against certain airlines. Must align with aircraft noise certification requirements. [22]

5. Noise Quotas[59]	
Noise Mitigation Measure / Description of the measure	
Under a noise quota scheme, each aircraft type is assigned a 'noise classification' according to its noise performance: the noisier the aircraft, the greater the noise classification. The numbers of movements of each aircraft type, over a given period, are multiplied by the corresponding noise factors, and these 'noise factored movements' are counted against an overall noise quota (or noise budget) for an airport. Noise quotas may be set separately for winter and summer seasons; they may be sub-divided between arrivals and departures, or between types of services in other ways, depending on the degree of flexibility required within the permitted limits. Calculations are usually undertaken on forecast traffic to inform proposed budgets which are consulted upon before they are adopted. This may also include noise exposure contour calculations so that potential noise exposure can be reviewed as part of setting a budget. [22]	
How the measure may contribute towards noise management and reduction (Pros)	**Potential disadvantages and drawbacks associated with the measures (Cons)**
A noise quota scheme may provide a better proxy for noise exposure than numbers of movements alone. It can also be used to encourage the introduction of quieter aircraft to help increase the number of movements within the quota. [22]	Quotas can be more complicated to administer than a movement limit.

58 The following list provide examples in Europe of where the measure is used at other airports [22]: Frankfurt am Main, Paris Charles de Gaulle Airport, Sydney Airport, London City Airport

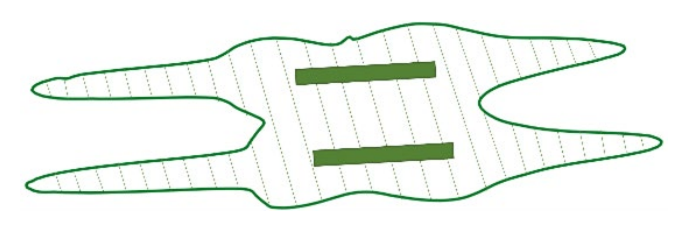
59 The following list provide examples in Europe of where the measure is used at other airports [22]: London Heathrow Airport, London Gatwick Airport, London City Airport, Belfast City Airport

6. Noise Contour Area Limits

Noise Mitigation Measure / Description of the measure

Noise exposure contours are routinely used to assess long-term noise exposure at airports, including the 5-yearly strategic noise mapping under the END. They can however be used to restrict aircraft noise by setting requirements that the noise exposure shall not exceed a certain area or encroach into a certain area.

Illustration(s)



How the measure may contribute towards noise management and reduction (Pros)	Potential disadvantages and drawbacks associated with the measures (Cons)
Noise exposure contours provide a way of describing the noise exposure in the vicinity of an airport and can be used to describe the area enclosed by a certain noise contour associated with a particular noise metric and level. The contour selected as a restriction usually has scientific or policy relevance. Being a single numerical value, it is straightforward to set a limit on contour area to restrict aircraft noise exposure in the vicinity of an airport and it is easy to understand and apply as a criterion. [22]	A contour restriction may not necessarily reflect perception of aircraft noise, and may only be confirmed using retrospective noise contours after any breach has occurred. The use of contours as a restriction requires the selection of a metric and associated threshold value which can often be subject to debate and may change over time with new developments. It also has the added complexity that the noise contour area used as a restriction may be confused with other noise contour areas around the airport, such as the areas reported from strategic noise mapping or used for land-use planning and management. This situation tends to occur when an airport is required to report several noise metrics. [22] A contour does not address the potential health impacts of aircraft noise.

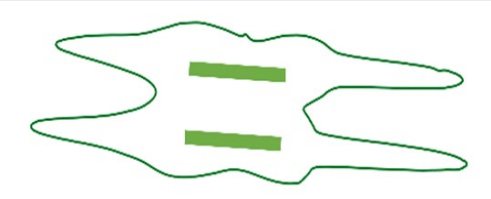
7. Noise Contour Shape Limit[60]

Noise Mitigation Measure / Description of the measure

The pattern of noise around an airport can vary depending upon the form of operations.

Depending on operations, the area of the noise contours can be measured and found to be the same, but their shapes, and the corresponding locations and communities that sit within that area can result in apparent differences in impact. The aim of this operating restriction is to fix a shape to safeguard local communities. [22]

Illustration(s)



How the measure may contribute towards noise management and reduction (Pros)	Potential disadvantages and drawbacks associated with the measures (Cons)
Very restrictive and can provide very clear safeguards to local communities. [22]	Significantly restricts operational flexibility at an airport and can lead to some unintended consequences [22]

8. Noise Budget[61]

Noise Mitigation Measure / Description of the measure

In order to control the runway preference system, and thereby control the distribution of noise around an airport, a noise budget restriction system is meant to set limits on noise exposure at specific locations. [22]

How the measure may contribute towards noise management and reduction (Pros)	Potential disadvantages and drawbacks associated with the measures (Cons)
This system allows noise limits to be set based on certain communities. Uses measured levels, therefore simple and transparent. [22]	Can be potentially challenging for new aircraft types and may inadvertently restrict new aircraft. Depending on the siting of the noise monitoring terminals, aircraft can be operated in ways which optimise low noise over the monitors, potentially resulting in higher noise elsewhere. Being based on measurements, breaches are identified retrospectively, so in theory, the mechanism cannot guarantee that there will be no breaches.. It can be quite complex to administer and manage. [22]

60 The following list provide examples in Europe of where the measure is used at other airports [22]: Amsterdam Airport Schiphol

61 The following list provide examples in Europe of where the measure is used at other airports [22]: Amsterdam Airport Schiphol, Paris Charles de Gaulle Airport

Table 5.2: Reference documents - Measures available under the Balanced Approach

[1] Aircraft Noise Competent Authority, Aircraft Noise Mitigation at Dublin Airport, Fingal County Council, 2020

[2] ICAO, "Aircraft Operations, Volume I (Doc 8168)," ICAO, 2006

[3] ICAO, "Guidance on the Balanced Approach to Aircraft Noise Management (DOC 9829)," ICAO, 2008

[4] Osprey Consulting Services Limited, "Review of Potential Noise Mitigation Measures," RiverOak Strategic Partners, Manston, 2019

[5] Boeing, "Airport Noise and Emission Regulations," http://www.boeing.com/commercial/noise/list.page

[6] Skybrary.aero, "Noise Preferential Routes," www.Skybrary.aero

[7] European Commission, "Commission Regulation (EC) No 859/2008," European Commission, 2008

[8] Civil Aviation Authority, "CAP1691 Departure Noise Mitigation: Main Report," Civil Aviation Authority, 2018

[9] ICAO, "CCO Manual (DOC 9993)," ICAO

[10] ICAO, "CDO Manual (Doc 9931)," ICAO, 2010

[11] EUROCONTROL, "Continuous Climb and Descent Operations," https://www.eurocontrol.int/concept/continuous-climb-and-descent-operations, 2020

[12] Skybrary.aereo, "Continuous Descending Operations," www.skybrary.aereo.

[13] Heathrow Airport Limited, "SSA Consultation Document," Heathrow Airport Limited, 2021

[14] CAA, "Steep Approach Approval Compliance Statement and Checklist.," CAA, 2019

[15] Skybrary.aero, "Ground Based Augmentation System," www.Skybrary.aero

[16] ICAO, "PBN Manual (Doc 9613)," ICAO, 2008

[17] CANSO, "Use of Performance based Navigation for Noise Management," CANSO, 2020

[18] ICAO, "Airport Planning Manual Part II - Land Use and Environmental Management (DOC 9184)," ICAO, 2018

[19] ICAO, "Assembly Resolution A39-1, Appendix F

[20] Civil Aviation Authority, "R&D Report 9850: Night Time Ground Noise," Civil Aviation Authority, 1998

[21] Noise Consultants Limited, "Noise Insulation Schemes in Europe," 2020

[22] Noise Consultants Limited, "Examples and Current Trends in Noise-Related Operating Restrictions," 2019

06

Preliminary Assessment by ANCA

06 Preliminary Assessment by ANCA

This section provides a summary of:

- The noise problem as identified following ANCA's preliminary assessment.
- The requirement for an NAO.
- The role of the NAO.
- The NAO defined by ANCA for Dublin Airport.

6.1 Introduction

Following the referral of the Application to ANCA on 23 December 2020 by the Planning Authority ANCA commenced its preliminary assessment through a screening exercise to identify whether the Application may give rise to a noise problem at Dublin Airport.

The screening exercise was supported by technical reviews undertaken by ANCA's experts. Copies of the documents and material supporting the preliminary assessment can be found in Appendix C. The outcome of that screening exercise was a determination by ANCA that a noise problem would arise if the Application is granted as proposed.

Following that determination, an NAO was defined, and is the subject of consultation along with the DRD. A report documenting the development of the NAO for Dublin Airport can be found in Appendix D.

6.2 Implications of the Application on Airport Operations

The preliminary assessment and screening exercise presented in Appendix C identified the implications of the Application on aircraft noise and highlighted recent trends in aircraft noise exposure using data provided with the Application and from the NAP. With respect to changes in the operation of Dublin Airport, the Application was found to result in:

- An increase in night time air traffic movements.
- A potential change in the night time airport fleet mix.
- Accelerate the recovery of Dublin Airport back to its pre pandemic numbers by around two years (from c. 2027 to 2025).
- Enable the use of the north runway and change the use of Dublin Airport's airspace at night.

Whilst these implications were identified, ANCA noted that the Application is seeking to amend noise-related operating restrictions which are yet to apply to Dublin Airport but would come into force with the commencement of operations from the north runway. As such, the impact of these restrictions would be to limit Dublin Airport's ability to operate, in the same way in which it can in its current form, as a two-runway operation.

Having regard to the above factors, ANCA made a number of observations with respect to changes in aircraft noise exposure as a result of the Application.

6.3 Implications of Aircraft Noise Exposure

Based on the information provided in the NAP and with the Application, ANCA and its experts noted that over the period 2006 to 2019, noise exposure levels at Dublin Airport had been increasing, particularly at night. However, it was recognised that the Covid-19 pandemic has significantly reduced noise exposure from its peak in 2019.

With respect to the impact of the Application itself and having regard for the implications of the relevant action, ANCA and its experts made a number of observations. These are summarised below[62].

- The harmful effects of aircraft noise in the future with the Proposed Development will be worse than without, particularly at night. As such the Proposed Development will increase aircraft noise rather than reduce it;
- Some people will experience elevated levels of night-time noise exposure for the first time which may be considered harmful to human health;
- The Proposed Development gives rise to significant adverse night-time noise effects as reported within the EIAR. This indicates that the noise effects of the Proposed Development are a material consideration;
- Mitigation in the form of a night-time noise insulation scheme is proposed by the Applicant. The provision of such mitigation is an indicator that the Proposed Development may give rise to a Noise Problem;
- The nature of the Proposed Development is to enable a form of operation which was not considered by ABP in their original decision to grant consent for the North Runway. Such a change will attract significant third party interest, particularly from communities, who may perceive there to be a noise problem.

62 Preliminary Noise Assessment Identifying a Noise Problem at Dublin Airport, see Appendix C

6.4 Aspects of the Noise Problem Determined by ANCA

Having regard for the outcomes of the preliminary assessment set out above, ANCA prepared a recommendation report for ascertaining a noise problem at Dublin Airport[63]. This report was published in February 2021 and identified three aspects of a noise problem which may arise from the Application. These aspects are set out below.

Aspect 1 – The Application proposes an increase in aircraft activity at night, when referenced against the situation that would otherwise pertain, which may result in higher levels of human exposure to aircraft noise.

This situation requires detailed evaluation in the context of the combined intent of environmental noise legislation. The Application should be assessed to ascertain whether an acceptable balance can be achieved between the effective functioning of the Airport and the protection of the environment through the application of the Balanced Approach.

Aspect 2 – The Application proposes a situation where some people will experience elevated levels of night time noise exposure for the first time which may be considered harmful to human health.

The Application seeks to enable a form of operation which was not considered by ABP in their original decision to grant consent for the north runway. A detailed assessment should be undertaken through the application of the Balanced Approach to ascertain the significance of the impact of a change in noise exposure arising from the Application for a relevant action.

Aspect 3 - The EIAR accompanying the Application indicates that the proposed relevant action will give rise to significant adverse night time noise effects. This indicates that the noise effects of the Proposed Development are a material consideration. Mitigation in the form of a night time noise insulation scheme is proposed by the Application. The provision of such mitigation is an indicator that the Proposed Development may give rise to a Noise Problem.

This situation requires detailed evaluation in the context of the combined intent of environmental noise legislation. The Application should be assessed to ascertain whether an acceptable balance can be achieved between the effective functioning of Dublin Airport and the protection of the environment through the application of the Balanced Approach.

Based on the three aspects outlined above, ANCA prescribed the following:

1. The determination of a noise problem at Dublin Airport, in the context of the Act of 2019 and the Aircraft Noise Regulation, arising from the Application.

2. The establishment of an NAO for Dublin Airport.

3. The commencement of the process of aircraft noise regulation prescribed by Section 34C of the Act of 2000 including the application of ICAO Balanced Approach

63 ANCA, Ascertaining a Noise Problem at Dublin Airport, Recommendation report arising from planning application F20A/0668 for a Relevant Action, February 2021

6.5 Requirement for a Noise Abatement Objective

ANCA is required to commence the process of aircraft noise regulation as prescribed under Section 34C of the Act of 2000 following the identification of a noise problem. This process requires ANCA to adopt the Balanced Approach to assess any noise mitigation measures or operating restrictions that may be required to address the noise problem. As highlighted in this report, the application of the Balanced Approach requires a NAO to be defined for Dublin Airport. As such, a NAO is required for ANCA to perform its functions under the Act of 2019.

6.6 Role of the Noise Abatement Objective

As highlighted above, a primary role of the NAO is to facilitate the application of the Balanced Approach, while having regard to the wider legislative and policy context

ANCA prepared the NAO Report, which sets out the background and setting of an NAO for Dublin Airport. The NAO Report is included at Appendix D of this regulatory decision report.

The NAO Report states that:

"The Noise Abatement Objective (NAO) is a policy objective for managing the effects of aircraft noise emissions on the surrounding communities and environment at an airport where a noise problem has been identified. It is a plan to ensure that development at Dublin Airport occurs in the most sustainable manner possible to minimise the impact of aircraft noise."

In this sense, and as well as being required to support the application of the Balanced Approach, the NAO can be used to guide decisions that are needed to manage the aircraft noise aspects of future aircraft operations at Dublin Airport.

6.7 A Noise Abatement Objective for Dublin Airport

ANCA has developed an NAO for Dublin Airport and undertook consultation on this. The NAO set by ANCA for Dublin Airport is provided in Appendix D.

07

Noise Assessment by ANCA

07 Noise Assessment by ANCA

This Chapter sets out the noise assessment carried out by ANCA in relation to the Application. In carrying out this assessment, ANCA has considered the documents and data supplied by the Applicant as recorded in Appendix A (including in response to ANCA's Direction to Provide Information).

This section also outlines the current inventory of noise management measures in place at Dublin Airport in line with the Balanced Approach; and describes the NAO and aspects of the noise problem relevant to ANCAs Assessment.

7.1 Introduction

To support the reading of this section, Appendix E summarises the scenarios which have been modelled by the Applicant. In particular, Appendix E summarises the various forecast scenarios and runway use and restriction scenarios which have been considered.

All aircraft noise modelling relied on in this assessment has been carried out by the Applicant and reviewed by ANCA having regard for the methodology and approach taken by the Applicant and their consultants. Under the European Communities (Environmental Noise) Regulations S.I. 549 of 2018, the Applicant is designated as the noise-mapping body for the preparation and revision of strategic noise maps at Dublin Airport. As such, the Applicant has a statutory role in the preparation of information under the regulatory framework. Commentary on the Applicant's modelling is provided in Appendix F.

This section specifically:

- Provides a Description of Dublin Airport.
- Reports the Current Inventory of noise management measures in place in line with the Balanced Approach.
- Describes the NAO and the aspects of the noise problem relevant to ANCA's assessment.
- Sets out the Forecast Without New Measures scenario, which outlines the noise outcomes that are forecast in the absence of the measures and operating restrictions which are the subject of the Application.
- Presents ANCA's application of the Balanced Approach. This section provides a review of the measures available to reduce aircraft noise and those which have been taken forward for further assessment and analysis of cost-effectiveness. This section specifically reviews the measures having regard to information provided by the Applicant and the assessment by ANCA. This section also reviews the performance of new measures against the NAO and aspects of the noise problem.
- Presents the wider environmental assessment which have been prepared in support of ANCA's assessment.
- Presents the cost-effectiveness assessment of the measures identified by ANCA.

7.2 Description of Dublin Airport

7.2.1 Current Situation

Dublin Airport is located approximately 10 km north of Dublin City Centre, and c.5km from the County town of Swords near the M50 and M1 motorways. It consists of lands of over 1,000 hectares and currently has two operational runways:

- The main 10/28 south runway (2,637m long) which runs in an east-west direction.
- The cross-wind runway 16/34 (2,072m long) which lies on a north-west to south-east orientation.

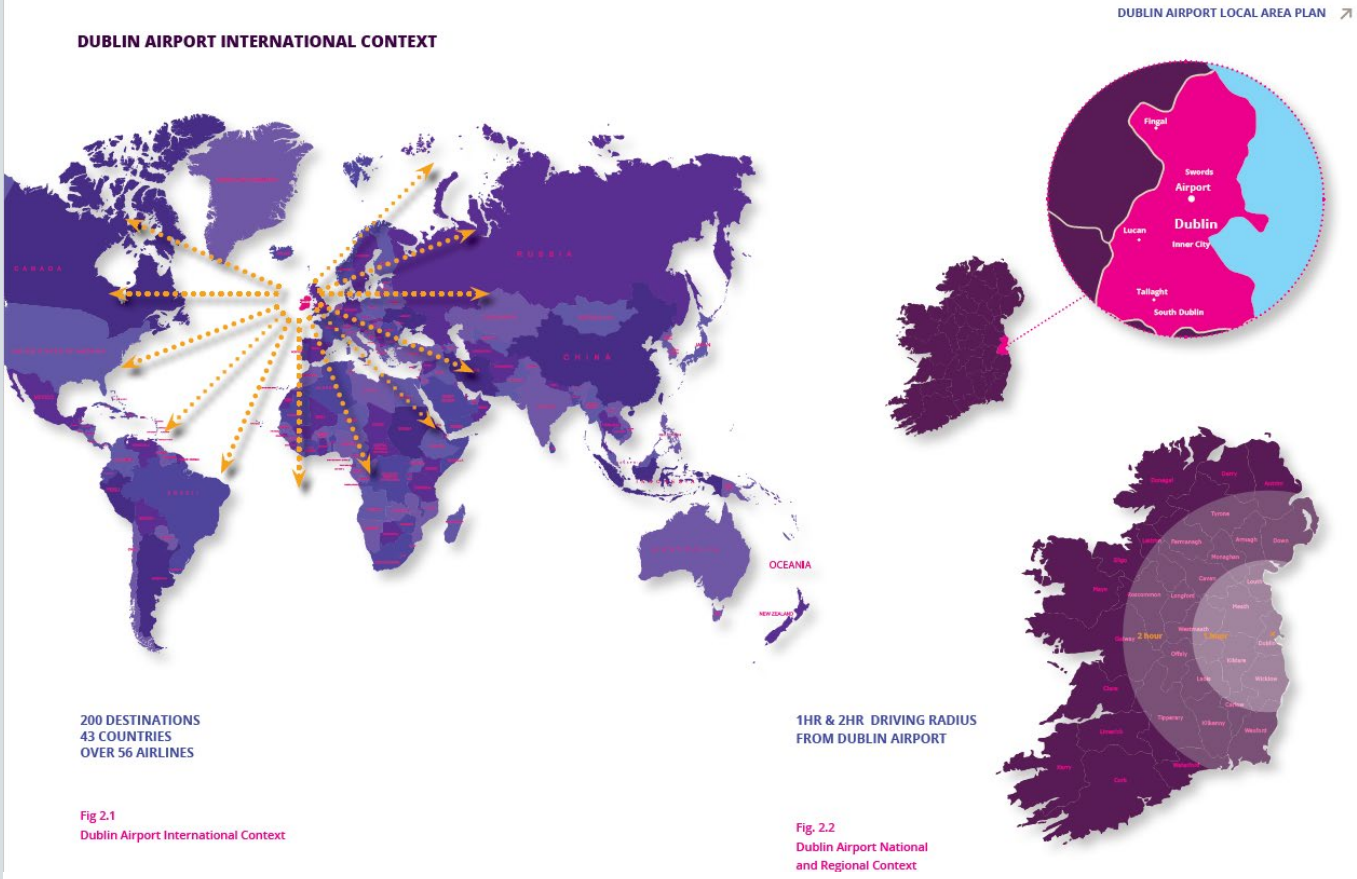


Figure 7.1: Dublin Airport International, National and Regional Context (Source: Dublin Airport Local Area Plan 2020)

The Noise Action Plan presents the current arrival and departure paths taken by aircraft using Dublin Airport. These are reproduced in Figure 7.2 and Figure 7.3 below.

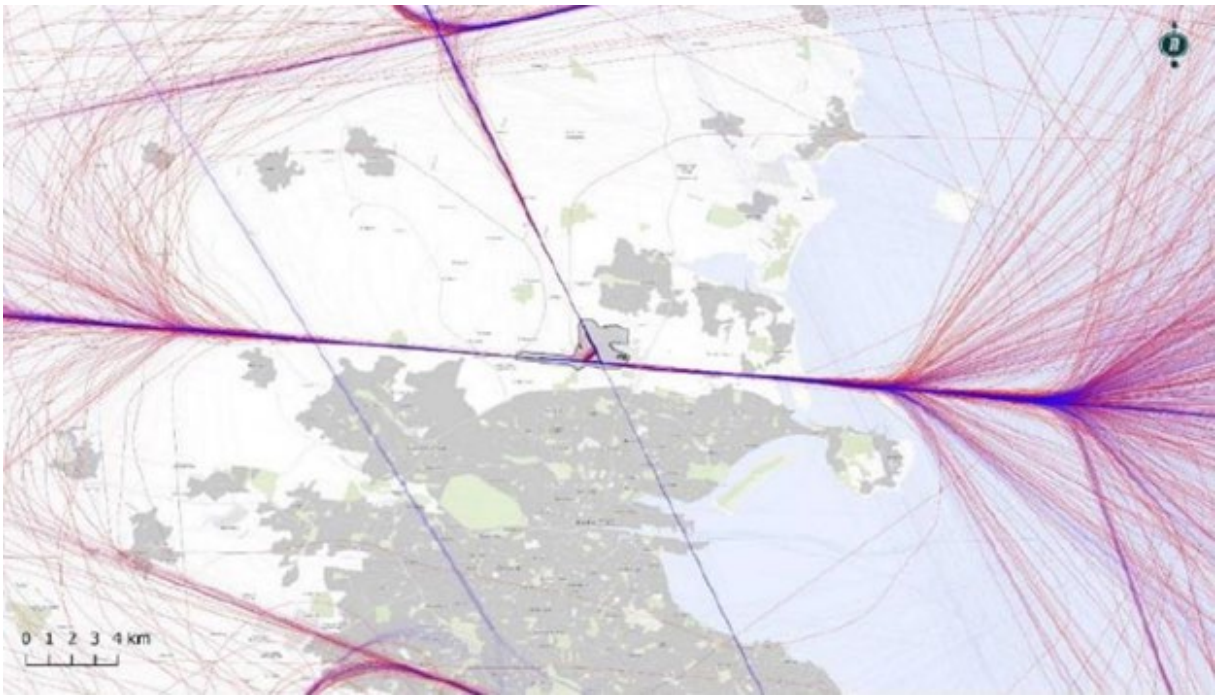


Figure 7.2: Dublin Airport Arrival Flight Paths are presented in the Dublin Airport Noise Action Plan 2018-2023 (Figure 5)

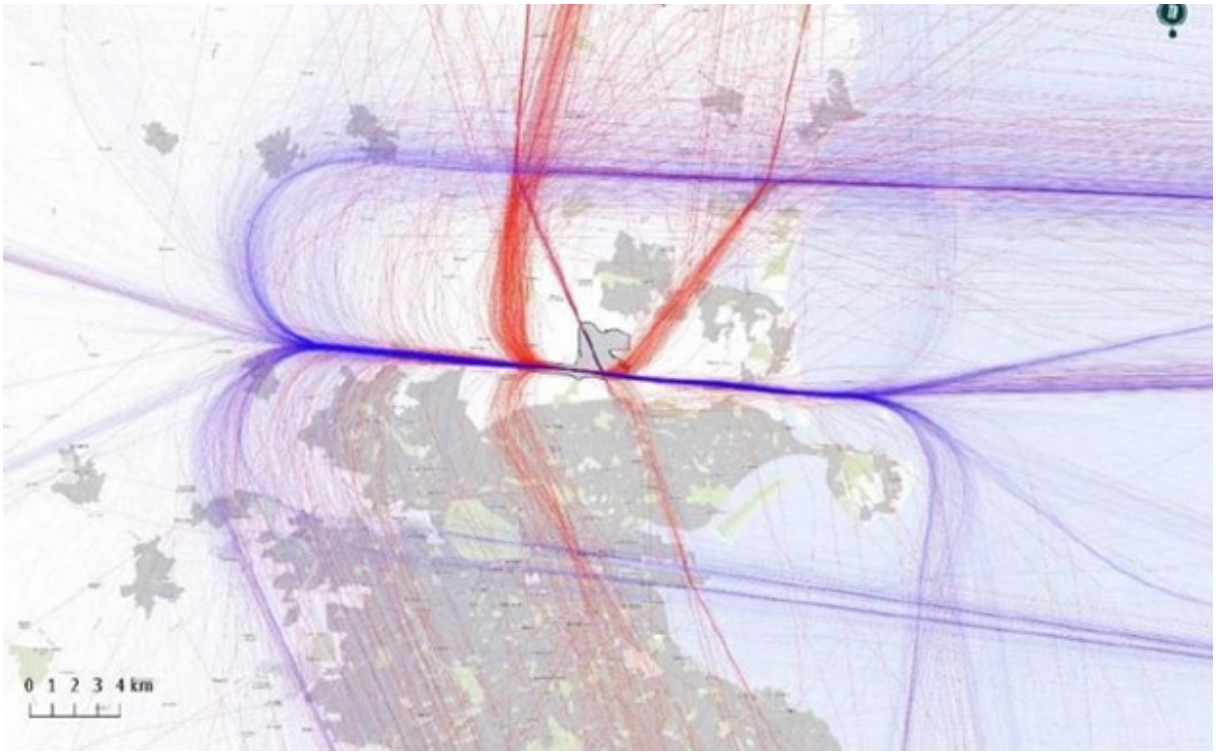


Figure 7.3: Dublin Airport Departure Flight Paths as presented in the Dublin Airport Noise Action Plan 2018-2023 (Figure 6)

Table 7.1: Fleet mix for Dublin Airport in 2019

Annual Movements in 2019						
Aircraft Type	**Noise Chapter**	**Generation**	**Annual Day**	**Annual Eve**	**Annual Night§**	**Annual 24hr**
Airbus A300	3	G0	0	0	0	0
Airbus A306	4	G0	162	301	377	840
Airbus A319	4	G0	3,159	911	370	4,440
Airbus A320	4	G0	41,840	10,109	6,796	58,745
Airbus A320neo	14	G1	1,000	119	13	1,132
Airbus A321	3	G0	5,461	907	1,086	7,454
Airbus A321neo	14	G1	619	87	158	864
Airbus A330	4	G0	8,905	40	2,031	10,976
Airbus A330neo	14	G1	0	0	0	0
Airbus A350	14	G1	214	0	220	434
ATR 42	4	G0	2,124	273	2	2,399
ATR 72	4	G0	14,398	2,481	1,089	17,968
BAe 146/Avro RJ	14	G0	4,280	767	207	5,254
Boeing 737-400	4	G0	196	547	527	1,270
Boeing 737-500	4	G0	89	1	4	94
Boeing 737-700	4	G0	1,001	298	104	1,403
Boeing 737-800	4	G0	58,447	18,855	12,136	89,438
Boeing 737 MAX	14	G1	251	6	103	360
Boeing 757	4	G0	2,939	23	528	3,490
Boeing 767	3	G0	1,845	541	693	3,079
Boeing 777	4	G0	1,536	587	1,121	3,244
Boeing 777X	14	G1	0	0	0	0
Boeing 787	14	G1	2,576	63	947	3,586
Bombardier CS300	14	G1	1,030	5	3	1,038
Bombardier Dash 8	14	G0	2,363	921	6	3,290
Convair 580	N/A	G0	0	0	0	0
Embraer E190/195	4	G0	4,323	940	275	5,538
Embraer E190-E2	14	G1	10	0	0	10
HS748A	3	G0	0	0	0	0
Lockheed C130	3	G0	0	0	0	0
McDonnell Douglas	4	G0	6	0	0	6
MD83	4	G0	2	0	0	2
Piper PA34	10	G0	0	0	0	0
Shorts SD330/360	N/A	G0	0	0	0	0
Other	N/A	G0	9,155	1,969	524	11,648
Total			**167,931**	**40,751**	**29,320**	**238,002**

Table 7.2: Fleet mix for 2019 by Noise Chapter and Generation

ICAO Chapter	Annual Day	Annual Eve	Annual Night	Annual 24hr
3	4.4%	3.6%	6.1%	4.4%
4	82.8%	86.8%	86.5%	84.0%
14	7.4%	4.8%	5.7%	6.7%
N/A	5.5%	4.8%	1.8%	4.9%
Generation	**Annual Day**	**Annual Eve**	**Annual Night**	**Annual 24hr**
G0	96%	99.3%	95.1%	96.9%
G1	3.4%	0.7%	4.9%	3.1%
G2	0.0%	0.0%	0.0%	0.0%
N/A	0.0%	0.0%	0.0%	0.0%

Table 7.2 shows that over the course of 2019, Dublin Airport operated 29,320 aircraft movements during the night. These movements were not subject to any form of operating restriction and translate to approximately 80 movements per night over the 2019 calendar year. Data provided by the Applicant shows that over the summer months i.e., between mid-June and mid-September that the average number of aircraft movements at night was approximately 103.

The data presented in Table 7.2 shows that over the calendar year, the fleet mix at Dublin Airport was mainly comprised of Chapter 4[64] aircraft. In 2019, around 3.1% of the total operations were from the latest generation of aircraft i.e., Generation 1, Chapter 14 certified types.

Noise exposure data has been reported by the Applicant for 2019. This data is summarised in Table 7.3 below.

Table 7.3: Noise exposure statistics for the current situation (2019)

Metric	Value	Population Exposure
L_{den}	>45	754,135
	>50	174,146
	>55	34,097
	>60	6,279
	>65	285
	>70	31
	>75	6
L_{night}	>40	344,912
	>45	59,307
	>50	13,838
	>55	1,533
	>60	110
	>65	13
	>70	0
Highly Annoyed (>45 dB L_{den})	**Total**	**170,231**
Highly Sleep Disturbed (>40 dB L_{den})	**Total**	**61,298**

64 The aim of the Chicago Convention Chapters is to ensure that the latest available noise reduction technologies are used for the design of new aircraft.

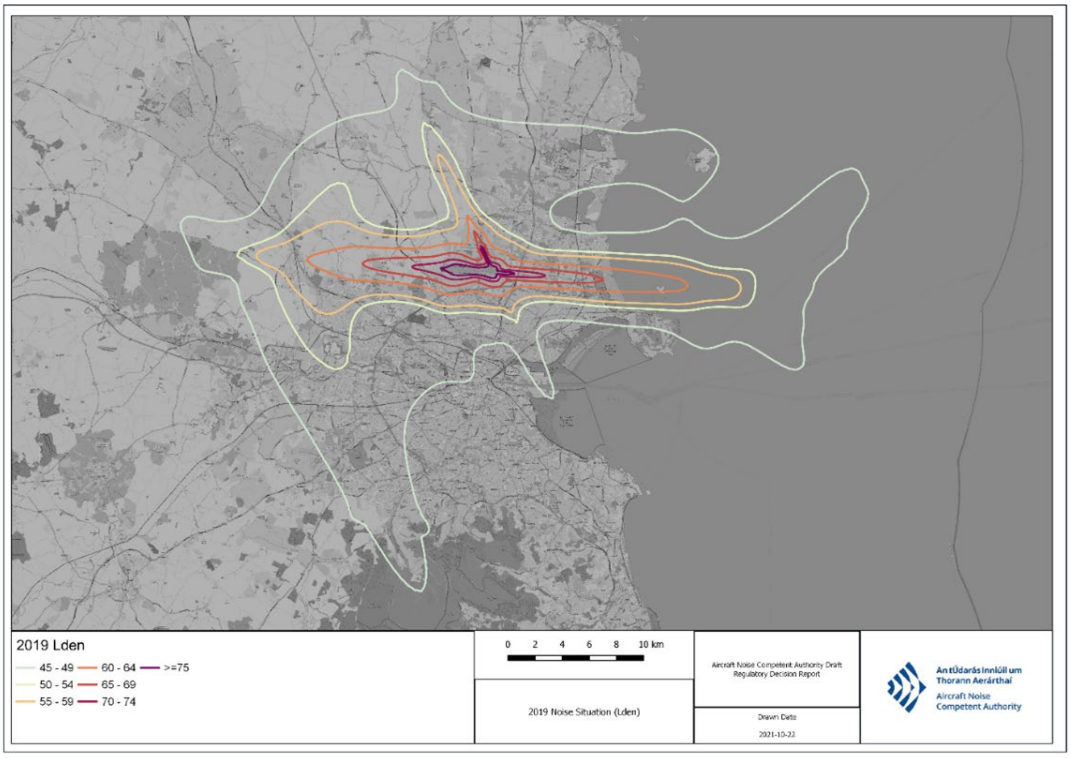


Figure 7.4: Day-evening-night Noise Exposure in 2019 (L_{den})

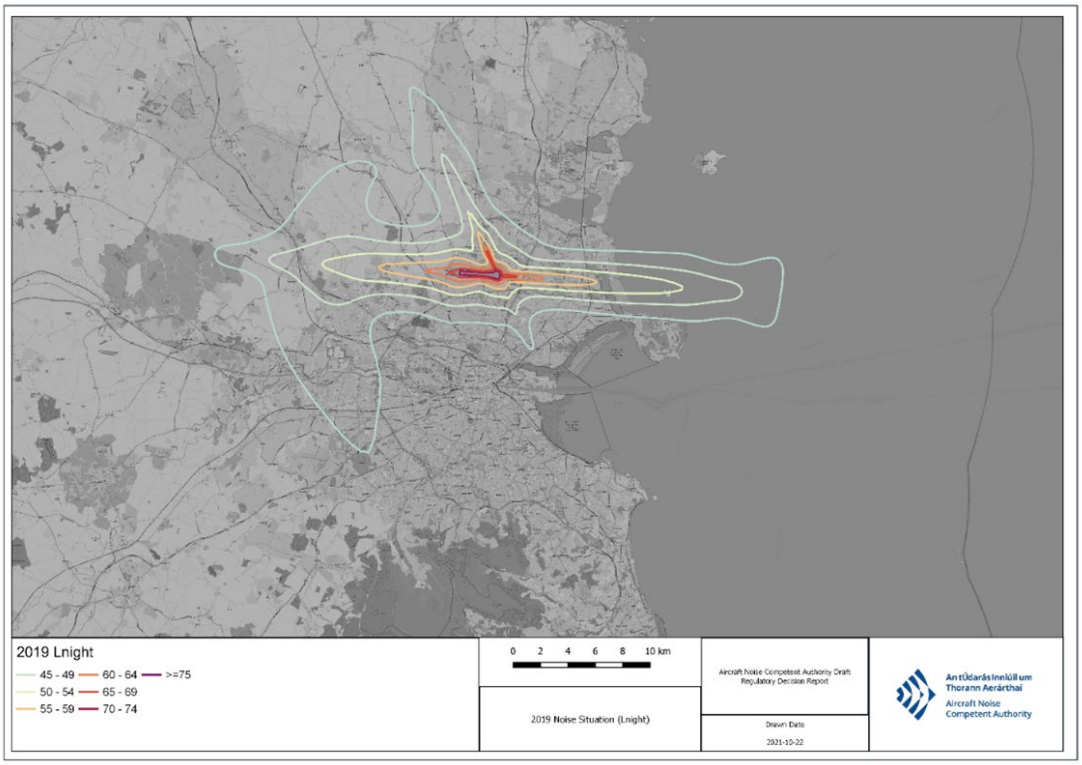


Figure 7.5: Night Noise Exposure in 2019 (L_{night})

The Covid-19 pandemic has resulted in a significant drop in air traffic and passenger numbers at Dublin Airport during 2020 and into 2021 which will have had a consequential effect on noise exposure. This outcome is reflected in a forecast situation provided by the Applicant for 2022, as is discussed below.

The Application discusses the relevant action in the context of recovery from the Covid-19 pandemic and how the recovery also coincides with the commencement of operations from the north runway[65].

The North Runway Planning Permission grants the Applicant permission to build a 3,110m long runway approximately 1.6 km north of the main existing 'south runway'. As noted above, that permission was granted in 2007. Construction of the new runway commenced in December 2016 and is due to be completed in 2022.

Table 7.4: Overview of planning consents

Fingal County Council Planning Authority Ref No.	An Bord Pleanála Ref No.	Permission Sought
F04A/1755	PL 06F.217429	10-year permission until August 2017
F04A/1755/E1		5 Year Extension of Duration until August 2022
F19A/0023	PL 06F.305298	Amendments to north runway

7.2.2 Evolution of the Noise Climate

This chapter considers the evolution of the noise climate without the relevant action as proposed in the Application. The analysis presented in this section commences with the noise situation in 2016 as this is the year for which noise exposure data was last reported under the ENR. It should be noted that at the request of ANCA the data presented in this section for 2016 has been updated by the Applicant[66]. This is to allow a direct comparison of noise exposure in 2016 given methodological changes, namely the use of a different noise model implementing ECAC Doc. 29 3rd Edition, as was used to report 2016 data through the ENR. This is the predecessor to ECAC Doc. 29 4th Edition as adopted through Directive 2015/996.

The commencement of north runway operations requires compliance with 31 planning conditions attached to the planning permission which includes a range of noise mitigation measures, operating restrictions, and monitoring requirements.

Conditions 3, 4 and 5 of the North Runway Planning Permission set conditions on how Dublin Airport can use its runways during the day and night. With the commencement of north runway operations, Conditions 3, 4 and 5 have the effect of redistributing noise around Dublin Airport as well as placing restrictions on aircraft operations occurring during the night time period.

65 Tom Phillips and Associates, Planning Report, Planning Application for a Proposed Relevant Action (S.34C OF P&D ACTS) to amend/replace operating restrictions set out in Conditions No. 3(d) and No. 5 of the North Runway Planning Permission (ABP Ref, No. PL06F.217429) as well as proposing new noise mitigation measures at Dublin Airport, Co. Dublin.

66 CA452_1.0 ANCA Reporting Template 2021 Update - 2016 END.xlsx

The Applicant expects *"strong sustained growth"* of passenger numbers post pandemic[67]. Without the relevant action, the forecast situation is that Dublin Airport will return to 32 mppa by 2027[68] even whilst operating as a three-runway system where during the night Dublin Airport will be restricted to no more than 65 aircraft movements on average with restricted use of the north runway.

ANCA has examined forecasts up to 2040 assuming that the 32 mppa terminal passenger capacity limit remains in place and that no relevant action is taken i.e., the Forecast Situation. Table 7.5 presents a summary of the historic and forecast aircraft movements and passenger numbers.

Table 7.5: Forecast and historic aircraft movements

	Annual Passengers	Annual Aircraft Movements			Summer Aircraft Movements	
Year	**24-hour**	**Day**	**Evening**	**Night**	**Day**	**Night**
2016	27.8	152,283	36,938	24,753	53,188	7,800
2019	32.9	167,931	40,751	29,320	58,163	9,445
2022	19.6	115,668	34,851	15,322	45,170	4,598
2025	30.4	163,653	43,598	19,521	57,432	5,410
2030	32.0	171,787	44,574	19,521	59,956	5,410
2035	32.0	171,787	44,574	19,521	59,956	5,410
2040	32.0	171,787	44,574	19,521	59,956	5,410

Table 7.5 shows that the Applicant expects Dublin Airport will recover from the pandemic and without new measures would reach 30.4 mppa in 2025. By 2030, Dublin Airport is forecast to have fully recovered to 32 mppa from which point the number of aircraft movements is forecast to stabilise.

Forecasts provided by the Applicant show that at night, the total number of night time movements would reach 19,521 where the 32 mppa terminal passenger capacity limit remains in place. The situation from 2025 is that the number of night time aircraft movements would be around a third lower than the number which occurred in 2019. During the summer months, the Applicant forecasts an average of approximately 59 movements during the night time period from 2025, a reduction from approximately 103 in 2019.

Noise exposure forecasts have been provided by the Applicant for the scenarios described above. These are reported in Table 7.6 below for the L_{den} and L_{night} metrics and assume no population growth.

67 Page 16, Tom Phillips and Associates, Planning Report, Planning Application for a Proposed Relevant Action (S.34C OF P&D ACTS) to amend/replace operating restrictions set out in Conditions No. 3(d) and No. 5 of the North Runway Planning Permission (ABP Ref, No. PL06F.217429) as well as proposing new noise mitigation measures at Dublin Airport, Co. Dublin.

68 Dublin Airport Operating Restrictions, Quantification of Impacts on Future Growth, Updated analysis in response to ANCA RFI, Version 1.2 (Final) May 2021

Table 7.6: Noise exposure data for the noise situation in 2016 and 2019, and for the forecast situation in 2022, 2025, 2030, 2035 and 2040

Year	Value	2016 27.8 mppa	2019 32.5 mppa	2022 19.6 mppa	2025 30.4 mppa	2030 32.0 mppa	2035 32.0 mppa	2040 32.0 mppa
L_{den}	>45		754,135	336,611	421,417	331,456	217,006	175,709
	>50		174,146	77,349	96,889	76,873	55,979	45,276
	>55	20,286	34,097	12,850	19,213	14,326	9,630	8,130
	>60	1,781	6,279	1,513	2,006	1,641	1,486	1,391
	>65	299	285	94	119	100	71	63
	>70	31	31	13	19	13	6	0
	>75	6	6	0	0	0	0	0
L_{night}	>40		344,912	138,421	163,476	135,151	81,373	68,662
	>45		59,307	27,964	33,932	28,348	21,201	18,582
	>50	6643	13,838	3,482	6,080	4,486	3,280	3,071
	>55	431	1,533	222	280	243	203	184
	>60	56	110	28	31	31	23	19
	>65	10	13	0	6	0	0	0
	>70	0	0	0	0	0	0	0
Highly Annoyed	Total	n/a	170,231	50,603	64,241	50,243	33,437	27,105
	% reduction compared to 2019	n/a	0%	70.3%	62.3%	70.5%	80.4%	84.1%
Highly Sleep Disturbed	Total	n/a	61,298	18,789	22,500	18,461	11,374	9669
	% reduction compared to 2019	n/a	0%	89.0%	86.8%	89.2%	93.3%	94.3%

Table 7.6 illustrates that compared to the 2019 situation and assuming no population growth, that the population exposure to aircraft noise in the forecast situation, along with the numbers of people HA and HSD, would reduce significantly. With Dublin Airport forecast to operate relatively stable numbers of aircraft movements from 2025 as a 32 mppa operation, this reduction would be driven by improvements in its fleet mix. To articulate this, Table 7.7 presents the proportion of aircraft within each noise generation category and in the forecast situations.

Table 7.7: Forecast fleet mix by Generation in 2022, 2025, 2030, 2053, and 2040

	24-Hour Annual			Night (23:00-07:00)		
Generation /Year	**G0**	**G1**	**G2**	**G0**	**G1**	**G2**
2022	91.3%	8.7%	0.0%	92.2%	7.8%	0.0%
2025	77.3%	22.7%	0.0%	85.0%	15.0%	0.0%
2030	51.0%	49.0%	0.0%	58.3%	41.7%	0.0%
2035	32.4%	67.6%	0.0%	33.3%	66.7%	0.0%
2040	16.7%	83.3%	0.0%	18.3%	81.7%	0.0%

Table 7.7 shows that over the period from 2022 to 2040, the Applicant is forecasting that G1 aircraft types would increase as a proportion of the overall fleet mix. No G2 aircraft are forecast. This is considered a generally conservative approach for the forecast years of 2035 and 2040, however ANCA's experts do broadly agree with the Applicant's fleet assumptions (see Appendix G). Nevertheless, the forecast reductions in population HA and HSD as presented in Table 7.6 are attributable to a reduction of noise at source through the introduction of quieter, G1, aircraft types.

7.3 Current Inventory

An inventory of the noise management measures in place at Dublin Airport has been provided by the Applicant and reviewed by ANCA. These measures are summarised in the following sections and are presented with respect to the categories of measures under the Balanced Approach.

7.3.1 Existing and Upcoming Noise Mitigation Measures

7.3.1.1 Reduction of Noise at Source

There are currently no specific measures seeking to reduce noise at source at Dublin Airport. However, Actions 1 and 2 of the Dublin Airport Noise Action Plan 2019-2023[69] (the NAP) relate to initiatives which seek to promote and introduce quieter aircraft. These initiatives are set out in Table 7.8 below.

Table 7.8: Actions relating to the Reduction of Noise at Source as reported in the Dublin Airport NAP

Action	Description	KPI	When
1	Encourage daa to work with airline partners to introduce quieter aircraft, particularly at night – including consideration of incentives	Report	Annually
2	Encourage daa to promote quieter aircraft through incentives such as FlyQuiet programmes.	Report	Ongoing

The Applicant has provided an update on these actions[70] in response to the Direction to Provide Information. This response indicates that these actions are being addressed through an Environmental Charging Scheme and that an initial consultation on this was held with airlines in November 2020.

69 Fingal County Council, Noise Action Plan for Dublin Airport, 2019 – 2023, December 2018

70 Dublin Airport North Runway Relevant Action Application, Draft – Initial Response to ANCA Request for Further Information, June 2021, Appendix I

The Applicant has indicated that this scheme would be fully implemented during the Winter 2021/22 season. The Applicant has proposed that the Environmental Charging Scheme be informed by operational statistics, which will be available from Dublin Airport's new Airport Noise and Operations Monitoring System (ANOMS) and its Noise and Flight Track Management System (NFTMS).

ANCA is not party to the details of the proposed Environmental Charging Scheme and its incentives but is supportive of such initiatives which seek to promote and encourage the use of quieter aircraft at Dublin Airport. In the absence of the relevant action, and as is presented in Table 7.7, the Applicant is forecasting a change in fleet mix that would see quieter aircraft introduced into the fleet. What is less clear is what influence the Environmental Charging Scheme would have on this outcome beyond organic fleet modernisation.

7.3.1.2 Noise Abatement Operating Procedures

The Applicant has identified eight noise abatement (NA) operating procedures which are currently in place at Dublin Airport. These procedures are set out in Table 7.9 below.

Table 7.9: Current inventory of Noise Abatement (NA) Operating Procedures (two-runway system)

Reference	Description
NA-01	**Two-runway Preferential Runway Programme** The aim of the measure is to use the runways in order to allow aircraft to avoid noise-sensitive areas during the phases of take-off and landing. The measure is subject to operational conditions, such as crosswind or tailwind component speed values over a certain threshold. During the daytime (06:00-23:00) RWY 28 and RWY 10 are the preferential runways. During the night time (23:00-06:00) runways will be prioritised for noise abatement purposes, when, subject to operational conditions, runway use is prioritised as follows: Arrival: 1st RWY 10, 2nd RWY 16, 3rd RWY 28, 4th RWY 34 Departure: 1st RWY 28, 2nd RWY 34, 3rd RWY 10, 4th RWY 16
NA-02	**Two-Runway Noise Preferential Routes (NPRs) or Environmental Noise Corridors and Track Keeping** The aim of the measure is to reduce overall impacts by directing aircraft along flight paths which are designed to avoid built-up areas. These paths are called Noise Preferential Routes (NPRs). All Aircraft taking off from Dublin Airport are required to follow specific NPRs. Once an aircraft reaches the end of the NPR, or at an altitude of 3,000 feet, the Irish Aviation Authority (IAA) Air Traffic Control (ATC) will begin turning aircraft onto a direct route to its destination.
NA-03	**Noise Abatement Departure Procedures (NADP) Climb Profile** On departure there are two noise abatement procedures where a stepped departure climb is being used. They are called "NADP 1" and "NADP 2". The NADP are based on the guidance included in ICAO's Procedures for Air Navigation Services Aircraft Operations Document 8168 Volume 1. This measure requires the use of NADP 2 with thrust cutback at 1,500 feet. The Applicant has provided details in response to the Direction to Provide Information to indicate the performance of the NADP in place at Dublin Airport[71].
NA-04	**Visual Approach** This measure is made by two parts: • Jet aircraft on visual approach must start the final approach procedures prior to reaching a distance from touchdown not lower than six nautical miles. • Jet aircraft on visual approach must follow a descend path higher or equal than the ILS approach path.

71 Dublin Airport North Runway Relevant Action Application, Draft – Initial Response to ANCA Request for Further Information, June 2021, Appendix J and RFI 118 Response

Reference	Description
NA-05	**Continuous Decent Approach (CDA)** CDA is a procedure in which an aircraft descends from an optimal position with minimum thrust and avoids inefficient segments of level flight and keeps the aircraft as high as possible for as long as possible. This procedure is currently in place at Dublin Airport and aims to reduce the noise on the ground. The Applicant has confirmed that the current procedure is managed by the IAA in their role as the Air Navigation Service Provider (ANSP). Details of the CDA procedure were provided by the Applicant in response to the Direction to Provide Information[72].
NA-06	**Continuous Climb Operations (CCO)** CCO is a procedure designed to avoid inefficient segments of level flight during the climb profile reducing the noise experienced on the ground and fuel consumption. The Applicant has confirmed that the airspace designs at Dublin Airport facilitate this with the support of Air Traffic Control (ATC). Details of the CCO procedure were provided by the Applicant in response to the Direction to Provide Information[73].
NA-07	**Reverse Thrust** To reduce the night time noise impact, reverse thrust procedure must not be used at night, unless required for safety reasons. Reverse thrust is a temporary diversion of an aircraft engine's thrust used to help the deceleration of aircraft on landing. This noise abatement procedure is reported within the AIP[74].
NA-08	**Engine Ground Running** In order to reduce noise impact during the most noise sensitive hours, any engine tests are not allowed to be undertaken between 20:00 and 07:00. Only aircraft smaller than aircraft Code C are allowed to perform engine tests between 07:00 and 09:00. The rest of the aircraft types are allowed to perform tests only after 09:00. The AIP sets out specific locations and operational hours for aircraft engine test runs. Permission for all such tests need to be obtained from Dublin Airport[75].

The Applicant has noted that all noise abatement operating procedures in place at Dublin Airport are subject to monitoring and reporting. ANCA as the Competent Authority is responsible for monitoring compliance with noise mitigation measures and operating restrictions, and the introduction of operating restrictions at Dublin Airport.

NA-01 to NA-08 relate to measures currently in place at Dublin Airport in its current form as a two-runway system. With the commencement of north runway operations, the current two-runway preference (NA-01) and associated noise preferential routes (NA-02) will be replaced by the three-runway operating preference described in Condition 3 of the North Runway Planning Permission with associated NPRs coming into place. As such, abatement measures NA-01 and NA-02 will be replaced with NA-09 and NA-10 as described in Table 7.10 below.

72 Dublin Airport North Runway Relevant Action Application, Draft – Initial Response to ANCA Request for Further Information, June 2021, Appendix I and RFI 119 Response

73 Dublin Airport North Runway Relevant Action Application, Draft – Initial Response to ANCA Request for Further Information, June 2021, RFI 125 Response

74 Aeronautical Information Publication, EIDW AD 2-1, EIDW AD 2.21 NOISE ABATEMENT PROCEDURES, Paragraph 7

75 Aeronautical Information Publication, EIDW AD 2-1, EIDW AD 2.20 LOCAL TRAFFIC REGULATIONS, Paragraph 5

Table 7.10: Current inventory of noise abatement operating procedures (three-runway system)

Reference	Description
NA-09	**Three-Runway Preferential Runway Programme** The aim of the measure is to use the runways in order to allow aircraft to avoid noise-sensitive areas during the phases of take-off and landing. During the daytime-period 06:00-23:59, preferable runways are selected based on wind directions and type of operation: • Westerly wind direction: RWY 28L for arrival and RWY 28L or 28R for departure operations. • Easterly wind direction: RWY 10L or 10R for arrival and RWY 10R for departure operations. During the night time (00:00-05:59) the north runway (10L-28R) must be avoided for any operations. The procedures above are subject to operational condition and safety reasons.
NA-10	**3-Runway Noise Preferential Routes (NPRs) or Environmental Noise Corridors and Track Keeping** The aim of the measure is to reduce impact by directing aircraft along paths which are designed to avoid built-up areas. These paths are called Noise Preferential Routes (NPRs). All Aircraft taking off from Dublin Airport are required to follow specific NPRs. Once an aircraft reaches the end of the NPR, or at an altitude of 3,000 feet, IAA-ATC will turn it onto a more direct heading to its destination.

7.3.1.3 Land Use Planning

The Applicant has identified five land use planning and management measures currently in place at Dublin Airport. These measures have been confirmed by ANCA and are set out in Table 7.11 below.

Table 7.11: Current inventory of land use planning and management measures (two runway system)

Reference	Description
LU-01	**Land Use Compatibility Management Framework** A noise zoning system has been developed and included in the Fingal County Council's (FCC's) County Development Plan 2017–2023 (Variation No. 1) and the Dublin Airport 2020 Local Area Plan (LAP). The goal of the zoning system is to ensure that land use is compatible with airport operations preventing, also, noise and safety concerns for surrounding communities. For Dublin Airport, the zones are based on potential noise exposure levels ($L_{Aeq,16hr}$ and L_{night} levels) due to Dublin Airport using either the new north or existing south runway.
LU-02	**Land Use Compatibility Management Review** The Applicant has stated in its inventory that Dublin Airport constantly reviews land-use policies in relation to aircraft noise related to the Dublin Airport activities[76]. ANCA has no reasons to challenge that the Applicant does not undertake such reviews as they relate to Dublin Airport.
LU-03	**Encroachment Management** The Applicant states that it monitors noise encroachment associated with Dublin Airport to ensure airport noise policy is appropriately informed through land-use planning frameworks[77]. The NAP also includes Action 4 which is to *"Monitor noise encroachment associated with Dublin Airport to ensure that airport noise policy is appropriately informed through land use planning frameworks in so far as they relate to Dublin Airport."*. The main KPI for this action is an Encroachment Analysis Report which is to be produced from 2019 onwards.

76 Ricondo, Dublin Airport North Runway 598/2014 (Aircraft Noise Regulation) Forecast Without New Measures and Additional Measures Assessment Report, Revision 1 – July 2021, Table 2-1

77 Ricondo, Dublin Airport North Runway 598/2014 (Aircraft Noise Regulation) Forecast Without New Measures and Additional Measures Assessment Report, Revision 1 – July 2021, Table 2-1

Reference	Description
LU-04	**Sound Insulation (HSIP)** This is a voluntary sound insulation scheme that has been offered to households located within the 2016 63 dB $L_{Aeq,16hr}$ noise contour. ANCA has already undertaken a review of this scheme to confirm eligibility. The extents of this scheme are presented in Appendix H along with details of the scheme itself.
LU-05	**Voluntary Dwelling Purchase Scheme** A Voluntary Purchase Scheme has been offered to households located within the predicted 69 dB $L_{Aeq,16hr}$ noise contour. Offers to purchase will include a 30% premium on the current market value of the residence, which will be evaluated based on the current activities at Dublin Airport, therefore, it will not be affected by the introduction of the new runway. The scheme will remain in effect until 2025. The extents of this scheme are presented in Appendix H along with details of the scheme itself.

With the commencement of north runway operations, the land use planning and management procedures currently in place at Dublin Airport will be expanded with three more procedures, which are set out in Table 7.12 below.

Table 7.12: Current inventory of land use planning and management measures (three runway system)

Reference	Description
LU-05	**Residential Noise Insulation Scheme (RNIS)** A Voluntary sound insulation scheme will be offered to households located within the 2022 63 dB $L_{Aeq,16hr}$ noise contour. Eligible properties must be completed before the new runway will be operational. This scheme is a requirement of Condition 7 of the North Runway Planning Permission. Condition 7 states that: *"Prior to commencement of development, a scheme for the voluntary noise insulation of existing dwellings shall be submitted to and agreed in writing by the planning authority. The scheme shall include all dwellings predicted to fall within the contour of 63 dB $L_{Aeq16\ hrs}$ within 12 months of the planned opening of the runway for use. The scheme shall include for a review every two years of the dwellings eligible for insulation."* The RNIS scheme was approved by FCC in 2016. Details of the scheme are available in Appendix H.
LU-06	**Schools Sound Insulation Scheme** A voluntary sound insulation scheme is available for all schools and registered pre-schools located within the predicted 60 dB $L_{Aeq,16hr}$ noise contour. This insulation is designed to grant that maximum noise levels within the school buildings shall not exceed 45 dB $L_{Aeq,8hr}$ where the 8-hour period relates to a "typical school day". This scheme is a requirement of Condition 6 of the North Runway Planning Permission which states: *"Prior to commencement of development, a scheme for the voluntary noise insulation of schools shall be submitted to and agreed in writing by the planning authority (in consultation with the Department of Education and Science). The scheme shall include all schools and registered pre-schools predicted to fall within the contour of 60 dB $L_{Aeq\ 16hr}$ within twelve months of the planned opening of the runway to use and, in any event, shall include Saint Margaret's School, Portmarnock Community School, Saint Nicholas of Myra, River Meade and Malahide Road schools. The scheme shall be designed and provided so as to ensure that maximum noise limits within the classrooms and school buildings generally shall not exceed 45 dB $L_{Aeq\ 8\ hr}$ (a typical school day). A system monitoring the effectiveness of the operation of the scheme for each school shall be agreed with the planning authority and the results of such monitoring shall be made available to the public by the planning authority."*

7.3.1.4 Operating Restrictions

At present, with Dublin Airport operating as a two-runway system and prior to the commencement of north runway operations, there are no operating restrictions in place at Dublin Airport limiting the hours or numbers of aircraft that can take off or land. However, with the commencement of north runway operations, two such operating restrictions will come into effect as set out in Table 7.13. The origin of these conditions was considered as part of ANCA's noise problem declaration which is provided in Appendix C.

Table 7.13: Current inventory of (OR) (three-runway System)

Reference	Description
OR-01	**Night time restriction on north runway use (Condition 3(d) North Runway Planning Permission)** This restriction prohibits the use of the north runway during the hours of 23:00-07:00. This means that during the night time Dublin Airport is allowed to use only its south runway and crosswind runway when conditions dictate.
OR-02	**Night time (Condition 5 North Runway Consent)** This condition sets an aircraft movement restriction of 65 per 8-hour night. Condition 5 states: *"On completion of construction of the runway hereby permitted, the average number of night time aircraft movements at the airport shall not exceed 65/night (between 2300 hours and 0700 hours) when measured over the 92 day modelling period as set out in the reply to the Direction to Provide Information received by An Bord Pleanála on the 5th day of March, 2007."* This condition applies to Dublin Airport as a whole and not just the north runway.

7.4 Description of the NAO and Aspects of the Identified Noise Problem

The NAO for Dublin Airport policy objective is:

"Limit and reduce the long-term adverse effects of aircraft noise on health and quality of life, particularly at night, as part of the sustainable development of Dublin Airport."

The measures and outcomes that the NAO intends to achieve are key to the assessment undertaken by ANCA in this chapter. The NAO describes primary measurable criteria which relate to the number of people HSD and HA using the methodology described in Directive 2002/49/EC (as amended by Directive 2020/367), which is based on the WHO Environmental Noise Guidelines 2018. The NAO requires that these measures are calculated from 45 dB L_{den} and 40 dB L_{night} which reflect the WHO recommendations.

Priorities are also set by the NAO. These relate to levels of noise exposure where populations may experience harmful effects. These are:

- 55 dB L_{night} (a level of night time noise exposure described by the WHO as representing a clear risk to health)
- 65 dB L_{den} (where a large proportion of those living around Dublin Airport can be considered HA)

The NAO requires aircraft noise to be modelled in accordance with Directive 2015/996 having regard for local noise and track keeping performance.

Under the NAO, noise exposure should be reduced compared to the situation in 2019 so that:

- *The number of people highly sleep disturbed and highly annoyed in 2030 shall reduce by 30% compared to 2019.*
- *The number of people highly sleep disturbed and highly annoyed in 2035 shall reduce by 40% compared to 2019.*
- *The number of people highly sleep disturbed and highly annoyed in 2040 shall reduce by 50% compared to 2019.*
- *The number of people exposed to aircraft noise above 55 dB L_{night} and 65 dB L_{den} shall be reduced compared to 2019.*

This assessment undertaken in section has regard for these outcomes.

ANCA determined a noise problem based on the Application and provided the following three aspects for this:

Aspect 1: The Application proposes an increase in aircraft activity at night, when referenced against the situation that would otherwise pertain, which may result in higher levels of human exposure to aircraft noise.

Aspect 2: The Application proposes a situation where some people will experience elevated levels of night time noise exposure for the first time which may be considered harmful to human health.

Aspect 3: The EIAR accompanying the Application indicates that the proposed relevant action will give rise to significant adverse night time noise effects. This indicates that the noise effects of the Proposed Development are a material consideration. Mitigation in the form of a night time noise insulation scheme is proposed by the Application. The provision of such mitigation is an indicator that the Proposed Development may give rise to a Noise Problem.

7.5 Forecast Without New Measures

Under the Balanced Approach and in line with the Aircraft Noise Regulation, a Forecast Without New Measures must be prepared[78]. This represents a scenario where there are no noise-related operating restrictions in place.

In the context of the Application, the Forecast Without New Measures requires consideration of airport operations during the night where Dublin Airport is unconstrained with respect to its ability to deliver its forecast flight schedules and how it uses its runways. This approach was taken by the Applicant in its own assessments[79] and ANCA agrees with this approach.

The Application seeks to amend OR-01 and OR-02 and as such a Forecast Without New Measures is required to understand the consequences of removing these restrictions altogether.

Without new measures and without OR-01 and OR-02, Dublin Airport would be able to utilise its runways in an operationally efficient manner and would be capable of operating an unconstrained flight schedule. The Applicant's approach to considering a Forecast Without New Measures has been to make the following assumptions:

- There are no operating restrictions limiting the number and type of aircraft which can take off or depart during the night.
- That the use of Dublin Airport's main runways at night would be conducted in a manner which allows for an efficient operation. For the purposes of assessment, this has been modelled by the Applicant so that:
  - o Departures modelled as using the north or south runway depending on destination.
  - o Arrivals have been modelled assuming a 50/50 split between runways unless runway capacity exceeded.

78 Annex I Regulation 598

79 Ricondo, Dublin Airport North Runway Regulation 598/2014 (Aircraft Noise Regulation) Forecast Without New Measures and Additional Measures Assessment Report (Revision 2 – September 2021), September 2021, Section 2

Figure 7.6 presents a comparison against the change in population HA and HSD in 2025 with and without population growth with Dublin Airport operating at 32 mppa. The figure shows that compared to 2019, a reduction in the population HA and HSD can be achieved without new measures.

With reference to the modelled forecasts and scenarios presented in this section and as outlined in Appendix E, the Forecast Without New Measures is described as Scenario P06.

Figure 7.7 presents Forecasts Without New Measures extending to 2030, 2035 and 2040 with and without population growth and with Dublin Airport operating at 32 mmpa. This shows that under the Applicant supplied forecast circumstances, the population HA and HSD would continue to reduce over the period to 2040 and that it may be possible for Dublin Airport to meet a 30%, 40% and 50% reduction in HA and HSD over this period.

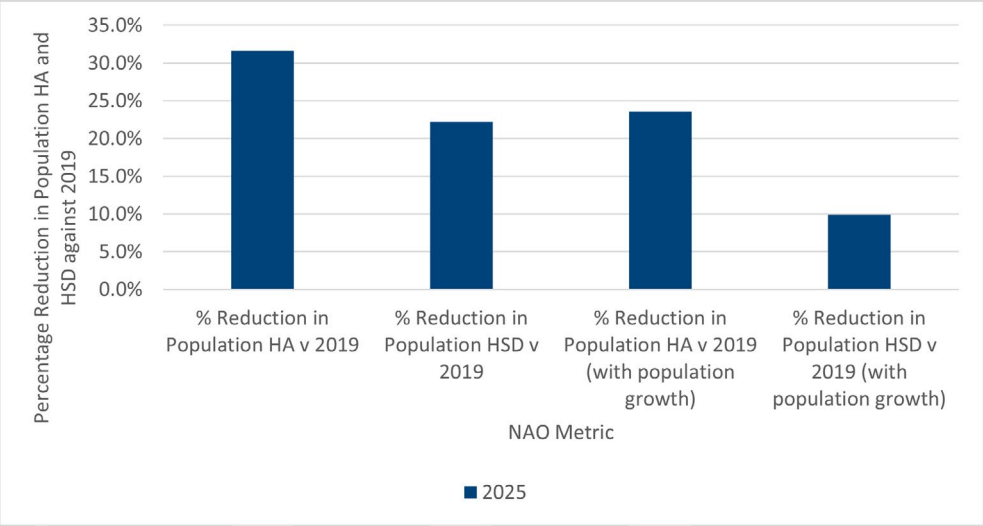


Figure 7.6: Percentage reduction in population HA and HSD in 2025 compared to 2019 for the forecast without new measures with and without population growth with Dublin Airport operating at 32 mppa

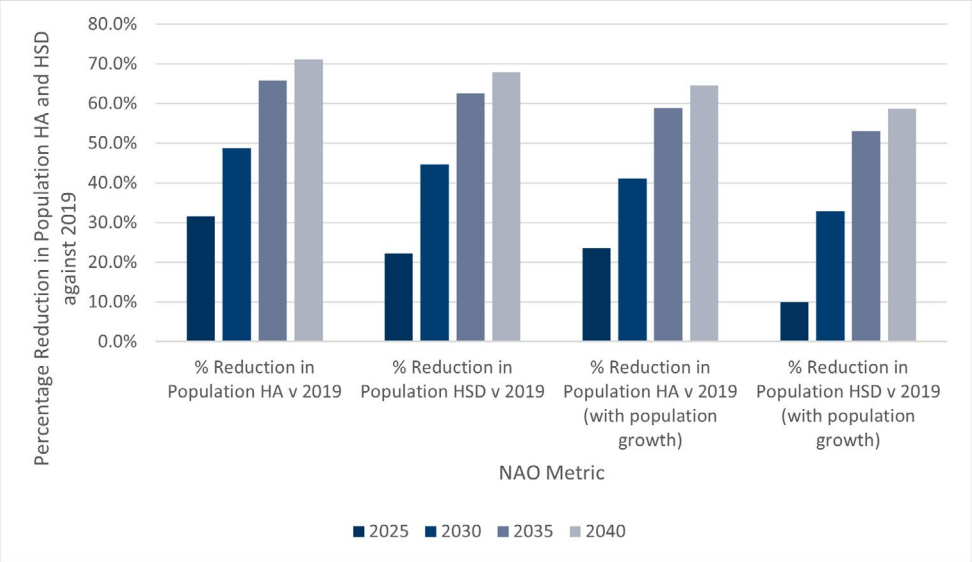


Figure 7.7: Percentage reduction in population HA and HSD in 2025, 2030, 2035 and 2040 compared to 2019 for the forecast without new measures and without population growth with Dublin Airport operating at 32mppa

When considering priorities, Figure 7.8 presents the population forecast to be exposed to levels of aircraft noise above 65 dB L_{den} and 55 dB L_{night}. This shows that with the terminal passenger capacity limit in place and assuming population growth, the number of people exposed to aircraft noise above the priorities values is forecast to reduce compared to 2019.

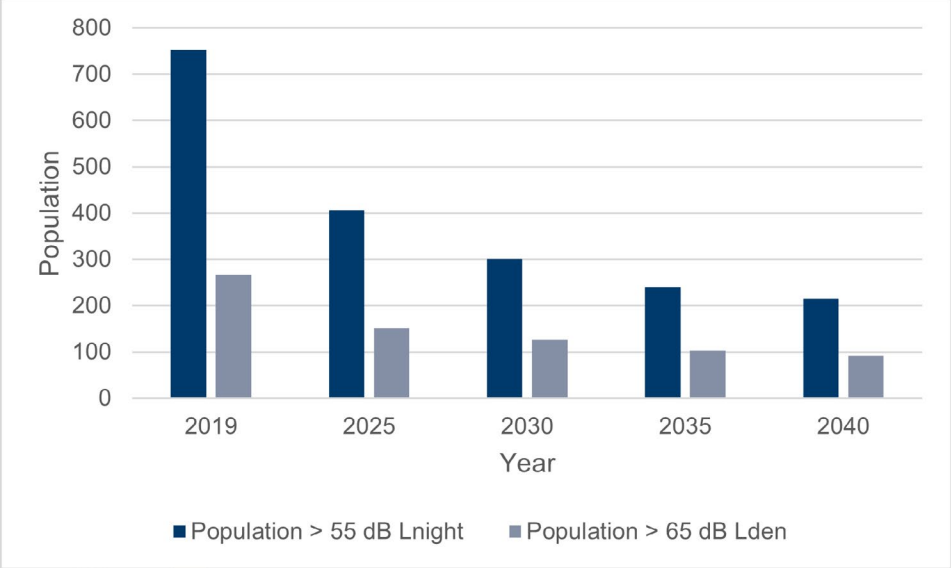


Figure 7.8: Population exposure to aircraft noise levels above 65 dB L_{den} and 55 dB L_{night} in 2025, 2030, 2035 and 2040 without new measures compared to 2019. Forecast for 2025 – 2040 include population growth

Whilst the Forecast Without New Measures may in certain circumstances meet the requirements of the NAO, it does not provide any certainty as to how and which areas around Dublin Airport will be affected by aircraft noise. It also does not reflect the Application which seeks to replace and amend Condition 5 and Condition 3(d) respectively. By removing Condition 5, there would be no operational limit on night time noise which is counter to the policy objective of the NAO.

7.6 Application of the Balanced Approach

7.6.1 Background

The Application relates to a relevant action to amend Conditions 3(d) and 5 of the North Runway Planning Permission, as denoted OR-01 and OR-02 in the current inventory.

The process and application of the Balanced Approach therefore requires that measures which fall under each element i.e., the Reduction of Noise at Source, Noise Abatement Operating Procedures and Land Use Planning and Management, be used to achieve the noise abatement objective in preference to operating restrictions. As the Application relates to a relevant action to amend two existing ORs it is incumbent upon ANCA to ensure that the Balanced Approach has been applied.

This has been undertaken as follows:

Table 7.14: Application of the Balanced Approach

Stage	Approach
1	**Prepare List of Available Mitigation Measures** This restriction prohibits the use of the north runway during the hours of 23:00-07:00. This means that during the night time Dublin Airport is allowed to use only its south runway and crosswind runway when conditions dictate.
2	**Review Available Measures and Undertake Analysis** For each of the measures identified, ANCA has had regard for whether such measures are already in place as part of the current inventory, the measures which have been proposed by the Applicant and the feasibility of considering alternative measures. This is discussed for each element of the Balanced Approach discussed in this report. This has entailed a review of the information provided by the Applicant and has considered the roles and responsibilities associated with developing and implementing each measure under the following headings: • Measures which reduce noise at source. • Noise abatement operating procedures. • Land use planning and management measures. • Operating restrictions. Where a measure is considered feasible and important in the context of this relevant action, it has been taken forward for further analysis and cost-effectiveness assessment.
3	**Identify Cost-Effectiveness of Measures** For each of the measures taken forward, a cost-effectiveness assessment (CEA) has been undertaken. This is a requirement of the Aircraft Noise Regulation and is used to inform decision making.

7.6.2 Reduction of Noise at Source

7.6.2.1 List of Available Measures

ICAO guidance states that in relation to reduction of noise at source, consideration should be given to:

- Integration into aircraft fleets, over time, of technology improvements meeting the latest standards.
- Specific fleet modernization plans of airlines operating at an airport.
- National plans to adopt the latest noise standard.
- Adoption by Contracting States of the latest ICAO noise recommendations.

As such, any measures available to reduce noise at source need to have regard for whether they facilitate, encourage, or incentivise a greater proportion of aircraft meeting the latest noise standards to operate at Dublin Airport.

The Applicant has indicated that it is developing an Environmental Charging Proposal in response to Actions 1 and 2 of Dublin Airport's NAP. The Applicant has stated that:

"There are currently no plans to phase out aircraft based on their noise certification." and that it "wishes to introduce noise charges as the first step an assess the impact of this measure before moving to an operating restriction such as phasing out of aircraft."[80].

80 Dublin Airport North Runway Relevant Action Application, Draft – Initial Response to ANCA Request for Further Information, June 2021, Response to RFI 123

No detail has been provided on the Environmental Charging Proposal however the Applicant has indicated as part of its own cost-effectiveness analysis that a management measure addressing Actions 1 and 2 of the NAP would be in place in 2025[81]. It is therefore assumed that the Environmental Charging Proposal would be in place by 2025 and would help encourage and incentivise airlines to utilise aircraft conforming to the latest noise standards at Dublin Airport.

ANCA has undertaken an analysis of the fleet mix for the forecast relied upon by the Applicant for its assessment of relevant action in 2025 and more broadly. This work is presented in Appendix G and summarised for 2025 with respect to the aircraft noise generations below. A comparison is made considering the situation in 2025 should relevant action not occur. Comparisons to 2019 are also provided for context.

Table 7.15: Comparison of forecast ATMs by period between the situation in 2019, the 2025 situation and the 2025 forecast with new measures

	2019 Situation	2025 Situation	2025 with New Measures	Forecast Change in 2025 (2019)
	32.9 mppa	30.4 mppa	32.0 mppa	
Annual Day	167,931	163,653	163,003	-650 (-4,928)
Annual Evening	40,751	43,598	40,995	-2,603 (+244)
Annual Night	29,320	19,521	31,885	12,364 (+2,565)
Annual 24-hour	238,002	22,6772	235,882	9,110 (-2,120)
Summer Day (16hr)	58,163	57,432	56,530	-902 (-1,633)
Summer Night (8hr)	9,445	5,410	8,836	3,426 (-609)
Summer (24hr)	67,608	62,842	65,366	2,524 (-2,242)

Table 7.16: Comparison of the fleet mix between the situation in 2019, the 2025 situation and the 2025 forecast with new measures

Generation	Annual Day	Annual Eve	Annual Night	Annual 24hr	Summer Day	Summer Night
2019 Situation						
G0	96.6%	99.3%	95.1%	96.9%	96.3%	96.2%
G1	3.4%	0.7%	4.9%	3.1%	3.7%	3.8%
2025 Situation						
G0	75.9%	79.1%	85.0%	77.3%	76.6%	85.0%
G1	24.1%	20.9%	15.0%	22.7%	23.4%	15.0%
2025 with new measures						
G0	77.0%	78.6%	83.7%	78.2%	77.4%	83.7%
G1	23.0%	21.4%	16.3%	21.8%	22.6%	16.3%

81 Response to RFI 77, Noise measures – existing, planned new

Table 7.15 shows that with relevant action in 2025 the Applicant is forecasting an increase in aircraft movements with most of this occurring during the night time period. This is a consequence of revoking and replacing Condition 5. With reference to aircraft movements in 2019, the relevant action is forecast to result in more aircraft movements at night over the calendar year but fewer in the summer months. The fleet mix comparisons presented indicate that in 2025 the proportion of G1 aircraft operating is forecast to increase substantially against 2019. At night, the 2025 forecasts indicate that although relevant action would increase the number of night time movements, the mix would include more G1 aircraft.

It is ANCA's view that any schemes which seek to encourage airlines to operate modern, quieter, and cleaner aircraft is good practice and that such measures should be introduced irrespective of the relevant action being sought under this Application and any restrictions which ANCA recommends in this regard.

ANCA is however conscious that aircraft noise performance and fleet mix is a key measure of reducing noise at source under the Balanced Approach. As such, any decision made by ANCA under this Application will require the reporting of information to help monitor fleet mix.

7.6.3 Noise Abatement Operating Procedures

7.6.3.1 List of Available Measures and Feasibility

The following tables present an overview of noise abatement operating procedures as they may be available to Dublin Airport. For each measure, the applicant's position and proposals are presented alongside ANCA's assessment.

Noise Preferential Routes	
Measure Part of Current Inventory	Yes
Responsibility for Measure	Irish Aviation Authority (IAA)
Applicant's Position and Proposals	
The design of the airspace will play a significant role in which locations are overflown and are affected by aircraft noise. How the airspace is used and by which aircraft will also affect the level and pattern of noise around Dublin Airport. To service the north runway with Dublin Airport operating as a three-runway system, the IAA have prepared an associated airspace design. This design allows the north runway to be used during the day which is allowed under the North Runway Consent and has included a set of Noise Preferential Routes. Through further information, the Applicant has confirmed that the airspace design and its associated NPRs have been developed to accommodate any preferential runway use at whatever time i.e., day and / or night. The airspace design has been the subject of consultation with main airport and community stakeholders in 2016 and 2017. The Applicant has also noted that the airspace design was also the subject of safety assessment by the IAA in 2018 and 2019[82].	
ANCA's Review and Opinion	
It is the role of the IAA to design and operate the airspace at Dublin Airport. This is separate from the planning process. The north runway flight paths have been the subject of stakeholder engagement and safety assessment work[83]. Within the context of the Application, it is not considered feasible or within ANCA's competency to promote alternative airspace designs which relate to night time operations or to reconsider a re-design of the airspace for Dublin Airport as a three-runway system. ANCA's experts have indicated that should the airspace be re-designed then this could take a minimum of four years to design, test, consult and implement. ANCA therefore is of the view that it is not feasible to consider alternative airspace designs within the context of this relevant action and as such the airspace design for Dublin Airport as a three-runway system as captured by measure NA-09 and NA-10 of the current inventory does not require further analysis. However, given the influence and significance of the airspace design on noise exposure around Dublin Airport, ANCA considers it necessary for the operation of the airspace to be subject to monitoring.	

82 Dublin Airport North Runway Relevant Action Application, Draft – Initial Response to ANCA Request for Further Information, June 2021 - Response to 115

83 Dublin Airport, North Runway Report, Consultation on Flight Paths and Change to Permitted Operations, February 2017 (available here: https://www.dublinairport.com/docs/default-source/north-runway-downloads/public-consultation-report--flight-paths-and-change- to-permitted-operations.pdf?sfvrsn=b06d628_2)

Route Alternation	
Measure Part of Current Inventory	No
Responsibility for Measure	IAA
Applicant's Position and Proposals	
The Applicant has not brought forward route alternation as a mitigation measure as part this Application. The justification for this is on the basis that this would require the airspace to be redesigned by the IAA to facilitate such a measure.	
ANCA's Review and Opinion	
ANCA accepts that route alternation would require a different airspace design to those prepared by the IAA for the three-runway system. As outlined in our consideration of noise preferential routes, the designs which have been relied on by the Applicant as part of their assessment work were originally the subject of consultation in 2016 and 2017 and have since been developed by the IAA and subject to safety assessment[84]. Any alternative designs including route alternation would also need to be the subject of consultation and further design work which, given the opening of the north runway and the operation of Dublin Airport as a three-runway system is scheduled for 2022 alongside the implementation of the relevant action if approved, is unfeasible. As such, this measure has not been considered further as part of this relevant action and is therefore not progressed for further assessment.	

Use / Mandate of Noise Abatement Departure Procedures (NADP) and / or Thrust Managed Climb	
Measure Part of Current Inventory	Yes
Responsibility for Measure	Airlines IAA The Applicant
Applicant's Position and Proposals	
The Applicant has indicated that the current departure procedures at Dublin Airport are based on the NADP2[85] procedure. The noise forecasts provided with the application and in response to the Direction to Provide Information are also based on this departure procedure. The choice of NADP will affect the distribution of noise under departure flight paths. This may have an influence on whether certain communities, populations or locations are exposed to different levels of aircraft noise under departure routes. ANCA requested that the Applicant provide evidence to confirm that environmentally, NADP2 is the optimum departure procedure for Dublin Airport[86]. Minutes from a meeting between the Applicant, airlines and the IAA indicate that the current procedure being operated is currently not compliant either NADP1 or NADP2 but is *"somewhere in between"*[87]. This procedure is currently described within Dublin Aiport's AIP[88]. The minutes provided by the Applicant confirm that Ryanair and Aer Lingus express a preference for NADP2. The Applicant has advised in response to FI requests that the current NADP procedure is under review.	

84 Dublin Airport North Runway Relevant Action Application, Draft – Initial Response to ANCA Request for Further Information, June 2021 - Response to 115

85 Reporting Template available on ANCA Website

86 Further Information Request 117

87 Dublin Airport North Runway Relevant Action Application, Draft – Initial Response to ANCA Request for Further Information, June 2021 – Appendix

88 Aeronautical Information Publication, EIDW AD 2-1, EIDW AD 2.21 NOISE ABATEMENT PROCEDURES

Use / Mandate of Noise Abatement Departure Procedures (NADP) and / or Thrust Managed Climb
ANCA's Review and Opinion
SEL and L_{Asmax} footprints of an Airbus A320 and Airbus 330-300 departing the main north and south runways using the current NADP, and NADP1 and NADP2 have been provided by the Applicant[89]. These indicate that NADP1 has the potential to slightly reduce noise impacts closer to Dublin Airport but at the expense of resulting slightly higher noise levels further away. This information does not conclusively demonstrate which NADP is optimal for Dublin Airport but does provide sufficient evidence that the selection of the procedure is likely to influence noise exposure levels but in a marginal way. This does not change the relative performance of the scenarios considered by the Applicant with respect to the primary measures of the NAO. It is ANCA's view that the differences due to selecting these procedures is marginal compared to the other measures available and considered by the Applicant, namely preferential runway use and noise insulation. Whilst insufficient evidence has been provided for ANCA to identify which NADP should be recommended, the Applicant has demonstrated that work is ongoing with respect to the selection of a NADP. ANCA considers it appropriate that the work underpinning the selection of the departure procedures is reported in line with Actions 5 and 6 of the NAP

Continuous Climb Operations (CCO)	
Measure Part of Current Inventory	Yes
Responsibility for Measure	Airlines IAA
Applicant's Position and Proposals	
The Applicant has indicated that Continuous Climb Operations are already in place at Dublin Airport and would be operated in the future with or without relevant action[90]. The Applicant has confirmed that the Instrument Flight Procedures (IFPs) contain minimum altitude constraints which enable CCO operations to take place. Although CCO is not a formal procedure, the Applicant states that ATC Officer training contains guidance to permit continuous climb departures. The Applicant claims that CCO routinely occurs with over 99% achieved.	
ANCA's Review and Opinion	
The Applicant has indicated that CCO occurs, however no evidence has been provided to confirm this. There is currently no formal definition of CCO and in the case of Dublin Airport there is no apparent or stated altitude to which any CCO would occur too. However, ANCA's experts have reviewed the airspace arrangements at Dublin Airport and have confirmed that all SIDs from all existing runways climb straight to at least FL90 for CAT C/D aircraft. The SIDs for Cat A/B aircraft do not do this and stop at 4000ft. As such, it is considered on balance that the vast majority of departures at Dublin Airport will be operating CCO to FL90. On this basis ANCA has concluded that CCO is already in place at Dublin Airport and as such there is no requirement to investigate the introduction of this measure as it is already in place.	

89 Dublin Airport North Runway Relevant Action Application, Draft – Initial Response to ANCA Request for Further Information, June 2021 – Appendix J

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Continuous Decent Approaches (CDA)	
Measure Part of Current Inventory	Yes
Responsibility for Measure	Airlines IAA The Applicant

Applicant's Position and Proposals

The Applicant has confirmed that Continuous Decent Approaches (CDA) are currently in operation at Dublin Airport and have been incorporated into the airspace designs associated with the three-runway system[91]. The CDA at Dublin Airport commences at 7,000 or 8,000 ft depending upon demand. In line with the standard definition of CDA[92], a compliant approach is one where an aircraft flies no more than one level segment on approach. For a CDA to be considered compliant, additional rules such as the maximum length of a level segment and the minimum height at which this occurs may also apply.

The Applicant has provided information in response to the Direction to Provide Information which includes an indication of progress with respect to the monitoring of CDA at Dublin Airport. This response indicates that Dublin Airport is currently in the process of reviewing and validating criteria to facilitate CDA monitoring and that this has been implemented in line with international best practice into ANOMS. The response confirms that a trial period for this implementation will occur in Q2 and Q3 2021. The response states that:

"The ANOMS system will process all arrival operations for the airport against the proposed CDA rules detailed above to determine if a CDA has occurred. Details will be stored within the ANOMS database, from where the relevant metrics and reports can be generated to advise aviation stakeholder engagement following the trial period completion. Agreed rules will only be applied to ANOMS following this stakeholder engagement for all current operational runway approaches and North Runway"

ANCA's Review and Opinion

ANCA is satisfied that CDA is in place at Dublin Airport and is part of the airspace designs for the three-runway system. However, Dublin Airport's AIP does not declare any requirement for operators to perform a CDA although there is an overarching European requirement for CDA. CDA itself is an important noise mitigation measure. Airports which monitor CDA will often set associated key performance metrics and targets to monitor adherence. Given this best practice and given that Dublin Airport is working towards setting up its NTK systems to monitor CDA adherence, ANCA is of the view that a monitoring requirement is necessary to encourage good noise management at Dublin Airport and would therefore encourage the Applicant to routinely report CDA adherence.

91 Dublin Airport North Runway Relevant Action Application, Draft – Initial Response to ANCA Request for Further Information, June 2021 – Response to Request 110, 119 and Appendix I

92 ICAO CDO Manual Doc 9931 (para 1.1.1.1) states that "Continuous Decent Operations is an aircraft operating technique aided by appropriate airspace and procedure design and appropriate ATC clearances enabling the execution of a flight profile optimised to the operating capability of the aircraft, with low engine thrust settings and, where possible, a low drag configuration, thereby reducing fuel burn and emissions during descent. The optimum vertical profile takes the form of a continuously descending path, with a minimum of level flight segments only as needed to decelerate and configure the aircraft or to establish on a landing guidance system)

Steeper / Segmented Approach Procedures / GBAS	
Measure Part of Current Inventory	No
Responsibility for Measure	Airlines IAA The Applicant

Applicant's Position and Proposals

The Applicant originally ruled out the use of steeper approaches and / or segmented approaches as the "*need for additional detailed assessments related to feasibility and the anticipated low level of benefit*"[93]. In response to the Direction to Provide Information, the Applicant has cited ICAO Annex 10 (7th edition 2018) which recommends that the Instrument Landing System (ILS) glide path angle should be 3.0˚. This document also states that glide path angles exceeding 3.0˚ should not be used except where alternative means of satisfying obstruction clearance requirements are impracticable. The Applicant states that for this reason a steeper approach was not considered further. The Applicant has not considered segmented approach procedures or the use of GBAS.

ANCA's Review and Opinion

ANCA accepts ICAO's recommendation that glide slopes shall not exceed 3.0˚ except in the case of satisfying obstruction clearance requirements. Increasing the glide slopes beyond 3.0˚ could entail a significant amount of work and may require Dublin Airport to introduce additional ILS or GLS equipment.

However, there is an international trend of moving towards slightly steeper approach procedures for noise management purposes. Recently Heathrow Airport proved that 3.2˚ approaches are safe, however this was for PBN approaches in CAT I conditions, and not using the ILS. As such this limits the total number of operations which can use them. In addition, Heathrow's Landing Distance Available (LDA) ranges from 3350m – 3882m. Likewise, Frankfurt Airport who have a 3.2˚ ILS on their northern runway also have a 3.0˚ ILS and their LDA on that runway is 2800m. Dublin's LDA is currently 2637m for its south runway.

When taking this into account the feasibility and cost of introducing an alternative approach procedure at Dublin Airport makes this measure difficult to justify. The potential noise improvements from such a measure are also likely to be very limited.

ANCA is of the view that the influence of this measure in reducing noise in line with the requirements of the NAO is likely to be minimal compared to the other measures that are available under this relevant action. Given it is the view of ANCA's experts that the introduction of slightly steeper approaches would be difficult to justify, this measure is not considered feasible for further consideration as part of this relevant action.

93 Dublin Airport North Runway Regulation 598/2014 (Aircraft Noise Regulation) Forecast Without New Measures and Additional Measures Assessment Report, Table 3-1

Automated (RNAV) Procedures / Performance Based Navigation (PBN)	
Measure Part of Current Inventory	Yes
Responsibility for Measure	Airlines IAA

Applicant's Position and Proposals

The Applicant has confirmed in response to the Direction to Provide Information that the existing and future instrument flight procedures (IFPs) are all designed in accordance with ICAO (Doc 8168 Vol II) and are performance-based navigation (PBN) compliant with a navigation accuracy of RNAV-1 (in accordance with ICAO Doc 9613)[94].

The noise modelling which supports the Applicant's assessment has made assumptions with respect to the dispersion of aircraft around the nominal departure routes[95]. This dispersion will be affected by how aircraft are navigating their routes. This modelling has assumed the same patterns of dispersion as part of its three-runway airspace designs as occurred in 2016 and was reviewed again 2018.

The Applicant's original cost-effectiveness analysis states that arrival and departure procedures and associated IFPs are the responsibility of the IAA and that *"far-reaching changes to existing RNAV SIDs and STARs were not considered at this stage"*[96]. It also indicates that there is foreseeable increased use of RNAV with increased improvement in aircraft avionics and as part of the European Airspace Modernisation Programme.

ANCA's Review and Opinion

It is unclear from the information provided by the Applicant the degree to which increased use of RNAV procedures will change aircraft dispersion patterns around Dublin Airport. Based on the information provided by the Applicant, this has not been considered. Nevertheless, the arrival and departure routes at Dublin Airport are RNAV compliant and as such would facilitate the better use of Dublin Airport's NPRs.

ANCA agrees with the Applicant's assessment that RNAV procedures are not a noise mitigation measure which requires appraisal as part of the relevant action. However, ANCA is mindful of the potential implications of increased use of PBN as part of adherence to the three-runway system NPRs. For this reason, monitoring the dispersion of aircraft along its arrival and departure routes is considered appropriate and should be captured as part of the noise modelling undertaken by either the Applicant in response to the wider requirement set out in this decision document or as part of its obligations to produce strategic noise maps. This is in keeping with the monitoring aspects of the NAO.

94 Dublin Airport North Runway Relevant Action Application, Draft – Initial Response to ANCA Request for Further Information, June 2021 – Response to Request 112

95 Dublin Airport North Runway Relevant Action Application, Noise Information – ANCA Request, February 2021, Page 83

96 Dublin Airport North Runway, Regulation 598/2014 (Aircraft Noise Regulation) Forecast Without New Measures and Additional Measures Assessment Report (Revision 2 – September 2021), Table 3-1 (2 of 6)

Preferential Runway Use	
Measure Part of Current Inventory	Yes
Responsibility for Measure	The Applicant IAA

Applicant's Position and Proposals

Preferential Runway Use is both an existing noise abatement operating procedure and a procedure which is part of planning conditions set by North Runway Planning Permission.

The Applicant's proposals effectively constitute an amendment to Condition 3(d) of the North Runway Planning Permission which would allow Dublin Airport to make use of the north runway for two hours during the night. When in use, the north runway would be used in line with the existing preferential runway use described under Conditions 3(a)-(c).

The Applicant has provided forecast with new measures which include a series of different night time runway operating preferences which are alternatives to their proposals. These include some scenarios which include restrictions. Additional scenarios have been considered by the Applicant in response to the Direction to Provide Information.

ANCA's Review and Opinion

An amendment to Condition 3(d) of the North Runway Planning Permission will result in a redistribution of night time aircraft noise at Dublin Airport. This redistribution of aircraft noise a result of the relevant action is one aspect of the noise problem identified with the Application.

A significant amount of work has been undertaken by the Applicant to consider the relative performance of different runway use and runway restrictions scenarios at night. Much of this work has been considered alongside a change to Condition 5 and a proposal to replace this operating restriction with an alternative form of restriction, namely a night time quota system.

ANCA agrees that consideration should be given to different runway use patterns as part of identifying measures that either replace or revoke Condition 3(d). In response to the Direction to Provide Information, the Applicant has studied and provided analysis for a series of different approaches to using its runways during the night as part of this relevant action. These are described in Appendix E.

Runway usage measures have therefore been taken forward for further analysis.

Displaced Landing Thresholds	
Measure Part of Current Inventory	Yes
Responsibility for Measure	The Applicant IAA

Applicant's Position and Proposals

Displaced thresholds have the potential to reduce arrival noise levels at locations under arrival flight paths and close to the runway by increasing the height at which they overfly. The north runway already includes displaced thresholds for both runway ends. The Applicant states that

"Further displacement of the landing thresholds is not expected to provide much additional benefit in reducing noise levels." and that *"Increasing the displaced threshold distance will reduce available landing length and could also impact departure and arrival separation"*[97].

No consideration has been given to introducing displaced thresholds onto the south runway. On this basis the Applicant has not explored landing displaced thresholds as a noise mitigation measures as part of this relevant action.

97 Dublin Airport North Runway, Regulation 598/2014 (Aircraft Noise Regulation) Forecast Without New Measures and Additional Measures Assessment Report (Revision 2 – September 2021), Table 3-1 (3 of 6)

Displaced Landing Thresholds
ANCA's Review and Opinion
The North Runway has been designed to include landing displaced thresholds and, as discussed by the Applicant, any additional displacement is unlikely to yield much additional noise benefit but could impact on the ability of certain aircraft to use the runway. Whilst there may be potential to introduce landing displaced thresholds onto the south runway, ANCA recognises that to do so would likely require airspace design and infrastructure works which would introduce significant cost and could lead to potential disruption of Dublin Airport. ANCA therefore agrees with the Applicant's assessment not to take forward landing displaced thresholds as a noise mitigation measure as part of this relevant action. However, this should not rule out such measures being investigated in the future.

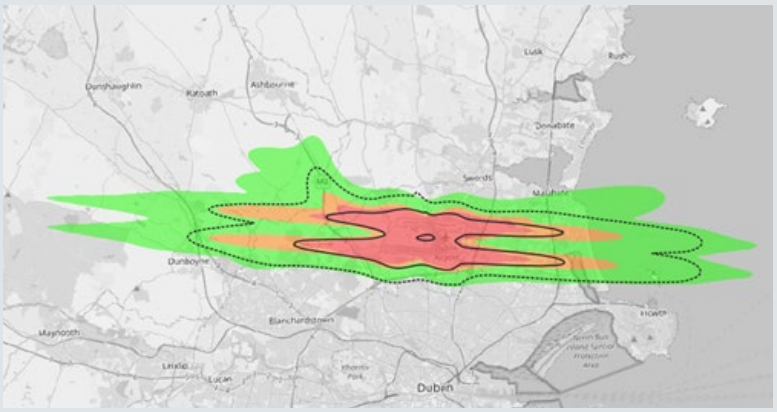
Runway Use Respite	
Measure Part of Current Inventory	No
Responsibility for Measure	IAA
Applicant's Position and Proposals	
Respite from aircraft noise can be delivered by alternating which runways are in use. The Applicant has considered scenarios as set out in Appendix E which involve alternating runways.	
ANCA's Review and Opinion	
ANCA considers it appropriate that the Applicant has considered such measures as part of the runway usage scenarios considered. These have been subject to further assessment by ANCA.	

7.6.4 New Measures Taken Forward for Assessment

Noise Abatement Operating Procedures	
Measure	**Taken forward for further assessment?**
Use of Noise Preferential Routes	No – part of existing measures
Route Alternation	No – not considered feasible
Use/Mandate of Noise Abatement Departure Procedures (NADP) and / or Thrust Managed Climb	No – part of existing measures
Continuous Climb Operations (CCO)	No – part of existing measures
Continuous Decent Approaches (CDA)	No – part of existing measures
Steeper/Segmented Approach Procedures / GBAS	No – not considered sufficiently effective in the context of other measures taken forward
Automated (RNAV) Procedures/Performance Based Navigation (PBN)	No – part of existing measures
Preferential Runway Use	Yes – presented in Appendix E
Landing Displaced Thresholds	No – not considered feasible
Runway Use Respite/Alternate Runway Use	Yes – presented in Appendix E

7.6.5 Land Use Planning and Management

The following tables present an overview of land use planning and management measures as they may be available to Dublin Airport. For each measure, the Applicant's position and proposals are presented alongside ANCA's assessment.

Planning Measures and Noise Zoning	
Measure Part of Current Inventory	No
Responsibility for Measure	Planning Authorities
Applicant's Position and Proposals	
The Applicant has identified the noise zones set out in the framework established by FCC through the County Development Plan 2017-2023 (Variation No. 1) and the Dublin Airport 2020 Local Area Plan (LAP) as being the means of managing new noise-sensitive development around Dublin Airport[98]. No further consideration of any alternative or additional planning and noise zoning measures have been given by the Applicant in their assessment.	
ANCA's Review and Opinion	
The noise zones established under the County Development Plan seek to ensure that aircraft noise from Dublin Airport is addressed appropriately during the planning process. Both the Local Area Plan and Variation No. 1 were open for statutory periods of public consultation. The four zones established are based on forecasts provided by Dublin Airport to the planning authority at the time the County Development Plan Variation No. 1 was prepared. New noise-sensitive development is restricted in Zone A only. Development in the other noise zones is subject to various requirements in terms of acoustic assessment and the need for sound insulation. The zones therefore manage development to ensure aircraft noise is appropriately considered rather than prohibit it. As such, the zones seek to ensure that new noise-sensitive development is designed and built with suitable noise insulation measures. The $L_{Aeq,16hr}$ and L_{night} metrics underpin the noise zones. The use of the L_{night} metric is compatible with the NAO however the $L_{Aeq,\ 16h}$r does not strictly align with the L_{den} metric which is also part of the NAO. However, the guidance attached to planning and noise, along with the technical standards[99, 100] cited by Variation No. 1 relating to the design of sound insulations, utilise the $L_{Aeq,16hr}$ metric. ANCA has reviewed the noise zones against the forecasts with and without new measures as provided by the Applicant. This review has been largely based on forecast noise exposure in 2025 which represents the highest levels of noise exposure identified in the Applicant's forecasts. This review has focussed on night time noise exposure forecasts comparing the maximum extent of the L_{night} noise levels reported across the various forecasts provided by the Applicant in 2025 with the thresholds underpinning the noise zones. This has focussed on the night time boundaries between Zones B&C, and C&D i.e., 48 dB L_{night} and 55 dB L_{night}. The diagram below shows that the maximum extent of the 48 dB L_{night} contour (black dotted) all 2025 noise forecasts sit mainly within Zone C[101] (green). Likewise, the figure shows that the extent of the 55 dB L_{night} (solid black) contours arising from the forecasts fall mainly within Zone B (orange) and A (red) reflecting the night time noise thresholds underpinning these zones.  	

98 Dublin Airport North Runway, Regulation 598/2014 (Aircraft Noise Regulation) Forecast Without New Measures and Additional Measures Assessment Report (Revision 2 – September 2021), Table 3-1 (5 of 6)

99 British Standards Institute (BSI), BS8233:2014 'Guidance on sound insulation and noise reduction for buildings', 2014

100 ProPG: Planning & Noise, Professional Practice Guidance on Planning and Noise, New Residential Development, May 2017

101 Fingal Development Plan

Encroachment Management	
Measure Part of Current Inventory	Yes
New Measure Proposed	No
Responsibility for Measure	Planning Authorities

Applicant's Position and Proposals

The Applicant has not considered any additional measures relating to encroachment management as a new measure as part of the Application. Instead, the Applicant has identified that encroachment management be captured through Action 4 of the Noise Action Plan.

ANCA's Review and Opinion

Encroachment is managed through the planning system. To this end the noise zones as defined by the County Development Plan 2017-2023 (Variation No. 1) are a means of achieving this.

Action 4 of the NAP requires that encroachment analysis is undertaken from 2019 onwards. This action was set prior to Variation No. 1 of the County Development Plan and is the responsibility of the planning authority. An update on the actions arising from the NAP was provided in response to the Direction to Provide Information[102]. This states that the Applicant has made available data to facilitate encroachment analysis.

Encroachment and future population growth is an important consideration and is part of the NAO. As such, future assessment of compliance with the NAO will require population data to be prepared which has regard for changes in the location and number of residential dwellings and associated population and dwelling occupancy estimates. This is no different to the requirements under the ENR.

Sound Insulation Schemes	
Measure Part of Current Inventory	Yes
New Measure Proposed	Yes
Responsibility for Measure	The Applicant

Applicant's Position and Proposals

There are currently two sound insulation schemes in place at Dublin Airport. These are the Residential Noise Insulation Scheme (RNIS) and the Home Sound Insulation Programme (HSIP). These schemes describe eligibility based on a 16-hour daytime noise exposure contours ($L_{Aeq,16hr}$).

As part of the measures brought forward by the Applicant as part of the Application, a new night time noise insulation scheme has been proposed. Detail relating to the proposed scheme was provided in response to the Direction to Provide Information[103]. The Applicant's proposed scheme is called the Residential Sound Insulation Grant Scheme (RSIGS). The scheme will make available a grant of €20,000 for insulation measures. RSIGS is intended for bedrooms only with eligible dwellings identified if they meet either of the following noise-related criteria.

- Criteria 1: Dwellings forecast to be exposed to "high" night time noise levels in 2025 of at least 55 dB L_{night}.
- Criteria 2: Dwellings with a "very significant" rating arising from forecast noise levels of at least 50 dB L_{night} in the first full year when the relevant action comes into operation, with a change of at least +9 dB when compared with the current permitted operation in the same equivalent year.

The Applicant proposes that Criteria 1 will be based on initial 2025 noise forecasts provided with the Application and that Criteria 2 will be based on forecasts for the first year of the relevant action. This has been assumed as 2022 in the Applicant's submissions, however the Applicant confirms that if this were to be later then the eligibility according to Criteria 2 will be revisited. In the case of Criteria 1, the Applicant proposes that RSIGS will be subject to bi-annual review reflecting the approach currently in place for RNIS.

Under the Applicant's proposals RNIS will not include dwellings approved for construction after December 2020.

102 Dublin Airport North Runway Relevant Action Application, Draft – Initial Response to ANCA Request for Further Information, June 2021 – Appendix I

103 Anderson Acoustics Document 3870-RSGIS, Dublin Airport Residential Sound Insulation Grant Scheme (RSIGS) overview – DRAFT, July 2021

Sound Insulation Schemes

ANCA's Review and Opinion

Dublin Airport's existing sound insulation schemes have been the subject of review by ANCA under Section 20(3) of the 2019 Act. This review was undertaken in 2020 and the two schemes (RNIS and HSIP) were found to be in place prior to the relevant day of 1 September 2019.

This review highlighted that eligibility to the RNIS scheme is a combination of the predicted 63 dB $L_{Aeq, 16hr}$ contour as defined by Condition 7 of the North Runway Consent, along with the predicted 63 dB $L_{Aeq, 16hr}$ as revised for a 2022 forecast. Eligibility to the HSIP scheme is based on the 2016 63 dB $L_{Aeq, 16hr}$ contour. The RNIS has regard for Dublin Airport operating as a three-runway system, with the HSIP considering it as a two-runway system. ANCA's review identified 125 properties eligible for insulation under the RNIS scheme and 77 properties eligible for insulation under the HSIP scheme.

The RNIS scheme differs from the HSIP scheme in that eligibility to the scheme is subject to biannual review under Condition 7 of the North Runway Planning Permission. This review results in the eligibility boundary of the scheme potentially being updated having regard for more recent exposure forecasts.

Both the RNIS and HSIP are designed so that all costs associated with the insulation works are met by Dublin Airport. Under the scheme, the measures available include: the replacement of existing windows with acoustic windows; installation of acoustic vents to allow for background ventilation; acoustic loft insulation and chimney dampers where these are necessary. The RNIS scheme entails an individual assessment of each dwelling with a target of improving the insulation performance of the building envelope by 5 to 10 dB. Review of eligibility is to occur every two years with a sample of dwellings selected to confirm the effectiveness of the insulation works.

In response to the Direction to Provide Information, the Applicant has provided information regarding the effectiveness of the insulation measures available under RNIS[104]. This shows that airborne noise insulation at surveyed dwellings improved by at least 5 dB and on average improved the insulation by an average of 7.7 dB. Analysis provided by the Applicant shows that many of the insulation measures which are available, and which could achieve this level of reduction would be available within the €20,000 grant for properties with a certain number of bedrooms.

One aspect of the noise problem which may arise as a result of the Application is a change in night time noise exposure resulting in dwellings becoming exposed to night time noise exposure levels that represent a clear risk to health i.e. 55 dB L_{night}. Another aspect is that the Application would give rise to significant effects as presented in the EIAR[105] and identified as the third aspect of the noise problem identified by ANCA.

The Applicant's proposed RSIGS attempts to address these two aspects of the noise problem arising from the Application. Firstly, the Criteria 1 aligns with the threshold above which effects may be considered night time noise exposure is a clear risk to health i.e. 55 dB L_{night}. This threshold is also the night time priority as set by the NAO. Secondly, Criteria 2 seeks to addresses those experiencing a 'very significant' effect as defined within the EIAR.

ANCA agrees that these eligibility thresholds are appropriate however notes that Criteria 2 may result in a situation where some dwellings receive insulation at lower levels of aircraft noise exposure than others. For example, a dwelling falling under Criterion 2 may observe noise exposure at 53 dB L_{night}, whereas elsewhere there may be dwellings experiencing 54 dB L_{night} which are not eligible under either Criteria 1 or Criteria 2.

Unlike the RNIS and HSIP scheme, the Applicant's proposed scheme is a grant scheme which means that insulation measures and works under the proposed scheme will be subject to a cap of €20,000. The proposed scheme would apply to bedrooms only rather than all habitable rooms as is the case for the RNIS and HSIP schemes.

In response to the Direction to Provide Information the Applicant suggests that the measures available under the proposed scheme could include primary or secondary glazing, rooflights, passive vents, mechanical vents and loft insulation[106]. However, analysis provided by the Applicant indicates that only a selection of these measures could be afforded under the grant depending upon the number of bedrooms in each eligible dwelling. This is reproduced in the figure below and is based on RNIS insulation programme tender rates[107].

104 Dublin Airport North Runway Relevant Action Application, Draft – Initial Response to ANCA Request for Further Information, June 2021 – Response to Request 130

105 Dublin Airport North Runway Relevant Action Application, Draft – Initial Response to ANCA Request for Further Information, June 2021 – Response to Request 93 and 130

106 Dublin Airport North Runway Relevant Action Application, Draft – Initial Response to ANCA Request for Further Information, June 2021 – Response to Request 93 and 130

107 Dublin Airport North Runway Relevant Action Application, Draft – Initial Response to ANCA Request for Further Information, June 2021 – Response to Request 136

Sound Insulation Schemes								
Ref	Item	Typical Base Rate	1 bed	2 bed	3 bed	4 bed	5 bed	6 bed
1	Access Equipment and Scaffolding	300	300	600	900	1,200	1,500	1,800
2	Glazing – Primary Window	4,300	4,300	8,600	12,900	17,200	21,500	25,800
3	Glazing – Secondary Glazing	870	870	1,740	2,610	3480	4,350	5,220
4	Glazing – Roof Light	3,400	3,400	6,800	10,200	13600	17,000	20,400
5	Passive Vent	690	690	1,380	2,070	2760	3,450	4,140
6	Mechanical Vent	1,350	1,350	2,700	4,050	5400	6,750	8,100
7	Loft Insulation	290	290	580	870	1160	1,450	1,740
8	Chimney Baffle	520	520	1,040	1,560	2,080	2,600	3,120
9	Ceiling Over-boarding	4,200	4,200	8,400	12,600	16,800	21,000	25,200

Ref	Permutations	1 bed	2 bed	3 bed	4 bed	5 bed	6 bed
1+2+5	Total: primary + passive vent	5,290	10,580	15,870	21,160	26,540	31,740
1+2+5+7	Total: primary + passive + insulation	5,580	11,160	16,740	22,320	27,900	33,480
1+2+4+5+7	Total: primary + passive + insulation + rooflight	8,980	17,960	26,940	35,920	44,900	53,880
1+2+6	Total: Primary + Mechanical Vent	5,950	11,900	17,850	23,800	29,750	35,700
1+2+6+7	Total: Primary + Mechanical + insulation	6,240	12,480	18,720	24,960	31,200	37,440
1+2+4+6+7	Total: Primary + Mechanical + insulation + Rooflight	9,640	19,280	28,920	38,560	48,200	57,840
1+3+5	Total: Secondary + passive vent	1,860	3,720	5,580	7,440	9,200	11,160
1+3+5+7	Total: Secondary + passive + insulation	2,150	4,300	6,450	8,600	10,750	12,900
1+3+4+5+7	Total: Secondary + Passive + Insulation + Rooflight	5,550	11,100	16,650	22,200	27,750	33,300
1+3+6	Total: Secondary + Mechanical Vent	2,520	5,040	7,560	10,080	12,600	15,200
1+3+6+7	Total: Secondary + Mechanical Vent + Insulation	2,810	5,620	8,430	11,240	14,050	16,860
1+3+4+6+7	Total: Secondary + Mechanical Vent + Insulation + Rooflight	6,210	12,420	18,630	24,840	31,050	37,260

Sound Insulation Schemes

What is apparent from the Application is that the proposed noise insulation scheme has only been considered as part of the Applicant's preferred and proposed runway use and restriction scenario (Scenario P02) as part of its own cost-effectiveness analysis. Consideration of the total number of dwellings eligible for the scheme should another form of night time runway use pattern or restriction be adopted has not been considered by the Applicant. ANCA believes that insulation is a consideration that should be made when considering the various runway use and restriction measures available.

ANCA also notes that there are alternatives to the years being considered as part of Criteria 2. This may also make a difference with respect to the number of dwellings which are eligible and may also better reflect changes in noise over time. The two years considered as part of this are 2022 and 2025. The year 2022 reflects the Applicant's forecast year for the relevant action commencing with 2025 being the year where noise output is expected to be at its highest with Dublin Airport operating at its 32 mppa terminal passenger capacity limit.

On this basis, a night time noise insulation scheme has been considered for further analysis by ANCA with the following options explored. As part of exploring these options, consideration has been given to whether eligible dwellings under the proposed RSIGS are likely to be eligible for the existing RNIS and HSIP schemes.

It is ANCA's view that these existing schemes are more comprehensive than the proposed RSIGS scheme as they cover all habitable rooms and are fully funded. As such, ANCA's view is that both the cost and effectiveness of the RSIGS scheme can only be established if they are not already eligible for insulation under the existing schemes.

ANCA therefore undertook further analysis as part of its cost-effectiveness analysis with respect to the following insulation eligibility options.

- Eligibility Option A: > 55 dB in 2022 for properties not captured by HSIP or RNIS
- Eligibility Option B: > 55 dB in 2025 for properties not captured by HSIP or RNIS
- Eligibility Option C1: > 55 dB in 2022 and a change of 9 dB above 50 dB compared to conditions in 2018 for properties not captured by HSIP or RNIS
- Eligibility Option C2: > 55 dB in 2025 and a change of 9 dB above 50 dB compared to conditions in 2018 for properties not captured by HSIP or RNIS
- Eligibility Option C3: > 55 dB in 2022 and a change of 9 dB above 50 dB compared to conditions in 2019 for properties not captured by HSIP or RNIS
- Eligibility Option C4: > 55 dB in 2025 and a change of 9 dB above 50 dB compared to conditions in 2019 for properties not captured by HSIP or RNIS
- Eligibility Option C5: > 55 dB in 2022 and a change of 9 dB above 50 dB compared to conditions forecast for the situation in 2022 for properties not captured by HSIP or RNIS
- Eligibility Option C6: > 55 dB in 2025 and a change of 9 dB above 50 dB compared to conditions forecast for the situation in 2025 for properties not captured by HSIP or RNIS

These different eligibility options have been explored to understand (a) the best forecast year to set the eligibility of any scheme, and to (b) understand the different approaches to determining eligibility how this may have a bearing on the effectiveness of insulation measures on those exposed above the night time priority and on sleep disturbance.

Relocation Assistance Scheme	
Measure Part of Current Inventory	Yes
New Measure Proposed	No
Responsibility for Measure	The Applicant

Applicant's Position and Proposals

Under Condition 9 of the North Runway Planning Permission, a scheme for the voluntary purchase of dwellings is required. This scheme includes all dwellings which are predicted to fall within the 69 dB $L_{Aeq, 16hr}$ contour within 12 months of the planned opening of the runway for use. This scheme was approved by Fingal County Council as part of discharging Condition 9. The scheme is known as the Voluntary Dwelling Purchase Scheme.

The Applicant has not proposed any additional voluntary purchase scheme or amendments to the existing scheme under the Application.

ANCA's Review and Opinion

Under Variation No. 1 of the County Development Plan, Zone A requires the new provision of residential and other noise sensitive development to be resisted. This relates to noise exposure levels of ≥ 63 dB $L_{Aeq, 16hr}$ and/or ≥ 55 dB L_{night}. The value of 55 dB L_{night} is a priority set by the NAO and as part of this, ANCA is of the view that noise insulation should be provided where exposure occurs above this threshold. The Local Area Plan 2020 states that *"Under no circumstances shall any dwelling be permitted within the predicated 69 dB $L_{Aeq, 16hr}$ noise contour".*

ANCA made a specific request as part of the Direction to Provide Information[108] to ascertain how night time noise exposure levels at dwellings located around Dublin Airport were forecast to change with reference forecast $L_{Aeq,16hr}$ noise exposure levels as they relate to the Voluntary Dwelling Purchase Scheme.

The Applicant provided a specific response to this request[109]. This considers the location of dwellings in the vicinity of Dublin Airport, identifying those which are in the existing Voluntary Dwelling Purchase Scheme and its boundary, along with the forecast boundary of the Voluntary Dwelling Purchase Scheme in 2025 and how this relates to L_{night} noise exposure levels for each of the modelled night time runway pattern scenarios as summarised in Appendix E.

The information presented in this response highlights the impact of the Application with respect to increasing night time noise exposure levels above those experienced in 2018 at locations in the vicinity of the north runway.

In the vicinity of the south runway, noise exposure levels in the forecasts are comparable to those experienced in 2018 under certain runway use and restriction scenarios. This indicates that any new or amended Voluntary Dwelling Purchase Scheme would need only consider changes in night time noise exposure around the north runway.

The data provided also shows that in 2018 there are properties within the existing Voluntary Dwelling Purchase Scheme which experienced lower levels of night time noise than some that are not. The data shows that some properties could experience night time aircraft noise above 60 dB L_{night} under certain runway preference and restriction scenarios. However, this level of impact occurred in 2018 at some properties around the south runway that are not in the Voluntary Dwelling Purchase Scheme.

The data does highlight that should the Applicant's preferred runway use and restriction scenario (Scenario P02) be adopted as part of the relevant action, this is more likely to lead to consistency with respect to the existing Voluntary Dwelling Purchase Scheme.

Whilst the data provided by the Applicant highlights the potential for elevated levels of night time noise well above the night time priority set by the NAO, the expectation would be that through noise insulation that this level of exposure could in effect be reduced. This needs to be considered alongside data provided by the Applicant which shows a reduction in aircraft night time noise exposure beyond 2025.

For these reasons, ANCA has not considered it appropriate to revisit the Voluntary Dwelling Purchase Scheme.

108 Request for Further Information 128

109 Bickerdike Allen Partners, A11267_12_MO028_2.0, ANCA RFI Response 128, 28 July 2021.

7.6.6 Operating Restrictions

ICAO guidance encourages "not to apply operating restrictions as a first resort, but only after consideration of the benefits to be gained from the other three principal elements of the Balanced Approach" noting that this obligation is also reflected in the Act of 2019 (Section 9(3)(d)) and in the Aircraft Noise Regulation (Article 5(3)(d)).

As such, benefits that can be gained from operating restrictions should only be considered once other measures from the Balanced Approach have been analysed.

The Applicant has made proposals which include operating restrictions. The following tables explore these and possible alternative forms of operating restrictions that are available in principle in respect of Dublin Airport.

Aircraft Movement Cap	
Measure Part of Current Inventory	Yes
New Measure Proposed	No – proposal is to replace the existing night time aircraft movement cap set under Condition 5 of the North Runway Planning Permission with a Noise Quota Scheme
Responsibility for Measure	The Applicant
Applicant's Position and Proposals	
The Applicant is applying to remove an aircraft movement cap which is in place through Condition 5 of the North Runway Planning Consent. The Applicant has not proposed an aircraft movement cap as part of the operating restrictions brought forward within the Application. The Applicant's proposals are to replace Condition 5 with a noise quota scheme which would apply over the period 23:30-05:59.	
ANCA's Review and Opinion	
A movement cap is a simple and transparent way of restricting aircraft operations for noise reasons. It is also a more straightforward measure to manage with respect to compliance. However, a movement limit does not take into account the noise being generated by the aircraft themselves. This means that a G0 aircraft is treated in the same manner as a G1 aircraft. There are therefore no incentives for airlines to introduce quieter aircraft. The NAO set by ANCA seeks to reduce aircraft noise in the context of the sustainable development of Dublin Airport. As such, a movements cap does not necessarily provide for long- term operational flexibility. With sustainability in mind, ANCA's view is that operating restrictions which are set for Dublin Airport should take the form of noise-related limits, rather than blanket restrictions on the aircraft themselves such is the case with a movement limit. A noise quota scheme will have the effect of limiting aircraft movements but within the scope of scheduling aircraft within an overall 'noise budget'. This is considered a more preferable form of restriction and one which aligns better with the wider sustainability aspects of the NAO. For these reasons, a movement limit which seeks to replace an existing movements limit has not been considered.	

Runway Use Restriction	
Measure Part of Current Inventory	Yes
New Measure Proposed	Yes – as part of proposal to amend Condition 3(d) of the North Runway Planning Permission

Applicant's Position and Proposals

The Applicant is applying to remove a runway use restriction as imposed through the North Runway Planning Permission. The Applicant has proposed that the existing restriction be amended so that the north runway shall not be used for take-off or landing between 00:00-05:59 except in *"cases of safety, maintenance considerations, exceptional air traffic conditions, adverse weather, technical faults in air traffic control systems or declared emergencies at other airports or where Runway 10L-28R length is required for a specific aircraft type."*

The Applicant's proposed amendment follows their own assessment work having regard for the provisions of the Aircraft Noise Regulation. As part of this several alternatives were considered by the Applicant in their December 2020 Application, with a further three considered following the Direction to Provide Information.

ANCA's Review and Opinion

Having regard for the current form of the North Runway Planning Permission and the restrictions imposed, ANCA agrees that runway preferences which incorporate runway use restrictions are a measure which should be given consideration.

Such restrictions have therefore been considered for further analysis. The runway use and runway restriction scenarios which have been considered for further analysis include:

- P02 – which prohibits north runway use between the hours of 00:00-06:00
- P09 – which restricts south runway use between the hours of 00:00-06:00
- P11 – which restricts the north runway during the night as per Condition 3(d) of the North Runway Planning Permission
- P12 – which restricts north runway use between the hours of 23:00-06:00
- P13 – which restricts north runway use between the hours of 23:30-05:00

It should be noted that Scenario P11 does not constitute a change to Condition 3(d) however has been considered to allow ANCA to understand the impact of relevant action in relation to Condition 5 of the North Runway Planning Permission in isolation from the relevant action proposed in relation Condition 3(d).

Aircraft Curfew	
Measure Part of Current Inventory	No
New Measure Proposed	No
Responsibility for Measure	N/A

Applicant's Position and Proposals

The Applicant has not brought forward proposals for a curfew and nor has one been considered within the documents supporting the Application.

Aircraft Curfew
ANCA's Review and Opinion
Curfews can be either a global or aircraft-specific partial restriction which prohibit aircraft movements during identified times. Airports Council International (ACI) state in their guidance that[110]: *"… curfews and restrictions are a 'blunt instrument' and can severely impact the efficiency of operations such as the movement of freight. Noise quotas or limits on certain movements can allow some activity while placing a limit on noise impact.".* Aircraft movement profiles provided by the Applicant[111] show that in 2019 aircraft movements occurred in each hour of the night albeit during the period 01:00-04:59 there were a total of 5,394 aircraft movements over the calendar year. The majority of night time movements occurred outside of these hours. A similar trend is shown in each of the other forecasts provided with the busiest periods of the night occurring between 23:00-00:00, and between 05:00-06:59. As such, records of existing aircraft movements along with the schedules utilised by the Applicant in its forecasts indicate a relatively low number of aircraft operating during the period 00:00-05:00. It is the view of ANCA's experts that an overly restrictive curfew at Dublin Airport has the potential to significantly impact airline operations, and in particular the profitability and future growth of low-cost operators (Appendix G). A curfew may also impact the competitiveness of Dublin Airport as a hub airport and the viability of some long-haul routes to North America could also be negatively impacted. Given the night time demand during the hours of 23:00 to midnight and between 05:00-06:59, a curfew could only be considered between these hours. The NAO assesses aircraft noise using an 8-hour noise exposure metric measured over the period 23:00-06:59. Using these metrics any curfew on the aircraft landing and taking off at Dublin Airport during hours of 00:00-04:59 is unlikely to significantly change overall night time noise exposure this but would result in an adverse impact on Dublin Airport and the airlines. It is noted that the Applicant's proposals effectively result in a partial curfew by restricting the use of the north runway between 00:00-05:59. For these reasons, ANCA has determined that a partial curfew in the form of a runway restriction is a measure which should be given consideration as part of this relevant action.

Aircraft Type Restriction	
Measure Part of Current Inventory	No
New Measure Proposed	No
Responsibility for Measure	N/A
Applicant's Position and Proposals	
There are currently no restrictions on the types of aircraft which can land or depart at Dublin Airport during the day, evening or night based on their noise impacts, except for where these are banned through existing European legislation. The Applicant has not brought forward any proposals which seek to restrict specific aircraft types based on the noise levels.	
ANCA's Review and Opinion	
Under the Aircraft Noise Regulation and the Act of 2019, measures such as aircraft-specific restrictions, including the withdrawal of marginally compliant aircraft, are operating restrictions. The Aircraft Noise Regulation is clear that restrictions which concern restrictions on aircraft types based on noise must be based on their noise certification. The Applicant has proposed a noise quota scheme, which is discussed in the following review. ANCA has reviewed noise quota restrictions at other airports and notes that these often include restrictions on aircraft types which can operate at night[112]. Such restrictions are therefore considered relevant to the Applicant's proposals and have been subject to further analysis as part of proposals for a Noise Quota Scheme.	

110 110 Airports Council International, Managing the Impacts of Aviation Noise, A Guide for Airport Operators and Air Navigation Service Provides, September 2015

111 Reporting template available on ANCA website

112 Example includes the restrictions in place in the UK at the 'noise designated' London Airports. Further information can be found here: https://nats-uk.ead-it.com/cms-nats/export/sites/default/en/Publications/aip-supplements/EG_Sup_2021_049_en.pdf

Noise Quotas	
Measure Part of Current Inventory	No
New Measure Proposed	Yes
Responsibility for Measure	Airport Airlines Fingal County Council

Applicant's Position and Proposals

The Applicant has brought forward proposals for a noise quota scheme[113]. The Applicant's proposal is that this scheme shall apply annually over the period 23:30-05:59. The Applicant's proposal is based on the quota system in place in the UK at Stansted Airport. This system uses noise certification data to establish a quota count for an aircraft arrival and departure having regard for take-off weight and engine variant.

The Applicant's proposal is that an Annual Noise Quota of 7,990 be used to limit aircraft noise and movements between the hours of 23:30-05:59 over a calendar year. The proposed quota scheme includes a carry-over and overrun arrangement for which the Applicant is proposing that an allowance from the quota could be carried over into future years. The Applicant's proposed carry-over and overrun provisions are:

- *"If required, a shortfall in use of noise quota in one year of up to 10% may be carried over to the next year;*
- *Conversely, up to 10% of an overrun in noise quota usage in one year (not being covered by carryover from the previous year) will be deducted from the corresponding allocation in the following year;*
- *An overrun of more than 10% will result in a deduction of 10% plus twice the amount of the excess over 10% from the corresponding allocation in the following year;*
- *The absolute maximum overrun is 20% of the original limit in each case."*

ANCA has considered other similar quota schemes and confirms that such provisions are common practice. In addition to the carry-over and overrun provisions of the proposals, dispensations have also been proposed as part of the scheme. These preclude certain movements from being counted towards the noise quota allowance. The Applicant has modelled its proposals for dispensations on those which are set by UK Department for Transport's guidance[114]. This sets four circumstances that allows operators to grant dispensations, which are:

- *"Emergencies;*
- *Widespread and prolonged air traffic disruption;*
- *Delays as a result of disruption leading to serious hardship and congestion at the airfield or terminal;*
- *The Secretary of State can also grant dispensations where movements relate to matters of the state."*

As part of the Direction to Provide Information ANCA requested information to better understand how Dublin Airport's noise quota proposals were developed, understand the potential configuration of a noise quota scheme that applies the 8-hour night time period i.e. 23:00-07:00 instead of 23:30-06:00, and to identify the utilisation of the noise quota beyond the main assessment year relied on by the Applicant of 2025, extending out to 2040 assuming Dublin Airport continues to operate in line with current 32 mppa terminal passenger capacity limit and if this were to increase.

ANCA also sought the views of the Applicant through the Direction to Provide Information on approaches to review and reduce the noise quota over time. The Applicant's response was that given recovery from the pandemic and the associated uncertainties, reductions in the proposed Annual Noise Quota have not been proposed or considered. However, this could be achieved through review and has indicated that such a review could be undertaken as part of a review five years after the noise quota scheme becomes operational.

113 Dublin Airport North Runway Relevant Action Application, Draft – Initial Response to ANCA Request for Further Information, June 2021 – Appendix A

114 UK Department for Transport, Annex F: Guidelines on Dispensations, July 2014

Noise Quotas

ANCA's Review and Assessment

The information provided by the Applicant has demonstrated that its proposed Annual Noise Quota of 7,990 applying over the period 23:30-05:59 would allow Dublin Airport to operate in line with its forecasts beyond 2025 and to 2040 with or without growth above and beyond its existing 32 mppa terminal passenger capacity limit[115]. A similar analysis undertaken by the Applicant, considering ANCA's request to explore a noise quota extending over the 8-hour night time period presents a similar trend, but instead sets the quota at 16,260.

The analysis therefore demonstrates that a noise quota set based on the Applicant's forecast fleet mix and night time movements in 2025 will be sufficient to allow Dublin Airport to meet its forecasts beyond 2025, with or without growth in passenger numbers.

ANCA is therefore conscious that under the Applicant's proposals, whilst the noise quota sets an operating restriction, it does not inhibit the ability of Dublin Airport to meet its forecasts for passenger and ATM growth in the future. This is due to the proposal setting the noise quota at a value for which the introduction of quieter aircraft will cater for more aircraft to be operated within the same noise quota in the future. As such, the proposed noise quota provides the incentive for Dublin Airport to use quieter aircraft in return for additional movements. This is only possible as the proposals do not include an aircraft movement limit, and providing Dublin Airport continues to meet the NAO.

The Applicant's proposals include allowances for carry-overs and overruns which would allow the noise quota in one year to be increased by as much as 10%. However, ANCA notes that the Applicant's proposed quota values already includes some headroom. The dispensations offered by the Applicant are noted and are accepted as these form part of other similar quota schemes.

There are two differences between the Applicant's proposals and other noise quota schemes, particularly in the UK. The first is that it does not include an associated aircraft movement limit however there are quota schemes that do not include these, and as outlined, such a restriction potentially affects the sustainable growth of Dublin Airport. The second is that no restrictions are imposed on certain aircraft types due to noise. Restrictions such as these are in place at other airports and at Stansted Airport upon which the Applicant has based its noise quota scheme proposals. At Stansted, aircraft with a QC of 4.0 or more are not permitted to take off or land during the hours of 23:30-05:59 as determined through a UK Department of Transport's recent decision on revisions to their night flying restrictions[116]. The fleet mix provided with the Applicant's forecasts for 2025 indicate that throughout the 8-hour night period there are no aircraft with a QC of 4.0 or more on take-off, or a QC of 2.0 or more on landing, forecast to operate. This indicates that Dublin Airport could potentially operate within such restrictions. If such restrictions were made progressively more restrictive in 2030 to restrict aircraft with a QC of 2.0 or more on take-off and a QC of 1.0 or more on landing, this would preclude a number of types forecast to operate during the night in 2030 and beyond.

These types are mainly G0 aircraft such as the Airbus A330, Boeing 737-400/500 and Boeing 757/767/777. In 2030, these types are forecast to make up approximately 12% of the forecast 8-hour night time movements. As such, a progressively tighter restriction of this nature would influence the forecasts.

ANCA is of the view that such a restriction should be given consideration and that further consideration should be given to making this type of restriction progressively more stringent in line with the NAO's objective of reducing aircraft noise at night.

With respect to the Applicant's proposals for a review of the noise quota, ANCA has given consideration to this proposal in the context of the Act of 2019. Under the Act of 2019 any amendment of a noise quota scheme or another form of operating restriction can only be achieved through one of the following routes:

1. A planning application which is brought forward to change the noise quota.
2. A noise problem being declared by ANCA having regard for Dublin Airport's performance against the outcomes defined within the NAO.

No other formal mechanism for amending the noise quota has been identified however the NAO provides clear outcomes that require aircraft noise to be reduced over the period to 2040. This will set an overarching framework within which Dublin Airport will need to operate.

The Applicant has determined that time period for their proposed noise quota is a 6.5-hour period between 23:30-05:59. This aligns with the approach taken by the UK Department for Transport. ANCA notes that this period does not align with the definition of night under EU or Irish noise policy. ANCA notes that during the UK Department of Transport's consultation on its night flight restrictions[117] it requested views on moving to an 8-hour noise quota period to align with the 8-hour noise policy period. This consultation sought views on this change as part of changes beyond 2024. It is noted that the movement restriction imposed by Condition 5 of the North Runway Planning Permission is an 8-hour night time restriction. It is for this reason that ANCA requested through the Direction to Provide Information that information be provided in relation to a potential 8-hour noise quota scheme[118]. Information was provided by the Applicant[119]. Based on the above ANCA determined that the following noise quota restrictions be considered for further analysis. These are outlined below.

- The Applicant's Proposal – a 6.5-hour annual noise quota set at 7,990 apply over the period 23:30-05:59.
- An alternative developed by ANCA: an 8-hour annual noise quota set at 16,260 should apply over the period 23:00-06:59 with restrictions on aircraft types based on their quota count as outlined above.

115 Dublin Airport North Runway Relevant Action Application, Draft – Initial Response to ANCA Request for Further Information, June 2021 – Appendix A

116 UK Department for Transport, Night Flight Restrictions at Heathrow, Gatwick and Stansted, July 2021

117 UK Department for Transport, Night Flight Restrictions Consultation Outcome, July 2021 – available here: https://www.gov.uk/government/consultations/night-flight-restrictions-at-heathrow-gatwick-and-stansted-airports-between-2022-and- 2024-plus-future-night-flight-policy/night-flight-restrictions

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Noise Contour Area and Shape Restriction	
Measure Part of Current Inventory	No
New Measure Proposed	No
Responsibility for Measure	N/A
Applicant's Position and Proposals	
The Applicant has not proposed a noise contour area or shape restriction.	
ANCA's Review and Opinion	
Noise contour area restrictions provide a means of restricting and limiting noise impacts. However, such a restriction or condition already forms part of the outcomes which have been set by ANCA in the NAO. A noise contour area restriction will restrict the 'noise output' of an airport. The NAO extends this further by restricting the effects of Dublin Airport. For this reason, ANCA considers that a noise contour restriction does not add any additional benefit than what is expected from Dublin Airport through the NAO.	

7.6.7 Forecast with New Measures

The implementation of the Balanced Approach as discussed in previous chapters has highlighted options for new measures to be taken forward for consideration as part of the relevant action. These are summarised as follows:

7.6.7.1 New Measures to be Considered

Table 7.17 presents the noise quota and aircraft type restrictions considered as part of the forecast with new measures. Having regard to the information provided by the Applicant, ANCA is of the view that these restrictions are unlikely to have a major bearing on the noise forecasts i.e., each of these forms of restriction are likely to result in similar levels of noise exposure as forecast by the Applicant. As such these measures have been the subject of a cost-effectiveness assessment.

Table 7.17: Noise Quota and Aircraft Type Restrictions

Noise Quota and Aircraft Type Restrictions	
Applicants Proposal	**6.5-hour Annual Noise Quota set at 7,990 apply over the period 23:30-05:59**
Alternative	8-hour Annual Noise Quota set at 16,260 applies over the period 23:00-06:59 with the following restrictions on aircraft types: • No aircraft with a Quota Count of 4.0 or more shall be permitted to take off at Dublin Airport during the Noise Quota period. • No aircraft with a Quota Count of 2.0 of more shall per permitted to land at Dublin Airport during the Noise Quota Period.

Table 7.18 presents the preferential runway use and runway restriction scenarios which have been considered. Scenario P06 relates to the Forecast Without New Measures with Scenario P01 reflecting a forecast situation should no relevant action be taken i.e., Dublin Airport operates in line with the North Runway Planning Permission.

All the scenarios outlined in Table 7.18 below have assumed different approaches to using Dublin Airport's runways at night with the exception of Scenario P11. This scenario relates to a forecast where relevant action is taken with respect to Condition 5 of the North Runway Planning Permission however the north runway

remains restricted throughout the night. This scenario has been considered specifically to understand the benefit in allowing scheduled use of the north runway at night. All forecasts provided by the Applicant for the scenarios outlined below have assumed that Condition 5 of the North Runway Planning Permission has been replaced with a noise quota scheme and that Dublin Airport is capable of meeting its unconstrained forecasts. On this basis, the further analysis provided by ANCA in the subsequent sections has focussed on the relative performance of these measures with respect to the NAO and its priorities.

Table 7.18: Preferential Runway Use and Runway Restriction Scenarios considered for further analysis

Preferential Runway Use and Runway Restriction Scenarios			
Scenario	**Forecast Type**	**Night time Runway Use and Restrictions**	**Requires Restriction?**
P02	Forecast with New Measures	South runway preferred 00:00- 06:00. Otherwise as per Condition 3(a)-(c)	Yes – north runway restricted between 00:00 and 06:00
P03	Forecast with New Measures	As per Condition 3(a)-(c)	No – however pattern effectively extends Condition 3(a-c) of the north runway Consent to apply irrespective of time of day
P04	Forecast with New Measures	Reverse of Condition 3(a)-(c) i.e. Runway 10L and Runway 28L preferred for departures, Runway 10R and Runway 28R preferred for arrivals	No
P05	Forecast with New Measures	Alternation between Patterns P03 and P04	No
P07	Forecast with New Measures	Departures operate from the north or south runway depending on destination. Arrivals operate as per Condition 3(b) and Condition 3(c) unless runway capacity exceeded	No
P08	Forecast with New Measures	Departures modelled as per Condition 3(b) and 3(c). Arrivals modelled as 50/50 split between runways unless runway capacity exceeded	No
P09	Forecast with New Measures	North runway preferred 00:00- 06:00. Otherwise as per Condition 3(b) and 3(c).	Yes – south runway restricted between 00:00-06:00
P10	Forecast with New Measures	Alternate between Patterns P02 and P09	No
P11[120]	Forecast with New Measures	South runway only	Yes – north runway restricted between 23:00-07:00
P12	Forecast with New Measures	South runway preferred 23:00- 06:00. Otherwise as per Condition 3(a)-(c)	Yes – north runway restricted between 23:00-06:00
P13	Forecast with New Measures	South runway preferred 23:30- 05:00. Otherwise as per Condition 3(a)-(c).	Yes – north runway restricted between 23:30-05:00

The preferential runway use and runway restriction scenarios outlined in Table 7.18 will lead to a different pattern and distribution of aircraft noise around Dublin Airport at night. This will have a consequential effect on the numbers of people who may be eligible for noise insulation under the proposed Residential Sound

120 120 P11 has been used to reflect a scenario where Condition 5 has been amended by Condition 3(d) remains in place

Insulation Grant Scheme (RSIGS). This measure has also been considered having regard for different approaches to determine eligibility. This has had regard for the following criteria as outlined in Table 7.19 below.

Table 7.19: Residential Sound Insulation Scheme eligibility options considered for further analysis

Preferential Runway Use and Runway Restriction Scenarios	
Eligibility Option A	> 55 dB L_{night} in 2022 for dwellings not captured by HSIP or RNIS
Eligibility Option B	> 55 dB L_{night} in 2025 for dwellings not captured by HSIP or RNIS
Eligibility Option C1	> 55 dB L_{night} in 2022 and a change of 9 dB above 50 dB compared to conditions in 2018 for dwellings not captured by HSIP or RNIS
Eligibility Option C2	55 dB L_{night} in 2025 and a change of 9 dB above 50 dB compared to conditions in 2018 for dwellings not captured by HSIP or RNIS
Eligibility Option C3	> 55 dB L_{night} in 2022 and a change of 9 dB above 50 dB compared to conditions in 2019 for dwellings not captured by HSIP or RNIS
Eligibility Option C4	> 55 dB L_{night} in 2025 and a change of 9 dB above 50 dB compared to conditions in 2019 for dwellings not captured by HSIP or RNIS
Eligibility Option C5	> 55 dB L_{night} in 2022 and a change of 9 dB above 50 dB compared to conditions forecast for the situation in 2022 for dwellings not captured by HSIP or RNIS
Eligibility Option C6	> 55 dB L_{night} in 2025 and a change of 9 dB above 50 dB compared to conditions forecast for the situation in 2025 for dwellings not captured by HSIP or RNIS

7.6.8 Noise Exposure from 2022 to 2025, and 2025 as the main year of assessment

The data provided by the Applicant shows that for all scenarios noise exposure is forecast to increase from 2022 to 2025 before beginning to reduce. This is explored further in later sections where the forecasts and scenarios prepared by the Applicant are considered more broadly against the NAO accounting for factors such as future development and growth in passenger numbers and populations.

As the data submitted by the Applicant points to noise exposure levels being at their highest in 2025 and that is the year when the Applicant forecasts that Dublin Airport returns to 32 million passengers (i.e., at its terminal passenger capacity limit) with the relevant action, ANCA has made the assessment year of 2025 its primary focus when considering forecasts with new measures. This is also reflected in the assessment period adopted in the cost-effectiveness analysis.

7.6.9 Impact of Relevant Action in Relation to Condition 5

In line with the first two aspects of the noise problem identified with the Application, any modification of Condition 5 that allows more aircraft than the 65 per night that is currently permitted is likely to result in increased night time noise. The best illustration of this is the comparison between Scenario P01 and Scenario P11. In these scenarios the only difference is the replacement of the 65 per night movement restriction with a quota scheme that facilitates Dublin Airport's forecasts.

Table 7.20 shows that in 2025 with Dublin Airport operating at 32 mppa in Scenario P11 and with Dublin Airport operating at 30.4 mppa in Scenario P01, the population HA and population HSD would increase, along with the number of people exposed to levels above the priorities set by the NAO.

Table 7.20: Population HSD, HA and exposed above the NAO priorities in 2019 and in Scenarios P01 and P11 in 2025

Scenario	Population HSD	Population > 55 dB L_{night}	Population HA	Population > 65 dB L_{den}
2019 Situation	47,045	1,533	115,738	285
2025 P01 30.4 mppa	22,500	280	64,241	119
2025 P11 32.0 mppa	35,799	1,535	77,630	236

This is also illustrated in Figure 7.9 below which presents the night time priority level of 55 dB L_{night}.

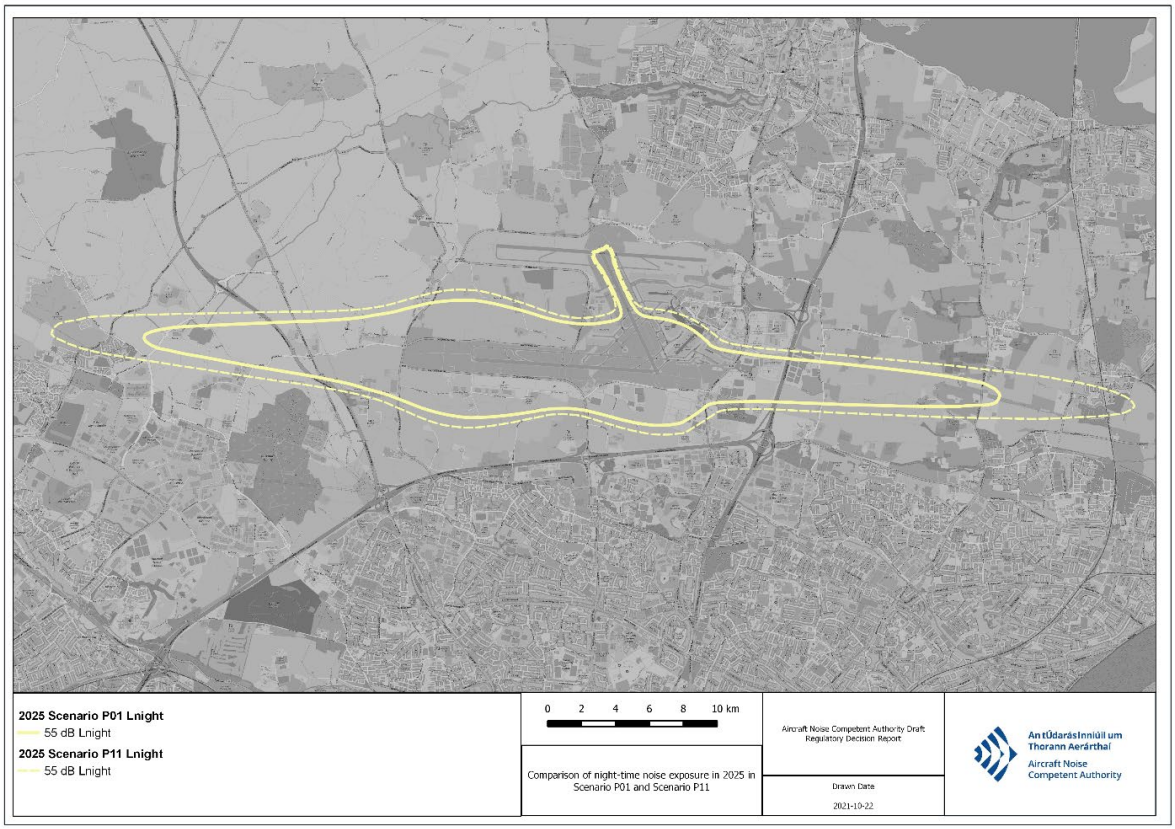

Figure 7.9: 2025 Scenario P01 and Scenario P11 55 dB L_{night} exposure contours

ANCA's analysis shows that irrespective of the preferential runway and runway restriction scenarios which have been considered, there will be an increase in noise exposure compared to the forecast situation. As such it has been necessary for ANCA to consider the cost-effectiveness of the existing restriction i.e., Condition 5 alongside the alternative noise quota scheme options.

If the south runway were to be used at night and Condition 5 is replaced with a noise quota scheme enabling the Applicant's forecasts, this would still result in a reduction in the number of people HSD and HA compared to 2019. However, the number of people experiencing night time noise above the priority value of 55 dB L_{night} could potentially exceed the number which occurred in 2019. Table 7.20 assumes no population growth, however if the population grows, the forecasts provided by the Applicant indicate that the number of people

exposed to levels above the night time priority under Scenario P11 could exceed 4,000. This will not achieve the outcomes of the NAO which require the number of people exposed to aircraft noise above 55 dB L_{night} to be reduced compared to 2019.

7.6.10 Impact of Relevant Action in Relation to Condition 3(d) and Condition 5

As established in the previous section, amending Condition 5 of the North Runway Planning Permission to facilitate the Applicant's forecasts will lead to increased aircraft noise exposure compared to the situation where the relevant action is not taken. The effect of the relevant action in relation to both Condition 3(d) and Condition 5 is therefore two-fold. Firstly, it will allow for increased aircraft noise exposure, and secondly it will have the effect of redistributing aircraft noise depending upon how the runways are to be used at night.

Table 7.21 shows how in 2025 the various preferential runway usage and runway restrictions scenarios combined with the Applicant's forecasts as part of replacing Condition 5 with a noise quota scheme perform against the key measures of the NAO. In Table 7.21, population growth has not been taken into account.

Table 7.21 shows that the outcomes are dependent upon how the runway can be used at night and in particular the sensitivity and variation in the population exposed to levels above the night time priority.

Table 7.21: Population HSD, HA and exposed above the NAO priorities in 2019 and in 2025 for the modelled runway use and restriction scenarios

Scenario	Population HSD	Population > 55 dB L_{night}	Population HA	Population > 65 dB L_{den}
2019 Situation	47,045	1,533	115,738	285
2025 P01 30.4 mmpa	22,500	280	64,241	119
2025 P02 32.0 mppa	37,080	1,059	79,405	196
2025 P03 32.0 mppa	35,757	1,055	77,962	201
2025 P04 32.0 mppa	35,260	737	78,838	167
2025 P05 32.0 mppa	36,363	412	78,774	151
2025 P07 32.0 mppa	36,699	989	78,921	192
2025 P08 32.0 mppa	35,784	422	78,301	161
2025 P09 32.0 mppa	34,896	528	77,553	163
2025 P10 32.0 mppa	36,463	426	78,686	158
2025 P11 32.0 mppa	35,799	1,535	77,630	236
2025 P12 32.0 mppa	37,159	1,119	79,641	199
2025 P13 32.0 mppa	36,275	1,055	78,606	189

What is apparent from Table 7.21 is that the main differentiator between the various runway use and runway restriction scenarios is the population exposed to the priority values, particularly at night. In relative terms, these change more considerably than the population HA or population HSD.

Table 7.21 highlights that for Scenario P11 where the south runway is used throughout the night, this results in a higher number of people being exposed above the night time priority value than in the other scenarios where the north runway is being used during the night to various degrees or as part of a wider pattern of use. It is however noted that the population HSD from using only the south runway at night is lower than for many of the other scenarios considered.

A further consideration is the fact that allowing the north runway to be used at night will result in changes in aircraft noise exposure, which may lead to potentially significant effects using the methodology used by the Applicant in the EIAR. This is highlighted in the third aspect of the noise problem determined from the Application as summarised in this report.

Appendix E presents night time noise change maps which help demonstrate the change in noise exposure for the various runway use and runway restriction scenarios in 2025 compared to the forecast situation (Scenario P01). Examples are presented in the following figures for Scenario P02, P10 and P13.

These figures illustrate that use of the north runway at night has the potential to result in increases of 9 dB in noise exposure and above in locations immediately under the north runway arrival and departure routes. In the case of Scenario P02 where the runway is used only for departures at night as shown in Figure 7.10 these increases are limited to the departure routes.

This is also the case for Scenario P13 as shown in Figure 7.12 for Scenario P10, increases occur under both the arrival and departure routes. However, in this scenario there is a clear reduction in noise under the south runway arrival and departure routes.

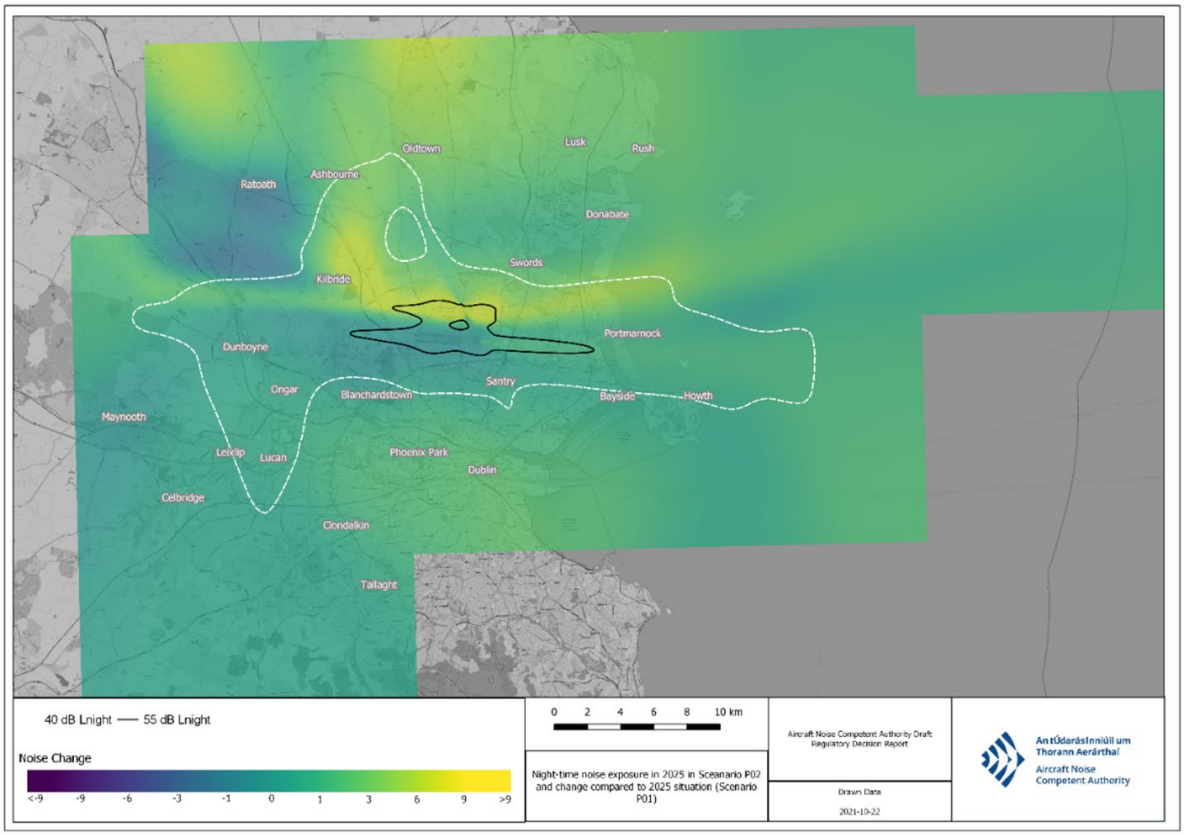

Figure 7.10: 55 dB L_{night} and 40 dB L_{night} in 2025 Scenario P02 with noise exposure changes compared to 2025 Scenario P01 (the noise situation in 2025)

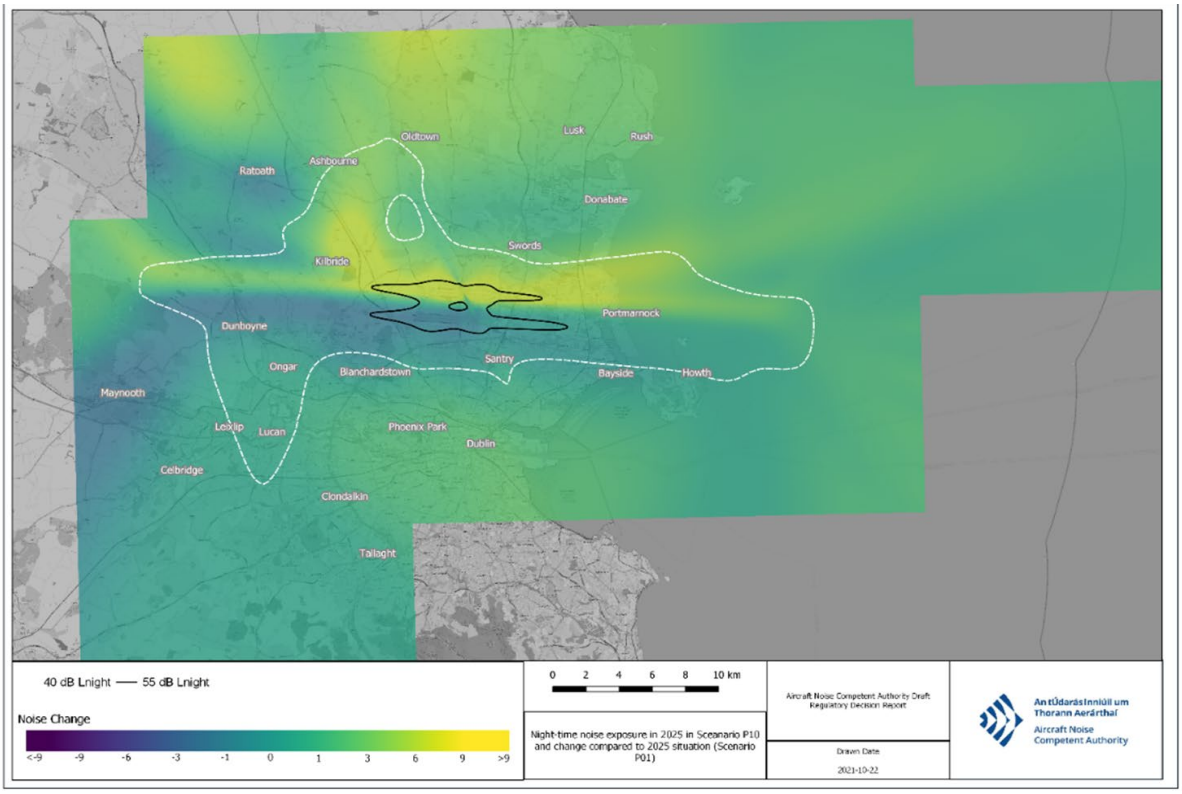

Figure 7.11 55 dB L_{night} and 40 dB L_{night} in 2025 Scenario P10 with noise exposure changes compared to 2025 Scenario P01 (the noise situation in 2025)

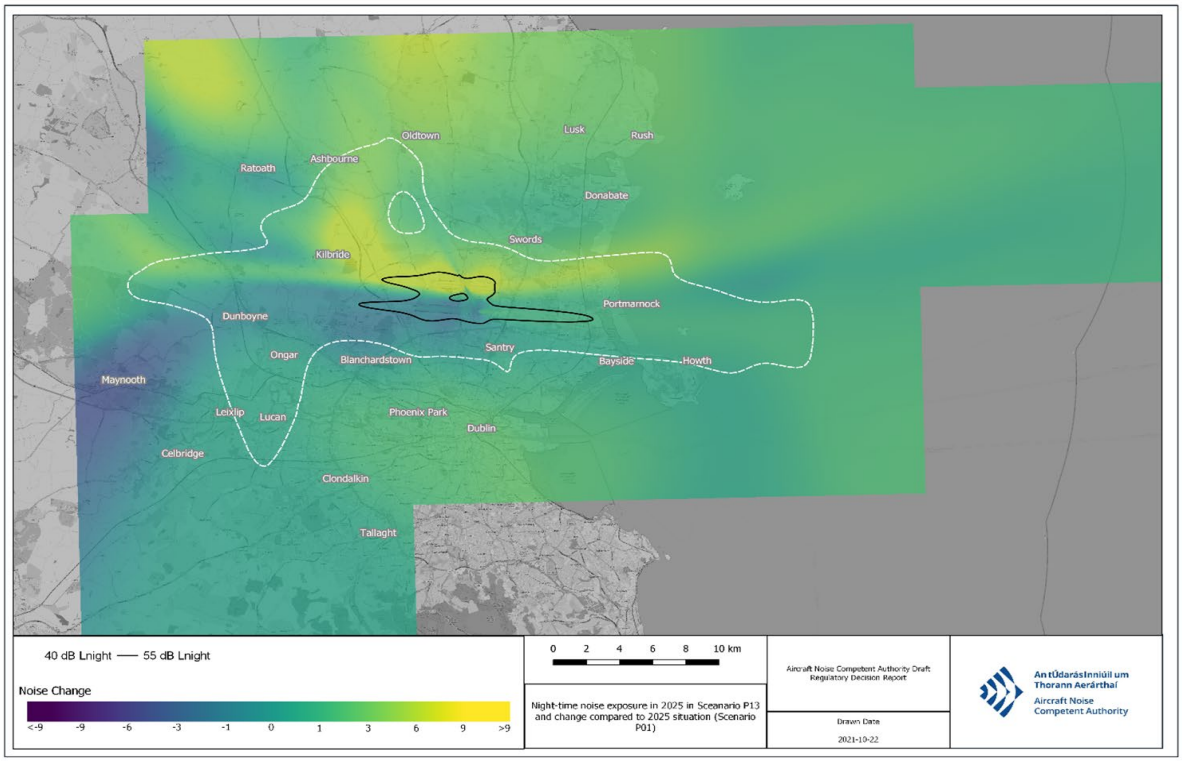

Figure 7.12: 55 dB L_{night} and 40 dB Lnight in 2025 Scenario P13 with noise exposure changes compared to 2025 Scenario P01 (the noise situation in 2025)

The Applicant has provided data which indicates the number of people that would experience significant effects using the EIAR methodology. This data does not include scenarios P11, P12 or P13 however it does highlight general trends with respect to how differences in the use of the north runway could lead to significant adverse effects. This is reproduced in Table 7.22Table 7.22: Population experiencing significant adverse effects due to changes in night time noise exposure in 2025 below.

Table 7.22: Population experiencing significant adverse effects due to changes in night time noise exposure in 2025

Scenario	Population Experiencing Significant Night time Noise Effects in 2025 arising from changes in aircraft noise exposure as per the EIAR significance criteria[121]
2025 P01 30.4 mmpa	0
2025 P02 32.0 mppa	1,879
2025 P03 32.0 mppa	3,677
2025 P04 32.0 mppa	23,414
2025 P05 32.0 mppa	17,547
2025 P07 32.0 mppa	17,050
2025 P08 32.0 mppa	4,629
2025 P09 32.0 mppa	14,984
2025 P10 32.0 mppa	22,379

Table 7.22 shows that for the scenarios where this analysis has been provided, Scenario P02 results in the fewest number of people experiencing adverse effects due to changes in noise exposure from the relevant action in 2025. ANCA's analysis is that adverse changes in noise exposure are expected to occur where the north runway is used. Where the north runway is utilised more, there will be greater adverse effects with respect to changes in exposure. However, such outcomes also need to be offset against the overall number of people forecast as HSD and exposed to noise above the priority of 55 dB L_{night}.

The number of people experiencing significant adverse changes in noise exposure is not a metric which is part of the NAO. However, this is an aspect of the noise problem identified as part of the Application. For this reason, ANCA has had regard for this in its decision making.

The data provided by the Applicant as reviewed by ANCA highlights that any decision which is made with respect to the form of operation or pattern of runway use that occurs by either setting a night time runway preference and / or runway restriction will have a consequential effect on the location and number of dwellings eligible under any proposed sound insulation scheme. For this reason, ANCA has had regard for how each potential runway use and runway restriction scenario potentially influences the eligibility and cost in relation to noise insulation. This assessment, along with the effectiveness of such measures is addressed within the cost-effectiveness assessment.

121 At least 40 dB Lnight and at least 9 dB increase
At least 45 dB Lnight and at least 6 dB increase
At least 50 dB Lnight and at least 3 dB increase
At least 55 dB Lnight and at least 2 dB increase
At least 60 dB Lnight and at least 1 dB increase
At least 40 dB Lnight and at least 9 dB increase
At least 45 dB Lnight and at least 6 dB increase
At least 50 dB Lnight and at least 3 dB increase
At least 55 dB Lnight and at least 2 dB increase
At least 60 dB Lnight and at least 1 dB increase

7.6.11 Review of Forecasts Against the NAO

The Applicant has provided data which allows consideration to be given to the performance of the various scenarios against the NAO. The Application originally provided data for 2022 and 2025. In response to the Direction to Provide Information, ANCA specifically requested forecasts which extend beyond 2025, and consider noise exposure in 2030, 2035 and 2040. These forecasts have also had regard for whether Dublin Airport would be operating at and above its current 32 mppa terminal passenger capacity limit.

It is stressed that the Application does not seek to remove or amend the existing terminal passenger capacity limit however this information is considered helpful in understanding under what circumstances Dublin Airport can meet the NAO. The information provided by the Applicant has also allowed consideration to be given to the potential impact of population growth on meeting the NAO. The following sections summarise ANCA's review of these forecasts.

7.6.11.1 2025 Forecasts

Figure 7.13 shows that in 2025 with Dublin Airport operating at 32 mppa with the relevant action, all runway usage and restriction scenarios would result in outcomes that are better than 2019 with respect to the population HA and population HSD.

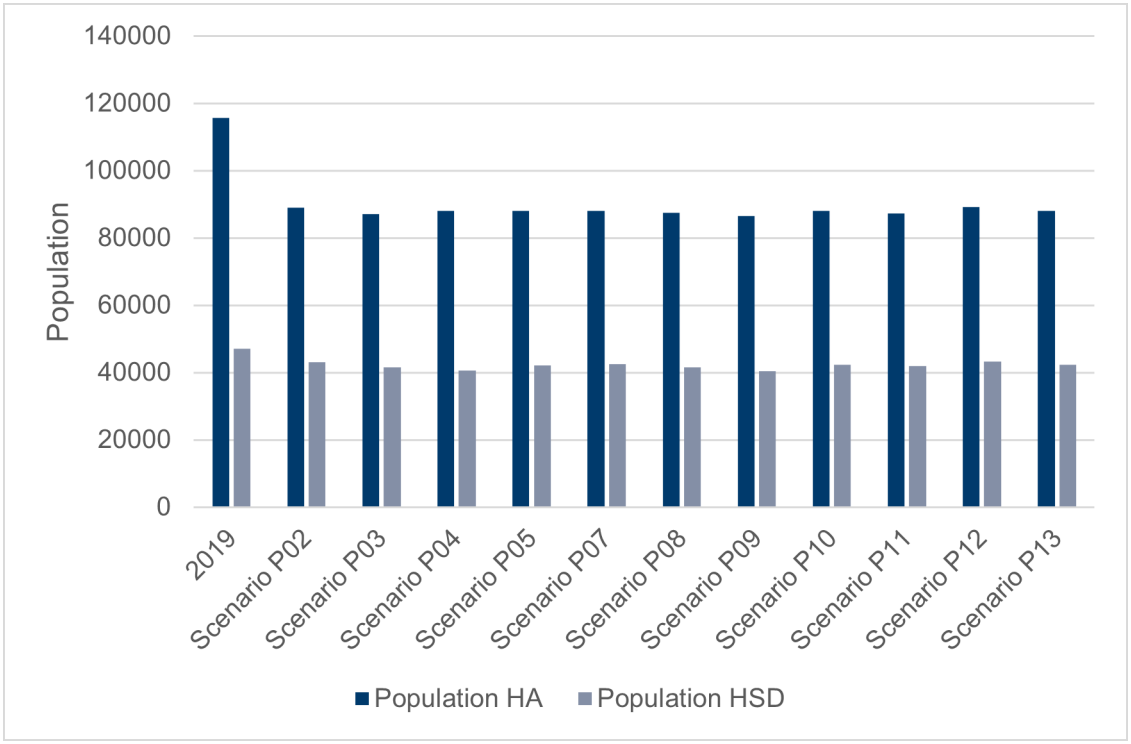

Figure 7.13: Population HA and HSD in 2025 under different runway use and restriction scenarios

Figure 7.14 presents the same analysis with respect to the night time priority value of 55 dB L_{night}.

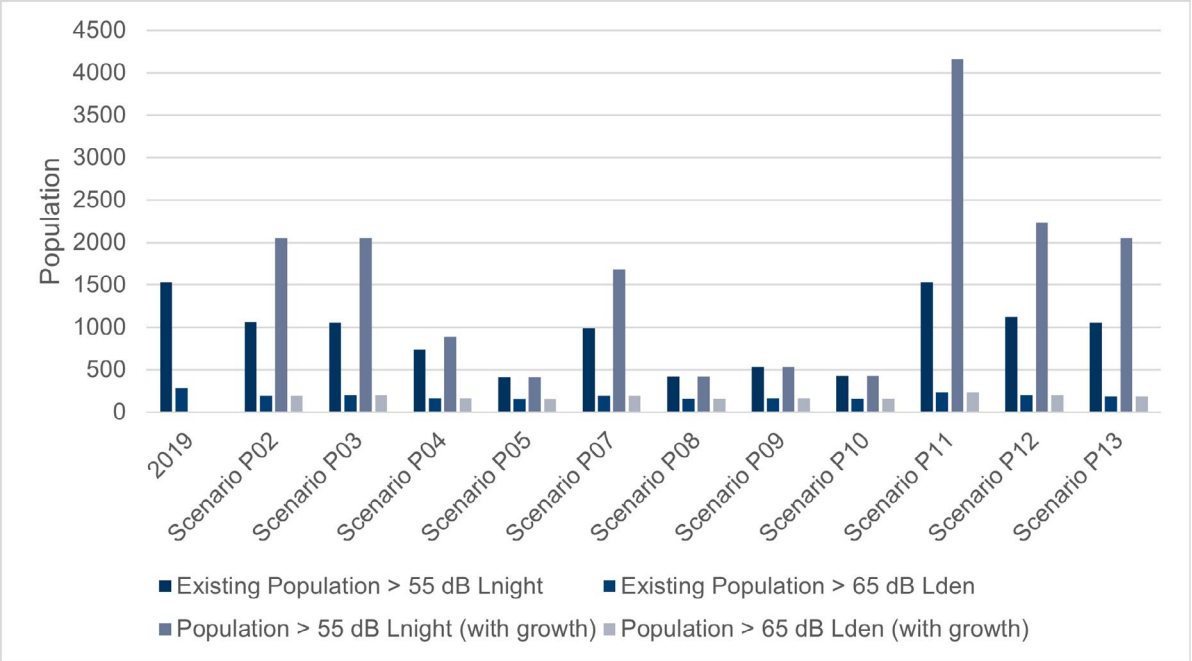

Figure 7.14: Population exposed to levels above the NAO priorities under different runway use and restriction scenarios with and without potential population growth

7.6.11.2 Forecasts beyond 2025 with the 32 mppa Terminal Passenger Capacity Limit

Figure 7.14 shows that, with respect to the priorities, without population growth, only Scenario P11 (south runway only) would result in more people being exposed to the night time priority value than occurred in 2019. With population growth, several scenarios have the potential to result in more people being exposed to the night time priorities than in 2019. However, this relies on all foreseeable development occurring and being built out over the period 2022 to 2025.

Figure 7.15 shows how each of the scenarios perform over the period from 2025 to 2040 with Dublin Airport operating at its 32 mppa terminal passenger capacity limit as per the Application. It should be noted that forecasts for Scenarios P04, P05, P09 and P10 have not been made available by the Applicant beyond 2025. This is considered a proportionate approach given the focus of the assessment is on 2025 and that the forecasts beyond 2025 have been used to identify how the noise climate may evolve into the future if relevant action is taken, in line with the NAO.

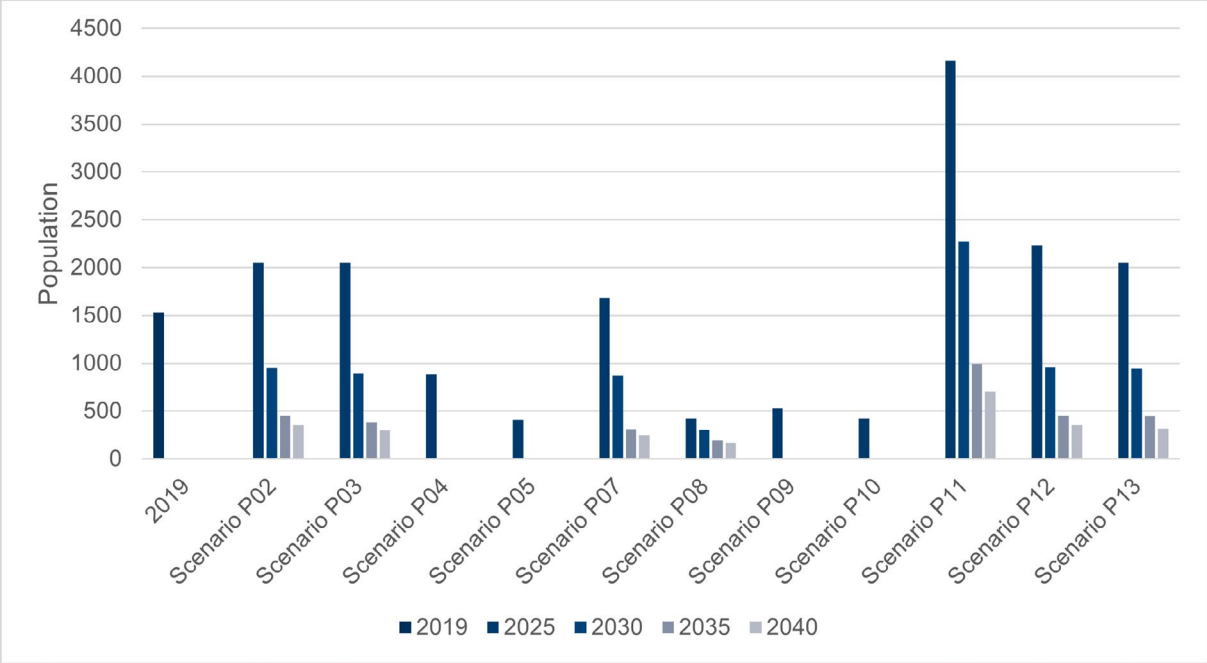

Figure 7.15: Population exposed to levels above the NAO night time priority of 55 dB L_{night} under different runway use and restriction scenarios with potential population growth over the period 2025 to 2040

Figure 7.15 demonstrates that, when accounting for potential population growth, the number of people that may be exposed to aircraft noise above the night time priority will be lower in 2030 than it was in 2019, (with the exception of Scenario P11 – south runway only).

The population growth assumptions utilised by the Applicant are documented[122]. What is important to note is that these are estimates only and rely on an analysis of permitted developments and allocating lands zoned for residential development with an assumed number of dwellings and population per hectare. In preparing the analysis presented in Figure 7.15 above, it has been assumed that all forecast population growth has already occurred. ANCA's view is that this is unlikely to have occurred by 2025 but that it may have occurred by 2030. For this reason, ANCA has not ruled out any scenario which exceeds the night time priority in 2025 when accounting for potential population growth except for Scenario P11.

It is important to note that any zoned land which is exposed to night time aircraft noise of above 55 dB L_{night} would need to be subject to a planning application and a noise assessment with the specification of appropriate sound insulation. This is a requirement under Variation No. 1 of the County Development Plan. As such, the population which may be exposed to aircraft noise above the night time priority in the future will be influenced by planning decisions.

When having regard for the reduction in the population HA and HSD, Figure 7.16 and Figure 7.17 show that, with the 32 mppa terminal passenger capacity limit in place, and when assuming population growth, all scenarios can achieve the outcomes set by the NAO for 2030 (30%), 2035 (40%) and 2040 (50%) with respect to the percentage reduction in HA and HSD respectively. In the case of Scenario P02, this only just meets the NAO in 2030 (by 0.3% for population HSD) with the population growth assumed. In the case of Scenario P12 the percentage reduction is 29.9% in 2030.

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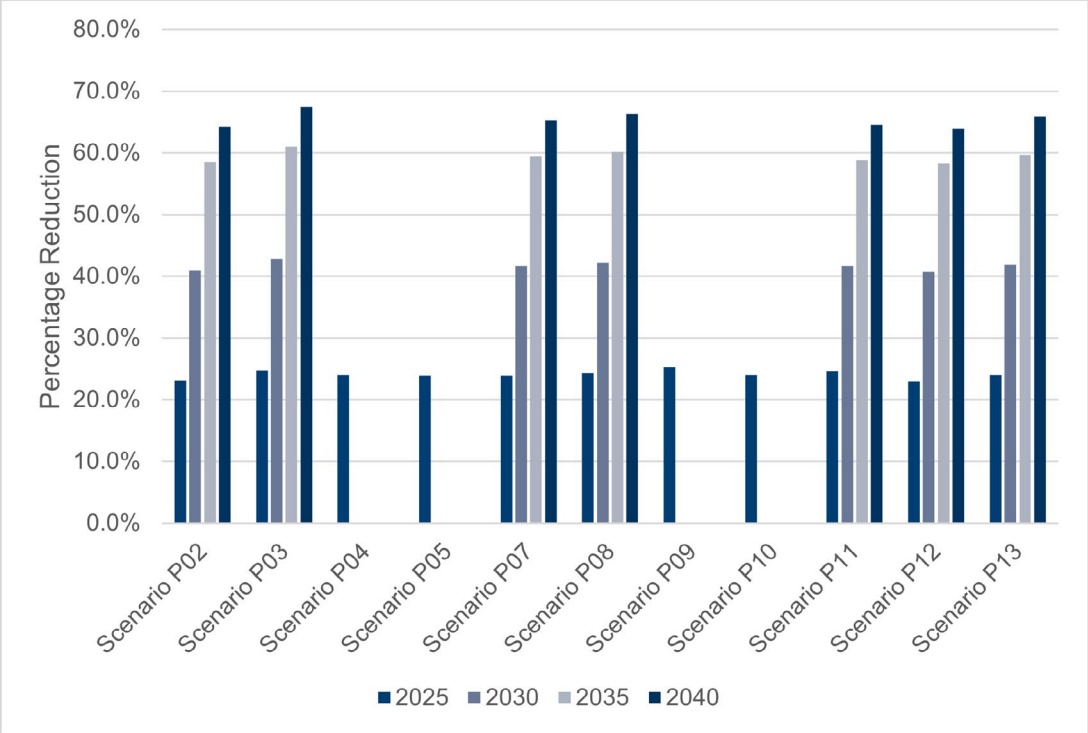

Figure 7.16: Percentage reduction in population HA for runway use and restriction scenarios over the period to 2040

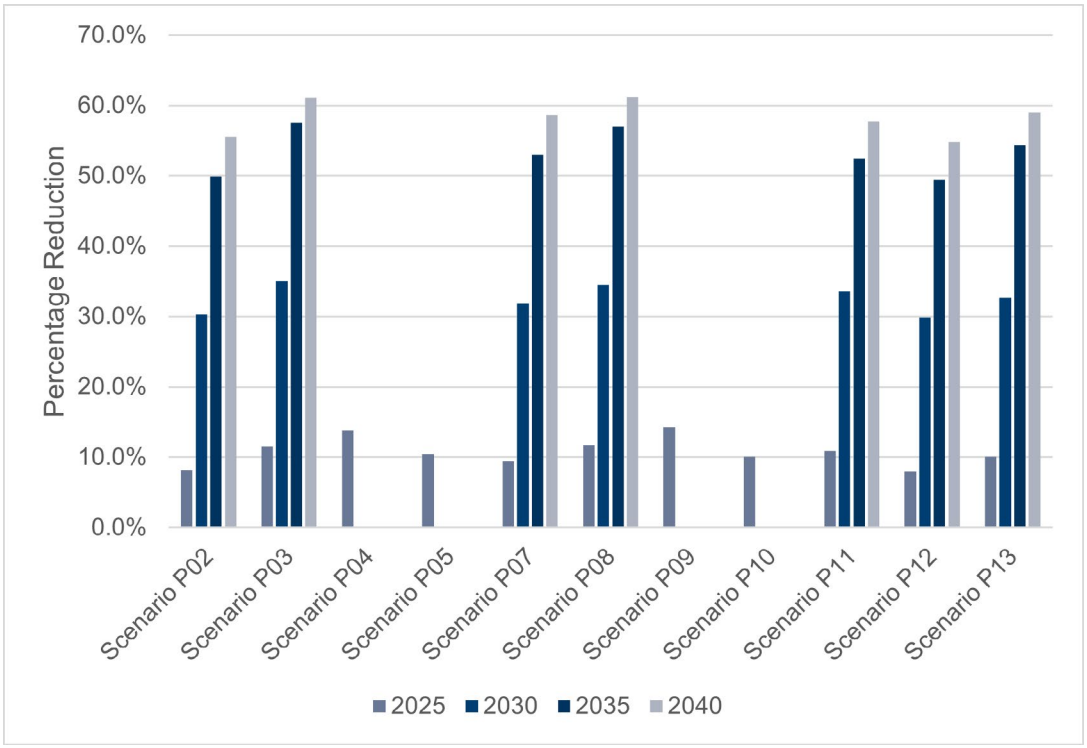

Figure 7.17: Percentage reduction in population HSD for runway use and restriction scenarios over the period to 2040

In reviewing the forecasts provided by the Applicant for the forecast years of 2025 to 2040 where the 32 mppa terminal passenger capacity limit remains in place, the Applicant has not forecast any increase in night time aircraft movements beyond 2025. In all forecasts the total number of aircraft movements during the night is forecast at approximately 32,884 in each of the forecast years. This should be compared to a total of 29,320 night time movements in 2019 and should be placed in context against the forecast of 19,521 night time movements if Condition 5 remained in place.

7.6.11.3 Forecasts beyond 2025 and without the 32 mppa Terminal Passenger Capacity Limit in Place

In response to the Direction to Provide Information, the Applicant has provided forecasts which extend beyond 2025 and study the impact of further growth in passenger numbers. Under scenarios where the relevant action is taken to replace Condition 5 of the North Runway Planning Permission with a noise quota scheme, and scheduled operations are allowed from the north runway at night, along with a further planning application to either lift or increase the 32 mppa terminal passenger capacity limit, the Applicant has forecast that by 2040 Dublin Airport could achieve a passenger throughput of 46.6 mppa.

These forecasts do not apply to the Application as has been made as the Applicant is not seeking to lift the 32 mppa terminal passenger capacity limit. However, the wider policy context upon which the NAO has had regard to anticipated growth at Dublin Airport. ANCA has therefore considered these forecasts against the outcomes set by the NAO in 2030, 2035 and 2040. It is stressed that this analysis does not form part of the assessment undertaken by ANCA with respect to the relevant action as applied for but is considered helpful to identify the potential performance against the NAO in a growth setting. In the analysis presented in Figure 7.18 and Figure 7.19 below, the reduction in population HA and population HSD compared to 2019 is presented for a selection of runway preference and runway restriction scenarios. The analysis has had regard for potential population growth and has adopted forecasts where Dublin Airport has a passenger throughput of 39.6 mppa in 2030, 43.4 mppa in 2035 and 46.6 mppa in 2040.

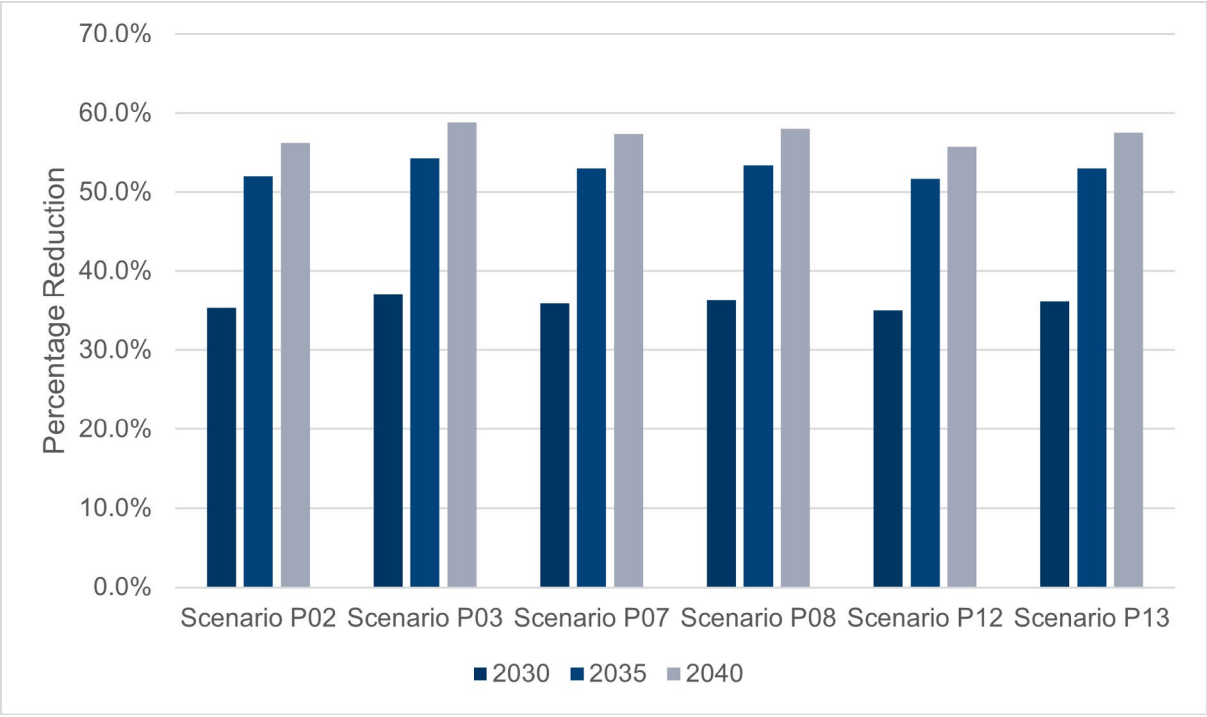

Figure 7.18: Percentage reduction in population HA for runway use and restriction scenarios over the period to 2040 with Dublin Airport operating above its current 32 mppa terminal passenger capacity limit

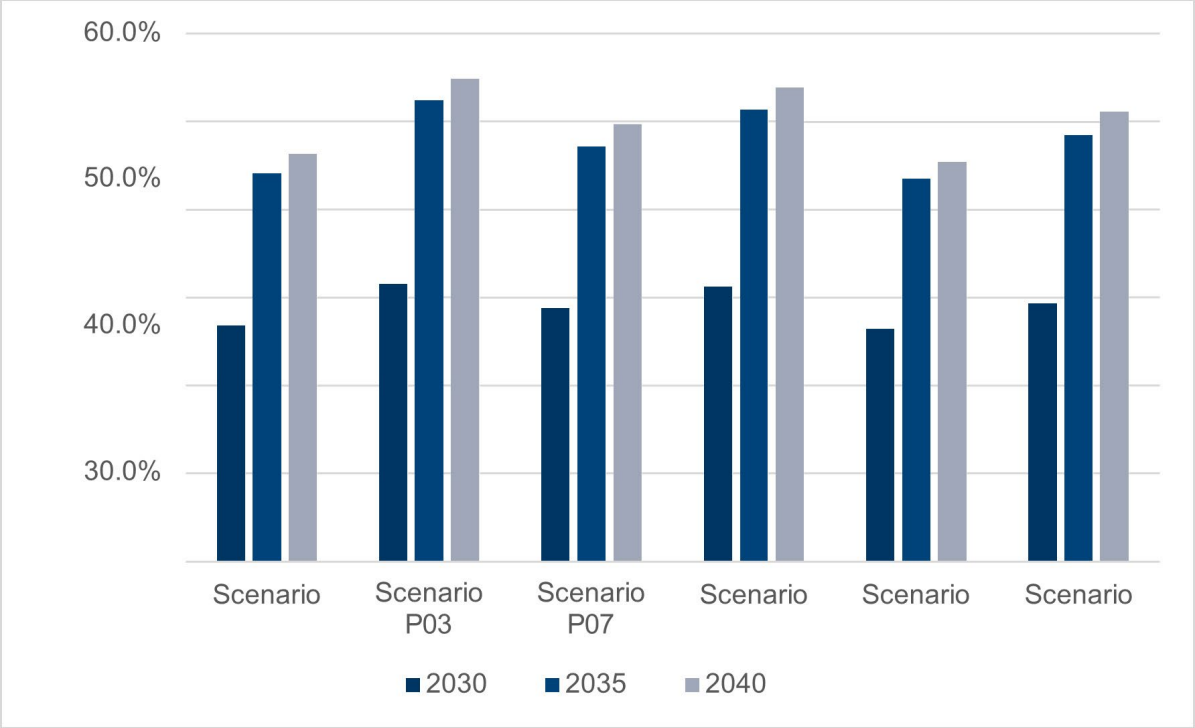

Figure 7.19: Percentage reduction in population HSD for runway use and restriction scenarios over the period to 2040 with Dublin Airport operating above its current 32 mppa terminal passenger capacity limit

This analysis shows that there are circumstances where the primary measures of the NAO cannot be met if growth in passenger numbers and the population occurs. This is the case for night time impacts where Figure 7.19 shows that under Scenario P02, P07, P12 and P13 that the NAO would not be met in 2030.

As set out above, the Applicant has not made an application to increase its 32 mppa terminal passenger capacity limit. However, the analysis presented in this section highlights that if such an application were to be brought forward and the population were to increase as the forecasts indicate it may be necessary for further measures such as additional incentives to introduce quieter aircraft at night to be put in place.

08

Environmental Assessments

08 Environmental Assessments

8.1 Appropriate Assessment (AA)

ANCA has prepared a Natura Impact Statement (NIS) for the purposes of carrying out Appropriate Assessment of the draft regulatory decision and the NAO in accordance with the European Communities (Birds and Natural Habitats) Regulations 2011 (the Regulations of 2011).

An Appropriate Assessment is an examination of the effects that a plan or project has on designated "European sites" (also known as "Natura 2000 sites") and in particular, whether the relevant plan or project has the potential to adversely affect their 'integrity'. Natura 2000 sites are important ecological sites that occur across the European Union and that are given special protective status to ensure the long-term survival of Europe's most valuable and threatened species and habitats. They are comprised of areas known as Special Protection Areas (SPAs) and Special Areas of Conservations (SACs). Each of these sites is designated because of their specific biodiversity value: for SPAs this is because of their value for wild birds; for SACs, it is because of the important habitats and species that they support.

8.1.1 Need for Appropriate Assessment

Article 6 (3) of the EU Habitats Directive (92/43/EEC) states that:

Article 6(3) – Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives. In the light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public.

The Regulations of 2011, which transpose the Habitats Directive into Irish law, require that 'Appropriate Assessment' (AA) be carried out where a plan is likely to have a significant impact on a Natura 2000 site.

In particular, the Regulations of 2011 provide that AA is required if it cannot be excluded, on the basis of objective scientific information following screening, that the plan, individually or in combination with other plans or projects, will have a significant effect on a European site.

A Screening exercise was undertaken to establish whether the implementation of the NAO and regulatory decision had the potential to create such effects. ANCA, in its role as Competent Authority, was required to make a Screening Decision on whether AA was required. On 18 August 2021, having regard for the information provided in the AA Screening Report (published on ANCA's website), ANCA determined that there was the potential for impacts on European sites to occur as a result of implementing the NAO and RD.

8.1.2 Work Undertaken Related to Appropriate Assessment

Following the determination that AA was required in relation to the NAO and regulatory decision, ANCA prepared a Natura Impact Statement (NIS) for the purposes of AA, in accordance with the Regulations of 2011. The NIS documents the findings of an assessment undertaken of the effects of implementing the NAO and regulatory decision on relevant Natura 2000 sites. Undertaking this assessment has also allowed AA considerations to influence the development of the NAO itself.

The NAO Report sets out in more detail how AA considerations informed the development of the NAO. The NIS prepared for the purposes of AA is included with this DRD, and was subject to public consultation along with the DRD and related matters.

In summary, however, the NIS identifies the following potential impact pathways as a result of implementing the NAO and regulatory decision:

- The effects of increases in the level and frequency of noise, and visual disturbance events caused by increases in aircraft overflying of Natura 2000 sites and potentially, also by this overflying occurring at differing times of the day and night.
- The effects of changes to air quality, particularly increases in the concentrations of NOx and levels of nitrogen deposition, caused by increased numbers of aircraft overflying Natura 2000 sites.
- The effects of potential emergency fuel dumping from overflying aircraft affecting Natura 2000 sites directly, or indirectly through surface water pathways.

The NIS concludes that the NAO and RD will not have an adverse effect on the integrity of any Natura 2000 site. This conclusion is due to a number of reasons, including the following:

- Increases in overflying when compared with the likely future baseline are generally quite small.
- The altitudes and noise levels of aircraft when above identified Natura 2000 sites are outside of the ranges commonly considered, including by reference to the scientific literature reviewed, to be causes of disturbance.
- The qualifying interests and protected species of the Natura 2000 sites have already become habituated to noise and overflying more generally, and any increase as a result of implementation of the NAO and RD is unlikely to have further effects.
- That although increases in night time flights will occur, such increases will not result in a significant effect on the conservation objectives of the Natura 2000 sites within the relevant Zone of Influence.
- That increased numbers of flights are low enough that changes in air quality will also be small and will not affect the habitats within the relevant SACs (and SPAs) such that there is deterioration.
- That any potential fuel dumping will be infrequent and subject to control measures by the Airport which will reduce the likelihood for effects albeit the potential for such will be assessed in future planning applications or similar related to, for example, growth or airspace redesign.

The NIS had regard to the fact that the NAO and RD are not sufficient of themselves to unlock growth up to the limits of existing policy and that a future application for planning permission would be needed in that regard, which would require screening for AA and full AA where necessary. Much is unknown about the future operations of the Airport at this point, and would have to be detailed and assessed in any such planning application(s), particularly should the Applicant choose to make an application to remove the 32 mppa capacity limit. Furthermore, there is the potential, as the implementation of the NAO and RD seeks to establish to overfly fewer people, that the Applicant will seek to change the way the airspace is operated, with a focus on overflying less densely populated areas that are currently not overflown or overflying these same areas more frequently than is currently the case.

It is, however, important to note that more detailed changes in overflying would have to be assessed in such future planning applications by the competent authority responsible for planning airspace design that will be necessary to achieve the growth anticipated in existing policy, including importantly whether as a result of airspace re-design that might occur to help meet the requirements of the NAO and RD, routes over an SPA or SAC become more used than others. The assessment of those impacts is a matter for assessment when the relevant plans are adopted or planning is sought for relevant proposed developments and they are not constrained at this stage by the NAO or RD.

As per the Key Strategic Objectives (Section 4.2) of the Dublin Airport LAP 2020:

"All development proposals at Dublin Airport shall have regard to the requirement for environmental assessment including screening for Appropriate Assessment, Environmental Impact Assessment and Flood Risk Assessment in accordance with relevant legislation and guidelines".

8.2 Strategic Environmental Assessment (SEA)

ANCA has prepared an Environmental Report for the purposes of SEA of the regulatory decision and the NAO, in accordance with the European Communities (Environmental Assessment of Certain Plans and Programmes) Regulations 2004 (the "Regulations of 2004") following notice to the prescribed environmental authorities as required under Article 11 of the Regulations of 2004.

SEA is a systematic process to assess the environmental, social and economic effects of a proposed plan or programme. SEA allows environmental, as well as social and economic, considerations to be fully integrated into the preparation of plans and programmes prior to their final adoption. The objectives of an SEA are to promote sustainable development as it assesses the extent to which a plan or programme helps to achieve relevant environmental, social and economic objectives. In order to be most effective, an SEA should be integrated into the preparation of plans or programmes at their earliest stages thereby allowing the SEA process to influence the final output.

8.2.1 Need for Strategic Environmental Assessment

Directive 2001/42/EC (hereinafter referred to as the SEA Directive) requires Member States to ensure that certain plans and programmes are subject to a requirement for SEA. The Regulations of 2004 transpose the SEA Directive into Irish legislation.

In terms of the requirement to carry out environmental assessment, the SEA Regulations state:

'9. (1) Subject to sub-article (2), an environmental assessment shall be carried out for all plans and programmes (a) which are prepared for agriculture, forestry, fisheries, energy, industry, transport, waste management, water management, telecommunications and tourism, and which set the framework for future development consent of projects listed in Annexes I and II to the Environmental Impact Assessment Directive, or (b) which are not directly connected with or necessary to the management of a European site but, either individually or in combination with other plans, are likely to have a significant effect on any such site.

(2) A plan or programme referred to in sub-article (1) which determines the use of a small area at local level or a minor modification to a plan or programme referred to in sub-article (1) shall require an environmental assessment only where the competent authority determines that it is likely to have significant effects on the environment and, for this purpose, the competent authority shall make any necessary determination.

(3) A competent authority shall determine whether plans and programmes other than those referred to in sub-article (1), which set the framework for future development consent of projects, are likely to have significant effects on the environment.'

A 'development consent' in Irish law includes a planning permission for projects listed in Annexes I and II to the EIA Directive.

The regulatory decision that has been made in response to the planning application relates to transport. Even though the regulatory decision will be incorporated into an individual planning permission, it is imposing operating restrictions and mitigation measures that will determine whether or not future planning applications for development consent at Dublin Airport potentially give rise to the potential for a noise problem. It thereby guides the decisions that ANCA and the planning authority will make on those future applications. It also

results from an assessment against an NAO; it cannot be more restrictive than necessary to achieve the NAO. Accordingly, the NAO and RD may set the framework for future development consent of projects listed in Annexes I and II to the EIA Directive, including changes or extensions to airfields and airports with a basic runway length of 2,100 metres or more. The 'Plan' addressed through the Environmental Report therefore comprises the NAO and the RD, as two interlinked components, the NAO setting a framework for the RD, which in turn sets the framework for future applications for planning permission at Dublin Airport.

The specific purpose of SEA is to ensure that early consideration is given to environmental aspects when a plan or programme is in development. However, a plan or programme that determines the use of a small area at local level or a minor modification to a plan or programme only requires SEA if implementation of the plan or programme is considered likely to lead to significant environmental effects. Determining whether significant effects are considered to be likely, and therefore whether SEA applies, is completed through a process known as Screening.

ANCA, in its role as Competent Authority, was therefore required to make a Screening Determination on whether SEA applies. On 15 April 2021, having regard to information provided in the SEA Screening Report (published on ANCA's website), and submissions and observations provided by the prescribed Environmental Authorities, ANCA determined that there is potential for likely significant environmental effects to occur as a result of implementing the NAO and RD.

With ANCA having determined that the NAO and RD requires SEA, an SEA Scoping Report (published on ANCA's website) was subsequently produced to set out the proposed scope of the detailed environmental assessment and to facilitate consultation with the prescribed Environmental Authorities in that regard.

8.2.2 What Work has been Undertaken Related to Strategic Environmental Assessment?

Following the determination that SEA was required in relation to the NAO and regulatory decision, and the subsequent scoping exercise, ANCA prepared a draft Environmental Report for the purposes of SEA, in accordance with the Regulations of 2004. The Draft Environmental Report was subject to public consultation along with the DRD and related matters and has subsequently been updated to account for the submissions made during the the public consultation as well as modifications to the RD (set out in Chapter 14).

ANCA prepared the Environmental Report as part of its legal duty to carry out an SEA, but equally importantly the SEA process has informed the evolution of the NAO and RD, ensuring that the environmental, social and economic implications of the proposals have been considered throughout the development of those plans.

For example, the SEA process has fed into the development and selection of alternatives for both the NAO and the RD, ensuring that each alternative put forward for assessment is reasonable and realistic. The SEA alternatives assessment itself has enabled ANCA to understand the implications of the different noise measures for each of the environmental aspects (including particularly air quality, biodiversity, climate change, cultural heritage and landscape), ensuring that these were taken into account alongside noise, health and cost considerations.

The SEA assessed a total of five different alternatives for the NAO, with the best realistic alternative considered to be Alternative (1), with a specific short-term, health-based outcome reduction of 30% set for 2030 (following EC guidance), and further, more stringent outcome reductions of 40% and 50% set for 2035 and 2040 respectively. These latter outcome reductions go beyond EC guidance, yet are considered to be achievable, and will incentivise further initiatives and measures to reduce noise at Dublin Airport (including efficiency measures that will have broader environmental benefits). The best NAO alternative in SEA terms is therefore also the preferred alternative identified by ANCA through application of the Balanced Approach.

Further details of the SEA process in the context of the development of the NAO are set out in the NAO Report.

The SEA assessed a total of ten different alternatives for the RD. The best realistic alternative to Condition 5 was considered to be Alternative (iv), as not only would the proposed noise quota operate throughout the eight hours of the night, but there would be additional noise-related limits on the types of aircraft permitted to operate at night. The preferred alternative to Condition 5 identified by ANCA is therefore also the best alternative in SEA terms. The alternatives to Condition 3(d) i.e. the different runway use patterns, perform similarly in environmental terms, as the overall level of noise (and number of ATMs) remains the same, while the spatial distribution differs. In some locations overflying and noise levels increase, whereas in other locations overflying and noise levels decrease. The preferred alternative of ANCA, Alternative (vi) (i.e. runway use pattern 2) is therefore acceptable in SEA terms. Finally, ANCA's preferred alternative of the two considered in relation to the proposed voluntary Residential Sound Insulation Grant Scheme for residential dwellings also performed best in the SEA.

The key environmental changes which would occur as a result of having the airport operate with amended night restrictions associated with the NAO and RD are detailed below.

The main cause of adverse environmental effects is that, compared to the future baseline, the assessment case used in the SEA includes a c. 10% increase in passenger numbers (of 4.6 mppa by 2040) associated with the the Applicant's planning application; all of which are expected to occur at night.

With the 32 mppa cap still in place, the increase in passenger numbers is restricted to 1.6 mppa (in 2025), again all of which are expected to occur at night.

The increase in passenger numbers and associated night time ATMs facilitated by the NAO and RD is likely to cause minor negative effects on air quality (specifically for settlements located directly under the flightpaths within 2 km of Dublin Airport); biodiversity (due to more overflying of protected sites and species, though existing research suggests that the birds, cetaceans, and other flora and fauna for which nearby Natura 2000 sites are designated are habituated to overflying); carbon and climate change; noise and vibration; and population and health (due to more frequent noise episodes at night impacting on sleep).

The other specified components of the NAO seek to limit and reduce the long-term adverse effects of aircraft noise on health and quality of life, including through encouraging a switch to quieter and more efficient aircraft, and these are expected to have beneficial effects on each of these environmental aspects. However, though not within ANCA's remit, the Applicant could choose to deliver the expected outcomes of the NAO (i.e. reductions in the number of people adversely affected by noise) by increasing the angle of aircraft ascent to ascend more quickly, and / or changing airspace design to overfly less densely populated areas. Though these latter effects are indirect and uncertain, they could result in additional adverse impacts on air quality (though emissions from additional burnt fuel would affect a smaller area); biodiversity (through overflying of sites not previously overflown); and carbon emissions and climate change.

In terms of impacts relating specifically to the RD, amending Condition 3(d) to enable use of north runway during the period 23:00-23:59 and 06:00-06:59, with all landings to be from the east, and all take-offs to the west (i.e. runway use pattern P02) is expected to have additional minor negative effects on biodiversity (due to the increase in noise over Malahide Estuary SPA / SAC and Feltrim Hill pNHA), and population and health (due to the increase in noise over settlements including Ridgewood, Kilbrook, The Ward Cross, Coolquay, Mooreside and Rathlittle. Having said that, it should be noted that the alternative runway use patterns simply redistribute spatially the noise associated with the lifting of Condition 5. Runway use pattern P02 therefore, whilst causing an increase in noise for the people and species residing in the aforementioned locations, also causes a decrease in noise over Baldoyle Bay SPA / SAC / pNHA, Ireland's Eye SPA / SAC / pNHA, and settlements such as Ratoath and Dunshaughlin.

Finally, there are a number of interrelationships between the environmental aspects that have been addressed throughout the assessment of the NAO and RD. For example, a deterioration in air quality has the potential

to lead to impacts on biodiversity (especially pollution-sensitive habitats associated with SACs) and human health. For the NAO and RD, this is only relevant for locations directly beneath the flight paths within 2 km of the Airport, and thus air pollution is not considered to be an issue for biodiversity or human health in this case. An increase in noise also has the potential to lead to impacts on several of the other environmental aspects, as has been the focus of this assessment. For the NAO and RD, this increase in noise is expected to occur only at night, and so impacts on human health are of greatest concern; impacts on biodiversity have been deemed to be insignificant; whilst impacts on the use of cultural heritage and landscape assets and their settings are considered negligible.

Overall, the assessment of the NAO and RD revealed that there would be no significant adverse environmental effects as a result of implementing the preferred alternatives, i.e. Alternative (1) for the NAO and Alternatives (iv), (vi) and (x) for the RD. ANCA will monitor the effectiveness of these measures with regard to noise through the requirements of the NAO.

ANCA has carried out appropriate assessment and strategic environmental assessment in relation to the regulatory decision and the NAO. These processes involved preparation of an NIS and SEA Environmental Report, which were provided for public consultation along with the NAO and draft regulatory decision.

ANCA subsequently updated the NIS and SEA Environmental Report in response to submissions and observations received through public consultation. However, ANCA considered that no changes were required to the NAO and regulatory decision as a result of submissions and observations relevant to appropriate assessment and strategic environmental assessment. Further, the overall conclusions of the NIS and SEA Environmental Report regarding the impacts of the NAO and regulatory decision remained the same.

ANCA's responses to consultation on appropriate assessment and strategic environmental assessment, including changes to the NIS and SEA Environmental Report, are set out in more detail in Chapter 3.4 and 3.5 of the Consultation Report and in Section 5 of the SEA Environmental Report. ANCA has also updated Chapter 8 of this Report following consultation.

Having updated the Natura Impact Statement and SEA Environmental Report to take into account relevant matters raised in submissions and observations received during the public consultation period, ANCA proceeded to:

- adopt the final Natura Impact Statement and make a determination on appropriate assessment, and
- adopt the final SEA Environmental Report and SEA Statement, prior to making a regulatory decision.

ANCA will issue an SEA Statement setting out its findings on strategic environmental assessment, as required under the applicable regulations.

09

Cost Effectiveness Analysis

9 Cost Effectiveness Analysis

The Act of 2019 requires ANCA to evaluate the cost-effectiveness of noise mitigation measures and any proposed operating restrictions, with a view to determining the most cost-effective measure or combination of measures for achieving the Noise Abatement Objective (NAO). Annex II of the Aircraft Noise Regulation sets out guidance on assessing the cost-effectiveness of operating restrictions.[123]

ANCA, as the Competent Authority, has exclusive competence to determine whether a noise problem has arisen; define, restate or amend the NAO in response; assess the cost-effectiveness of noise mitigation measures and operating restrictions; and determine which measures and / or restrictions should apply.

In June 2020, prior to the Applicant making a formal application, ANCA provided guidance on how it intended to assess cost-effectiveness which is provided in Appendix I[124]. The Applicant has since made a formal application and provided its assessment of its proposals, including a cost-effectiveness analysis. Since commencing the formal process, ANCA has requested further information and clarifications to assist its cost-effectiveness evaluation through the Direction to Provide Information.[125]

In the following section, ANCA presents its cost-effectiveness evaluation. ANCA has developed this evaluation independently but has drawn on the analysis and modelling undertaken by the Applicant in support of the Application.

All of the monetary values in the cost-effectiveness analysis are presented in 2020 prices. The costs of each measure assessed within this cost-effectiveness analysis are presented in cumulative terms over the five-year period from 2022 to 2026. The year 2022 has been selected as the start as it is when the north runway is expected to become operational; while 2026 has been selected as it is the final year that the operating restrictions are expected to impose a cost. This has allowed ANCA to compare the options on a consistent time basis where the use of a different time horizon for the cost-effectiveness evaluation may lead to differing results.

To present the effectiveness of the different mitigation measures, ANCA has chosen a single effectiveness year, 2025. This is because 2025 has been identified as the peak year for noise exposure and, therefore, the peak year for health effects from noise exposure, according to the Applicant's noise modelling. As a result, the cost-effectiveness ratios presented in the analysis below are in the format:

Cumulative cost between 2022 and 2026 per person no longer impacted in 2025.

The full methodology and results are presented in Appendix J.

123 Regulation (EU) No 598/2014 of the European Parliament and of the Council on the establishment of rules and procedures with regard to the introduction of noise-related operating restrictions at Union airports within a Balanced Approach and repealing Directive 2002/30/EC, Available at https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32014R0598

124 Aircraft Noise Competent Authority (2020) ANCA interim response to pre-application consultation on cost-effectiveness, 9 June 2020.

125 Aircraft Noise Competent Authority (2021) Re: Direction 01 by the Competent Authority in relation to planning application F20A/0668 under Section 9(10) of the Aircraft Noise (Dublin Airport) Regulation Act 2019 to provide information and assessments for the purposes of an Assessment of the Noise Situation at Dublin Airport. Available at fingal.ie

9.1 Effectiveness Metric

To assess the cost-effectiveness of noise mitigation measures, an effectiveness metric (or metrics) needs to be selected that can be used to evaluate how well different mitigation measures perform against the NAO. As the outcomes targeted within the NAO are multi-faceted, ANCA selected two metrics for assessment:

Number of people HSD in 2025. The NAO sets targets for the number of people HA and HSD by 2030, 2035 and 2040. ANCA selected HSD as the relevant metric instead of HA as it relates more directly to night time noise exposure and, is therefore, a more relevant metric when assessing the performance of different measures for mitigating night time noise. ANCA has used 2025 as the assessment year as it is the peak year for noise exposure according to the Applicant's noise modelling and, therefore, the year when health effects from night-noise are highest.

Number of people exposed to a high noise impact in 2025, i.e., noise levels over 55 dB L_{night}. The NAO also sets targets for the number of people exposed to 55 dB L_{night} and 65 dB L_{den}. ANCA selected the 55 dB L_{night} metric over the 65 dB L_{den} metric as it relates more directly to night time noise exposure.

ANCA's approach differs to the approach used by the Applicant in that two metrics have been selected. ANCA has applied these throughout its cost-effectiveness analysis, rather than using different metrics at various stages of the cost-effectiveness analysis. The Applicant also used an additional metric: the number of people significantly adversely affected. This metric represents the number of people exposed to an increase in night noise exposure relative to 2018 as a result of the opening of the new runway. ANCA does not consider it appropriate to use this metric as it does not relate to the NAO. However, the NAO was not available to the Applicant at the time it prepared its own cost-effectiveness analysis, and accordingly could not be factored into the Applicant's identification of proposed metrics. The significantly adversely affected metric also forms part of the noise problem and, therefore, may be a relevant consideration when deciding between measures. A more detailed discussion on the choice of cost-effectiveness metrics is included in Appendix J.

9.2 Forecast Without New Measures

The Forecast Without New Measures is used as a scenario to test new measures against, i.e. it is the counterfactual against which the costs and impacts of all noise mitigation measures are assessed for compliance with the NAO. It has been created in line with the Draft Cost-Effectiveness Guidance issued by ANCA which is in reference to the Aircraft Noise Regulation (Appendix I).

The Forecast Without New Measures (Scenario P06) includes all existing and planned measures to manage aircraft noise, except for Conditions 3(d) and 5 of the North Runway Planning Permission. Conditions 3(d) and 5 are excluded as these are operating restrictions that the Applicant has applied to replace.

The Applicant's estimates of the noise impacts under the Forecast Without New Measures are presented in Table 9.1 below. To develop these estimates, the Applicant has forecast future flight movements and used this to forecast future noise levels around Dublin Airport, making assumptions around the fleet mix. Further details of Applicant's approach are provided in Appendix J.

Table 9.1 Forecast Without New Measures

	2018	2019	2022	2025	2030	2035	2040
ATMs (thousands)	232.3	238.0	175.7	235.9	235.9	235.9	235.9
Passengers (millions)	31.5	32.9	21.0	32.0	32.0	32.0	32.0
Population Highly Sleep Disturbed (% reduction from 2019 levels)	42,260	47,045	26,261 (-44%)	36,592 (-22%)	26,057 (-45%)	17,639 (-63%)	15,095 (-68%)
Population >55 dB L_{night} (% reduction from 2019 levels)	753	1,533	283 (-82%)	407 (-73%)	301 (-80%)	240 (-84%)	215 (-86%)

As can be seen in Table 9.1, noise exposure levels are expected to reduce over time despite aircraft numbers generally recovering to 2019 levels. This is due to the Applicant's assumptions around the evolution of the fleet mix, with newer, quieter aircraft gradually replacing older, noisier aircraft. Importantly, the Applicant's analysis shows that the NAO targets may be met under certain circumstances in the Forecast Without New Measures (i.e. without conditions 3(d) and 5 being in place. The number of people HSD in the Forecast Without New Measures is expected to reduce by 45% by 2030 compared with 2019 (against a target of 30%), 63% by 2035 (against a target of 40%), and 68% by 2040 (against a target of 50%).

Additionally, the figures in the table do not account for homes that the Applicant expects will have been insulated by 2025 under existing noise insulation schemes.

The Applicant anticipates that by 2025, all eligible homes under both the RNIS and HSIP will have been fully insulated. The assumption made by the Applicant is that insulation implies a 5 dB reduction in noise exposure levels. As a result, when we account for homes that will have been insulated by 2025, the number of people HSD in 2025 reduces further to 36,564 and the number of people exposed to a high noise impact in 2025 reduces to 16.

ANCA developed its cost-effectiveness analysis below to understand whether further measures can be cost-effectively introduced as a replacement for the operating restrictions contained within Conditions 3(d) and 5, and to understand the impact of the Applicant's proposed mitigation measures.

As part of this cost-effectiveness analysis, the impact of a Noise Quota Scheme to provide communities with certainty that the forecast noise reductions assumed within the Forecast Without New Measures materialise. This is considered in detail alongside the cost-effectiveness of operating restrictions.

9.3 Assessment of Noise Mitigation Measures

The Aircraft Noise Regulation requires that the Balanced Approach is adopted to manage aircraft noise, with operating restrictions only introduced once other measures have been fully considered. The four principal elements to aircraft noise management considered under the Balanced Approach are:

Reduction of noise at source. Refers to the setting of noise limits for aircraft in the form of aircraft noise standards and recommended practices for operating aircraft. The aim is for noise reducing technology to be incorporated into aircraft to reduce noise levels around airports.

Noise abatement operational procedures. These aim to reduce noise pollution around airports by optimising how aircraft use the facilities, including preferential runways and routes. They depend on the physical layout of an Airport and its surroundings.

Land use planning and management. This relates to how the land near to an Airport is used and encompasses zoning laws, building regulations, land purchasing and noise control schemes such as insulation programmes.

Operating restrictions. This includes restrictions on use of certain types of aircraft or establishing periods of time when the number of flights is restricted.

The Applicant has a mix of existing and planned measures designed to manage aircraft noise at Dublin Airport. Many of these measures are already in place, with others planned to be introduced by 2025. The Applicant has also identified several additional measures for managing aircraft noise, including a series of preferential runway patterns (which fall into the category of noise abatement operational procedures), and a new residential noise insulation scheme (which falls into the category of land use planning and management), which the Applicant evaluated as part of its cost- effectiveness analysis.

In the following sections, ANCA has considered each of the principal approaches to noise management. No additional measures were identified by either the Applicant or ANCA beyond those which are planned. ANCA undertook the cost-effectiveness of both additional measures (over and above the existing and planned mix) identified by the Applicant, and additional measures identified by ANCA. A comparison is then made of the cost-effectiveness of these measures relative to the cost-effectiveness of the existing operating restrictions contained within Conditions 3(d) and 5.

9.3.1 Night Time Preferential Runway Use and Runway Restriction Measures

These scenarios consider the combined effect of taking the relevant action in respect of both Conditions 3(d) and 5.

9.3.1.1 Cost of Measures

The different runway usage and runway restrictions do not themselves impose any direct financial cost on the Applicant or the aviation industry. However, the Applicant in its cost-effectiveness analysis identified two other impacts:

- Cost-savings. The Applicant has estimated the potential for cost savings from operating mostly a single runway for parts of the night period rather than two runways. The main saving was from needing one fewer air traffic controller.
- Indirect costs associated with delays. The Applicant also considered the potential for delays from managing air traffic movements over a single runway rather than two runways, but considered the impact to be negligible relative to the Forecast Without New Measures (Scenario P06).

In Table 9.2 below, ANCA has presented its estimate of the cost savings that operating each of the different runway use and runway restriction scenarios could offer. The scenarios that involve only using a single runway for parts of the night provide a cost saving, whereas the other runway patterns impose no cost.

Table 9.2: Cost savings under the different runway patterns over the period 2022-2026 (€ million, 2020 prices)

Runway Use and Restriction Scenario	Cumulative Costs (2022-2026)
P02	-1.7
P03	-
P04	-
P05	-
P07	-
P08	-
P09	-1.7
P10	-1.7
P12	-2.0
P13	-1.6

The estimates presented in the table above differ from those presented in the Applicant's cost-effectiveness analysis. There are three reasons for this:

- The Applicant only assessed the costs of its preferred runway pattern (Scenario P02), under which the north runway is not used between 00:00-05:59. ANCA's analysis extends this to all runway use and runway restriction scenarios.
- ANCA has assessed the cumulative costs over the period 2022 to 2026, whereas the Applicant has assessed the cumulative costs over the period 2022 to 2025.
- ANCA also considers the Applicant's estimate of the wage savings from needing fewer air traffic controllers to be an over-estimate. A different approach has therefore been taken to estimate these savings.

Further details on the method used to estimate savings are presented in Appendix J.

9.3.1.2 Effectiveness of Metrics

In Table 9.3 below, an analysis of the number of people HSD and exposed to the night time priority under the different runway patterns is presented. Scenario P09 is the most effective at minimising the number of people HSD in 2025, but (in absolute terms) none of the runway patterns are as effective as the Forecast Without New Measures at minimising the number of people exposed to the priority of 55 dB L_{night}. However, the table also shows that the difference, in effectiveness terms, between the runway patterns is small in comparison to the number of people HSD.

Based on the Applicant's modelling, and as outlined in Table 9.3, the NAO continues to be met under each of the runway use and restriction scenarios assessed[126].

126 P11 was not considered in this analysis, as it was found to not meet the objectives of the NAO.

Table 9.3: Effectiveness of different runway use and restriction scenarios in 2025 (before accounting for existing noise insulation schemes)

	Noise Impacts		Change relative to the Forecast Without New Measures (FWNM) (P06)	
	Population HSD	Population > 55 dB L_{night}	Population HSD	Population > 55 dB L_{night}
FWNM (P06)	36,592	407	-	-
Runway Use and Restriction Scenario (Forecast with new measures)				
P02	37,080	1,059	487	652
P03	35,757	1,055	-835	648
P04	35,260	737	-1,332	330
P05	36,363	412	-230	6
P07	36,699	989	106	582
P08	35,784	422	-808	15
P09	34,896	528	-1,696	121
P10	36,463	426	-129	19
P12	37,159	1,119	567	712
P13	36,275	1,055	-318	648

The Applicant has also compared the performance of the different runway patterns against its significantly adversely affected metric, which has been included below for reference. The Applicant's preferred measure (Scenario P02) is the most effective at minimising the number of people significantly adversely affected, i.e. it is the most effective at minimising the number of people newly affected by noise.

Table 9.4: Number of people significantly adversely affected in 2025[127]

Runway Use and Restriction Scenario (Forecast with new measures)	Total	Compared to Forecast Without New Measures (P06)
P02	1,879	-15,171
P03	3,677	-13,373
P04	23,414	6,364
P05	17,547	497
P07	4,629	-12,421
P08	14,984	-2,066
P09	22,379	5,329
P10	15,044	-2,006
P12	-	-
P13	-	-

127 Source: daa, A11267_19_CA437_2.0 Summary of Results Including Mitigation Excel Sheet
Note: The Applicant's analysis for number of people significantly adversely affected was not extended to Scenarios P12 and P13. However, ANCA would expect both of these measures to have substantially fewer people significantly adversely affected than the Forecast Without New Measures, with Scenario P12 more effective than Scenario P02 and Scenario P12 slightly less effective than Scenario P02.

The results in Table 9.4 above show that no single runway usage or runway restriction scenario is definitively the most effective at achieving the noise outcomes prioritised within the NAO. Performance between measures is similar and all scenarios meet the NAO outcomes of an improvement over the 2019 situation.

When comparing Table 9.3 and Table 9.4, the results illustrate the trade-off between minimising the overall health effects of aircraft noise (as demonstrated by the HSD and high noise impact metrics) and minimising the number of people who may experience significant change in night time noise (as demonstrated by the significantly adversely affected metrics). The measures that perform strongly under the HSD metric do not perform as strongly under the significantly adversely affected metric, and vice versa.

The Applicant's preferred measure minimises the number of people significantly adversely affected, which is not a prioritised outcome within the NAO but is a clear aspect of the noise problem. Several other measures also perform strongly under this metric, including Scenarios P03, P07, P12 and P13[126].

9.3.1.3 Cost-Effectiveness of Measures

Table 9.5 shows the cost-effectiveness, in monetary terms, of the runway use and runway restriction scenarios firstly in terms of reducing the number of people HSD in 2025, and secondly in terms of reducing the number of people exposed to high levels of night noise (i.e. greater than 55 dB L_{night}). The table shows that from a purely cost-effectiveness perspective, some of the scenarios (P02, P07 and P12) perform worse than the Forecast Without New Measures (Scenario P06) under both metrics. Under the HSD metric, Scenarios P09, P10 and P13 are all cost-effective with several other scenarios being cost-neutral, though all scenarios perform worse than the Forecast Without New Measures with respect to the night time priority.

Table 9.5: Cost-effectiveness of different runway patterns relative to the Forecast Without New Measures (FWNM) (€ per person, 2020 prices)[128]

Runway Use and Restriction Scenario (Forecast with new measures)	Population HSD	Population > 55 dB L_{night}
P02	Performs worse than FWNM	Performs worse than FWNM
P03	0	Performs worse than FWNM
P04	0	Performs worse than FWNM
P05	0	Performs worse than FWNM
P07	Performs worse than FWNM	Performs worse than FWNM
P08	0	Performs worse than FWNM
P09	Leads to cost savings	Performs worse than FWNM
P10	Leads to cost savings	Performs worse than FWNM
P12	Performs worse than FWNM	Performs worse than FWNM
P13	Leads to cost savings	Performs worse than FWNM

However, all of the runway patterns continue to meet the 2030, 2035 and 2040 targets as set out in the NAO with the Airport operating at its 32 mppa passenger cap. As such, ANCA considers that all scenarios can proceed to the next stage of the analysis. In this respect, ANCA's approach differs from that taken by the Applicant, which assessed only Scenario P02 on the basis that it performed most strongly when considering the number of people experiencing significant effects with respect to changes in night time noise exposure.

128 Source: daa. Note: daa's analysis for number of people significantly adversely affected was not extended to Scenarios P12 and P13. However, we expect both of these measures to have substantially fewer people SAA than the FWNM, with Scenario P12 more effective than Scenario P02 and Scenario P12 slightly less effective than Scenario P02.

As highlighted earlier this metric is not part of the NAO but it does relate to the third aspect of the noise problem identified with the Application. The evidence from the Applicant is that Scenario P02 would be the best at reducing this aspect of the noise problem, albeit with a higher number of people being exposed to aircraft noise above the night time priority set out in the NAO.

9.3.2 Residential Sound Insulation Grant Scheme (RSIGS)

Land-use planning and management refers to a range of possible measures that seek to ensure that the activities that take place around an airport are compatible with aviation. This includes:

- Locating new airports away from noise-sensitive areas, such as densely populated areas; and
- Introducing land-use zoning around airports to minimise the number of houses and other noise-sensitive premises built in close proximity.

The Applicant has proposed a new Residential Sound Insulation Grant Scheme (RSIGS) for dwellings which fall within eligible noise contours. As proposed the RSIGS will provide a grant in the sum of €20,000 for noise insulation to residential dwellings exposed to noise levels exceeding 55 dB L_{night} in 2025 and is aimed at mitigating noise from the operation of the north runway at night but would potentially help some dwellings already affected by night time noise from south runway operations.

Based on ANCA's review of the proposed scheme, there are additional ways in which eligibility to the proposed scheme could be determined having regard to the forecast and historic years. Table 9.6 presents the list of options assessed in this cost-effectiveness analysis.

Table 9.6: Noise insulation measures based on different RSIGS eligibility criteria

Measure	RSIGS Eligibility Criterion The Applicant's Proposed Eligibility Criterion
RSIGS B	A €20,000 grant for noise insulation given to dwellings exposed to noise levels exceeding 55 dB L_{night} in 2025 and not eligible under existing noise insulation schemes
Additional Measures Assessed by ANCA	
RSIGS A	€20,000 grant for dwellings exposed to noise levels exceeding 55 dB L_{night} in 2022 and not eligible under existing noise insulation schemes
RSIGS C1	€20,000 grant for dwellings exposed to noise levels that, in 2022, either a) exceed 55 dB, or b) exceed 50 dB and are 9 dB higher than in 2018, provided they are not eligible under existing noise insulation schemes
RSIGS C2	€20,000 grant for dwellings exposed to noise levels that, in 2025, either a) exceed 55 dB, or b) exceed 50 dB and are 9 dB higher than in 2018, provided they are not eligible under existing noise insulation schemes
RSIGS C3	€20,000 grant for dwellings exposed to noise levels that, in 2022, either a) exceed 55 dB, or b) exceed 50 dB and are 9 dB higher than in 2019, provided they are not eligible under existing noise insulation schemes
RSIGS C4	€20,000 grant for dwellings exposed to noise levels that, in 2025, either a) exceed 55 dB, or b) exceed 50 dB and are 9 dB higher than in 2019, provided they are not eligible under existing noise insulation schemes
RSIGS C5	€20,000 grant for dwellings exposed to noise levels that, in 2022, either a) exceed 55 dB, or b) exceed 50 dB and are 9 dB higher than in a scenario with the operating restrictions, provided they are not eligible under existing noise insulation schemes
RSIGS C6	€20,000 grant for dwellings exposed to noise levels that, in 2025, either a) exceed 55 dB, or b) exceed 50 dB and are 9 dB higher than in a scenario with the operating restrictions, provided they are not eligible under existing noise insulation schemes

9.3.2.1 Cost of Measures

The Applicant states that the proposed RSIGS scheme will operate between 2022 and 2024, with set-up costs of €300,000 and annual administrative costs of €100,000 per year. The grant itself is €20,000 per eligible dwelling.

Based on these cost estimates, and assuming there is 100% uptake of the grant[129], ANCA has estimated the cumulative costs of the eligibility options for the insulation scheme as outlined in Table 9.6. As the eligibility of the noise insulation scheme is based on noise exposure, it is assumed that the number of households eligible for noise insulation, and therefore the cost, will vary depending on the runway pattern.

In Table 9.7 the cumulative costs of the noise insulation schemes are presented assuming Scenario P06 (i.e. the Forecast Without New Measures), and the range of costs under the other runway usage and runway restriction scenarios.

Table 9.7: Total costs associated with RSIGS scheme under different eligibility criteria, 2022-26 (€ million, 2020 prices)

RSIGS Eligibility Option	Eligibility set based on 2022 or 2025 noise exposure?	Insulation costs under Scenario P06 (FWNM)	Full range of insulation costs
RSIGS A	2022	0.6	0.6 to 1.0
RSIGS B	2025	0.6	0.7 to 7.2
RSIGS C1	2022	4.1	0.9 to 4.1
RSIGS C2	2025	16.7	4.5 to 41.5
RSIGS C3	2022	3.9	0.6 to 3.9
RSIGS C4	2025	14.3	4.0 to 40.8
RSIGS C5	2022	13.6	1.1 to 13.6
RSIGS C6	2025	24.6	5.8 to 50.6

The eligibility criteria which are based on exposure levels in 2025 lead to the highest noise insulation costs. This is unsurprising as 2025 is the peak year for noise exposure. Therefore, more dwellings will be eligible for the insulation scheme, and the costs of the scheme will also be higher. This effect is most notable for noise insulation measure C6, where eligibility is extended to households that will experience materially higher noise levels in 2025 than they would experience if the operating restrictions were retained.

9.3.2.2 Effectiveness of Measures

In Table 9.8 the change in the number of people HSD and exposed to the night time priority are presented for the different noise insulation options. These impacts are presented assuming Scenario P06 (i.e. the forecast without new measures) with the full range of impacts under the other scenarios also presented. As can be seen, the range of impacts varies substantially across the runway use and runway restriction scenarios, due to differences in the noise exposure levels (which determine eligibility).

129 This is a simplifying assumption, but is supported by the high uptake of daa's existing sound insulation schemes

Table 9.8: Change in people highly sleep disturbed or exposed to high noise impact following insulation, 2025[130]

RSIGS Eligibility Option	Effectiveness under Scenario P06 (FWNM)		Full Effectiveness Range	
	Population HSD	Population > 55 dB L_{night}	Population HSD	Population > 55 dB L_{night}
RSIGS A	-1	-14	-1 to -5	-14 to -80
RSIGS B	-1	-16	-1 to -59	-16 to -906
RSIGS C1	-27	-14	-4 to -27	-14 to -80
RSIGS C2	-123	-16	-31 to -329	-16 to -906
RSIGS C3	-26	-14	-1 to -26	-14 to -80
RSIGS C4	-105	-16	-27 to -324	-16 to -906
RSIGS C5	-97	-14	-5 to -97	-14 to -80
RSIGS C6	-181	-16	-46 to -396	-16 to -906

Where the eligibility is set based on exposure in 2025 (B, C2, C4 and C6) this is most effective in terms of total reduction in number of people HSD or exposed to the night time priority, as they result in more households being insulated.

However, it is important to put the change in the number of people HSD into context – the reduction in the number of HSD people as a result of insulation is modest compared to how many people remain HSD, regardless of how the eligibility of the insulation scheme is set. However, the noise insulation scheme is effective at reducing the number of people exposed to aircraft noise levels above the night time priority set in the NAO to zero.

Table 9.9 below shows the number of people that remain HSD or exposed to high noise impacts after accounting for existing insulation schemes (RNIS and HSIP) and the proposed noise insulation scheme (RSIGS). The table also shows which combination of runway pattern and noise insulation scheme minimises the number of people HSD or exposed to high noise impacts.

130 Source: CEPA analysis of the Applicant's data and assumptions

Table 9.9: Number of highly sleep disturbed or exposed to high noise impact following insulation under RSIGS, RNIS and HSIP, 2025

RSIGS Eligibility Option	Under Scenario P06 (Forecast Without New Measures)		Scenario with the lowest number of people affected	
	Population HSD	Population > 55 dB L_{night}	Population HSD	Population > 55 dB L_{night}
RSIGS A	36,563	0	35,722 (P03)	0 (All except P04)
RSIGS B	36,563	0	34,860 (P09)	0 (All except P04)
RSIGS C1	36,537	0	35,715 (P03)	0 (All except P04)
RSIGS C2	36,441	0	35,640 (P08)	0 (All except P04)
RSIGS C3	36,537	0	35,717 (P03)	0 (All except P04)
RSIGS C4	36,459	0	35,662 (P08)	0 (All except P04)
RSIGS C5	36,467	0	35,666 (P08)	0 (All except P04)
RSIGS C6	36,382	0	34,542 (P09)	0 (All except P04)

The table demonstrates how the eligibility can collectively reduce the number of people exposed to aircraft noise exposure above the night time priority to zero.

9.3.2.3 Cost-Effectiveness of Measures

Table 9.2: Cost savings under the different runway patterns over the period 2022-2026 (€ million, 2020 prices) shows the cost-effectiveness of the different noise insulation eligibility options in terms of reducing the number of people HSD or exposed to noise above the night time priority, in 2025. The cost-effectiveness ratio is the cost (in €) per person no longer impacted, under the HSD metric or high noise impact metric, after being insulated. Therefore, the measure with the lowest cost-effectiveness ratios is the most cost-effective.

As with the previous tables, we present the cost-effectiveness ratio under Scenario P06 (Forecast Without New Measures) and the full range of cost-effectiveness ratios under the other runway patterns.

Table 9.10: Cost-effectiveness of insulation scheme (Residential Noise Insulation Grant Scheme) (€ per person no longer impacted)[131]

RSIGS Eligibility Option	Under Scenario P06 (Forecast Without New Measures)		Scenario with the lowest number of people affected	
	Population HSD	Population > 55 dB L_{night}	Population HSD	Population > 55 dB L_{night}
RSIGS A	663,000	44,000	220k to 663k	13k to 44k
RSIGS B	555,000	38,000	123k to 555k	7k to 38k
RSIGS C1	149,000	296,000	149k to 264k	21k to 296k
RSIGS C2	136,000	1,035,000	123k to 147k	7k to 1,035k
RSIGS C3	150,000	287,000	150k to 524k	20k to 287k
RSIGS C4	137,000	886,000	123k to 149k	7k to 886k
RSIGS C5	140,000	988,000	140k to 224k	33k to 988k
RSIGS C6	136,000	1,520,000	123k to 140k	7k to 1,520k

131 Source: CEPA analysis of daa data and assumptions. Note: Cost-effectiveness ratios are rounded to nearest thousand

The results show that insulation can be a relatively expensive noise mitigation measure, particularly if the eligibility is poorly targeted against the chosen noise outcomes. For example, noise insulation variants A and B are most cost-effective at reducing the number of people exposed above the night time priority. This is because only households that are exposed to those impacts are eligible for insulation under these eligibility options.

The results also show that insulation schemes that are based on 2025 exposure levels are generally more cost effective than those that are based on 2022 exposure levels. There are two reasons for this:

- More households are eligible under these schemes, which spreads the overheads, therefore reducing the overall percentage of fixed costs, thus lowering the cost per person no longer impacted.
- Setting eligibility based on 2022 noise exposure results in the insulation of some households who would have benefitted from reduced noise exposure regardless (due to the background reduction in aircraft noisiness over time).

As a result, ANCA has not considered proceeding with eligibility options that are based on 2022 noise exposure levels preferring instead to focus on setting eligibility based on the forecasts provided with the Application for 2025.

9.3.2.4 Overall Cost-Effectiveness

ANCA now considers the combined effect of changing the runway pattern scenario and implementing a noise insulation scheme. Here, consideration has been given to the impact of changing the runway pattern on existing noise insulation schemes as changing the runway pattern changes the numbers of households that are eligible for noise insulation under the existing schemes, which can increase insulation costs for the Applicant but also reduce the noise impact on households.

Table 9.11: Change in number of people HSD in 2025 compared against the Forecast Without New Measures, after accounting for the impact of changing the runway pattern and of insulating homes under RNIS, HSIP and RSIGS[132]

Scenario	Highly Sleep Disturbed			
	B	C2	C4	C6
Scenario P06 (FWNM)	-1	-123	-105	-181
Scenario P02	442	442	442	439
Scenario P03	-881	-885	-884	-922
Scenario P04	-1,367	-1,656	-1,651	-1,723
Scenario P05	-231	-352	-335	-425
Scenario P7	65	62	62	35
Scenario P08	-810	-924	-902	-993
Scenario P09	-1,704	-1,909	-1,898	-2,022
Scenario P10	-131	-161	-157	-219
Scenario P12	506	506	506	505
Scenario P13	-364	-366	-365	-393

132 Source: CEPA analysis of daa data and assumptions

Under the HSD metric, the most effective combination of measures is Scenario P09 with noise insulation variant C6, which results in just over 2,000 people no longer being HSD. For context, 34,542 people remain HSD in 2025. However, with reference to the priority almost all of the measures are fully effective at reducing the number of people exposed to noise levels over 55 dB L_{night} to 0, as shown in Table 9.12.

Table 9.12: Change in number of people exposed to the night time priority of 55 dB L_{night} in 2025 compared against the Forecast Without New Measures after accounting for the impact of changing the runway pattern and of insulating homes under RNIS, HSIP and RSIGS[133]

Scenario	> 55 dB L_{night}			
	B	C2	C4	C6
Scenario P06 (FWNM)	-16	-16	-16	-16
Scenario P02	-16	-16	-16	-16
Scenario P03	-16	-16	-16	-16
Scenario P04	-14	-14	-14	-14
Scenario P05	-16	-16	-16	-16
Scenario P7	-16	-16	-16	-16
Scenario P08	-16	-16	-16	-16
Scenario P09	-16	-16	-16	-16
Scenario P10	-16	-16	-16	-16
Scenario P12	-16	-16	-16	-16
Scenario P13	-16	-16	-16	-16

In Table 9.13 and Table 9.14, the cost-effectiveness of the combined measures in terms of reducing the number of people HSD and exposed to the night time priority is presented. Here, the additional cost of insulating homes that become eligible under existing schemes is also accounted, which would not otherwise be eligible in the Forecast Without New Measures. Items highlighted in red are measures that do not have a cost-effectiveness ratio as they perform worse than the Forecast Without New Measures. Items highlighted in green are measures that do not have a cost-effectiveness ratio as they lead to cost savings.

133 Source: CEPA analysis of daa data and assumptions

Table 9.13: Cost-effectiveness per person no longer HSD in 2025, (€ per person, 2020 prices)[134]

Scenario	Insulation Eligibility Option			
	RSIGS B	RSIGS C2	RSIGS C4	RSIGS C6
Scenario P06 (FWNM)	520,000	136,000	137,000	136,000
Scenario P02	Worse than FWNM	Worse than FWNM	Worse than FWNM	Worse than FWNM
Scenario P03	6,000	7,000	7,000	13,000
Scenario P04	4,000	25,000	25,000	29,000
Scenario P05	3,000	47,000	43,000	63,000
Scenario P7	Worse than FWNM	Worse than FWNM	Worse than FWNM	Worse than FWNM
Scenario P08	1,000	17,000	14,000	25,000
Scenario P09	0	14,000	13,000	21,000
Scenario P10	Cost Savings	18,000	15,000	50,000
Scenario P12	Worse than FWNM	Worse than FWNM	Worse than FWNM	Worse than FWNM
Scenario P13	11,000	12,000	12,000	21,000

Table 9.14: Cost-effectiveness per person no longer exposed to night time priority of > 55 dB L_{night} in 2025, (€ per person, 2020 prices)[135]

Scenario	Insulation Eligibility Option			
	RSIGS B	RSIGS C2	RSIGS C4	RSIGS C6
Scenario P06 (FWNM)	36,000	1,035,000	886,000	1,530,000
Scenario P02	242,000	245,000	242,000	277,000
Scenario P03	354,000	385,000	377,000	708,000
Scenario P04	363,000	2,987,000	2,942,000	3,644,000
Scenario P05	38,000	1,033,000	889,000	1,653,000
Scenario P7	325,000	350,000	346,000	580,000
Scenario P08	43,000	976,000	797,000	1,562,000
Scenario P09	Cost Savings	1,640,000	1,553,000	2,575,000
Scenario P10	Cost Savings	178,000	148,000	680,000
Scenario P12	333,000	333,000	333,000	346,000
Scenario P13	251,000	277,000	260,000	511,000

134 Source: CEPA analysis of daa data and assumptions provided in reporting template
Note: Items highlighted in red are measures that perform worse than the Forecast Without New Measures. Items highlighted in green are measures that lead to cost savings.

135 Source: CEPA analysis of daa data and assumptions provided in reporting template
Note: Items highlighted in red are measures that perform worse than the FWNM. Items highlighted in green are measures that lead to cost savings.

Looking at the differences between the scenarios in more detail, the noise insulation variant B is more cost effective than the alternatives, but is less effective overall. In other words, it has less of an effect in terms of reducing the number of people HSD than the other noise insulation schemes.

When looking at the different runway use or runway restriction scenarios, there is variation in cost-effectiveness, but there is no single measure that consistently performs better than the others:

- The Applicant's preferred runway preference and restriction scenario is Scenario P02 with a noise insulation eligibility variant B. This results in an increase in the number of people HSD compared to the Forecast Without New Measures but is relatively cost effective at minimising the number of people exposed to the night time priority. As mentioned previously, it also performs well at minimising the number of people forecast to experience significant adverse changes in night time noise exposure.
- Overall, it could be considered that the most cost-effective combination of measures occurs with Scenario P10 with noise insulation eligibility variant B. This combination of measures leads to cost savings while reducing the population HSD and exposed to the night time priority. However, Scenario P10 performs less effectively when it comes to minimising the number of people significantly adversely affected and is worse in this respect to the Applicant's preferred scenario. It is also one of the least effective measures, in that it does not have a very large effect in terms of reducing the number of people HSD.
- Scenario P09 is relatively cost-effective when targeting the number of people HSD but less so when targeting the number of people exposed to noise levels exceeding the night time priority. It also generally has the highest levels of effectiveness under the HSD and night time priority metrics, but leads to more people significantly adversely affected (i.e. it leads to more people experiencing an increase in noise relative to historic levels).
- Scenario P13 is also generally cost-effective under both the HSD and night time noise priority metrics, though this depends somewhat on the noise insulation option assumed. It also delivers reductions in the number of people HSD and exposed to noise levels exceeding the night time noise priority, and it is likely to perform well at minimising the number of people significantly adversely affected.

Generally, we consider that all scenarios assessed can be considered suitable, as they all continue to meet the targets set out in the NAO in the context of the Application and none of them consistently underperforms the others when having regard for all metrics considered. However, in the following section, we test only a subset of these against the operating restrictions to make it easier to compare them. These are as follows:

The Applicant's preferred measures, which is Scenario P02 with noise insulation eligibility variant B.

A more effective variant of the Applicant's preferred measure. The Applicant's preferred measure performs worse than the Forecast Without New Measures in terms of reducing the number of people HSD. We therefore consider a variant of this measure that performs better in terms of reducing the number of people HSD – Scenario P13 with noise insulation variant C6.

9.3.3 Operating Restrictions

Operating restrictions include measures such as restrictions on certain types of aircraft or periods of time when the number of flights is restricted. In our analysis, we assess two types of operating restrictions, as presented in Table 9.15 below.

Table 9.15: Operating Restrictions

Measure	Description The Applicant's Assessed Options
Permitted Operations	Retain existing restrictions currently due to be introduced on the opening of the new north runway: Condition 3(d) – Runway 10L-28R shall not be used for take-off or landing between 23:00-07:00. Condition 5 – The average number of night time aircraft movements at Dublin Airport shall not exceed 65 per night (between 23:00-07:00) when measured over the 92-day modelling period.
The Applicant's Proposed Noise Quota Scheme	Annual noise quota limit of 7,990 between the hours of 23:00-05:59, with noise related limits on aircraft permitted to operate at night.
Additional Measures Assessed by ANCA	
Alternative Noise Quota Scheme	Annual noise quota limit of 16,260 between the hours of 23:00-06:59, with noise related limits on aircraft permitted to operate at night.
Scenario P11	Retain Condition 3(d) only – Runway 10L-28R shall not be used for take-off or landing between 23:00-07:00.

The Permitted Operations scenario are the operating restrictions currently due to be introduced in 2022 when operations commence on the new north runway as set out in Conditions 3(d) and Condition 5 of the North Runway Planning Permission. As such, it is necessary to compare the cost-effectiveness of this scenario against alternatives.

Scenario P11, which involves retaining Condition 3(d) but not Condition 5, has been ruled out at an earlier stage of the analysis as it is expected to lead to an increase in the number of people exposed to noise levels exceeding 55 dB L_{night}, relative to 2019.

ANCA has also considered the cost-effectiveness of a Noise Quota Scheme as it has been proposed by the Applicant as a replacement to the operating restrictions contained within the Permitted Operations scenario.

The Noise Quota Scheme creates an annual limit on the volume of noise generated by aircraft during the night period, using the Quota Count (QC) system. Each aircraft type is given a QC rating depending on how much noise it generates. If there is a risk that the total QC rating of all the night flights flown in a year will breach the quota limit, it will impose an operating restriction. Airlines will either be required to fly a quieter aircraft with a lower QC, or not operate at all.

The Applicant proposed a Noise Quota Scheme that would create an annual noise quota limit for 6.5 hours of the night period. The limit was set such that it would not impose any operating restrictions based on the Applicant's forecasts in terms of ATMs and the corresponding fleet mix. ANCA has assessed an additional measure that extends the Noise Quota Scheme to cover the full night period and introduces restrictions on certain aircraft types based on their QC from 2025.

9.3.3.1 Cost of Measures – Permitted Operations

The Applicant assessed the cost of the permitted operations scenario to be €1,396 million over the period 2022-2025, based on the Applicant's consultant's assessment of the economic impact of the operating restrictions. The Applicant used an economic impact methodology, that seeks to value lost economic output as a result of the operating restrictions, estimating:

- The 'direct' loss in economic activity within the aviation sector from fewer flights and fewer passengers.
- 'Indirect' losses in economic activity incurred by the wider supply chain.
- 'Catalytic' losses in economic activity based on the wider relationship between aviation and economic growth.

ANCA has taken a more stringent approach that accounted for displacement effects – the concept that less spending on aviation would lead to more spending elsewhere in the economy. Without accounting for these effects, the Applicant's estimates of the direct and indirect losses are likely to be significantly overstated. Additionally, the Applicant's approach for assessing the costs of operating restrictions is inconsistent with the treatment of costs elsewhere in the Applicant's cost-effectiveness analysis. Needing fewer air traffic controllers due to runway closures is treated as cost saving, whereas needing fewer airport and airline staff as a result of operating restrictions is treated as a cost due to lower economic output.

As a result of these deficiencies, which are somewhat inherent in economic impact methodologies, this approach is not commonly used for economic appraisal in Ireland (or globally). ANCA has therefore used a different approach, although the Applicant's estimate of catalytic losses has been retained for the ANCA cost-effectiveness analysis. The ANCA cost-effectiveness analysis approach identifies four key impacts:

Loss in value to passengers no longer able to travel – ANCA has estimated this by proxy by considering how much ticket prices would have to rise to reduce demand by enough to meet the capacity constraints introduced by the operating restrictions.

Wider losses to the economy from having less connectivity – There is evidence to suggest that improved air connectivity leads to higher economic growth. However, the precise relationship is highly uncertain. As ANCA does not have detailed flight schedules from the Applicant as these are commercially sensitive, it is not possible to separately estimate this effect, but the Applicant's estimate for the 'catalytic' impacts of the operating restrictions as our upper bound estimate can be used.

Air traffic controller savings from only operating a single runway during the night period – This was not assessed by the Applicant for the operating restrictions measures, but was assessed for the other measures.

Lower profits for airlines from higher airport charges – As most of Dublin Airport's other costs are fixed, it will have to spread those costs over a smaller passenger base meaning higher charges for everybody else. This will lead to lower profits for airlines.

The detailed methodology used for these calculations is set out in Appendix J. Using this methodology ANCA assess that the costs of the permitted operations scenario to range from €88 million to €1,023 million over the period 2022-26.

9.3.3.2 Noise Quota Schemes

Whether the Noise Quota Scheme will impose a cost will depend on how tight the restriction is and the state of technology available to airlines.

- If there is no risk of the quota limit being breached or the QC restriction acting as a constraint on airline operating plans, there would be no cost to airlines.
- If there is a risk of the quota limit being breached or the QC restriction acting as a constraint, airlines may choose to "shuffle" their fleet so that their quietest aircraft are in use during the night period, with noisier aircraft in use during the day period or at other airports. This may impose a cost on airlines in terms of reduced operational efficiency. However, fleet shuffling is less likely to be an option for airlines at Dublin Airport as many are based at the airport and, therefore, have less scope for shuffling their fleet.
- If airlines are unable to shuffle their fleet in order to meet the restrictions, their next option would be to bring forward investment in quieter aircraft. This would present an opportunity cost to airlines.
- If the technology does not exist for airlines to replace their existing fleet, their final option would be to schedule a smaller aircraft, which are typically quieter, or opt not to schedule a flight at that time.

The Applicant's modelling shows that the annual night quota count (i.e. over the period 23:00 to 06:59) will be highest in 2025, at 15,892. This suggests that the noise quota limit of 16,260 suggested by ANCA can be met without imposing any restrictions on how an airline may wish to operate from the airport.

The Applicant's forecasts also shows that the quota limit on individual aircraft does not restrict operations up to 2030 as there are no aircraft forecast which have a QC rating of 4.0 of more on take-off or 2.0 or more on landing. From 2030, when aircraft with a QC rating of 2.0 or more are restricted from taking off during the night period, and aircraft with a QC rating of 1.0 or more are restricted from arriving during the night period, there may be an impact on airline operations. The Applicant's modelling suggests that approximately 12% of the aircraft forecast in the night period in 2030 would be restricted under the proposed QC restrictions. This may result in a cost to certain operators but would also likely improve the noise forecasts. As ANCA's appraisal only considers costs over the five-year period covering 2022-26, the cost of the scheme is estimated to be zero.

ANCA recognise that there may be a cost (and an improvement in noise impacts) when considering a longer time horizon.

It is also possible that ATM growth increases more quickly than forecast by the Applicant, and / or the Applicant's assumptions around fleet replacement are optimistic. Under such a scenario, there would be a cost to the Noise Quota Scheme over the period 2022-26. The Noise Quota Scheme effectively guards against the Applicant's forecasts being optimistic.

9.3.3.3 Effectiveness of Measures

As the Balanced Approach requires ANCA to consider operating restrictions only after other alternatives have been fully considered, it is necessary for ANCA to compare the performance of operating restrictions against alternative measures.

Below, the operating restrictions measures are compared to four other measures that do not include operating restrictions:[136]

Table 9.16 compares the effectiveness of the measures compared with the Forecast Without New Measures, and shows the number of people that remain HSD or exposed to high noise impact following the implementation of the measures.

Table 9.16: Reduction in people impacted in 2025 under different measures[137]

Measure	Number of people no longer impacted compared with Forecast Without New Measures		Number of people impacted following measure	
	Population HSD	Population > 55 dB L_{night}	Population HSD	Population > 55 dB L_{night}
Permitted Operations	-14,083	-16	22,481	0
Applicant's Noise Quota Scheme	0	0	36,564	16
Alternative Noise Quota Scheme	0	0	36,564	16
Most effective measure under HSD metric	-2,022	-16	34,542	0
Most cost-effective measure	-219	-16	36,345	0

This table shows that the operating restrictions within the Permitted Operations scenario are by far the most effective at reducing the number of people HSD. However, as discussed previously, these restrictions are not necessary to achieve the targets set out in the NAO. The other measures do vary in their effectiveness, but the differences between them are relatively small. This analysis underlines the analysis covered previously in the report which demonstrates that the biggest impact of the relevant action as applied is to replace Condition 5 of the North Runway Planning Permission.

136 Note that it was not possible to derive effectiveness measure Permitted Operations Scenario for Significantly Adversely Affected people due to data not being available.

137 Source: CEPA analysis of daa data and assumptions provided in reporting template

9.3.3.4 Cost-Effectiveness of Measures

Table 9.17 presents the cost-effectiveness of the different measures against the two metrics set by the NAO for night time noise. Given the uncertainty around the costs imposed by the Permitted Operations scenario, the cost-effectiveness is presented as a range.

Table 9.17: Cost-effectiveness of different measures relative to the Forecast Without New Measures (FWNM) (€ per person, 2020 prices)[138]

Measure	HSD	Population > 55 dB L_{night}
Permitted Operations	6,000 to 73,000	694,000 to 8,032,000
Applicant's Noise Quota Scheme	0	0
ANCA Noise Quota Scheme	0	0
Most effective measure under HSD metric	21,000	2,575,000
Most cost-effective measure	Cost savings	Cost savings
The Applicant's Preferred Option	Performs worse than FWNM	242,000

From a purely cost-effectiveness perspective, alternating between using the north runway and south runway over the period 00:00-05:59 with noise insulation variant B (insulating homes exposed to noise greater than 55 dB L_{night}) is the most cost-effective under both metrics. However, as discussed previously, it does not perform as well in minimising the number of people experiencing significant adverse noise changes and has limited effectiveness.

The table also shows that when looking at the outcomes targeted by the NAO, particularly the HSD metric, the measure preferred by the Applicant (Scenario P02 with noise insulation variant B) does not perform well. However, it does perform well against minimising the number of people experiencing significant noise changes (i.e. significantly adversely affected), which is an important part of the noise problem.

Scenario P13, in isolation, is one of the most cost-effective runway use and restriction scenarios. When combined with insulation option C6, the combination of measures is not necessarily the most cost effective under the outcomes targeted by the NAO. However, it does achieve an improvement under both outcomes targeted by the NAO, and under the significantly adversely affected metric.

The lower bound estimate of the cost-effectiveness of the Permitted Operations scenario, suggests it is possible that the restrictions could be more cost-effective than some of the alternatives. However, that is assuming the most optimistic outcome in terms of costs.

138 Cells which are red do not result in an improvement in the noise situation. Cells with a number provide a noise reduction benefit and the value is the cost per person required to deliver that benefit. Cells which are green provide a noise reduction benefit and deliver a cost saving at the same time. Therefore, when a noise benefit is delivered, large values achieve it at the highest cost, small values achieve it a lower cost, and green cells achieve it with no cost, indeed they deliver a cost saving.

9.3.4 Summary of ANCA's Analysis

The analysis presented by ANCA can be summarised as follows:

For Dublin Airport to meet its forecasts in 2025 with Condition 5 either revoked or replaced, noise impacts will need to increase above those forecast in 2025 without relevant action i.e. the noise situation. However, these impacts in overall terms will be lower than what occurred in 2019 and in this respect the relevant action can meet the NAO.

The permitted operations whilst being extremely effective in reducing noise impacts in terms of population HSD and the night time priority are costly. The analysis shows that the existing restrictions are not cost-effective when compared to the alternatives considered.

Replacing Condition 5 with a noise quota scheme is a much more cost-effective means of managing and limiting aircraft noise impacts. Such schemes provide security of meeting outcomes whereas revoking Condition 5 altogether would not. This is particularly the case over the period to 2030 before the first reduction in HA and HSD outcomes set by the NAO needs to be achieved.

By retaining Condition 3(d) and allowing only aircraft to use the south runway at night will lead to increases in the number of people exposed to aircraft noise above the night time priority. In this respect, single south runway operations (Scenario P11) would fail to meet the NAO.

The analysis shows that all other runway use and restriction scenarios considered have various strengths and weaknesses. For example, a scenario which may perform well with respect to reducing population HSD may perform badly in terms of introducing significant adverse changes in aircraft noise exposure. The selection of a runway use restriction, which can be informed by the analysis presented earlier in this report, is therefore a matter of judgement.

Noise insulation is a relatively costly measure. Based on the insulation eligibility options explored, these will not reduce the population HSD more than what can be achieved through a certain runway use or restriction. However, insulation is particularly effective at reducing the number of people exposed above the night time priority.

The main finding from the cost-effectiveness analysis with respect to insulation is that eligibility should be based on 2025 exposure forecasts.

9.4 Summary of Data Explained

The analysis presented in this report has had regard for the material submitted by the Applicant as presented in Appendix A. This has taken forecast, noise exposure information and digital noise contours and noise exposure grids as reported in the following Excel documents that are available on the ANCA website: https://www.fingal.ie/aircraftnoiseca/documents-f20a0668

- Summary of results including mitigation - a11267_19_ca437_2.0-summary-of-results-including-mitigation.xlsx
- Reporting Template Update 20210618-reporting-template-update.xlsxCA434_5.0

10

Draft Regulatory Decision and Reasons for Selection of Preferred Options

10 Draft Regulatory Decision and Reasons for Selection of Preferred Options

This chapter of this regulatory decision report was included in the draft regulatory decision report which was publicly consulted on. Changes which occurred as a result of the public consultation are included in Chapter 14 and the regulatory decision. Based on the analysis presented in Chapter 6, ANCA has made a draft regulatory decision (DRD). This chapter sets out the conditions attached to the draft decision along with the reasons for them.

10.1 Noise Quota Scheme

The Applicant has proposed an annual noise quota scheme effective over a period of six-and-a-half-hours from 23:30-05:59 (local time). Following ANCA's review of the measures available, an alternative scheme, where an annual noise quota is proposed for an eight-hour period from 23:00-06:59 (local time) with restrictions on certain aircraft types based on their quota count, was also considered. Both noise quota schemes would allow Dublin Airport to meet its forecasts although in the case of the alternative restrictions on aircraft types would require some change to the forecasted fleet mix from 2030 onwards. In the Forecast Without New Measures, a scenario is presented whereby there are no restrictions on the number and type of aircraft operating at night.

ANCA's analysis shows that each of these alternatives to Condition 5 of the North Runway Planning Permission will increase noise exposure compared to the situation that would pertain without any changes. However, noise exposure and health outcomes in 2025 and beyond would be better than those which occurred in 2019. This is a key component of the NAO.

Whilst the Forecast Without New Measures is also capable of meeting the NAO, this does not provide any limits on night-time noise beyond the NAO itself. ANCA determined that a restriction is necessary in the form of a limit to ensure that the Applicant's forecasts will be met. This is particularly important over the period to 2030 in anticipation of the 30% noise reduction target being required under the NAO. For this reason, ANCA considers that revoking Condition 5 would not be in line with the broader policy of setting limits as defined by the NAO.

The Cost-Effectiveness Analysis presented in this report has had regard to the cost-effectiveness of the permitted operation i.e. Condition 5 alongside the noise quota schemes. This cost-effectiveness analysis demonstrates that whilst the existing consent is an effective way of managing aircraft noise, i.e. it performs best in reducing the number of people HSD, it is not cost-effective and will result in economic impacts. This is a clear conclusion from the cost-effectiveness analysis and is in line with the Applicant's own assessment. The analysis presented throughout this report has highlighted that Dublin Airport was operating above the movement restriction of 65/night in 2016 and 2019. It also shows that if Condition 5 is to be replaced to facilitate aircraft movements above the 65/night restriction set by Condition 5 then noise outcomes in terms of population HA and HSD would be better than 2019 and would continue to improve over time. This is mainly due to fleet modernisation.

ANCA has considered the two noise quota schemes and proposes the following condition:

Condition 1:

The existing operating restriction, Condition 5, of the North Runway Planning Permission (FCC Reg. Ref: F04A/1755; ABP Ref: PL06F.217429) reading as:

On completion of construction of the runway hereby permitted, the average number of night time aircraft movements at the airport shall not exceed 65/night (between 2300 hours and 0700 hours) when measured over the 92 day modelling period as set out in the reply to the further information request received by An Bord Pleanála on the 5th day of March, 2007. shall be revoked and replaced with an annual noise quota scheme operating restriction as follows:

The airport shall be subject to a Noise Quota Scheme (NQS) with an annual limit of 16,260 between the night time hours of 23:00 and 06:59 (inclusive, local time) with noise-related limits on the aircraft permitted to operate at night. The annual noise scheme shall be applied as detailed in Schedule A.

REASON:

To limit the impact of the aircraft noise at Dublin Airport on sleep disturbance in the interest of residential amenity and to ensure the effective implementation of the Noise Abatement Objective for the Dublin Airport by means of a noise-related limit on aircraft operations.

Schedule A, of the DRD which sets out the mechanics of the proposed NQS is attached to this report.

Whilst this is different to the NQS proposal brought forward by the Applicant, ANCA is of the view that night time noise is better managed through restrictions which cover the whole night period. The cost-effectiveness analysis presented in this report shows that this scheme will lead to the same outcomes as the Applicant's proposed scheme over the assessment period of 2022-2026.

Although the Application proposes a night time NQS effective over a period of six-and-a-half-hours from 23:30-05:59 (local time), this does not cover the same night time period as defined in European Union noise policy and against which the NAO has been set. The Application identifies demand for night flights in the context of eight-hour night time movements rather than during discrete periods of the night, although it is accepted that demand is greatest during 06:00-06:59. Under the NQS set by ANCA, the eight-hour night time restriction on aircraft movements set out under Condition 5 of the North Runway Planning Permission is replaced with an eight-hour noise- related limit.

The Applicant did not propose any specific restrictions on aircraft types which can operate during the night time period. However, such restrictions are a common features of noise quota schemes in other jurisdictions. ANCA has therefore decided that such restrictions are warranted to set limits on individual aircraft noise events at night and to further deliver the noise limiting aspects of the NAO. The aircraft type restrictions that shall accompany the NQS as it becomes effective are aircraft with a Quota Count (QC) of 4.0 on take-off and 2.0 on landing. ANCA also requires that no aircraft with a QC of 2.0 or more on take-off and 1.0 or more landing shall operate during the night-time from 1 January 2030. This allows the Applicant to plan for this restriction to be implemented, with the aim of phasing out marginally compliant aircraft during the night.

10.2 North Runway Operating Restriction

The Applicant proposed an amendment to Condition 3(d) of the North Runway Planning Permission to prohibit scheduled use of the north runway between 00:00-05:59.

The analysis presented in this report has considered the relative performance of different runway use and runway restriction scenarios. These scenarios entail different forms of night-time runway use as well as runway restrictions. This has shown that the different scenarios have different strengths and weaknesses when considering metrics such as the population HSD and population exposed to levels above the night time priority of 55 dB L_{night} as defined by the NAO.

In reviewing the documentation submitted in support of the Application, ANCA may impose, revoke, revoke and replace, or amend the terms of an operating restriction.

Restating Condition 3(d) as an operating restriction but allowing additional aircraft noise at night compared to the forecast situation through the introduction of an NQS would result in more people being exposed to the night-time priority of 55 dB L_{night} than occurred in 2019. This situation would fail to meet the outcome required by the NAO and therefore ANCA determined that the use of both runways at night should be preferred over single runway use.

All remaining scenarios considered can achieve the requirements of the NAO in the forecast year of 2025 by having noise exposure outcomes which are better than 2019. In the context of the airport operating at 32 mppa and accounting for population growth, all of the scenarios considered are capable of meeting the NAO in 2030, 2035 and 2040. This also includes the Forecast Without New Measures which would allow Dublin Airport to operate without any defined restriction on how it uses its runways at night. Whilst this situation may provide the Airport a great deal of flexibility and this could meet the NAO, it is not consistent with the existing arrangements for the North Runway as set out in Conditions 3(a)-(c) of the North Runway Planning Permission and does not reflect the Application.

The analysis presented in this report shows that different runway use and restriction scenarios perform better or worse depending upon how they are assessed and the metrics used to evaluate them. When considered alongside the implications these each have on different eligibility criteria for sound insulation, some differentiation can be seen in the cost-effectiveness assessment.

The Applicant's proposal constitutes a shortening by two hours of the current restriction imposed by Condition 3(d). This would result in Dublin Airport implementing the form of operation as described in Condition 3(a)-(c) of the North Runway Planning Permission at 00:00 and recommencing this pattern at 06:00 (local time). ANCA's DRD strikes a balance between the number of people forecast to be exposed to night time aircraft noise, including the number of people exposed above the priority value of 55 dB L_{night}, and those who may experience significant adverse changes in night time noise exposure. ANCA's three proposed conditions address the identified noise problem.

In general, the differences between each runway use and restriction scenario considered in health terms is relatively small compared to the overall number of people forecast to be HSD with the key differentiator being the number of people exposed above the night-time priority value of 55 dB L_{night}. The Applicant has however proposed that those experiencing aircraft noise above 55 dB L_{night} would be eligible for noise insulation under a new night time noise insulation grant scheme. ANCA agrees with this approach and has considered sound insulation eligibility options which incorporate this level of exposure which is also the night time priority set by the NAO. In this respect, any form of night-time runway use or runway restriction selected by ANCA will result in those most affected by aircraft noise being eligible for sound insulation.

Overall, based on the evidence provided in the Application and ANCA's own analysis, taking into account the noise insulation proposals which are discussed in the following paragraphs, ANCA is proposing the following condition:

Condition 2:

The existing operating restriction imposed by Condition 3(d) and the exceptions at the end of Condition 3 of the North Parallel Runway Planning Permission (FCC Reg. Ref: F04A/1755; ABP Ref: PL06F.217429) reading:

'3(d). Runway 10L-28R shall not be used for take-off or landing between 2300 hours and 0700 hours. except in cases of safety, maintenance considerations, exceptional air traffic conditions, adverse weather, technical faults in air traffic control systems or declared emergencies at other airports.'

shall be amended as follows:

Runway 10L/28R shall not be used for take-off or landing between 00:00 and 05:59 (inclusive, local time) except in cases of safety, maintenance considerations, exceptional air traffic conditions, adverse weather, technical faults in air traffic control systems or declared emergencies at other airports or where Runway 10L/28R length is required for a specific aircraft type.

REASON:

To permit the operation of the runways in a manner which reduces the impacts on those newly affected by aircraft night time noise, whilst providing certainty to communities as to how they will be affected by night time operations from the north runway, while also providing continuity with the day-time operating pattern set down by Conditions 3(a)-(c) of the North Runway Planning Permission.

10.3 Residential Sound Insulation Grant Scheme (RSIGS)

The NAO has set a priority of 55 dB L_{night} to reflect levels of noise exposure which presents a clear risk to human health. ANCA agrees with the Applicant's proposal to provide a noise insulation scheme for eligible dwellings found to be exposed to aircraft noise at or above this threshold. This threshold is evidence based and reflects the observations made in determining the second aspect of the noise problem.

Exposure to aircraft noise above this threshold occurs due to operations from Dublin Airport's runways and not just the north runway arising from proposed Condition 2 (above). As such, a noise insulation scheme set around the priority value of 55 dB L_{night} will help to mitigate the effects on those who become newly exposed to potentially harmful levels of aircraft noise, as well as those who have already been exposed to noise above this value and would continue to do so in the future.

The Application proposed a second criterion for eligibility to the proposed scheme. This criterion proposes to provide noise insulation grants for those who experience a 'very significant' effect as a result of the Application. This occurs where a dwelling is forecast to experience noise exposure of at least 50 dB L_{night} and an increase in noise exposure of at least 9 dB when compared to the current permitted operation. The Application has proposed that subsequent eligibility will be on forecasts for the first year of the relevant action and would be a 'one-off' in terms of the area of eligibility and would therefore not be subject to any annual review. ANCA recognises that a scheme of this nature would help mitigate the effect of those who become newly exposed to night-time aircraft noise below the priority value.

The analysis presented in this report has considered a range of different approaches to setting eligibility alongside the runway use and restriction scenarios. Having accepted the Applicant's proposals with respect to amending Condition 3(d), a key finding from the cost-effectiveness analysis is that insulation schemes which

are set against forecast year of 2025 are more effective. This is because in this year noise exposure is forecast to be at its peak. Having regard for this and the Applicant's second criteria which seeks to mitigate those who experience a 'very significant' effect the following condition is proposed by ANCA:

Condition 3:

A voluntary residential sound insulation grant scheme (RSIGS) for residential dwellings shall be provided as detailed in Schedule B, for all homes forecast in 2025 to be exposed to aircraft noise at or above 55dB Lnight contour or experience a 'very significant' effect i.e. exposure to aircraft noise at or above the 50dB Lnight contour together with an increase in noise exposure of at least 9 dB compared to the forecast noise situation in 2025 (had the relevant action not been taken) as shown on the Initial Eligibility Area Contour. Dwellings exposed to levels at or above 55 dB Lnight shall be reviewed every two years commencing in 2027 and if applicable be made eligible for the scheme. This scheme shall not apply to properties where works were undertaken under the existing Residential Noise Insulation Scheme (RNIS) or Home Sound Insulation Programme (HSIP) or to properties where a planning application was lodged after 09 December 2019, the date being the adoption of Variation No. 1 to the Fingal Development Plan 2017 – 2023 incorporating policies relating to development within Aircraft Noise Zones.

REASON:

To mitigate the impact of aircraft night time noise as a result of the use of the Airport's runways, in the interest of residential amenity and the proper planning and sustainable development of the area.

The proposed RSIGS is set out in Schedule B of the DRD.

Schedule B seeks to ensure that the proposed RSIGS scheme operates in a consistent manner with the existing RNIS scheme. ANCA has determined that this is particularly important with regards to the setting of a 'statement of need' i.e. a schedule of the insulation works for each eligible dwelling.

The DRD contains the noise mitigation measures and operating restrictions that ANCA proposes to direct the planning authority to include as conditions of the planning authority's decision. The DRD is comprised of the conditions 1 – 3 and schedules A and B. The DRD is attached in Appendix K.

11

Notice of Proposed Measures to the Applicant

11 Notice of Proposed Measures to The Applicant

Section 34C(8) of the Act of 2000 requires ANCA to issue notice to the Applicant detailing the noise mitigation measures or operating restrictions proposed to be required in a decision of the planning authority and its reasons for so proposing. The notice must provide for the Applicant to make submissions, observations or counter proposals on the proposed measures during the specified notice period of not less than 4 weeks.

On 17 September 2021, ANCA issued notice to the Applicant pursuant to 34C(8) of the Act of 2000. Although no counter proposals were made by the Applicant during the period specified in the Notice (17 September 2021 to 19 October 2021), the Applicant made a number of observations and submissions that included requests for clarification.

ANCA proceeded to make a DRD, having regard to the submissions and observations contained within the response of the Applicant.

The 34C(8) Notice and the response of the Applicant dated 12 October 2021 is attached in Appendix K.

12

Consultation with Other Authorities

12 Consultation with Other Authorities

Having complied with the provisions of Section 34C(8) of the Act of 2000 in respect of the issue of notice of proposed measures to the Applicant, ANCA also consulted with the following authorities pursuant to Section 34C(10) of the Act of 2000:

- Irish Aviation Authority
- Commission for Aviation Regulation

The correspondence issued and response(s) received are attached in Appendix L.

13

Public Participation Process

13 Public Participation Process

The text of this chapter is reproduced verbatim from the Report which accompanied the draft regulatory decision (DRD) when put out to consultation in November 2021. The changes made to the regulatory decision arising out of such consultation with other statutory authorities and the public participation process are addressed in Chapter 14 below.

This section describes the methods by which interested stakeholders can participate in the aircraft noise regulation process.

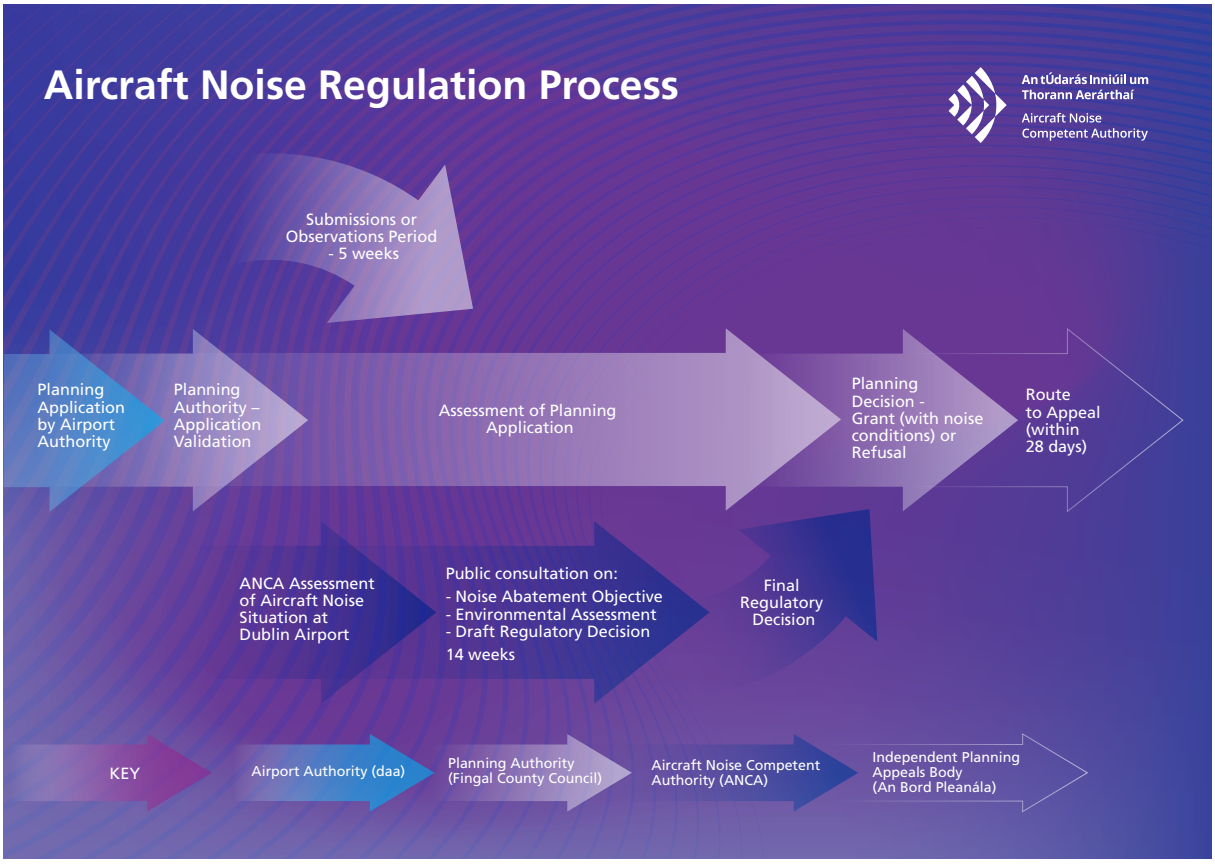

Figure 13.1: The Aircraft Noise Regulation Process

13.1 Statutory Consultation

Having completed and presented the findings of its aircraft noise assessment at Dublin Airport, ANCA is now providing the opportunity for all interested individuals, groups, businesses or organisations to have a say in influencing the final regulatory decision.

The legislation provides for 14-weeks of public consultation so that everyone can consider the implications of our draft proposals and make suggestions as to how aircraft noise can be managed at Dublin Airport in a sustainable way that achieves the best balance between airport development and protection of the environment, including human health.

13.1.1 Component Parts of the Consultation

- Noise Abatement Objective
- Draft regulatory decision and related report
- Environmental Report for the purposes of Strategic Environmental Assessment
- Natura Impact Statement for the purposes of Appropriate Assessment

ANCA will consider all submissions/observations made in writing during this consultation prior to making a regulatory decision. We will send a copy of our regulatory decision to everyone that made a submission during this consultation.

These documents may be viewed on the ANCA website: www.fingal.ie/aircraftnoiseca/documents-f20a0668

13.2 How to Have Your Say

Information on how to make a submission or observation is available at https://consult.fingal.ie/en/browse

You can make a submission or observation:

- Online at https://consult.fingal.ie/en/browse
- By e-mail to aircraftnoiseconsultation@fingal.ie
- In writing to Director of Services, Aircraft Noise Competent Authority, County Hall, Main Street, Swords, Co Dublin K67 X8Y2

Submissions should be in ONE medium only. Submissions should include the full name and address of the person making the submission, details of organisation, community group or company represented where relevant.

Submissions or observations may be made between 11 November 2021 and 28 February 2022. Late submissions will not be accepted.

A submissions policy is available at https://consult.fingal.ie/en/consultation/aircraft-noise-consultation setting out the requirements for making a submission and how your personal information will be managed.

13.3 The Subsequent Role of the Planning Authority

Once a regulatory decision is made, it will be forwarded by ANCA to the planning authority. The planning authority will make a decision on whether to grant or refuse the planning permission. The planning authority will include any noise mitigation measures or operating restrictions provided for in the regulatory decision as conditions of the planning decision.

13.4 Route to Appeal

An Bord Pleanála is the appeals body in relation to a decision of the planning authority containing the regulatory decision.

For the purposes of an appeal to An Bord Pleanála any person who made submissions or observations in writing in relation to the draft regulatory decision, may on payment of the appropriate fee, may, at any time before the expiration of the appropriate period, appeal to the Board against the decision of the planning authority on the planning application containing the regulatory decision.

An acknowledgment of a submission / observation made in writing during this consultation will be made prior to making a regulatory decision.

14

Regulatory Decision and Reasons for Selection of Preferred Options Following Public Participation Process

14 Regulatory Decision and Reasons for Selection of Preferred Options Following Public Participation Process

Based on the analysis presented in Chapters 6 - 9, ANCA made a draft regulatory decision (DRD) available for public consultation and, following that process, has made a regulatory decision (RD) This chapter sets out the RD along with the reasons therefore and for the conditions therein, arising from the application of the Balanced Approach and the changes which have resulted from public consultation.

The RD contains the noise mitigation measures and operating restrictions that ANCA will give to the planning authority to include as conditions of the planning authority's decision. The RD is comprised of three conditions. The RD is attached in Appendix O.

The RD strikes a balance between the number of people forecast to be exposed to night time aircraft noise, including the number of people exposed above the priority value of 55 dB L_{night}, and those who may experience significant adverse changes in night time noise exposure. ANCA's three conditions address the identified noise problem.

The DRD is presented in Chapter 10 of this report. Having regard to the submissions made in the public consultation, the following sections detail the changes that were made to the DRD in making the RD.

Reason for Regulatory Decision:

A Noise Abatement Objective (NAO) has been set for Dublin Airport which seeks to *"Limit and reduce the long-term adverse effects of aircraft noise on health and quality of life, particularly at night, as part of the sustainable development of Dublin Airport."*. The NAO sets outcomes which are required with respect to the harmful effects of aircraft noise. The NAO is the relevant policy which applies for decision making in relation to aircraft noise management at Dublin Airport.

The Application as proposed was screened by ANCA and it was determined that a noise problem would arise from the application due to three aspects:

1. The Application proposes an increase in aircraft activity at night, when referenced against the situation that would otherwise pertain, which may result in higher levels of human exposure to aircraft noise.

2. The Application proposes a situation where some people will experience elevated levels of night time noise exposure for the first time which may be considered harmful to human health.

3. The EIAR accompanying the Application indicates that the proposed relevant action will give rise to significant adverse night time noise effects.

Having followed the process of aircraft noise regulation as set out in Section 11 of the Aircraft Noise (Dublin Airport) Regulation Act 2019 which inserts Section 34C into the Planning and Development Act 2000 (as amended) , ANCA has made a Regulatory Decision requiring the inclusion of three conditions in any planning permission that the planning authority may grant for the proposed development for the reasons set out in the Regulatory Decision Report which accompanies the Regulatory Decision, including the following principal reasons:

First Condition: Condition 5 of the North Runway Planning Permission shall be revoked and replaced with a Night-time Noise Quota Scheme as described in the First Condition.

The Noise Quota Scheme will limit the impact of aircraft noise at Dublin Airport on communities surrounding the airport in accordance with the NAO. ANCA's Cost Effectiveness Assessment (CEA) identified that while it reduced the population highly sleep disturbed and population exposed above the NAO night-time priority of 55 dB L_{night}, condition 5 was more costly than other means of achieving those aspects of the NAO. Replacing Condition 5 with a Night-Time Noise Quota and associated aircraft type restrictions is a much more cost-effective means of managing and limiting aircraft noise impacts in line with the NAO. It allows the airport to meet its movement forecasts whilst guarding against any risk that the Applicant's noise forecasts are optimistic with respect to fleet modernisation. For example, should the aircraft fleet mix not improve as forecast, the Night-Time Noise Quota will limit the number of night flights. Overall, the Night-Time Noise Quota will place a limit on night-time aircraft noise.

Second Condition: Condition 3(d) of the North Runway Planning Permission shall be revised to apply over the period 00:00 to 06:00 as set out in the Second Condition.

The revision to Condition 3(d) of the Northern Runway Planning Permission will facilitate the operation of runways at Dublin Airport in a manner that minimises the impact of night time noise on communities surrounding Dublin Airport, particularly those newly affected by aircraft night time noise. Although a series of runway use and restriction scenarios were considered by ANCA, the scenario which allows the preferred pattern of operation (Option 7b) as described in Condition 3(a)-(c) of the North Runway Planning Permission to be extended by 2 hours to commence from 06:00 and cease at 00:00 was considered by ANCA to strike a balance between the number of people forecast to be exposed to night time aircraft noise, including the number of people exposed above the NAO night-time priority value of 55 dB L_{night}, and those who may experience significant adverse changes in night time noise exposure. Whilst other options were found to further reduce the number of people exposed above the NAO night-time priority value, these would have resulted in a much greater number experiencing significant adverse changes, and vice versa. The balance struck by extending the preferred pattern of operation also provides continuity between daytime operations and those occurring between 23:00-00:00, and 06:00-07:00.

Third Condition: A Night-Time Residential Sound Insulation Grant Scheme shall be provided in line with the Third Condition

The NAO night-time priority of 55 dB L_{night} reflects levels of noise exposure which presents a clear risk to human health. The Residential Sound Insulation Grant Scheme is therefore designed to mitigate the impact of night time aircraft noise in the vicinity of Dublin Airport. Although noise insulation is a relatively costly measure, a noise insulation scheme comprising of suitable measures with eligibility set around the priority value of 55 dB L_{night} will help to mitigate effects on those who become newly exposed to potentially harmful levels of aircraft noise as per the second aspect of the noise problem. It will also benefit those who have already been exposed to noise above this priority value and would continue to do so in the future. By further allowing those who are forecast to experience very significant effects in 2022 and 2025 to benefit from insulation under the scheme will further reduce the number of people highly sleep disturbed.

14.1 First Condition - Noise Quota Scheme

The Applicant has proposed an annual noise quota scheme effective over a period of six-and-a half-hours from 23:30-05:59 (local time). Following ANCA's review of the measures available, an alternative scheme, where an annual noise quota is proposed for an eight-hour period from 23:00-06:59 (local time) with restrictions on certain aircraft types based on their quota count, was also considered. Both noise quota schemes would allow Dublin Airport to meet its forecasts although in the case of restrictions on certain aircraft types by virtue of their quota count, a degree of fleet modernisation would be required in order for Dublin Airport to meet its forecasts.

ANCA's analysis shows that each of these alternatives to Condition 5 of the North Runway Planning Permission will increase noise exposure compared to the situation that would pertain without any changes. However, noise exposure and health outcomes in 2025 (the peak year for noise exposure) and beyond would be better than those which occurred in 2019. This is a key component of the NAO.

Whilst the Forecast Without New Measures is also capable of meeting the NAO, this does not provide any limits on night time noise beyond the NAO itself. ANCA determined that a restriction is necessary in the form of a limit to ensure that the Applicant's forecasts will be met. This is particularly important over the period to 2030 in anticipation of the 30% noise reduction outcome being required under the NAO. For this reason, ANCA considers that revoking Condition 5 would not be in line with the broader policy of setting limits as defined by the NAO.

The Cost-Effectiveness Analysis (CEA) presented in this report had regard to the cost-effectiveness of the permitted operation (i.e., Condition 5 alongside the noise quota schemes). This CEA demonstrates that whilst the existing consent is an effective way of managing aircraft noise (i.e., it performs best in reducing the number of people HSD), it is not cost-effective and will result in adverse economic impacts. This is a clear conclusion from the CEA and aligns with the Applicant's own assessment.

The analysis presented throughout this report has highlighted that Dublin Airport, in 2016 and 2019, operated above 65 aircraft movements per night. (65 aircraft movements per night is the limit at Dublin Airport when Condition 5 of the North Runway Planning Permission becomes active, without the relevant action). It also shows that if Condition 5 is to be replaced to permit aircraft movements above the 65/night restriction set by Condition 5, then noise outcomes in terms of population HA and HSD would be better than 2019 and would continue to improve over time. This is mainly due to fleet modernisation.

The NQS is different to the proposal brought forward by the Applicant because ANCA is of the view that night time noise is better managed through restrictions that cover the full night period.

The CEA presented in this report shows that this scheme will lead to the same outcomes as the Applicant's proposed scheme over the assessment period of 2022-2026.

The Application proposes a night time NQS effective over a period of six-and-a-half-hours from 23:30-05:59 (local time). However, this does not cover the same night time period as defined in European Union environmental noise policy and legislation, and against which the NAO has been set, taking into account the relevant evidence base of health effects. The Application identifies demand for night flights in the context of eight-hour night time movements rather than during discrete periods of the night, with demand greatest during 06:00-06:59. Under the NQS set by ANCA, the eight-hour night time restriction on aircraft movements set out under Condition 5 of the North Runway Planning Permission is replaced with an eight-hour noise related limit.

The Applicant did not propose any specific restrictions on aircraft types which can operate during the night time period. However, such restrictions are a common feature of noise quota schemes in other jurisdictions. ANCA has therefore decided that such restrictions are warranted to set limits on individual aircraft noise events at

night, so ANCA's DRD included aircraft type restrictions that would accompany the NQS. These were two-fold: firstly, restrictions which would become effective immediately following any grant of permission and would prohibit aircraft with a Quota Count (QC) of 4.0 on take-off and 2.0 on landing operating during the night time period; and secondly, no aircraft with a QC of 2.0 or more on take-off and 1.0 or more landing would be permitted to operate during the night time from 1 January 2030.

ANCA considered that the more stringent restrictions after 2030 would yield a small added benefit in terms of reducing individual noise exposure events without disproportionately restricting operations, as the aircraft affected by the proposed restrictions represented only 12% of the overall fleet mix. However, the measures were additional to those required to achieve the quantitative health objectives in the NAO and were intended to further the general objective in the NAO to limit and reduce aircraft noise.

Following publication of the DRD for consultation, ANCA received a number of submissions from cargo operators on the restrictions proposed to take effect from 1 January 2030. These submissions highlighted that, while the affected aircraft comprised 12% of the overall fleet mix, such aircraft are more concentrated in cargo operators' fleets.

Further, a large proportion of cargo operations currently occur in the night time period with aircraft types that could not achieve this restriction. Further analysis has shown that aircraft types such as the Boeing 767, which are used by cargo operators, are still being delivered into cargo carrier fleets and are likely to be part of cargo operations beyond 2030. ANCA has therefore accepted that this restriction would likely have a significant adverse impact on cargo operators at Dublin Airport if implemented. Accordingly, given the limited additional benefit of imposing this restriction, ANCA is satisfied that it would represent a disproportionate adverse effect on cargo operators.

As the post-2030 QC prohibition was additional to what was required to achieve the quantitative health objectives in the NAO, its removal does not jeopardise the achievement of those objectives and ANCA continues to anticipate that the RD will allow the NAO to be achieved and to have a net positive impact on health.

Having regard to submissions received during the consultation period, ANCA has therefore decided to modify the post-2030 QC restriction as proposed. The RD has been changed so that Schedule A, Part 2, 2.1(d) and 2.1(e) as proposed in the DRD have been removed. Notwithstanding this, the overall QC scheme is likely to require the introduction of mechanisms to reduce the occurrences of high QC fleet movements during the night period.

Appendix N of this report contains an analysis of the Dublin Airport Forecast Analysis prepared in the context of submissions and observations in relation to the DRD.

Based on the evidence provided in the Application, ANCA's own analysis and having had regard to the submissions and observations made during the public consultation, ANCA has included the following condition within the RD:

First Condition:

The existing operating restriction, Condition 5, of the North Runway Planning Permission (FCC Reg. Ref: F04A/1755; ABP Ref: PL06F.217429) reading as:

'On completion of construction of the runway hereby permitted, the average number of night time aircraft movements at the airport shall not exceed 65/night (between 2300 hours and 0700 hours) when measured over the 92 day modelling period as set out in the reply to the further information request received by An Bord Pleanála on the 5th day of March, 2007'

shall be revoked and replaced with an annual noise quota scheme operating restriction as follows:

The Airport shall be subject to a Noise Quota Scheme (NQS) with an annual limit of 16,260 between 23:00 and 06:59 (inclusive, local time) with noise-related limits on the aircraft permitted to operate at night. The NQS shall be applied as detailed below.

Part 1 Definitions

1.1 The following definitions shall apply with reference to the scheme described in Part 2.

Term	**Meaning**
Annual Quota Period	The twelve-month period from 1 April to 31 March inclusive each year
EASA Noise Certification Database	The database of noise certification levels approved and as varied from time to time by the European Union Aviation Safety Agency (EASA) and published on its website. (https://www.easa.europa.eu/domains/environment/easa-certification-noise-levels). The noise levels are established in compliance with the applicable noise standards as defined by International Civil Aviation Organization (ICAO) Annex 16 Volume 1.
Night time	The hours at night between 23:00 (local time) to 07:00 (local time)
Noise Classification Level (NCL)	The noise level band in EPNdB assigned to an aircraft for take-off or landing, as the case may be, for the aircraft in question for the purposes of identifying the Quota Count of the aircraft. The Noise Classification Level for an aircraft taking off from and landing at the Airport shall be taken from the Flyover Level from the EASA Noise Certification Database: *NCL(Take-Off) = EPNL(Flyover)* *NCL(Landing) = EPNL(Approach) –9 dB*

Quota Count

The amount of the quota assigned to one take-off or to one landing by an aircraft based on the Noise Classification Level for the aircraft having regard for engine type and take-off weight:

Noise Classification Level	Quota Count (QC)
Greater than 101.9 EPNdB	16.0
99-101.9 EPNdB	8.0
96-98.9 EPNdB	4.0
93-95.9 EPNdB	2.0
90-92.9 EPNdB	1.0
87-89.9 EPNdB	0.5
84-86.9 EPNdB	0.25
81-83.9 EPNdB	0.125
Less than 81 EPNdB	0

Part 2 – Noise Quota Scheme

2.1 Subject the dispensations described in Paragraph 2.2:

a. A take-off or landing at the Airport shall be determined to fall within the night time based on runway time.

b. No aircraft with a Quota Count of 4.0 or more shall be permitted to take off at the Airport during the night time.

c. No aircraft with a Quota Count of 2.0 or more shall per permitted to land at the Airport during the night time.

d. Each aircraft landing at or taking off from the Airport during the night time will be assigned a Quota Count based on its Noise Classification Level.

e. The Noise Quota at the Airport shall be limited to 16,260 for the Annual Quota Period.

2.2 The restrictions set out in Paragraph 2.1 shall not apply in any of the following dispensations:

a. Where a take-off or landing of any aircraft at the Airport is made in an emergency, where there is an immediate danger to life or health, whether human or animal.

b. Where a take-off or landing of any aircraft at the Airport occurs as a result of a delay to that aircraft which is likely to lead to serious congestion at the Airport and/or serious hardship or suffering to passengers or animals.

c. Where a take-off or landing of any aircraft at the Airport occurs as a result of widespread and prolonged disruption of air traffic.

d. Flights for military, medical or humanitarian purposes granted exemption by the Irish Government

Part 3 – Noise Quota Scheme Reporting Requirements

3.1 The Applicant shall submit quarterly reports to the planning authority and ANCA on its implementation of the Noise Quota Scheme. The reports shall include:

a. The number of aircraft operating during the Noise Quota Period and their type, including technical details including their engines and take-off weights, where applicable;

b. The Quota Count assigned to aircraft operating in the Noise Quota Period;

c. The total Noise Quota used during the quarter and in the Annual Period to date;

d. The total Noise Quota used by Quota Count in the quarter and in the Annual Period to date; and

e. Details of any dispensations pursuant to Paragraph 2.2 which have been relied upon during the quarter and in the Annual Period to date.

3.2 The quarterly reports shall be issued so that:

a. The first quarterly report considering activity over the period 1 April to 30 June each year is published by no later than the 30 September each year

b. The second quarterly report considering activity over the period 1 July to 30 September each year is published by no later than the 31 December each year

c. The third quarterly report considering activity over the period 1 October to 31 December each year is published by no later than the 31 March the following year

d. The fourth quarterly report considering activity over the period 1 January to 31 March each year is published by no later than the 30 June each year

Part 4 – Noise Performance Reporting

4.1 The Applicant shall issue annual reports to the planning authority and ANCA on its noise performance. The report for the previous Annual Period (1 January to 31 December) shall be issued by no later than 31 March each year, for the first full Annual Period to which this regulatory decision applied and comprise of:

a. Noise exposure statistics and contours as required to facilitate performance review of the Noise Abatement Objective including as a minimum:

- Annual 55dB L_{night}
- Annual 65dB L_{den}
- the number of people 'highly sleep disturbed' and 'highly annoyed' in accordance with the approach recommended by the World Health Organisation's Environmental Noise Guidelines 2018 as endorsed by the European Commission through Directive 2020/367, taking into account noise exposure from 45 dB L_{den} and 40 dB L_{night}.
- Annual L_{night} contours from 40 dB in 5 dB increments
- Annual L_{den} contours from 45 dB in 5 dB increments
- Summer 60 dB $L_{Aeq.\ 16hr}$, 63 dB LAeq. 16hr and 69 dB $L_{Aeq.\ 16hr}$ (measured averaged across 92-day summer period from 16th June to 15th September).

b. Confirmation of the number of residential properties that (i) have benefitted from and (ii) are eligible for but yet to benefit from the Applicant's noise insulation schemes.

c. Key Statistics with respect to aircraft operations in the preceding Annual and Summer Periods including but not limited to:

- aircraft movements including average hourly movements
- use of the Noise Quota Scheme
- movements by aircraft type
- passenger numbers
- aircraft destinations
- flight routings
- runway use

d. Summaries from noise monitoring terminals for the Airport in such format as ANCA shall stipulate

e. Details of all noise modelling undertaken in support of the Noise Performance Reporting describing compliance with the methodology set out in Directive 2015/996 (ECAC Doc.29 4th Edition). All noise modelling shall be validated using local noise and track keeping performance data from the Airport's systems.

f. Summary of complaints records for the preceding Annual Period categorised by the:

- location of complaints; and
- reason for complaint

g. Details of any anticipated changes or developments that may affect noise at the Airport in the current year, through for example airspace change or fleet modernisation.

REASON:

To limit the impact of the aircraft noise at Dublin Airport on sleep disturbance in the interest of residential amenity and to ensure the effective implementation of the Noise Abatement Objective for the Dublin Airport by means of a noise-related limit on aircraft operations.

As a result of the analysis described in this report and having regard to the submissions and observations made to the public consultation, the changes as detailed below were made to the DRD.

Schedule A from the draft RD has been incorporated into the body of the First Condition. The other changes to the First Condition are detailed below.

Part 1 Definitions

No change.

Part 2 – Noise Quota Scheme

2.1 Subject to the dispensations described in Paragraph 2.2:

a. A take-off or landing at the Airport shall be determined to fall within the night time based on runway time

b. No aircraft with a Quota Count of 4.0 or more shall be permitted to take off at the Airport during the night time

c. No aircraft with a Quota Count of 2.0 or more shall per permitted to land at the Airport during the night time

d. No aircraft with a Quota Count of 2.0 or more shall be permitted to take off at the Airport during the night time from 1 January 2030

e. No aircraft with a Quota Count of 1.0 or more shall be permitted to land at the Airport during the night time from 1 January 2030

f. Each aircraft landing at or taking off from the Airport during the night time will be assigned a Quota Count based on their Noise Classification Level

g. The Noise Quota at the Airport shall be limited to 16,260 for the Annual Period

Has been amended to read as follows:

2.1 Subject to the dispensations described in Paragraph 2.2:

a. A take-off or landing at the Airport shall be determined to fall within the night time based on runway time

b. No aircraft with a Quota Count of 4.0 or more shall be permitted to take off at the Airport during the night time

c. No aircraft with a Quota Count of 2.0 or more shall per permitted to land at the Airport during the night time

d. Each aircraft landing at or taking off from the Airport during the night time will be assigned a Quota Count based on its Noise Classification Level

e. The Noise Quota at the Airport shall be limited to 16,260 for the Annual Quota Period

Part 3 - Noise Quota Scheme Reporting Requirements

For the purposes of clarity and to ensure the efficient implementation of planning conditions and the NAO, Part 3 - Noise Quota Scheme Reporting Requirements, subsection 3.1 reading as:

> 3.1 The Airport shall submit quarterly reports to the planning authority on its implementation of the Noise Quota Scheme. The reports shall include:
>
> a. The number of aircraft operating during the Noise Quota Period and their type, including technical details including their engines and take-off weights, where applicable;
>
> b. The Quota Count assigned to aircraft operating in the Noise Quota Period;
>
> c. The total Noise Quota used during the quarter and in the Annual Period to date;
>
> d. The total Noise Quota used by Quota Count in the quarter and in the Annual Period to date; and
>
> e. Details of any dispensations pursuant to Paragraph 2.2 which have been relied upon during the quarter and in the Annual Period to date.

Has been amended to read as follows:

> **Part 3 – Noise Quota Scheme Reporting Requirements**
>
> 3.1 The Applicant shall submit quarterly reports to the planning authority and ANCA on its implementation of the Noise Quota Scheme. The reports shall include:
>
> a. The number of aircraft operating during the Noise Quota Period and their type, including technical details including their engines and take-off weights, where applicable;
>
> b. The Quota Count assigned to aircraft operating in the Noise Quota Period;
>
> c. The total Noise Quota used during the quarter and in the Annual Period to date;
>
> d. The total Noise Quota used by Quota Count in the quarter and in the Annual Period to date; and
>
> e. Details of any dispensations pursuant to Paragraph 2.2 which have been relied upon during the quarter and in the Annual Period to date.

Part 4 – Noise Performance Reporting

For the purposes of clarity relating to the preparation and issue of noise performance reports, subsection 3.1 reading as:

3.1 The Airport shall issue annual reports to the planning authority on its noise performance. The report for the previous Annual Period shall be published by no later than 31 March each year and comprise of:

a. Noise exposure statistics and contours as required to facilitate performance review of the Noise Abatement Objective including as a minimum:

- Annual 55 dB L_{night}
- Annual 65 dB L_{den}
- through the number of people 'highly sleep disturbed' and 'highly annoyed' in accordance with the approach recommended by the World Health Organisation's Environmental Noise Guidelines 2018 as endorsed by the European Commission through Directive 2020/367, taking into account noise exposure from 45 dB L_{den} and 40 dB L_{night}
- Annual L_{night} contours from 40 dB in 5 dB increments
- Annual L_{den} contours from 45 dB in 5 dB increments
- Summer 60 dB $L_{Aeq,\ 16hr}$ and 63 dB $L_{Aeq,\ 16hr}$ (measured averaged across 92-day summer period from 16th June to 15th September)

Has been re-numbered as sub-section 4.1 and amended to read as follows:

Part 4 – Noise Performance Reporting

4.1 The Applicant shall issue annual reports to the planning authority and ANCA on its noise performance. The report for the previous Annual Period (1 January to 31 December) shall be issued by no later than 31 March each year, for the first full Annual Period to which this regulatory decision applied and comprise of:

a. Noise exposure statistics and contours as required to facilitate performance review of the Noise Abatement Objective including as a minimum:

- Annual 55dB L_{night}
- Annual 65dB L_{den}
- the number of people 'highly sleep disturbed' and 'highly annoyed' in accordance with the approach recommended by the World Health Organisation's Environmental Noise Guidelines 2018 as endorsed by the European Commission through Directive 2020/367, taking into account noise exposure from 45 dB L_{den} and 40 dB L_{night}
- Annual Lnight contours from 40 dB in 5 dB increments
- Annual Lden contours from 45 dB in 5 dB increments
- Summer 60 dB $L_{Aeq.\ 16hr}$, 63 dB $L_{Aeq.\ 16hr}$ and 69 dB $LA_{eq.\ 16hr}$ (measured averaged across 92-day summer period from 16th June to 15th September)

14.2 Second Condition - North Runway Operating Restriction

The Applicant proposed an amendment to Condition 3(d) of the North Runway Planning Permission to allow scheduled use of the north runway between 00:00-05:59.

The analysis presented in this report has considered the relative performance of different runway use and runway restriction scenarios. These scenarios entail different forms of night time runway use as well as runway restrictions. This has shown that the different scenarios have different strengths and weaknesses when considering metrics such as the population HSD and population exposed to levels above the night time priority of 55 dB L_{night} as defined by the NAO.

In reviewing the documentation submitted in support of the Application, ANCA may impose, revoke, revoke and replace, or amend the terms of an operating restriction.

Restating Condition 3(d) as an operating restriction but allowing additional aircraft noise at night compared to the forecast situation through the introduction of an NQS would result in more people being exposed to the night time priority of 55 dB L_{night} than occurred in 2019. This situation would fail to meet the outcome required by the NAO and therefore ANCA determined that the use of both runways at night should be preferred over single runway use.

All remaining scenarios considered can achieve the requirements of the NAO by having noise exposure outcomes which are better than 2019. In the context of the airport operating at 32 mppa and accounting for population growth, all of the scenarios considered are capable of meeting the NAO in 2030, 2035 and 2040. This also includes the Forecast Without New Measures which would allow Dublin Airport to operate without any defined restriction on how it uses its runways at night. Whilst this situation would provide the Airport a great deal of flexibility while nonetheless allowing it to meet the NAO, it would not be consistent with the existing arrangements for the North Runway as set out in Conditions 3(a)-(c) of the North Runway Planning Permission and does not reflect the Application.

The Applicant's proposal constitutes a shortening by two hours of the current restriction imposed by Condition 3(d). This would result in Dublin Airport implementing the form of operation as described in Condition 3(a)-(c) of the North Runway Planning Permission from 06:00 to 23:59 (local time).

In general, the differences between each runway use and restriction scenario considered in health terms is relatively small compared to the overall number of people forecast to be HSD with the key differentiator being the number of people exposed above the night time priority value of 55 dB L_{night}. The Applicant has however proposed that those experiencing aircraft noise above 55 dB L_{night} would be eligible for noise insulation under a new night time noise insulation grant scheme. ANCA agrees with this approach. Consideration has been given to the sound insulation eligibility options which incorporate this level of exposure. This is also the night time priority set by the NAO. In this respect, any form of night time runway use or runway restriction selected by ANCA will result in those most affected by aircraft noise being eligible for sound insulation. (The criteria for the night time noise insulation scheme, (Residential Sound Insulation Grant Scheme), are within condition 3.)

Based on the evidence provided in the Application and ANCA's own analysis, ANCA has included the following condition within the RD:

Second Condition:

The existing operating restriction imposed by Condition 3(d) and the exceptions at the end of Condition 3 of the North Parallel Runway Planning Permission (FCC Reg. Ref: F04A/1755; ABP Ref: PL06F.217429) reading:

'3(d). Runway 10L-28R shall not be used for take-off or landing between 2300 hours and 0700 hours. except in cases of safety, maintenance considerations, exceptional air traffic conditions, adverse weather, technical faults in air traffic control systems or declared emergencies at other airports.'

shall be amended as follows:

Runway 10L/28R shall not be used for take-off or landing between 00:00 and 05:59 (inclusive, local time) except in cases of safety, maintenance considerations, exceptional air traffic conditions, adverse weather, technical faults in air traffic control systems or declared emergencies at other airports or where Runway 10L/28R length is required for a specific aircraft type.

REASON:

To permit the operation of the runways in a manner which reduces the impacts of aircraft night time noise, whilst providing certainty to communities as to how they will be affected by night time operations from the North Runway, while also providing continuity with the day-time operating pattern set down by Conditions 3(a)-(c) of the North Runway Planning Permission.

14.3 Third Condition - Residential Sound Insulation Grant Scheme (RSIGS)

The NAO has set a priority exposure level of 55 dB L_{night} to reflect levels of noise exposure which present a clear risk to human health. ANCA agrees with the Applicant's proposal to provide a noise insulation scheme for eligible dwellings found to be exposed to aircraft noise at or above this threshold. This threshold is evidence based and reflects the observations made in determining the second aspect of the noise problem.

Exposure to aircraft noise above this threshold occurs due to operations from Dublin Airport's runways and not just the north runway arising from proposed Condition 2 (above). As such, a noise insulation scheme set around the priority value of 55 dB L_{night} will help to mitigate the effects on those who have already been exposed to noise above this value and would continue to do so in the future.

Additionally, the scheme will help to mitigate the effects on those who become newly exposed to potentially harmful levels of aircraft noise. The Application proposed a second criterion for eligibility to the proposed scheme. This criterion would have the effect of limiting the availability of noise insulation grants to those who experience a 'very significant' effect as a result of the Application. This occurs where a dwelling is forecast to experience noise exposure of at least 50 dB L_{night} and an increase in noise exposure of at least 9 dB when compared to the current permitted operation. The Application has proposed that subsequent eligibility will be on forecasts for the first year of the Relevant Action and would be a 'one-off' in terms of the area of eligibility and would therefore not be subject to any annual review. ANCA recognises that a scheme of this nature would help mitigate the effect of those who become newly exposed to night time aircraft noise below the priority value.

The analysis presented in this report has considered a range of different approaches to setting eligibility alongside the runway use and restriction scenarios. Having accepted the Applicant's proposals with respect to amending Condition 3(d), a key finding from the CEA is that insulation schemes which are set against forecast

year of 2025 are more effective. This is because in 2025 noise exposure is forecast to be at its peak. 2025 was therefore used to set initial eligibility for both aspects of the scheme in the DRD.

Having regard to the submissions made during the public consultation, ANCA has further reviewed the 2022 forecast used by the Applicant. This forecast suggests that noise exposure from the North Runway is higher in 2022 forecast than in the 2025 forecast. However overall noise exposure from the airport remains at its highest in 2025. In light of the submissions received during the consultation period, ANCA has extended the initial eligibility boundary to reflect the 'very significant' effect determined from the 2022 forecast. Figure 14.1 presents a comparison of the initial eligibility boundary provided with the DRD, and the extended eligibility boundary.

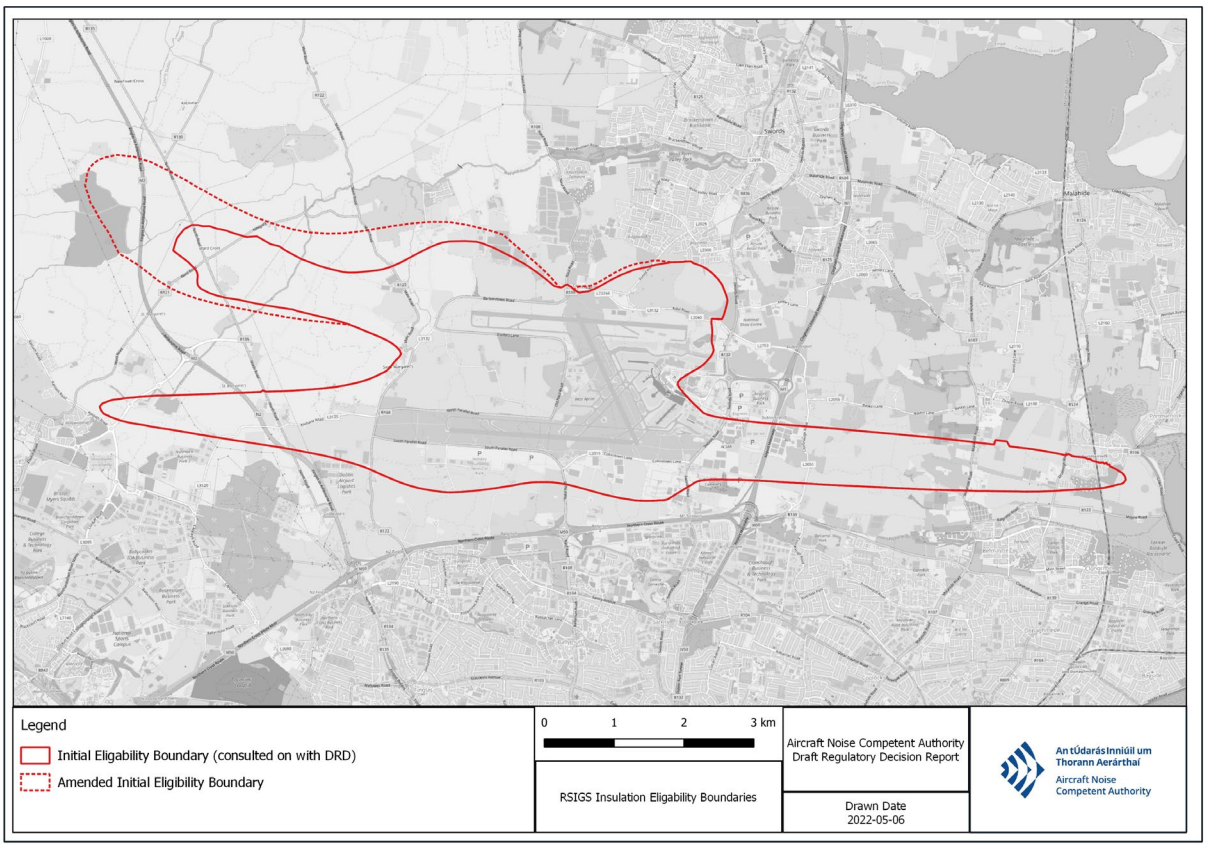

Figure 14.1 – RSIGS Initial Eligibility Boundaries

Section 9.3.1 of the DRD report considered whether noise insulation scheme eligibility criteria may influence decisions in relation to the runway use and restriction scenarios considered. A cost-effectiveness assessment was prepared that in general terms did not identify insulation eligibility to be a determining factor in the selection of a particular runway use and/or restriction scenario. Instead, the CEA concluded that all runway scenarios and restrictions can be considered suitable against the noise objective. While they all meet the objective, each combination of pattern and noise insulation option results in different levels of costs and effectiveness.

ANCA's RD associated with the North Runway Planning Permission, reflecting runway use and restriction Scenario P02, strikes a balance between the number of people exposed to noise above the priority value of 55 dB L_{night}, and those who may experience significant adverse changes in night time noise exposure. ANCA considered the cost effectiveness of the extension to the initial eligibility boundary as presented in the Application and shown in Figure 14.1 with Scenario P02 as the runway use and restriction scenario. ANCA's analysis shows that amending the eligibility would result in approximately 50 additional residential dwellings

being eligible for the RSIGS scheme. When assuming that the insulation can be equated to a 5 dB improvement in night time noise exposure, it is estimated that this would further reduce the number of people highly sleep disturbed in 2025 by five at a further cost of up to €1 million i.e., a further €200,000 per person no longer HSD in 2025. With reference to Table 9.11 of this report, this will not result in Scenario P02 producing a better outcome with respect to changes in the number of people HSD in 2025 compared to the Forecast Without New Measures. As such, in cost-effectiveness terms, amending the insulation boundary would mean that the number of people no longer HSD in 2025 would continue to be worse than the Forecast Without New Measures.

Amending the insulation boundary will not further improve the number of people exposed to aircraft noise above the night time priority level in 2025. This is because extending the boundary does not affect the number of dwellings that would be insulated above this threshold. As such, when taking into account the cost-effectiveness per person no longer exposed to night time priority of 55 dB L_{night} in 2025 the CEA outcome remains the same as identified by ANCA in the DRD report[139].

Extending the insulation boundary results in broadly the same CEA outcomes as those reported in Section 9.3 of this report. Whilst there is additional cost, this will contribute to a reduction in the number of people HSD but would not lead to any reduction in the number of people exposed to more than 55 dB L_{night}. A further consideration is that by extending the insulation boundary this will further mitigate the third aspect of the noise problem i.e., the significant effects arising from the relevant action. Amending the insulation boundary allows for more of those potentially experiencing significant effects to benefit from noise insulation.

For these reasons ANCA has amended the initial Eligibility Contour Area to reflect the extended insulation eligibility boundary as shown in Figure 3.1 of the RD. This is reflected in the change to the Third Condition as amended from the DRD.

The Application proposed a night noise insulation grant scheme of €20,000 for eligible dwellings. The DRD included provision to increase the grant assistance sum in line with the Consumer Price Index maintained by the Central Statistics Office in the form of a grant of up to and limited to €20,000 towards the costs of noise insulation measures to Bedrooms in Eligible Dwellings. Submissions received during the public consultation raised issues relating to limitations in the proposed scheme. The RSIGS is intended to complement, but not replace, the two prior insulation schemes in place at Dublin Airport – the Residential Noise Insulation Scheme (RNIS) and the Home Sound Insulation Programme (HSIP).

Having regard to the foregoing and submissions made during the public consultation relating to limitations in the proposed scheme, the DRD has been amended with provision for properties to be eligible for assistance in the form of a grant in the sum of €20,000.

The airport authority is the noise mapping body for the purposes of the European Communities (Environmental Noise) Regulations 2018 (the Regulations of 2018). In this context, the statutory obligations of the Applicant are reflected in the amended text (sub section 3.2) to align the RD with statutory obligations. These statutory requirements are in addition to the statutory functions of ANCA pursuant to Section 20 of the Act of 2019.

139 €277,000 per person, based on 2020 prices

Based on the evidence provided in the Application, ANCA's own analysis and having had regard to the submissions and observations made during the public consultation, ANCA has included the following condition within the RD:

Third Condition:

A voluntary residential sound insulation grant scheme (RSIGS) for residential dwellings shall be provided. Initial eligibility to the scheme shall apply to all residential dwellings situated within the Initial Eligibility Contour Area as shown in Figure 3.1 - regulatory decision, Third Condition. Residential Sound Insulation Grant Scheme (RSIGS) - Initial Eligibility Contour Area – June 2022.

Eligibility to the scheme shall be reviewed every 2 years commencing in 2027 with residential dwellings situated in the 55 dB L_{night} contour being eligible under the scheme as detailed below.

Part 1 Definitions

1.1 The following definitions shall apply with reference to the scheme described in Part 2.

Term	Meaning
Approved Contractor	A contractor procured and managed by the Applicant and considered competent and appropriately qualified and have suitable levels of insurance coverage to install the sound insulation measures described in Part 4 in line with acceptable standards and in compliance with the Building Regulations.
Bedroom	A room other than in an attic or loft within an Eligible Dwelling which is used as sleeping accommodation.
Competent Surveyor	An appropriately qualified surveyor to inspect and determine relevant information in relation to the existing construction and elements of an Eligible Dwelling for the purposes of undertaking an Elemental Analysis as defined in Part 5.1, Step 5 below.
Eligibility Contour Area	The 55 dB L_{night} contour area as varied from time to time pursuant to the review process set out in Part 3.2 below.
Eligible Dwelling	A habitable dwelling built in compliance with the provisions of the building regulations and the Planning and Development Act within the Eligibility Contour Area and which otherwise qualifies under the conditions set out under Part 3.1 below.
Index Linked	Index-linked by reference to changes in the Consumer Price Index (CPI) (maintained by the Central Statistics Office) in the period between the Application and the date of the Statement of Need.
Initial Eligibility Contour Area	The area shown on the map Figure 3.1 - regulatory decision, Third Condition. Residential Sound Insulation Grant Scheme (RSIGS) - Initial Eligibility Contour Area – June 2022.
Relevant External Noise Level	The noise exposure level at the relevant Eligible Dwelling.
Statement of Need	The recommended measures identified from those available under the scheme as outlined in Part 4
Target Performance	An improvement of at least 5 dB, where feasible, in the sound insulation of each bedroom of the Eligible Dwelling. Where possible, the guidelines recommended in BS8233:2014 for internal ambient noise levels shall be targeted.

Part 2 – Purpose of the Scheme

2.1 The purpose of the scheme is to provide financial assistance by the Applicant to property owners in the form of a grant in the sum of €20,000 (Index Linked) towards the costs of noise insulation measures to Bedrooms in Eligible Dwellings (the Grant).

2.2 Bedrooms and properties may qualify only once for the financial assistance provided under this scheme.

2.3 Where a dwelling is eligible under this scheme but is also eligible for insulation under the Residential Noise Insulation Scheme (RNIS) and the Home Sound Insulation Programme (HSIP) best endeavours shall be made by the Applicant to ensure that the dwelling receives insulation under RNIS and HSIP instead of this scheme.

Part 3 – Eligibility

3.1 Dwellings shall be determined to be Eligible Dwellings under this scheme if they are located within (i) the Initial Eligibility Contour Area as shown in Figure 3.1 - regulatory decision, Third Condition. Residential Sound Insulation Grant Scheme (RSIGS) - Initial Eligibility Contour Area – June 2022 or (ii) the Eligibility Contour Area (following any review carried out pursuant to Part 3.2 below) and:

a. Were constructed pursuant to a planning permission granted following a planning application lodged on or prior to 09th December 2019, being the date of adoption of Variation No. 1 to the Fingal Development Plan 2017 – 2023 incorporating policies relating to development within Aircraft Noise Zones and

b. Have not benefitted from noise insulation previously under this scheme; and

c. Have not benefitted from noise insulation under either the RNIS or HSIP schemes previously.

3.2 By 31 March 2027 and every two years thereafter, the Applicant shall update and publish a revised Eligibility Contour Area map identifying all authorised habitable dwellings within the 55 dB L_{night} contour in the calendar year immediately preceding the review.

Part 4 – Measures available under the Scheme

4.1 The owner of an Eligible Dwelling in accordance with Part 3 and following the procedure described in Part 5 shall be entitled to the Grant to be applied towards a selection of insulation measures to be applied to Bedrooms within an Eligible Dwelling as specified in Paragraphs 4.2 to 4.10 below.

4.2 The insulation measures referred to in Paragraph 4.1 must be installed by an Approved Contractor and comprise of the following unless the equivalent measure already exists within the Eligible Dwelling:

a. Primary Acoustic Glazing
b. Secondary Acoustic Glazing
c. Glazing Roof Light
d. Passive Ventilator
e. Mechanical Ventilator
f. Loft Insulation
g. Ceiling Overboarding

4.3 The sound installation measures provided under this scheme shall otherwise comply with the specification of the measures in place under the RNIS scheme as summarized in Part 5 below.

4.4 Where secondary acoustic glazing is to be installed, this shall meet the following specification, namely, 6.4mm laminated glass with minimum 100mm gap from the primary glazing unit. However, where this is not possible, the secondary glazing should be provided to account for the below variations.

Thickness of Glazing of the Inner Window	Minimum Horizontal Distance
Less than 4 mm and not less than 3 mm thick	200 mm
Less than 6 mm and not less than 4 mm thick	150 mm

4.5 Where secondary glazing is being installed reasonable endeavours will be made to repair the draft seals, catches and hinges to provide an air-tight seal on the existing primary glazing unit.

4.6 Where a replacement primary acoustic glazing is to be provided, this shall achieve a minimum Rw of 43 dB tested and rated to BS EN ISO 140-3 and BS EN ISO 717.

4.7 Where ventilators (passive or mechanical) are to be provided, a ventilation strategy for the bedrooms within each Eligible Dwelling shall be determined in accordance with Part F of the Building Regulations. Mechanical ventilation shall comprise of a ventilator unit consisting of a controlled variable- speed inlet fan with sound attenuating duct and cover that is capable of supplying fresh air to the room directly from outside by means of the supply duct and cowl (or grille).

4.8 Where no loft insulation is present in an Eligible Dwelling 200mm of fibrous acoustic insulation may be placed between ceiling joists, the insulation is to have a minimum density of 80kg/m3. Where insulation is already present but found to be unsatisfactory additional layers of insulation will be added to increase the total thickness to 200mm.

4.9 Any ceiling overboarding shall comprise of a continuous layer of mass to provide at least 12kg/m^2 added above joists in attic, for example 22mm plywood (or similar approved).

4.10 In the event that loft Insulation or loft boards cannot be installed due to inaccessibility or other practical reasons, any ceiling overboarding shall comprise a dense plasterboard with a total minimum surface mass of 12 kg/m2, i.e. 15mm SoundBloc (or similar approved).

Part 5 – Procedure

5.1. The Applicant in operating this Scheme shall follow the procedure set out in this Part 5 as required in the discharge of the Applicant's obligations under Condition 7 of the North Runway Consent, the discharge of which obligations is achieved through the RNIS.

Step 1 – Determine Eligibility - Eligible Dwellings shall be identified as per Part 3 of this Schedule.

Step 2 – Notification of Eligibility - The Owner of an Eligible Dwelling shall be notified of their eligibility under the scheme within six months of their eligibility being determined under Step 1.

Step 3 – Determine Relevant External Noise Level - The Relevant External Noise Level at the Eligible Dwelling shall be determined

Step 4 – Undertake Building Survey – The Applicant shall use reasonable endeavours to arrange for the Eligible Dwelling to be inspected by the Competent Surveyor (and secure the necessary agreement to this from the owner of the Eligible Dwelling) within six months of eligibility being determined to record relevant information. The building survey shall be carried out by a Competent Surveyor appointed on behalf of the Applicant. The survey shall record the location and number of Bedrooms, and for each Bedroom record the following relevant information:

- External wall constructions - where possible the construction type of the external walls will be recorded for example wall composition including inner leaf, cavity, and external leaf dimensions including all associated building materials;
- Window type – e.g. frame material, single glazing, double glazing, including key dimensions;
- Roof construction – including where possible roof construction type
- Details of chimneys and fireplaces
- Ventilation paths – e.g. existing wall and floor vent types, quantities and dimensions
- Details of any existing sound insulation measures which have been installed previously
- Dimensions of all Bedrooms including window, roof and wall dimensions
- Drawings and/or floor plans – if these are available from the owner
- Photographic records of the building

Step 5 – Elemental Analysis - An elemental analysis shall be undertaken to provide a technical assessment of the noise insulation required for the Eligible Dwelling. The following process shall be followed:

a. The existing sound insulation properties of each Bedroom shall be established

b. The anticipated future internal noise levels within each Bedroom having regard for the Relevant External Noise Level, presented in octave bands scaled from measurements taken around the Airport, and the existing noise insulation performance obtained from Step a.

c. A comparison shall be made between the anticipated internal noise level to the BS8233:2014 Targets for internal ambient noise;

d. An assessment will be undertaken to determine the required improvement in the noise insulation performance, having regard for the Target Performance.

e. Through an elemental analysis, the most effective combination of measures set out in Part 4 having regard for the Target Performance and the financial assistance grant shall be identified.

Step 6 – Statement of Need - A Statement of Need shall be prepared for each Eligible Dwelling. The Statement of Need will be a bespoke document for each Eligible Dwelling. The Statement of Need shall:

a. Describe the existing sound insulation performance for each Bedroom having regard for the Building Survey as described in Step 4

b. Identify the potential improvement in the existing sound insulation performance for each Bedroom as can be afforded within the Grant and whether the Target Performance can be met

c. Set out the recommended set of measures for the Eligible Dwelling in the form of a schedule of works and the associated measures on a bedroom-by-bedroom basis

d. Provide an opinion on the future internal noise level following the implementation of the noise insulation works and the ability of the works to the meet Target Performance.

The Statement of Need shall be issued to the owner of the Eligible Dwelling.

Step 7 – Acceptance - Subject to the owner of the Eligible Dwelling agreeing to the scope of works as defined under the Statement of Need, the engagement of the Approved Contractor and access to the dwelling by the Approved Contractor for the purposes of undertaking the works, the Airport will use reasonable endeavours to procure that the Approved Contractor undertakes the scope of works within six months of the owner's agreement to the same.

Step 8 – Works – The scope of works as defined by the Statement of Need shall be undertaken by the Approved Contractor or a suitably qualified contractor procured by the home owner. The Applicant shall procure the Approved Contractor to ensure that the works are undertaken to the necessary standards and in compliance with the necessary regulations and that the Approved Contractor provides the owner with all appropriate certification and warranties relative to the works completed to the Eligible Dwelling. The Approved Contractor shall photograph the Eligible Dwelling before and after the works for record purposes.

5.2 In the event that a property owner declines to accept the scope of works as defined under the Statement of Need (Step 6) the Applicant shall make a grant available towards the costs of sound insulation measures through the Approved Contractor equal to the cost of the measures identified through the Statement of Need. This grant may be used by the owner to request alternative measures providing they as a minimum meet the Target Performance. Where the alternative measures are calculated to cost more than the cost of the measures identified through the Statement of Need, any difference shall be at the expense of the owner.

5.3 In the event that a property owner wishes to appoint their own competent contractor, the Applicant will provide a specification for the works. The property owner must provide a written quotation from their competent contractor for approval of both the identity of the contractor and the quotation by the Applicant. Following approval, the property owner shall be responsible for managing the works and making payments to their contractor and the provisions of this Schedule B shall be deemed to be amended accordingly. Upon completion of the works, the Applicant will carry out an inspection and issue payment to the property owner. Where works are not carried out in accordance with the approved specification, payment will not be made by the Applicant. Where works are not carried out in accordance with the approved specification, payment will not be made by the Applicant. The Applicant must act reasonable in the approvals process, but if the Applicant does not approve of the contractor or the quotation, payment will not be made by the Applicant.

REASON:

To mitigate the impact of aircraft night time noise as a result of the use of the Airport's runways.

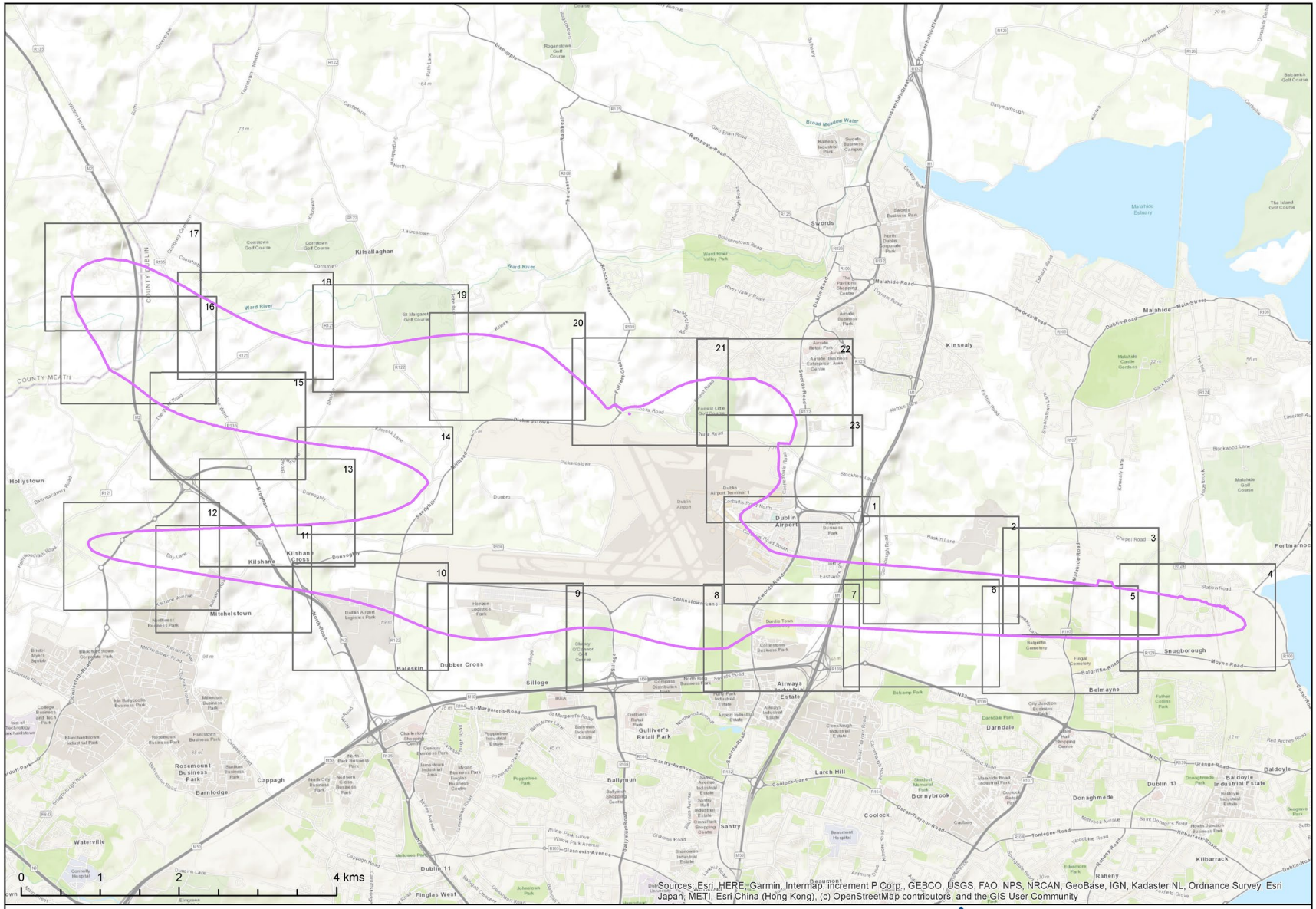

Figure 3.1 – Regulatory Decision, Third Condition.
Residential Sound Insulation Grant Scheme (RSIGS) - Initial Eligibility Contour Area - June 2022

An tÚdarás Inniúil um Thorann Aerárthaí
Aircraft Noise Competent Authority

The following paragraphs details changes between the DRD and RD.

Schedule B from the draft RD has been incorporated into the body of the Third Condition. The other changes to the Third Condition are detailed below.

The Initial Eligibility Contour Area has been changed. The amended map is within the RD.

For the purposes of clarity and to ensure the efficient implementation of planning conditions and the NAO, Part 1 - Definitions, subsection 1.1 reading as:

Part 1 Definitions

1.1 The following definitions shall apply with reference to the scheme described in Part 2.

Term	Meaning
Airport	daa PLC
Approved Contractor	Means a contractor procured and managed by the Airport and considered competent and appropriately qualified and have suitable levels of insurance coverage to install the sound insulation measures described in Part 4 in line with acceptable standards and in compliance with the Building Regulations.
Bedroom	A room other than in an attic or loft within an Eligible Dwelling which is used as sleeping accommodation.
Competent Surveyor	Means an appropriately qualified surveyor to inspect and determine relevant information in relation to the existing construction and elements of an Eligible Dwelling for the purposes of undertaking an Elemental Analysis as defined in Part 5.1, Step 5 below.
Eligibility Area	The Initial Eligibility Area as varied from time to time pursuant to the review process set out in Part 3.2 below.
Eligible Dwelling	A habitable dwelling built in compliance with the provisions of the building regulations and the Planning and Development Act within the Eligibility Area and which otherwise qualifies under the conditions set out under Part 3.1 below.
Index Linked	Means index-linked each year on 1 January by reference to changes in the Consumer Price Index (CPI) in the proceeding 12-month period maintained by the Central Statistics Office.
Initial Eligibility Area	The initial area of eligibility to the scheme was derived from all homes forecast in 2025 to be exposed to aircraft noise at or above 55 dB L_{night} contour or experience a 'very significant' effect i.e. exposure to aircraft noise at or above the 50 dB L_{night} contour together with an increase in noise exposure of at least 9 dB compared to the forecast noise situation in 2022 and 2025 as shown on the Initial Eligibility Contour Area Map (which contours have been adjusted to accommodate local land boundaries that would otherwise be bisected by the contours).
Initial Eligibility Contour Area	The area shown on the map annexed to the Appendix to this Schedule B.
Relevant External Noise Level	This noise exposure level at the relevant Eligible Dwelling.
Statement of Need	The recommended measures identified from those available under the scheme as outlined in Part 4.
Target Performance	means an improvement of at least 5 dB, where feasible, in the sound insulation of each bedroom of the Eligible Dwelling. Where possible, the guidelines recommended in BS8233:2014 for internal ambient noise levels shall be targeted.

Has been amended to read as follows:

1.1 The following definitions shall apply with reference to the scheme described in Part 2.

Term	Meaning
Approved Contractor	A contractor procured and managed by the Applicant and considered competent and appropriately qualified and have suitable levels of insurance coverage to install the sound insulation measures described in Part 4 in line with acceptable standards and in compliance with the Building Regulations.
Bedroom	A room other than in an attic or loft within an Eligible Dwelling which is used as sleeping accommodation.
Competent Surveyor	An appropriately qualified surveyor to inspect and determine relevant information in relation to the existing construction and elements of an Eligible Dwelling for the purposes of undertaking an Elemental Analysis as defined in Part 5.1, Step 5 below.
Eligibility Contour Area	The 55 dB L_{night} contour area as varied from time to time pursuant to the review process set out in Part 3.2 below.
Eligible Dwelling	A habitable dwelling built in compliance with the provisions of the building regulations and the Planning and Development Act within the Eligibility Contour Area and which otherwise qualifies under the conditions set out under Part 3.1 below.
Index Linked	Index-linked by reference to changes in the Consumer Price Index (CPI) (maintained by the Central Statistics Office) in the period between the Application and the date of the Statement of Need.
Initial Eligibility Contour Area	The area shown on the map Figure 3.1 - Regulatory Decision, Third Condition. Residential Sound Insulation Grant Scheme (RSIGS) - Initial Eligibility Contour Area – June 2022.
Relevant External Noise Level	The noise exposure level at the relevant Eligible Dwelling.
Statement of Need	The recommended measures identified from those available under the scheme as outlined in Part 4
Target Performance	An improvement of at least 5 dB, where feasible, in the sound insulation of each bedroom of the Eligible Dwelling. Where possible, the guidelines recommended in BS8233:2014 for internal ambient noise levels shall be targeted.

Part 2 – Purpose of the Scheme

2.1 The purpose of the scheme is to provide financial assistance by the Applicant to property owners in the form of a grant of up to and limited to €20,000 (Index Linked) towards the costs of noise insulation measures to Bedrooms in Eligible Dwellings (the Grant).

Has been amended to read as follows:

2.1 The purpose of the scheme is to provide financial assistance by the Applicant to property owners in the form of a grant in the sum of €20,000 (Index Linked) towards the costs of noise insulation measures to Bedrooms in Eligible Dwellings (the Grant).

Part 3 – Eligibility

3.2 On 31 March 2027 and every two years thereafter, ANCA shall carry out a review exercise to ascertain whether any authorised habitable dwelling outside the Initial Eligibility Area or the Eligibility Area as at the date of that review (as appropriate) was subject to aircraft noise level at or above 55 dB L_{night} contour in the calendar year immediately preceding the review. If there is/are any such authorised habitable dwelling/s, same shall as and from the date of the review be deemed to be an Eligible Dwelling/s and the Eligibility Area shall be amended to include such dwelling/s. Following each review, ANCA shall prepare a revised contour map showing the revised Eligibility Area following such review and shall publish same on its website.

Has been amended to read as follows:

3.2 By 31 March 2027 and every two years thereafter, the Applicant shall update and publish a revised Eligibility Contour Area map identifying all authorised habitable dwellings within the 55 dB L_{night} contour in the calendar year immediately preceding the review.

Part 4 – Measures available under the Scheme

No change.

Part 5 – Procedure

No change.

Initial Eligibility Contour Area map

Revised.

The RD contains the noise mitigation measures and operating restrictions that ANCA directs the planning authority to include as conditions of the planning authority's decision relating to planning application F20A/0668. The RD is attached in Appendix O.

An tÚdarás Inniúil um Thorann Aerárthaí

Aircraft Noise Competent Authority

Comhairle Contae Fhine Gall
Fingal County Council

An tÚdarás Inniúil um Thorann Aerárthaí

Aircraft Noise Competent Authority

ANCA

Regulatory Decision

Appendix A - Schedule of Data Considered

Appendix A - Schedule of Documents and Data Considered

Document / Dataset	Summary
Received by ANCA on 12 December 2020	
Planning Report	The Planning Report outlines the background to and the substance of the proposed relevant action. It also summarises the various issues arising from the proposal whilst providing technical details to supplement the complementary specialist reports included with the Application.
Dublin Airport North Runway Relevant Action Application Environmental Impact Assessment Report Main Report **December 2020**	An Environmental Impact Assessment Report has been prepared within an Environmental Impact Assessment for the proposed planning application. The EAIR includes assessment of following environmental aspect: • Population and Human Health • Major Accidents and Disasters • Traffic and Transportation • Air Quality Climate and Carbon • Water (Drainage) - Aircraft Noise and Vibration • Ground Noise and Vibration • Biodiversity • Flora and Fauna, Terrestrial Ecology, • Biodiversity (Aquatic) • Landscape and Visual Land and Soils • Material Assets • Cultural Heritage.

Dublin Airport North Runway Relevant Action Application Environmental Impact Assessment Report Non-Technical Summary **December 2020**	Non-technical summary in language of the North Runway proposed Relevant Action Environmental Impact Assessment Report (EIAR). This document describes the Current State of the Environment and its evolution without the proposed relevant action. This is then assessed against the proposed Relevant Action to predict potential beneficial and/or adverse impacts, to identify potential significant adverse effects and to propose appropriate mitigating measures where necessary and feasible.
Dublin Airport North Runway Relevant Action Application Appropriate Assessment Screening Report **December 2020**	This Appropriate Assessment Screening Report provides information whether there are likely significant effects arising from the proposed relevant action, either individually or in combination with other plans or projects, and thus the requirement to proceed to the next stage of detailed AA. It provides all the information needed by the competent authority to make their own screening decision in relation to the proposed Relevant Action.
Received by ANCA on 04 June 2021	
Tom Phillips & Associates (TPA) Response letter to ANCA	The letter presents the response to the noise information requested by ANCA's Appendix A Overarching Information Request and all the documents/technical reports that have been provided to facilitate the decision-making process.
	The spreadsheet includes: • A description of each scenario within the planning application; • A description of the following measures within each scenario: Reduction of Noise at Source, Land-Use Planning and Management, Noise Abatement Operating Procedures, Operating Restrictions, Financial Instruments;

A11267_19_CA434_2.0 ANCA Reporting Template 2021 Update	• Number of Movements for each Aircraft type for each scenario and for each of the following metrics: Annual Day, Annual Evening, Annual Night, Annual 24hr, Summer Day 16hr, Summer Night, Summer 24hr; • Number of Movements for each hour of a typical day for each scenario and for each of the following metrics: Annual Day, Annual Evening, Annual Night, Annual 24hr, Quota Count, Summer Day 16hr, Summer Night, Summer 24hr; • Area in km^2 of the noise contours for each scenario of the following metrics: L_{den}, L_{night}, L_{Aeq},16h, L_{day}, $L_{evening}$; • Number of Dwelling exposed to noise for each scenario for the following metrics: L_{den}, L_{night}, L_{Aeq},16h, L_{day}, $L_{evening}$; • Number of People exposed to noise for each scenario for the following metrics: L_{den}, L_{night}, L_{Aeq},16h, L_{day}, $L_{evening}$; • Health Effect on people for each scenario for the following metrics: L_{den}, L_{night}, L_{Aeq},16h, L_{day}, $L_{evening}$;
Dublin Airport Operating Restrictions: Quantification of Impacts on Future Growth. Updated analysis in response to the ANCA RFI. **Version 1.2**	The document presents the assessment of the impact on aircraft movements at the airport due to the application of Operating Restriction dictated by Condition 3d and 5 attached to the planning application of the third runway. The assessment has been updated to include the review of the unconstrained traffic forecast, for both pre and post COVID-19 crisis scenarios.
Received by ANCA on 18 June 2021	
A11267_19_CA434_5.0 ANCA Reporting Template 2021 Update	A11267_19_CA434_5.0 ANCA Reporting Template 2021 Update is a revision of A11267_19_CA434_2.0 ANCA Reporting Template 2021 Update

Tom Phillips & Associates (TPA) Response letter to ANCA	The letter presents the response to the following points as set out in the Appendix A to ANCA's correspondence dated 24th February 2021: • Overarching and specific information requests • ANCA reporting template 2021 update • all documents/technical reports that have been provided to facilitate the decision-making process.
Dublin Airport Economic Impact of Operating Restrictions	This report documents the methodology and findings of this study, and is structured as follows: • Chapter 1 – introduction. • Chapter 2 outlines the methodology used to estimate the economic impact of the operating restrictions attached to the grant of planning. • Chapter 3 summarises the traffic and demand implications of the operating restrictions at Dublin Airport taken from separate research commissioned by daa which reflects the impact of the COVID-19 outbreak. • Chapter 4 provides the forgone economic impact resulting from the proposed operating restrictions at Dublin Airport – the lost employment and GDP in Ireland that will result.
Dublin Airport North Runway Relevant Action Application Draft - Initial Response to ANCA Request for Further Information	This report has been prepared in response to the request from the Aircraft Noise Competent Authority (ANCA) to Dublin Airport for further information (Direction 01, dated 24 February 2021), in respect of daa's relevant action Application for the Dublin Airport north runway.
Received by ANCA on 1 July 2021	

Tom Phillips & Associates (TPA) Response letter to ANCA	The letter shows the following of a recent correspondence in June 2021. TFA provides to ANCA the updated versions of technical reports previously sent in response to the noise information requested by ANCA's Appendix A Overarching Information Request.
Tom Phillips & Associates (TPA) letter to FCC	The letter presents that Fingal County Council has been informed by TFA and provided a copy of the new information recently presented to ANCA as the Aircraft Noise Competent Authority in relation to ANCA-F20/0668-D01
Dublin Airport Operating Restrictions: Quantification of Impacts on Future Growth. Updated analysis in response to the ANCA RFI. **Version 1.3.1**	The document presents the assessment of impact on aircraft movements at the airport due to the application of operating restriction dictated by Condition 3d and 5 attached to the planning application of the third runway. The assessment has been updated to include the review of the unconstrained traffic forecast, for both pre and post COVID-19 crisis scenarios. This report includes 'Scenario F'- 23:00 - 07:00 Single Runway (no 65/night or 32mppa limits)
Received by ANCA on 23 July 2021	
	The letter provides information in response to the remaining points as set out in the Appendix A to ANCA's Direction 01, dated 24th February 2021. In support of the responses provided in the letter, it has been also provided a hard copy and electronic copy of the following documents: Noise Abatement Measures – Existing, Planned and New RFI Response #77 by Anderson Acoustics

Tom Phillips & Associates (TPA) Response letter to ANCA	Residential Sound Insulation Grant Scheme (RSIGS) overview, DRAFT, by Anderson Acoustics, July 2021 Technical Memo: A11267_19_MO027_2.0 ANCA RFI Responses by Bickerdike Allen Partners, dated 22nd July 2021 BAP Contour Report: Noise Information – ANCA Request
Tom Phillips & Associates (TPA) letter to FCC	The letter presents that Fingal County Council has been informed by TFA and provided a copy of the new information recently presented to ANCA as the Noise Competent Authority in relation to ANCA-F20/0668-D01
ANCA Request for Further Information Response	This memo presents the updated and additional responses of the initial Request for Further Information given in Chapter 02: Aviation Noise Competent Authority RFIs, in June 2021.
RFI 77 Noise measures - Existing, Planned and New	The document includes a description of the existing noise measures, planned noise measures and new measures related to the relevant action application.
	The document is based on Noise Information for the Regulation 598/2014 (Aircraft Noise Regulation) Assessment (Ref:A11267_12_RP032_3.0) dated November 2020 and details the additional noise information and the details of its derivation. – Section 2.0 summarizes comments on the application including the ANCA request and the subsequent clarifications. – Section 3.0 discusses the updated forecasts – Section 4.0 detailing the scenarios that are considered.

Dublin Airport North Runway Relevant Action Application Noise Information – Anca Request February 2021 **June 2021**	– Section 5.0 details the noise modelling methodology used and the population and demographics assessment methodology. – Section 6.0 presents the resulting information.
Dublin Airport Residential Sound Insulation Grant Scheme (RSIGS) overview. DRAF	The document presents the overview of Residential Sound Insulation Grant Scheme (RSIGS) proposed by daa as part of the package of measures submitted in support of the planning application and associated EIA (relevant action). The proposals considered in this document are additional to the North Runway Insulation Scheme (NRIS) from Condition 7 of the North Runway Planning Permission.
Received by ANCA on 30 July 2021	
Tom Phillips & Associates (TPA) Response letter to ANCA	The letter provides information in response to the remaining points as set out in the Appendix A to ANCA's Direction 01, dated 24th February 2021. In support of the responses provided in the letter, it has been also provided a hard copy and electronic copy of the following documents: RFI 12 & 13 Technical Memo: Landscape and Tranquillity RFI 14 Technical Memo: Cultural Heritage RFI 128 Technical Memo: A11267_12_MO028_2.0 Revised Regulation 598 package
	The letter provides the following revised Regulation 598/2014 assessment documentation:

PR-407849-ACM_CL_EN_002_(A)_598 Pack Contents Letter	Dublin Airport North Runway Relevant Action Application, Regulation 598/2014 (Aircraft Noise Regulation) Assessment Non-Technical Summary', PR407849_ACM_RP_EN_002_(C)_598 NTS_FINAL_290721 'Dublin Airport North Runway, Regulation 598/2014 (Aircraft Noise Regulation) Forecast Without New Measures and Additional Measures Assessment Report (Revision 1 – July 2021)'. Dublin Airport North Runway, Regulation 598/2014 (Aircraft Noise Regulation) Cost Effectiveness Analysis Report (Revision 1 – July 2021)'.
Dublin Airport North Runway Relevant Action Application Regulation 598/2014 (Aircraft Noise Regulation) Assessment **Non-Technical Summary - Revision 01**	The document is a non-technical summary of important information from various assessments undertaken aligned to the headings of the Aircraft Noise Regulation Annex I. Overviews of the Aircraft Noise (Dublin Airport) Regulation Act 2019 The document includes: A summary of the current inventory (airport description, noise situation, aircraft noise management measures) Description of Forecast Without New Measures Assessments of additional measures
	This report contains: • Description of the Forecast Without New Measures scenario; which represents the noise conditions that would arise from any development proposals inclusive of specific or combinations of noise mitigation measures:

Dublin Airport North Runway, Regulation 598/2014 (Aircraft Noise Regulation) Forecast Without New Measures and Additional Measures Assessment Report (Revision 1 – July 2021)	• Screening assessment for potential new mitigation measures, a summary of the Preferred Option that becomes the forecast including Additional Measures scenario, and the results of the cost-effectiveness analysis. • Comparison between the forecast including Additional Measures scenario and the situation with the North Runway Planning Permission's operating restrictions at night, called the Permitted Operations Situation Scenario. The documents states: "The Permitted Operations Situation by itself would meet the NAO but is more restrictive and not as cost-effective compared to the Forecast including Additional Measures scenario."
Dublin Airport North Runway, Regulation 598/2014 (Aircraft Noise Regulation) Cost Effectiveness Analysis Report (Revision 1 – July 2021)	This report includes the methodology applied to evaluate the cost-effectiveness of the proposed measures; the baseline noise exposure levels used to assess change in noise exposure; the units of effectiveness selected to assess a measure's influence on reducing noise exposure levels; the estimated costs to implement a measure; and the cost-effective analysis results. This compares the Forecast including Additional Measures scenario and the situation with the North Runway Planning Permission's operating restrictions at night, called the Permitted Operations Situation scenario in terms of cost effectiveness.
RFI 12 & 13 Technical Memo: Landscape and Tranquillity	The memo addresses the ANCA Request for Information on the potential impact on tranquillity and on additional lighting
	This note has been prepared in response to a Request for Information (RFI) received from ANCA to address the impact of changes in noise levels on sensitive heritage assets as a result of changes to airborne traffic between the Permitted Scenario, which is the situation which will come into effect once the

RFI 14 Technical Memo: Cultural Heritage	north runway is operational and the Proposed Scenario, which is the situation which will come into effect if the proposed relevant action is consented.
RFI 128 Technical Memo: A11267_12_MO028_2.0	This memo addresses the ANCA Request for Information (RFI) number 128 about the eligibility boundaries for the existing voluntary purchase scheme and how it aligns with the night time noise exposure levels calculated for 2025 in Scenarios 2 to 9
Tom Phillips & Associates (TPA) Response letter to ANCA	The letter provides information in response to the remaining points as set out in the Appendix A to ANCA's Direction 01, dated 24th February 2021. In support of the responses provided in the letter, it has been also provided a hard copy and electronic copy of the following documents: RFI 12 & 13 Technical Memo: Landscape and Tranquillity RFI 14 Technical Memo: Cultural Heritage RFI 128 Technical Memo: A11267_12_MO028_2.0 Revised Regulation 598 package
	The letter provides the following revised Regulation 598/2014 assessment documentation: Dublin Airport North Runway Relevant Action Application, Regulation 598/2014 (Aircraft Noise Regulation) Assessment Non-Technical Summary', PR407849_ACM_RP_EN_002_(C)_598 NTS_FINAL_290721 'Dublin Airport North Runway, Regulation 598/2014 (Aircraft Noise Regulation) Forecast Without New Measures and Additional Measures Assessment Report (Revision 1 – July 2021)'.

PR-407849-ACM_CL_EN_002_(A)_598 Pack Contents Letter	Dublin Airport North Runway, Regulation 598/2014 (Aircraft Noise Regulation) Cost Effectiveness Analysis Report (Revision 1 – July 2021)'.
Dublin Airport North Runway Relevant Action Application Regulation 598/2014 (Aircraft Noise Regulation) Assessment **Non-Technical Summary - Revision 01**	The document is a non-technical summary of important information from various assessments undertaken aligned to the headings of the Aircraft Noise Regulation Annex I. Overviews of the Aircraft Noise (Dublin Airport) Regulation Act 2019. The document includes: – A summary of the current inventory (airport description, noise situation, aircraft noise management measures) – Description of Forecast Without New measures – Assessments of additional measures
Dublin Airport North Runway, Regulation 598/2014 (Aircraft Noise Regulation) Forecast Without New Measures and Additional Measures Assessment Report (Revision 1 – July 2021)	This report contains: Description of the Forecast Without New Measures scenario; which represents the noise conditions that would arise from any development proposals inclusive of specific or combinations of noise mitigation measures; Screening assessment for potential new mitigation measures, a summary of the Preferred Option that becomes the Forecast including Additional Measures scenario, and the results of the Cost-Effectiveness Analysis. Comparison between the Forecast including Additional Measures scenario and the situation with the North Runway Planning Permission's operating restrictions at night, called the Permitted Operations Situation scenario.

	The documents states: “The Permitted Operations Situation by itself would meet the cNAO but is more restrictive and not as cost-effective compared to the Forecast including Additional Measures scenario.”
Dublin Airport North Runway, Regulation 598/2014 (Aircraft Noise Regulation) Cost Effectiveness Analysis Report (Revision 1 – July 2021)	This report includes the methodology applied to evaluate cost-effectiveness of the proposed measures; the baseline noise exposure levels used to assess change in noise exposure; the units of effectiveness selected to assess a measure’s influence on reducing noise exposure levels; the estimated costs to implement a measure; and the cost-effective analysis results. Compares the Forecast including Additional Measures scenario and the situation with the North Runway Planning Permission’s operating restrictions at night, called the Permitted Operations Situation scenario in terms of cost effectiveness.
RFI 12 & 13 Technical Memo: Landscape and Tranquillity	The memo addresses ANCA Request for Information on the potential impact on tranquillity and on additional lighting
RFI 14 Technical Memo: Cultural Heritage	This note has been prepared in response to a Request for Information (RFI) received from ANCA to address the impact of changes in noise levels on sensitive heritage assets as a result of changes to airborne traffic between the Permitted Scenario, which is the situation which will come into effect once the North Runway is operational and the Proposed Scenario, which is the situation which will come into effect if the proposed Relevant Action is consented.
RFI 128 Technical Memo: A11267_12_MO028_2.0	This memo addresses the ANCA Request For Information (RFI) number 128 about the eligibility boundaries for the existing Voluntary purchase scheme and how it aligns with the night time noise exposure levels calculated for 2025 in Scenarios 2 to 13

Received by ANCA on 28 August 2021	
Tom Phillips & Associates (TPA) letter response to ANCA_item #106	The letter provides information in response to Item #106. In support of the response provided in the letter, it has been also provided a copy of Memo no 1 prepared by Bickerdike Allen Partners (BAP).
ANCA RFI Response 106	This memo addresses ANCA Request for Information (RFI) number 106, to provide data for 2016 per the Aircraft Noise Reporting Template. In support of the response provided in the memo, it has been also provided a copy of the following documents: ANCA Reporting template 2021 update – 2021 END A11267_19_DR821_1.0 2016 L_{den} A11267_19_DR822_1.0 2016 L_{night}
	The spreadsheet includes: A description of 2016's scenario within the planning application; A description of the following measures for 2016's scenario: Reduction of Noise at Source, Land-Use Planning and Management, Noise Abatement Operating Procedures, Operating Restrictions, Financial Instruments;

ANCA Reporting template 2021 update – 2021 END	Number of Movements for each Aircraft type for 2016's scenario and for each of the following metrics: Annual Day, Annual Evening, Annual Night, Annual 24hr, Summer Day 16hr, Summer Night, Summer 24hr; Number of Movements for each hour of a typical day for 2016's scenario and for each of the following metrics: Annual Day, Annual Evening, Annual Night, Annual 24hr, Quota Count, Summer Day 16hr, Summer Night, Summer 24hr; Area in km2 of the noise contours for 2016's scenario of the following metrics: L_{den}, L_{night}, L_{Aeq},16h, L_{day}, $L_{evening}$ Number of Dwelling exposed to noise for 2016's scenario for the following metrics: L_{den}, L_{night}, L_{Aeq},16h, L_{day}, $L_{evening}$ Number of People exposed to noise for 2016's scenario for the following metrics: L_{den}, L_{night}, L_{Aeq},16h, L_{day}, $L_{evening}$ Health Effect on people for 2016's scenario for the following metrics: L_{den}, L_{night}, L_{Aeq},16h, L_{day}, $L_{evening}$
A11267_19_DR821_1.0 2016 L_{den}	Actual L_{den} Noise Contours 2016 – Scale: 1:250000
A11267_19_DR822_1.0 2016 L_{night}	Actual L_{night} Noise Contours 2016 – Scale: 1:250000
Received by ANCA on 14 September 2021	
Planning Report	Planning Report, September 2021 is a revision of Planning Report, December 2020

Dublin Airport North Runway Relevant Action Application Environmental Impact Assessment Report Volume 1 – Non-Technical Summary	Dublin Airport North Runway Relevant Action Application Environmental Impact Assessment Report Volume 1 – Non-Technical Summary is a revision of Dublin Airport North Runway Relevant Action Application Environmental Impact Assessment Report Non-Technical Summary December 2020
Dublin Airport North Runway Relevant Action Application Environmental Impact Assessment Report Volume 2 - Main Report	Dublin Airport North Runway Relevant Action Application Environmental Impact Assessment Report Volume 2 - Main Report is a revision of Dublin Airport North Runway Relevant Action Application Environmental Impact Assessment Report Main Report
Dublin Airport North Runway Relevant Action Application Environmental Impact Assessment Report Volume 3 - Figures	Dublin Airport North Runway Relevant Action Application Environmental Impact Assessment Report Volume 3 – Figures is a revision of all the figures included in Dublin Airport North Runway Relevant Action Application Environmental Impact Assessment Report Main Report
	This document includes all the Appendices for the environmental assessment that have not been included in the main report: Appendix 1A. Operating Restrictions Report Appendix 2A. Dublin Airport Proposed Night Quota System Appendix 3A. Economic Impact of Operating Restrictions Appendix 3B. Crosswind Runway Information Appendix 4A. ANCA Noise Information Reporting Template Appendix 6A. Impacts on Existing Land Use and Zoning

Environmental Impact Assessment Report Volume 4 - Appendices	Appendix 8A. Hazard Technical Appendix Appendix 9A. Mobility Management Update 2019 Appendix 10A. AQC Technical Report Appendix 10B. Detailed Model Prediction – Future Years Appendix 10C. Detailed Model Prediction - Odour Appendix 11A. Aircraft Model Substitutions Appendix 13A. Air Noise Legislation and Guidance Appendix 13B. Air Noise Methodology Appendix 13C. Air Noise Modelling Results Appendix 13D. Air Noise Baseline Survey Appendix 13E. Air Noise Glossary Appendix 14A. Ground Noise Legislation and Guidance Appendix 14B. Ground Noise Methodology Appendix 14C. Ground Noise Modelling Results Appendix 14D. Ground Noise Baseline Survey Appendix 14E. Ground Noise Glossary

	Appendix 14F. Traffic Noise Methodology Appendix 15A. Non-breeding Bird Survey Appendix 17A. Impact on Landscape Tranquillity Appendix 19A. Waste Minimisation Plan Appendix 20A. Impact of Overflights Appendix 21A. Planning Applications Assessed Appendix 21B. Location of Planning Applications
Dublin Airport North Runway Relevant Action Application Appropriate Assessment Screening Report	Dublin Airport North Runway Relevant Action Application Appropriate Assessment Screening Report, December 2020 is a revision of Dublin Airport North Runway Relevant Action Application Appropriate Assessment Screening Report September 2021
Dublin Airport North Runway, Relevant Action Application **Final - Response to ANCA Direction 01 in relation to planning application F20A/0668**	Dublin Airport North Runway, Relevant Action Application Final - Response to ANCA Direction 01 in relation to planning application F20A/0668 is a revision of Dublin Airport North Runway Relevant Action Application Draft - Initial Response to ANCA Request for Further Information

Dublin Airport North Runway Relevant Action Application Noise Information – Anca Request February 2021 **September 2021**	Dublin Airport North Runway Relevant Action Application Noise Information – ANCA Request February 2021 September 2021 is a revision of Dublin Airport North Runway Relevant Action Application Noise Information – Anca Request February 2021 June 2021
PR-407849-ACM_CL_EN_003_(A)_598 Pack Contents Letter	PR-407849-ACM_CL_EN_003_(A)_598 Pack Contents Letter is a revision of PR-407849-ACM_CL_EN_002_(A)_598 Pack Contents Letter
PR-407849-ACM_598 Pack Contents Letter	'Dublin Airport North Runway, Regulation 598/2014 (Aircraft Noise Regulation) Forecast Without New Measures and Additional Measures Assessment Report (Revision 1 – July 2021)'. Dublin Airport North Runway, Regulation 598/2014 (Aircraft Noise Regulation) Cost Effectiveness Analysis Report (Revision 1 – July 2021)'.
Dublin Airport North Runway Relevant Action Application Regulation 598/2014 (Aircraft Noise Regulation) Assessment Non-Technical Summary - Revision 02	Dublin Airport North Runway Relevant Action Application Regulation 598/2014 (Aircraft Noise Regulation) Assessment Non-Technical Summary - Revision 02 is a revision of Dublin Airport North Runway Relevant Action Application Regulation 598/2014 (Aircraft Noise Regulation) Assessment Non-Technical Summary - Revision 01
Dublin Airport North Runway, Regulation 598/2014 (Aircraft Noise Regulation) Forecast Without New Measures and	Dublin Airport North Runway, Regulation 598/2014 (Aircraft Noise Regulation) Forecast Without New Measures and Additional Measures Assessment Report (Revision 2 – September 2021) is a revision

Additional Measures Assessment Report (Revision 2 – September 2021)	of Dublin Airport North Runway, Regulation 598/2014 (Aircraft Noise Regulation) Forecast Without New Measures and Additional Measures Assessment Report (Revision 1 – July 2021)
Dublin Airport North Runway, Regulation 598/2014 (Aircraft Noise Regulation) Cost Effectiveness Analysis Report (Revision 2 – September 2021)	Dublin Airport North Runway, Regulation 598/2014 (Aircraft Noise Regulation) Cost Effectiveness Analysis Report (Revision 2 – September 2021) is a revision of Dublin Airport North Runway, Regulation 598/2014 (Aircraft Noise Regulation) Cost Effectiveness Analysis Report (Revision 1 – July 2021)

Objective Noise Exposure Forecasts and Airport Data

The main objective data utilised in the preparation of ANCA's Draft Regulatory Decision has been taken from the following reporting template:

A11267_19_CA452_1.0 ANCA Reporting Template 2021 Update - 2016 END.xlsx

A11267_19_CA434_5.0 ANCA Reporting Template 2021 Update.xlsx

These are available on the ANCA website https://www.fingal.ie/aircraftnoiseca/documents-f20a0668

An tÚdarás Inniúil um Thorann Aerárthaí

Aircraft Noise Competent Authority

ANCA

Regulatory Decision

Appendix B - Quota Count and Noise Certification Procedure

Determining Aircraft Quota Counts

Introduction

In 1993, the Quota Count (QC) system was first introduced by the UK, as part of a new night restrictions scheme for London Heathrow, Gatwick and Stansted airports, and has been gradually followed by an increasing number European airports.

The QC system relies on a count of aircraft movements (arrivals and departures) against a noise quota (in effect a noise budget), for each airport according to the QC rating. It reflects the contribution of an individual aircraft to the total noise impact around an airport, e.g., a QC/2.0 aircraft is deemed to have twice the impact of a QC/1.0 aircraft, a QC/4.0 aircraft has four times the impact and so on.

Methodology for calculating QC classification

International Standards and Recommended Practices for Aircraft Noise define three reference measurement points for noise certification as illustrated.

1. Approach reference point: under a 3-degree descent path, 2000 m from the runway threshold
2. Sideline reference point: 450 m to the side of initial climb at the longitudinal position
3. Flyover reference point: under the departure climb path, 6500 m from start of roll.

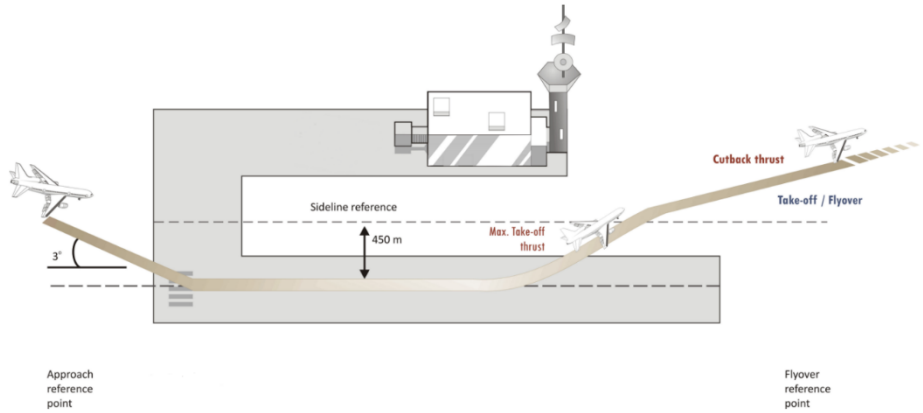

Figure 1:Aircraft noise certification reference measurement points (ref https://www.icao.int/environmental-protection/Pages/Reduction-of-Noise-at-Source.aspx)

The departure QC ratings are calculated by a simple average of the sideline and flyover noise levels, measured on at their respective reference point.

$$Ld = [EPNL\ (Sideline) + EPNL\ (Flyover)/2$$

The approach reference point is much nearer to the aircraft flight path than the lateral and flyover points. Therefore, for the same level of measured noise at the reference points, an aircraft will have a larger noise impact and a bigger footprint on departure than arrival. Arrival Effective Perceived Noise Levels are adjusted downwards by 9 EPNdB in order to adjust for this difference, so that the noise QC classification for arrivals and departures reflects comparable numbers of people affected

$$La = EPNL\ (Approach) - 9$$

The present Quota Count System

The central feature of the QC system is that each aircraft is given a quota count rating according to how much noise it makes. The aircraft classifications are assigned separately for landing and take-off. The data used are aircraft certificate noise levels because these are:

i. considered to be reliable indicators of aircraft noise performance

ii. available for almost every civil transport aircraft

iii. published and therefore readily applied by administrators of the scheme

iv. correlated well with noise footprint areas

The metric used for aircraft certificates noise levels is Effective Perceived Noise Levels or EPNL and it is measured in EPNdB. EPNL metric is common for all the UK airports. The certified Effective Perceived Noise Levels or EPNLs, are grouped into 3 EPNdB - wide bands for practical QC purposes. The QC doubles with each increase of 3 EPNdB, which corresponds to doubling of noise energy.

The QCt of an aircraft on taking off or landing is to be calculated on the basis of the noise classification for that aircraft on take-off or landing as appropriate as follows:

Certified noise level (EPNdB)	Quota Count Classification
Greater than 101.9 EPNdB	16
99 - 101.9 EPNdB	8
96 – 98.9 EPNdB	4
93 – 95.9 EPNdB	2
90 – 92.9 EPNdB	1
87 – 89.9 EPNdB	0.5
84 – 86.9 *EPNdB*	0.25
81 – 83.9 *EPNdB*	0.125
Below 81 EPNdB	0

The EPNdB is defined in accordance with the following criteria:

- in the case of an aircraft certificated to the standards of Chapter 2, 3, 4, or 14 of ICAO Annex 16 (or the equivalent standards): the certificated approach noise level of the aircraft at its maximum certificated landing weight, minus 9 EPNdB;
- in the case of a light propeller-driven aircraft with a maximum take-off weight not exceeding 8,618 KG: the noise classification will be QC/0;

- in the case of any other aircraft not certified to the standards of Chapter 2, 3, 4, 5, or 14 of ICAO Annex 16 (or the equivalent standards): the noise level indicated in relation to that aircraft in the noise data supplied for this purpose to the CAA.
- where the aircraft is certified to the standards of Chapter 3, 4, 5, or 14 of ICAO Annex 16 (or the equivalent standards): half the sum of the flyover and the sideline noise levels in EPNdB as measured at the certification points specified in that Annex during the noise certification of the aircraft at its maximum certificated take-off weight;
- where the aircraft is certificated to the standards of Chapter 2 of ICAO Annex 16 (or the equivalent standards): half the sum of the flyover and the sideline noise levels in EPNdB as measured at the certification points specified in that Annex during the noise certification of the aircraft at its maximum certificated take-off weight, plus 1.75 EPNdB;
- where the aircraft is a light propeller-driven aircraft with a maximum take-off weight not exceeding 8,618 KG: the noise classification will be QC/0; and iv. in the case of any other aircraft not certificated to the standards of Chapter 2, 3, 4, 5, or 14 of ICAO Annex 16 (or the equivalent standards): the noise level indicated in relation to that aircraft in the noise data supplied for this purpose to the CAA.

Airports operating the system have a fixed quota for each of the summer and winter seasons.

Noise limits can be set per aircraft, possibly depending on MTOW. These limits could relate to the certified noise level or to quota counts. Different limits could apply during the day and night. (e.g. by limiting certified noise levels, or restricting aircraft with a Quota Count > 8.0)

An tÚdarás Inniúil um Thorann Aerárthaí

Aircraft Noise Competent Authority

ANCA

Regulatory Decision

Appendix C - Preliminary Assessment and Identification of a Noise Problem

An tÚdarás Inniúil um Thorann Aerárthaí
Aircraft Noise Competent Authority

Ascertaining a Noise Problem at Dublin Airport

Recommendation report arising from planning application F20A/0668 for a Relevant Action

Comhairle Contae Fhine Gall
Fingal County Council

10th February 2021

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Part 1 - Overview

Introduction

The Airport Authority for Dublin Airport (daa) submitted a planning application to Fingal County Council, as Planning Authority for the area encompassing the airport, on 18th December 2020 (FCC ref. F20A/0668 – the Application). The Application relates to a Relevant Action only within the meaning of Section 34C of the Planning and Development Act 2000, as amended, at Dublin Airport, Co. Dublin.

The Application relates to the night-time use of the runway system at Dublin Airport. It proposes the amendment of the operating restriction set out in condition no. 3(d) and the replacement of the operating restriction in condition no. 5 of the North Runway Planning Permission (Fingal County Council ref. F04A/1755; ABP ref. PL06F.217429 as amended by FCC ref. F19A/0023, ABP ref. ABP-305289-19), in addition to proposing new noise mitigation measures.

The Application was referred to the Aircraft Noise Competent Authority (ANCA) on 23rd December 2020 by the Planning Authority in accordance with the provisions of the Aircraft Noise (Dublin Airport) Regulation Act 2019 (the 2019 Act) for an assessment of the potential noise impact of the proposed Relevant Action.

The Competent Authority is responsible for ensuring that noise generated by aircraft activity at Dublin Airport is assessed in accordance with EU and Irish legislation and for the application of the *Balanced Approach* to aircraft noise management where a noise problem or potential noise problem at the Airport is identified.

North Runway Planning History

Planning consent was granted for Dublin Airport's north runway by An Bord Pleanála in August 2007 (FCC Ref: F04A/1755; ABP Ref: PL06.217429). The planning consent was subject to 31 conditions. Two of these conditions place restrictions on night flights and take effect upon completion of the construction of the north runway.

These are:

Condition 3(d): Runway 10L-28R[1] shall not be used for take-off or landing between 2300 hours and 0700 hours;

Condition 5: On completion of construction of the runway hereby permitted, the average number of night time aircraft movements at the airport shall not exceed 65/night (between 2300 hours and 0700 hours) when measured over the 92 day modelling period as set out in the reply to the further information request received by An Bord Pleanála on the 5th day of March, 2007.

Condition 3(a) to 3(c) and Condition 4 establish preferential modes of operating the runways but are not the subject of this Application.

Permission was granted for 10 years from the date of the grant of permission. An Extension of Duration of Permission was granted by Fingal County Council until 28th August 2022 (FCC ref. F04A/1755/E1).

DAA applied for planning permission to amend specified runway structural details in July 2019 (F19A/0023) and permission was granted by An Bord Pleanála in March 2020 (ABP-305289-19).

Planning Permission Ref FCC ref: F04A/1755; ABP ref: PL06.217429 as extended by the Extension of Duration of Permission (FCC ref: F04A/1755/E1) and as amended by planning permission FCC Ref: F19A/0023; ABP ref: 305289/19 is hereinafter referred to as the **North Runway Planning Permission**.

In Dublin Airport's current form as a two-runway operation, there are no operating restrictions relating to the use of its runways or the numbers or types of aircraft which can fly. The airport is however subject to a passenger capacity limit which restricts the airport to 32 million passengers per annum (mppa). These passenger cap restrictions are contained in Condition

2 of the Terminal 1 Extension Planning Permission (FCC Reg ref No. F06A/1248; ABP ref:

[1] the north runway

PL06F.220670) and Condition 3 of the Terminal 2 Planning Permission (FCC Ref 04A/1775; ABP Ref: PL06F.220670).

Overview of the Proposed Application

The proposed development proposes that a Relevant Action be taken pursuant to Section 34C(1)(a) so as:

1. **To amend condition no. 3(d) of the North Runway Planning Permission. Condition 3(d) and the exceptions at the end of Condition 3 state the following:**

   3(d). Runway 10L-28R shall not be used for take-off or landing between 2300 hours and 0700 hours

   except in cases of safety, maintenance considerations, exceptional air traffic conditions, adverse weather, technical faults in air traffic control systems or declared emergencies at other airports.

Permission is being sought to amend condition 3(d) so that it reads:

'Runway 10L-28R shall not be used for take-off or landing between 0000 hours and 0559 hours except in cases of safety, maintenance considerations, exceptional air traffic conditions, adverse weather, technical faults in air traffic control systems or declared emergencies at other airports or where Runway 10L-28R length is required for a specific aircraft type.'

2. **To replace condition no. 5 of the North Runway Planning Permission which provides as follows:**

   5. On completion of construction of the runway hereby permitted, the average number of night time aircraft movements at the airport shall not exceed 65/night (between 2300 hours and 0700 hours) when measured over the 92 day modelling period as set out in the reply to the further information request received by An Bord Pleanála on the 5th day of March, 2007.

Permission is being sought to replace Condition 5 with the following:

A noise quota system is proposed for night time noise at the airport. The airport shall be subject to an annual noise quota of 7990 between the hours of 2330hrs and 0600hrs.

The Application proposes the following noise mitigation and monitoring measures:

a) A noise insulation grant scheme for eligible dwellings within specific night noise contours; and
b) A detailed Noise Monitoring Framework to monitor the noise performance with results to be reported annually to the Aircraft Noise Competent Authority (ANCA), in compliance with the 2019 Act.

It is noted that Conditions 3(d) and 5 of the North Runway Planning Permission have not yet come into effect or operation, as the construction of the north runway has not yet been completed.

It is further noted that the Application does not seek to make changes to or modify:

a) the airport's existing passenger capacity limit of 32 million passengers per annum (mppa);
b) the preferred daytime mode of operation as set out in Condition 3(a) – 3(c) of the North Runway Planning Permission,
c) the restricted use of the airport's crosswind runway as set out under Condition 4 of the North Runway Planning Permission.

Part 2 - Assessment of the Application

International, EU and national context

International Civil Aviation Organization

The International Civil Aviation Organization (ICAO) introduced the Balanced Approach to noise management which consists of analyzing the various measures available to reduce aircraft noise in the most cost-effective manner through the exploration of four principal elements where a noise problem is identified at an airport using objective and measurable criteria. To determine whether there is a noise problem at a particular airport that needs to be addressed, it is necessary to assess the evolution of the noise climate at that airport and the surrounding community. To the extent a noise problem is identified, characterization of the problem should assist in determining what measure or measures might mitigate or solve the problem. (See ICAO guidance on the Balanced Approach to Aircraft Noise, second edition, 2008).

European Legislation

Directive 2002/49/EC as amended by Directive 2015/996/EU (the END) relates to the assessment and management of environmental noise and establishes common assessment methods for the major sources of environmental noise, including that emitted by aircraft.

Regulation (EU) No. 598/2014 (the Aircraft Noise Regulation) establishes a regulatory basis for the identification of additional noise abatement measures in accordance with the Balanced Approach methodology for airports where a noise problem has been identified. The Aircraft Noise Regulation, in recognizing that sustainable development is a key objective of the common transport policy, sets out an integrated approach to balance the effective functioning of Union transport systems with the protection of the environment. Sustainable development of air transport requires the introduction of measures aimed at reducing the noise impact from aircraft at Union airports to improve the noise environment around Union airports in order to maintain or increase the quality of life of neighbouring citizens and foster compatibility between aviation activities and residential areas, particularly where night flights are concerned. The ICAO Balanced Approach is established as the mechanism for the regulation of aviation noise.

Irish Legislation

The European Communities (Environmental Noise) Regulations 2018 (SI 549/2018) provide for the implementation in Ireland of the END and in particular the common approach within the European Union to avoid, prevent or reduce on a prioritized basis the harmful effects,

including annoyance, due to exposure to environmental noise.

The 2019 Act gives further effect to The Aircraft Noise Regulation and defines, inter alia, the process to be followed to address any noise problem that would arise from the carrying out of a proposed development or from taking a relevant action in relation to an operating restriction at Dublin Airport.

Ascertaining a noise problem at Dublin Airport

Method of assessment

The 2019 Act and The Aircraft Noise Regulation requires ANCA to have regard for the effect of noise exposure on human health using common assessment methods. In doing so, the overall number of people exposed to specific levels of aircraft noise at different levels must be understood and presented with respect to health outcomes. To ascertain whether a noise problem may arise, it is appropriate to consider the evolution of the noise climate at the airport and the surrounding community to examine trends in human noise exposure.

Dublin Airport Noise Action Plan 2019 – 2023

The Dublin Airport Noise Action Plan 2019 – 2023 (the NAP) was prepared in accordance with the provisions of the European Communities (Environmental Noise) Regulations 2018 but prior to the introduction of the 2019 Act. The noise mapping outputs of the action plan assessments are presented alongside noise exposure levels from previous years. From this, trends can provide context to the noise situation pertaining at the time of assessment. This comparison assists in the identification of noise problems and situations to be improved, from which any required actions can be determined. The assessment of the noise mapping in this plan indicated that '*night noise and land use planning were areas which may be a problem and may need to be improved'* cautioning however that further work needed to be undertaken in these areas.

Current Noise Situation

The noise climate at the Airport, since assessed in the Noise Action Plan, has significantly changed during the coronavirus pandemic and the full extent of this impact has yet to be determined. Construction work on the north runway remains underway and the completion of the project will further influence the evolving noise climate as the prescribed modes of day-time runway operation take effect. The new modes of runway operation may occur in tandem with a rescheduling of flights post-pandemic which present circumstances that must be further understood in the context of the Application for a Relevant Action.

Consideration of the Application for a Relevant Action

An assessment of the evolving noise climate at Dublin Airport must also consider the current Application for a Relevant Action. In this context, the Application proposes a form of night-time runway operations that are not currently permitted.

Condition 3 of the North Runway Planning Permission establishes how the primary runways should be used during day-time (0700 hours - 2300 hours) depending on the prevailing wind conditions. This is illustrated in Figure 1 which shows that:

- the parallel runways (10R-28L and 10L-28R) shall be used in preference to the cross runway, 16-34;
- When winds are westerly, Runway 28L shall be preferred for arriving aircraft. Either Runway 28L or 28R shall be used for departing aircraft as determined by air traffic control,
- When winds are easterly, either Runway 10L or 10R as determined by air traffic control shall be preferred for arriving aircraft. Runway 10R shall be preferred for departing aircraft.

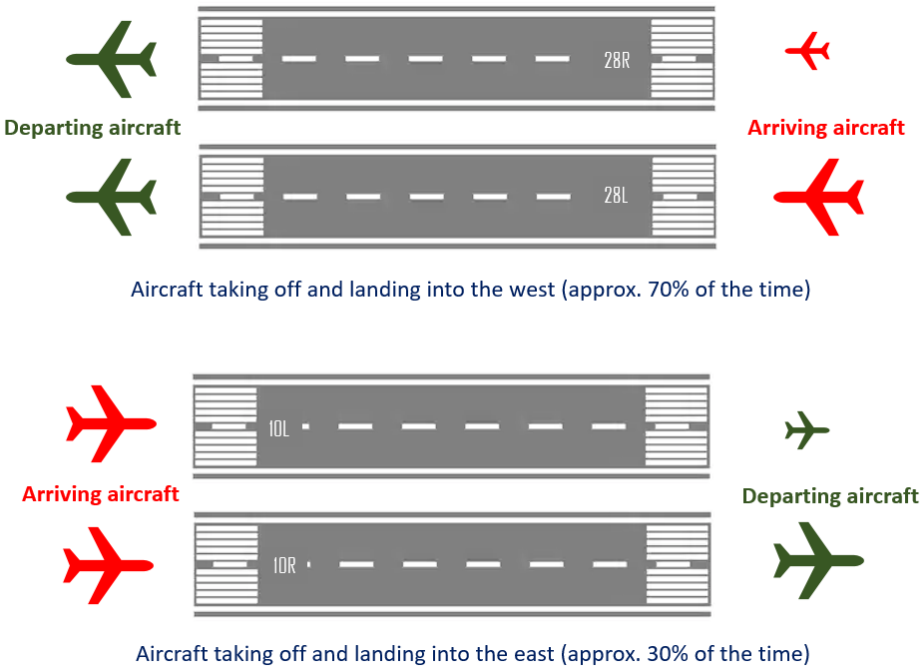


Figure 1 - parallel runway system daytime operating mode

The Application for the Relevant Action states that '*in practice it is expected that, unless capacity requires mixed mode, the runways will operate in segregated mode during the daytime with arrivals using either Runway 10L or Runway 28L and departures using either Runway 10R or Runway 28R depending on wind direction*'.

It is preferable for an aircraft to take off and land into the wind and, in a Dublin Airport context, the prevailing wind dictates that approximately 70% of flights take off and land into the west.

The Application for the Relevant Action presents the forecasts and operating scenarios considered with a description of the environmental effects of the proposed Relevant Action together with proposed mitigation measures and controls. The Application states that the proposed Relevant Action, if permitted, will allow for an increase in the number of flights taking off and/or landing at Dublin Airport between 2300hrs and 0700hrs over and above the number stipulated in condition no. 5 of the North Runway Planning Permission, in accordance with the annual night time noise quota sought.

ANCA commissioned Noise Consultants Ltd (NCL) to undertake an initial technical review of the potential noise impacts of planning application F20A/0668, if granted. This work[2] has examined and detailed the potential implications of the proposed development with respect of an aircraft noise problem and made 5 summary observations:

- The harmful effects of aircraft noise in the future with the Proposed Development will be worse than without, particularly at night. As such the Proposed Development will increase aircraft noise rather than reduce it;
- Some people will experience elevated levels of night-time noise exposure for the first time which may be considered harmful to human health;
- The Proposed Development gives rise to significant adverse night-time noise effects as reported within the EIAR. This indicates that the noise effects of the Proposed Development are a material consideration;
- Mitigation in the form of a night-time noise insulation scheme is proposed by the Applicant. The provision of such mitigation is an indicator that the Proposed Development may give rise to a Noise Problem;
- The nature of the Proposed Development is to enable a form of operation which was not considered by ABP in their original decision to grant consent for the North Runway. Such a change will attract significant third party interest, particularly from communities, who may perceive there to be a noise problem.

[2] Advice Report: Aspects of a Potential Noise Problem associated with Planning Application F20A/0668; February 2021

Part 3 - Report Recommendations

Summary

The implications of the data submitted in support of planning application ref. F20A/0668 for a Relevant Action, together with the technical analysis undertaken by Noise Consultants Ltd, support a considered view for the reasons given below, either in isolation or in tandem, that the proposed development may significantly influence the evolving noise climate at Dublin Airport to the extent that presents a noise problem that requires detailed assessment. This assessment should be undertaken through the provisions of the Balanced Approach to identify whether the noise impacts may be appropriately mitigated.

1) **The Application proposes an increase in aircraft activity at night, when referenced against the situation that would otherwise pertain, which may result in higher levels of human exposure to aircraft noise.**

This situation requires detailed evaluation in the context of the combined intent of environmental noise legislation. The Application should be assessed to ascertain whether an acceptable balance can be achieved between the effective functioning of the Airport and the protection of the environment through the application of the ICAO Balanced Approach.

2) **The Application proposes a situation where some people will experience elevated levels of night-time noise exposure for the first time which may be considered harmful to human health.**

The Application seeks to enable a form of operation which was not considered by ABP in their original decision to grant consent for the north runway. A detailed assessment should be undertaken through the application of the ICAO Balanced Approach to ascertain the significance of the impact of a change in noise exposure arising from the Application for a Relevant Action.

3) **The EIAR accompanying the Application indicates that the proposed Relevant Action will give rise to significant adverse night-time noise effects. This indicates that the noise effects of the Proposed Development are a material consideration. Mitigation in the form of a night-time noise insulation scheme is proposed by the Application. The provision of such mitigation is an indicator that the Proposed Development may give rise to a Noise Problem.**

This situation requires detailed evaluation in the context of the combined intent of environmental noise legislation. The Application should be assessed to ascertain whether an acceptable balance can be achieved between the effective functioning of the airport and the protection of the environment through the application of the ICAO Balanced Approach

Recommendation

The proposed introduction of night-time use of the north runway and associated redistribution of night-time noise present a situation whereby significant environmental effects arise that require detailed assessment through the provisions of the Balanced Approach to ascertain whether noise mitigation measures, up to and including operating restrictions, may be required if the Application is granted.

In consideration of the issues addressed in this report, the technical assessment report of Noise Consultants Ltd together with technical guidance documents and legislative provisions, I conclude that the Application for a Relevant Action, if granted, may reasonably be considered to present a noise problem at Dublin Airport and accordingly, I recommend the following:

1. The determination of a noise problem at Dublin Airport, in the context of the 2019 Act and the Aircraft Noise Regulation, arising from the Application for a Relevant Action ref. F20A/0668;

2. The establishment of a Noise Abatement Objective for Dublin Airport;

3. The commencement of the process of aircraft noise regulation prescribed by Section 34C of the Planning and Development Act of 2000 including the application of the ICAO Balanced Approach.

Joseph Mahon

Senior Engineer
Aircraft Noise Competent Authority
An tÚdarás Inniúil um Thorann Aerárthaí

An tÚdarás Inniúil um Thorann Aerárthaí
Aircraft Noise Competent Authority

Appendix B - Glossary

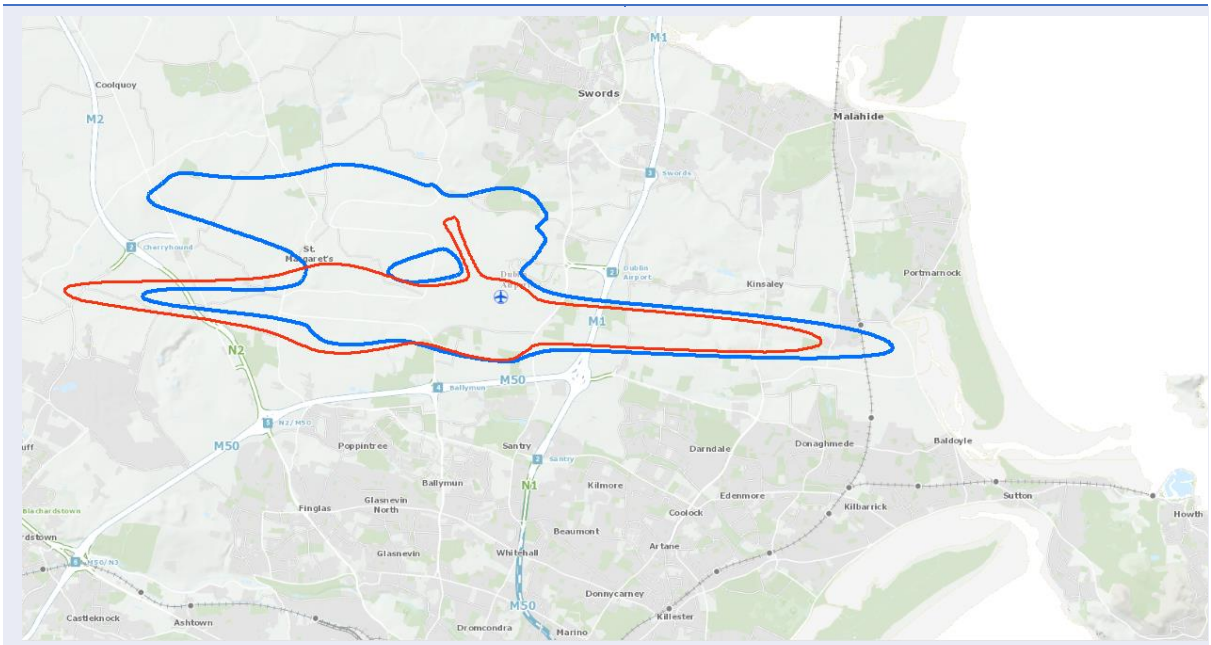
2019 Act	Aircraft Noise (Dublin Airport) Regulation Act 2019
ABP	An Bord Pleanála
Application	Planning application for a Relevant Action ref. F20A/0668
ANCA	Aircraft Noise Competent Authority
ANR	Aircraft Noise Regulation
Balanced Approach	ICAO Balanced Approach to Aircraft Noise Management
daa	Dublin Airport Authority
EIAR	Environmental Impact Assessment Report
END	Environmental Noise Directive
FCC	Fingal County Council
ICAO	International Civil Aviation Organization
MPPA	Million Passengers Per Annum
L_{night}	8-hour night-time LAeq sound level value in dB for the period 23:00 to 07:00 determined over all the night periods of a year;
NAO	Noise Abatement Objective
NAP	Noise Action Plan
NCL	Noise Consultants Ltd.
Relevant Action	As defined in Section 34C (23) of the Planning and Development Act 2000.

Appendix B – Noise contours

Noise Contours

Application for a Relevant Action F20A/0668

An tÚdarás Inniúil um Thorann Aerárthaí
Aircraft Noise Competent Authority

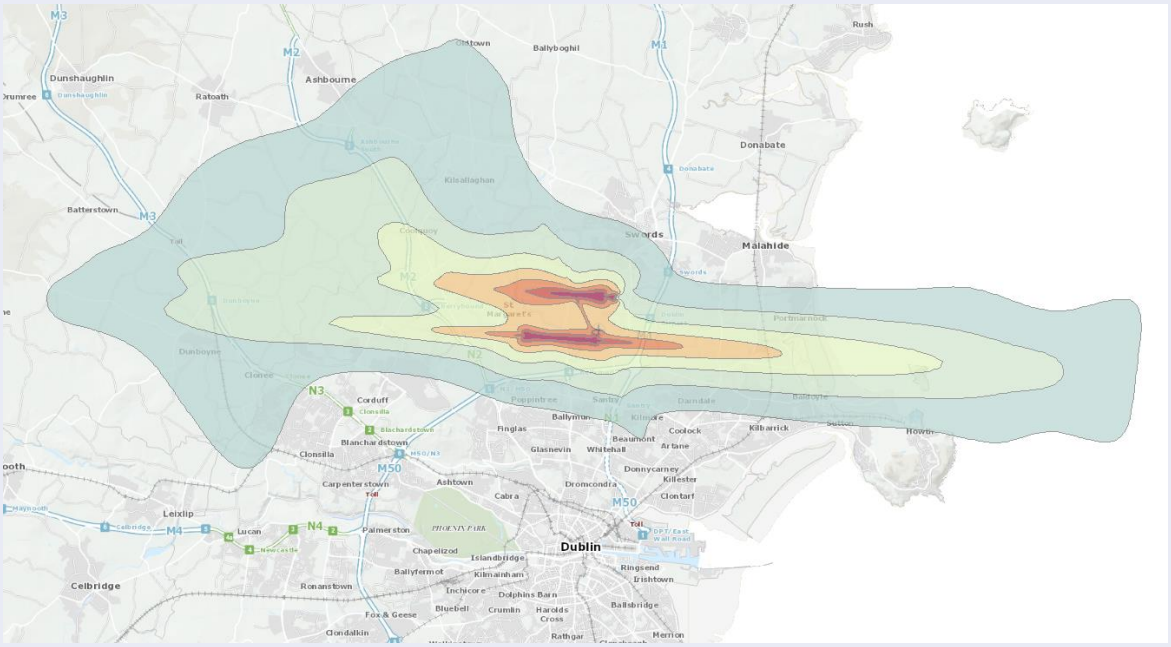


2025 Forecast 55dB L_{night} contour with Relevant Action

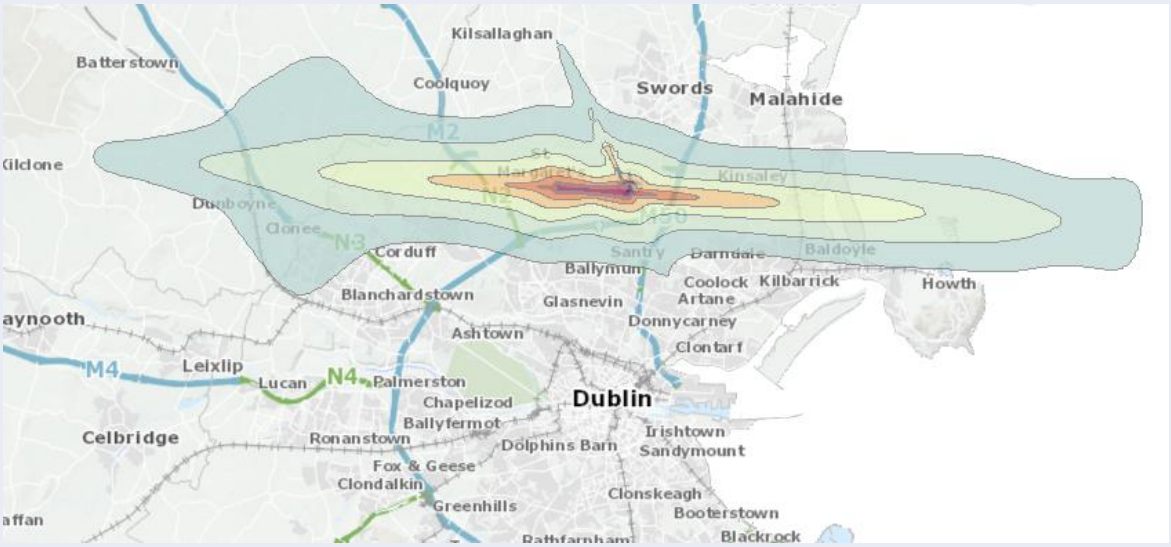
2025 Forecast 55dB L_{night} contour without Relevant Action

Application for a Relevant Action F20A/0668

An tÚdarás Inniúil um Thorann Aerárthaí
Aircraft Noise Competent Authority



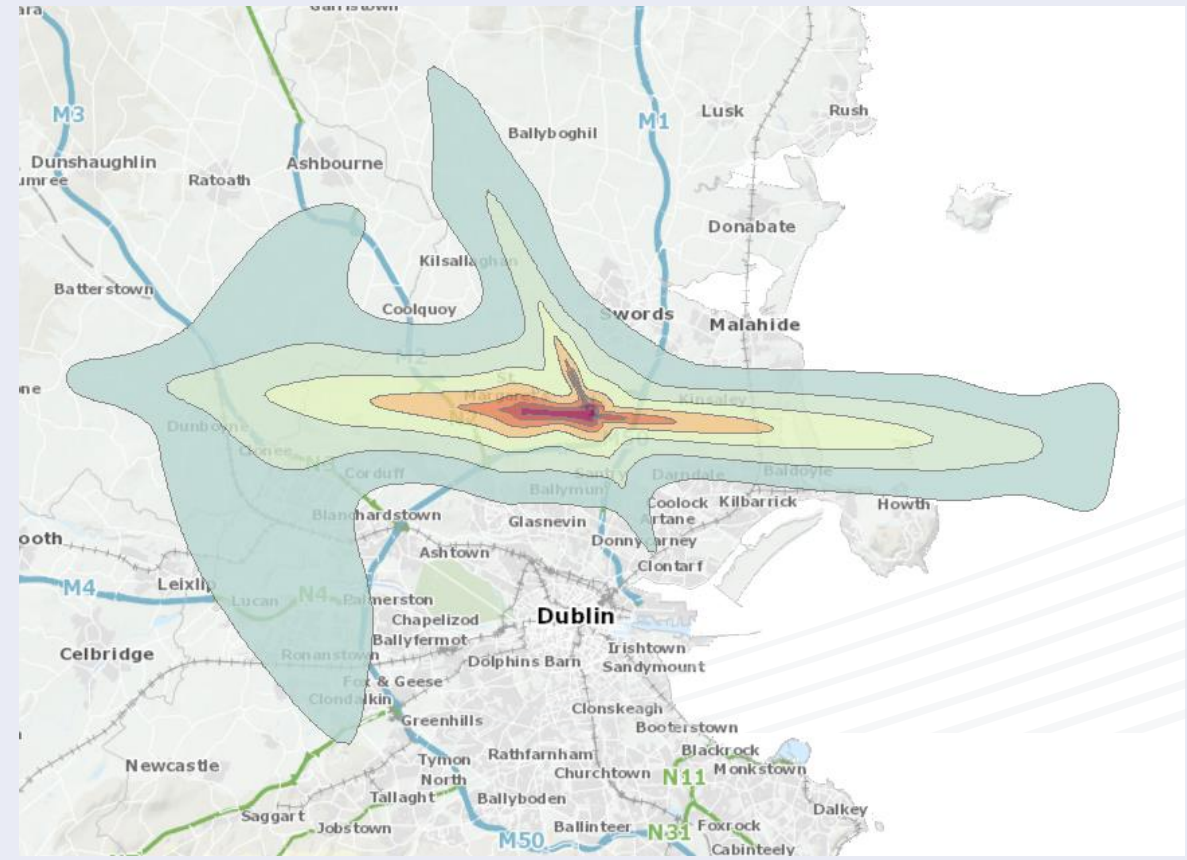
2025 Forecast L_{night} noise contours (40dB – 70dB) with Relevant Action



2025 Forecast L_{night} noise contours (40dB – 70dB) without Relevant Action

Application for a Relevant Action F20A/0668

An tÚdarás Inniúil um Thorann Aerárthaí
Aircraft Noise Competent Authority



2019 L_{night} noise contours (40dB - 70dB)

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Noise CONSULTANTS

Advice Report:
Aspects of a Potential Noise Problem associated with Planning Application F20A/0668

February 2021






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Document Control

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Appendix A: Origin of Conditions 3(d) and 5
Appendix B: Overview of Runway Preference Scenarios considered within the Application
Appendix C: Night-time Noise Contour Comparisons
Appendix D: ANCA Aircraft Noise Information Reporting Template

Glossary of Terms

Acronym / Term	Meaning / Description
ABP	An Bord Pleanala
Aircraft Noise Regulation	EU Regulation 598/2014
ANCA	Airport Noise Competent Authority
ATM	Air Transport Movement Landings or take offs of aircraft engaged in the transport of passenger or freight or mail on commercial terms. All scheduled movements, including those operated empty, loaded charter and air taxi movements are included.
the Applicant	Dublin Airport Authority
the Application	Planning Application Reference F20A/0668 made by Dublin Airport Authority on 18th December 2020 in relation to relevant action comprising changes to Conditions 3(d) and 5 of the North Runway Consent
Balanced Approach	Balanced Approach to Aircraft Noise Management, adopted by the ICAO Assembly in its 33rd Session (2011) and reaffirmed in all the subsequent Assembly Sessions (reference: ICAO Resolution A39-1 Appendix C).
EC	European Commission
EIA	Environmental Impact Assessment
EIAR	An Environmental Impact Assessment Report prepared under the EIA Regulations
EIS	Environmental Impact Statement
END	European Noise Directive
ENG18	WHO Environmental Noise Guidelines 2018
ERF	Exposure Response Function
EU	European Union
ICAO	International Civil Aviation Organization
IHD	Ischaemic Heart Disease
L_{den}	The average noise level over a 24-hour period which incorporates weightings to reflect evening (19:00 to 23:00) and night-time (23:00 to 07:00) operations.

L_{night}	8-hour night-time L_{Aeq} value for the period 23:00 to 07:00 based on annual operations; plotted from 45 to 60 dB in 5 dB increments
mppa	Million passengers per annum
NAP	Noise Action Plan Latest NAP: Noise Action Plan for Dublin Airport 2019 - 2023
NNG 2009	WHO Night Noise Guidelines 2009
Noise contours	Noise contours are lines on a map showing where equal levels of noise are experienced.
North Runway Planning Consent	Planning Consent for Dublin Airport's North Runway (10R – 28L) FCC Reg. Ref:. F04A/1755; ABP Ref: PL06.217429
PA	The Planning Authority of Fingal County Council
Proposed Development	Relevant Action as proposed within the Application
Relevant Action	As defined in Section 34C(23) of the Planning and Development Act 2000.
Runway	A defined rectangular area on a land aerodrome prepared for the landing and take-off run of aircraft along its length.
SEA	Strategic Environmental Assessment as required under Directive 2001/42/EC requiring Members States to ensure that certain plans and programmes are subject to a requirement for Strategic Environmental Assessment. Statutory Instrument (S.I.) No. 435/2004 - European Communities (Environmental Assessment of Certain Plans and Programmes) Regulations (2004) transpose this Directive into Irish legislation.
WHO	World Health Organisation

1 Introduction

1.1 This advice report has been prepared by Noise Consultants Limited (NCL) to assist the Aircraft Noise Competent Authority (ANCA) in the screening of planning application F20A/0668 ('the Application'). The screening is necessary to identify whether the Proposed Development under the Application may give rise to a noise problem at Dublin Airport in order to facilitate ANCA in the exercise of its statutory powers of aircraft noise regulation under the Aircraft Noise (Dublin Airport) Act 2019.

1.2 The Application was submitted by Dublin Airport Authority (daa) on 18 December 2020. According to the planning application form[1]:

> '[daa] *intends to apply for permission for a proposed development comprising the taking of a 'relevant action' only within the meaning of Section 34C of the Planning and Development Act 2000 to amend/replace operating restrictions set out in conditions no. 3(d) & no. 5 of the North Runway Planning Permission (Fingal County Council Reg. Ref. No. F04A/1755, ABP Ref. No.:PL06F.217429 as amended by Fingal County Council F19A/0023, ABP Ref. No. ABP-305298-19) as well as proposing new noise mitigation measures"*

1.3 NCL have been asked to provide an initial review of the Application to identify any aspects of the Proposed Development applied for within the Application which has the potential to be considered a 'noise problem' at Dublin Airport in the context of the Aircraft Noise (Dublin Airport) Regulation Act 2019.

Background

1.4 Dublin Airport's North Runway Planning Permission was granted in August 2007 by An Bord Pleanala (FCC Reg. Ref:. F04A/1755; ABP Ref: PL06.217429) ('the North Runway Planning Permission').

1.5 The North Runway Planning Permission was subject to 31 conditions. Two of these conditions place restrictions on night flights and come into force upon completion of the construction of the north runway. These are:

- Condition 3(d) "*On completion of the runway hereby permitted … Runway 10L-28R* (the 'North Runway') *shall not be used for take-off or landing between 2300 hours and 0700 hours except in cases of safety, maintenance considerations, exceptional air traffic conditions, adverse weather, technical faults in air traffic control systems or declared emergencies at other airports*."

[1] Planning Application Form, Tom Phillips and Associates, Dated 17 December 2020

- Condition 5 "*On completion of construction of the runway hereby permitted, the average number of night time aircraft movements at the airport shall not exceed 65/night (between 2300 hours and 0700 hours) when measured over the 92 day modelling period*"

1.6 The origin of these operating restrictions is based on the Environmental Impact Statement (EIS) and other information that daa supplied to the planning authority in the application for the North Runway Planning Permission and in daa's response to An Bord Pleanala's (ABP's) further information requests. Appendix A provides analysis and commentary carried out by NCL with regards to the origin of these Conditions. However, in summary Condition 3(d) and 5 reflect the basis upon which the effects of the North Runway and the wider operation of Dublin Airport were reported and assessed by ABP at the time of their decision.

1.7 The wider parts of Condition 3 of the North Runway consent introduce a form of preferential runway use during daytime periods (0700 – 2300). Condition 3(a) to 3(c) state that:

"(a) the parallel runways (10R-28L and 10L-28R) shall be used in preference to the cross runway, 16-34,

(b) when winds are westerly, Runway 28L shall be preferred for arriving aircraft. Either Runway 28L or 28R shall be used for departing aircraft as determined by air traffic control,

(c) when winds are easterly, either Runway 10L or 10R as determined by air traffic control shall be preferred for arriving"

1.8 This form of operating preference is known as 'Option 7b' which is the name of the runway operating preference scenario aligned to Condition 3 as reported within the EIS and additional information as submitted to ABP.

1.9 No such restrictions currently exist at Dublin Airport. In its current form as a two-runway operation, there are no operating restrictions relating to the use of its runways or the numbers or types of aircraft which can fly. The airport is however restricted by virtue of a 'passenger cap' which restricts the airport to 32 million passengers per annum (mppa)[2]. This cap applies to both the current operation and following commencement of operation of the North Runway. One of the effects of the passenger cap is to limit the number of passenger flights that can be profitably operated from the Airport.

1.10 A comparison of (1) the Airport's current form of runway operations and (2) the form of runway operations which will be permitted once the conditions of the Northern Runway Planning

[2] This 'passenger cap' is set through the combined effect of Condition 3 of the Terminal 2 Planning Permission (FCC Reg Ref No F04A/1775; ABP Ref. No. PL06F.220670); and Condition 2 of the Terminal 1 Extension Planning Permission

Permission will apply (i.e. on commencement of the operation of the Northern Runway) and their respective constraints are presented in Table 1.

1.11 The construction of Dublin Airport's north runway commenced in December 2016. Following the grant of the North Runway permission in 2007 Dublin Airport has experienced strong growth. The Applicant states that[3]:

> *"The above referenced operating restrictions were imposed through Conditions 3(d) and 5 of the 2007 determination of An Bord Pleanála (ABP). Since then, further evidence and understanding on the impact of the restrictions has become available and it is evident that they will impact significantly on Dublin Airport's ability to meet the foreseeable need for aviation travel and safe expansion of air traffic at the airport. As such, it is considered that the operating restrictions are particularly limiting and will have the effect of unduly hindering growth of the Airport in line with the relevant Strategic Objectives of National, Regional and Local policies."*

1.12 The Proposed Development therefore seeks to amend Conditions 3(d) and 5 of the North Runway consent so to remove the limit of 65 aircraft movements per night limit under Condition 5 and relax Condition 3(d) so to allow aircraft to utilise the North Runway at night, subject to the night aircraft movements complying with a 'Noise Quota System'

1.13 The Applicant's Planning Report[4] states that changing the currently drafted planning conditions is:

"imperative to the airport's ability to:

- *to rebound post Covid-19;*
- *to grow in line with government wide strategic direction which seeks to develop the airport as a hub, thereby enhancing Ireland's connectivity with key tourism and export markets;*
- *to meet the demands of multi-trip passengers which in turn requires early morning and late evening flights;*
- *to meet the operational demands of the predominantly short haul service based airline fleet at Dublin Airport and cargo operations at the airport;*

[3] Section 1.2, Planning Report – Planning Application for a Proposed Relevant Action (S.34C of P&D Acts) to Amend/Replace Operating Restrictions set out in Conditions No 3(d) and No 5 of the North Runway Planning Permission (ABP REF NO: PL06F.217429) as well as Proposing New Noise Mitigation Measures at Dublin Airport, Co. Dublin.

[4] Planning Report – Planning Application for a Proposed Relevant Action (S.34C of P&D Acts) to Amend/Replace Operating Restrictions set out in Conditions No 3(d) and No 5 of the North Runway Planning Permission (ABP REF NO: PL06F.217429) as well as Proposing New Noise Mitigation Measures at Dublin Airport, Co. Dublin.

- *to maintain existing flight slots and connectivity to mainland Europe by facilitating early morning/late evening arrival and departures;*
- *to facilitate the ability to attract high-value transatlantic and long-haul services; and*
- *to maintain and facilitate growth in jobs and economic activity."*

1.14 The Application has been accompanied by a series of reports providing assessments of the potential noise impacts of the Proposed Development along with other environmental effects.

Table 1 Overview of Current and Future (i.e. once the Northern Runway commences operation) Operations and Restrictions

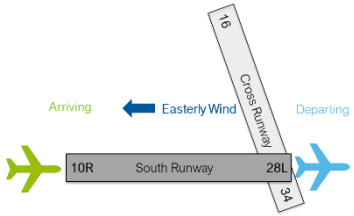
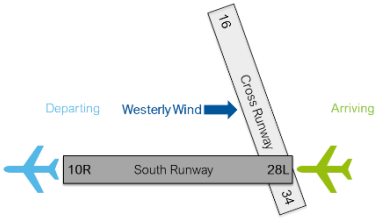
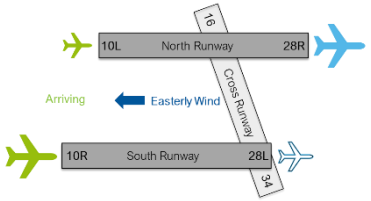
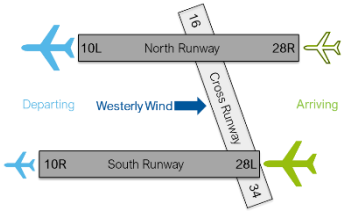
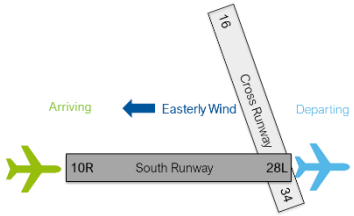
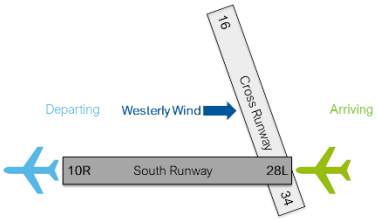
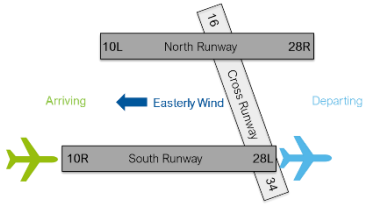
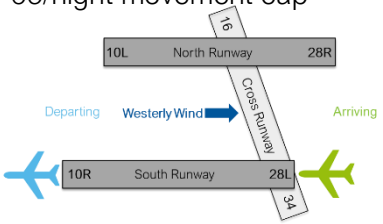
	All operations subject to a Passenger Cap of 32mppa			
	Current Two Runway Operations		Consented Three Runway Operations	
	Easterly	Westerly	Easterly	Westerly
Daytime 0700 – 2300				
Night-time 2300 - 0700			65/night movement cap 	65/night movement cap 

Figure Notes:

Larger aircraft indicated preferential use whereas smaller aircraft indicates non-preferential use.

No aircraft indicates prohibited use save for exceptions such as emergencies

The Identification of a Noise Problem

1.15 Condition 3(d) and 5 are noise related operating restrictions that were already introduced before 13 June 2016, when Regulation (EU) 598/2014 entered into force (the 'Aircraft Noise Regulation'). The Aircraft Noise Regulation introduced a new process for imposing, amending and replacing operating restrictions, but provided that operating restrictions that were already introduced before 13 June 2016 would remain in force until the Member State's competent authority decided to revise them in accordance with the Aircraft Noise Regulation.

1.16 In Ireland, the Aircraft Noise (Dublin Airport) Regulation Act 2019 introduced a process whereby daa could apply, among other things, to amend or replace an operating restriction. That process was inserted into the Planning and Development Act 2000 as a new Section 34C. Under Section 34C, daa can apply to the planning authority for the amendment or replacement of the operating restriction by way of a new grant of planning permission. The planning authority provides the application to ANCA and ultimately ANCA decides either to direct the planning authority to incorporate as planning conditions specified noise mitigation measures and operating restrictions in any permission that the planning authority decides to grant, or as described under Section 34B(5)(a) and 34C(5)(a) of the 2019 Act:

"… where the competent authority is satisfied that permission should not be granted for the development for the reason that inadequate provision has been made in the application (or in any plans or further information, or both, subsequently given by the applicant to the planning authority and the competent authority) to deal with the noise problem that would arise from the carrying out of the development as proposed."

1.17 The above is given further effect through Section 16 of the 2019 Act which makes amendments to the Fourth Schedule of the Planning and Development Act 2000 entitled "Reasons for the Refusal of Permission which Exclude Compensation". This states that:

"The proposed development would cause a serious aircraft noise problem at Dublin Airport including, as appropriate, the area around Dublin Airport significantly affected by aircraft noise."

1.18 Through the process of Aircraft Noise Regulation, ANCA can impose different operating restrictions and noise mitigation measures to those sought by daa.

1.19 The Application has been submitted under Section 34C of the Planning and Development Act 2000. Under this section, the Planning Authority (PA) of Fingal County Council are required to provide a copy of the relevant application and then consult with ANCA. As part of this consultation ANCA is required to advise the PA of *"any noise problem that would arise from taking the relevant action as proposed"*.

1.20 Under the 2019 Act, a 'relevant action' is defined as:

> *" 'relevant action' in relation to a relevant operating restriction the subject of a relevant application, means—*
>
> *(a) to revoke the operating restriction,*
>
> *(b) to amend the terms of the operating restriction in the manner specified in the application,*
>
> *(c) to replace the operating restriction with the alternative operating restriction specified in the application,*
>
> *(d) to take an action referred to in paragraph (a), (b) or (c) together with introducing new noise mitigation measures or revoking, revoking and replacing, or amending the terms of, existing noise mitigation measures, or a combination thereof,*
>
> *(e) if the relevant application relates to 2 or more relevant operating restrictions, to take any combination of any of the actions referred to in paragraphs (a) to (d), or*
>
> *(f) to take an action referred to in paragraph (a), (b), (c), (d) or (e) together with revoking, revoking and replacing, or amending the terms of, a condition of the relevant permission;"*

1.21 As such the Application consists of a '*relevant action'* therefore requiring ANCA to advise the PA as to whether a noise problem may arise.

1.22 The Application also asks ANCA to revise operating restrictions introduced before 13 June 2016. Under the 2019 Act, if ANCA decides to do so, it must apply the International Civil Aviation Organisation (ICAO) Balanced Approach to Aircraft Noise Management[5] ('the Balanced Approach'), which is a process for identifying a noise problem at a specific airport and then analysing the various measures which are available to reduce noise having regard to a noise objective. Accordingly, in advising the PA as to whether a noise problem would arise from the taking of the relevant action, ANCA must take account of the Balanced Approach and seek to anticipate whether the application of the Balanced Approach would identify a noise problem at the Airport.

1.23 Under the Balanced Approach the measures available to reduce noise are classified into four principal elements:

- Reduction of noise at source

[5] Balanced Approach to Aircraft Noise Management, adopted by the ICAO Assembly in its 33rd Session (2011) and reaffirmed in all the subsequent Assembly Sessions (reference: ICAO Resolution A39-1 Appendix C).

- Land use planning and management
- Noise abatement operating procedures
- Operating restrictions

1.24 The objective of the Balanced Approach is to address noise problems and achieve the maximum environmental benefit in the most cost-effective manner.

1.25 The application of the ICAO Balanced Approach requires a significant volume of technical assessment work and supporting evidence to be prepared which considers subject matter beyond just noise. For example, the economic and social impacts of noise mitigation measures and operating restriction should be considered alongside other environmental consequences as part of a cost-effectiveness assessment[6].

1.26 This report does not apply the Balanced Approach, but seeks to determine whether the taking of the relevant action outlined in the Application would, if the Balanced Approach were applied, give rise to a noise problem at the Airport.

Scope of Works

1.27 The Report has been requested by ANCA to inform its consultations with the PA in relation to the noise problem (if any) that would arise from the taking of the relevant action ('the Proposed Development') and, if so, any decision by ANCA to declare that such a noise problem would arise.

1.28 The scope of works as presented in this report is as follows:

- Undertake an initial review of the information provided within the Application from a noise perspective to identify the potential impacts associated with the Proposed Development; and
- Consider how the potential impacts identified may give rise to a potential 'noise problem' having regard for legislation and any other associated guidance.

1.29 This Report is not a comprehensive review of the Application and as such the commentary provided within this report is based on the information as provided by the Applicant. It does not opine on whether that information is adequate or sufficient to allow the PA or ANCA to grant permission or make a regulatory decision, respectively, in relation to the Application.

1.30 To support this exercise, consideration has been given to information reported within the Dublin Airport Noise Action Plan 2018 – 2023 ('the NAP'). This provides information presenting changes in noise exposure levels for each round of strategic noise mapping since 2006, as

[6] EU Regulation 598/2014 Annex II

required under European Communities (Environmental Noise) Regulations 2018. The information contained within and reported by the NAP is a consideration under the Aircraft Noise (Dublin Airport) Regulation Act 2019[7] which may influence the identification of a noise problem.

Structure of this Report

1.31 This report is structured as follows:

- Section 2 provides an overview of relevant legislation and guidance, along with other documents which may assist in determining how a 'noise problem' can be identified
- Section 3 presents the method of assessment which is defined by the Irish and EU regulatory frameworks governing the assessment and reporting of aircraft noise and the implementation of the ICAO Balanced Approach
- Section 4 provides an overview of the information and reports provided with the Application which have been considered
- Section 5 considers the potential implications of the Proposed Development on aircraft noise. This section considers the changes in the airport's operation as reported within the Application
- Section 6 presents a review of the information provided within the Application highlighting the effect of the Proposed Development on noise at Dublin Airport along with considering the evaluation of the noise climate and historic trends.
- Having regard for the reviews carried out in Sections 2 – 7, Section 7 summarises various aspects and observations which may be indicative of a noise problem.

1.32 This report is supported by technical appendices including:

- Appendix A which provides a review of the origins of Condition 3(d) and 5 of the North Runway planning consent;
- Appendix B which presents an overview of the night-time runway preference scenarios considered by the Applicant within the Application;
- Appendix C which presents relevant night-time noise exposure contours; and
- Appendix D presents a copy of the Aircraft Noise Information Reporting Guidance as prepared by ANCA.

[7] 9(2)(a) referring to Annex V of the Environmental Noise Directive stating the minimum requirements for a Noise Action Plan

2 Identification of a Noise Problem

2.1 This section considers how a 'noise problem' may be identified taking into account the relevant legislative framework and any relevant guidance or publications.

Aircraft Noise (Dublin Airport) Regulation Act 2019

2.2 The Application has been submitted under Section 34C of the Planning and Development Act 2000. Under the Act, once an application for development has been submitted, the Planning Authority (PA) of Fingal County Council must provide a copy of the application to ANCA for review[8]. Consultations between the PA and ANCA are required in relation to:

> *"(a) any noise problem that would arise from taking the relevant action as proposed (including any implications that would arise therefrom in relation to appropriate assessment or environmental impact assessment matters) and any further information subsequently sought by the relevant authority from the applicant in relation to such action and given by the applicant to the planning authority and the competent authority;"*

2.3 The 2019 Act does not define what is or is not considered a 'noise problem'. However it does require that decisions in relation to the identification of a 'noise problem' be informed by an assessment of the 'noise situation at the airport' which should be undertaken in accordance with European Communities (Environmental Noise) Regulations 2018 (S.I. No. 549 of 2018) which is transposed from the Environmental Noise Directive (EC Directive 2002/49/EC).

2.4 This strongly indicates that a noise problem should be identified having regard for the methodologies and approaches adopted under EU noise policy and associated legislation.

2.5 In the context of the END, its objective is to:

> *"to avoid, prevent or reduce on a prioritised basis the harmful effects, including annoyance, due to exposure to environmental noise"*

EU Regulation No. 598/2014

2.6 Under the European legislation, upon which the 2019 Act is derived from, EU Regulation 598/2014 does not provide any guidance in relation to the identification of a noise problem.

2.7 The stated objective of EU Regulation 598/2014 is to set down:

> *"… where a noise problem has been identified, rules on the process to be followed for the introduction of noise related operating restrictions in a consistent manner on an*

[8] 34C (2)

airport by airport basis, so as to help improve the noise climate and to limit or reduce the number of people significantly affected by potentially harmful effects of aircraft noise, in accordance with the Balanced Approach."

2.8 Given the objective of Regulation 598/2014, a 'noise problem' may be identified where the noise situation at the airport or resulting from development may be counter to this objective i.e. *"to limit and reduce the number of people significantly affect by potentially harmful effects"*.

2.9 Annex I of Regulation 598/2014 describes the assessment of the noise situation at an airport. This annex makes clear that *"air traffic noise impact will be described, at least, in terms of noise indicators L_{den} and L_{night} which are defined and calculated in accordance with Annex I to Directive 2002/49/EC"*.

2.10 The calculation and presentation of noise impacts at Dublin Airport in terms of L_{den} and L_{night} is carried out every 5 years under the European Communities (Environmental Noise) Regulations 2018 (S.I. No. 549 of 2018) and is reported within the NAP.

2.11 The use of measures such as L_{den} and L_{night} along with *"additional noise indicators which have an objective basis"* is an important feature of Regulation 598/2014. This is because application of the ICAO Balanced Approach as described within Annex I and II relies on objective and measurable criteria as part of establishing the cost-effectives of the measures being proposed.

ICAO Guidance on the Balanced Approach to Aircraft Noise, Second Edition 2008

2.12 ICAO guidance states that the goal of the ICAO Balanced Approach is to:

"… address noise problems on an individual airport basis and to identify the noise-related measures that achieve the maximum environmental benefit most cost-efficiently using objective and measurable criteria".

2.13 Whilst the drawing out of the use of objective and measurable criteria is again important it is noted that the guidance also goes on to state that:

"The Balanced Approach is intended to apply to any airport being served by international air traffic which has a perceived noise problem"

2.14 A "perceived noise problem" could well be determined in a different manner to one which is evidenced by "objective and measurable criteria". The concept that a noise problem may be identified by other means is specifically referred to within Appendix 1[9] of the guidance where ICAO urges states to:

[9] Appendix 1, I-A1-5, 2(b)

"institute or oversee a transparent process when considering measures to alleviate noise, including assessment of the noise problem at the airport concerned based on objective, measurable criteria and other relevant factors" [emphasis added]

2.15 The guidance provides some narrative with respect to how a noise problem may be determined[10]. It states that:

"A fundamental part of the Balanced Approach as defined by the ICAO Assembly is the identification of the noise problem at an airport. To determine whether there is a noise problem at a particular airport that needs to be addressed, it is necessary to assess the evolution of the noise climate at that airport and the surrounding community. To the extent a noise problem is identified, characterization of the problem should assist in determining what measure or measures might mitigate or solve the problem."

2.16 It goes on:

"The noise objective to be achieved should be identified and defined in order to assist in determining the extent of the noise problem. For the purposes of assessment under the Balanced Approach, an actual noise problem is deemed to exist if any difference between the defined objective and the assessed evolution of the noise climate can be identified. This may be reflected in the evolution of the number of people affected by an unacceptable level of aircraft noise. However, it is recognized that ICAO Contracting States and their airports may have different standards and policies regarding what constitutes a noise problem, how these may be assessed and what objectives are sought in airport-related noise programmes"

2.17 The above paragraphs are drafted with the premise that a noise abatement objective (i.e. the noise objective) is already defined so that the "extent of the noise problem" can be understood. In the context of the 2019 Act and for Dublin Airport, a noise abatement objective is yet to be defined and can only be defined by ANCA if it determines that the ICAO Balanced Approach should apply and advises the PA to that effect.

2.18 The above guidance indicates that whilst different states may form their own views as to what may constitute a noise problem, consideration of the "evolution of the noise climate" either, for example, over time or as the result of airport development is capable of being measured by establishing the change in the number of people who may be experiencing an "unacceptable level of noise". Clearly what is, and is not, an acceptable level of noise would need to be defined for this aspect of the guidance to function.

2.19 The guidance is clear that objective and measurable criteria entail the use of noise contours and associated noise exposure statistics for different times of the day. As outlined above, this

[10] Chapter 3, Paragraph 3.1.1

is implicit within the 2019 Act through the requirement to have regard for the European Communities (Environmental Noise) Regulations 2018 (S.I. No. 549 of 2018) and by extension the Environmental Noise Directive (EC Directive 2002/49/EC). These instruments adopt noise contours as the means of assessment for aircraft noise and as outlined above are therefore adopted by the 2019 Act and Regulation 598/2014 as the means of "assessing the noise situation" at an airport which foreruns the identification of a 'noise problem'.

2.20 In summary, the ICAO guidance advocates the use of measurable and objective criteria in the identification of a noise problem at an airport but recognises that states may have their own policies or standards with respect to this. Other factors may also be a consideration and a noise problem could potentially be identified if an authority perceives there to be one.

European Commission – Call for Tenders ENG/2020/OP/0036 'Study on Airport noise Reduction' Tender Specification

2.21 As outlined above, EU Regulation 598/2014 does not provide any guidance as to what constitutes a 'noise problem'. However, within a recent tender specification issued by the European Commission[11] some insight is provided as to the Commission's thinking as to the circumstances under which a 'noise problem' may arise.

2.22 Box 1 of the tender specification states that the identification of a 'noise problem' is a prerequisite for the application of the Balanced Approach under Regulation 598/2014. It also confirms that a 'noise problem' may *"emerge from the action plan"* i.e. the airport's NAP.

2.23 Box 1 states that the END *"does not state expressly how the Member States shall identify a problem"* but links potential problems back to the objective of END i.e. reducing the harmful effects of environmental noise exposure on human health.

2.24 Box 1 introduces a series of 'Q&As'. One of these is entitled *'Noise problem: to be assessed or not?'*. Under this heading Box 1 states that:

"The Directive does not state expressly how the Member States shall identify a problem. However, the objective of the END is to reduce on a prioritised basis harmful effects (defined in Article 3(b) as negative effects on human health) of exposure to environmental noise, Article1 (1). To that end, Member States adopt action plans, "with a view to preventing and reducing noise levels where necessary, and particularly where exposure levels can induce harmful effects on human health", Article 1(1)(c)· It can be inferred from these provisions that where the noise exposure level are harmful to human health, Member States are required to identify that situation in the action plan as a "problem" in the sense of Annex V No. 1, 6th indent to the END."

[11] Available here: https://etendering.ted.europa.eu/cft/cft-display.html?cftId=7178

2.25 The consideration of noise exposure and human health is addressed under Annex III of the END. This was amended by Commission Directive (EU) 2020/367 of 4 March 2020 which establishes assessment methods for harmful effects of environmental noise. Directive 2002/367 adopts the Exposure Response Functions (ERF) published within the World Health Organisation (WHO) Environmental Noise Guidelines for the European Region 2018.

2.26 Directive 2020/367 reproduces the ERFs for the number of people 'highly annoyed' and 'highly sleep disturbed' from aircraft noise along with a methodology for calculating the harmful effects of aircraft noise in relation to Ischaemic Heart Disease (IHD).

2.27 Box 1 of the tender specification suggests that the Balanced Approach may be triggered when measures other than operating restrictions are introduced and potentially when the noise action plan is being revised or reviewed.

2.28 A further 'Q&A' which may be helpful in the interpretation of how a 'noise problem' can be identified is *"Can there be an increase in the number of people exposed to the health effects?"*. In response to this the Commission Services' assessment states that:

"No if the airport does not undergo a major expansion.

Yes if the airport undergoes an expansion and in such case, the EIA directive shall come into play if it may have significant adverse noise effects on the environment.

Yes if the population is allowed to build in the surrounding of the airport."

2.29 When read in combination the view offered by Commission Services' within the tender specification suggests that a noise problem could be determined where:

a) aircraft noise exposure is harmful to human health;

b) aircraft noise exposure is increasing in the absence of an expansion of the airport; and

c) where there is a major change which entails the introduction of new operating restrictions or noise mitigation measures

Summary

2.30 Taking into account the legislation and publications outlined above, it is concluded that there is no prescribed method of identifying a 'noise problem' under the ICAO Balanced Approach. However, horizonal analysis of these documents does allow for the following principles to be drawn:

a) A noise problem should be identified using measurable and objective data. In the context of EU noise policy this should have regard for:

a. Directive 2002/49/EC and, as a minimum, primarily the use of the L_{den} and L_{night} metrics;

b. Directive 2020/367 allowing the harmful effects of aircraft noise to be quantified through use of the ERFs adopted from the WHO ENG18;

c. The calculation of aircraft noise facilitating the above should have regard for the noise assessment method for aircraft noise as described in Directive 2015/996 (as amended) which replaces Annex II of Directive 2002/49/EC;

d. Other noise metrics and measures may be used providing that these have an objective basis.

b) The EU regulatory framework for aircraft noise, as is described above, through both Directive 2002/49/EC and EU Regulation 598/2014 sets objectives to "limit and reduce" the "harmful effects" of aircraft noise. Trends or the evolution of the noise climate at an airport which goes against these objectives may constitute a 'noise problem'.

c) Where aircraft noise is resulting in a population being exposed to levels which are "harmful to human health" or an "unacceptable level of aircraft noise" then this may also be considered a noise problem

d) A major change in noise in the noise situation which results in new operating restrictions and/or new mitigation measures may be a noise problem. This view is tabled by Commission Services'

e) Other relevant factors may be considered in the identification of a noise problem. Whilst the ICAO guidance does not elaborate on this, there are a number of considerations which may apply in this regard, such as whether:

- the evolution of the airport noise is likely to result in a specific population becoming affected thus introducing populations to a certain level of effect which they may not have previously observed
- whether the evaluation of the noise climate may be subject to a decision making and the identification of significant environmental effects in the context of the EIA Directive[12]

[12] Directive 2011/92/EC and Directive 2014/52/EU amending the EIA Directive 2011/92/EU

- the acceptability of the noise situation or a forecast is subject to mitigation at a receptor level i.e. through the provision of noise insulation or other compensation policies

f) A noise problem may be identified if one is 'perceived'. This is suggested by the ICAO guidance however such an approach does not necessarily align with the use of 'objective and measurable' criteria.

3 Method of Assessment Required under EU Assessment Framework

3.1 As identified in Section 2, the objective and measurable approach to assessing aircraft noise under EU Regulation 598/2014 and the 2019 Act is consistent with the approach described in Directive 2002/49/EC which has in turn been transposed into Irish law through European Communities (Environmental Noise) Regulations 2018.

3.2 Having regard for the status of Directive 2002/49/EC and the objectives of both the END including Directive 2020/367 and the WHO ENG18 the following method of assessment is required with respect to the primary objective measures:

- Noise contours and associated noise exposure forecasts prepared using the L_{den} and L_{night} metrics as stipulated within Directive 2002/49/EC and within Annex I of Regulation 598/2014.
- The requirements of Directive 2020/367 in relation to the calculation of the harmful effects of aircraft noise, namely the population 'highly annoyed' and 'highly sleep disturbed' as quantifiable under this Directive. Consideration should be given to the WHO ENG18 as the underpinning evidence base for Directive 2020/367

3.3 The preparation of the above should be undertaken using the noise assessment method described within Directive 996/2015.

3.4 ANCA has provided the Applicant with an 'Aircraft Noise Information Reporting Template' ('the Reporting Template') and associated guidance. A copy of the guidance is provided in Appendix D. This template and guidance has requested that noise exposure data using the metrics outline above be provided in the following bands:

- For L_{den} for 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, ≥ 75 dB
- For L_{night} for 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, ≥ 70 dB

3.5 The reporting of noise exposure information from 45 dB L_{den} and 40 dB L_{night} has regard for the recommendations made within the WHO ENG18. The Reporting Template accordingly allows for the harmful effects of aircraft noise to be reported in accordance with the method described in Directive 2020/367 at and above these thresholds.

3.6 The presentation and assessment of just the above metrics should not be considered a comprehensive assessment of effects but instead the primary basis upon which the ICAO Balanced Approach under EU Regulation 598/2014 can be executed and a reasonable guide to the existence and extent of the noise problem (if any) that would be identified through the full application of the Balanced Approach to the Application.

3.7 Alternative and supplementary noise metrics, including those with an objective basis, should be used to help articulate and communicate the effects of aircraft noise before making a regulatory decision in response to the Application. This is matter which must be considered as part of assessment work undertaken as part of the EIA Directive, the SEA Directive and any associated consultation.

4 Information Considered

4.1 To meet the scope of work defined at Paragraph 1.28, NCL has considered information presented in relevant publications and as part of the Application. These are outlined and summarised below:

Relevant Publications

- The Dublin Airport Noise Action Plan 2018-2023

Documents provided within the Application

4.2 Table 2 below sets out the documents which have been considered by NCL from the Application as they are relevant to the scope of works requested by ANCA.

Table 2 Application Documents Consulted

Document	Description and Contents
ANCA Aircraft Noise Change Considerations Proforma ('completed Proforma')	This form has been completed by daa as requested by ANCA for any planning application at Dublin Airport. The form is used by ANCA to assist in 'screening' potential changes are Dublin Airport and to identify whether these may result in a noise change and potentially a noise problem. The form allows a number of considerations to be captured in a manner where early indication of the potential implications of the proposals on noise can be identified. This form has been completed by the Applicant and has been provided with the Application.
Planning Application for A Proposed Relevant Action (S.34c of P&D Acts) to Amend/Replace Operating Restrictions Set Out In Conditions No. 3(D) & No. 5 Of The North Runway Planning Permission (ABP Ref. No.: PI06f.217429) As Well As Proposing New Noise Mitigation Measures at Dublin Airport, Co. Dublin	This report presents the planning case for the Proposed Development. It provides an overview of the need for the Proposed Development along with how the proposals have been developed. It also provides a description of the environmental effects of the development along with all proposed mitigation measures and controls.
Dublin Airport Operating Restrictions, Quantification of Impacts on Future Growth	This report has been prepared by Mott MacDonald and describes impact of the night-time operating restrictions imposed by the North Runway consent on future growth at Dublin Airport as it recovered to a 30+ mppa operation over the period 2022 to 2025.
ANCA Reporting Template v2.0 - Completed.	A completed Airport Noise Information Reporting Template has been provided for all scenarios and situations considered as part of the Application taking into account a range of forecasts, scenarios and situations considered within the wider assessment work.
Dublin Airport North Runway Noise Information For The Regulation	A report has been prepared by Bickerdike Allen Partners. This report describes the methodology adopted for the modelling

598/2014 (Aircraft Noise Regulation) Assessment	and assessment of the forecasts, scenarios and situations considered within the Application. The report demonstrates that the requirements of the Directive 996/2015 have been consulted in the preparation of noise contours and that noise exposure data has been calculated for the primary objective measures discussed in Section 3. Some analysis of the forecasts, situations and scenarios considered by the Application are presented within this report however the main analysis work leading to the Applicant's 'preferred option' is described within the reports prepared by Ricondo.
Dublin Airport North Runway, Regulation 598/2014 (Aircraft Noise Regulation) Forecast Without New Measures and Additional Measures Assessment Report	This report has been prepared by Ricondo and Associates. The report utilises the outcomes of the noise modelling presented in the report prepared by Bickerdike Allen Partners whilst promoting a Candidate Noise Abatement Objective (cNAO) for the Airport. Using the cNAO the report identifies daa's preferred option for a form of night-time runway preference whilst exploring other forms of noise mitigation measures such as a proposed night-time noise quota system and a noise insulation scheme. Consideration is also given to the various noise management and mitigation measures already in place at the Airport or part of the existing consented operation. The report identifies the measures which have been considered as part of the Proposed Development having regard for their feasibility.
Dublin Airport North Runway, Regulation 598/2014 (Aircraft Noise Regulation) Cost Effectiveness Analysis Report	This report has been prepared by Ricondo and Associates and presents Applicant's final cost-effectiveness analysis for their preferred option as well as undertaking cost-effectiveness analysis for the existing North Runway consent.
Dublin Airport North Runway Relevant Action Application Environmental Impact Assessment Report Main Report	This document is the main assessment report for the Environmental Impact Assessment (EIAR) of the Proposed Development. The noise and vibration assessment is presented in Chapters 13 and 14. Chapter 13 of the EIAR reports the baseline conditions in 2018 and in 2022 and 2025 against which the noise effects of the Applicant's preferred option are also considered.

5 Potential Implications of the Proposed Development on Aircraft Noise

5.1 As outlined in Section 1, the Proposed Development centres around changes to Conditions 3(d) and 5 of the North Runway Planning Permission. The implications of the Proposed Development on noise are highlighted within the ANCA Proforma completed by the Applicant and submitted with the Application. Each of the implications is considered in turn.

An increase in aircraft movements at night

5.2 The completed ANCA Proforma confirms that the Proposed Development will result in an increase in aircraft movements at night. This is driven by amending and replacing Condition 5 of the North Runway consent.

5.3 Table 3 below shows that in 2022 and 2025 that the Proposed Development would have the effect of increasing overall annual Air Traffic Movements ('ATMs') by 5,849 and 7,809 respectively. Annual ATMs in 2025 without the Proposed Development are forecast to be slightly lower than those which occurred in 2018 and 2019 however with the Proposed Development in 2025 they are forecast to be higher.

5.4 The main effect of the Proposed Development is the increase in night-time ATMs. In 2025, night-time ATMs are forecast to be approximately 10,000 more with the Proposed Development than without. ATMs during the evening and the day are forecast to be comparable (within 1-2%) albeit slightly lower with the Proposed Development.

Table 3 Comparison of Air Traffic Movements for Forecasts and Situations reported with the Application

	Air Transport Movements (ATMs)			
	Annual Day 0700 – 1900	Annual Evening 1900 – 2300	Annual Night 2300 – 0700	Annual 24-Hour
2018	164079	40363	27896	232338
2019	167931	40751	29320	238002
2022 without the Proposed Development	159540	42241	21120	222902
2025 without the Proposed Development	168878	42952	21150	232981
2022 with the Proposed Development	157591	41591	29569	228751
2025 with the Proposed Development	167251	42301	31238	240790

5.5 This analysis indicates that the effect of the Proposed Development will be to allow more night flights than is permissible under the North Runway consent. The level of night flights underpinning the forecasts in 2025 with the Proposed Development is higher than the level which occurred in 2018 and 2019. Whilst this is not a measure of noise impacts, it is indicative that the proposals have the potential to lead to adverse effects.

A change in the aircraft fleet mix i.e. number and proportion of certain aircraft types forecast to operate at the Airport

5.6 The completed ANCA Proforma indicates that the Proposed Development will result in a change in the proportion of various types of aircraft operating at the Airport. Information relating to the aircraft fleet mixes is available within the Reporting Template.

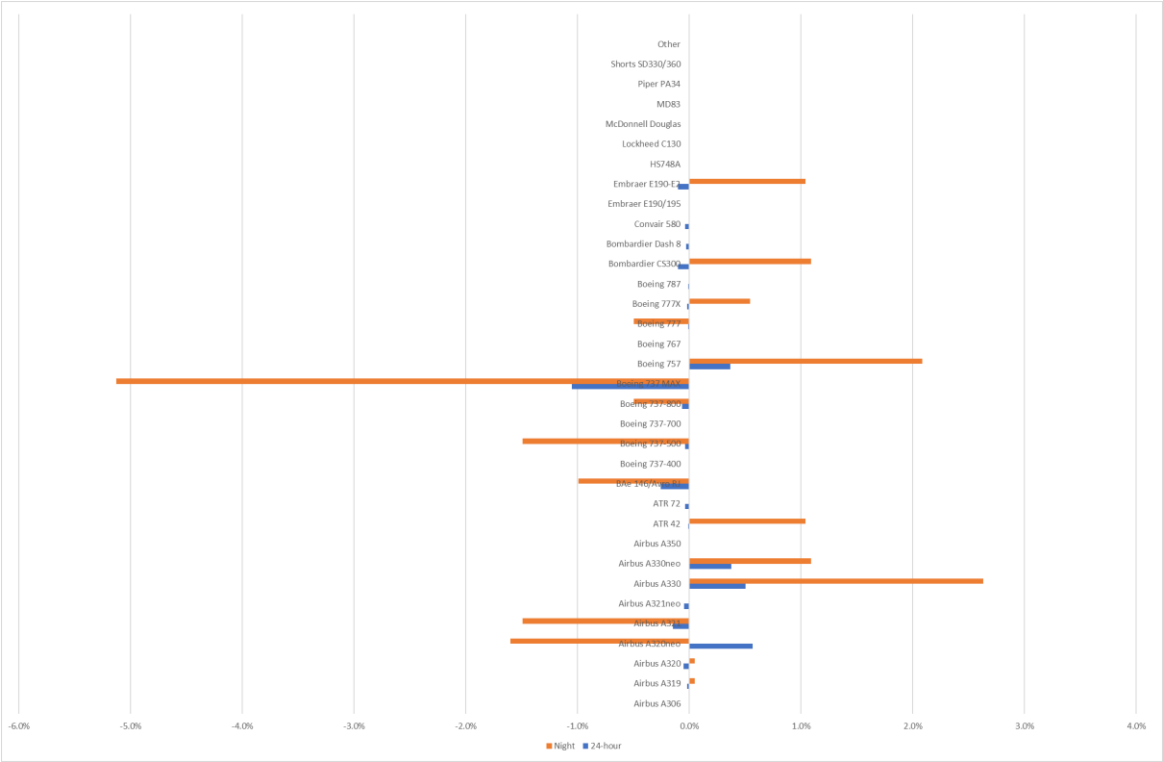
5.7 This shows that in 2025, the fleet mix operating at the Airport will be different. Figure 1 presents fleet mix in terms of the percentage of aircraft by type forecast in 2025 for scenarios with and without the Proposed Development.

5.8 Figure 1 shows that over the 24-hour period the annual fleet mix remains relatively unchanged with all changes being within 1%.

5.9 A greater change in the fleet mix is observed for the forecast annual night-time movements. Figure 1 shows that the Proposed Development would result in a reduction in the proportion of the latest generation of narrow body aircraft types such as the Boeing 737max and Airbus A320neo whilst allowing an increase in types such as the A330.

5.10 In general, during the night-time period this analysis therefore shows that the Proposed Development may result in a decrease in the proportion of latest generation of aircraft which typically have the lowest noise characteristics of their size and code.

Figure 1 Fleet Mix Comparison for 2025 for 24-hour and night-time operations



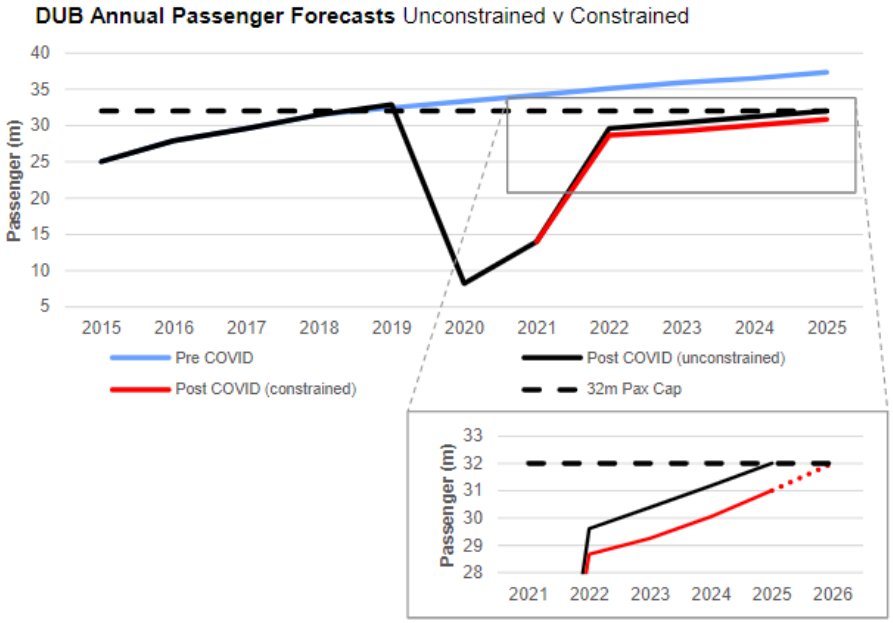
A change in the rate of growth

5.11 The completed ANCA Proforma cross references the EIAR and the Dublin Airport Operating Restrictions, Quantification of Impacts on Future Growth report (Mott MacDonald). These reports highlight that whilst the Proposed Development is not seeking changes to the 32 mppa passenger cap, changes to Condition 3(d) and 5 will facilitate a quicker recovery of the airport's operation to 32 mppa.

5.12 This is highlighted on Page 4 of the Mott MacDonald report.

5.13 Figure 2 below reproduces the illustration provided within this report which shows that the Proposed Development would result in passenger numbers reaching 32 mppa in 2025 as oppose to 30.9 mppa if the North Runway consent remained unchanged.

Figure 2 Historic and Forecast Passenger Movements at Dublin Airport



Annual Traffic Impact Summary (millions of passengers)

	2022	2023	2024	2025	2022-2025 Total
Unconstrained	29.6	30.4	31.2	32.0	123.2
Constrained	28.7	29.3	30.1	30.9	118.8
Difference	-0.9	-1.1	-1.1	-1.1	-4.3

A change in use of airspace

5.14 The Proposed Development is forecast to result in a change in the use of airspace by virtue of a change in the use of the Airport's runways and associated operating pattern.

5.15 During daytime and evening periods, the airport would operate in line with the daytime runway preference set out under Conditions 3(a) – 3(c) (Option 7b) of the North Runway consent. However, by enabling the use of the North Runway at night through the relaxation of Condition 3(d) this will allow aircraft to use the North Runway and its associated airspace at night.

5.16 This is a major change to the North Runway consent. Where a relaxation in Condition 5 serves to allow the Airport to operate aircraft at night-time at a rate akin to 2018 and 2019, allowing night-time operations to occur from the North Runway is a matter which was not assessed or permitted by ABP as part of the North Runway consent.

5.17 A change to Condition 3(d) therefore has the potential to result in populations becoming exposed to aircraft noise at night at levels potentially harmful to human health. This is a consideration which has been specifically addressed within Section 6.

Operational scenarios affecting noise considered by the Application

5.18 The Applicant has provided evidence that a range of night-time runway preference scenarios have been considered as part of developing their proposals.

5.19 The BAP[13] and Ricondo[14] reports provide objective noise exposure data and associated analysis for these options. A full description of the options considered is provided in Appendix B and summarised in Table 4 below.

Table 4 Night-time Runway Preference Scenarios Considered by the Applicant

Scenario	Type / Description	Detail
Scenario 1	Situation North Runway Consent Unchanged	Day - 10R and 28R preferred for departures, 10L and 28L preferred for arrivals. Cross runway only used when wind dictates Night - South Runway only
Scenario 2	Forecast with Additional Measures The Applicant's Preferred Scenario	Day - 10R and 28R preferred for departures, 10L and 28L preferred for arrivals. Cross runway only used when wind dictates Night - South Runway preferred 00:00-06:00. Otherwise as day.
Scenario 3	Forecast with Additional Measures	Day - 10R and 28R preferred for departures, 10L and 28L preferred for arrivals. Cross runway only used when wind dictates Night - same as day
Scenario 4	Forecast with Additional Measures	Day - 10R and 28R preferred for departures, 10L and 28L preferred for arrivals. Cross runway only used when wind dictates Night - 10L and 28L preferred for departures, 10R and 28R preferred for arrivals (i.e. opposite to day). Cross runway only used when wind dictates
Scenario 5	Forecast with Additional Measures	Day - 10R and 28R preferred for departures, 10L and 28L preferred for arrivals. Cross runway only used when wind dictates Night - alternate between Runway use Scenarios 03 and 04
Scenario 6	Forecast with Additional Measures	Day - 10R and 28R preferred for departures, 10L and 28L preferred for arrivals. Cross runway only used when wind dictates

[13] Dublin Airport North Runway, Noise Information for the Regulation 598/2014 (Aircraft Noise Regulation) Assessment, Bickerdike Allen Partners LLP

[14] Dublin Airport North Runway, Regulation 598/2014 (Aircraft Noise Regulation) Forecast Without New Measures and Additional Measures Assessment Report' Ricondo and Associates Inc

		Night - no restrictions. Departures modelled as using north or south runway depending on destination. Arrivals modelled as 50/50 split between runways unless runway capacity exceeded
Scenario 7	Forecast with Additional Measures	Day - 10R and 28R preferred for departures, 10L and 28L preferred for arrivals. Cross runway only used when wind dictates Night - departures modelled as using north or south runway depending on destination. Arrivals modelled as per day unless runway capacity exceeded
Scenario 8	Forecast with Additional Measures	Day - 10R and 28R preferred for departures, 10L and 28L preferred for arrivals. Cross runway only used when wind dictates Night - departures modelled as per day. Arrivals modelled as 50/50 split between runways unless runway capacity exceeded
Scenario 9	Forecast with Additional Measures	Day - 10R and 28R preferred for departures, 10L and 28L preferred for arrivals. Cross runway only used when wind dictates Night - North Runway preferred 00:00-06:00. Otherwise as day.

5.20 Scenario 1 is equivalent to a 'baseline' position in EIA terms i.e. the situation where the North Runway consent remains unchanged. Indeed Scenario 1 is used within the EIAR to allow for comparisons against the situation where the North Runway consent remains unchanged. As such the effects of the Proposed Development are best understood by comparison of Scenarios 2 – 9 with Scenario 1 in the same assessment year.

5.21 Noise exposure data has been provided for the primary measures of assessment within the Reporting template for all scenarios described above for the assessment year of 2025. This year has been selected as it corresponds to the first year that with the Proposed Development the Airport is forecast to reach the passenger cap of 32 mppa.

5.22 Data has been provided for 2022 but only for the Applicant's preferred option and Scenario 1.

5.23 The Applicant has provided noise exposure data within the Reporting Template for the situation in 2018 and 2019. This information, particularly for 2018, is used throughout the assessment work provided within the Application. Comparisons back to 2018 and 2019 cater for some understanding of how the noise climate compares to recent years however due to the impact of the ongoing Covid-19 global pandemic the current noise situation at Dublin Airport is unlikely to be represented by data for 2018 and 2019.

5.24 The Reporting Template does not include data for 2006, 2011 and 2016 as reported within the Airport's NAP.

6 Noise Exposure Observations

6.1 Based on NCL's initial review of the Application and the associated noise information provided it is our view that sufficient information is available to allow ANCA to form a view as to whether a noise problem may arise from the Proposed Development.

6.2 The noise information provided with the Application responds to the primary objective measures required by the regulatory framework namely the L_{den} and L_{night} noise level indicators and number of highly annoyed and highly sleep disturbed people.

6.3 Due to the nature of the Applicant's proposal which is modify operating restrictions which are effective during night-time hours i.e. 2300 - 0700, the observations reported in this Section focus on the corresponding changes in night-time noise which are presented within the Application.

In recent years, night-time noise at Dublin Airport had been increasing

6.4 The latest noise situation formally reported for the Airport (presented within the NAP) is for 2016 in line with the requirements of the relevant regulations. However, the NAP also presents comparisons with the situations reported under previous rounds of the relevant regulations for 2011 and 2006.

6.5 The information provided by the Applicant within the Reporting Template provides historical data for 2018 and 2019 only.

6.6 Table 5 presents the population exposed to night-time noise in 5 dB bands above 50 dB L_{night}. This shows that since 2006, night-time noise from Dublin Airport has increased incrementally reaching a peak in 2019. In 2019, the number of people reported as being exposed to levels above 55 dB L_{night} had doubled compared to 2018 with approximately 100 people being reported as exposed to aircraft noise above 60 dB L_{night} for the first time.

6.7 Over the period 2006 to 2019 the population reported to be exposed to night-time noise above 50 dB L_{night} had increased by a multiple of seven.

Table 5 Reported Night-time Noise Exposure (L_{night}) for Dublin Airport

Noise Band Lnight dB(A)	Population Exposed				
	2006	2011	2016	2018	2019
50 - 54.9	1,800	1,200	6,200	11,600	12,300
55 - 59.9	200	200	400	700	1,400
60 - 64.9	0	0	0	0	100
65 - 69.9	0	0	0	0	0
>=70	0	0	0	0	0

6.8 The NAP recognises the increase in night-time noise over the period 2006 to 2016, highlighting that the population exposed to level of 50 dB L_{night} or above had increased from 2,000 to 6,600 over this period.

6.9 The NAP identifies that this may be a result of increasing noise from the Airport or the result of the encroachment of residential developments in areas around the Airport. The NAP does not state that there is a noise problem at Dublin Airport however it highlights this as a situation that may need to be improved.

"… indicates that night noise and land-use planning are areas which may be a problem and may need to be improved. However, further work needs to be undertaken. To this end, actions have been proposed which will prompt further work"

6.10 Clearly from the data provided with the Application, the trend of increasing night-time noise exposure has continued into 2018 and 2019, over the period 2016 to 2019 following the point at which the NAP indicated that night-time noise was a situation which may need to be improved, the Application now reveals that the population exposed to night-time noise above 50 dB L_{night} had in fact almost doubled.

6.11 Whilst this trend of increasing night-time noise exposure is clear, the impact of the Covid-19 global pandemic on operations and noise around Dublin Airport cannot be ignored. The impact of the pandemic is likely to result in noise exposure in 2020 being significantly lower than the levels reported for 2018 and 2019, and potentially below those reported for 2016. In reviewing the aircraft and passenger forecasts provided with the Application, that reduced operation and noise compared to recent year is likely to prevail through the period to 2025.

6.12 The consequence of this is that whilst historic trends are indicative of what may be considered a noise problem at Dublin Airport, the impact of the pandemic is somewhat of a watershed. Furthermore, in the absence of the Proposed Development and in line with Condition 5 of the North Runway Planning Permission, the Airport would be required to operate night-time

movements of 65 per night on average once the North Runway commences operation. This will place a further constraint on night-time noise as the Airport recovers from the pandemic and commences as a three-runway operation. This is explored further in the following observation.

Without the Proposed Development, noise exposure and its harmful effects will be lower than in recent years

6.13 Without the Proposed Development and as airport operations begins to recover from the global pandemic, passenger activity will be lower than occurred in 2018 and 2019. As presented in

6.14 Figure 2 in Section 4, passenger numbers in 2020 are likely to be less than 10 mppa increasing to 30.9 mppa in 2025.

6.15 The Application reports forecast noise exposure data within the Reporting Template for 2022 and 2025. Table 6 and

6.16 Table 7 present the cumulative number of people forecast to be exposed to levels of aircraft noise above 45 dB L_{den} and 40 dB L_{night} in 2022 and 2025 without the Proposed Development alongside the situation which occurred in 2018 and 2019.

6.17 Table 6 shows that with respect to L_{den}, the number of people exposed to more than 45 dB will reduce by around 39% between 2019 and 2025.

6.18 Table 7 shows that for L_{night}, that the number of people forecast to be exposed to levels above 40 dB in 2025 is less than half that was reported for 2018 and 2019

Table 6 Day-Evening-Night L_{den} Population Exposure for 2018 and 2019 and for scenarios/situations where the North Runway consent remains unchanged

Noise Band L_{den} dB(A)	Number of People Exposed			
	2018	2019	2022 Scenario 01	2025 Scenario 01
≥ 45	716726	754135	430569	458833
≥ 50	184777	174146	97385	107643
≥ 55	35483	34097	20811	23830
≥ 60	4717	6279	2410	3207
≥ 65	257	285	134	227
≥ 70	31	31	26	32
≥ 75	6	6	0	0

Table 7 Night-time L_{night} Population Exposure for 2018 and 2019 and for scenarios/situations where the North Runway consent remains unchanged

Noise Band L_{night} dB(A)	Number of People Exposed			
	2018	2019	2022 Scenario 01	2025 Scenario 01
≥ 40	307458	344912	143248	141766

Noise Band L_{night} dB(A)	Number of People Exposed			
	2018	2019	2022 Scenario 01	2025 Scenario 01
≥ 45	55493	59307	31447	30881
≥ 50	12317	13838	6247	6032
≥ 55	753	1533	284	281
≥ 60	57	110	34	31
≥ 65	10	13	0	0
≥ 70	0	0	0	0

6.19

6.20 Table 7 shows that the forecast number of people to be exposed to levels above 55 dB L_{night} in 2025 (312) without the Proposed Development is around 19% of the number of people reported for 2019 (1656). This is illustrated graphically in

6.21 Figure 3 which presents the 55 dB L_{night} contour for 2018 and 2019, and for 2022 and 2025 without the Proposed Development.

6.22 Given the reductions in noise exposure indicated in Table 6 and

6.23 Table 7 it follows that the number of people experiencing the harmful effects of aircraft noise is also forecast to reduce without the Proposed Development. This is presented graphically in Figure 4 and reported in Table 8.

Figure 3 Comparison of 55 dB L_{night} Contours for 2018 and 2019 and for scenarios/situations where the North Runway consent remains unchanged

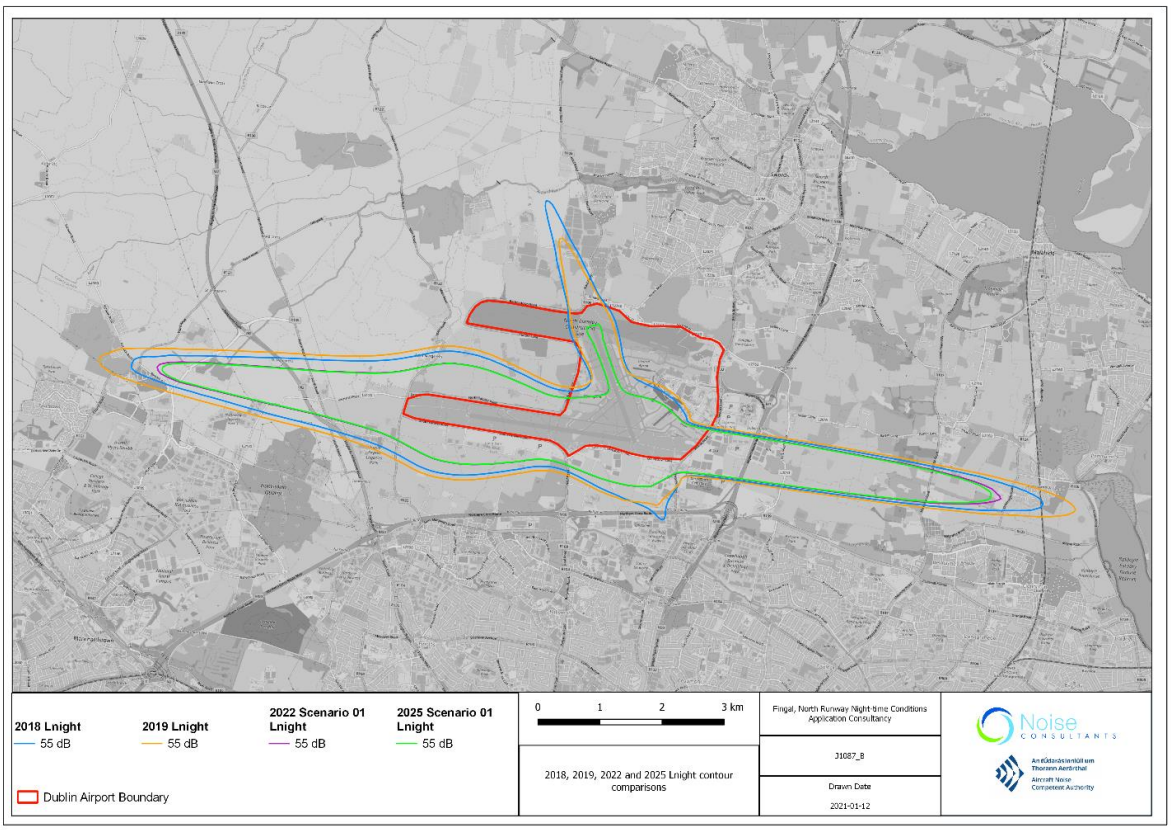
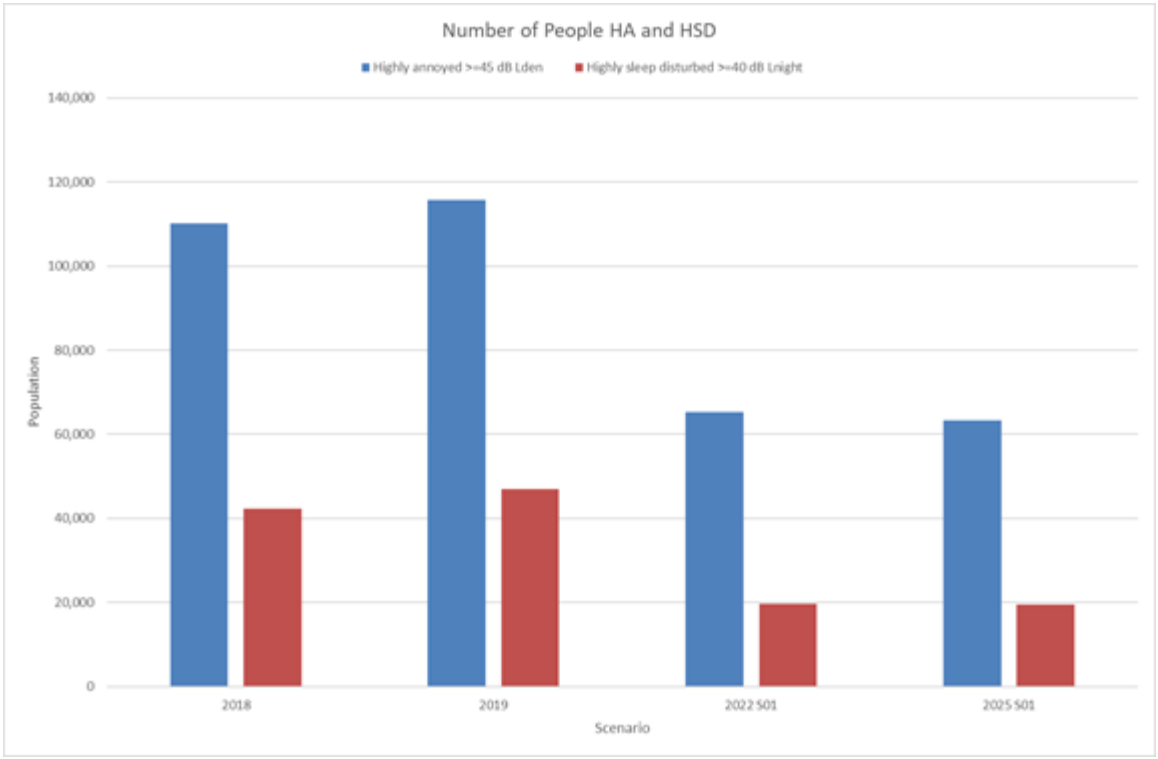


Table 8 Number of people HA and HSD for 2018 and 2019 and for scenarios/situations where the North Runway consent remains unchanged

Metric	Number of People HA/HSD			
	2018	2019	2022 Scenario 01	2025 Scenario 01
Highly Annoyed >=45 dB L_{den}	110,238	115,738	65,227	63,317
Highly Sleep Disturbed >=40 dB L_{night}	42,260	47,045	19,691	19,465

Figure 4 Number of people HA and HSD for 2018 and 2019 and for scenarios/situations where the North Runway consent remains unchanged



In general, with or without the Proposed Development, noise exposure and its harmful effects will be lower than in recent years

6.24 As outlined above, without the Proposed Development noise exposure and its harmful effects are forecast to be lower than occurred in 2018 and 2019. However, this outcome is also demonstrated amongst the scenarios considered within the Application for the Proposed Development.

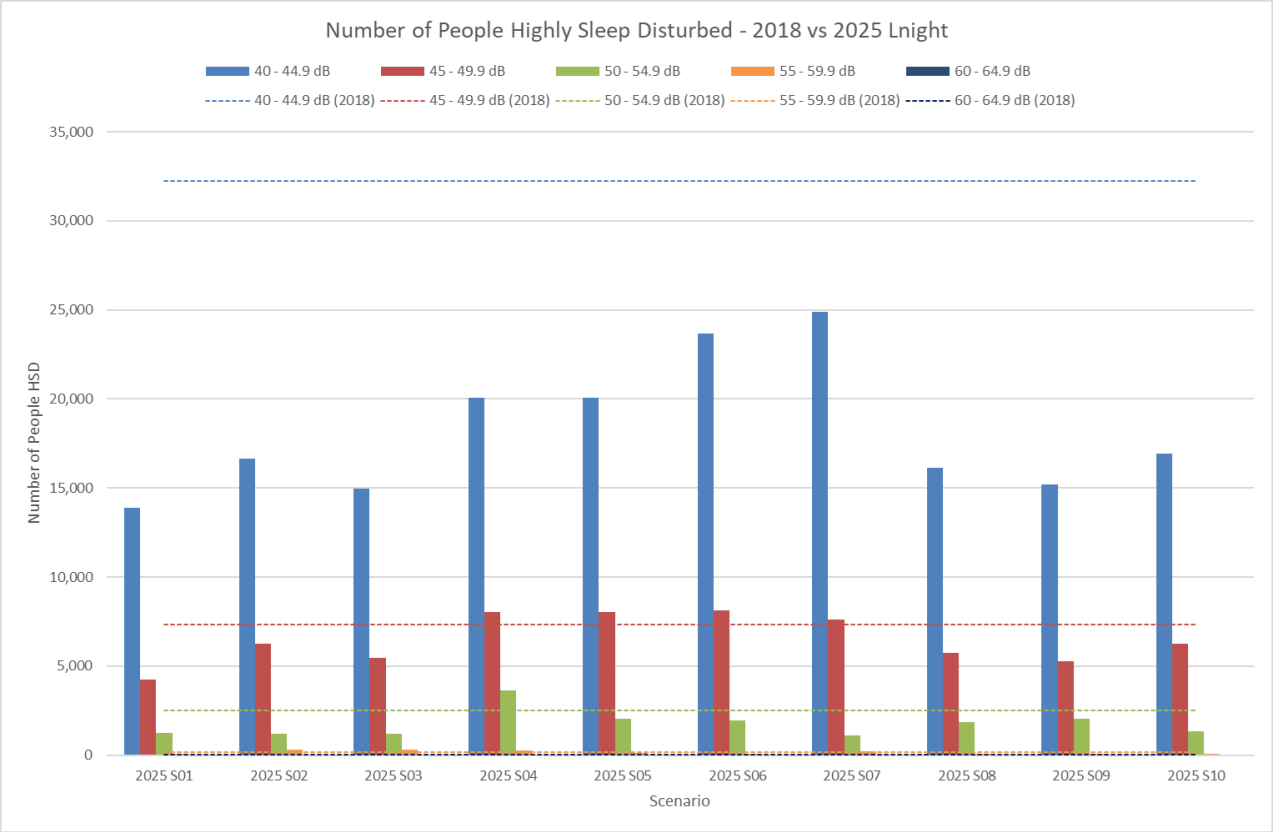
6.25 Figure 5 shows that with respect to the number of people HSD and HA all preferential runway use scenarios considered by the Applicant would result in lower exposure than those reported for 2018 and 2019.

Figure 5 Number of people HA and HSD for Scenarios considered within the Application against 2018

6.26 This outcome is also reflected within the noise exposure data which is summarised in Figure 6 however this does show that at certain reporting bands in certain scenarios in 2025, the number of people exposed is forecast to be higher than occurred in 2018.

6.27 For example, Scenario 4 may result in fewer people being exposed to noise levels above 40 dB L_{night} compared to 2018 however more people would be exposed to noise levels between 45.0 and 49.9 dB, and 50.0 and 54.9 dB. This observation does not however detract from overall reduction in harmful effects compared to the situation in 2018 but does highlight that there are wider considerations to be taken into account.

Figure 6 Night-time (L_{night}) noise exposure in 5 dB bands from 40 dB L_{night} for scenarios considered within the application against reported exposure in 2018



The harmful effects of aircraft noise will be higher with the Proposed Development than Without

6.28 When comparing the scenarios considered by the Applicant which have led to their preferred option for the Proposed Development against the situation which would occur if the North Runway consent remained unchanged, the harmful effects of aircraft noise of the former are higher.

6.29

6.30 Figure 7 and Figure 8 show that for the number of people HA and HSD respectively that a change to the North Runway consent will result in an increase in such harmful effects. The Proposed Development must therefore be described as having an adverse effect on human health.

6.31 The figures show that the various scenarios considered by the Applicant lead to different outcomes in terms of the harmful effects. As such, decisions made in relation to a preferred option are important in mitigating the effects of the Proposed Development.

Figure 7 Cumulative number of people HA for scenarios considered by the Application against the situation where the North Runway consent remains unchanged

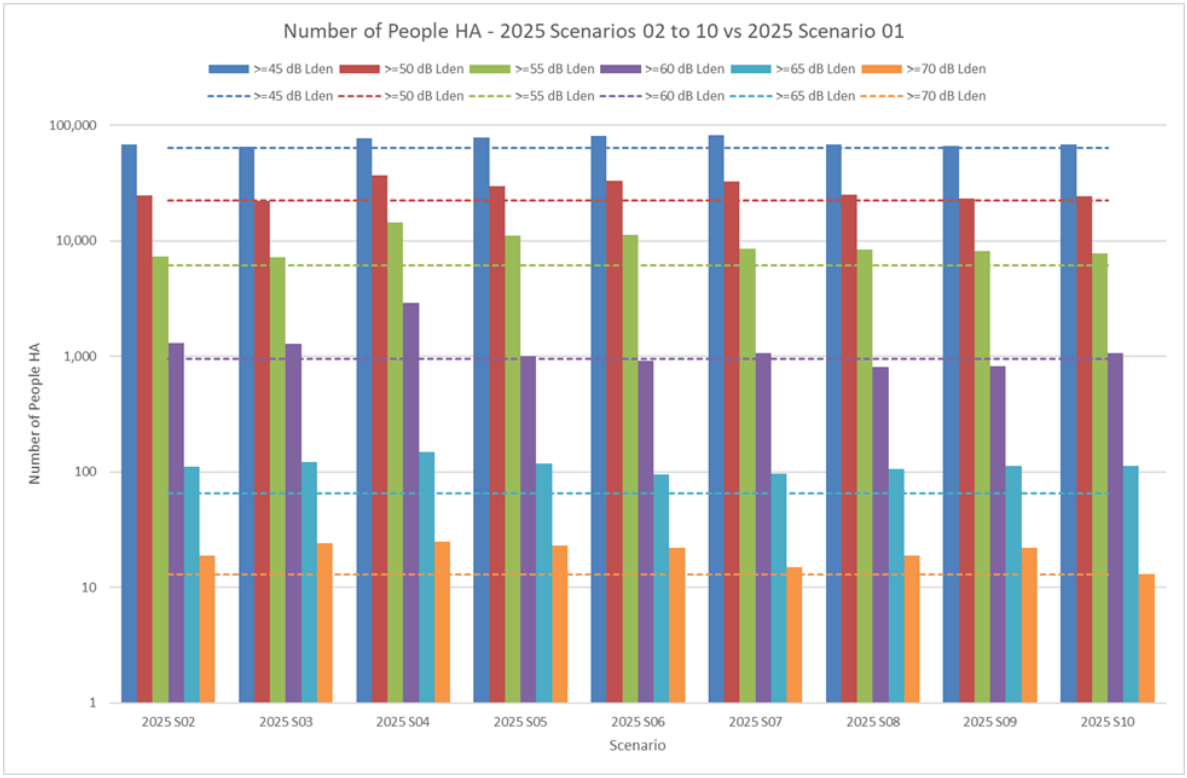
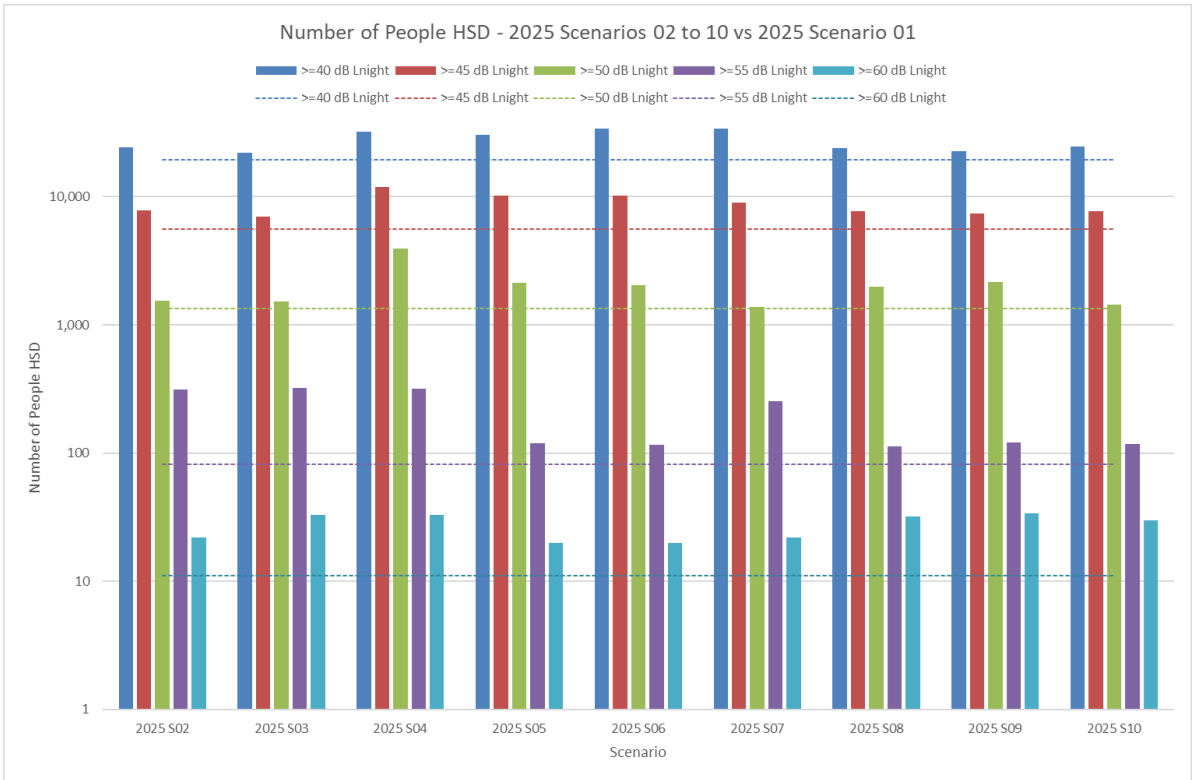


Figure 8 Cumulative number of people HSD for scenarios considered by the Application against the situation where the North Runway consent remains unchanged



6.32 Table 9 highlights that further differentiation can be made between the scenarios when considering the number of people exposed to the higher levels of night-time noise where impacts are most felt, and health risks are elevated i.e. above 50 dB and 55 dB L_{night}.

6.33 This shows that compared to the situation where the North Runway consent remains unchanged, all scenarios considered within the Application result in a higher population exposure at these levels. In most cases these changes in exposure could result in people becoming exposed to levels of aircraft noise at night which are potentially harmful for the first time. This is explored further in the following section.

Table 9 Number of people Exposed to night-time noise above 50 dB and 55 dB L_{night}

Scenario	Number of People Exposed (Lnight)	
	>=50	>=55
2025 Scenario 01 i.e. North Runway Consent Remains unchanged	6,100	300
2025 Scenario 02	6,800	1,200
2025 Scenario 03	6,700	1,200
2025 Scenario 04	17,600	1,100
2025 Scenario 05	10,000	500
2025 Scenario 06	9,500	400
2025 Scenario 07	6,200	1,000
2025 Scenario 08	9,200	400
2025 Scenario 09	10,000	400

The Proposed Development will result in populations becoming exposed to aircraft noise at night and at potentially harmful levels of night-time noise

6.34 The Proposed Development has the potential to result in certain populations becoming exposed to levels of night-time aircraft noise which are harmful to human health. Appendix C presents night-time noise contour comparisons for the scenarios considered by the Applicant against the situation in 2018 and forecast in 2025 if the North Runway consent remained unchanged. These contours shows that certain populations may become exposed to night-time noise at levels they may not have experienced before.

6.35 This is summarised in Figure 9 and Figure 10 below which clearly demonstrates the potential for a change in the North Runway restrictions to result in a redistribution of the population being exposed to aircraft noise above 50 dB and 55 dB L_{night}.

Figure 9 2025 Forecast Scenarios overlaid against 2018 and the situation which would arise without the Proposed Development , 50 dB L_{night}

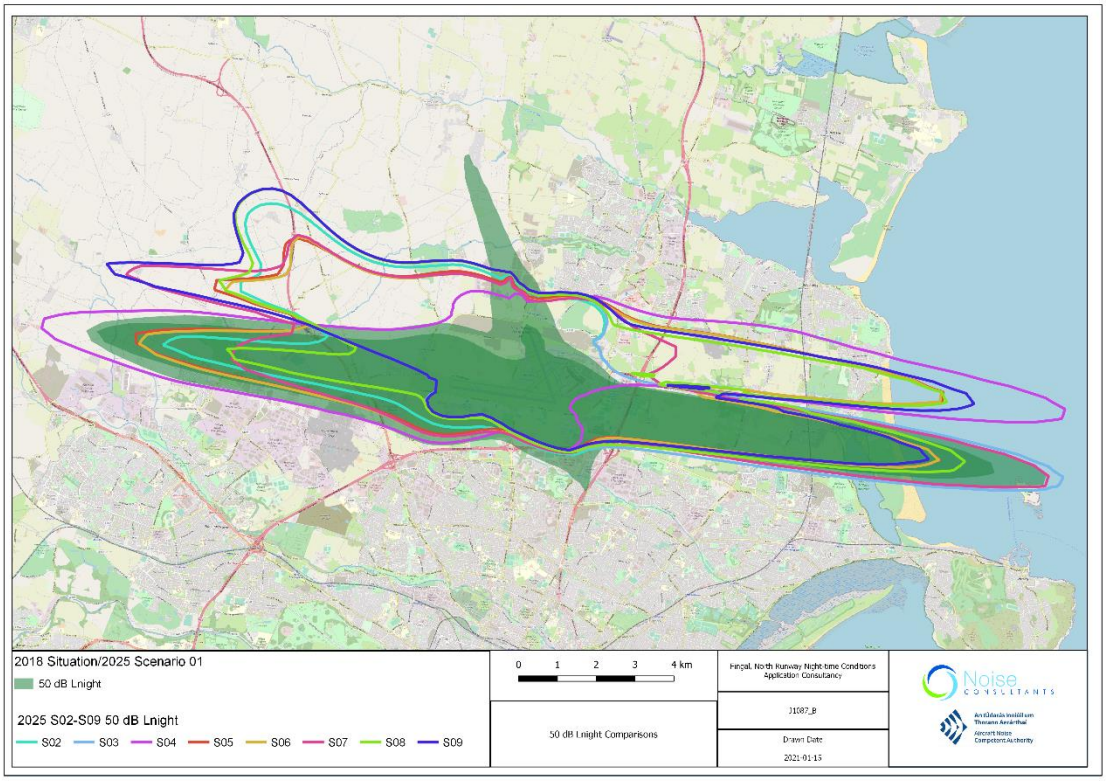


Figure 10 2025 Forecast Scenarios overlaid against 2018 and the situation which would arise without the Proposed Development , 55 dB Lnight

6.36 The Proposed Development would increase the number of people experiencing aircraft noise which may be considered harmful to human health.

6.37 The increase in the number of people exposed to night time noise above 55 dB L_{night} is of relevance in this respect given the recommendations for health protection reported within the WHO Night Noise Guidelines 2009 (NNG 2009). These state that above 55 dB *"the situation is considered increasing dangerous for public health. Adverse health effects occur frequently, a sizeable proportion of the population is highly annoyed and sleep-disturbed. There is evidence that risk of cardiovascular disease increases".*

6.38 On this basis the WHO NNG 2009 recommends that night-time noise exposure should be reduced below 55 dB L_{night}.

6.39 The evidence provided in Section 3.1.7 of the WHO NNG 2009 reports the risk of behavioural awakenings in adults due to night-time aircraft noise exposure. It reports that the risk of objective awakenings begins to increase as night-time noise exposure passes 50 dB L_{night} and then increases exponentially with increasing exposure above 55 dB L_{night}.

6.40 It is important to note that it is in these locations where night-time aircraft operations from the North Runway are likely to be experience direct aircraft overflight.

6.41 Given the levels and changes in night-time aircraft noise exposure illustrated by Appendix C and indicated in Figure 9 and Figure 10, these changes are highly likely to result in significant environmental effects.

The Proposed Development will result in significant adverse effects

6.42 The EIAR presents the Applicant's methodology for the assessment of significant aircraft noise effects arising from the Proposed Development. Based on the methodology and significance criteria adopted, the EIAR reports that when comparing the Applicant's preferred option against baseline conditions that the Proposed Development will result in both significant adverse and significant beneficial effects.

6.43 Table 13-57 of the EIAR is reproduced in Figure 11. This shows that based on the pure EIA comparison i.e. the effects reported against the 2025 baseline, that whilst the Proposed Development is predicted to result in a beneficial effect in terms of L_{den} exposure and annoyance, that around ten times more people are forecast to experience significant adverse effects (11756) in terms of L_{night} exposure as oppose to beneficial effects (1125).

6.44 The comparisons provided against 2018 and the '2025 Consented Situation' are informative however these are not pure EIA comparisons upon which significance can be determined. The comparison made against the 2018 baseline indicates that when compared to noise exposure in recent years the effects of the Proposed Development are on balance beneficial. However, this comparison can only be considered contextual.

Figure 11 Summary of Residual Air Noise Effects, 2025 (Table 13-57 of the EIAR)

Table 13-57: Summary of Residual Air Noise Effects, 2025 Relevant Action

Baseline Scenario	*L_{den} Residual Effects*			*L_{night} Residual Effects*		
	Significant Beneficial	Significant Adverse	Not Significant	Significant Beneficial	Significant Adverse	Not Significant
2018 Baseline	24,699	7,949	709,163	10,485	1,483	318,476
2025 Baseline	2,110	10	457,802	1,125	11,756	182,451
2025 Consented	14,154	119	792,856	7,180	3,172	253,316

Mitigation Measures – Proposed Night-time Noise Insulation Scheme

6.45 The Proposed Development includes proposals for a noise insulation scheme. The planning statement reports that:

"A night noise insulation grant scheme of €20,000 is proposed for dwellings forecasted to be exposed to night-time noise levels of at least 55 dB L_{night} in 2025 or noise levels greater than 50 dB L_{night} in 2022 arising from a change of least 9bB when compared with 2018. Eligibility within the 55 dB L_{night} contour will be reviewed every two years with revised forecasts. This night insulation scheme is proposed in addition to the daytime noise insulation scheme currently provided for in accordance with Condition 7 of the North Runway Planning Permission."

6.46 Having regard to the opinion provided by Commission Services', the Applicant's proposals for such mitigation aligned to the thresholds that the WHO NNG 2009 would indicate harmful effects on human health is an indicator that the Proposed Development would give rise to a noise problem.

The evolution of the noise climate

6.47 As outlined in the previous sections, the noise climate around Dublin Airport has been changing and the Proposed Development would result in a further change or evolution.

6.48 Over the period to 2019 noise from Dublin Airport has increased with the pandemic likely resulting in a significant reduction in noise in 2020. Over the period to 2025, noise is expected to increase as the Airport recovers however this period also coincides with the commencement of North Runway operations resulting in a redistribution of daytime noise. If the Proposed Development proceeds then a redistribution in night-time noise would also occur.

6.49 Systematic reviews supporting the development of the WHO ENG18 considered annoyance relationships at airports where there has been large changes in the noise situation, from for example, the opening of a new runway, introduction of new flight paths, an abrupt increase in number of aircraft movements, etc. The systematic review presented by Gjestland[15] considered research by Gelderblom et al[16]. which classified 62 aircraft noise annoyance studies conducted over the last 50 years against whether these airports could be considered 'high rate' or 'low rate' in terms of change. This research demonstrated that annoyance

[15] Gjestland, A Systematic Review of the Basis for WHO's New Recommendation for Limiting Aircraft Noise Annoyance, Int J Environ Res Public Health. 2018 Dec; 15(12): 2717.

[16] Gelderblom F.B., Gjestland T., Fidell S., Berry B. On the stability of community tolerance for aircraft noise. Acta Acust. United Acust. 2017;103:17–27. doi: 10.3813/AAA.919029

responses at 'high rate' airports occurred around 9 dB lower than 'low change' airports. Work carried out by Guski[17] reports a similar effect but at a lower value of 6 dB.

6.50 Gjestland concludes that attempting to derive an average dose-response relationship is ultimately dependent upon the nature of the airports considered in the study. However, the findings also demonstrate that abrupt changes in the noise situation are likely to increase annoyance responses.

6.51 When considering the evolution of the noise situation at Dublin Airport and the potential changes associated with the Proposed Development, a heightened level of annoyance may be expected alongside the other changes which will take place over the period to 2025.

[17] Guski R., Schreckenberg D., Schuemer R. WHO Environmental Noise Guidelines for the European Region. A systematic review on environmental noise and annoyance. Int. J. Environ. Res. Public Health. 2017 doi: 10.3390/ijerph14121539.

7 Aspects of the Proposed Development which may give rise to a Noise Problem

7.1 Taking into account the relevant legislation and guidance, the nature of the Proposed Development along with the observations presented in Section 6, the following aspects may be considered to give rise to a noise problem:

- The harmful effects of aircraft noise in the future with the Proposed Development will be worse than without, particularly at night. As such the Proposed Development will increase aircraft noise rather than reduce it;
- Some people will experience elevated levels of night-time noise exposure for the first time which may be considered harmful to human health;
- The Proposed Development gives rise to significant adverse night-time noise effects as reported within the EIAR. This indicates that the noise effects of the Proposed Development are a material consideration;
- Mitigation in the form of a night-time noise insulation scheme is proposed by the Applicant. The provision of such mitigation is an indicator that the Proposed Development may give rise to a Noise Problem; and
- The nature of the Proposed Development is to enable a form of operation which was not considered by ABP in their original decision to grant consent for the North Runway. Such a change will attract significant third party interest, particularly from communities, who may perceive there to be a noise problem.

Appendix A – Origin of Conditions 3(d) and 5

An tÚdarás Inniúil um Thorann Aerárthaí
Aircraft Noise Competent Authority

Noise CONSULTANTS

Review

North Runway: Origin of Conditions 3 and 5

July 2019



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Document Control

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6 Conclusions 13

1 Introduction

1.1 Noise Consultants Limited (NCL) have been asked by the Airport Noise Competent Authority (ANCA) to prepare a review studying seeking to identify the origin of the noise-related operating restrictions attached to the planning consent for Dublin Airport's North Runway.

1.2 Dublin Airport's North Runway was granted planning permission in 2007 following an Oral Hearing and was subject to a total of 31 planning conditions (An Bord Pleanála Reference Number: PL 06F.217429[1]).

1.3 Six of the planning conditions relate to the management of noise, addressing matters such the requirement for noise insulation and voluntary purchase schemes. Three of the conditions impose 'noise-related operating restrictions' on the future operation of Dublin Airport following the commencement of operations from its North Runway. These are:

- Condition 3 – describing a form of preferred operation in terms of runway usage and restrictions on runway usage by time of day and operating restriction
- Condition 4 – restricting the use of the Airport's crosswind runway to essential use only therefore making the parallel i.e. existing and new North Runway the main operation; and
- Condition 5 – limiting the number of aircraft movements from the Airport at night.

1.4 This document has been prepared to provide some insight into the origin of the noise-related operating restrictions set out in the planning consent.

1.5 This insight has been provided by Mr. Rupert Thornely-Taylor of NCL's consulting team. Mr. Taylor was present at the Oral Hearing for the North Runway acting in the capacity as a consultant to An Bord Pleanála. Mr. Taylor sat with the Inspector on the relevant days of the Hearing and was addressed by the parties present as "Mr Inspector".

1.6 His role was to act as an inspector with the Inspector herself only intervening on matters of procedure. Mr Taylor questioned witnesses and daa's counsel in some detail, particularly as there was a shortage of incisive cross-examination by parties opposing daa.

1.7 To support this review, Mr. Taylor has relied on:

- The Consultants' Report – Volume 2 Consultants Report, Report by Rupert Thornely-Taylor on Issues Relating to Noise; and
- Notes and transcripts held by Mr. Taylor taken during his time at the Oral Hearing.

[1] Available here: https://www.dublinairport.com/docs/default-source/planning/planning-conditions.pdf?sfvrsn=ff46e534_0

Structure of this report

1.8 This document is structed as follows:

- Section 2 defines what constitutes a noise-related operating restriction;
- Section 3 sets out the noise-related operating restrictions imposed as part of the North Runway planning consent and daa's stated intentions to change these;
- Section 4 provides a narrative of the matters discussed within the EIS and Oral Hearing which provide insight into the potential background to the setting of the restrictions;
- Section 5 attempts to describe the origin of Condition 5; and
- Section 6 presents conclusions arising from this review.

2 What is a 'noise-related operating restriction'?

2.1 European Union (EU) Regulation No 598/2014 (herein referred to as 'EU598') establishes rules and procedures with regard to the introduction of noise-related operating restrictions at Union airports within a Balanced Approach.

2.2 The EU Regulation 598/2014 defines operating restrictions as:

"any noise-related restriction that limits access to or reduces the operational capacity of an airport"

2.3 EU598 defines a 'noise-related action' and an operating restriction as:

*(5) **'noise-related action'** means any measure that affects the noise climate around airports, for which the principles of the Balanced Approach apply, including other non-operational actions that can affect the number of people exposed to aircraft noise;*

*(6) **'operating restriction'** means a noise-related action that limits access to or reduces the operational capacity of an airport, including operating restrictions aimed at the withdrawal from operations of marginally compliant aircraft at specific airports as well as operating restrictions of a partial nature, which for example apply for an identified period of time during the day or only for certain runways at the airport.*

2.4 Restrictions include for example limits on total movements either directly or indirectly, curfews, restrictions of the use of certain runways or routes. They are usually imposed by public authorities and are today in place at many major airports.

2.5 Within the EU, EU598 is complementary to and builds on the Environmental Noise Directive (Directive 2002/49). Both EU598 and Directive 2002/49 have been transposed into Irish Law via:

- Aircraft Noise (Dublin Airport) Regulation Act 2019 (herein referred to as 'the 2019 Act')[2]; and
- S.I. No. 140/2006 - Environmental Noise Regulations 2006[3]

2.6 Directive 2002/49, addressing various noise sources, requires EU Member States to regularly map noise exposure around key infrastructure, including major airports, and to set up noise action plans to address identified noise problems for each of these sources. Both pieces of legislation obligate public participation and consultation as a key element of their respective decision-making processes.

2.7 Both instruments provide process and a framework for ensuring that the approach taken to the management of aircraft noise, in the setting of noise-related operating restrictions is consistent at all Union Airport. Critically, the legislation does not influence or pre-judge what noise actions or restrictions should be taken. This is consistent with the principles of the ICAO Balanced Approach and allows for

[2] Available here: https://data.oireachtas.ie/ie/oireachtas/act/2019/12/eng/enacted/a1219.pdf

[3] Available here: http://www.irishstatutebook.ie/eli/2006/si/140/made/en/print

noise mitigation and restrictions to be developed based on local circumstances and the need for flexibility. This is consistent with the principle of subsidiarity.

2.8 Under the ICAO Balanced Approach to noise management the principle has been established that operating restrictions should not be applied as a first resort, but only after consideration of the benefits to be gained from other elements in a manner which is consistent with the Balanced Approach, on an airport-by-airport approach.

2.9 The process to be followed when introducing new, or amended, noise-related operating restrictions at an airport are set out in EU598. Under EU598 operating restrictions shall only be applied after consideration of the other measures of the Balanced Approach. This procedure is given further effect in Ireland through the 2019 Act.

3 North Runway Noise-Related Operating Restrictions

Condition 3

3.1 Conditions 3 restricts the use of parallel runways (i.e. the new north runway and the Airport's existing runway). This restriction is described as a 'mitigation measure' as presented within the Environmental Impact Statement (EIS) and within the reason for the condition.

3.2 The condition states:

3. On completion of construction of the runway hereby permitted, the runways at the airport shall be operated in accordance with the mode of operation – Option 7b – as detailed in the Environmental Impact Statement Addendum, Section 16 as received by the planning authority on the 9 th day of August, 2005 and shall provide that –

(a) the parallel runways (10R-28L and 10L-28R) shall be used in preference to the cross runway, 16-34,

(b) when winds are westerly, Runway 28L shall be preferred for arriving aircraft. Either Runway 28L or 28R shall be used for departing aircraft as determined by air traffic control,

(c) when winds are easterly, either Runway 10L or 10R as determined by air traffic control shall be preferred for arriving aircraft. Runway 10R shall be preferred for departing aircraft, and

(d) Runway 10L-28R shall not be used for take-off or landing between 2300 hours and 0700 hours, except in cases of safety, maintenance considerations, exceptional air traffic conditions, adverse weather, technical faults in air traffic control systems or declared emergencies at other airports.

Reason: In the interest of clarity and to ensure the operation of the runways in accordance with the mitigation measures set out in the Environmental Impact Statement in the interest of the protection of the amenities of the surrounding area.

3.3 This form of operation will directly affect the pattern of noise exposure around the airport therefore potential changes to this condition could result in a noise problem. The condition should therefore be considered a 'noise-related operating restriction' under the 2019 Act and EU598 as a clear 'noise action' was intended when the condition was drafted and accepted.

Condition 4

3.4 Condition 4 restricts the use of the Airport's crosswind runway. It states:

4. The crosswind runway (16-34) shall be restricted to essential occasional use on completion of the new runway in accordance with Objective DA03 of the Fingal County Development Plan, 2005-2011. 'Essential' use shall be interpreted as use when required by international regulations for safety reasons.

Reason: In the interest of public safety, residential amenity and the proper planning and sustainable development of the area

3.5 This condition may also be considered a noise-related operating restriction as is clear from the 'reason' provided within the condition itself i.e. residential amenity.

Condition 5

3.6 Condition 5 imposes restrictions on the number of aircraft which allowed to operate between the hours of 2300-0700hrs. The condition states:

5. On completion of construction of the runway hereby permitted, the average number of night time aircraft movements at the airport shall not exceed 65/night (between 2300 hours and 0700 hours) when measured over the 92 day modelling period as set out in the reply to the further information request received by An Bord Pleanála on the 5th day of March, 2007.

Reason: To control the frequency of night flights at the airport so as to protect residential amenity having regard to the information submitted concerning future night time use of the existing parallel runway.

3.7 Condition 5 is potentially badly worded as it refers to the '92-day modelling period' which is established through UK aviation noise policy as a period from mid-June to mid-September i.e. the 'average summer period'. The wording of the condition would suggest that the limit applies to this period and not beyond this period.

3.8 Regardless of how this condition should be interpreted, it must be considered a noise-related operating restriction in the context of EU598. The reason for the condition also highlights it as means of controlling night time use.

daa Announcement to Change Operating Restrictions

3.9 In June 2016, daa held a series of public consultation events for the North Runway. The purpose of these events was to carry out a scoping exercise for an Environmental Impact Assessment as part of reviewing and potentially seeking to change the noise-related operating restrictions.

3.10 A scoping report and subsequent consultation feedback report were prepared as part of this exercise and are published and remain available on daa's website[4].

3.11 As part of the materials available, daa state that Condition 3(d) and Condition 5 of the North Runway consent would *'severely reduce the future operational capacity of Dublin Airport at peak periods'*.

[4] Available here: https://www.dublinairport.com/corporate/north-runway/operating-conditions

3.12 Both conditions in either isolation of combination relate to night-time operations and therefore seek to manage and restrict night-time aircraft noise exposure. As outlined in Section 2, these conditions should be treated as noise-related operating restrictions.

3.13 As part of this consultation, daa clarified these conditions present a significant impact to their operation as at present circa 100 aircraft currently operate during the night between the hours of 2300 and 0700. As a result, the restrictions attached to the North Runway would likely result in economic and socio-economic impacts.

3.14 A further consultation was held in October 2016 and sought to provide an update on the scoping exercise for the planned EIA. The materials presented at this consultation included proposed flight path options for the expanded airport and noise contours considering the potential changes in the restrictions attached to Conditions 3(d) and Condition 5.

3.15 Within the materials presented by daa, the origin of the restrictions is not discussed or described. The origin of the restrictions may be an important consideration and provide valuable context for the ANCA as part of any proposals which seek to remove or amend them.

What could be consequence of changing Conditions 3(d) and Condition 5?

3.16 An application to change Condition 3(d) would mean the use of north runway during night-time hours i.e. 2300-0700hrs, which is currently prohibited save for the exceptions reported under Conditions 3(d).

3.17 The use of the north runway is permitted during daytime hours however parts 3(a-c) dictate runway usage preferences. Therefore, changing Condition 3(d) ultimately would enable the airport to use the runway during the night-time hours resulting in aircraft noise events at night at certain communities that Condition 3(d) may have served to prevent.

3.18 A change to Condition 5 would likely seek to allow more than the average of 65 movements at night to operate following the commencement of the North Runway. The consequences of such a change can only be determined by understanding what may happen if there were no restriction. In general, airports without any restrictions, such is currently the case at Dublin Airport enables airports to schedule flights based on demand and market forces. Even without any restrictions the airport may only be able to attract airlines and customers for certain slots based on this demand. Therefore, the potential impact of changing such a restriction depends on what operations it is possible for the airport to attract or facilitate. However, given the current level of night-time movements at Dublin Airport is beyond the 65 per night reference within Condition 5, the potential consequence of such a change would be potentially increase night noise but only to a level or 'output' consistent with current activity. This can only be determined from the detail provided with any proposal for an alternative set of controls.

4 EIS and Oral Hearing

4.1 This section addresses matters considered at the Oral Hearing and within the EIS which are potentially pertinent to the origin of Conditions 3 and 5.

4.2 It is understood from the Consultants Report that the EIS considered a range of operational scenarios i.e. how the airport would function with an additional runway. It is clear from the Consultants Report that between the time of the EIS being submitted and commencement of the Oral Hearing daa had favoured an operational scenario known as 'Option 7b'. It was confirmed at the Oral Hearing (through daa's Counsel Mr. O'Donnell) that daa were content to be restricted to the use of the new runway based on the assumptions of the Option 7b scenario. These assumptions reflect Condition 3(a-c).

4.3 What is notable is that through Oral Hearing it was confirmed by the consultants acting on behalf of daa that noise exposure above 63 dB $L_{Aeq,\ 16hr}$ equates to likely significant effects in the context of Environmental Impact Assessment regulations in place at the time. This approach is not current best practice for the assessment of aircraft noise, particularly for a major change such as a new runway or a major change in operating conditions. What is unclear from the transcripts of the Consultants report is whether or not the outcome of the assessment using this measure had any bearing on the decision and favour of Option 7b by the daa. Nevertheless, as daa have expressed an intention to change parts of the Conditions that relate to night-time noise exposure this may not be critical and certainly explains the origin of Condition 3(a-c).

4.4 The Consultant Report highlights that the EIS assumed that the North Runway would not be used at night however it did indicate that the introduction of the North Runway would lead to an increase in night-time noise exposure. No assessment in relation to the potential significance of this increase was reported or response provided under examination. Indeed Mr. Taylor has pointed out at the Oral Hearing and in his report that the significance of the changes in noise exposure at night had not been determined by daa's consultants. He rightly pointed out that by not doing so the EIS may be inadequate.

4.5 The rationale for why an assessment of night-time noise significance was absent from the EIS was provided by daa's expert Mr. Douglas Sharps. Mr. Sharps stated that as the new runway would not be used at night (save for exceptional circumstances) then there would be no significant effect from the development (i.e. the new runway) at night and therefore the EIS did not need to consider it.

4.6 One potential oversight identified at the Oral Hearing and reported in Mr. Taylor's report was that the definition of 'night-time' reported in the EIS was 2300-0600hrs whereas the clarifications provided at the Oral Hearing accepted that the definition of night-time was in fact 2300-0700hrs and remains the case today in relevant noise legislation. It is therefore not clear whether the assessment in the EIS had assumed that the North Runway may be operational in the period 0600-0700hrs or not. Whether intended or not the Oral Hearing received evidence from daa's advocates that during the night (confirmed as 2300-0700hrs) the North Runway would not be in use. This lays the ground for and sets the origin of Condition 3(d).

4.7 With regards to Condition 5, the EIS, Consultants Report and Mr. Taylor's notes from the Oral Hearing do not directly indicate any will or intention to restrict the number of movements at the airport at night. The Consultant Report deals with matters discussed by third parties regarding the potential impact of the airport due to the use of its existing runway at night. The Consultant Report states:

"Evidence was given by several third parties concerning the effects of the use of the existing runways at night. Powers are not available to impose controls on the use of the existing runways and it is necessary to consider the consequences of permitting the current application with respect to the resting effect on the of the existing runway".

4.8 It goes on to state that:

"… the response to information request 5 did make clear that the number of night movement in the modelling period would increase form 45 to 65 in the constrained case and from 45 to 95 in the unconstrained case."

4.9 This is the only reference within the Consultants Report to a number of night time aircraft movements equivalent to the restriction in Condition 5.

4.10 Within the Consultant Report, Mr. Taylor does not make any conclusion or recommendation in relation to a restriction on night-time movements, instead cautioning that it may not be possible to do so as the existing runway is not the development being sought planning consent.

5 Origin of Conditions 3 and 5

Condition 3

5.1 As outlined in Section 4, the Oral Hearing centred around the noise impact of daa's favoured operational scenario, Option 7b.

5.2 At the Oral Hearing, daa indicated through their Counsel that they would implement a planning permission that contained a condition limiting the use of the new runway in accordance with Option 7b, thus prohibiting the use of the North Runway during the hours of 2300-0700.

5.3 It therefore followed that with a suitable planning condition, enforceable under Irish Planning Law, that by restricting the use of the North Runway between the hours of 2300 and 0700hrs would itself result in no noise effects from the development during the night.

5.4 Mr. Taylor's transcripts confirm that on Day 3 of the Oral Hearing, Mr O.Donnell introduced Mr Andrew Evans who said it was not intended for the runway to be used at night except in emergencies or ATC problems/adverse weather. He said that the condition offered (3d) would not cause difficulties.

5.5 Mr Taylor recommends a condition reflecting the operational scenario in the Consultants Report.

5.6 This is considered to be the origin of Condition 3(d).

Condition 5

5.7 As outlined in Section 4, Condition 5 did not follow a recommendation from Mr. Taylor as he believed that planning law in Ireland is similar to the position in England in that you cannot impose planning conditions that relate to matters other than the use of the development applied for. As Condition 5 applies to all runways, not just the North Runway, it is assumed that this was not the case.

5.8 Based on Mr. Taylor's notes from the Oral Hearing, it is assumed Condition 5 may have originated from Eamonn O'Kelly, the planning authority witness. In his cross-examination by Karl Searson and Mr Walsh, there were questions about maximum aircraft noise event levels (L_{Amax}) during the night and whether these happened to be a better indicator of sleep disturbance. Mr Byrne in cross-examination asked about night noise, and Mr O'Kelly replied that he was sympathetic to a night curfew or a limit on the number of aircraft movements at night.

5.9 In Mr Taylor's notes, there is record from Day 2 of the Oral Hearing stating:

"Night Noise: FCC consider some form of criterion is appropriate for night time use of the airport".

5.10 The next note is not very legible but appears to state:

"Rec of O'Kelly reviewed by Stanley eminently practical to put some form of criterion re night time use. Stakeholder forums being vehicle".

5.11 On the next page Mr. Taylor has noted under the heading "Flanagan" (FCC's advocate) *"Meant runway not the airport"*.

5.12 It is therefore assumed that Condition 5 was imposed rather than volunteered. However, there is uncertainty as to whether Condition 5 was intended for the North Runway or the Airport as a whole.

5.13 It can only be concluded that by agreeing to an operating restriction as per Condition 3(d) which prohibits the use of the North Runway at night, it could only follow that Condition 5 would have affected the Airport's ability to use their existing runway at night.

6 Conclusions

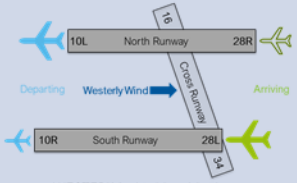
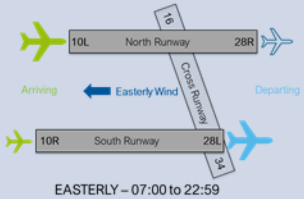
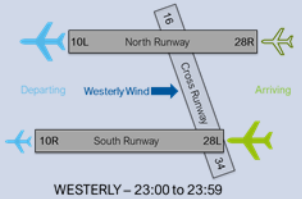
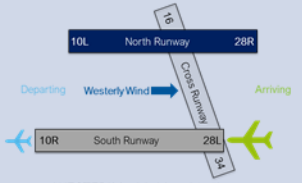
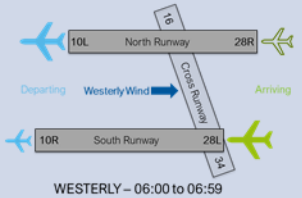
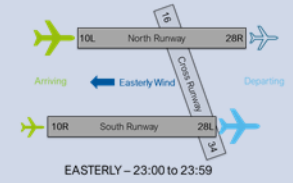
6.1 The review presented in this document is clear that Conditions 3 and 5 of the north-runway consent are restrictions that seek to manage and limit the noise impact from Dublin Airport with its north runway in operation. They are therefore noise-related operating restrictions as defined under relevant legislation.

6.2 As outlined in Section 3, daa have publicly stated that they are seeking to change Condition 5 and Condition 3(d) of the North Runway consent. These conditions relate to night-time noise.

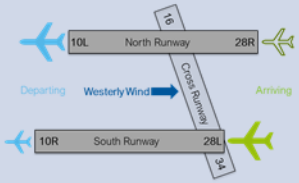
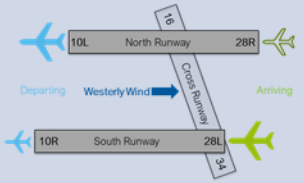
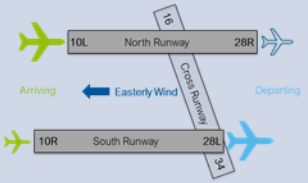
6.3 Based on the review presented in Sections 4 and 5 it appears that Condition 3 was volunteered by daa at the Oral Hearing. It is also clear that the main focus of the debate at the Oral Hearing was on daytime noise effects as it was accepted that with an operating scenario identical to that of Condition 3(d) that there would be no night-time noise emanating from the North Runway.

6.4 This review has not identified the origin of Condition 5 however it is assumed that the planning authority witness may have at least introduced the concept of movement limit at night. There is nothing to suggest within the Consultants' Report or Mr. Taylor's notes of the Oral Hearing that the consequences of introducing such a limit may not have been fully explored. However, the movement limit set out in Condition 5 (i.e. 65 movements at night) can be linked back to a constrained forecast underpinning the assessment work submitted to the Oral Hearing.

Appendix B – Overview of Runway Preference Scenarios considered within the Application

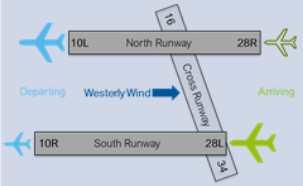
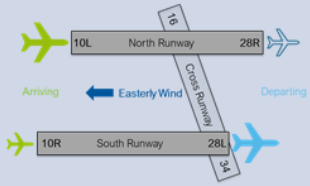
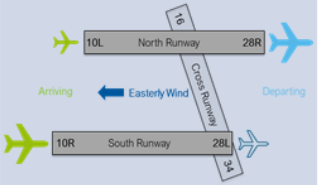
SCENARIO	DAY[1] – WESTERLY WINDS	DAY[1] – EASTERLY WINDS	NIGHT[2] – WESTERLY WINDS	NIGHT[2] – EASTERLY WINDS
SCENARIO 2 **Option 7b and South Runway Only between 0000 and 0559** **0700 to 2359:** When winds are westerly, Runway 28L shall be preferred for arriving aircraft. Either Runway 28L or 28R shall be used for departing aircraft as determined by air traffic control. When winds are easterly, either Runway 10L or 10R as determined by air traffic control shall be preferred for arriving aircraft. Runway 10R shall be preferred for departing aircraft. **2300 to 2359:** When winds are westerly, Runway 28L shall be preferred for arriving aircraft. Either Runway 28L or 28R shall be used for departing aircraft as determined by air traffic control. When winds are easterly, either Runway 10L or 10R as determined by air traffic control shall be preferred for arriving aircraft. Runway 10R shall be preferred for departing aircraft. **0000 to 0559:** Movements preferred on the South Runway only (single runway). **0600 to 0659:** When winds are westerly, Runway 28L shall be preferred for arriving aircraft. Either Runway 28L or 28R shall be used for departing aircraft as determined by air traffic control. When winds are easterly, either Runway 10L or 10R as determined by air traffic control shall be preferred for arriving aircraft. Runway 10R shall be preferred for departing aircraft	 WESTERLY – 07:00 to 22:59	 EASTERLY – 07:00 to 22:59	 WESTERLY – 23:00 to 23:59  WESTERLY – 00:00 to 05:59  WESTERLY – 06:00 to 06:59	 EASTERLY – 23:00 to 23:59  EASTERLY – 00:00 to 05:59  EASTERLY – 06:00 to 06:59

NOTES:
1. Day-time hours from 0700 to 2259
2. Night-time hours from 2300 to 0659
Scenario 6 represents the Forecast without New Measures scenario and was purposely excluded from this table
Mixed-Mode – both North Runway and South Runway can be used for arrivals and departures Segregated Mode – one runway is used for arrivals and the opposite runway is used for departures Single Runway – limit arrivals and departures to one runway
SOURCE: Bickerdike Allen Partners LLP, August 2020

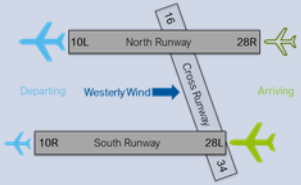
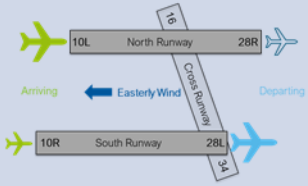
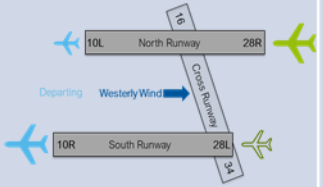
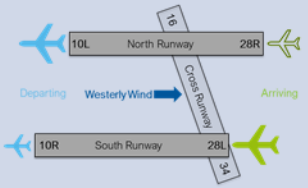
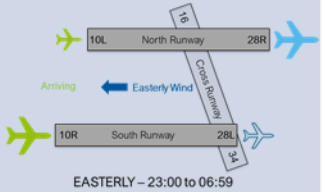
SCENARIO	DAY[1] – WESTERLY WINDS	DAY[1] – EASTERLY WINDS	NIGHT[2] – WESTERLY WINDS	NIGHT[2] – EASTERLY WINDS
SCENARIO 3 **Option 7b for 24-Hours** **24 hours:** When winds are westerly, Runway 28L shall be preferred for arriving aircraft. Either Runway 28L or 28R shall be used for departing aircraft as determined by air traffic control. When winds are easterly, either Runway 10L or 10R as determined by air traffic control shall be preferred for arriving aircraft. Runway 10R shall be preferred for departing aircraft.	 WESTERLY – 24 Hours	 EASTERLY – 24 Hours	 WESTERLY – 24 Hours	 EASTERLY – 24 Hours

NOTES:
1. Day-time hours from 0700 to 2259
2. Night-time hours from 2300 to 0659

Scenario 6 represents the Forecast without New Measures scenario and was purposely excluded from this table
Mixed-Mode – both North Runway and South Runway can be used for arrivals and departures Segregated Mode – one runway is used for arrivals and the opposite runway is used for departures Single Runway – limit arrivals and departures to one runway
SOURCE: Bickerdike Allen Partners LLP, August 2020

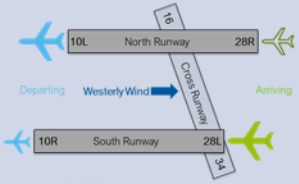
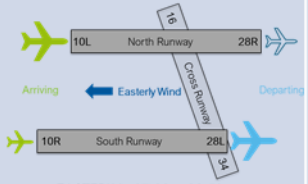
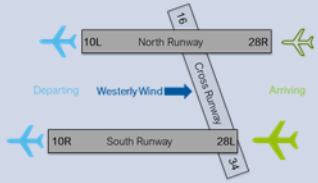
SCENARIO	DAY[1] – WESTERLY WINDS	DAY[1] – EASTERLY WINDS	NIGHT[2] – WESTERLY WINDS	NIGHT[2] – EASTERLY WINDS
SCENARIO 4 **Option 7b and Reverse Option 7b between 2300 and 0659** **0700 to 2259:** When winds are westerly, Runway 28L shall be preferred for arriving aircraft. Either Runway 28L or 28R shall be used for departing aircraft as determined by air traffic control. When winds are easterly, either Runway 10L or 10R as determined by air traffic control shall be preferred for arriving aircraft. Runway 10R shall be preferred for departing aircraft. **2300 to 0659:** When winds are westerly, Runway 28R shall be preferred for arriving aircraft. Either Runway 28L or 28R shall be used for departing aircraft as determined by air traffic control. When winds are easterly, either Runway 10L or 10R as determined by air traffic control shall be preferred for arriving aircraft. Runway 10L shall be preferred for departing aircraft.	 WESTERLY – 07:00 to 22:59	 EASTERLY – 07:00 to 22:59	 WESTERLY – 23:00 to 06:59	 EASTERLY – 23:00 to 06:59

NOTES:
1. Day-time hours from 0700 to 2259
2. Night-time hours from 2300 to 0659
Scenario 6 represents the Forecast without New Measures scenario and was purposely excluded from this table
Mixed-Mode – both North Runway and South Runway can be used for arrivals and departures Segregated Mode – one runway is used for arrivals and the opposite runway is used for departures Single Runway – limit arrivals and departures to one runway
SOURCE: Bickerdike Allen Partners LLP, August 2020

SCENARIO	DAY[1] – WESTERLY WINDS	DAY[1] – EASTERLY WINDS	NIGHT[2] – WESTERLY WINDS	NIGHT[2] – EASTERLY WINDS
SCENARIO 5 **Option 7b and Alternate Option 7b and Reverse Option 7b between 2300 and 0659** **0700 to 2259:** When winds are westerly, Runway 28L shall be preferred for arriving aircraft. Either Runway 28L or 28R shall be used for departing aircraft as determined by air traffic control. When winds are easterly, either Runway 10L or 10R as determined by air traffic control shall be preferred for arriving aircraft. Runway 10R shall be preferred for departing aircraft. **2300 to 0659:** Preferred arrival runway will alternate between North and South Runways while either Runway 28L or 28R shall be used for departing aircraft as determined by air traffic control in westerly and preferred departure runway will alternate between North and South Runways while either Runway 10L or 10R as determined by air traffic control shall be preferred for arriving aircraft in easterly wind conditions each day.	 WESTERLY – 07:00 to 22:59	 EASTERLY – 07:00 to 22:59	 WESTERLY – 23:00 to 06:59 OR Option 7b  WESTERLY – 23:00 to 06:59	 EASTERLY – 23:00 to 06:59 OR Option 7b  EASTERLY – 23:00 to 06:59

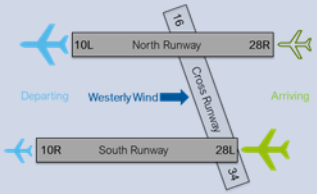
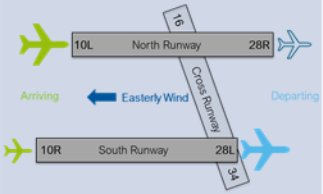
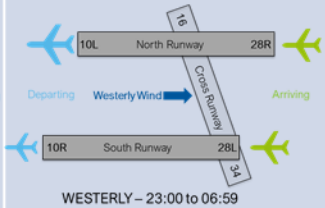
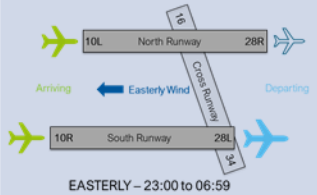
NOTES:
1. Day-time hours from 0700 to 2259
2. Night-time hours from 2300 to 0659

Scenario 6 represents the Forecast without New Measures scenario and was purposely excluded from this table
Mixed-Mode – both North Runway and South Runway can be used for arrivals and departures Segregated Mode – one runway is used for arrivals and the opposite runway is used for departures Single Runway – limit arrivals and departures to one runway
SOURCE: Bickerdike Allen Partners LLP, August 2020

SCENARIO	DAY[1] – WESTERLY WINDS	DAY[1] – EASTERLY WINDS	NIGHT[2] – WESTERLY WINDS	NIGHT[2] – EASTERLY WINDS
SCENARIO 7 **Option 7b and Semi-Mixed Mode – Mixed Mode for Departures and Option 7b for Arrivals between 2300 and 0659** **0700 to 2259:** When winds are westerly, Runway 28L shall be preferred for arriving aircraft. Either Runway 28L or 28R shall be used for departing aircraft as determined by air traffic control. When winds are easterly, either Runway 10L or 10R as determined by air traffic control shall be preferred for arriving aircraft. Runway 10R shall be preferred for departing aircraft. **2300 to 0659:** Both North and South Runways available for departures (runway used depends on whether turn to the north or south is required based on destination); prefer arrivals landing on the South Runway in westerly conditions and the North Runway in easterly conditions unless this exceeds the single-runway capacity for a given hour. If single-runway capacity is exceeded, then arrivals are moved to the other runway.	 WESTERLY – 07:00 to 22:59	 EASTERLY – 07:00 to 22:59	 WESTERLY – 23:00 to 06:59	

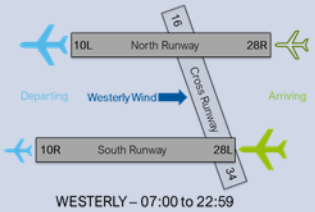
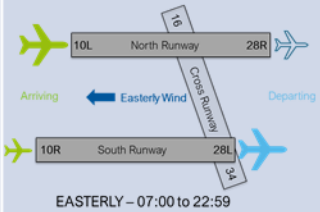
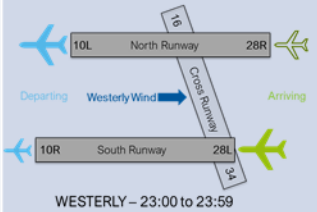
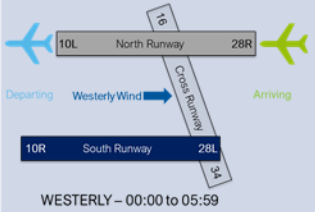
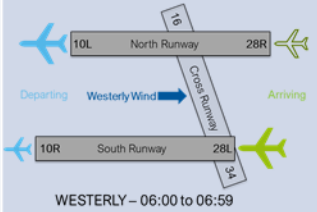
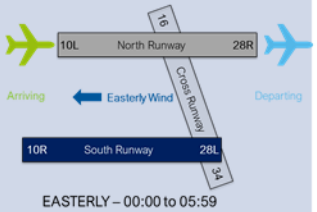
NOTES:
1. Day-time hours from 0700 to 2259
2. Night-time hours from 2300 to 0659

Scenario 6 represents the Forecast without New Measures scenario and was purposely excluded from this table
Mixed-Mode – both North Runway and South Runway can be used for arrivals and departures Segregated Mode – one runway is used for arrivals and the opposite runway is used for departures Single Runway – limit arrivals and departures to one runway
SOURCE: Bickerdike Allen Partners LLP, August 2020

SCENARIO	DAY – WESTERLY WINDS	DAY – EASTERLY WINDS	NIGHT – WESTERLY WINDS	NIGHT – EASTERLY WINDS
SCENARIO 8 **Option 7b and Semi-Mixed Mode – Mixed Mode for Arrivals and Option 7b for Departures between 2300 and 0659** **0700 to 2259:** When winds are westerly, Runway 28L shall be preferred for arriving aircraft. Either Runway 28L or 28R shall be used for departing aircraft as determined by air traffic control. When winds are easterly, either Runway 10L or 10R as determined by air traffic control shall be preferred for arriving aircraft. Runway 10R shall be preferred for departing aircraft **2300 to 0659:** Both North and South Runways available for arrivals (assumed 50/50 split); prefer departures take off on the North Runway in westerly conditions and the South Runway in easterly conditions.	 WESTERLY – 07:00 to 22:59	 EASTERLY – 07:00 to 22:59	 WESTERLY – 23:00 to 06:59	 EASTERLY – 23:00 to 06:59

NOTES:
1. Day-time hours from 0700 to 2259
2. Night-time hours from 2300 to 0659

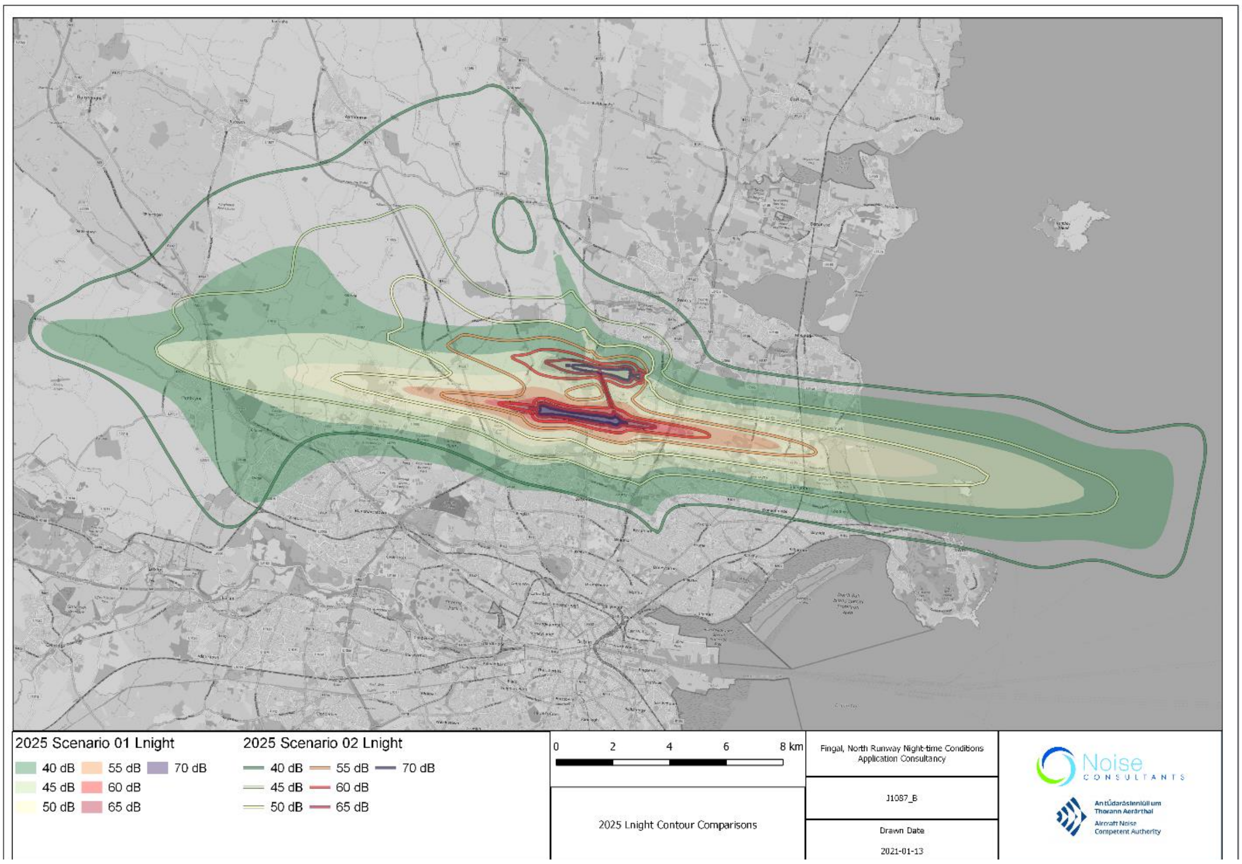
Scenario 6 represents the Forecast without New Measures scenario and was purposely excluded from this table
Mixed-Mode – both North Runway and South Runway can be used for arrivals and departures Segregated Mode – one runway is used for arrivals and the opposite runway is used for departures Single Runway – limit arrivals and departures to one runway
SOURCE: Bickerdike Allen Partners LLP, August 2020

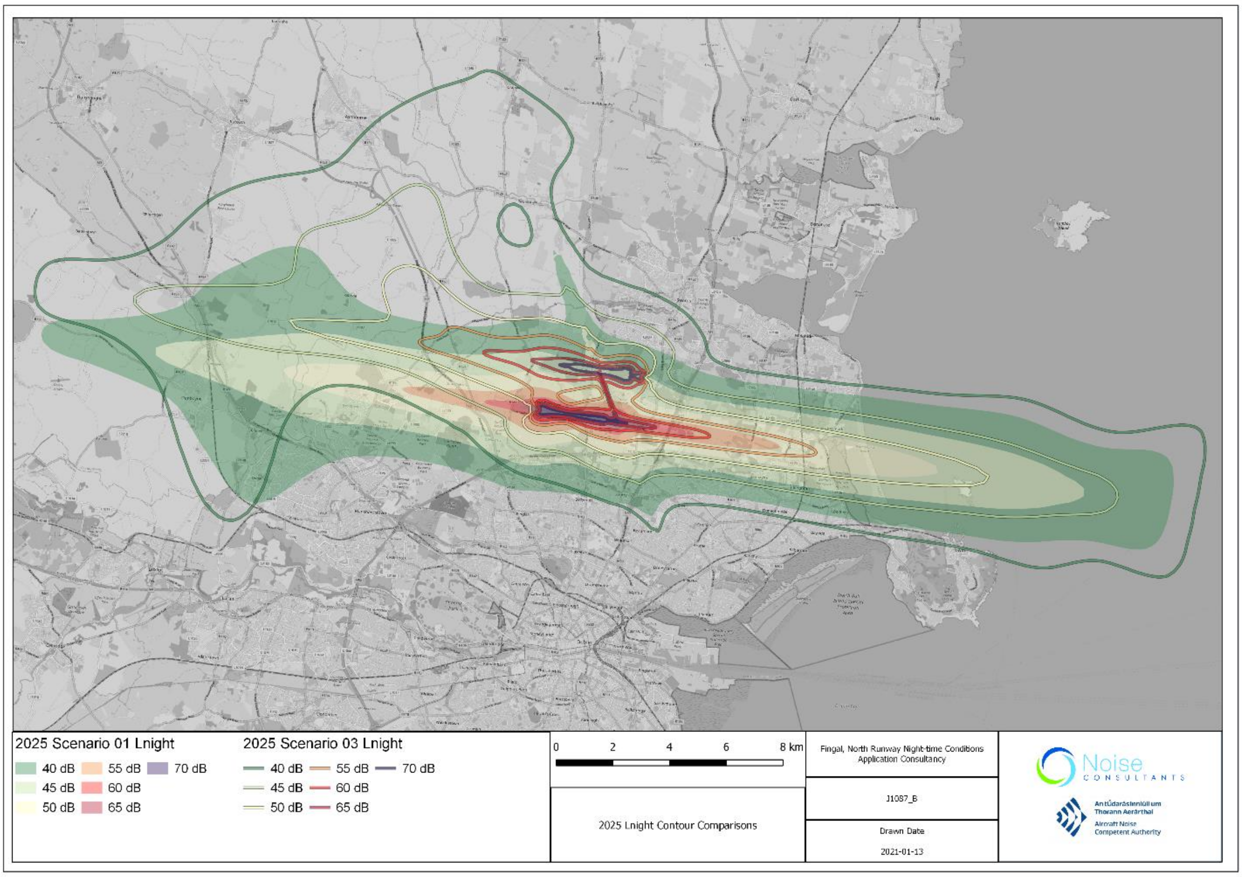
SCENARIO	DAY[1] – WESTERLY WINDS	DAY[1] – EASTERLY WINDS	NIGHT[2] – WESTERLY WINDS	NIGHT[2] – EASTERLY WINDS
SCENARIO 9 **Option 7b and North Runway Only between 0000 and 0559** **0600 to 2359:** When winds are westerly, Runway 28L shall be preferred for arriving aircraft. Either Runway 28L or 28R shall be used for departing aircraft as determined by air traffic control. When winds are easterly, either Runway 10L or 10R as determined by air traffic control shall be preferred for arriving aircraft. Runway 10R shall be preferred for departing aircraft. **2300 to 2359:** When winds are westerly, Runway 28L shall be preferred for arriving aircraft. Either Runway 28L or 28R shall be used for departing aircraft as determined by air traffic control. When winds are easterly, either Runway 10L or 10R as determined by air traffic control shall be preferred for arriving aircraft. Runway 10R shall be preferred for departing aircraft. **0000 to 0559:** Movements preferred on the North Runway only (single runway). **0600 to 0659:** When winds are westerly, Runway 28L shall be preferred for arriving aircraft. Either Runway 28L or 28R shall be used for departing aircraft as determined by air traffic control. When winds are easterly, either Runway 10L or 10R as determined by air traffic control shall be preferred for arriving aircraft. Runway 10R shall be preferred for departing aircraft	 WESTERLY – 07:00 to 22:59	 EASTERLY – 07:00 to 22:59	 WESTERLY – 23:00 to 23:59  WESTERLY – 00:00 to 05:59  WESTERLY – 06:00 to 06:59	 EASTERLY – 00:00 to 05:59

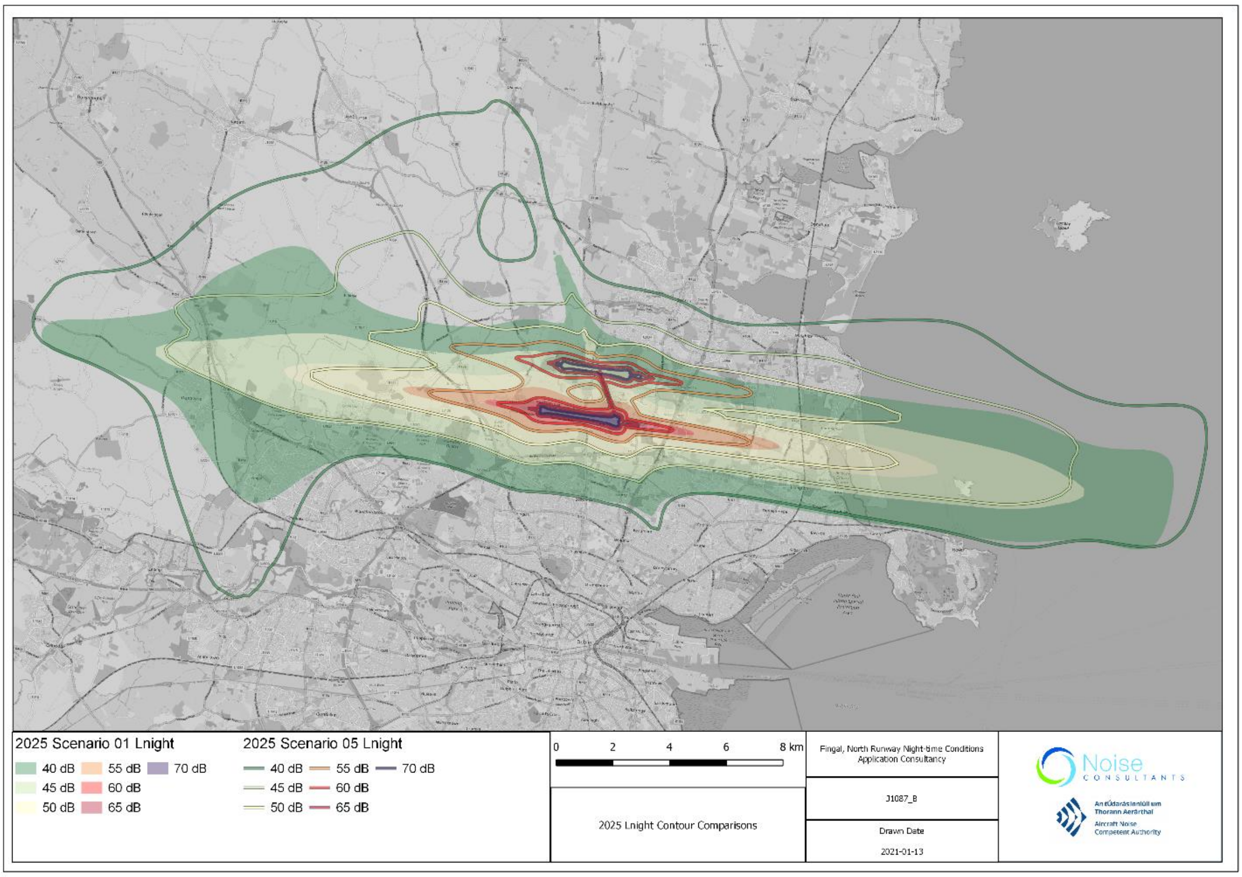
NOTES:
1. Day-time hours from 0700 to 2259
2. Night-time hours from 2300 to 0659

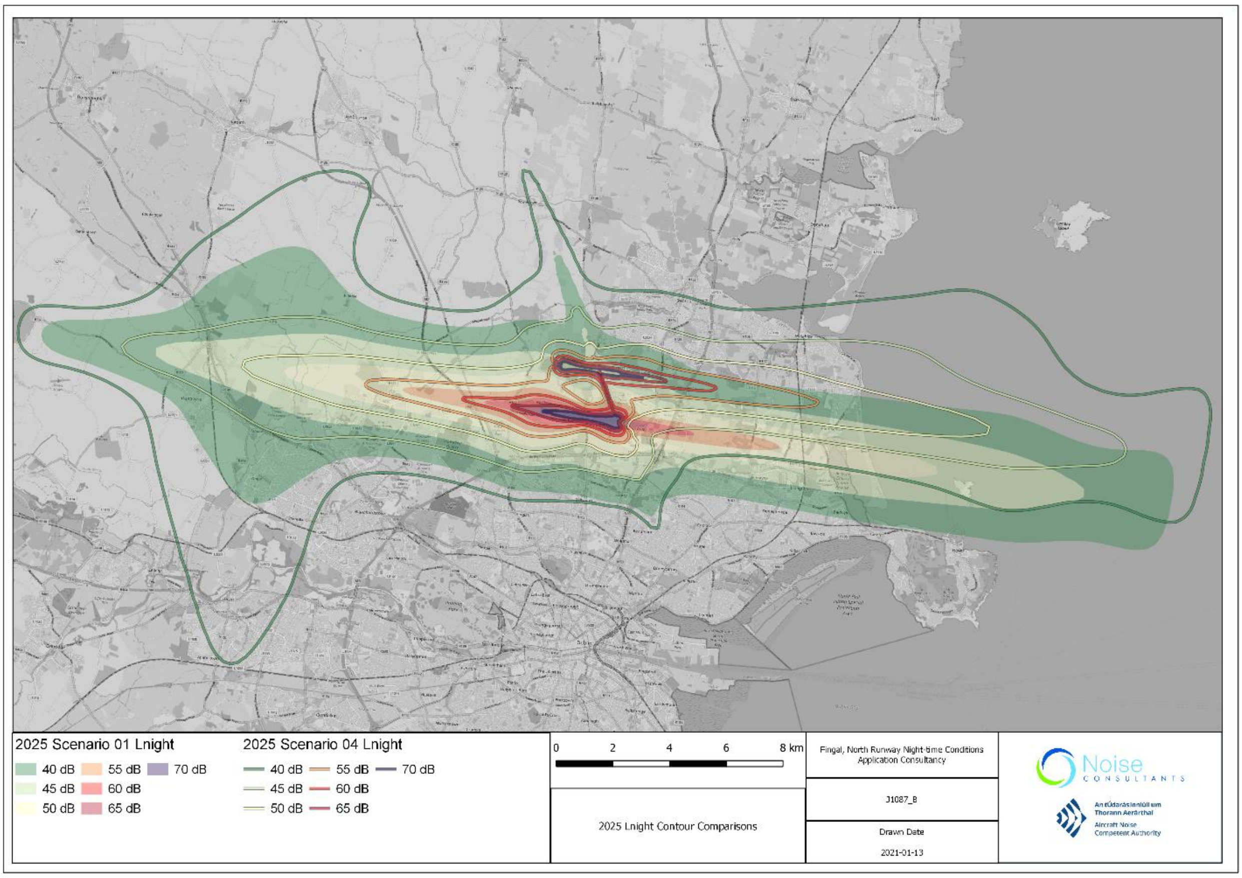
Scenario 6 represents the Forecast without New Measures scenario and was purposely excluded from this table
Mixed-Mode – both North Runway and South Runway can be used for arrivals and departures Segregated Mode – one runway is used for arrivals and the opposite runway is used for departures Single Runway – limit arrivals and departures to one runway
SOURCE: Bickerdike Allen Partners LLP, August 2020

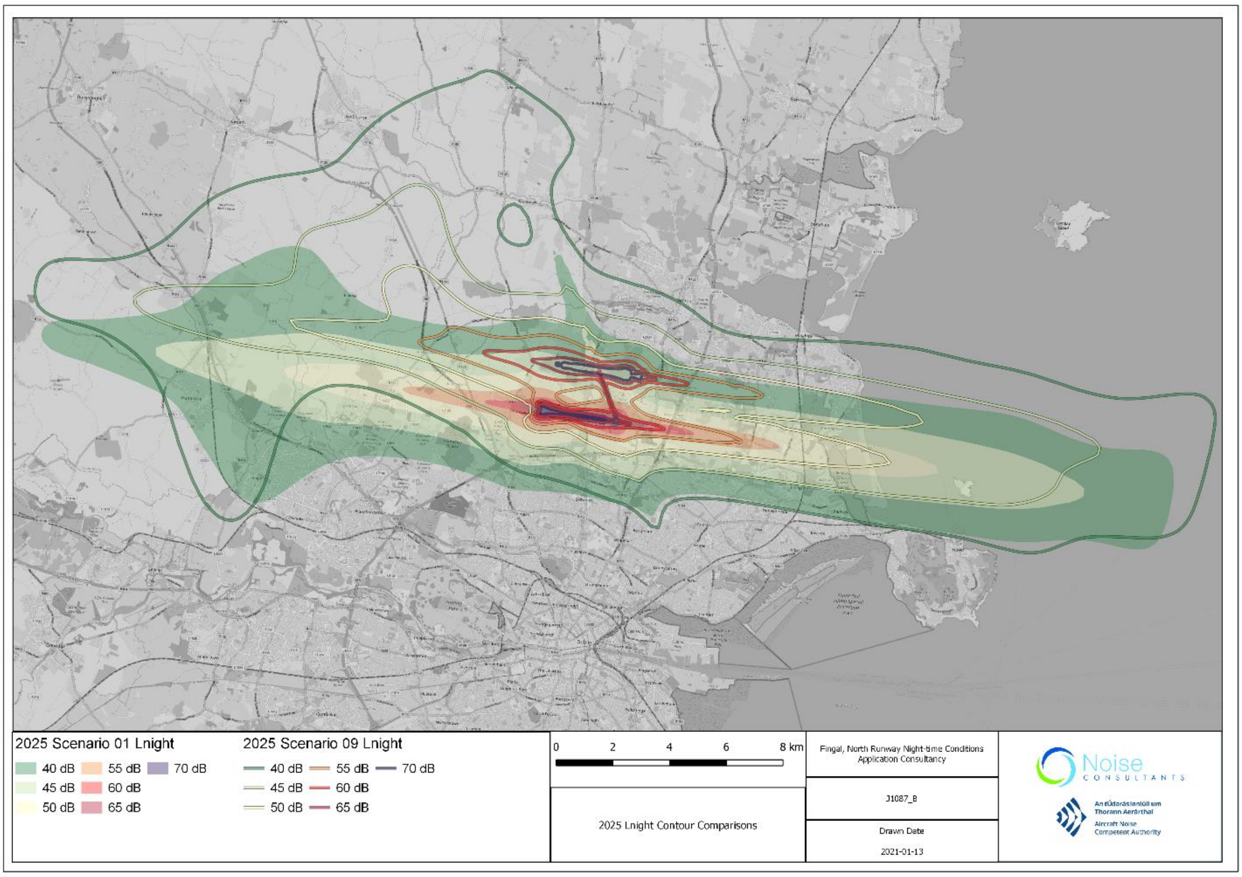
Appendix C – Night-time Noise Contour Comparisons


2025 Scenario 01 Lnight
40 dB
45 dB
50 dB
55 dB
60 dB
65 dB
70 dB
2025 Scenario 02 Lnight
40 dB
45 dB
50 dB
55 dB
60 dB
65 dB
70 dB
0 2 4 6 8 km
Fingal, North Runway Night-time Conditions Application Consultancy
J1087_B
2025 Lnight Contour Comparisons
Drawn Date
2021-01-13
Noise CONSULTANTS
Aircraft Noise Competent Authority


2025 Scenario 01 Lnight
40 dB
45 dB
50 dB
55 dB
60 dB
65 dB
70 dB
2025 Scenario 03 Lnight
40 dB
45 dB
50 dB
55 dB
60 dB
65 dB
70 dB
0 2 4 6 8 km
Fingal, North Runway Night-time Conditions Application Consultancy
J1087_B
2025 Lnight Contour Comparisons
Drawn Date
2021-01-13
Noise CONSULTANTS
Aircraft Noise Competent Authority


2025 Scenario 01 Lnight
40 dB
45 dB
50 dB
55 dB
60 dB
65 dB
70 dB
2025 Scenario 05 Lnight
40 dB
45 dB
50 dB
55 dB
60 dB
65 dB
70 dB
0 2 4 6 8 km
Fingal, North Runway Night-time Conditions Application Consultancy
J1087_B
Drawn Date
2021-01-13
2025 Lnight Contour Comparisons
Noise CONSULTANTS
Aircraft Noise Competent Authority


2025 Scenario 01 Lnight
40 dB
45 dB
50 dB
55 dB
60 dB
65 dB
70 dB
2025 Scenario 04 Lnight
40 dB
45 dB
50 dB
55 dB
60 dB
65 dB
70 dB
0 2 4 6 8 km
Fingal, North Runway Night-time Conditions Application Consultancy
J1087_B
Drawn Date
2021-01-13
2025 Lnight Contour Comparisons
Noise CONSULTANTS
Aircraft Noise Competent Authority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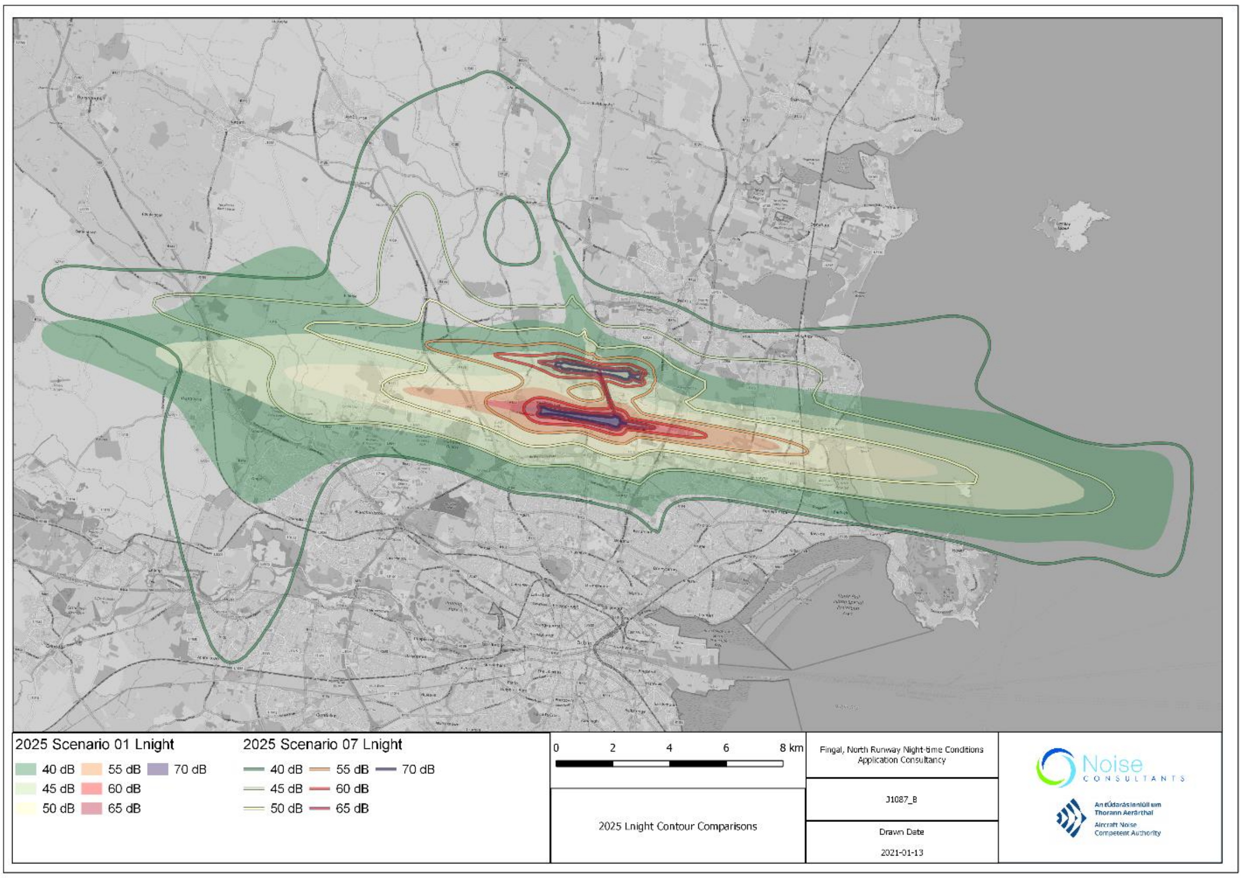
40 dB
45 dB
50 dB
55 dB
60 dB
65 dB
70 dB
2025 Scenario 09 Lnight
40 dB
45 dB
50 dB
55 dB
60 dB
65 dB
70 dB
0 2 4 6 8 km
Fingal, North Runway Night-time Conditions Application Consultancy
J1087_B
Drawn Date
2021-01-13
2025 Lnight Contour Comparisons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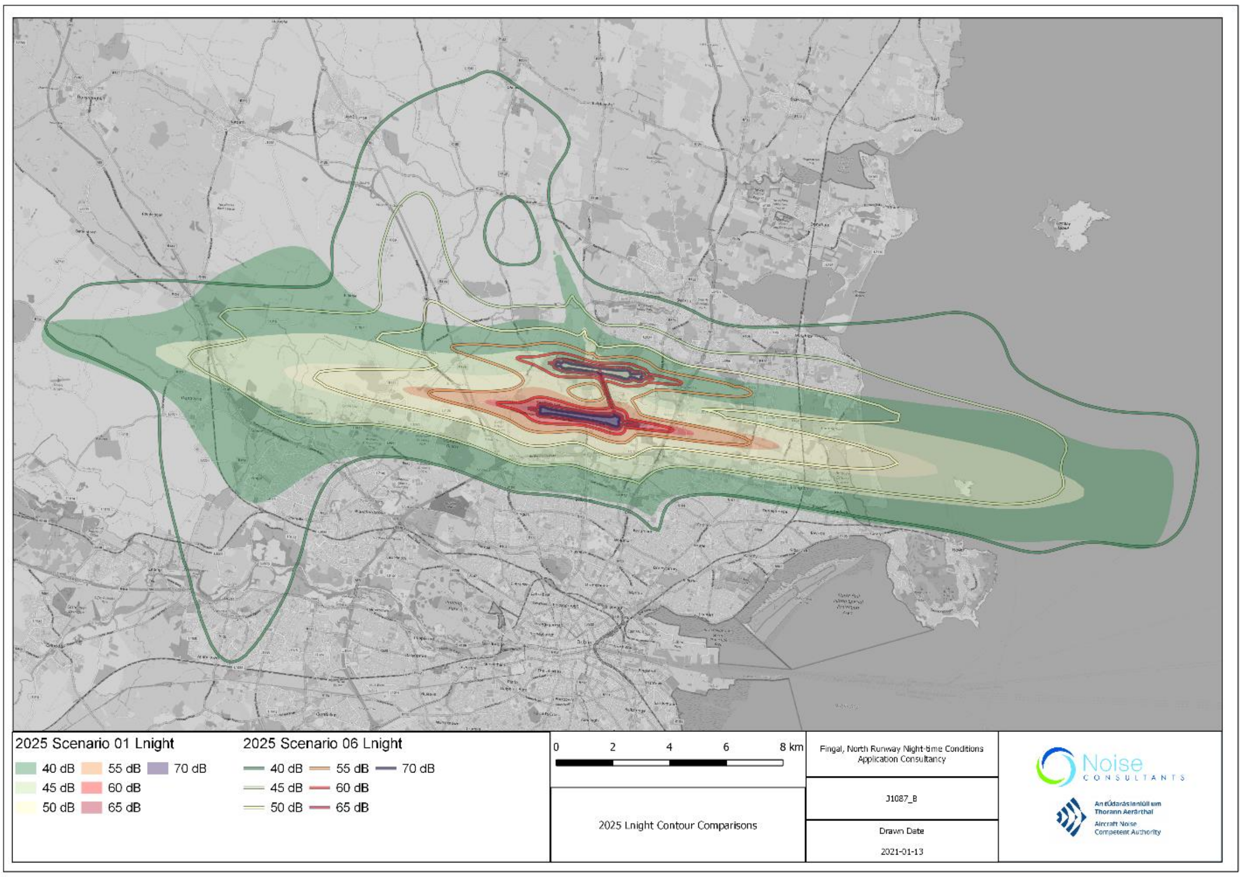
40 dB
45 dB
50 dB
55 dB
60 dB
65 dB
70 dB
2025 Scenario 07 Lnight
40 dB
45 dB
50 dB
55 dB
60 dB
65 dB
70 dB
0 2 4 6 8 km
Fingal, North Runway Night-time Conditions Application Consultancy
J1087_B
Drawn Date
2021-01-13
2025 Lnight Contour Comparisons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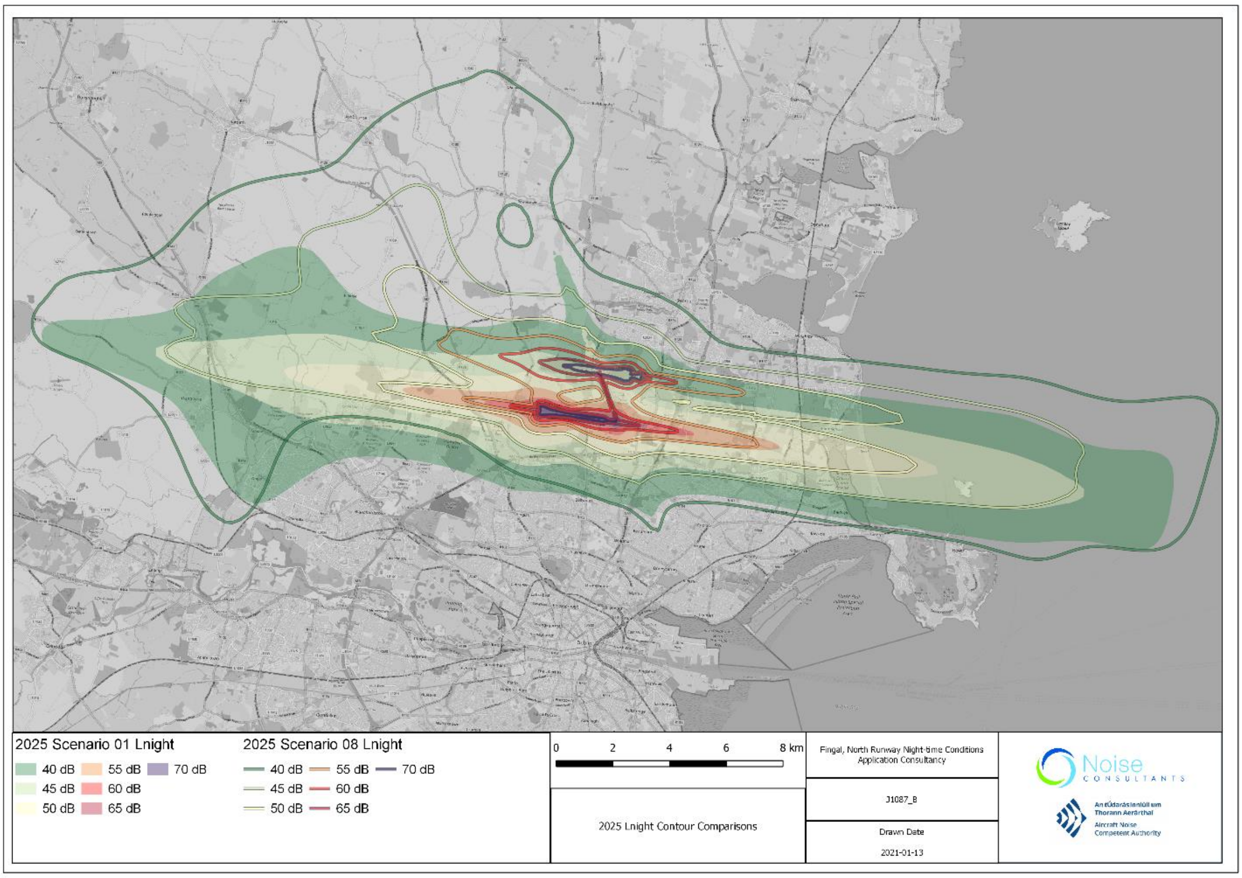
40 dB
45 dB
50 dB
55 dB
60 dB
65 dB
70 dB
2025 Scenario 06 Lnight
40 dB
45 dB
50 dB
55 dB
60 dB
65 dB
70 dB
0 2 4 6 8 km
Fingal, North Runway Night-time Conditions Application Consultancy
J1087_B
2025 Lnight Contour Comparisons
Drawn Date
2021-01-13
Noise CONSULTANTS
Aircraft Noise Competent Authority


2025 Scenario 01 Lnight
40 dB
45 dB
50 dB
55 dB
60 dB
65 dB
70 dB
2025 Scenario 08 Lnight
40 dB
45 dB
50 dB
55 dB
60 dB
65 dB
70 dB
0 2 4 6 8 km
Fingal, North Runway Night-time Conditions Application Consultancy
J1087_B
2025 Lnight Contour Comparisons
Drawn Date
2021-01-13
Noise CONSULTANTS
Aircraft Noise Competent Authority

Appendix D – ANCA Airport Noise Information Reporting Template and Guidance

An tÚdarás Inniúil um Thorann Aerárthaí

Aircraft Noise Competent Authority

Aircraft Noise Information Reporting under The Airport Noise (Dublin Airport) Regulation Act 2019

Draft Version 2

May 2020

Draft Data Request Templates

These data request templates have been prepared by ANCA to support the 'Process of Aircraft Noise Regulation' as defined in Part 2, Section 9 of the Aircraft Noise (Dublin Airport) Regulation Act 2019 ('the Act', S.I. No. 12 of 2019) for which ANCA is the Competent Authority.

These data request templates focus specifically on information required to enable ANCA to determine the noise situation, clarify any noise problem, and begin the process of setting a Noise Abatement Objective (NAO) (if necessary) for Dublin Airport as well as facilitating the reporting of information as part of the process.

1. Preliminary Information

Preliminary information is requested to assist ANCA in understanding the potential changes to aircraft operations resulting from the application. For all development proposals, ANCA requests that information is provided to indicate whether the development would result in:

a. Additional stand capacity	If so: - How many stands and what aircraft can these accommodate? - Can information be provided in relation to the use of the stands?
b. Additional aircraft capacity / movements	If so: - What additional capacity would be generated above and beyond either the operational capacity and/or any existing restrictions on airport movements? - When would the additional capacity be used? i.e. what slots would be generated?
c. Change in Fleet Mix at the Airport	i.e. does the change result in a change in the proportion of various aircraft types operating at the airport
d. Rate of growth	i.e. does the change facilitate accelerated growth of aircraft operations? If so, growth forecasts in terms of ATMs and Passengers should be provided.
e. Change in the use of the Airport's runways	If the proposals result in a change in the use of the airport's existing runways then information regarding the proposed operating pattern should be provided alongside a baseline position.
f. Use or location of airspace	If the proposals result in a change in the use of the airport's existing airspace then information regarding the proposed operating pattern should be provided alongside a baseline position.

Responses to the above should be accompanied by data provided, where possible, using the 'Scenarios' and 'FleetMove', and 'ManagementMeasures' tabs within the data reporting template. A qualitative description of the development should be provided against each of the considerations (a – f) above to support ANCA in determine whether any aspect of the development relation to noise may arise from its operation.

2. Noise Situation and Forecasts

ANCA requires information that describes the noise situation taking into account relevant context namely existing consents and restriction. For development proposals, ANCA requires forecasts to be provided help determine whether any noise problem currently exists or would arise from the carrying out of the development as proposed.

Under the Act, ANCA has defined:

- a 'situation' to represent the historic, current and future noise conditions that would prevail in the absence of development or changes to the existing consents.
- a 'forecast without new measures' to represent the situation which would prevail as a result of development proposals but without any noise-related action. This should be representative of an unconstrained / unrestrictive operation.
- a 'forecast including additional measures' to represent the noise conditions that would arise from any development proposals inclusive of specific or combinations of noise mitigation measures.

ANCA urges the Applicant to provide information presenting both forecasts scenarios i.e. including and excluding measures. These measures shall include all noise mitigation and other noise-related action including within the Applicants development proposals or are in the pipeline.

At this time (April 2020), ANCA's current view of the noise situation at Dublin Airport is set out in Table 1 below.

All situations and forecasts should be provided with a 'Scenario ID' and described in the 'Scenarios' tab of the data reporting template. The 'Scenarios' tab allows for high level descriptions of the scenarios to be reported including whether the scenario can be considered a 'situation' or 'forecast' based on the descriptions outlined above.

All noise management measures which form part of the scenarios should be reported within the 'ManagementMeasures' tab. This should be completed to provide detail either within the reporting template itself or through references to external information / documentation. These have been presented with respect to the categories of noise management as defined within the ICAO 'Balanced Approach' and within Annex I of Regulation (EU) No. 598/2014.

Where possible, information describing the diurnal pattern of aircraft movements should be provided for each 'ScenarioID' within the 'Diurnal' tab of the reporting template. The 'Diurnal' tab allows information to be presented for an annual average (i.e. over a whole year) as well as the peak summer season. The 'Diurnal' tab also includes the provision for reporting aircraft noise quotas by each hour of the night. Where aircraft noise quotas are reported these should be calculated using the latest aircraft quota counts as reported by NATS and the UK Civil Aviation Authority (UK CAA)[1] .

[1] Available here: https://www.aurora.nats.co.uk/htmlAIP/Publications/2019-03-31/html/eSUP/EG-eSUP-2019-012-en-GB.html

2.1 Noise Situation

ANCA consider the following scenarios presented in Table 1 to describe the noise situation with respect to the process of noise regulation under the Act.

Table 1 – Scenarios Describing the Situation at Dublin Airport

Index	Noise Situation	Description	Rationale
A	Consented Situation	A scenario which describes the impact consented at the Oral Hearing for the North Runway.	To identify the impact that was consented following the North Runway Oral Hearing. The EIS indicated this was 2025, with 310k movements, and 38M passengers with average growth. It is understood that the operating restrictions attached to the North Runway Consent were not assessed. This point was made by daa at the Meeting. This situation would therefore provide a contextual understanding of the noise impact associated with the consent based on the information submitted to the Oral Hearing.
B	Current Situation	The situation in 2018/19	To understand the noise impact of the Airport at this moment in time with the airport operating in its current form and with the passenger capacity restrictions in place.
C	Pre-North Runway Operation	The situation in 2021/2 immediately before the opening and operation of the new North Runway	To understand how the noise impact of the Airport will change from now and to before the North Runway comes into operation with the passenger capacity restrictions in place.
D	Current Consented North Runway Operation upon Opening	The situation immediately after the opening and operation and the North Runway	To understand what would happen in the year following the opening of the North Runway with the Airport operating in line with its current consents, including the passenger capacity restriction.
E	Future Forecast North Runway Operation	A situation in the future following the growth of airport operations as forecast by the Airport's masterplan.	This situation provides an understanding of the noise impact associated with a mature operation taking into account the current consents, including the passenger capacity restriction.

2.2 Forecasts

ANCA strongly advises the Applicant to provide forecasts of its development proposals with and without new measures.

It should be noted that under the Act all measures available are to be identified, including operating restrictions, and the likely cost-effectiveness of the identified measured is to be thoroughly evaluated, including environmental sustainability and any interdependencies between noise and emissions as per Annex II of Regulation 598/2014.

3. Noise Exposure and Effects Information to be Provided for Current Situations and Forecasts

For each situation and forecast scenario, the following information is requested for aircraft noise resulting from take-offs and landings. This information should be reported within the 'Area', 'Dwellings', 'People' and 'Health' tabs by 'Scenario'.

For the reporting of 'Dwellings' and 'People', existing dwellings and populations should be reported alongside estimates for future dwellings and populations reported against the fields prefixed 'Fut'. These should include all forecast population growth and consented developments which are likely to affect future forecast noise exposure. The future reporting elements are split into three sub-classes, of "FutOcc", "FutCon", and "FutZon", for newly Occupied dwellings, Consented developments and Zoned lands respectively. This is considered appropriate as the first represents completed and occupied dwellings since the baseline situation, the second represents post consent developments which may be expected to proceed, and the third represents pre-consented areas around the airport which would need to be addressed in light of the local land use management and planning policy in place at the relevant time of an application.

3.1 Noise Exposure Information

- Strategic noise maps for the following noise indicators and noise levels:
  - L_{den} for 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, **≥** 75 dB
  - L_{night} for 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, **≥** 70 dB
  - $L_{Aeq,\ 16hr}$ for 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, **≥** 75 dB

  NOTEs: 1) L_{den} and L_{night} are annual average, $L_{Aeq,\ 16hr}$ is average 92-day summer day
  2) All results are to be delivered as both grid points and noise level contour polygons
  3) All results are to be delivered as maps in PDF format

- Assessment of noise exposure, in 1 dB bands, due to airport operations in terms of:
  - Area (km^2);
  - Number of dwellings;
    - Including dwellings with insulation against noise i.e. those with insulation already in place;
    - Including dwellings within voluntary residential purchase scheme;
    - Including dwellings within voluntary residential noise insulation scheme;
  - Number of people living in dwellings;
    - Including people living in dwellings with insulation against noise i.e. those with insulation already in place;
    - Including people living in dwellings within voluntary residential purchase scheme;
    - Including people living in dwellings within voluntary residential noise insulation scheme;
  - Number of non-residential noise-sensitive receptors;
    - Including, as a minimum, the number of schools and hospitals;
    - Including schools within the voluntary school insulation scheme.

  NOTE: When considering any forecasts, areas of land zoned for future residential use should be included within the assessment, in addition to any approved and/or under construction residential developments must be accounted for within the analysis.

- Noise level difference maps comparing the existing situation with each potential future scenario in 1 dB noise level change bands:
  - L_{den};
  - L_{night};
  - $L_{Aeq,\ 16hr}$;
  - Area (km^2);

- Number of dwellings;
    - Including dwellings with insulation against noise i.e. dwellings with approved scheme insulation already in place;
    - Including dwellings within voluntary residential purchase scheme;
    - Including dwellings within voluntary residential noise insulation scheme;
- Number of people living in dwellings;
    - Including people living in dwellings with insulation against noise i.e. those with approved scheme insulation already in place;
    - Including people living in dwellings within voluntary residential purchase scheme;
    - Including people living in dwellings within voluntary residential noise insulation scheme;
- Number of non-residential noise-sensitive receptors;
    - Including, as a minimum, the number of schools and hospitals;
    - Including schools within the voluntary school insulation scheme.

NOTE: When considering any forecasts, areas of land zoned for future residential use should be included within the assessment, in addition to any approved and/or under construction residential developments must be accounted for within the analysis.

daa are invited to provide further, objective measures, using the following or derivations of, for example:

- L_{day};
- $L_{evening}$;
- L_{Amax}; and
- SEL

Noise exposure data should be provided in a digital format. All noise contours and noise level grids should be provided in a GIS format within the WGS84 or ETRS89 projection systems.

3.2 Noise Effects Data

Using the noise exposure data, the effects information should be provided:

- Assessment of any significant effects of noise on sensitive receptors;
- Assessment of harmful effects due to long term exposure to noise from airport operations, including:
    - Number of people living in dwellings highly annoyed;
    - Number of people living in dwellings highly sleep disturbed;
    - Sub-totals per Electoral Division
        - Where effects are to be reported per Electoral Division, this should be achieved by prefixing the elements presented in the 'Health' tab to report designators for the Electoral Divisions.
- Assessment of costs of noise exposure, including:
    - Costs of annoyance;
    - Costs of health.

When considering any forecasts, areas of land zoned for future residential use should be included within the assessment, in addition to any approved and/or under construction residential developments must be accounted for within the analysis. These future reporting elements are split into three sub-classes, of "FutOcc", "FutCon", and "FutZon", for newly Occupied dwellings, Consented developments and Zoned lands respectively. The costs of noise exposure on health should ideally be monetised.

The Applicant is advised, as a minimum, to have regard for the relevant guidance documents when preparing noise effects data.

- WHO Community Noise Guidelines 1999 – WHO CNG 1999;
- WHO Night Noise Guidelines 2009 – WHO NNG 2009;

- WHO Environmental Noise Guidelines 2018 – WHO ENG 2018;
- EEA Good practice guide on noise exposure and potential health effects, Technical report No 11/2010 – EEA 2010
- CAA CAP1506: Survey of noise attitudes 2014: Aircraft - SONA 2014
- EPA Guidance Note for Strategic Noise Mapping, Version 2, August 2011;
- EPA Guidance Note for Strategic Noise Mapping, Revised Section 10: Methodology for Exposure Assessment – Post Processing and Analysis, October 2017;
- EPA Guidelines on the Information to be Contained in Environmental Impact Assessment Reports, Draft, August 2017;
- Appropriate Assessment of Plans & Projects – Guidance for Planning Authorities (2009) DoEHLG.

4. Data to be Reported

A summary of data to be reported by Dublin Airport Authority is set out in Table 2.

Table 2: Information to be reported by daa

ID	Title	Contents / Minimum Requirements
1	Noise Levels ESRI Shapefiles Points	Air noise level results in ESRI Shapefile Point format
2	Noise Levels ESRI Shapefile Polygons	Air noise level results in ESRI Shapefile Polygon format
3	Noise Levels PDF Maps	Air noise level results presented as PDF format graphical maps
4	Exposure Statistics	Air noise area, dwelling & people exposure statistics spreadsheet
5	Noise Modelling Report	See Section 4.5 for minimum requirements
6	Population and Demographic Methodology Report	See Section 4.6 for requirements
7	Exposure and Effects Methodology Report	See Section 4.7 for requirements
8	Noise Mitigation Feasibility Report	See Section 4.8 for requirements
9	Metadata	Metadata files providing information on each of the reports

Set out below is detailed requirements for each of the reports to be read in conjunction with accompanying template files, where relevant.

4.1 Noise Level ESRI Shapefiles Points

Based upon the results of the noise level calculations the results are to be delivered as 10m Grid points in ESRI Shapefile Point format in WGS84 or ETRS89 projection.

The Shapefile format was developed by ESRI and although it is a proprietary format, it has open documentation and has become a de facto standard supported by all the leading commercial noise mapping software systems, and most commercial and open source GIS software packages.

What is referred to as a "Shapefile" is actually a set of several files. Four individual files are mandatory to store the core data that comprises a Shapefile ("<a>.shp", "<a>.prj", "<a>.dbf" and "<a>.shx"; <a> being the file name, which should be the same for all the files). If only the single ".shp" file is provided this file cannot be used for any purpose, as it is incomplete for distribution. The other three supporting files are required.

Shapefiles can either contain point, polyline or polygon data, however only one type of data may be stored within a single Shapefile. The noise level grid points can be exported to Shapefile Point files, noise contour lines can be exported to Shapefile Polyline format, and noise contour bands can be exported to Shapefile Polygon format files.

The Shapefiles of noise level grid results to be provided are shown in Table 3. The noise level results grids should be exported without any processing of the noise levels, such that the calculated noise levels for each grid point are exported as is. Noise calculations should be undertaken on a grid resolution of 50m x 50m or at a more refined resolution.

Each Shapefile should be accompanied by the corresponding metadata. More information on metadata for spatial files is detailed in Section 4.9 below.

Should any other noise indictors and metrics be provided then the same format should be applied.

Table 3: Minimum of 50m noise level grids for each scenario

Scenario	Indicator	Name of the ESRI Shapefile Point file
*[ScenarioID]_[Scenario]_[Year]*_Grid	L_{den}	*[ScenarioID}_[Scenario]_[Year]*_Grid_Lden_*[Version]*
	L_{night}	*[ScenarioID}_[Scenario]_[Year]*_Grid_Lngt_*[Version]*
	$L_{Aeq,16hr}$	*[ScenarioID}_[Scenario]_[Year]*_Grid_LA16_*[Version]*
	L_{day}	*[ScenarioID}_[Scenario]_[Year]*_Grid_Lday_*[Version]*
	$L_{evening}$	*[ScenarioID}_[Scenario]_[Year]*_Grid_Leve_*[Version]*
	L_{Amax}	*[ScenarioID}_[Scenario]_[Year]*_Grid_Lmax_*[Version]*
	L_{SEL}	*[ScenarioID}_[Scenario]_[Year]*_Grid_LSEL_*[Version]*

NOTE: In line with Annex I of Directive 2002/49/EC daa are invited to provide results for the supplementary indicators L_{day}, $L_{evening}$, L_{Amax} and SEL

Table 4: Attribute table for ESRI Shapefile Point files

ScenarioID (SCENARIOID)	Integer (4)
Scenario (SCENARIO)	Text (10)
Year (YEAR)	Integer (4)
Indicator (IND)	Text (10)
Level (DB)	Float (6, 2)

4.2 Noise Level ESRI Shapefiles Points

Based upon the results of the noise level calculation grids the noise mapping software is able to run an interpolation process to generate noise level contours, which may be presented in 1 dB(A) wide noise level bands described by polygon objects. These results are to be delivered as polygon objects in ESRI Shapefile Polygon format in WGS84 projection.

The noise contour polygons should be exported for the following noise indicators and noise level bands:

- L_{den} for 45 to ≥ 75 dB
- L_{night} for 40 to ≥ 70 dB
- $L_{Aeq,\ 16hr}$ for 45 to ≥ 75 dB
- L_{day} for 45 to ≥ 75 dB
- $L_{evening}$ for 45 to ≥ 70 dB

Delivery of 1 dB contour polygons will enable maps to be drawn up at 1 dB, 3 dB or 5 dB intervals as may be appropriate for various different views on the data.

The Shapefiles of noise contour bands to be provided are shown in Table 5.

Each Shapefile file should be accompanied by the corresponding metadata. More information on metadata for spatial files is detailed in Section 4.9 below.

Should any other noise indictors and metrics be provided then the same format should be applied.

Table 5: Noise contour bands for each scenario

Noise source	Indicator	Name of the ESRI Shapefile Polygon file
*[ScenarioID]_[Scenario]_[Year]*_Polygon	L_{den}	*[ScenarioID]_[Scenario]_[Year]*_Polygon_Lden_*[Version]*
	L_{night}	*[ScenarioID]_ [Scenario]_[Year]*_Polygon_Lngt_*[Version]*
	$L_{Aeq,16hr}$	*[ScenarioID]_ [Scenario]_[Year]*_Polygon_LA16_*[Version]*
	L_{day}	*[ScenarioID]_ [Scenario]_[Year]*_Polygon_Lday_*[Version]*
	$L_{evening}$	*[ScenarioID]_ [Scenario]_[Year]*_Polygon_Leve_*[Version]*

NOTE: In line with Annex I of Directive 2002/49/EC daa are invited to provide results for the supplementary indicators L_{day}, $L_{evening}$

Table 6: Attribute table for ESRI Shapefile Polygon files

ScenarioID (SCENARIOID)	Integer (4)
Scenario (SCENARIO)	Text (10)
Year (YEAR)	Integer (4)
Indicator (IND)	Text (10)
Level (DB)	Integer (3)

4.3 Noise Level Maps in PDF Format

Based upon the results of the noise level calculation the noise contour polygons are to be presented at 5 dB intervals in maps delivered in PDF format. The PDF maps to be submitted may be prepared such that the whole of the noise contour footprint from DIA is shown on a single A3 page. The noise level contours should be overlaid above OS mapping data, and should include information on the location and names of villages and towns within the maps.

Maps should be prepared for the following noise indicators and noise level bands:

- L_{den} for 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, ≥ 75 dB
- L_{night} for 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, ≥ 70 dB
- $L_{Aeq,\ 16hr}$ for 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, ≥ 75 dB

In line with Annex I of Directive 2002/49/EC daa are invited to provide results for the supplementary indicators L_{day}, $L_{evening}$.

- L_{day} for 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, ≥ 75 dB
- $L_{evening}$ for 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, ≥ 75 dB

The colour bands below are recommended for use in the production of noise level contour maps are presented in Table 8 below. The colour bands are based upon those developed by Dr Beate Weninger and presented at coloringnoise.com. Furthermore, it is recommended that the colour bands are made semi-transparent such that the base mapping below remains partly visible such that orientation and location remains possible.

The PDF maps of noise contour bands to be provided are shown in Table 6.

Should any other noise indictors and metrics be provided then the same format should be applied.

Table 7: Noise contour band PDF map sets for DAA

Noise source	Indicator	Name of the PDF maps
*[ScenarioID]_[Scenario]_[Year]*_Map	L_{den}	*[ScenarioID]_[Scenario]_[Year]*_Map_Lden_*[Version]*
	L_{night}	*[ScenarioID]_ [Scenario]_[Year]*_Map_Lngt_*[Version]*
	$L_{Aeq,16hr}$	*[ScenarioID]_ [Scenario]_[Year]*_Map_LA16_*[Version]*
	L_{day}	*[ScenarioID]_ [Scenario]_[Year]*_Map_Lday_*[Version]*
	$L_{evening}$	*[ScenarioID]_ [Scenario]_[Year]*_Map_Leve_*[Version]*

Notes: It is recommended that class boundaries be at .00, e.g. 55 to 59 is actually 55.00 to 59.99.

Table 8: Recommended Noise Level Bands for PDF Maps

Noise zone dB	Colour	Code	Red	Green	Blue
< 40	Transparent				
40 to 44	Light blue-green	# B8 D6 D1	184	214	209
45 to 49	Light green	# CE E4 CC	206	228	204
50 to 54	Yellowish green	# E2 F2 BF	226	242	191
55 to 59	Light orange	# F3 C6 83	243	198	131
60 to 64	Orange	# E8 7E 4D	232	126	77
65 to 69	Dark orange	# CD 46 3E	205	70	62
70 to 74	Magenta	# A1 1A 4D	161	26	77
≥75	Purple	# 75 08 5C	117	8	92

NOTE: Colour scheme from colouringnoise.com used under Creative Commons License

4.4 Exposure Statistics

The exposure assessment is to determine the exposure to L_{den}, L_{night} and $L_{Aeq,\ 16hr}$ noise levels within 5dB bands of the following:

- Area (km^2);
- Dwellings, and where possible whether the dwellings are occupied or not;
- Numbers of people living within dwellings, for occupied dwellings.

In line with Annex I of Directive 2002/49/EC daa are invited to provide results for the supplementary indicators L_{day}, $L_{evening}$.

The recommended methodology for determining the exposure is set out within the October 2017 update to the EPA Guidance Note on Strategic Noise Mapping, namely "Revised Section 10 of Guidance (Oct 17).pdf".

For each of the exposure assessments to be undertaken a reporting template is provided.

Exposure statistics should be prepared for the following noise indicators and noise level bands:

- L_{den} for 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, **≥** 75 dB
- L_{night} for 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, **≥** 70 dB
- $L_{Aeq,\ 16hr}$ for 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, **≥** 75 dB

In line with Annex I of Directive 2002/49/EC daa are invited to provide results for the supplementary indicators L_{day}, $L_{evening}$:

- L_{day} for 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, **≥** 75 dB
- $L_{evening}$ for 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, **≥** 75 dB

In order to assess the potential long-term health effects, ANCA request that for each operational scenario the following information is provided:

- WHO 2018, Dir 2020/367 - %HA - L_{den} for 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, **≥** 75 dB
- WHO 2018, Dir 2020/367 - %HSD - L_{night} for 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, **≥** 70 dB
- EEA 2010 - %HA - L_{den} for 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, **≥** 75 dB
- EEA 2010 - %HSD - L_{night} for 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, **≥** 70 dB
- SONA 2014 - %HA - L_{den} for 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, **≥** 75 dB

In order to contextualise the exposure data, ANCA request that for each operational scenario the following information is also provided:

- Annual average aircraft movements, by day, evening and night periods;
- Average summer day aircraft movements, by 16hr day and 8 hr night periods.

For each of the scenarios and movement periods, ANCA request that the fleet movement data per aircraft type is provided by day, evening and night periods for both the annual average and average summer day periods.

For each of the scenarios and movement periods, ANCA request that the fleet movement data per hour is provided by day, evening and night periods for both the annual average and average summer day periods.

4.5 Noise Modelling Report

All information should be accompanied by a modelling report describing the approach and supporting evidence for modelling works, including:

- Confirmation of the noise assessment method i.e. ECAC Doc 29 4th Edition including the modelling software utilised
- Confirmation of input datasets including:
  - Schedules / Flight Records including copies of relevant flight operations reports
  - Meteorological conditions
  - Inputs to flight track assumptions including dispersions
  - Inputs to flight profile and aircraft type assumptions
  - Modal Splits
- Validation Methodologies and Adjustments
  - Reporting of any validation activities including the preparation and evidencing of:
    - Customised procedures profiles; and/or
    - NPD adjustments based on noise monitoring data
- Calculation Settings, including:
  - Grid resolutions / dynamic grid settings
  - Receptor definitions
  - Application of meteorology
  - Use of bank angle
  - Ground attenuation

4.6 Population and Demographic Methodology Report

A methodology report is required to demonstrate how the following has been considered in the reporting of noise exposure and effects:

- Consideration of zoned lands;
- Residential developments that are approved and/or under construction;
- Analysis and monitoring of population encroachment around the Airport;
- Use and application of any population and/or demographic datasets including those describing non-residential noise-sensitive receptors;
- Approach to and datasets used for forecast population approved and/or under construction residential developments;

4.7 Exposure and Effects Methodology Report

The applicant shall report its methodology for the calculation of noise exposure and effects using noise model outputs and relevant demographic datasets. In this respect, it is recommended that ANCA advise that the applicant shall have regard to for the approaches defined within EC Directive 2002/49/EC, Commission Directive (EU) 2015/996 establishing common noise assessment methods according to Directive 2002/49/EC, and Commission Directive (EU) 2020/367 amending Annex III on assessment methods for harmful effects of environmental noise.

4.8 Noise Mitigation Feasibility Report

Where noise mitigation is explored in any of the forecasts provided, ANCA require a report to identify the feasibility of such measures in the context of the potential cost, safety and practicality implications for Dublin Airport. These measures include, but are not limited to:

- Reduction of noise at source
  - Financial incentives such as:
    - Landing charges
    - Taxes
  - Displaced Landing Thresholds
- Noise Abatement Operating Procedures
  - Steeper / Segmented Approach Procedures
  - Continuous Climb Operations
  - Runway Alternation
  - Preferential Runway Use
  - Directional Preference
  - Noise Abatement Departure Procedures
  - Airspace Design / Navigational Aids
- Land Use Management
  - Land Use Planning
  - Noise Insulation Schemes
  - Relocation Schemes

It is recommended that ANCA consider the potential cost, safety and practicality issues associated with any noise mitigation being explored.

4.9 Metadata

The reporting from daa to ANCA is based upon electronic files. Therefore, in order to manage these files effective metadata needs to be provided with each item reported.

The specified metadata standards for spatial data are those currently adopted by ANCA and proposed for future use within INSPIRE. They are based around a profile of ISO19115.

The standard for non-spatial data has been based upon the widely used Dublin Core metadata standard.

In order to be able to deal with the data provided, it is very important to provide some information about the data itself.

Therefore, several metadata files are to be provided to accompany the information reported. Template files for the metadata are provided for each dataset to be reported.

The metadata within the template files consists of the elements in Table 9.

Each metadata .xml file should be named to match the accompanying dataset.

Table 9: Guidance on metadata requirements

	Description
File Identifier	Unique file name, should match accompanying dataset
Language	ISO 639-2 Language Code
Character Set	ISO TC 211 Character Code
Hierarchy Level	ISO 19139 Scope Code
Organisation Name	Organisation name responsible for metadata
Contact Info	Email address
Role	ISO 19139 Role Code
Date	Date of metadata creation or revision
Metadata Standard Name	ISO 19115
Metadata Standard Version	2003 Cor. 1 2006
Reference System Info	CRS of harmonised dataset
Identification Info	Dataset identification
Citation	Dataset citation
Dataset Title	Human readable name of the dataset
Dataset Date	Date when dataset was revised
Dataset Set	ISO19139 Data Type Code
Dataset Creation Date	Date when dataset was created
Identifier	Same name as the title, but with underscores
Code Space	Daa website
Abstract	Information on the dataset; what it is depicting, what it is about.
Organisation Name	The organisation responsible for the data
Contact Info	Email address
Role	ISO 19139 Role Code
Keyword	Name and link of the INSPIRE data theme which the dataset falls under
Thesaurus Name	Name of thesaurus used
Date	Date of publication of the thesaurus
Date Type	ISO 19139 Date Type Code
Use Limitations	If there are conditions on the use of data
Access Constraints	ISO 19139 Restrictions Code
Other Constraints	If there are no limitations on the data
Topic Category	Environment
Extents	N, E, S, W bound lat/long decimal coordinates of bounding box
Data Quality	ISO 19139 Scope Code
Data Quality Title	INSPIRE Directive
Explanation	Any reference specification
Lineage	Include information on the history of the dataset, overall quality of the data, how the data was collected, any QA checks

An tÚdarás Inniúil um Thorann Aerárthaí

Aircraft Noise Competent Authority

ANCA

Regulatory Decision

Appendix D - Noise Abatement Objective for Dublin Airport

An tÚdarás Inniúil um Thorann Aerárthaí

Aircraft Noise Competent Authority

Noise Abatement Objective for Dublin Airport

20th June 2022

Noise Abatement Objective for Dublin Airport

Policy Objective

Limit and reduce the long-term adverse effects of aircraft noise on health and quality of life, particularly at night, as part of the sustainable development of Dublin Airport.

Explaining the Objective

Noise from Dublin Airport should be limited and reduced in line with principles of sustainable development. As Dublin Airport grows, the long-term adverse effects on human health and quality of life should progressively reduce over the lifetime of this NAO. The Balanced Approach will be used to ensure that cost-effective, practicable and sustainable measures are implemented to achieve this objective.

Measurable Criteria

The NAO will be primarily measured through the number of people highly sleep disturbed and highly annoyed in accordance with the approach recommended by the World Health Organisation's Environmental Noise Guidelines 2018 as endorsed by the European Commission through Directive 2020/367, taking into account noise exposure from 45 dB L_{den} and 40 dB L_{night}. These metrics describe those chronically disturbed by aircraft noise.

These metrics help articulate the effect of aircraft noise on health and quality of life. The following will also be used to help identify where noise exposure results in the populations experiencing the harmful effects. These are the number of people exposed to aircraft noise above:

- 55 dB L_{night} (a level of night-time noise exposure described by the WHO as representing a clear risk to health)
- 65 dB L_{den} (where a large proportion of those living around Dublin Airport can be considered highly annoyed)

In order to measure performance, these metrics shall be completed using a noise model prepared in accordance with the methodology described in Directive 2015/996 (European Civil Aviation Conference (ECAC) Doc.29 4th Edition or as amended). The noise model shall be validated using local noise and track keeping performance data from Dublin Airport's systems.

The calculation of the number of people exposed to aircraft noise shall have regard for the most recent population data available and assessed against the population exposed to aircraft noise in 2019.

Expected Outcomes

In context of its recovery from the global pandemic, noise exposure from Dublin Airport is expected to increase up to 2025. Whilst the resultant health effects are expected to be lower than those which occurred prior to the pandemic and in the years 2018 and 2019, these effects should then reduce over the medium to long-term, to improve the noise situation at Dublin Airport whilst allowing for sustainable growth. ANCA therefore expects the following outcomes to be achieved through this NAO as set against the measures described in Part 3.

The number of people highly sleep disturbed and highly annoyed shall reduce so that compared to conditions in 2019:

- The number of people highly sleep disturbed and highly annoyed in 2030 shall reduce by 30% compared to 2019;
- The number of people highly sleep disturbed and highly annoyed in 2035 shall reduce by 40% compared to 2019
- The number of people highly sleep disturbed and highly annoyed in 2040 shall reduce by 50% compared to 2019 and;
- The number of people exposed to aircraft noise above 55 dB L_{night} and 65 dB L_{den} shall be reduced compared to 2019.

Monitoring

Monitoring of the NAO will be informed by annual reports which will be reviewed by ANCA as part of its obligations under the Aircraft Noise (Dublin Airport) Regulation Act 2019.

An tÚdarás Inniúil um Thorann Aerárthaí

Aircraft Noise Competent Authority

ANCA

Regulatory Decision

Appendix E - Forecasts, Runway Use & Restrictions Scenarios and Noise Exposure Contours

1.1 Forecasts

1.1.1 The Application principally seeks to amend Condition 3(d) and replace Condition 5 of the North Runway Consent. The consequence of this change is to enable the Airport to recover back to its current 32 MPPA Terminal Passenger Capacity Limit quicker than otherwise would be the case if the conditions remained in place. Whilst this is the focus of the Application, there are several forecasts which have been prepared, including those which have been prepared in response to the Direction to Provide Information and Assessments.

1.1.2 The forecasts prepared by the Applicant have considered passenger numbers, aircraft movements and fleet mixes out to 2040 under a range of different forecast scenarios having regard for whether or not the North Runway would be in use at night and in what form, whether Condition 5 remains in place, and whether the Airport was operating with or without its current 32 MPPA Terminal Passenger Capacity Limit.

1.1.3 These forecasts are summarised in Table E1 below.

Table E1 – Overview of Forecast Scenarios

Forecast Scenario	Condition 3(d) Single Runway Use	Condition 5	32MPPATerminal Passenger Capacity Limit	Description
A	n/a	None	No	daa input schedule
B	2300-0700	65/night	No	Night Limit Constraints
C	2300-0600	None	No	Unconstrained (runway capacity only)
D	2300-0600	None	Yes	32 MPPA Terminal Passenger Capacity Limit Only
E	2300-0700	65/night	Yes	Night limits + 32 MPPA Terminal Passenger Capacity Limit
F	2300-0700	None	No	Single runway 2300-0700 only

Source: Dublin Airport North Runway Relevant Action Application, Environmental Impact Assessment Report, Volume 4 – Appendices, Appendix 1A, September 2021

1.1.1 Under Forecast Scenario B, Conditions 3(d) and 5 remain in place, but passenger numbers go beyond the 32mppaTerminal Passenger Capacity Limit, as part of policy directed growth as discussed in Section 3.

1.1.2 Under Forecast Scenario C, relevant action is taken with respect to Conditions 3(d) and 5 and but passenger numbers go beyond the 32 MPPA Terminal Passenger Capacity Limit, as part of policy directed growth as discussed in Section 3.

1.1.3 Forecast Scenario D reflects the Application. In this forecast scenario the 32 MPPA Terminal Passenger Capacity Limit remains in place however relevant action is taken with respect to Condition 3(d) and 5.

1.1.4 Forecast Scenario E reflects a 'forecast situation', i.e. without relevant action as sought by the Application or any growth beyond the existing 32 MPPA Terminal Passenger Capacity Limit. The forecast situation therefore allows insight as to how the noise climate would evolve in the absence of the relevant action sought under the Application or an increase in passenger capacity.

1.1.5 Scenario F describes represents a forecast where Condition 3(d) remains in place however Condition 5 is revised and the 32 MPPA Terminal Passenger Capacity Limit is lifted.

1.1.6 **Table E2** presents the passenger forecast numbers for the above forecast scenarios.

Table E2 – Annual Passengers (mppa) for 2019-2040 under different Forecast Scenarios

Year	Scenario A/C	Scenario B	Scenario D	Scenario E	Scenario F
2019	32.9	32.9	32.9	32.9	32.9
2020	7.4	7.4	7.4	7.4	7.4
2021	7.9	7.9	7.9	7.9	7.9
2022	21.0	19.6	21.0	19.6	20.6
2023	26.7	24.9	26.7	24.9	26.2
2024	31.2	29.3	30.8	29.3	30.8
2025	32.3	30.4	32.0	30.4	31.9
2026	34.0	31.6	32.0	31.2	33.3
2027	35.6	32.8	32.0	32.0	34.7
2028	37.0	33.9	32.0	32.0	36.2
2029	38.4	35.1	32.0	32.0	37.6
2030	39.6	36.3	32.0	32.0	39.0
2031	40.5	37.0	32.0	32.0	39.7
2032	41.3	37.6	32.0	32.0	40.4
2033	42.1	38.2	32.0	32.0	41.0
2034	42.7	38.9	32.0	32.0	41.7
2035	43.4	39.5	32.0	32.0	42.4
2036	44.0	40.0	32.0	32.0	43.0
2037	44.7	40.5	32.0	32.0	43.6
2038	45.3	41.0	32.0	32.0	44.2
2039	46.0	41.5	32.0	32.0	44.7
2040	46.6	42.0	32.0	32.0	45.3

Source: Dublin Airport North Runway Relevant Action Application, Environmental Impact Assessment Report, Volume 4 – Appendices, Appendix 1A, September 2021

1.2 Modelled Runway Use and Restriction Scenarios

1.1.4 The Applicant has prepared a series of noise forecasts for 2022, 2025, 2030, 2035 and 2040. To support the assessment of new measures under the relevant action, a range of runway use, and restriction scenarios have been considered. These are described below as 'patterns' and are illustrated in the following sections. These scenarios are described as 'patterns' as they influence the distribution and pattern of noise exposure around Dublin Airport at night.

1.1.5 For all patterns considered, the same form of runway use during daytime hours of 0700-2300 has been modelled consistent with Condition 3(a)-(c) of the North Runway Consent. This entails using Runway 10R and Runway 28R preferred for departures, and Runway 10L and Runway 28L preferred for arrivals with the cross runway (16-34) only used when wind dictates. For this reason, **Table E3** presents runway use and restriction scenarios with respect to the night-time period (23:00-07:00) only. To support the reading of the **Table E3**, Runway 10L-28R is referred to as the North Runway, with Runway 10R-28L referred to as the South Runway.

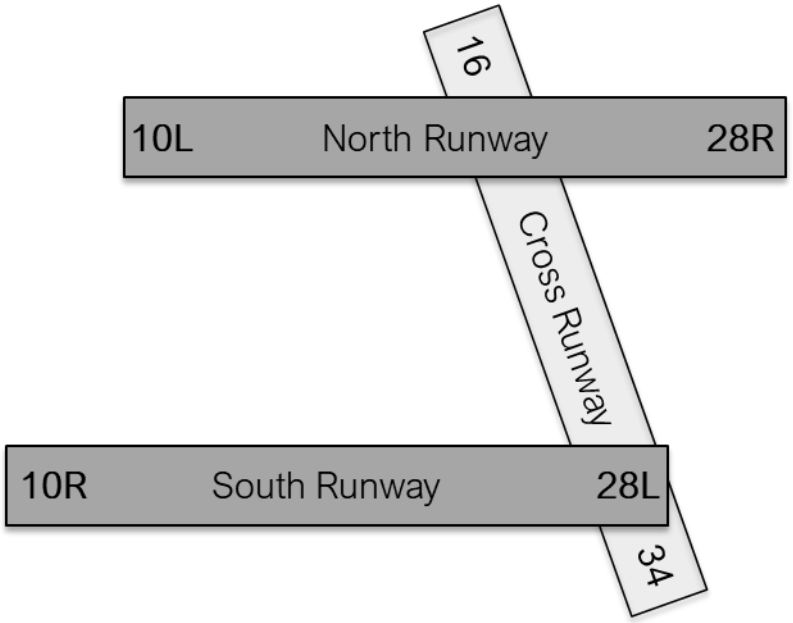


Table E3 – Night-time Runway Use and Restriction Patterns Considered

Runway Use and Restriction Scenario	Forecast Type	Night-Time Runway Use and Restrictions	Requires Restriction?
P01	Situation	South Runway Operations Only	Yes
P02	Forecast with New Measures	South Runway preferred 00:00-06:00. Otherwise as per Condition 3(a)-(c)	Yes – North Runway restricted between 00:00 and 06:00
P03	Forecast with New Measures	As per Condition 3(a)-(c)	No – however pattern effectively extends Condition 3(a-c) of the North Runway Consent to apply irrespective of time of day
P04	Forecast with New Measures	Reverse of Condition 3(a)-(c) i.e. Runway 10L and Runway 28L preferred for departures, Runway 10R and Runway 28R preferred for arrivals	No
P05	Forecast with New Measures	Alternation between Patterns P03 and P04	No
P06	Forecast without new Measures	No restrictions. Departures operate from the north or south runway depending on destination. Arrivals operate as a 50/50 split between runways unless runway capacity exceeded	No
P07	Forecast with New Measures	Departures operate from the north or south runway depending on destination. Arrivals operate as per Condition 3(b) and Condition 3(c) unless runway capacity exceeded	No
P08	Forecast with New Measures	Departures modelled as per Conditions 3(b) and 3(c). Arrivals modelled as 50/50 split between runways unless runway capacity exceeded	No

P09	Forecast with New Measures	North Runway preferred 00:00-05:59. Otherwise as per Condition 3(b) and 3(c).	Yes – South Runway restricted between 00:00 and 05:59
P10	Forecast with New Measures	Alternate between Patterns P02 and P09	No
P11	South Runway Only as per P01		
P12	Forecast with New Measures	South Runway preferred 23:00-05:59. Otherwise as per Condition 3(a)-(c)	Yes – North Runway restricted between 23:00 and 05:59
P13	Forecast with New Measures	South Runway preferred 23:30-04:59. Otherwise as per Condition 3(a)-(c).	Yes – North Runway restricted between 23:30 and 04:00

1.3 Overview of Modelling Scenarios

The Applicant has provided a series of noise forecasts. These have each been given a scenario number to reflect the runway use and restriction scenario which is reflected in the figures found in Section E.5.

ANCA's assessment has used noise exposure forecasts provided by the Applicant in the file 'CA434_5.0 ANCA Reporting Template 2021 Update' which is available on the ANCA website.

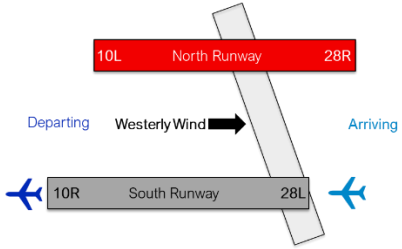
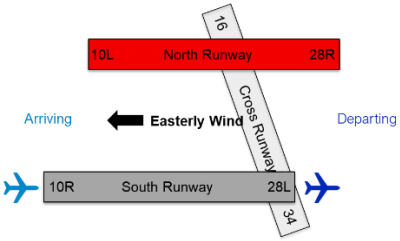
Table E4 summarises the modelled scenarios by the ScenarioID reported in 'CA434_5.0 ANCA Reporting Template 2021 Update' having regard for the runway use and restriction scenarios illustrated in Section E.4. This table can be used by interested parties to the following information associated with the Applicant's forecasts for 2022 and beyond as stored within 'CA434_5.0 ANCA Reporting Template 2021 Update':

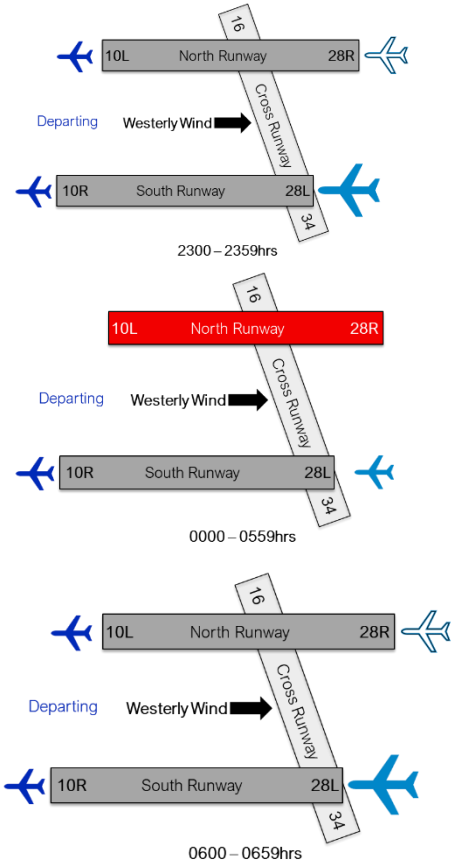
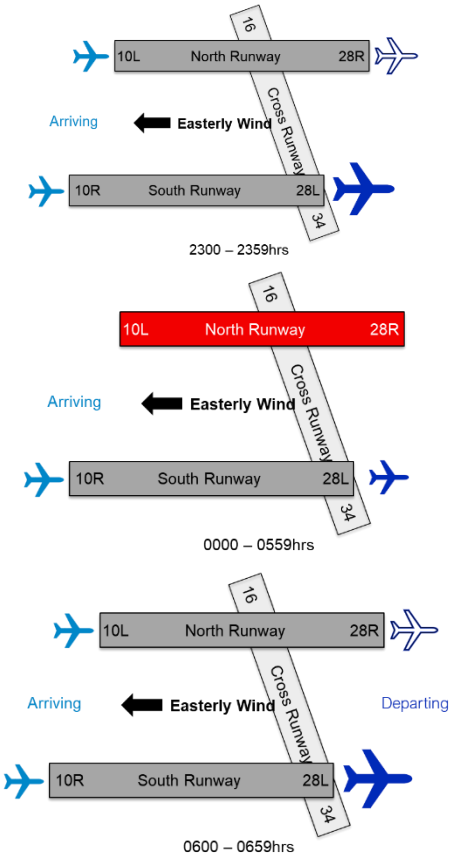
- Forecast aircraft movements;
- Forecast fleet mix;
- Forecast diurnal pattern of movements;
- Noise management measures assumed in each forecast;
- Exposure statistics with respect to area, dwellings, population and health metrics

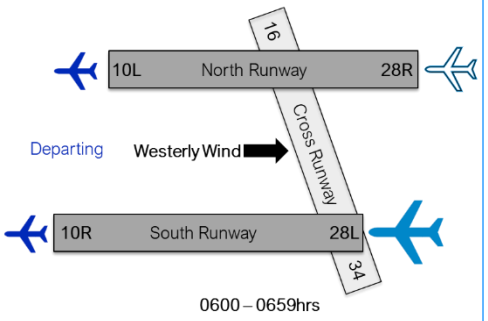
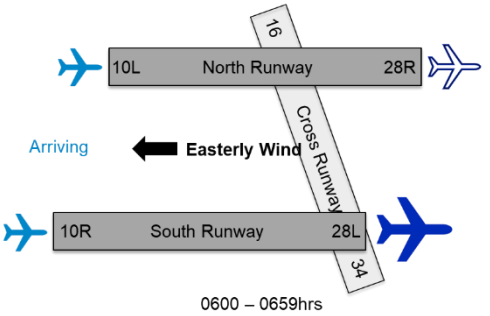
Table E4 – Scenario ID provided in 'CA434_5.0 ANCA Reporting Template 2021 Update' mapped against

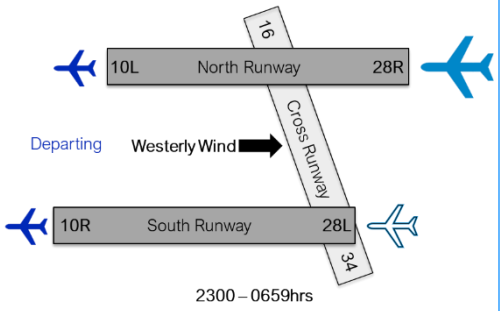
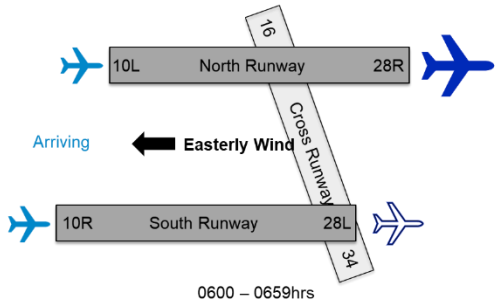
Pattern	Forecast Year	2022		2025		2030			2035				2040				
	Passengers (mppa)	19.6	21.0	30.4	32.0	32.0	36.3	39.0	39.6	32.0	39.5	42.4	43.4	32.0	42.0	45.3	46.6
	Forecast	B/E	A/C/D	B/E	D	D/E	B	F	A/C	D/E	B	F	A/C	D/E	B	F	A/C
P01		0016		0025		0038	0047	0053		0056	0065	0071		0074	0083	0089	
P02			0017		0026	0039			0048	0057			0066	0075			0084
P03			0018		0027	0040			0049	0058			0067	0076			0085
P04					0028												
P05					0029												
P06			0019		0030	0041			0050	0059			0068	0077			0086
P07			0020		0031	0042			0051	0060			0069	0078			0087
P08			0021		0032	0043			0052	0061			0070	0079			0088
P09					0033												
P10					0034												
P11			0022		0035	0044				0062				0080			
P12			0023		0036	0045			0054	0063			0072	0081			0090
P13			0024		0037	0046			0055	0064			0073	0082			0091

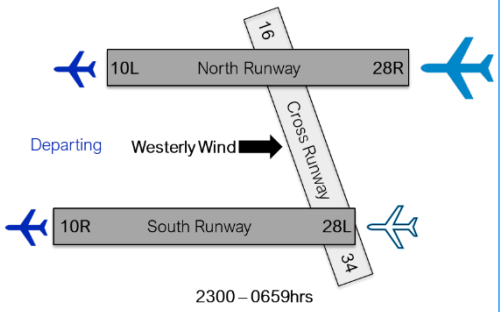
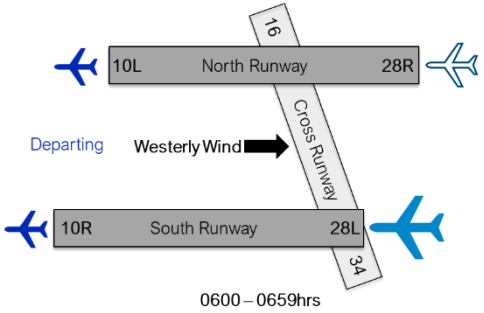
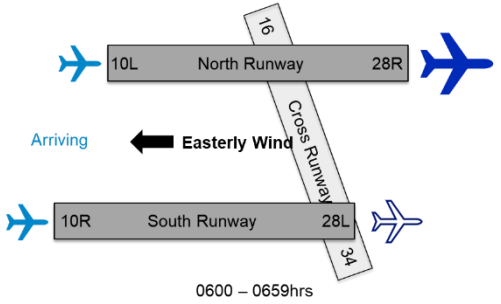
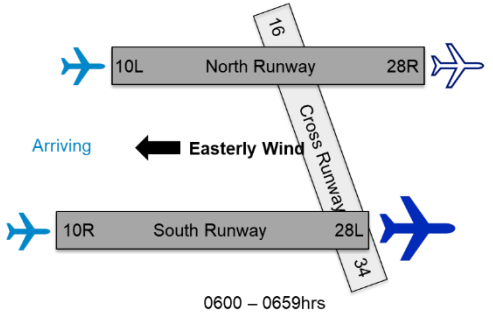
1.4 Illustration of Runway Use and Restriction Scenarios Considered

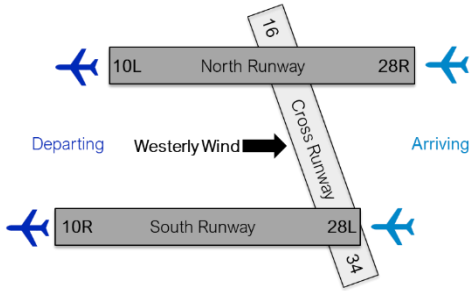
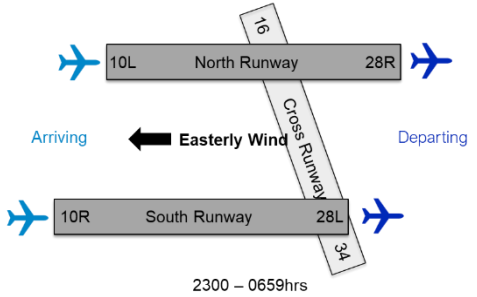
Pattern	Description	Night – Westerly Winds	Night – Easterly Winds
1	Situation 23:00 to 05:59 South Runway Only		

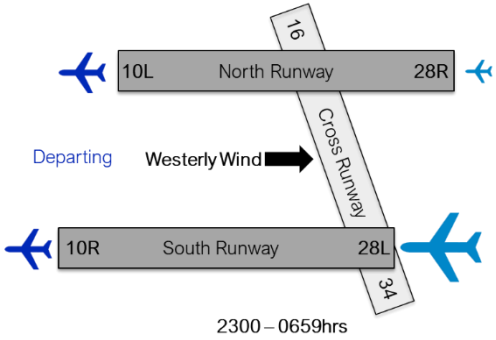
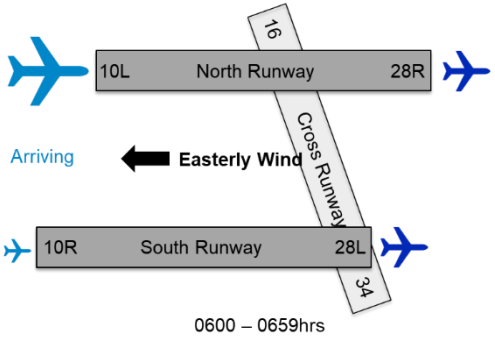
Scenario	Description	Night – Westerly Winds	Night – Easterly Winds
P02	Forecast with New Measures 23:00 to 23:59 When winds are westerly, Runway 28L shall be preferred for arriving aircraft. Either Runway 28L or 28R shall be used for departing aircraft as determined by air traffic control. When winds are easterly, either Runway 10L or 10R as determined by air traffic control shall be preferred for arriving aircraft. Runway 10R shall be preferred for departing aircraft. 00:00 to 05:59 Movements preferred on the South Runway only (single runway). 06:00 to 06:59 When winds are westerly, Runway 28L shall be preferred for arriving aircraft. Either Runway 28L or 28R shall be used for departing aircraft as determined by air traffic control. When winds are easterly, either Runway 10L or 10R as determined by air traffic control shall be preferred for arriving aircraft. Runway 10R shall be preferred for departing aircraft		

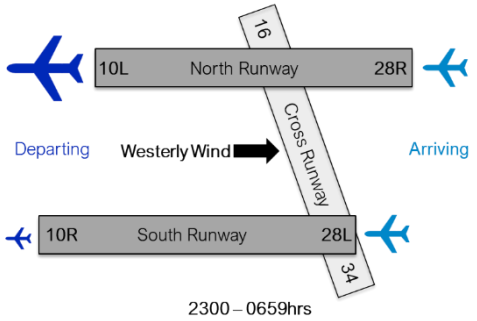
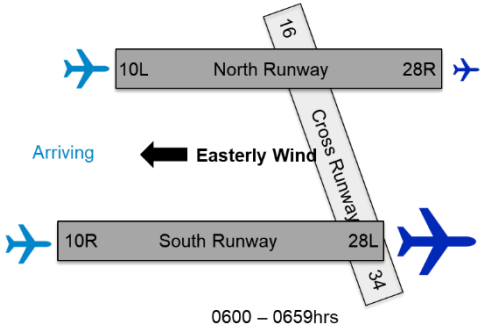
Scenario	Description	Night – Westerly Winds	Night – Easterly Winds
P03	Forecast with New Measures 23:00 to 06:59 At all times when winds are westerly, Runway 28L shall be preferred for arriving aircraft. Either Runway 28L or 28R shall be used for departing aircraft as determined by air traffic control. At all times winds are easterly, either Runway 10L or 10R as determined by air traffic control shall be preferred for arriving aircraft. Runway 10R shall be preferred for departing aircraft.		

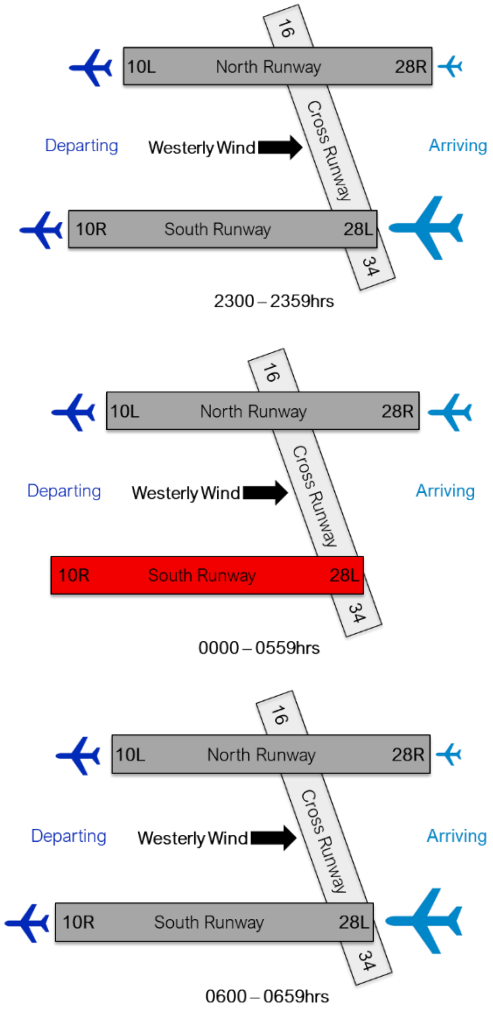
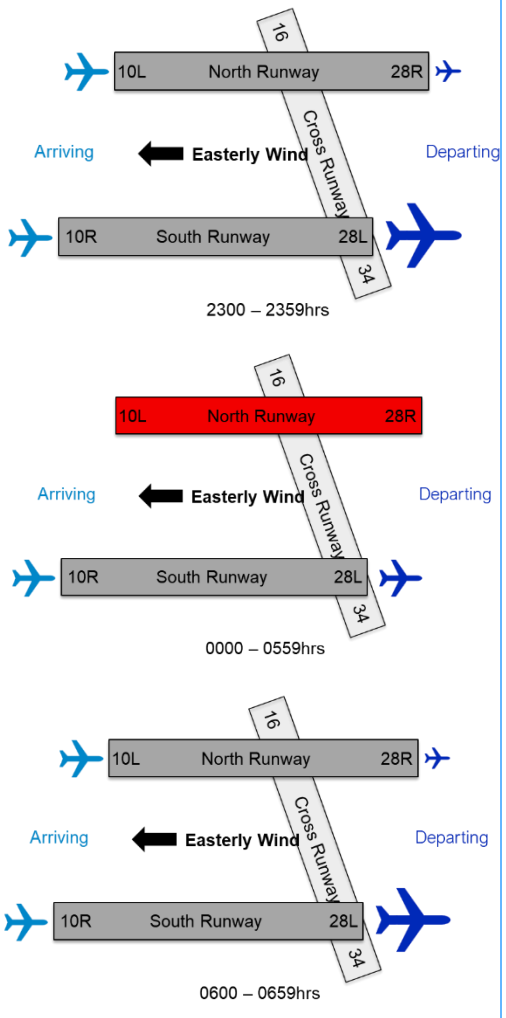
Scenario	Description	Night – Westerly Winds	Night – Easterly Winds
P04	Forecast with New Measures When winds are westerly, Runway 28R shall be preferred for arriving aircraft. Either Runway 28L or 28R shall be used for departing aircraft as determined by air traffic control. When winds are easterly, either Runway 10L or 10R as determined by air traffic control shall be preferred for arriving aircraft. Runway 10L shall be preferred for departing aircraft.		

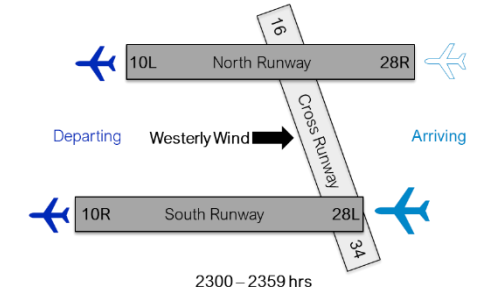
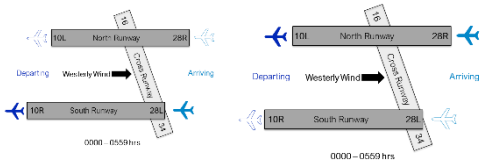
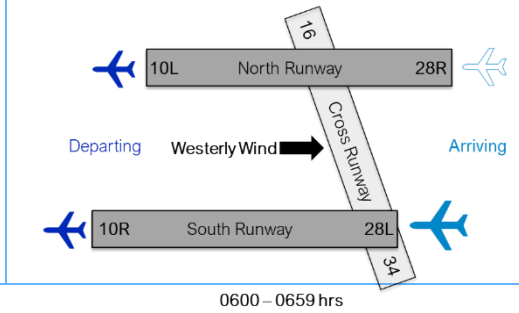
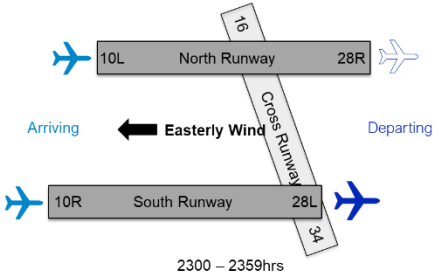
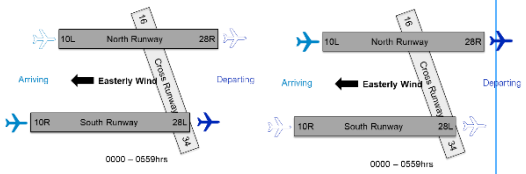
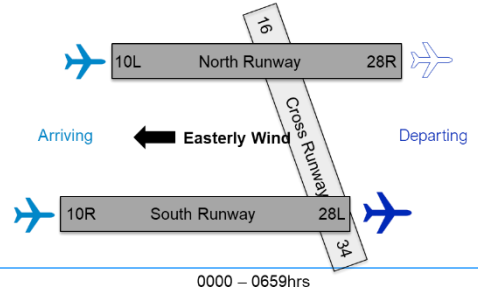
Scenario	Description	Night – Westerly Winds	Night – Easterly Winds
P05	Forecast with New Measures 23:00 to 06:59 Preferred arrival runway will alternate between North and South Runways while either Runway 28L or 28R shall be used for departing aircraft as determined by air traffic control in westerly and preferred departure runway will alternate between North and South Runways while either Runway 10L or 10R as determined by air traffic control shall be preferred for arriving aircraft in easterly wind conditions each day.	Alternation between:  2300 – 0659hrs And  0600 – 0659hrs	Alternating between:  0600 – 0659hrs And  0600 – 0659hrs

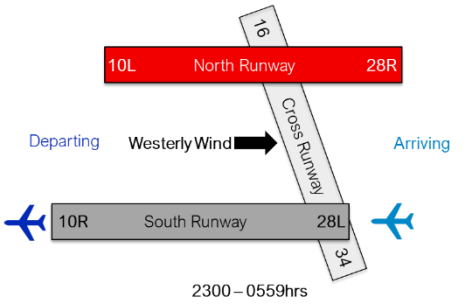
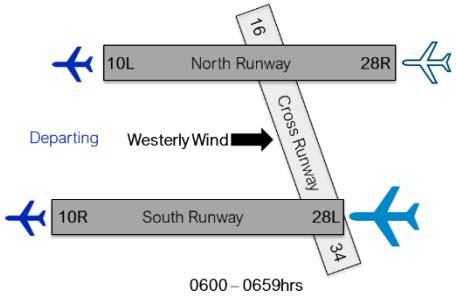
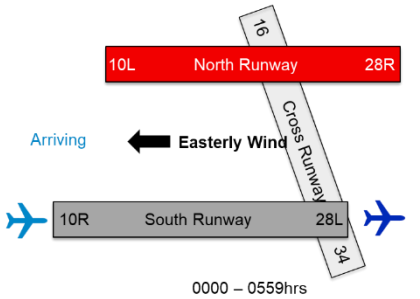
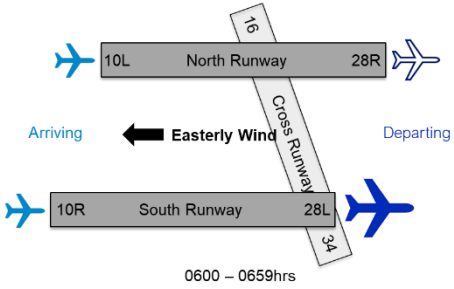
Scenario	Description	Night – Westerly Winds	Night – Easterly Winds
P06	Forecast without New Measures 23:00 to 06:59 Departures use north or south runway depending on destination. Arrivals occur as 50/50 split between runways unless runway capacity exceeded.		

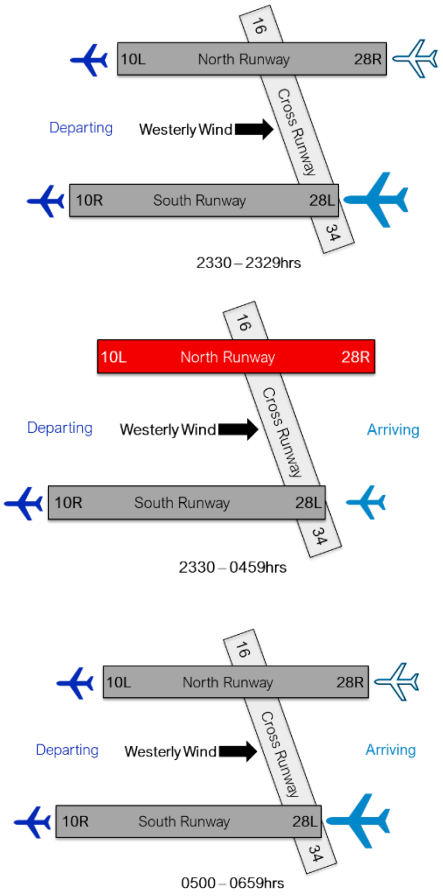
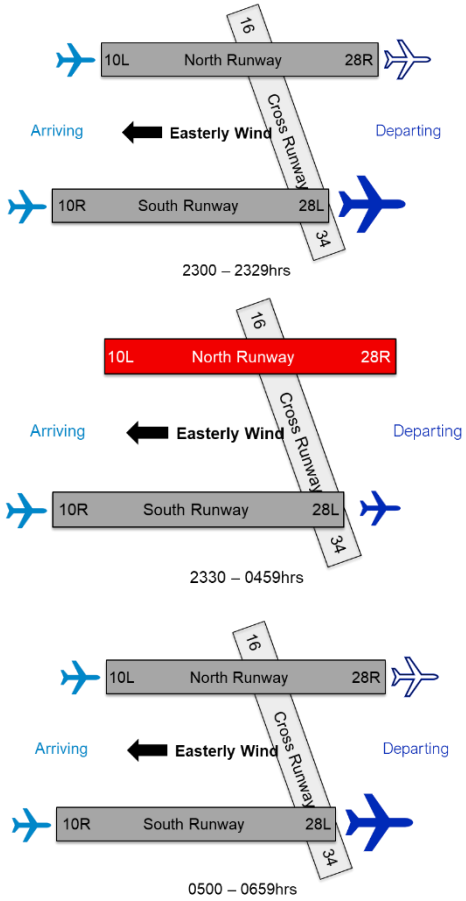
Scenario	Description	Night – Westerly Winds	Night – Easterly Winds
P07	Forecast with New Measures 23:00 to 06:59 Both North and South Runways available for departures (runway used depends on whether turn to the north or south is required based on destination); prefer arrivals landing on the South Runway in westerly conditions and the North Runway in easterly conditions unless this exceeds the single-runway capacity for a given hour. If single-runway capacity is exceeded, then arrivals are moved to the other runway.		

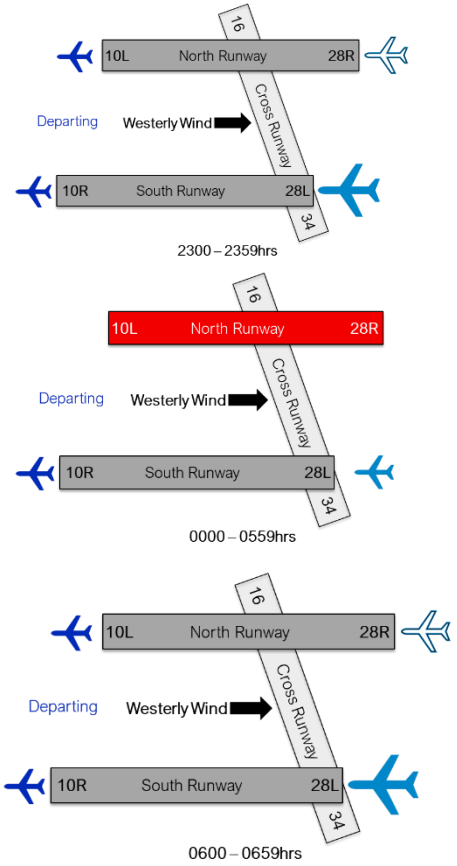
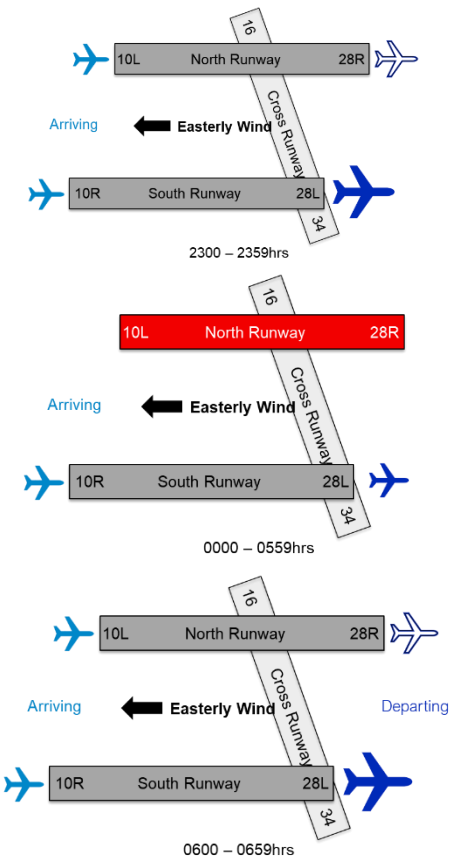
Scenario	Description	Night – Westerly Winds	Night – Easterly Winds
P08	Forecast with New Measures Both North and South Runways available for arrivals (assumed 50/50 split); prefer departures take off on the North Runway in westerly conditions and the South Runway in easterly conditions.		

Scenario	Description	Night – Westerly Winds	Night – Easterly Winds
P09	Forecast with New Measures 23:00 to 23:59 When winds are westerly, Runway 28L shall be preferred for arriving aircraft. Either Runway 28L or 28R shall be used for departing aircraft as determined by air traffic control. When winds are easterly, either Runway 10L or 10R as determined by air traffic control shall be preferred for arriving aircraft. Runway 10R shall be preferred for departing aircraft. 00:00 to 05:59 Movements preferred on the North Runway only (single runway). 06:00 to 06:59 When winds are westerly, Runway 28L shall be preferred for arriving aircraft. Either Runway 28L or 28R shall be used for departing aircraft as determined by air traffic control. When winds are easterly, either Runway 10L or 10R as determined by air traffic control shall be preferred for arriving aircraft. Runway 10R shall be preferred for departing aircraft		

Scenario	Description	Night – Westerly Winds	Night – Easterly Winds
P10	Forecast with New Measures 23:00 to 23:59 When winds are westerly, Runway 28L shall be preferred for arriving aircraft. Either Runway 28L or 28R shall be used for departing aircraft as determined by air traffic control. When winds are easterly, either Runway 10L or 10R as determined by air traffic control shall be preferred for arriving aircraft. Runway 10R shall be preferred for departing aircraft. 00:00 to 05:59 Alternate each night between movements on the North Runway only and the South Runway only. 06:00 to 06:59 When winds are westerly, Runway 28L shall be preferred for arriving aircraft. Either Runway 28L or 28R shall be used for departing aircraft as determined by air traffic control. When winds are easterly, either Runway 10L or 10R as determined by air traffic control shall be preferred for arriving aircraft. Runway 10R shall be preferred for departing aircraft	 2300 – 2359 hrs  Alternation  0600 – 0659 hrs	 2300 – 2359hrs  Alternation  0000 – 0659hrs

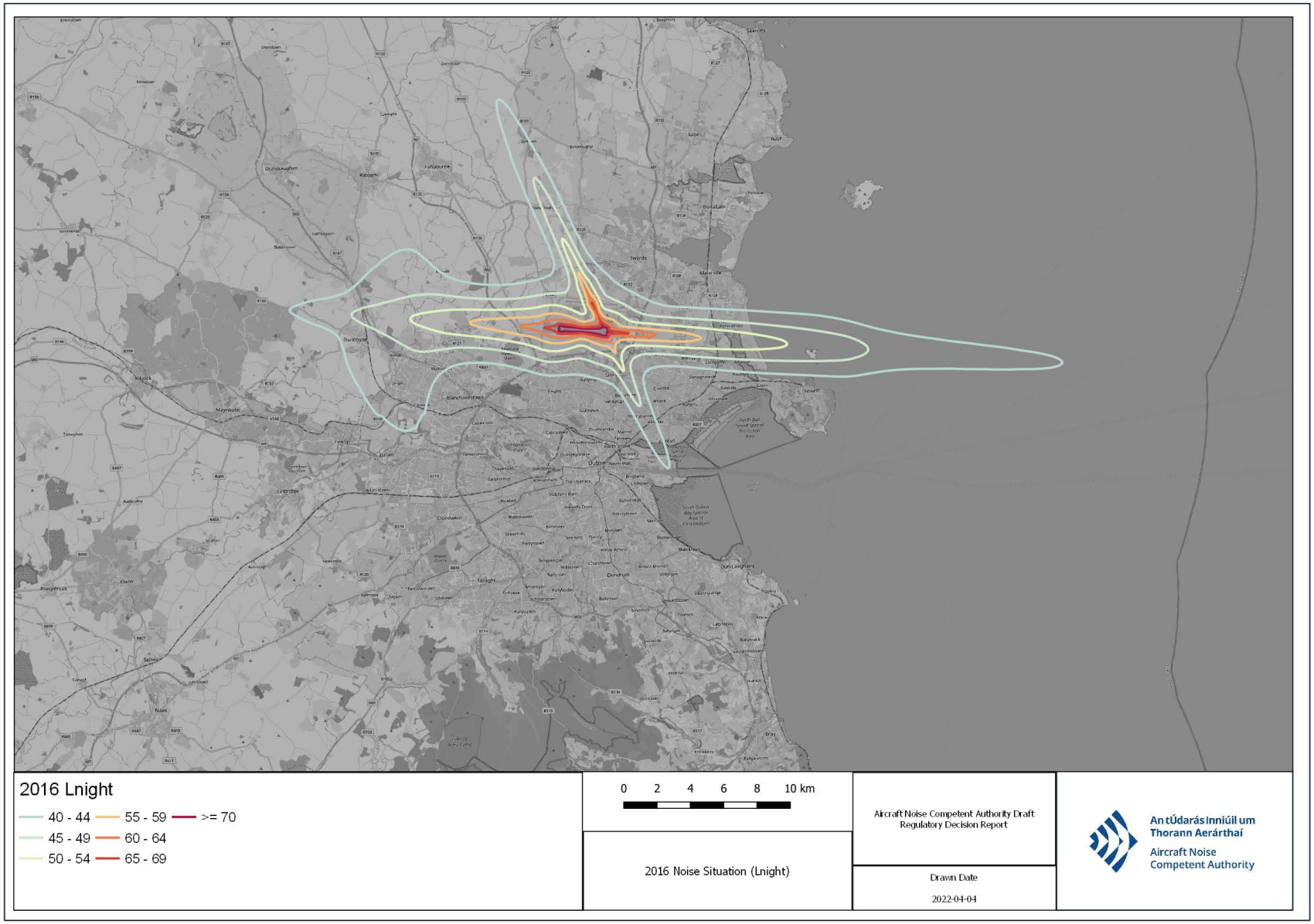
Scenario	Description	Night – Westerly Winds	Night – Easterly Winds
P12	Forecast with New Measures 23:00 to 05:59 South runway preferred 06:00 to 06:59 When winds are westerly, Runway 28L shall be preferred for arriving aircraft. Either Runway 28L or 28R shall be used for departing aircraft as determined by air traffic control. When winds are easterly, either Runway 10L or 10R as determined by air traffic control shall be preferred for arriving aircraft. Runway 10R shall be preferred for departing aircraft	 	 

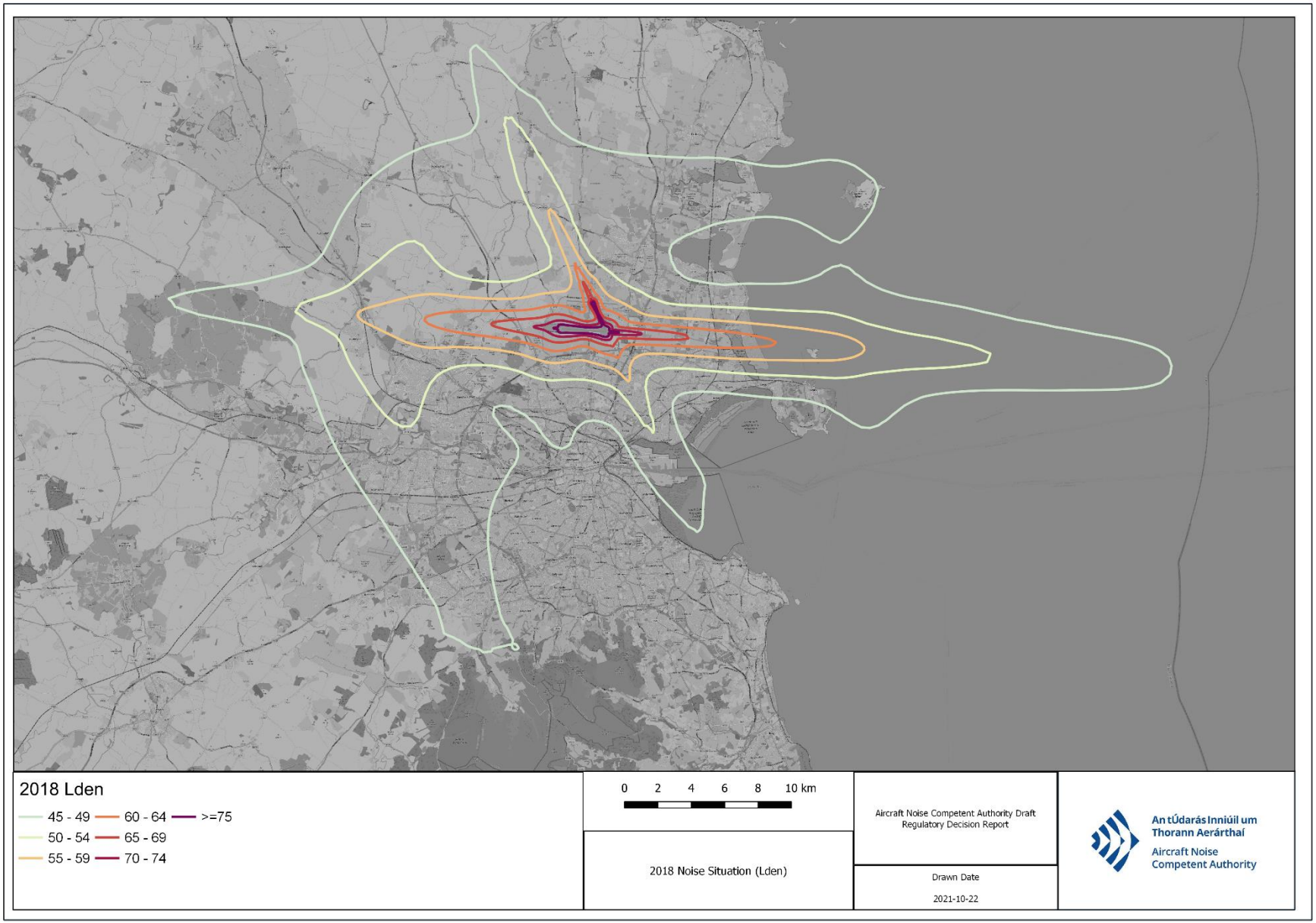
Scenario	Description	Night – Westerly Winds	Night – Easterly Winds
P13	Forecast with New Measures 23:00 to 23:29 When winds are westerly, Runway 28L shall be preferred for arriving aircraft. Either Runway 28L or 28R shall be used for departing aircraft as determined by air traffic control. When winds are easterly, either Runway 10L or 10R as determined by air traffic control shall be preferred for arriving aircraft. Runway 10R shall be preferred for departing aircraft 23:30 to 05:59 South runway preferred 06:00 to 06:59 When winds are westerly, Runway 28L shall be preferred for arriving aircraft. Either Runway 28L or 28R shall be used for departing aircraft as determined by air traffic control. When winds are easterly, either Runway 10L or 10R as determined by air traffic control shall be preferred for arriving aircraft. Runway 10R shall be preferred for departing aircraft		

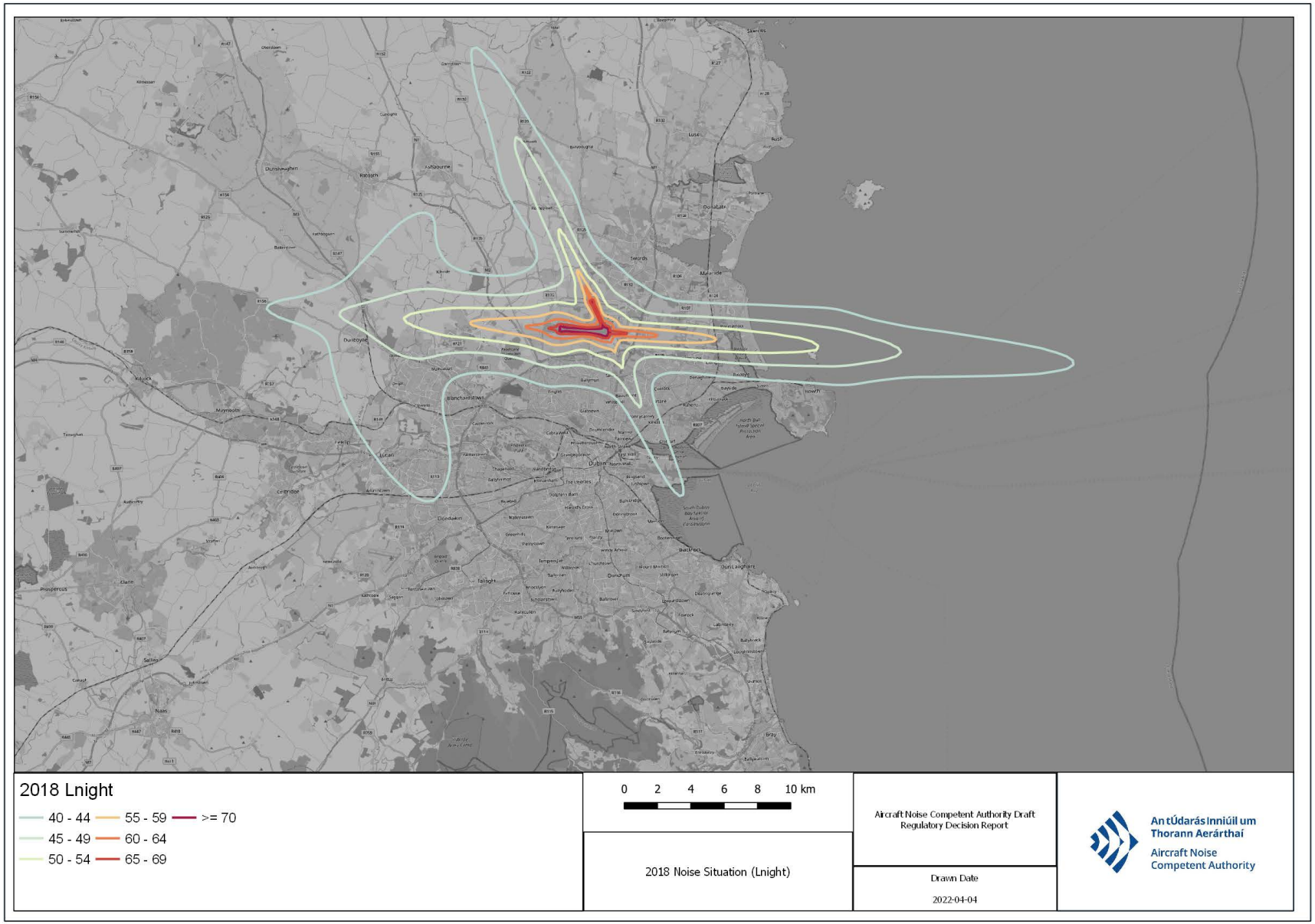
Scenario	Description	Night – Westerly Winds	Night – Easterly Winds
P13	Forecast with New Measures 23:00 to 23:59 When winds are westerly, Runway 28L shall be preferred for arriving aircraft. Either Runway 28L or 28R shall be used for departing aircraft as determined by air traffic control. When winds are easterly, either Runway 10L or 10R as determined by air traffic control shall be preferred for arriving aircraft. Runway 10R shall be preferred for departing aircraft. 00:00 to 05:59 Movements preferred on the South Runway only (single runway). 06:00 to 06:59 When winds are westerly, Runway 28L shall be preferred for arriving aircraft. Either Runway 28L or 28R shall be used for departing aircraft as determined by air traffic control. When winds are easterly, either Runway 10L or 10R as determined by air traffic control shall be preferred for arriving aircraft. Runway 10R shall be preferred for departing aircraft		

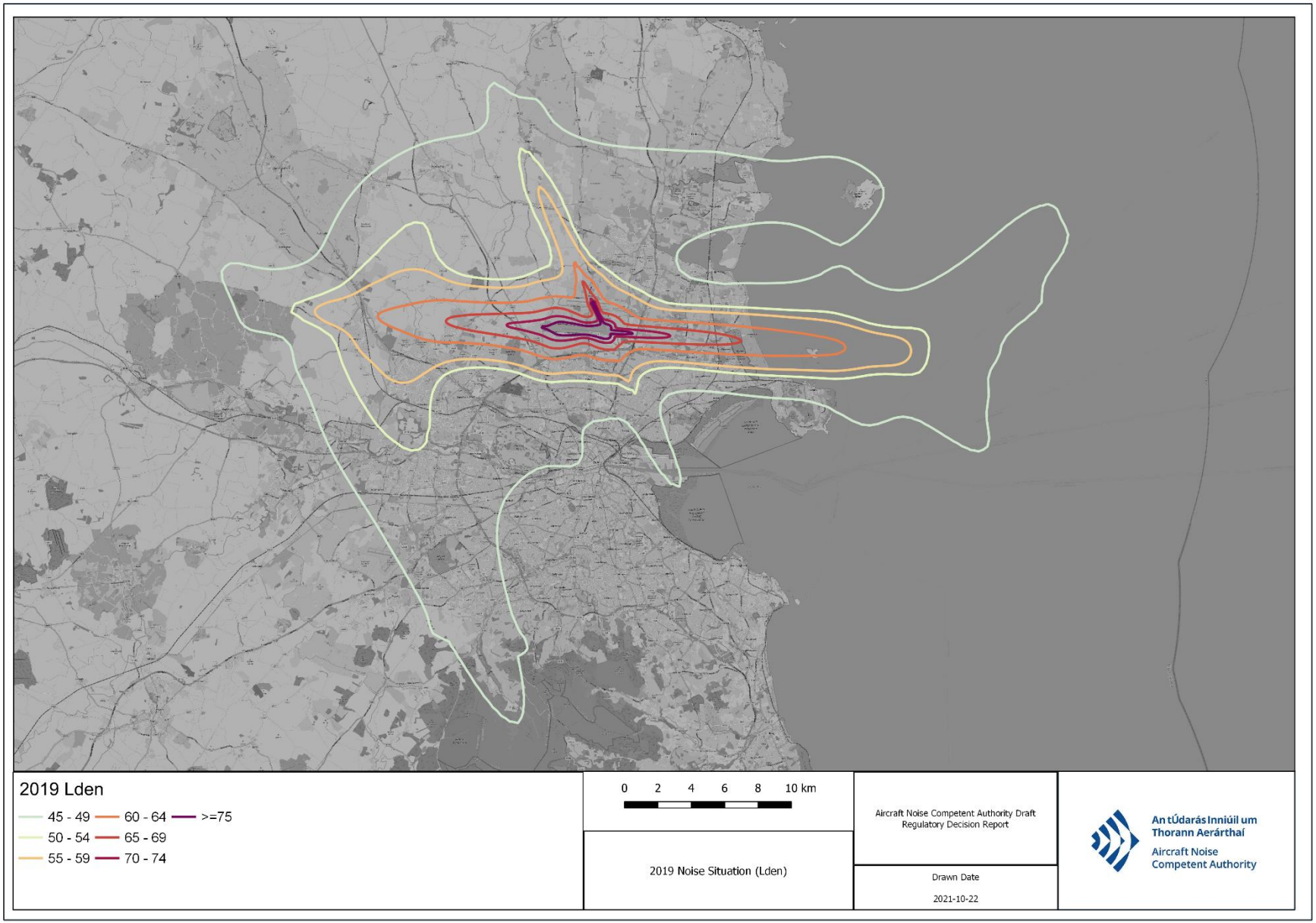
1.5 Selected Noise Exposure Forecast and Change Figures

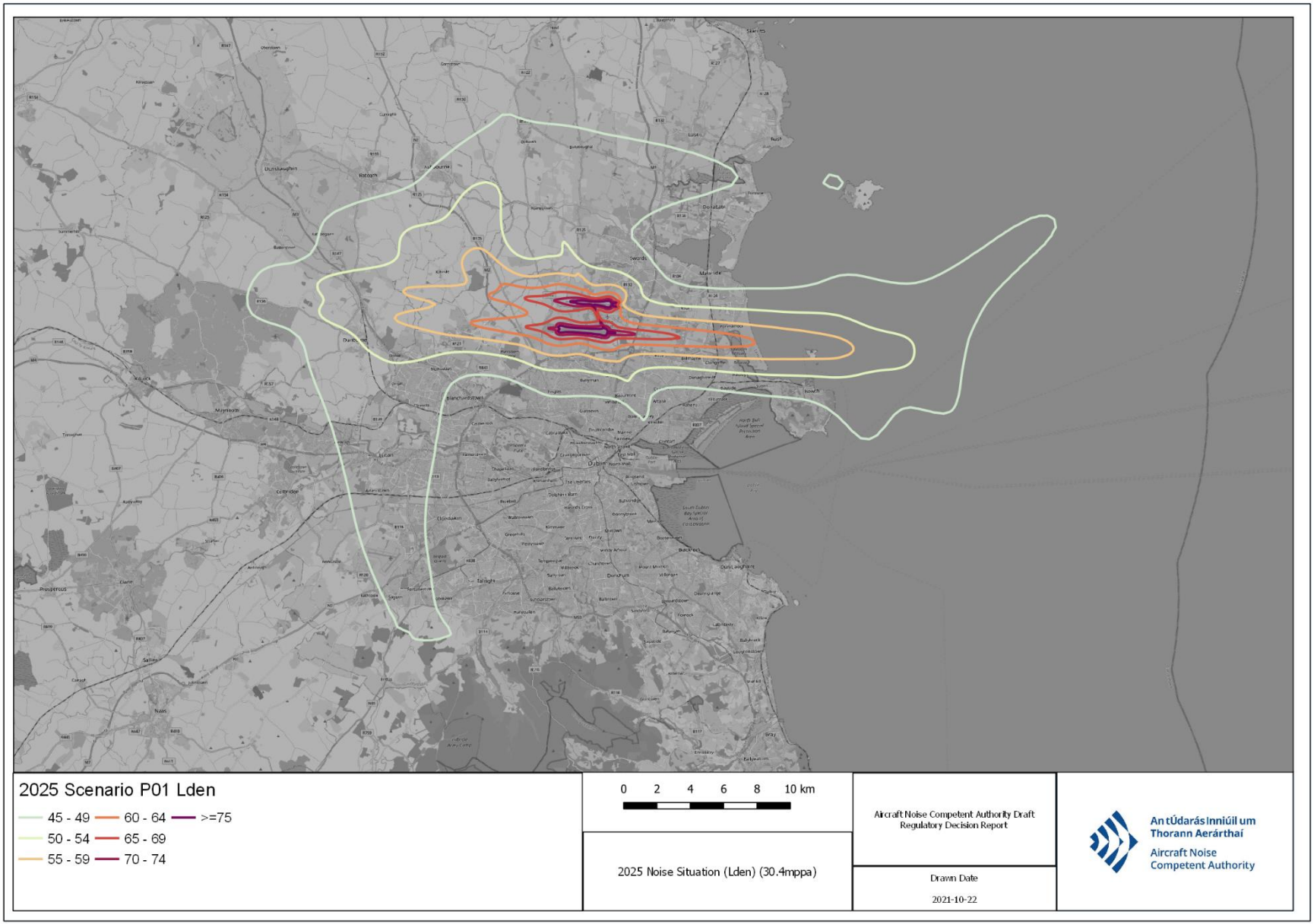

2016 Lden
45 - 49
50 - 54
55 - 59
60 - 64
65 - 69
70 - 74
>=75
0 2 4 6 8 10 km
2016 Noise Situation (Lden)
Aircraft Noise Competent Authority Draft Regulatory Decision Report
Drawn Date
2021-10-22
An tÚdarás Inniúil um Thorann Aerárthaí
Aircraft Noise Competent Authority

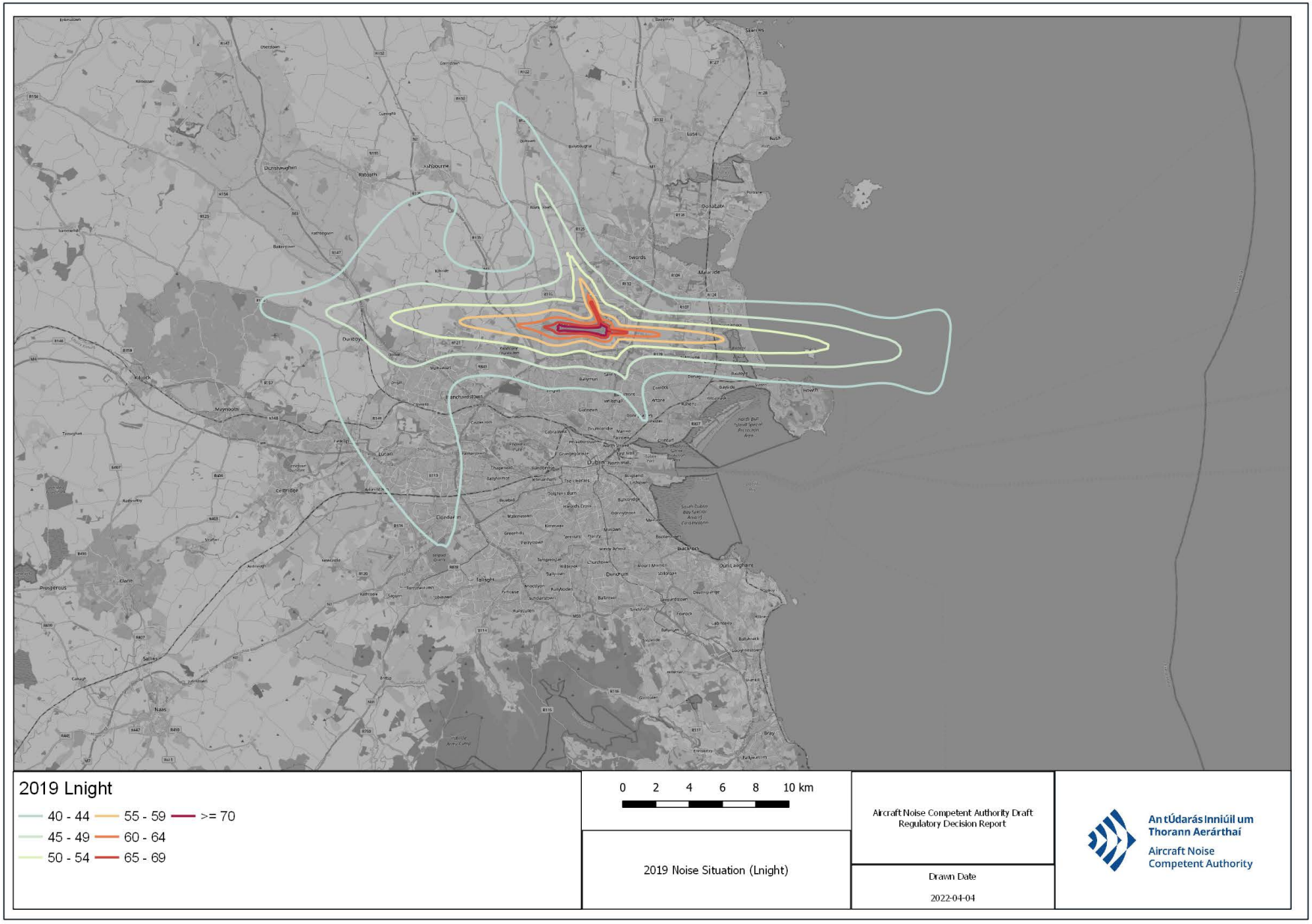

2016 Lnight
40 - 44
45 - 49
50 - 54
55 - 59
60 - 64
65 - 69
>= 70
0 2 4 6 8 10 km
2016 Noise Situation (Lnight)
Aircraft Noise Competent Authority Draft Regulatory Decision Report
Drawn Date
2022-04-04
An tÚdarás Inniúil um Thorann Aerárthaí
Aircraft Noise Competent Authority

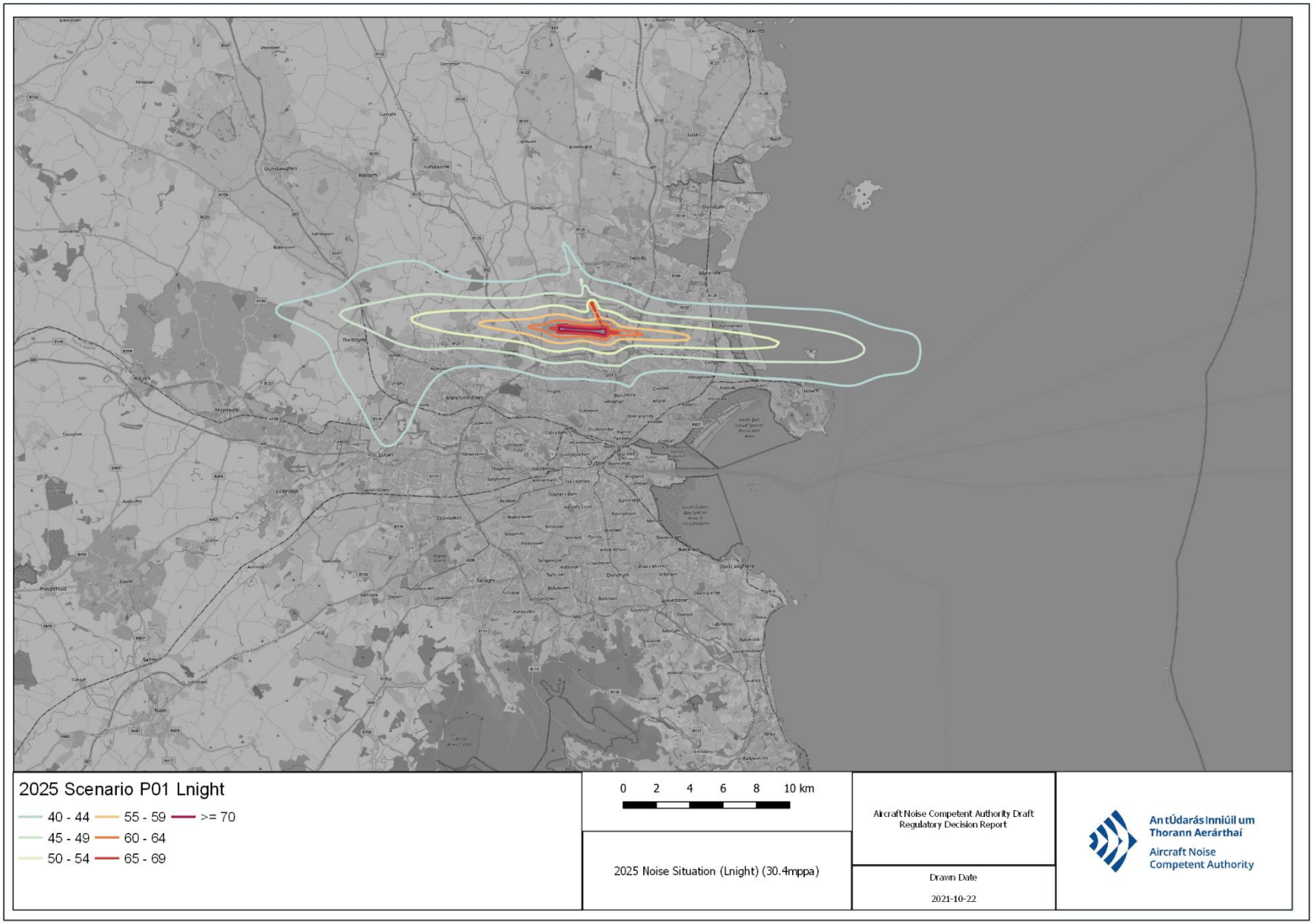

2018 Lden
45 - 49
50 - 54
55 - 59
60 - 64
65 - 69
70 - 74
>=75
0 2 4 6 8 10 km
2018 Noise Situation (Lden)
Aircraft Noise Competent Authority Draft Regulatory Decision Report
Drawn Date
2021-10-22
An tÚdarás Inniúil um Thorann Aerárthaí
Aircraft Noise Competent Authority


2018 Lnight
40 - 44
45 - 49
50 - 54
55 - 59
60 - 64
65 - 69
>= 70
0 2 4 6 8 10 km
2018 Noise Situation (Lnight)
Aircraft Noise Competent Authority Draft Regulatory Decision Report
Drawn Date
2022-04-04
An tÚdarás Inniúil um Thorann Aerárthaí
Aircraft Noise Competent Authority


2019 Lden
45 - 49
50 - 54
55 - 59
60 - 64
65 - 69
70 - 74
>=75
0 2 4 6 8 10 km
2019 Noise Situation (Lden)
Aircraft Noise Competent Authority Draft Regulatory Decision Report
Drawn Date
2021-10-22
An tÚdarás Inniúil um Thorann Aerárthaí
Aircraft Noise Competent Authority


2025 Scenario P01 Lden
45 - 49
50 - 54
55 - 59
60 - 64
65 - 69
70 - 74
>=75
0 2 4 6 8 10 km
2025 Noise Situation (Lden) (30.4mppa)
Aircraft Noise Competent Authority Draft Regulatory Decision Report
Drawn Date
2021-10-22
An tÚdarás Inniúil um Thorann Aerárthaí
Aircraft Noise Competent Authority


2019 Lnight
40 - 44
45 - 49
50 - 54
55 - 59
60 - 64
65 - 69
>= 70
0 2 4 6 8 10 km
2019 Noise Situation (Lnight)
Aircraft Noise Competent Authority Draft Regulatory Decision Report
Drawn Date
2022-04-04
An tÚdarás Inniúil um Thorann Aerárthaí
Aircraft Noise Competent Authority


2025 Scenario P01 Lnight
40 - 44
45 - 49
50 - 54
55 - 59
60 - 64
65 - 69
>= 70
0 2 4 6 8 10 km
2025 Noise Situation (Lnight) (30.4mppa)
Aircraft Noise Competent Authority Draft Regulatory Decision Report
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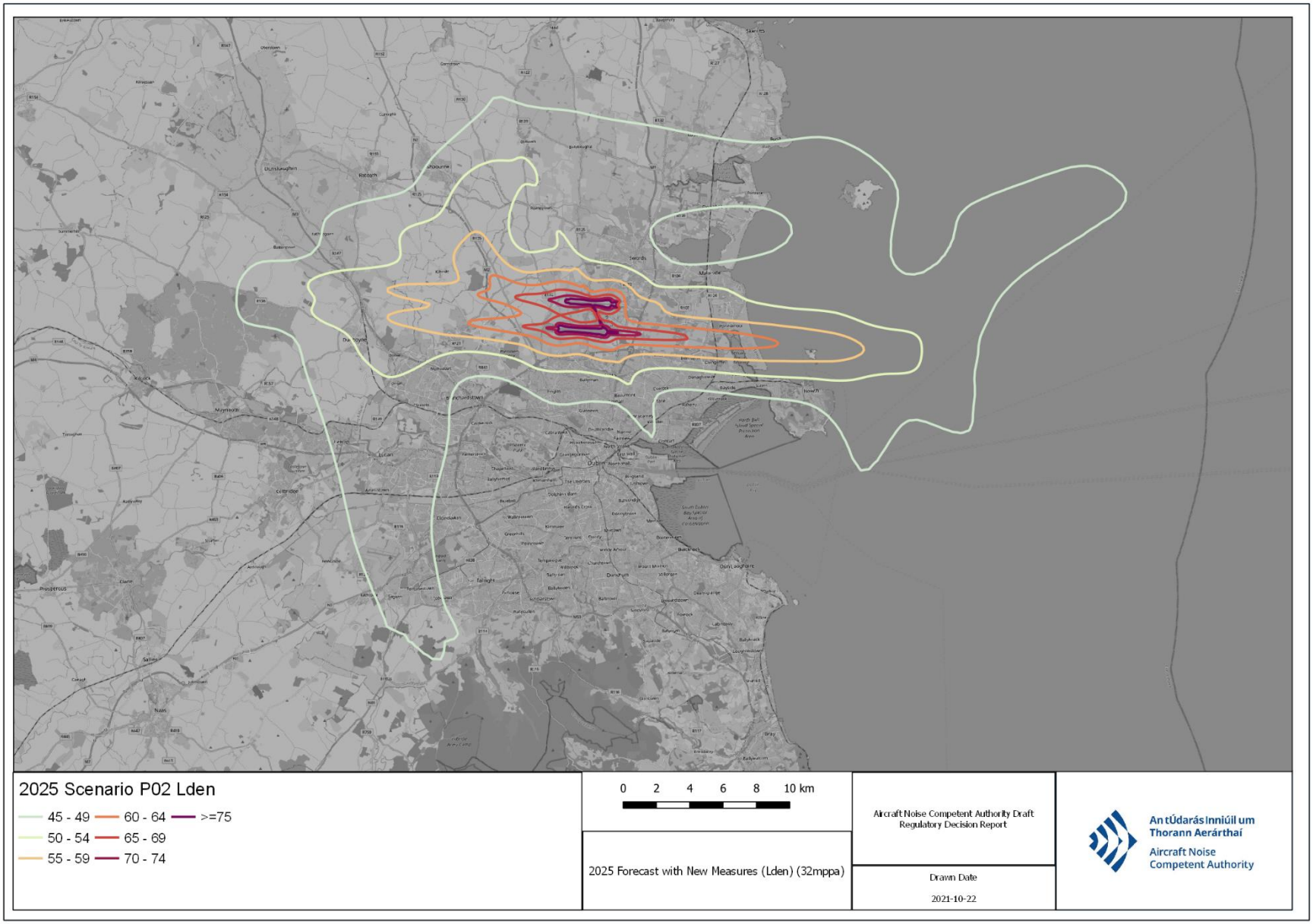
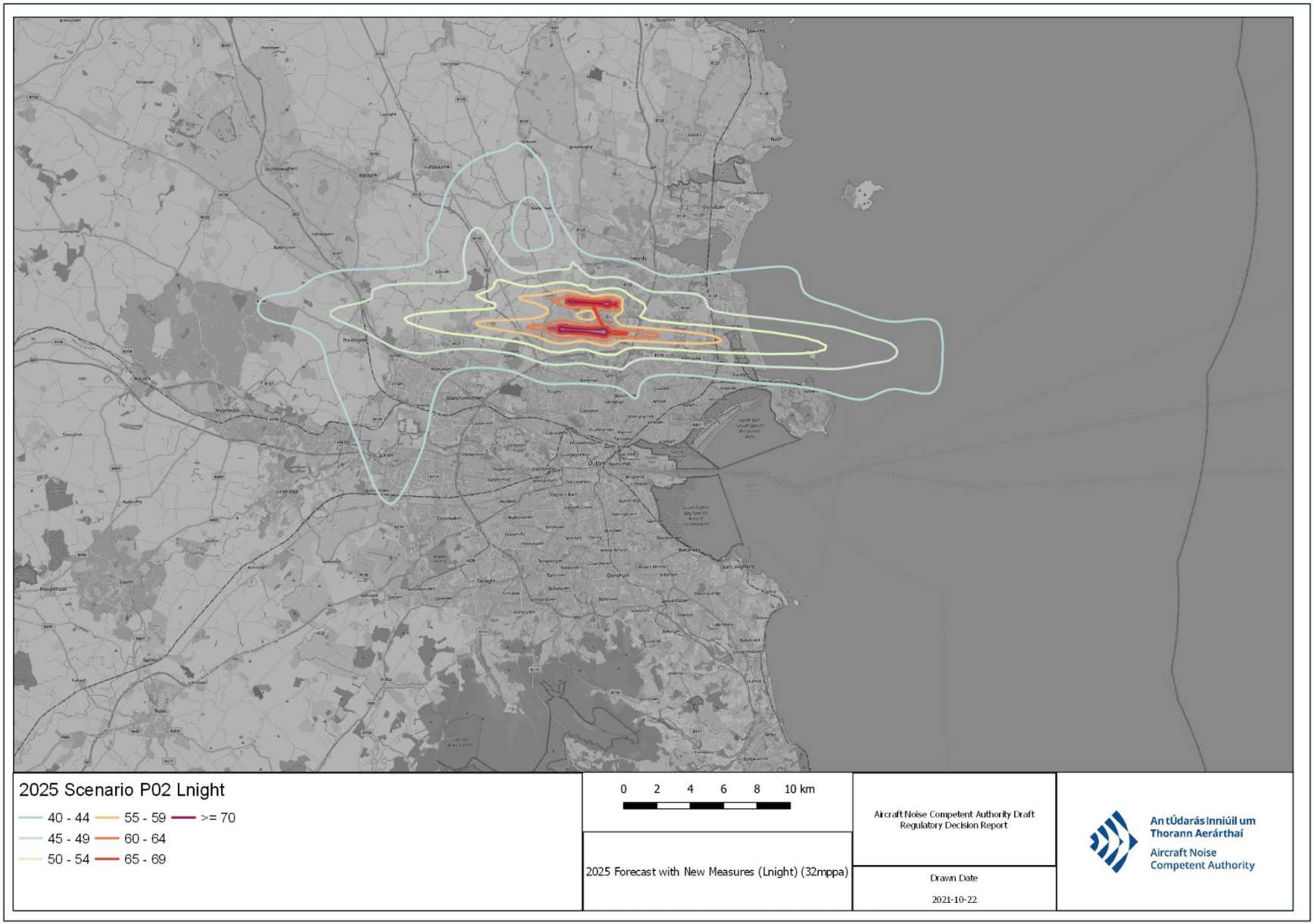
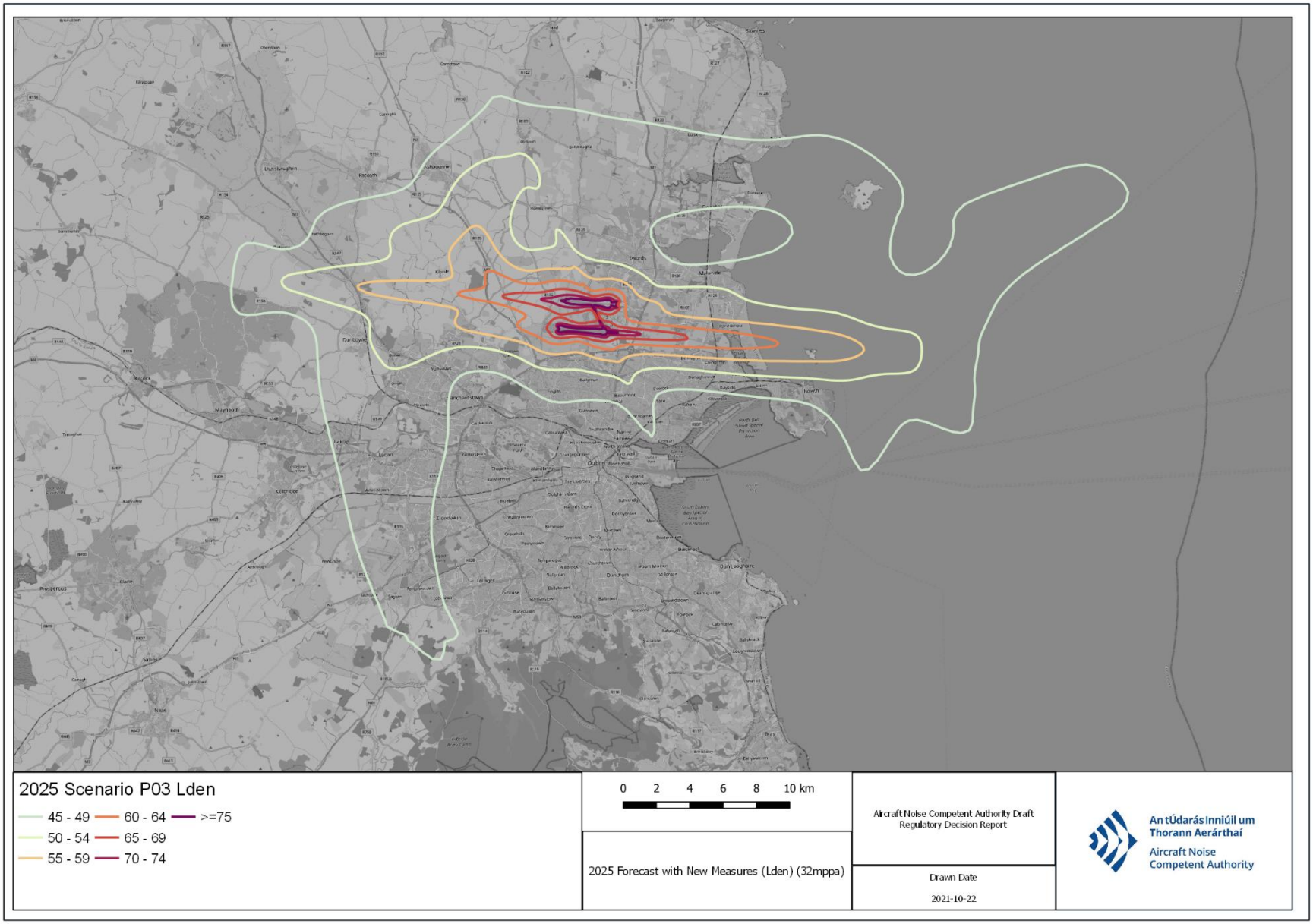
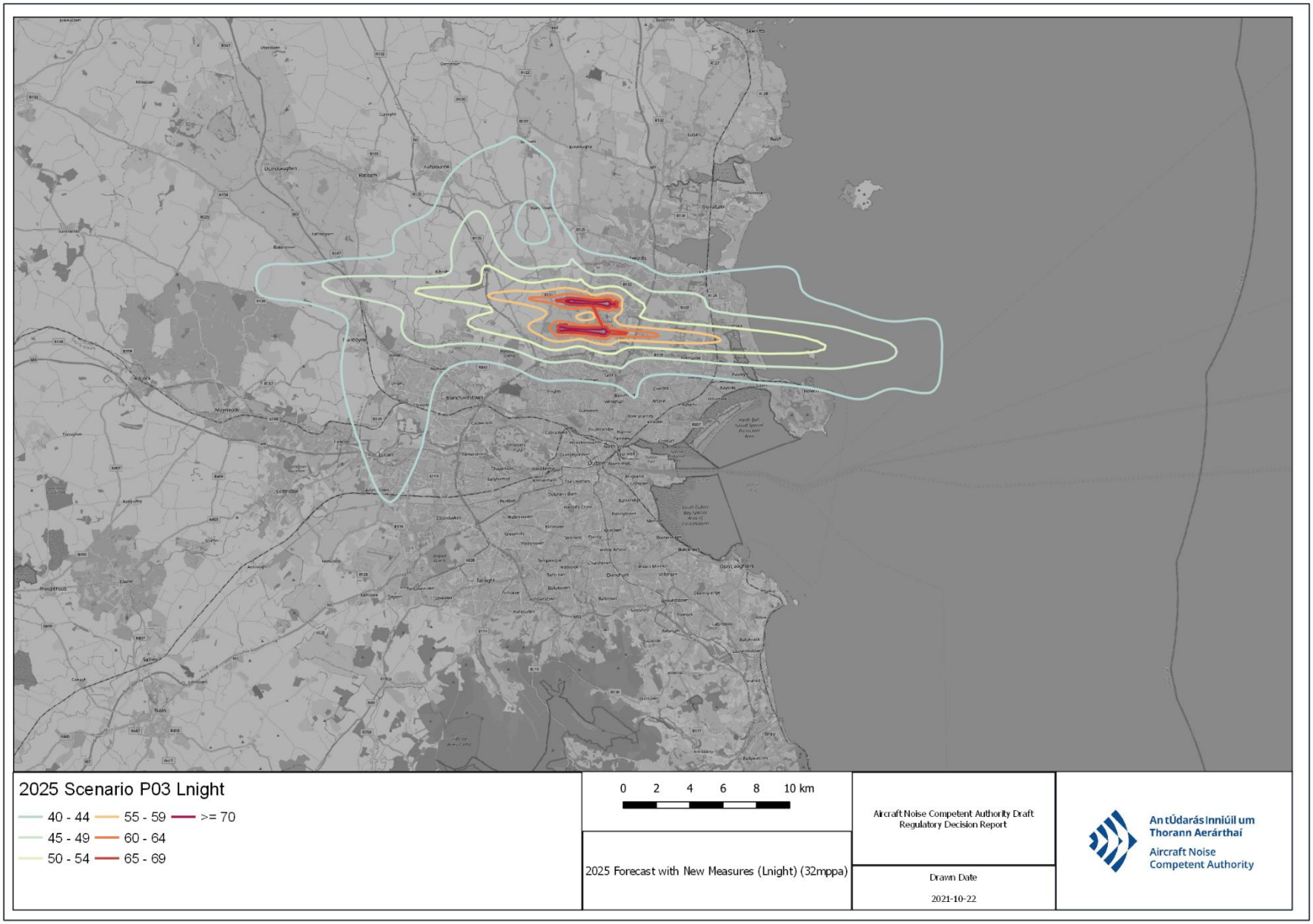
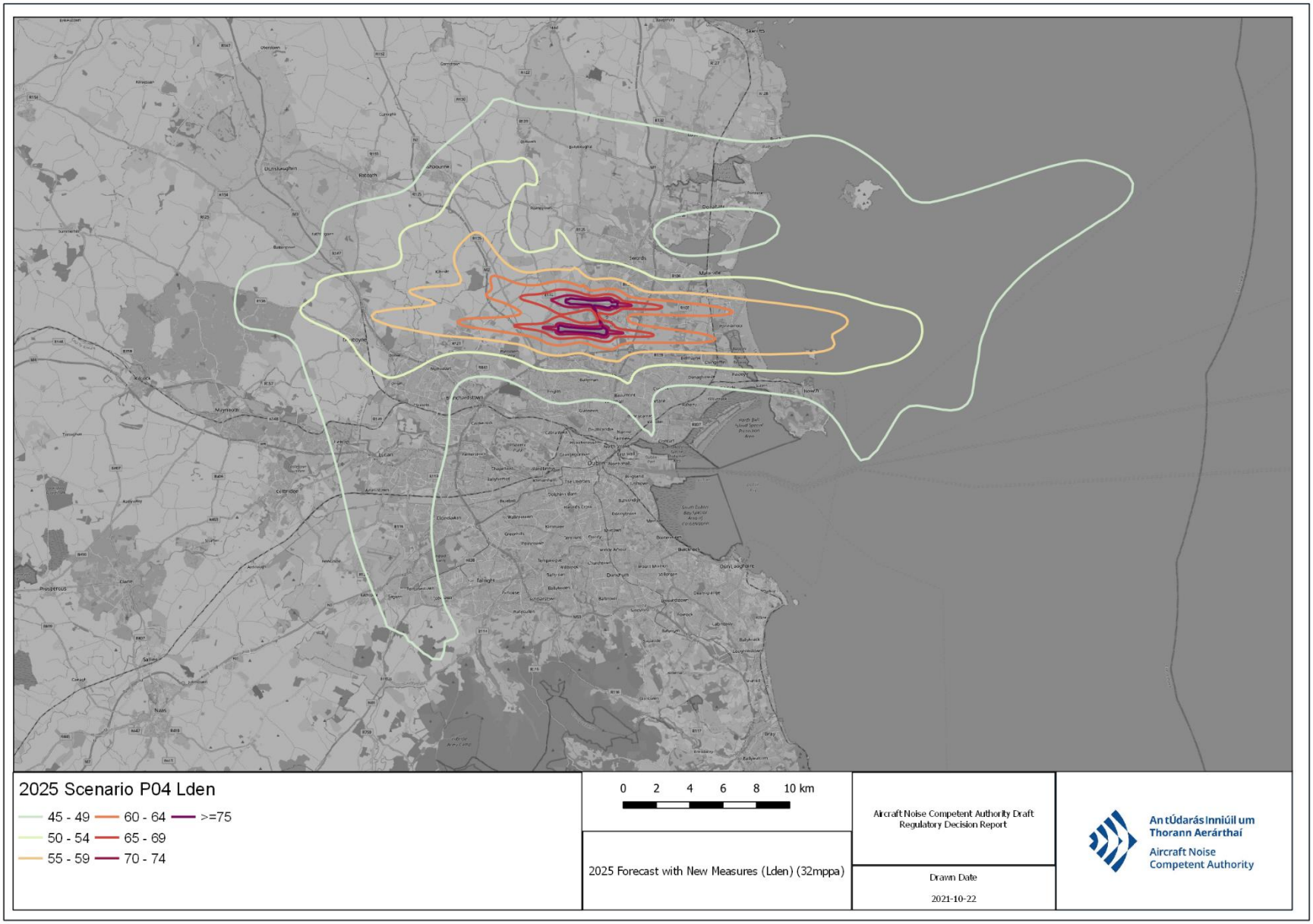
2021-10-22
An tÚdarás Inniúil um Thorann Aerárthaí
Aircraft Noise Competent Authority

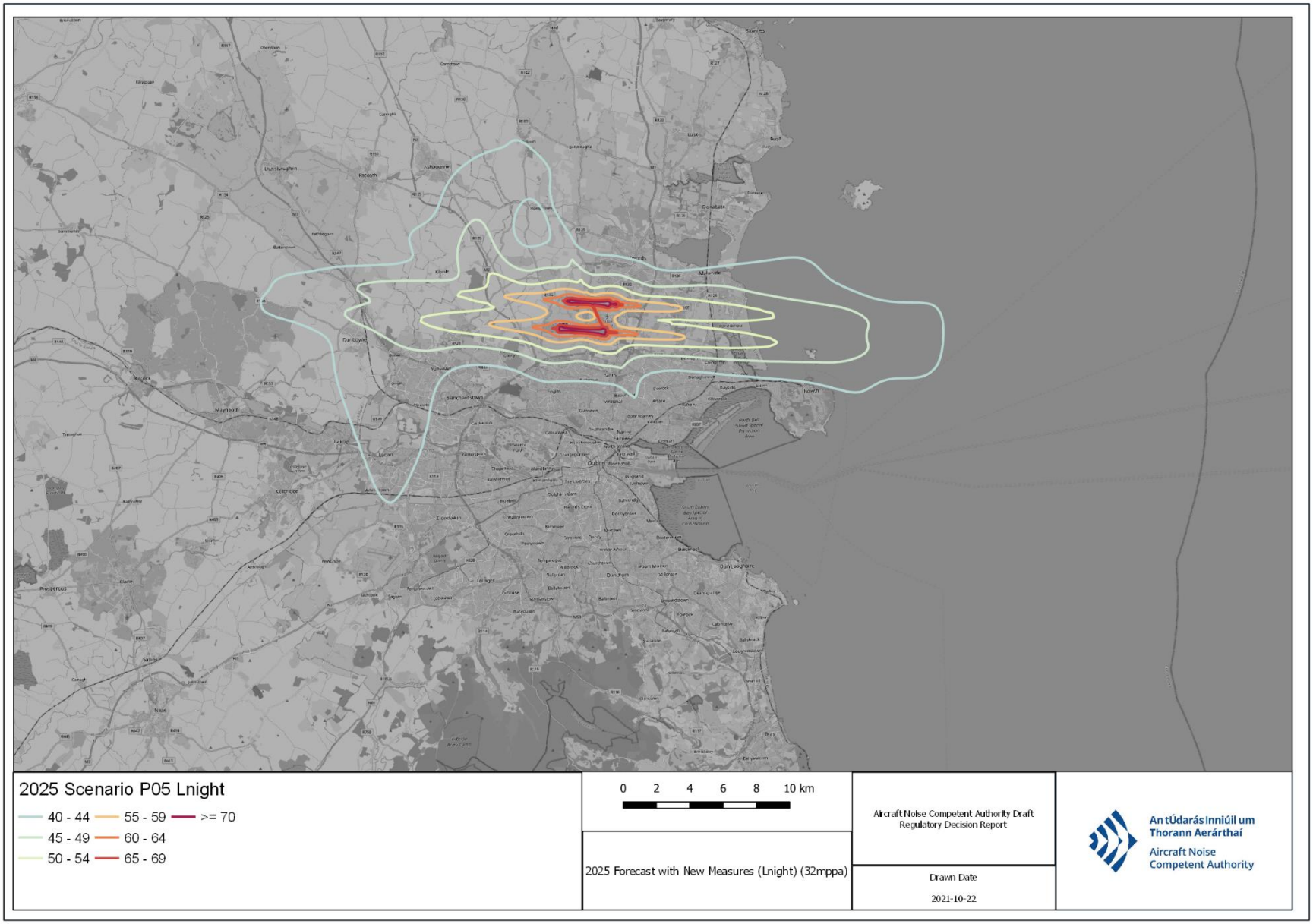

2025 Scenario P02 Lden
45 - 49
50 - 54
55 - 59
60 - 64
65 - 69
70 - 74
>=75
0 2 4 6 8 10 km
2025 Forecast with New Measures (Lden) (32mppa)
Aircraft Noise Competent Authority Draft Regulatory Decision Report
Drawn Date
2021-10-22
An tÚdarás Inniúil um Thorann Aerárthaí
Aircraft Noise Competent Authority

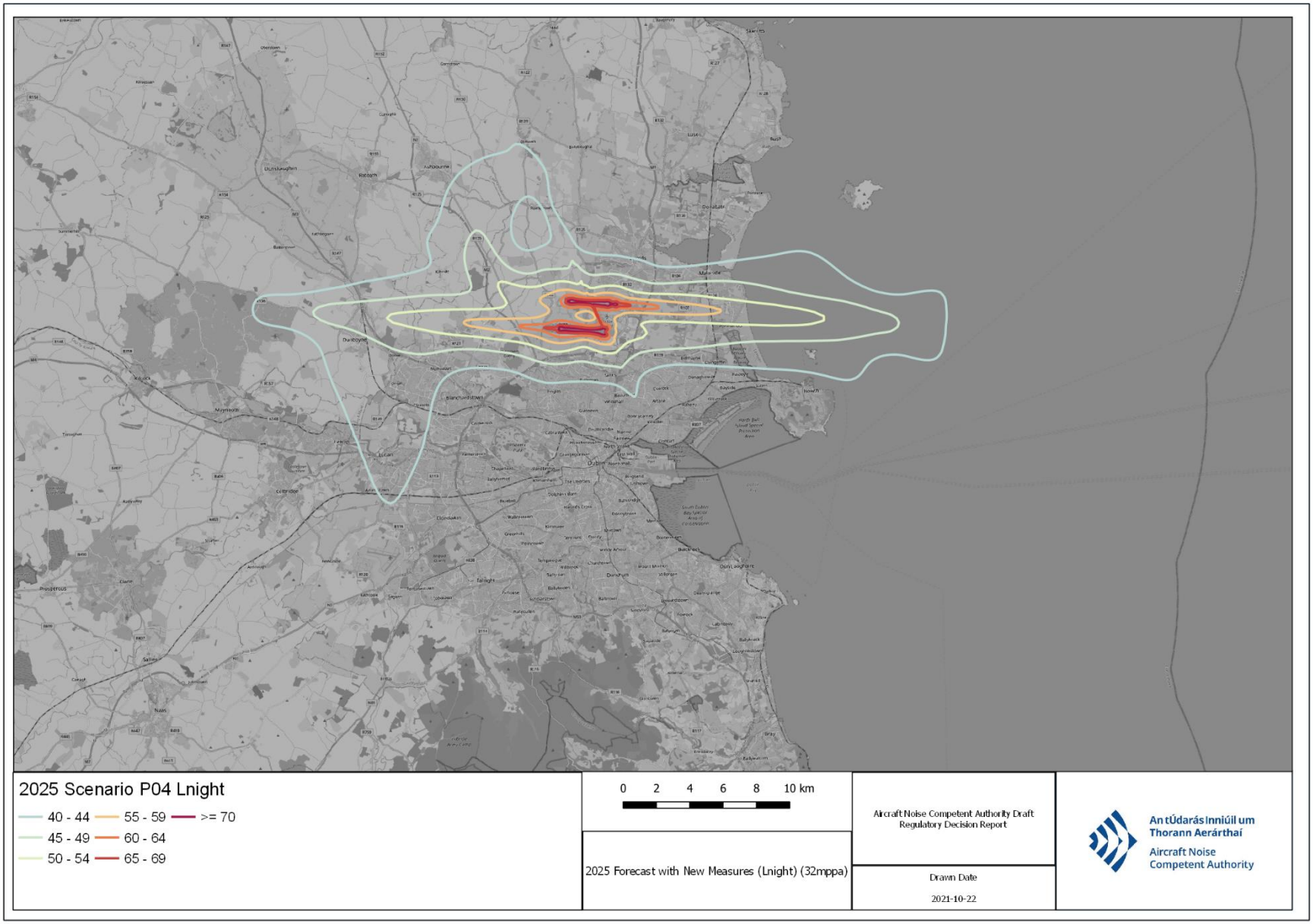

2025 Scenario P02 Lnight
40 - 44
45 - 49
50 - 54
55 - 59
60 - 64
65 - 69
>= 70
0 2 4 6 8 10 km
2025 Forecast with New Measures (Lnight) (32mppa)
Aircraft Noise Competent Authority Draft Regulatory Decision Report
Drawn Date
2021-10-22
An tÚdarás Inniúil um Thorann Aerárthaí
Aircraft Noise Competent Authority

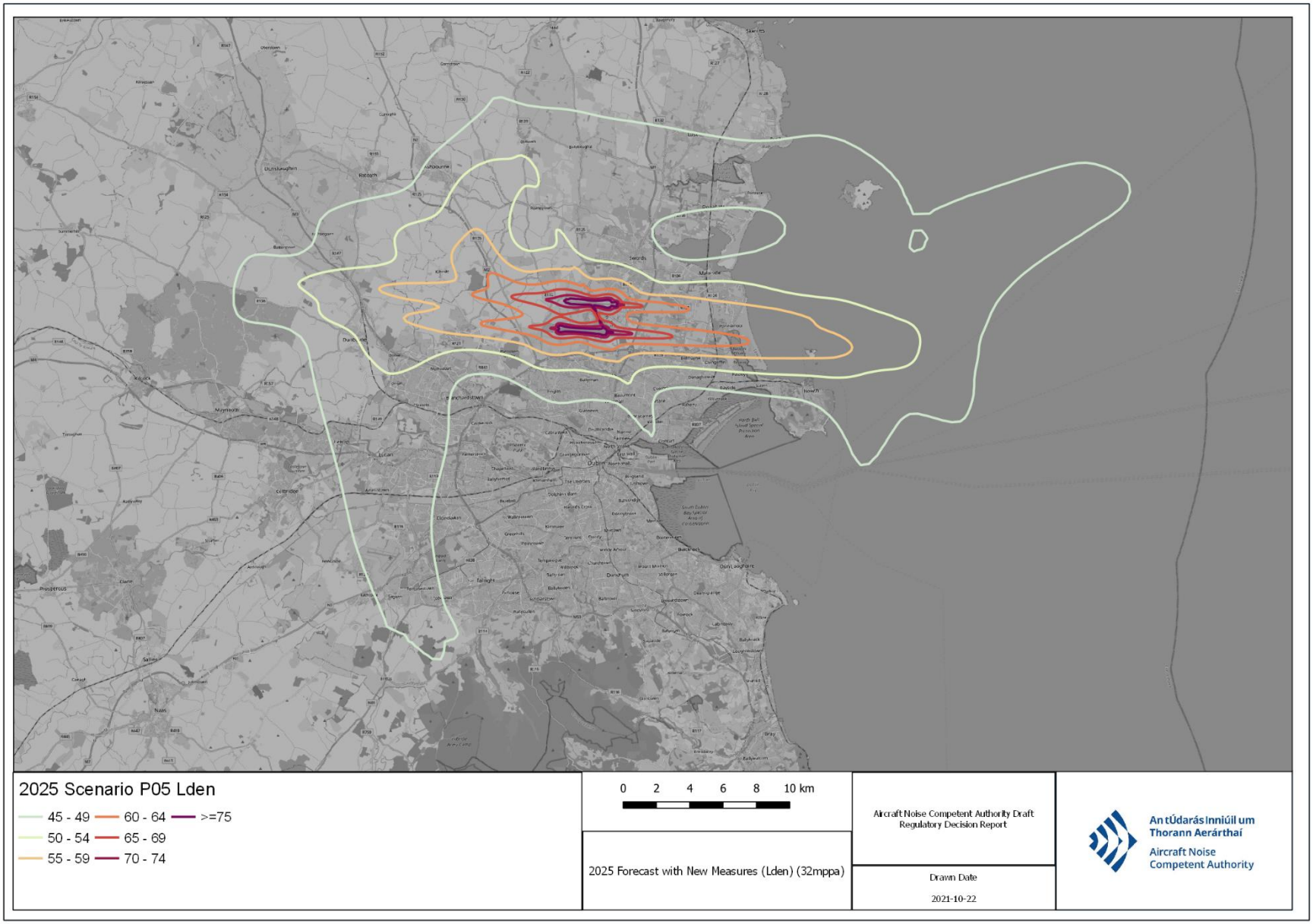

2025 Scenario P03 Lden
45 - 49
50 - 54
55 - 59
60 - 64
65 - 69
70 - 74
>=75
0 2 4 6 8 10 km
2025 Forecast with New Measures (Lden) (32mppa)
Aircraft Noise Competent Authority Draft Regulatory Decision Report
Drawn Date
2021-10-22
An tÚdarás Inniúil um Thorann Aerárthaí
Aircraft Noise Competent Authority

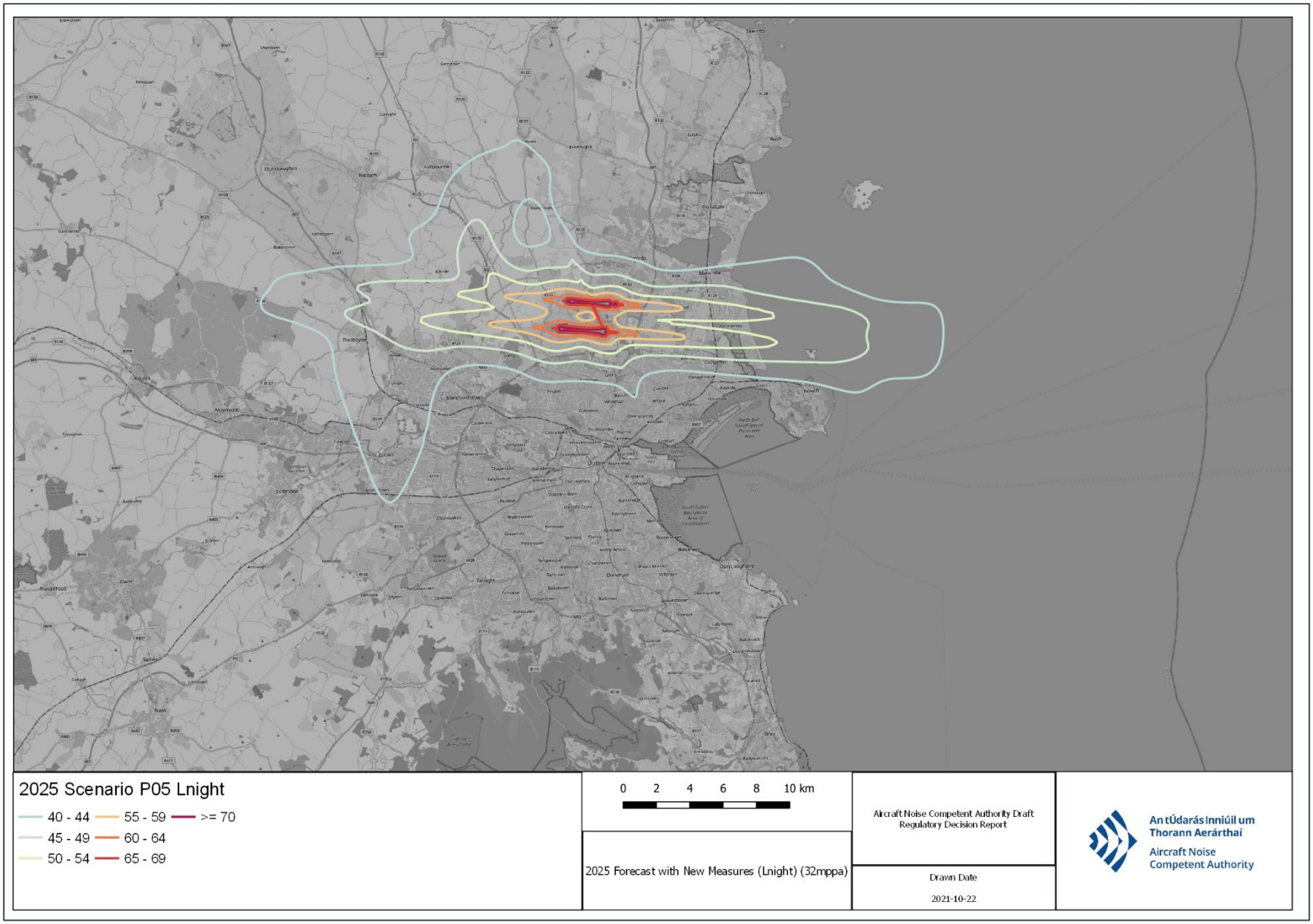

2025 Scenario P03 Lnight
40 - 44
45 - 49
50 - 54
55 - 59
60 - 64
65 - 69
>= 70
0 2 4 6 8 10 km
2025 Forecast with New Measures (Lnight) (32mppa)
Aircraft Noise Competent Authority Draft Regulatory Decision Report
Drawn Date
2021-10-22
An tÚdarás Inniúil um Thorann Aerárthaí
Aircraft Noise Competent Authority


2025 Scenario P04 Lden
45 - 49
50 - 54
55 - 59
60 - 64
65 - 69
70 - 74
>=75
0 2 4 6 8 10 km
2025 Forecast with New Measures (Lden) (32mppa)
Aircraft Noise Competent Authority Draft Regulatory Decision Report
Drawn Date
2021-10-22
An tÚdarás Inniúil um Thorann Aerárthaí
Aircraft Noise Competent Authority


2025 Scenario P05 Lnight
40 - 44
45 - 49
50 - 54
55 - 59
60 - 64
65 - 69
>= 70
0 2 4 6 8 10 km
2025 Forecast with New Measures (Lnight) (32mppa)
Aircraft Noise Competent Authority Draft Regulatory Decision Report
Drawn Date
2021-10-22
An tÚdarás Inniúil um Thorann Aerárthaí
Aircraft Noise Competent Authority


2025 Scenario P04 Lnight
40 - 44
45 - 49
50 - 54
55 - 59
60 - 64
65 - 69
>= 70
0 2 4 6 8 10 km
2025 Forecast with New Measures (Lnight) (32mppa)
Aircraft Noise Competent Authority Draft Regulatory Decision Report
Drawn Date
2021-10-22
An tÚdarás Inniúil um Thorann Aerárthaí
Aircraft Noise Competent Authority


2025 Scenario P05 Lden
45 - 49
50 - 54
55 - 59
60 - 64
65 - 69
70 - 74
>=75
0 2 4 6 8 10 km
2025 Forecast with New Measures (Lden) (32mppa)
Aircraft Noise Competent Authority Draft Regulatory Decision Report
Drawn Date
2021-10-22
An tÚdarás Inniúil um Thorann Aerárthaí
Aircraft Noise Competent Authority


2025 Scenario P05 Lnight
40 - 44
45 - 49
50 - 54
55 - 59
60 - 64
65 - 69
>= 70
0 2 4 6 8 10 km
2025 Forecast with New Measures (Lnight) (32mppa)
Aircraft Noise Competent Authority Draft Regulatory Decision Report
Drawn Date
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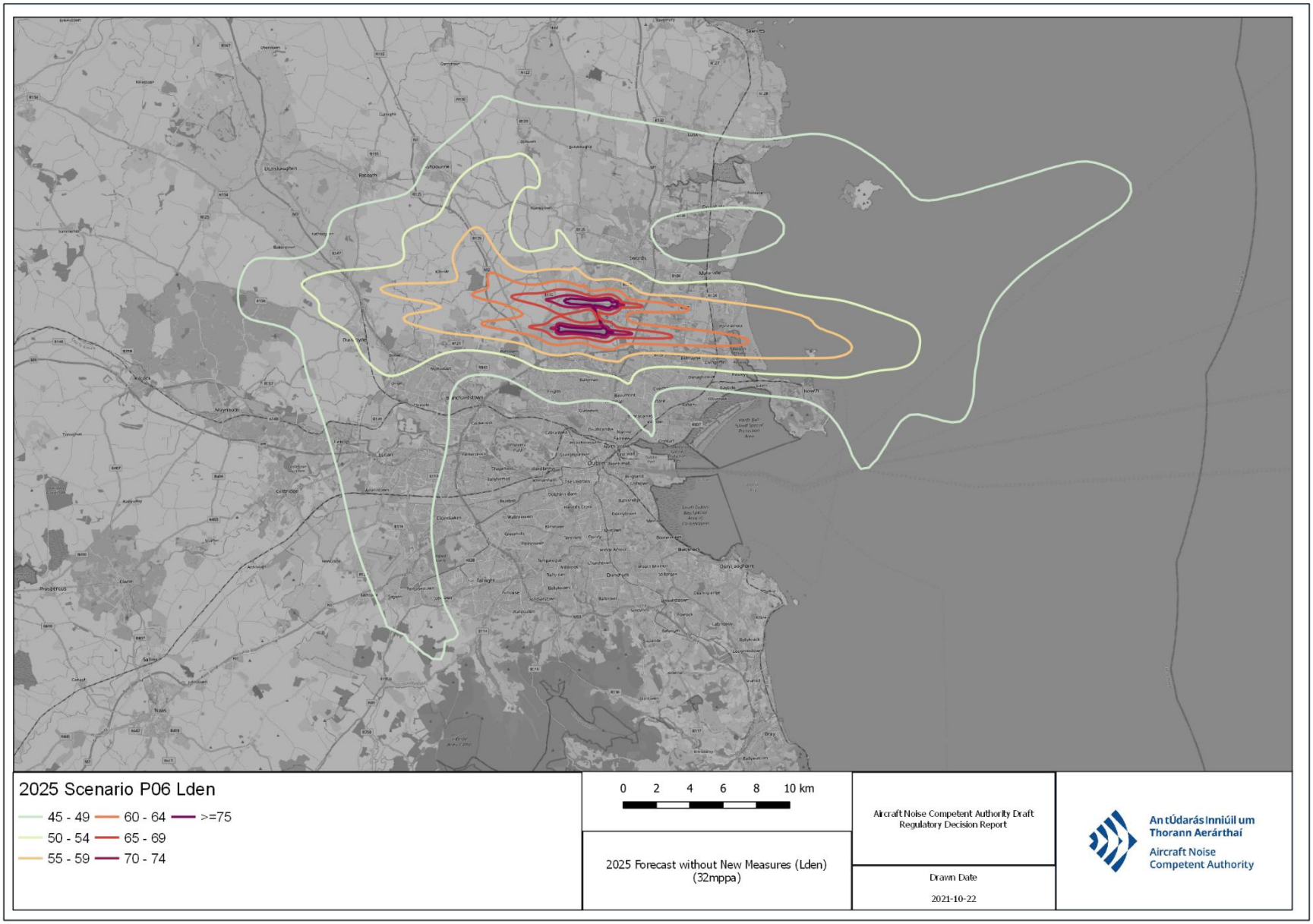
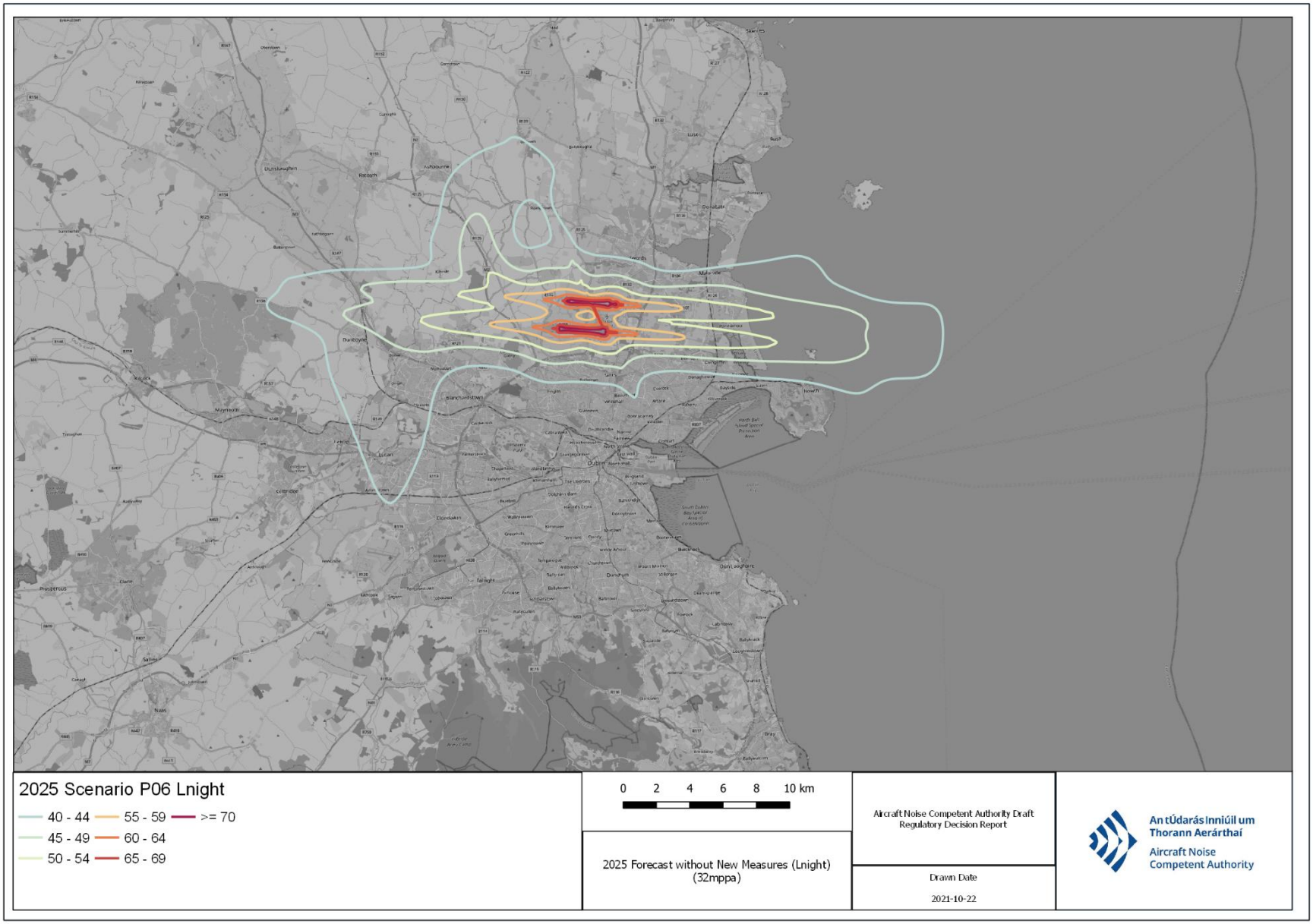
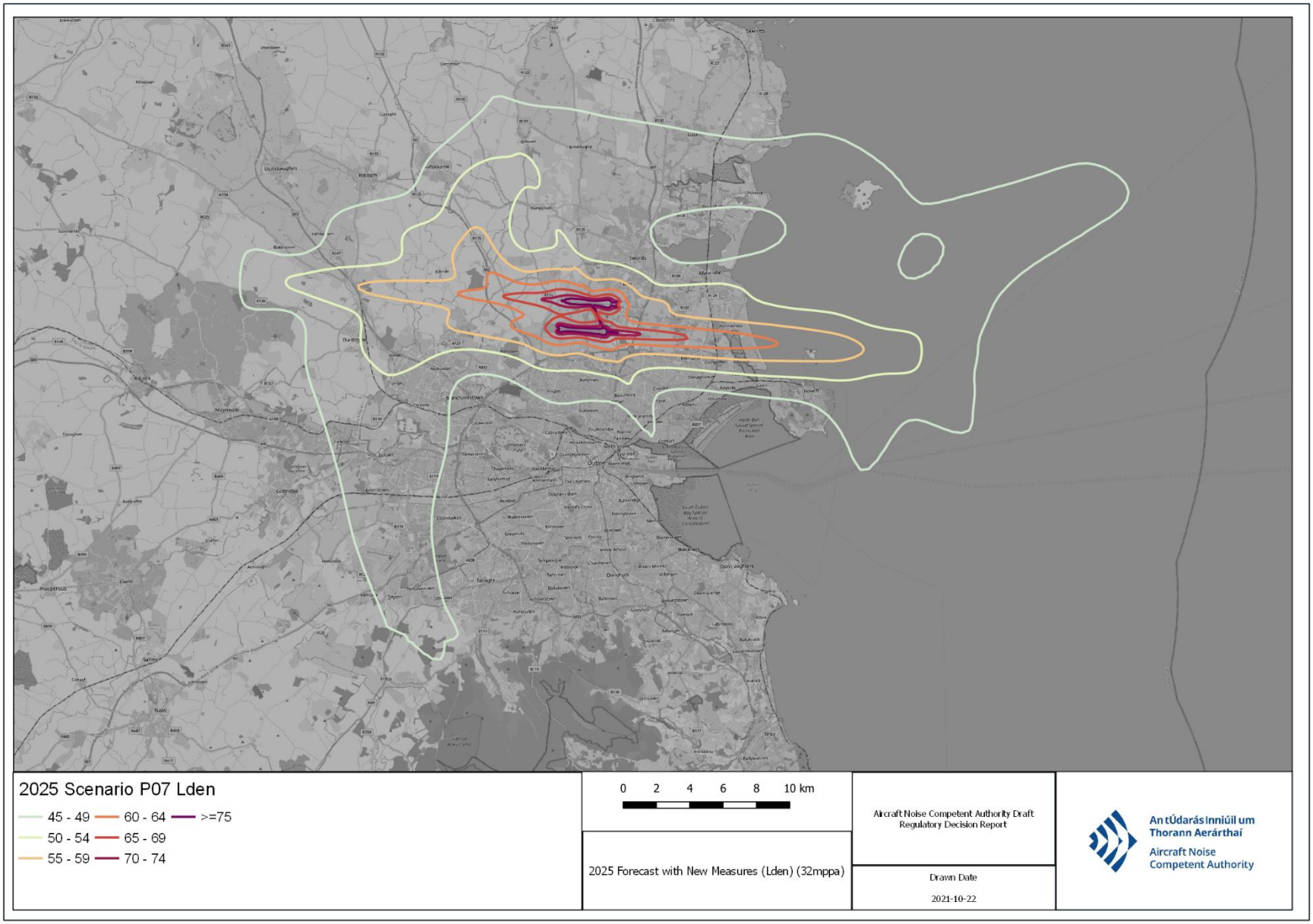
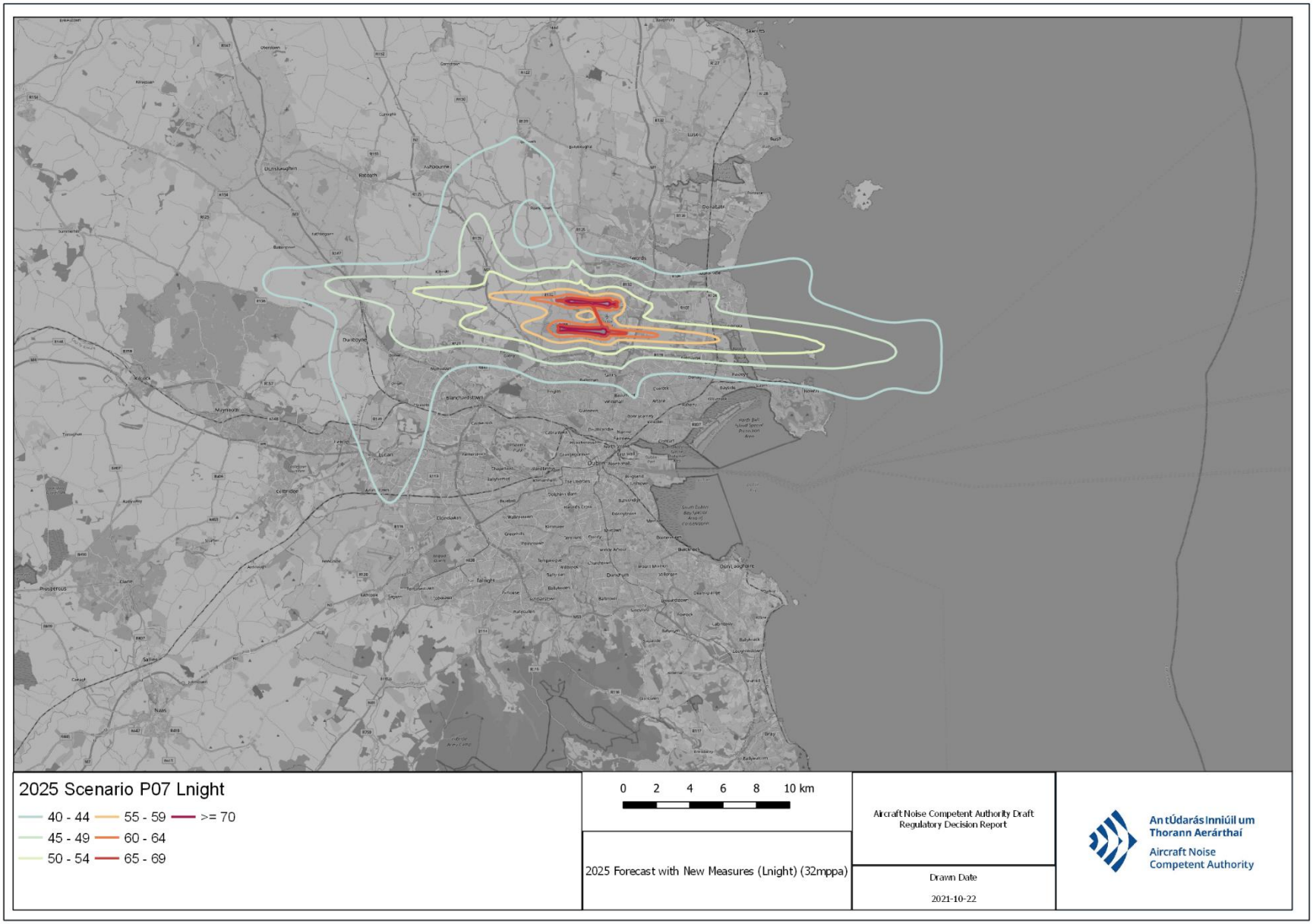
An tÚdarás Inniúil um Thorann Aerárthaí
Aircraft Noise Competent Authority


2025 Scenario P06 Lden
45 - 49
50 - 54
55 - 59
60 - 64
65 - 69
70 - 74
>=75
0 2 4 6 8 10 km
2025 Forecast without New Measures (Lden) (32mppa)
Aircraft Noise Competent Authority Draft Regulatory Decision Report
Drawn Date
2021-10-22
An tÚdarás Inniúil um Thorann Aerárthaí
Aircraft Noise Competent Authority


2025 Scenario P06 Lnight
40 - 44
45 - 49
50 - 54
55 - 59
60 - 64
65 - 69
>= 70
0 2 4 6 8 10 km
2025 Forecast without New Measures (Lnight) (32mppa)
Aircraft Noise Competent Authority Draft Regulatory Decision Report
Drawn Date
2021-10-22
An tÚdarás Inniúil um Thorann Aerárthaí
Aircraft Noise Competent Authority


2025 Scenario P07 Lden
45 - 49
50 - 54
55 - 59
60 - 64
65 - 69
70 - 74
>=75
0 2 4 6 8 10 km
2025 Forecast with New Measures (Lden) (32mppa)
Aircraft Noise Competent Authority Draft Regulatory Decision Report
Drawn Date
2021-10-22
An tÚdarás Inniúil um Thorann Aerárthaí
Aircraft Noise Competent Authority


2025 Scenario P07 Lnight
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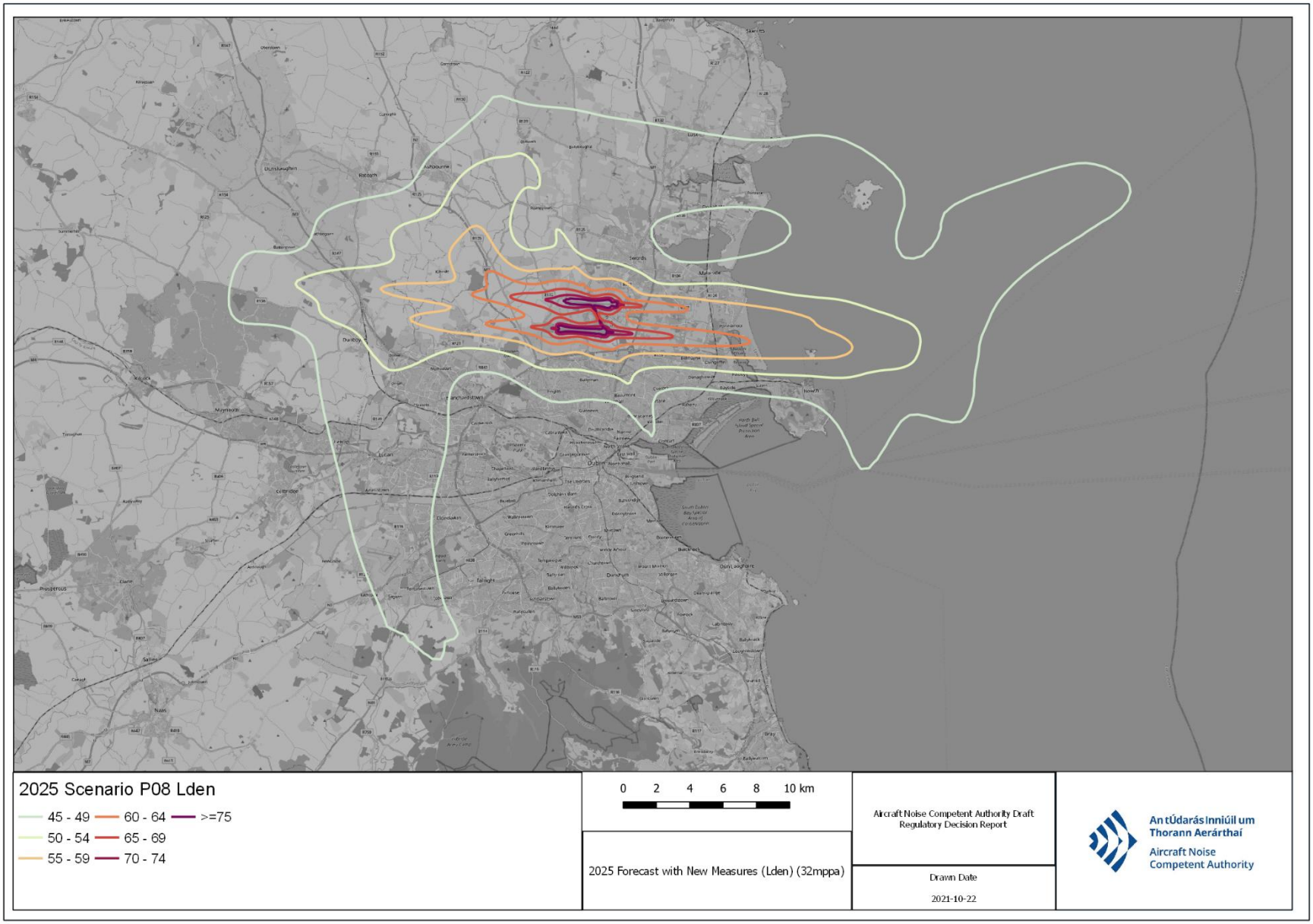
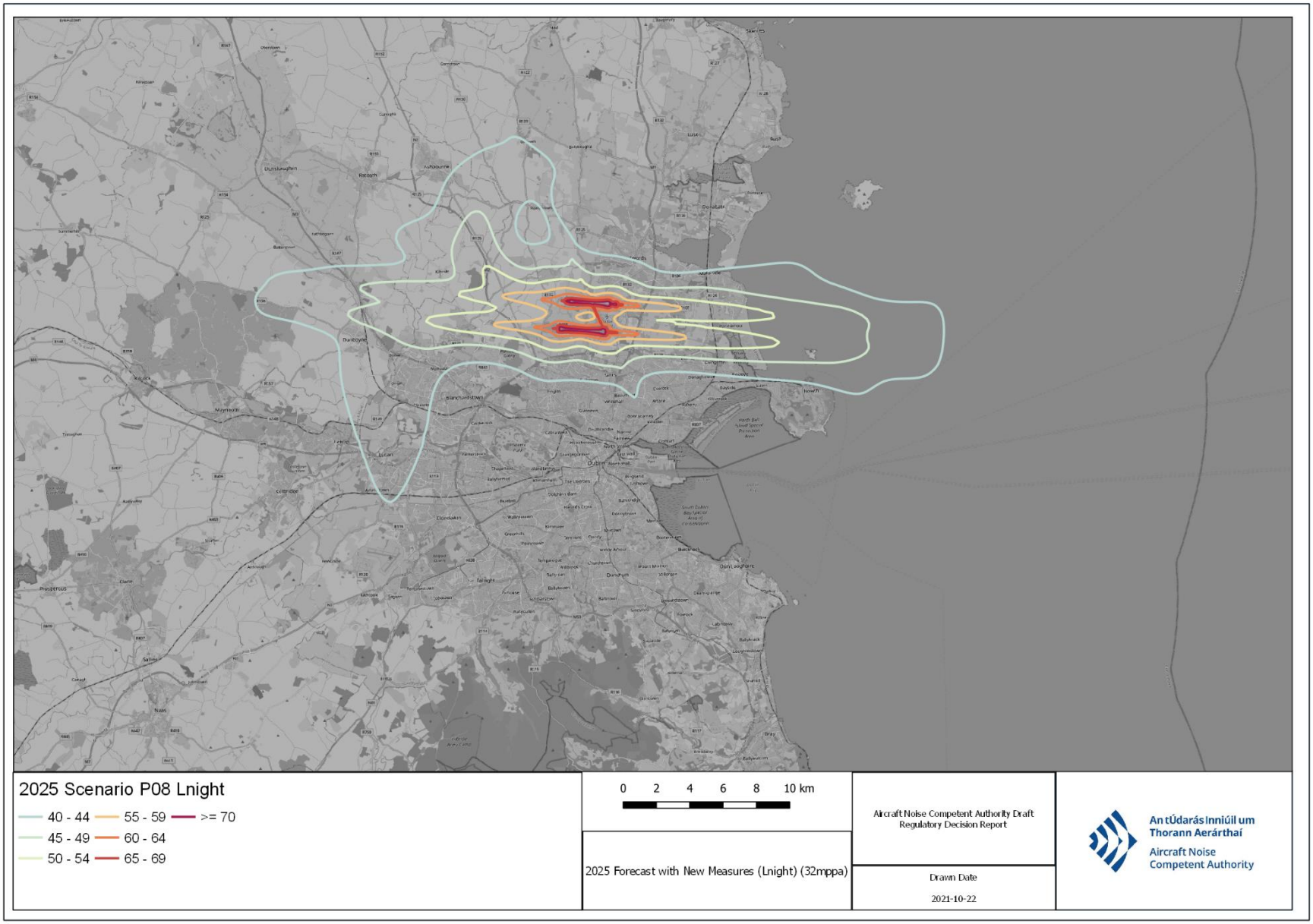
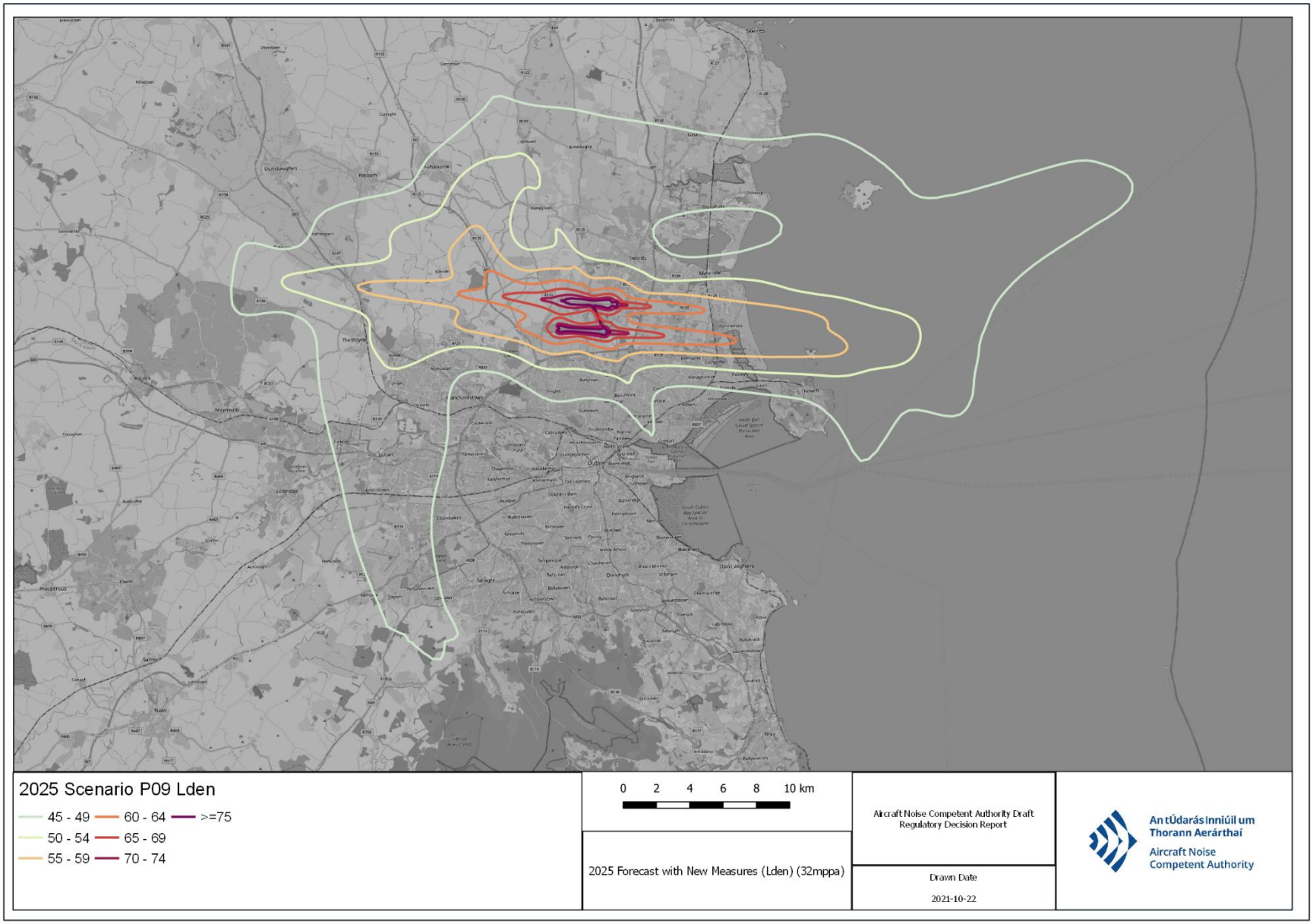
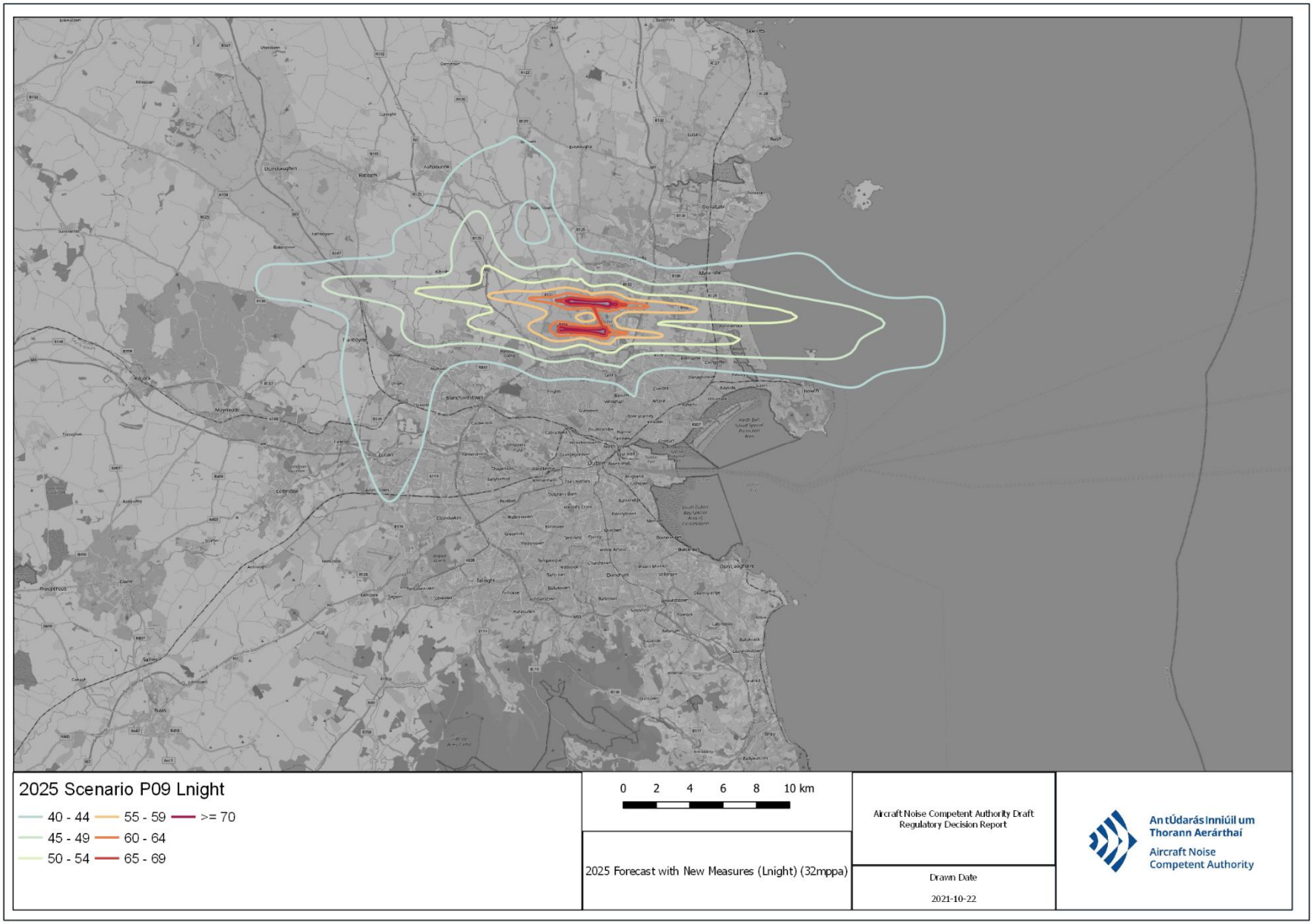
45 - 49
50 - 54
55 - 59
60 - 64
65 - 69
>= 70
0 2 4 6 8 10 km
2025 Forecast with New Measures (Lnight) (32mppa)
Aircraft Noise Competent Authority Draft Regulatory Decision Report
Drawn Date
2021-10-22
An tÚdarás Inniúil um Thorann Aerárthaí
Aircraft Noise Competent Authority


2025 Scenario P08 Lden
45 - 49
50 - 54
55 - 59
60 - 64
65 - 69
70 - 74
>=75
0 2 4 6 8 10 km
2025 Forecast with New Measures (Lden) (32mppa)
Aircraft Noise Competent Authority Draft Regulatory Decision Report
Drawn Date
2021-10-22
An tÚdarás Inniúil um Thorann Aerárthaí
Aircraft Noise Competent Authority


2025 Scenario P08 Lnight
40 - 44
45 - 49
50 - 54
55 - 59
60 - 64
65 - 69
>= 70
0 2 4 6 8 10 km
2025 Forecast with New Measures (Lnight) (32mppa)
Aircraft Noise Competent Authority Draft Regulatory Decision Report
Drawn Date
2021-10-22
An tÚdarás Inniúil um Thorann Aerárthaí
Aircraft Noise Competent Authority


2025 Scenario P09 Lden
45 - 49
50 - 54
55 - 59
60 - 64
65 - 69
70 - 74
>=75
0 2 4 6 8 10 km
2025 Forecast with New Measures (Lden) (32mppa)
Aircraft Noise Competent Authority Draft Regulatory Decision Report
Drawn Date
2021-10-22
An tÚdarás Inniúil um Thorann Aerárthaí
Aircraft Noise Competent Authority


2025 Scenario P09 Lnight
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50 - 54
55 - 59
60 - 64
65 - 69
>= 70
0 2 4 6 8 10 km
2025 Forecast with New Measures (Lnight) (32mppa)
Aircraft Noise Competent Authority Draft Regulatory Decision Report
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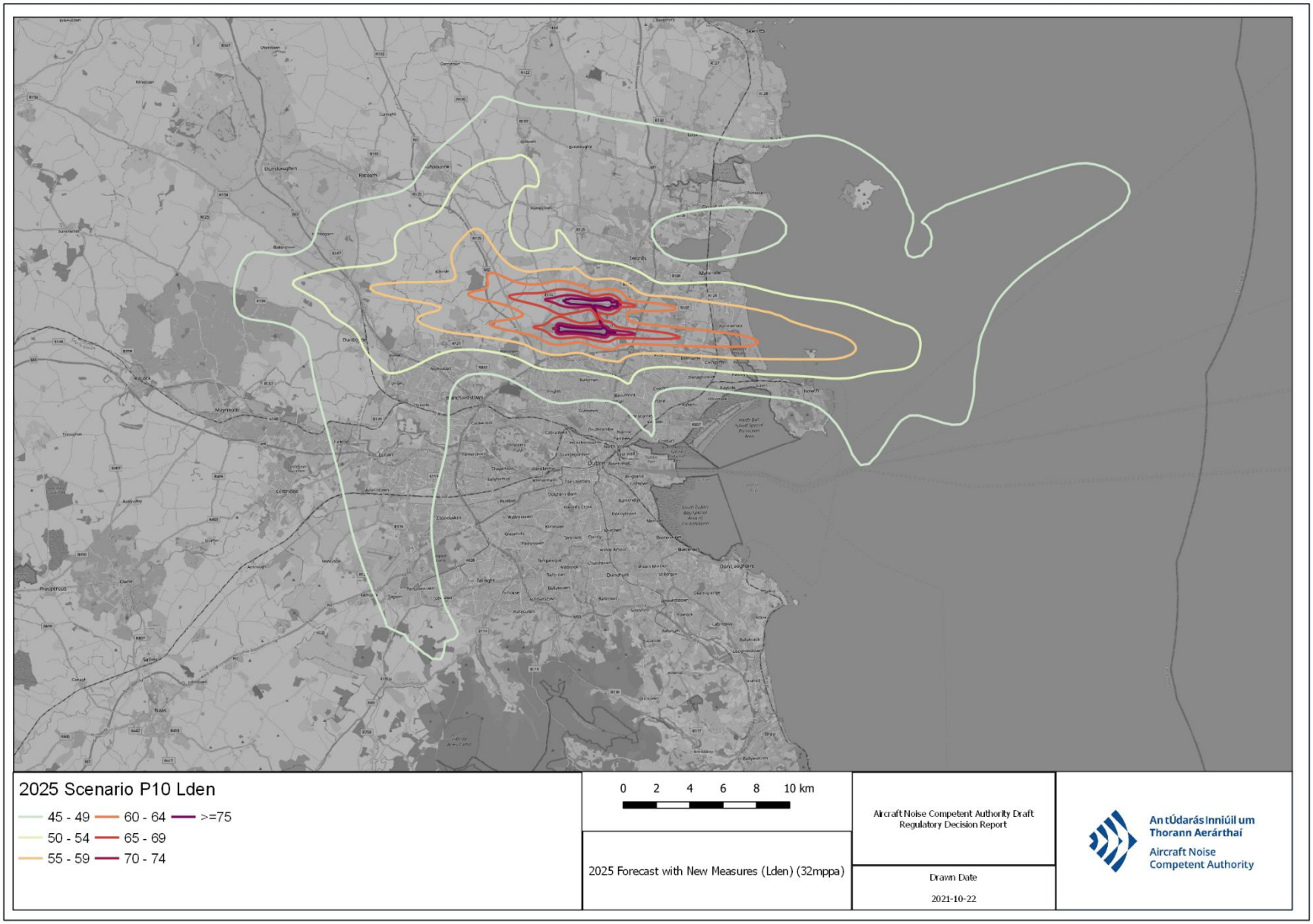
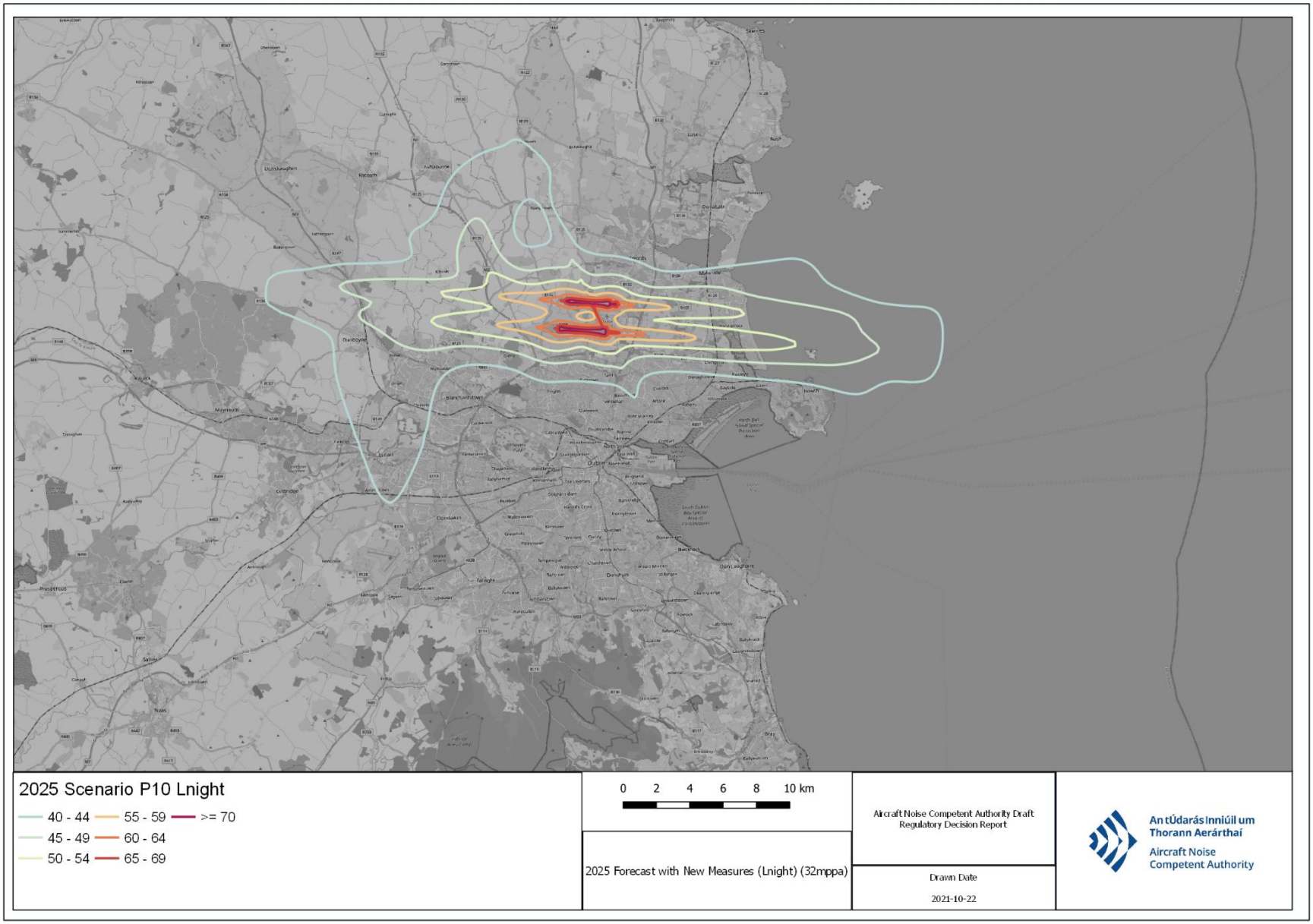
2021-10-22
An tÚdarás Inniúil um Thorann Aerárthaí
Aircraft Noise Competent Authority


2025 Scenario P10 Lden
45 - 49
50 - 54
55 - 59
60 - 64
65 - 69
70 - 74
>=75
0 2 4 6 8 10 km
2025 Forecast with New Measures (Lden) (32mppa)
Aircraft Noise Competent Authority Draft Regulatory Decision Report
Drawn Date
2021-10-22
An tÚdarás Inniúil um Thorann Aerárthaí
Aircraft Noise Competent Authority


2025 Scenario P10 Lnight
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45 - 49
50 - 54
55 - 59
60 - 64
65 - 69
>= 70
0 2 4 6 8 10 km
2025 Forecast with New Measures (Lnight) (32mppa)
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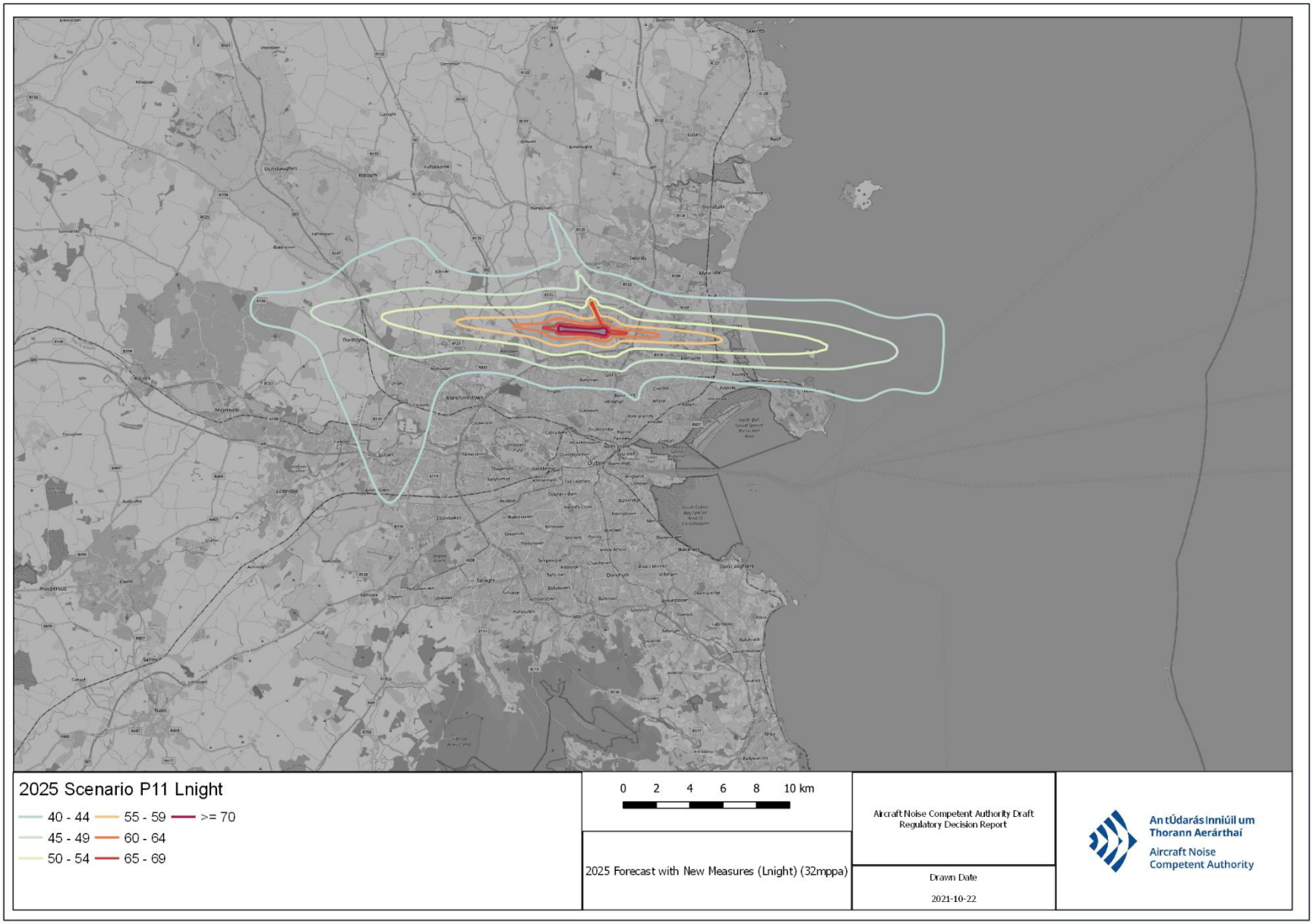
An tÚdarás Inniúil um Thorann Aerárthaí
Aircraft Noise Competent Authority


2025 Scenario P11 Lnight
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45 - 49
50 - 54
55 - 59
60 - 64
65 - 69
>= 70
0 2 4 6 8 10 km
2025 Forecast with New Measures (Lnight) (32mppa)
Aircraft Noise Competent Authority Draft Regulatory Decision Report
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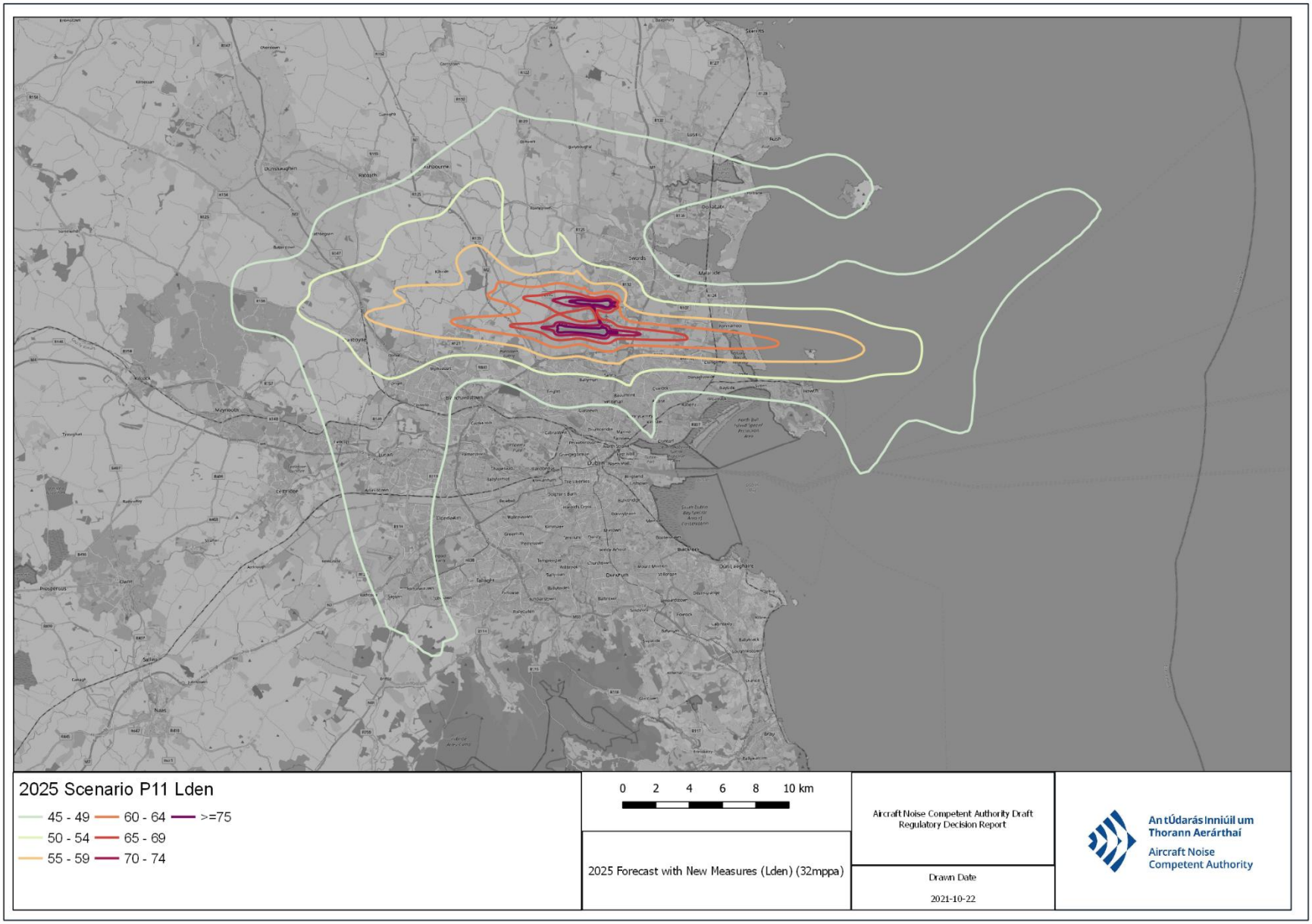
2021-10-22
An tÚdarás Inniúil um Thorann Aerárthaí
Aircraft Noise Competent Authority


2025 Scenario P11 Lden
45 - 49
50 - 54
55 - 59
60 - 64
65 - 69
70 - 74
>=75
0 2 4 6 8 10 km
2025 Forecast with New Measures (Lden) (32mppa)
Aircraft Noise Competent Authority Draft Regulatory Decision Report
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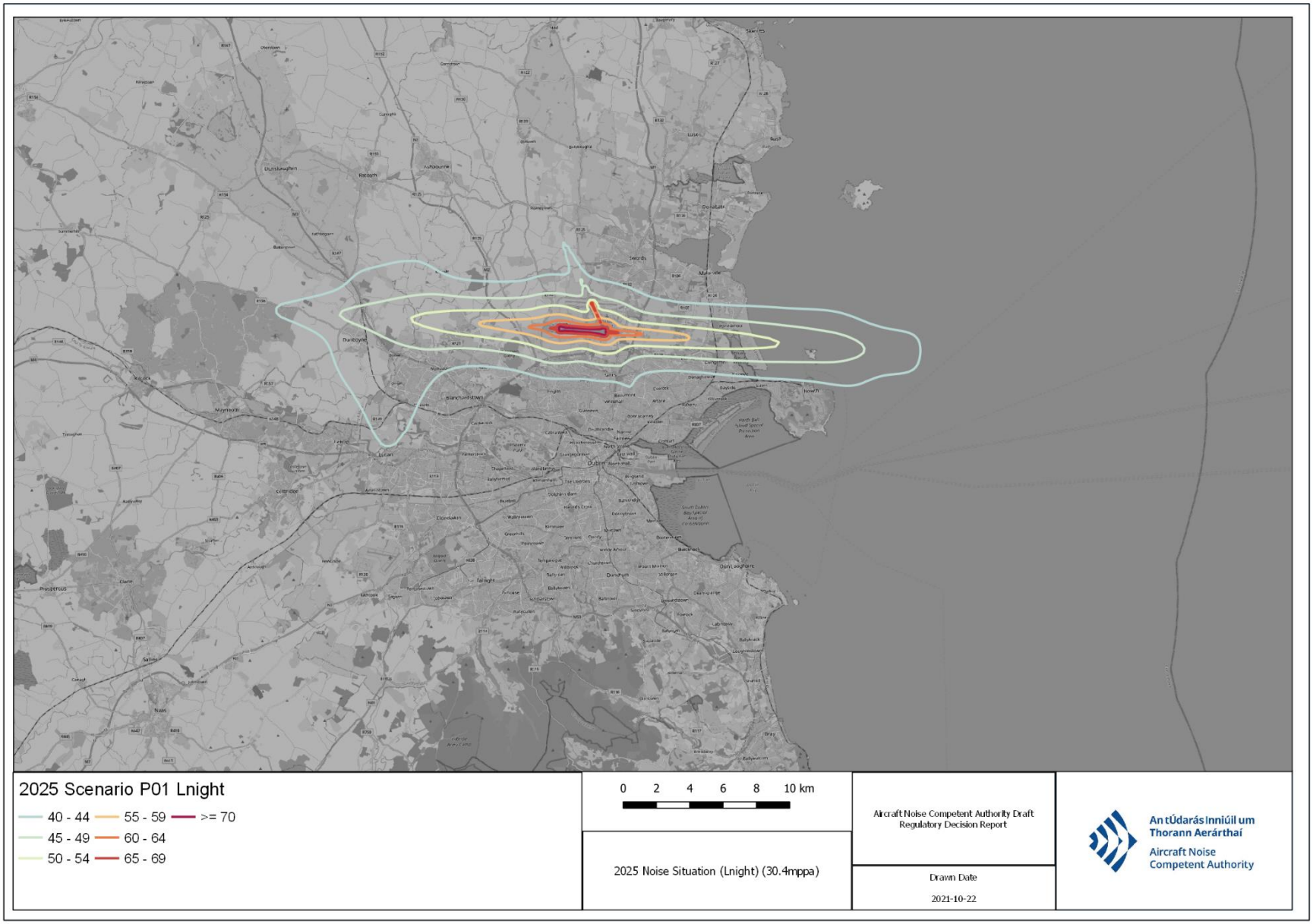
2021-10-22
An tÚdarás Inniúil um Thorann Aerárthaí
Aircraft Noise Competent Authority


2025 Scenario P01 Lnight
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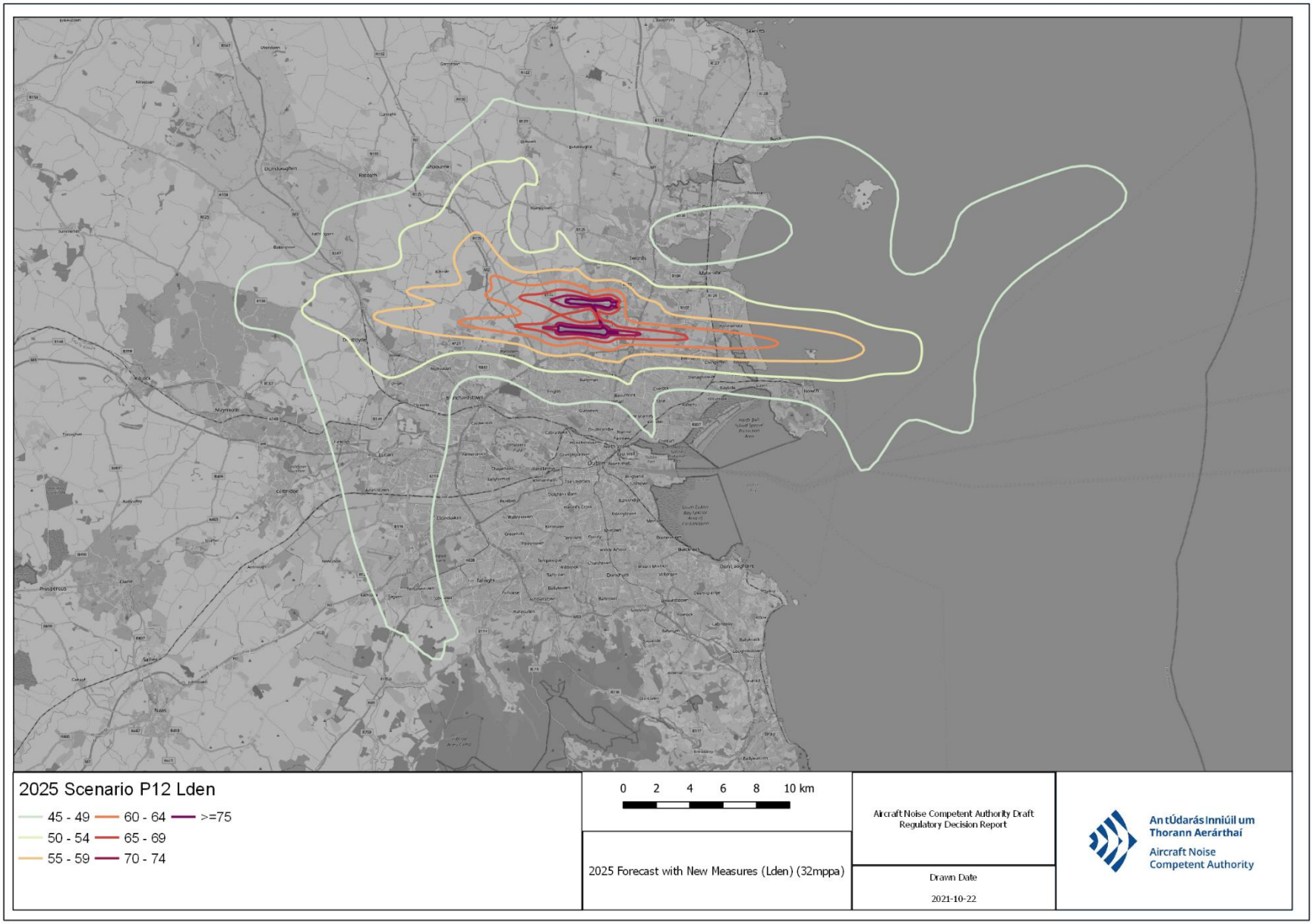
45 - 49
50 - 54
55 - 59
60 - 64
65 - 69
>= 70
0 2 4 6 8 10 km
2025 Noise Situation (Lnight) (30.4mppa)
Aircraft Noise Competent Authority Draft Regulatory Decision Report
Drawn Date
2021-10-22
An tÚdarás Inniúil um Thorann Aerárthaí
Aircraft Noise Competent Authority


2025 Scenario P12 Lden
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50 - 54
55 - 59
60 - 64
65 - 69
70 - 74
>=75
0 2 4 6 8 10 km
2025 Forecast with New Measures (Lden) (32mppa)
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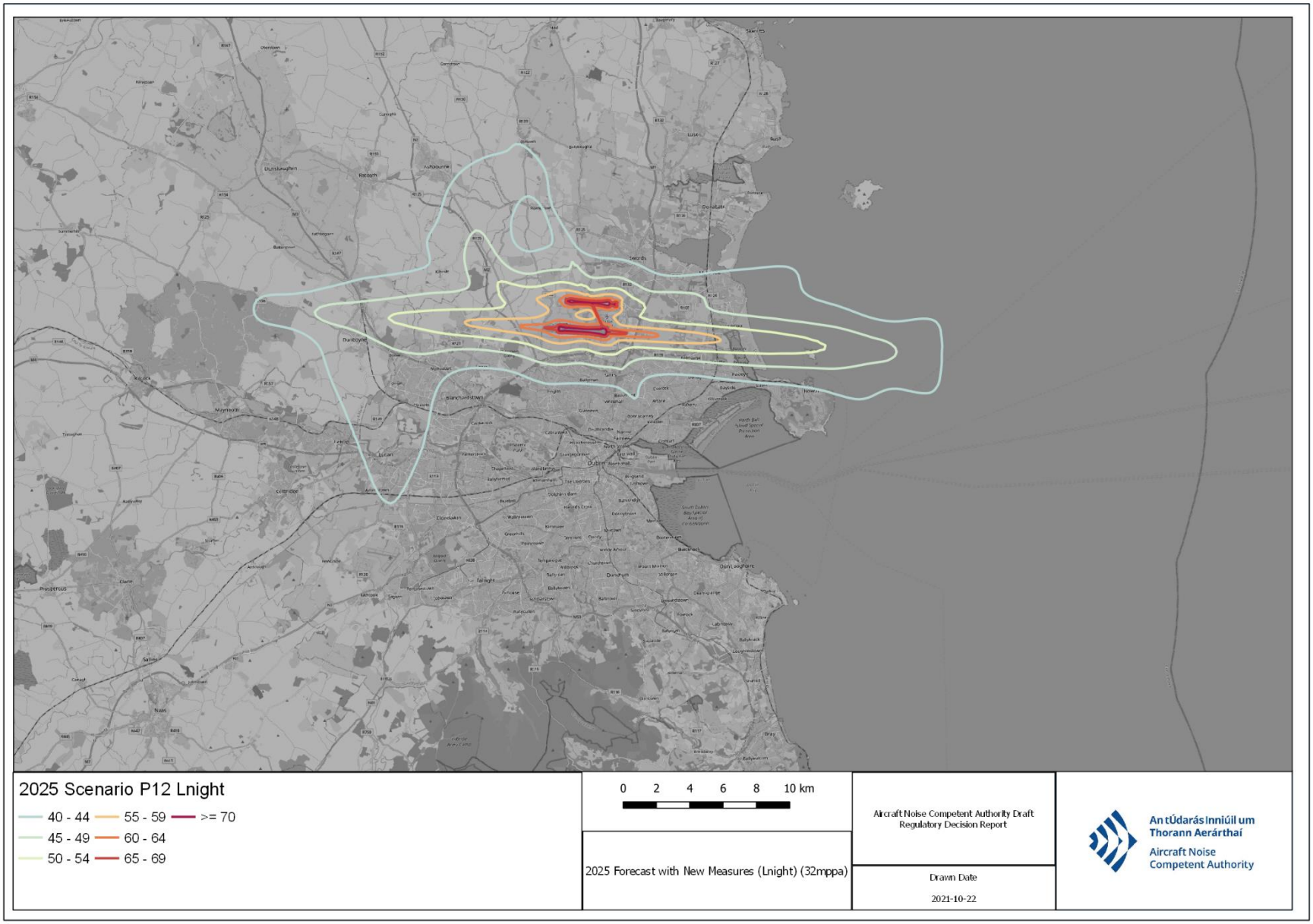
Drawn Date
2021-10-22
An tÚdarás Inniúil um Thorann Aerárthaí
Aircraft Noise Competent Authority


2025 Scenario P12 Lnight
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45 - 49
50 - 54
55 - 59
60 - 64
65 - 69
>= 70
0 2 4 6 8 10 km
2025 Forecast with New Measures (Lnight) (32mppa)
Aircraft Noise Competent Authority Draft Regulatory Decision Report
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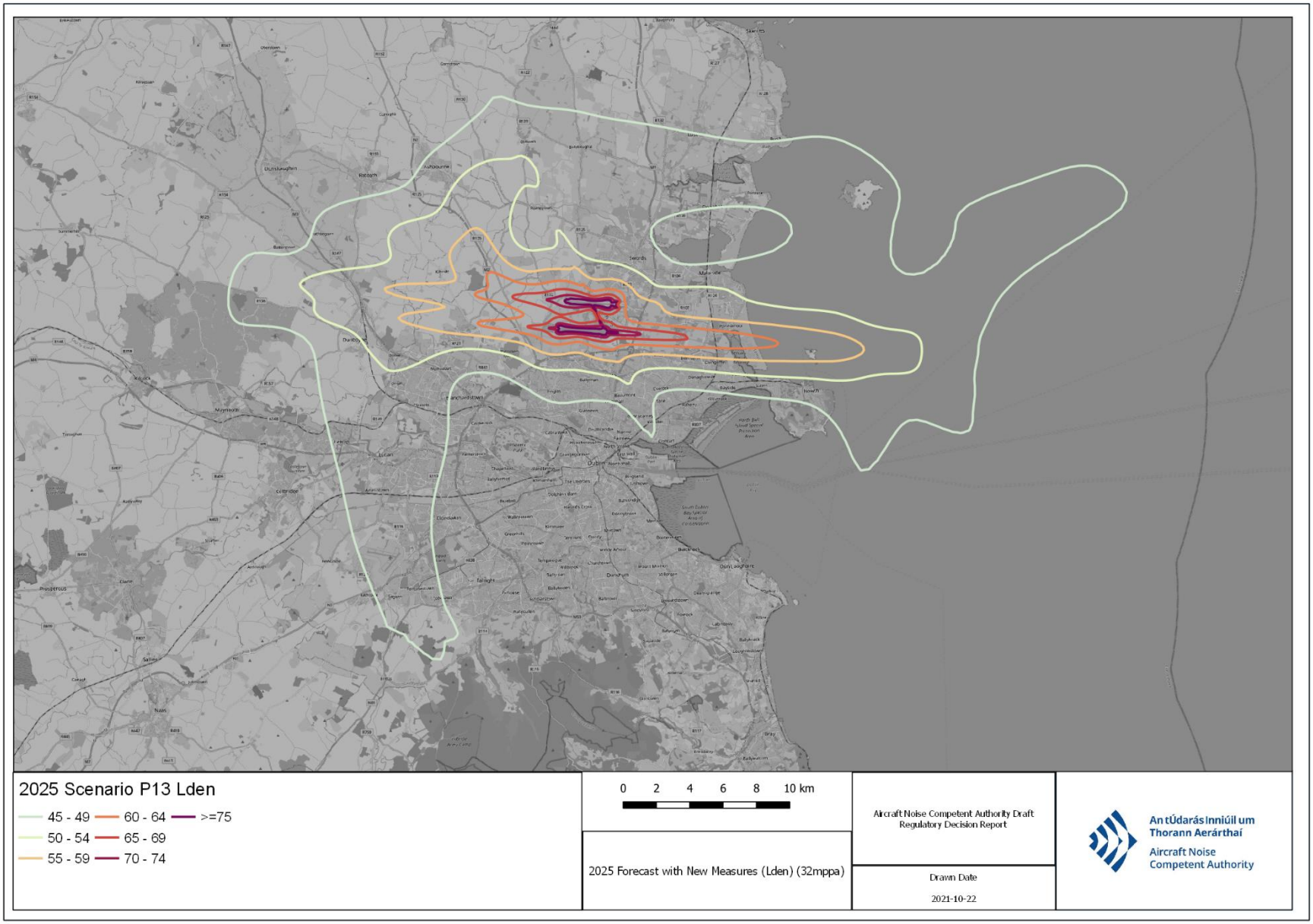
2021-10-22
An tÚdarás Inniúil um Thorann Aerárthaí
Aircraft Noise Competent Authority


2025 Scenario P13 Lden
45 - 49
50 - 54
55 - 59
60 - 64
65 - 69
70 - 74
>=75
0 2 4 6 8 10 km
2025 Forecast with New Measures (Lden) (32mppa)
Aircraft Noise Competent Authority Draft Regulatory Decision Report
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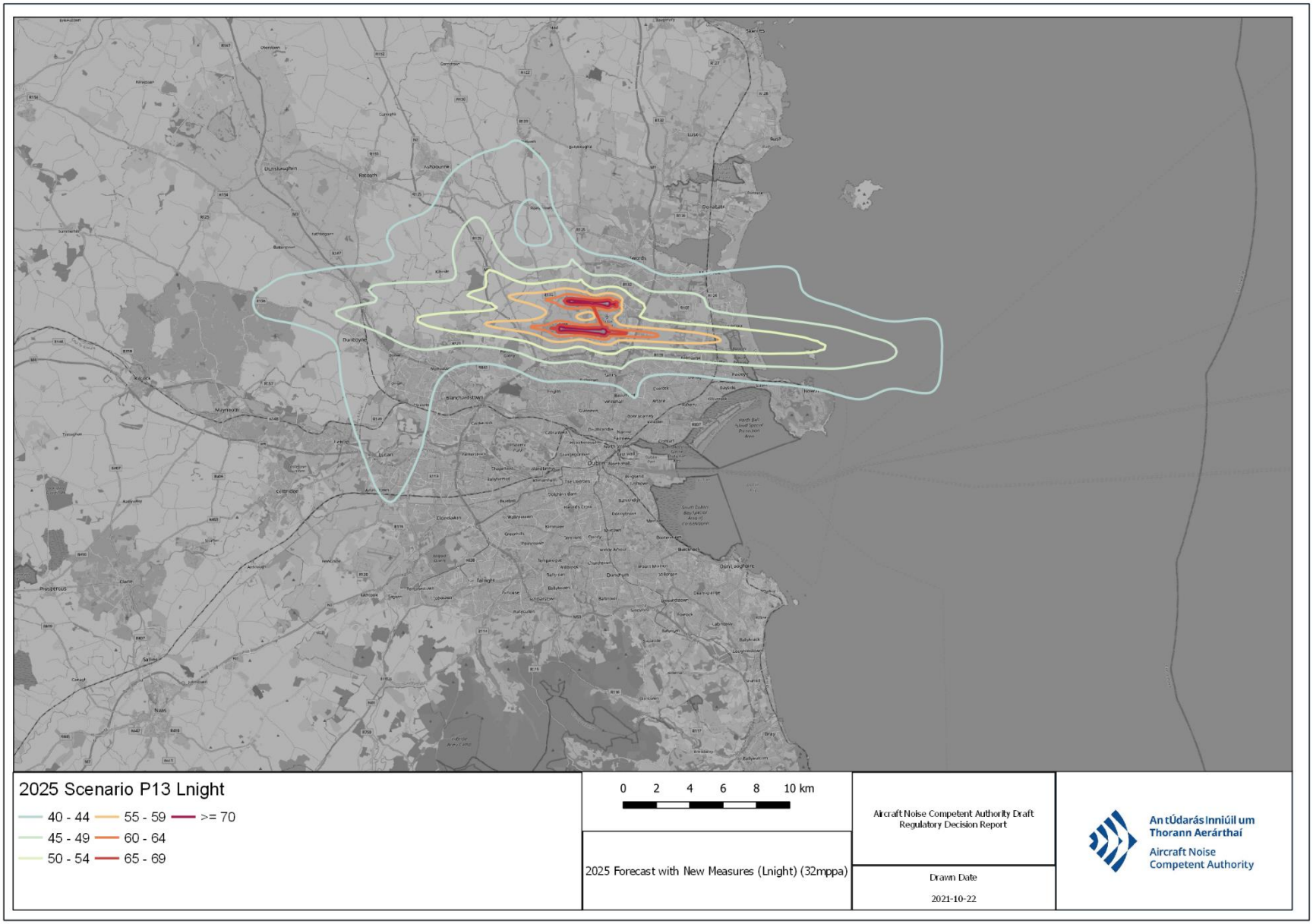
2021-10-22
An tÚdarás Inniúil um Thorann Aerárthaí
Aircraft Noise Competent Authority


2025 Scenario P13 Lnight
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45 - 49
50 - 54
55 - 59
60 - 64
65 - 69
>= 70
0 2 4 6 8 10 km
2025 Forecast with New Measures (Lnight) (32mppa)
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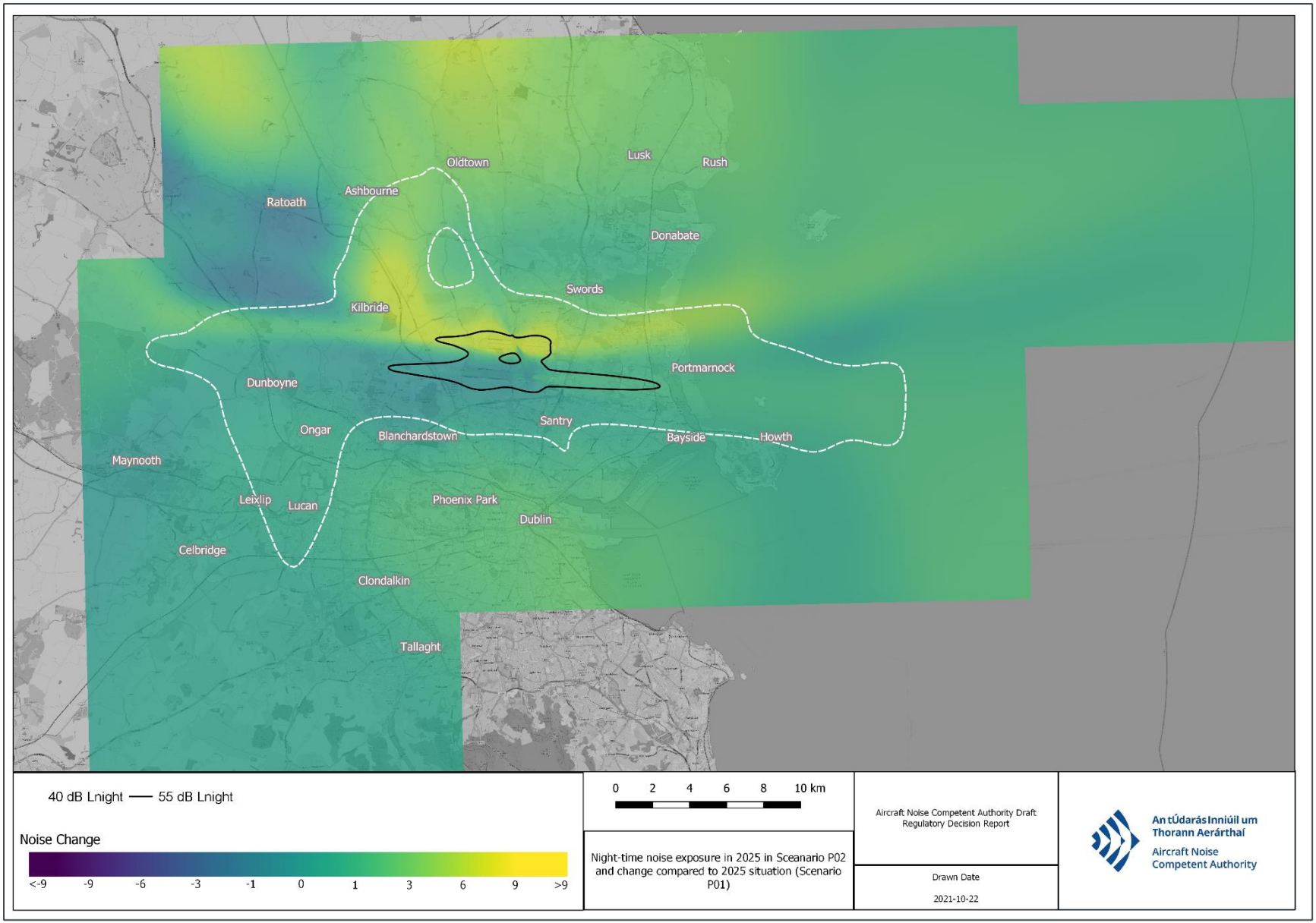
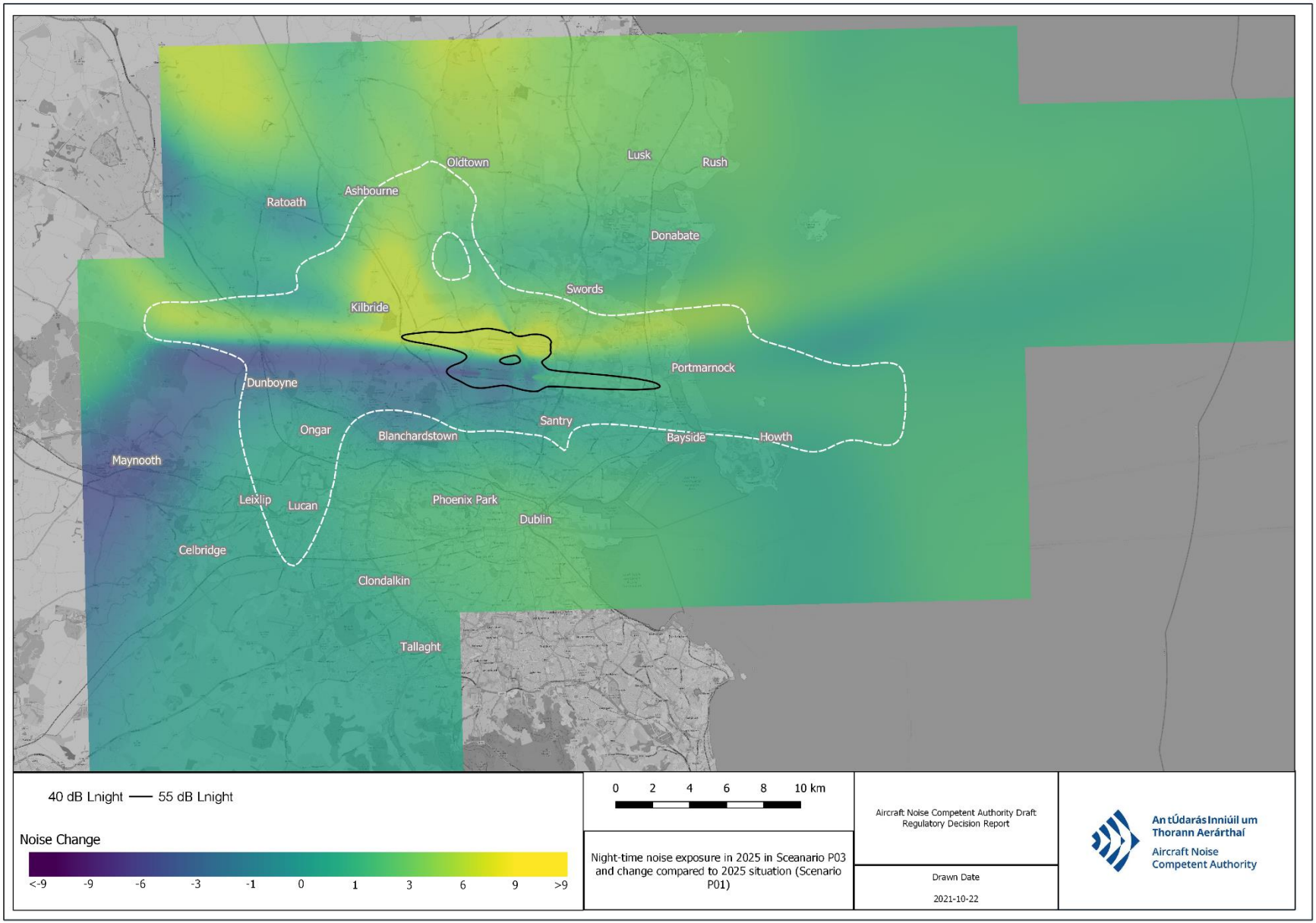
An tÚdarás Inniúil um Thorann Aerárthaí
Aircraft Noise Competent Authority


Oldtown
Lusk
Rush
Ashbourne
Ratoath
Donabate
Swords
Kilbride
Portmarnock
Dunboyne
Santry
Ongar
Blanchardstown
Bayside
Howth
Maynooth
Leixlip
Lucan
Phoenix Park
Dublin
Celbridge
Clondalkin
Tallaght
40 dB Lnight
55 dB Lnight
Noise Change
<-9 -9 -6 -3 -1 0 1 3 6 9 >9
0 2 4 6 8 10 km
Night-time noise exposure in 2025 in Sceanario P02 and change compared to 2025 situation (Scenario P01)
Aircraft Noise Competent Authority Draft Regulatory Decision Report
Drawn Date
2021-10-22
An tÚdarás Inniúil um Thorann Aerárthaí
Aircraft Noise Competent Authority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Kilbride
Portmarnock
Dunboyne
Santry
Ongar
Blanchardstown
Bayside
Howth
Maynooth
Leixlip
Lucan
Phoenix Park
Dublin
Celbridge
Clondalkin
Tallaght
40 dB Lnight
55 dB Lnight
Noise Change
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0 2 4 6 8 10 km
Night-time noise exposure in 2025 in Sceanario P03 and change compared to 2025 situation (Scenario P01)
Aircraft Noise Competent Authority Draft Regulatory Decision Report
Drawn Date
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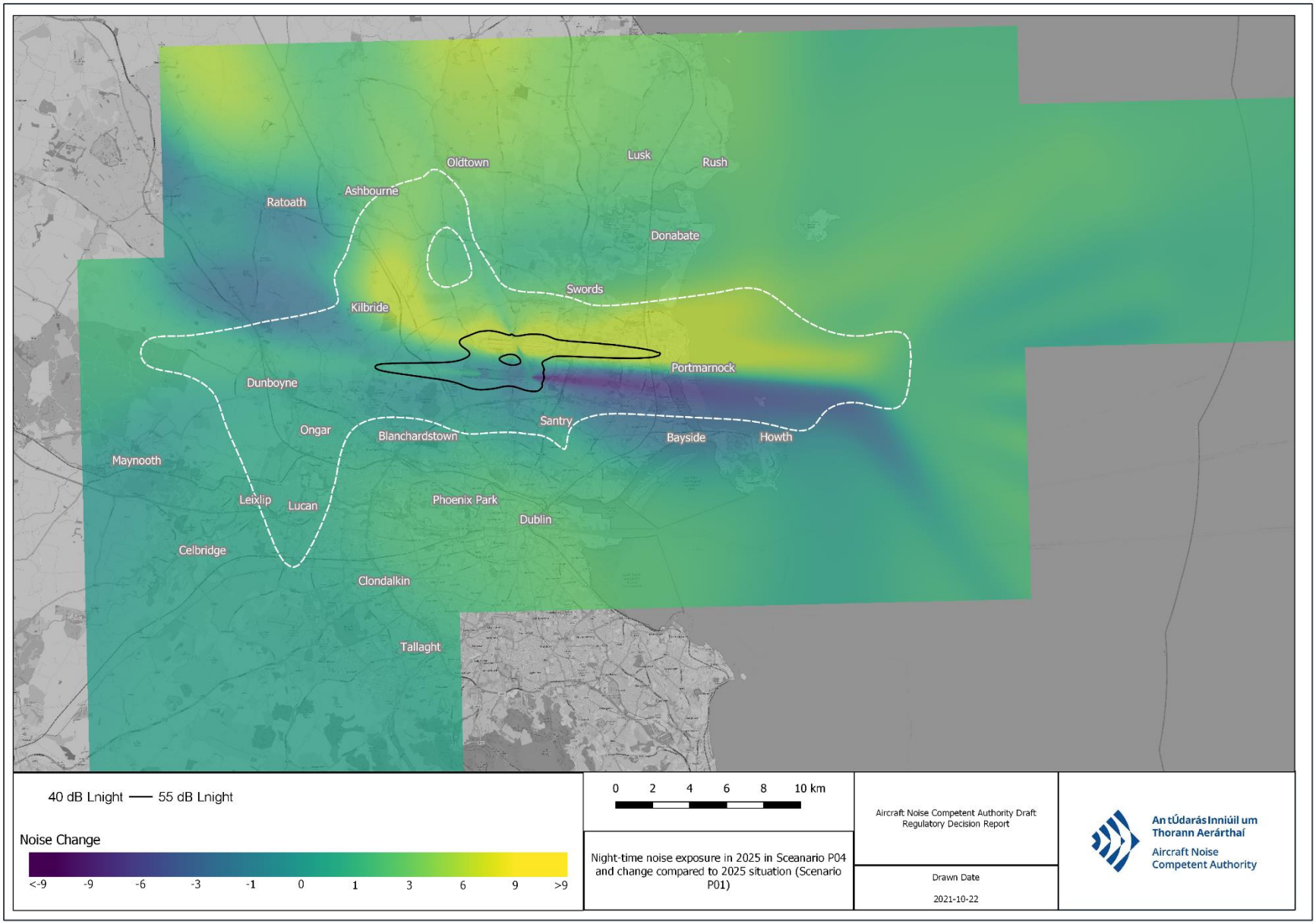
An tÚdarás Inniúil um Thorann Aerárthaí
Aircraft Noise Competent Authority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Bayside
Howth
Maynooth
Leixlip
Lucan
Phoenix Park
Dublin
Celbridge
Clondalkin
Tallaght
40 dB Lnight
55 dB Lnight
Noise Change
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0 2 4 6 8 10 km
Night-time noise exposure in 2025 in Sceanario P04 and change compared to 2025 situation (Scenario P01)
Aircraft Noise Competent Authority Draft Regulatory Decision Report
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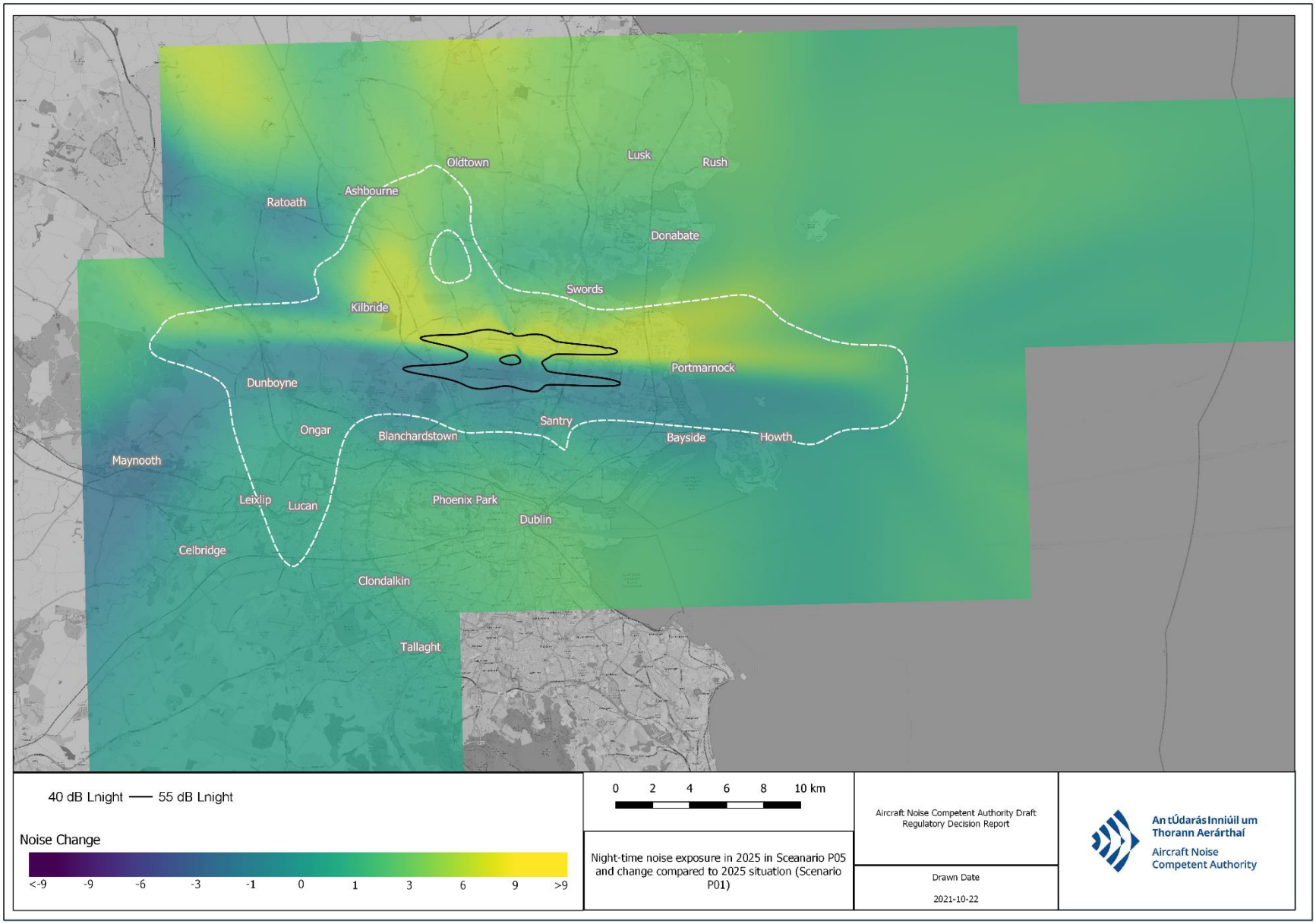
An tÚdarás Inniúil um Thorann Aerárthaí
Aircraft Noise Competent Authority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Dunboyne
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Bayside
Howth
Maynooth
Leixlip
Lucan
Phoenix Park
Dublin
Celbridge
Clondalkin
Tallaght
40 dB Lnight
55 dB Lnight
Noise Change
<-9 -9 -6 -3 -1 0 1 3 6 9 >9
0 2 4 6 8 10 km
Night-time noise exposure in 2025 in Sceanario P05 and change compared to 2025 situation (Scenario P01)
Aircraft Noise Competent Authority Draft Regulatory Decision Report
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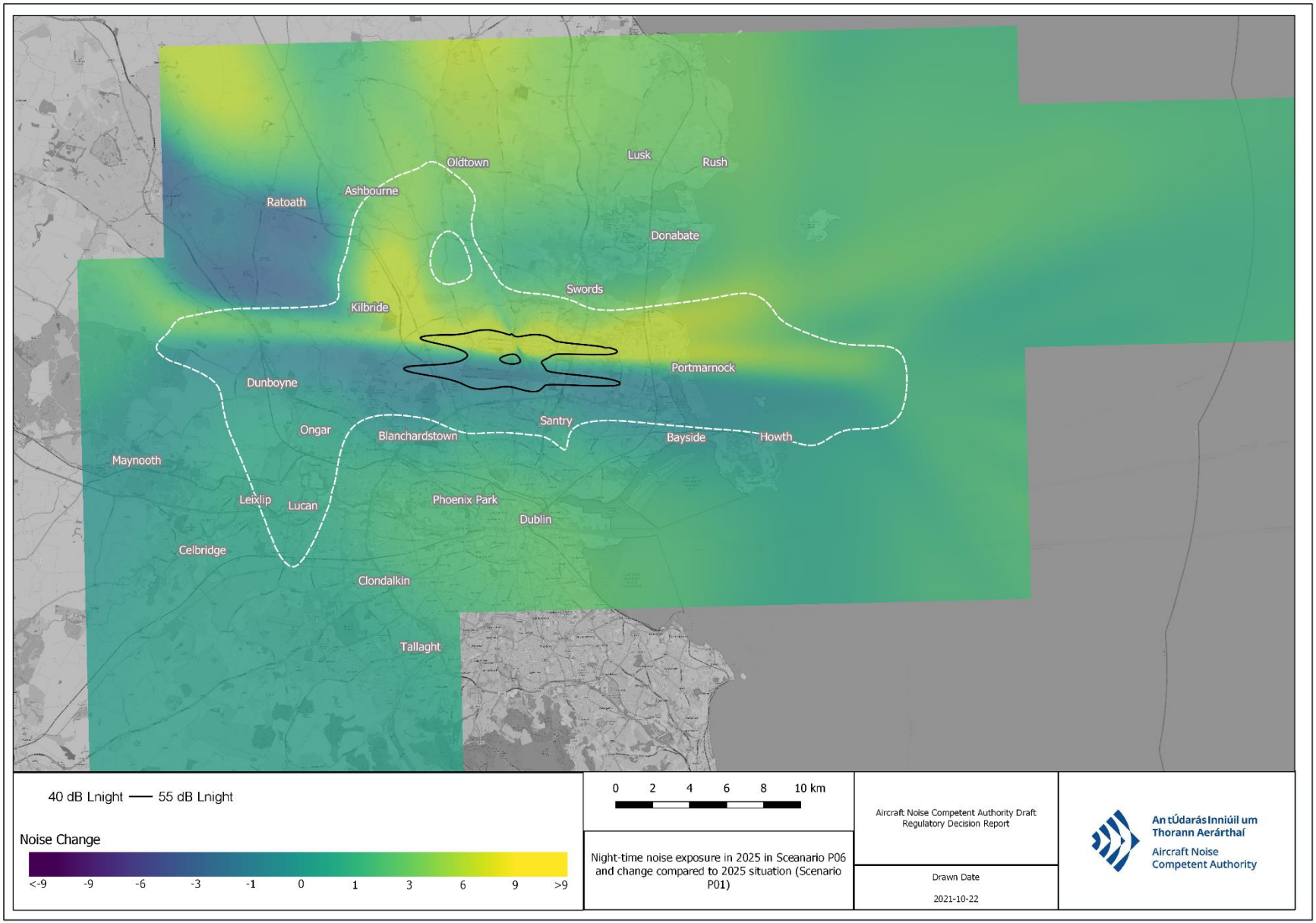
2021-10-22
An tÚdarás Inniúil um Thorann Aerárthaí
Aircraft Noise Competent Authority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Maynooth
Leixlip
Lucan
Phoenix Park
Dublin
Celbridge
Clondalkin
Tallaght
40 dB Lnight
55 dB Lnight
Noise Change
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0 2 4 6 8 10 km
Night-time noise exposure in 2025 in Sceanario P06 and change compared to 2025 situation (Scenario P01)
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An tÚdarás Inniúil um Thorann Aerárthaí
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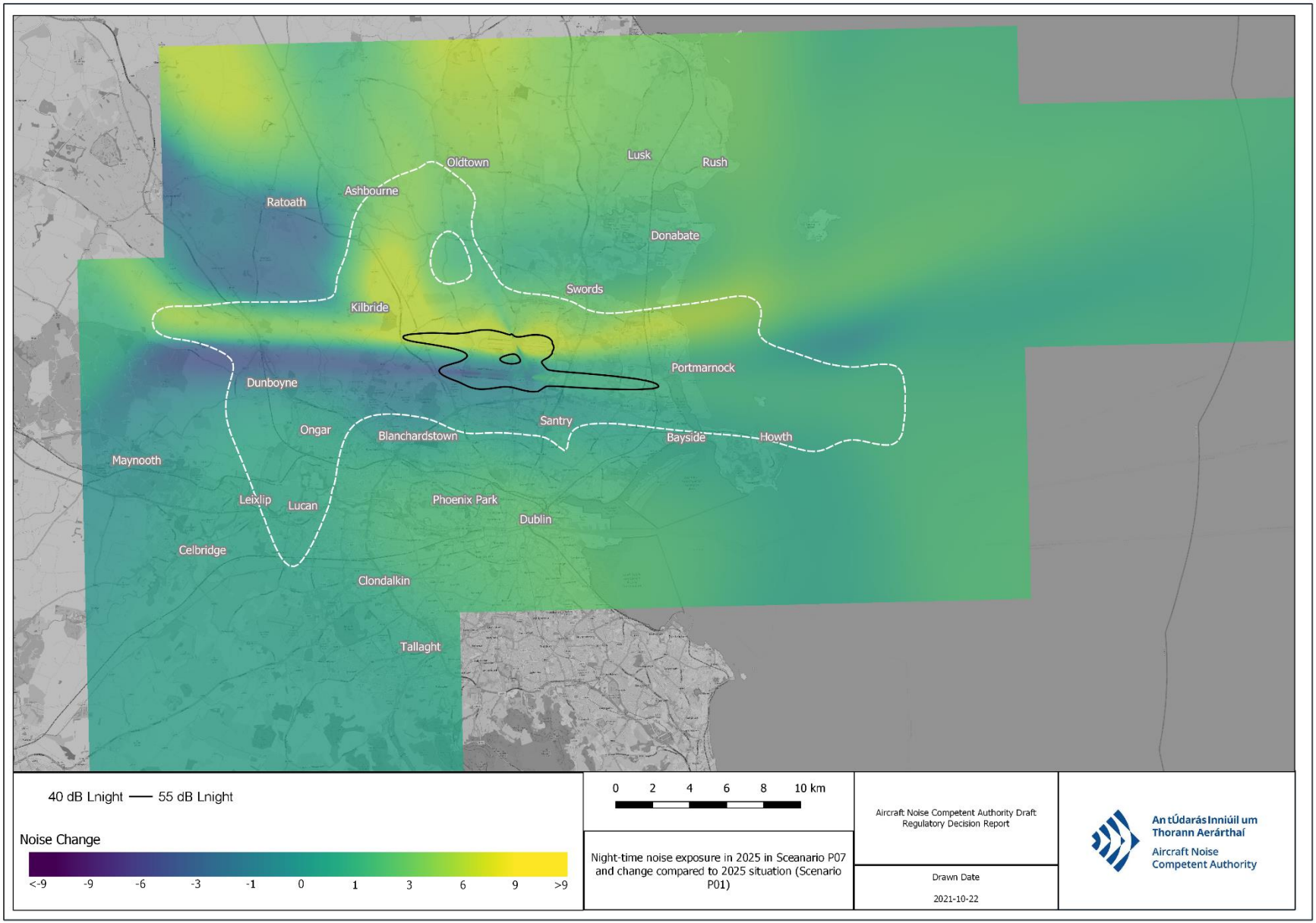
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Maynooth
Leixlip
Lucan
Phoenix Park
Dublin
Celbridge
Clondalkin
Tallaght
40 dB Lnight
55 dB Lnight
Noise Change
<-9 -9 -6 -3 -1 0 1 3 6 9 >9
0 2 4 6 8 10 km
Night-time noise exposure in 2025 in Sceanario P07 and change compared to 2025 situation (Scenario P01)
Aircraft Noise Competent Authority Draft Regulatory Decision Report
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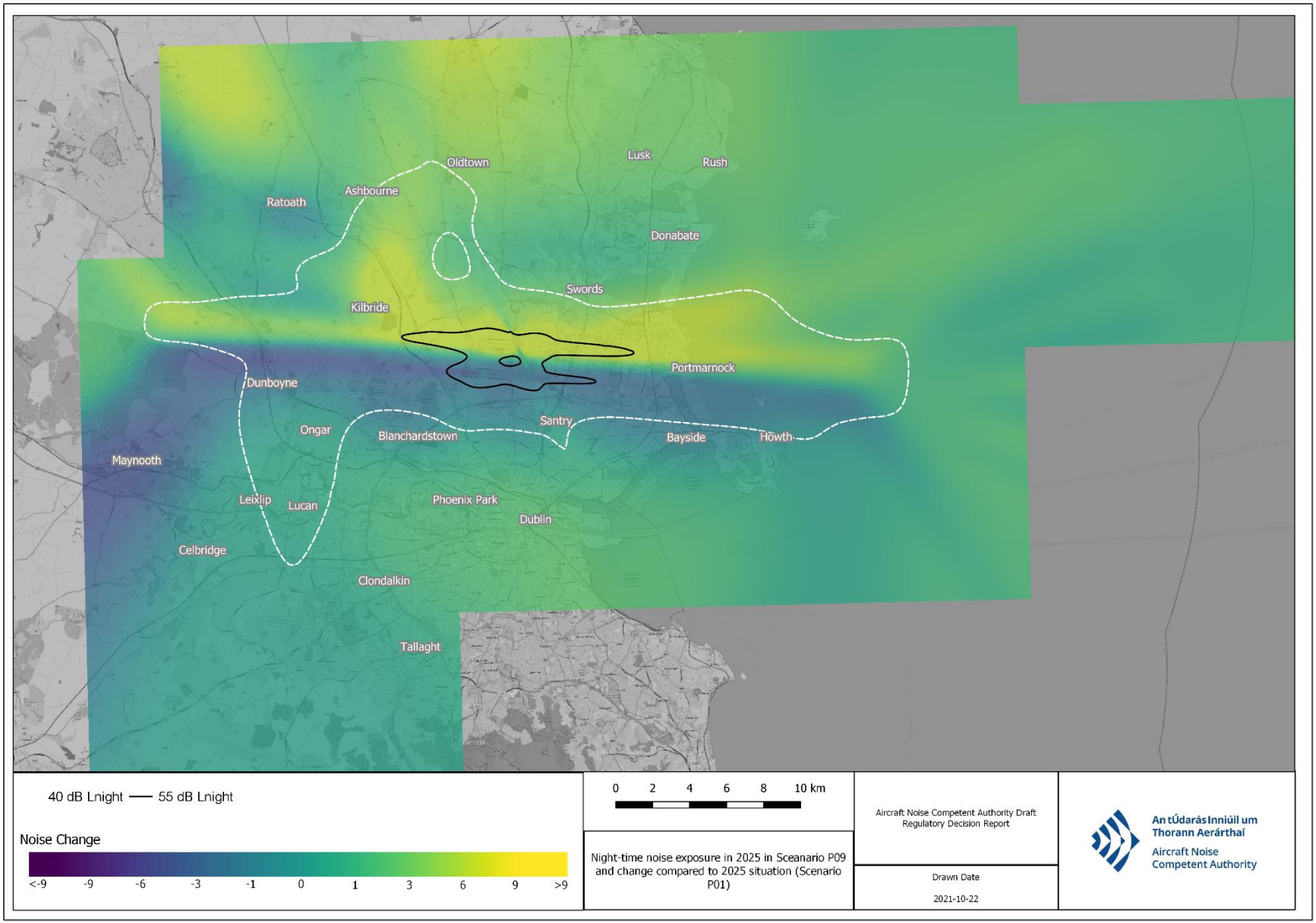
2021-10-22
An tÚdarás Inniúil um Thorann Aerárthaí
Aircraft Noise Competent Authority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Howth
Maynooth
Leixlip
Lucan
Phoenix Park
Dublin
Celbridge
Clondalkin
Tallaght
40 dB Lnight
55 dB Lnight
Noise Change
<-9 -9 -6 -3 -1 0 1 3 6 9 >9
0 2 4 6 8 10 km
Night-time noise exposure in 2025 in Sceanario P09 and change compared to 2025 situation (Scenario P01)
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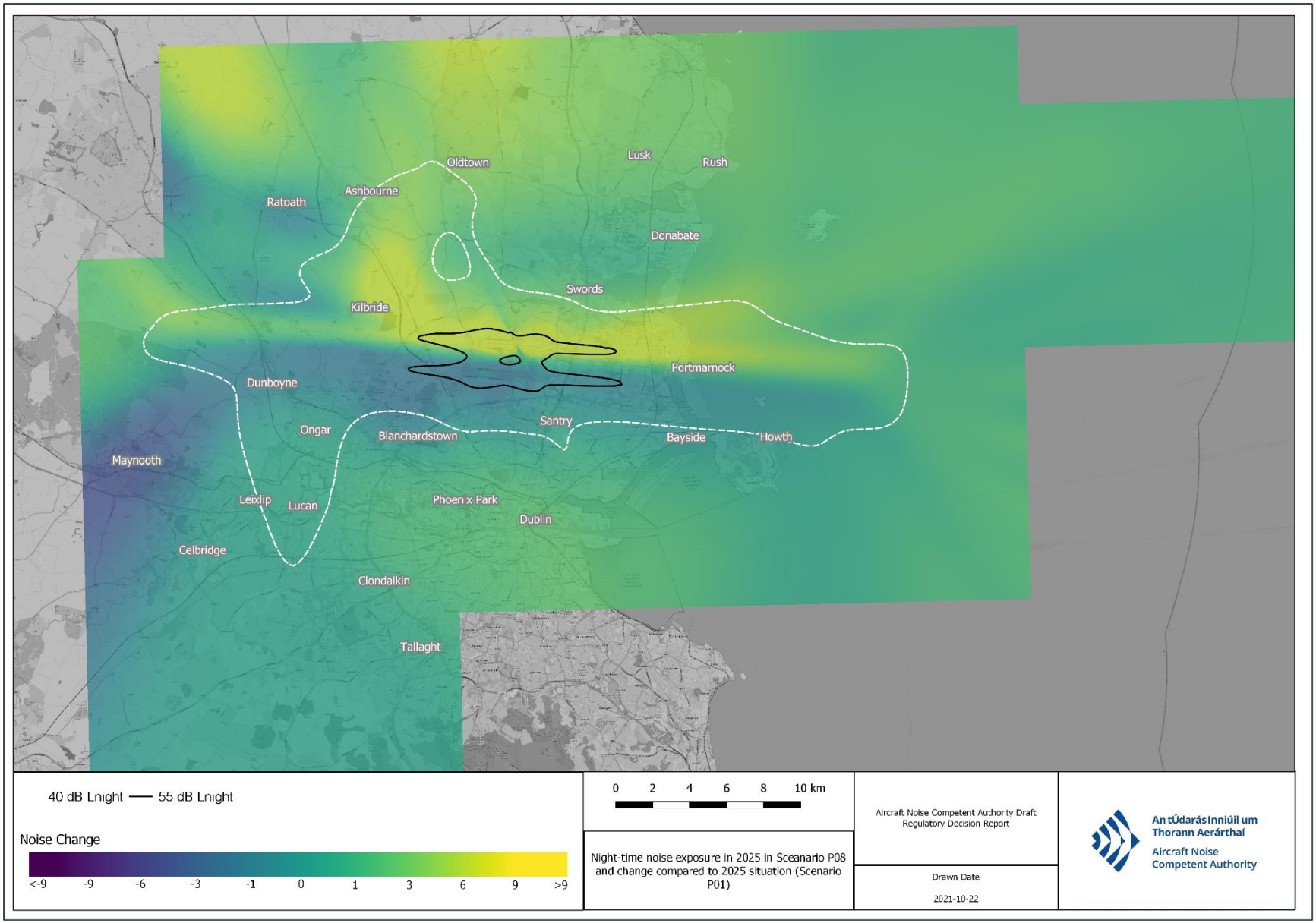
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Maynooth
Leixlip
Lucan
Phoenix Park
Dublin
Celbridge
Clondalkin
Tallaght
40 dB Lnight
55 dB Lnight
Noise Change
<-9 -9 -6 -3 -1 0 1 3 6 9 >9
0 2 4 6 8 10 km
Night-time noise exposure in 2025 in Sceanario P08 and change compared to 2025 situation (Scenario P01)
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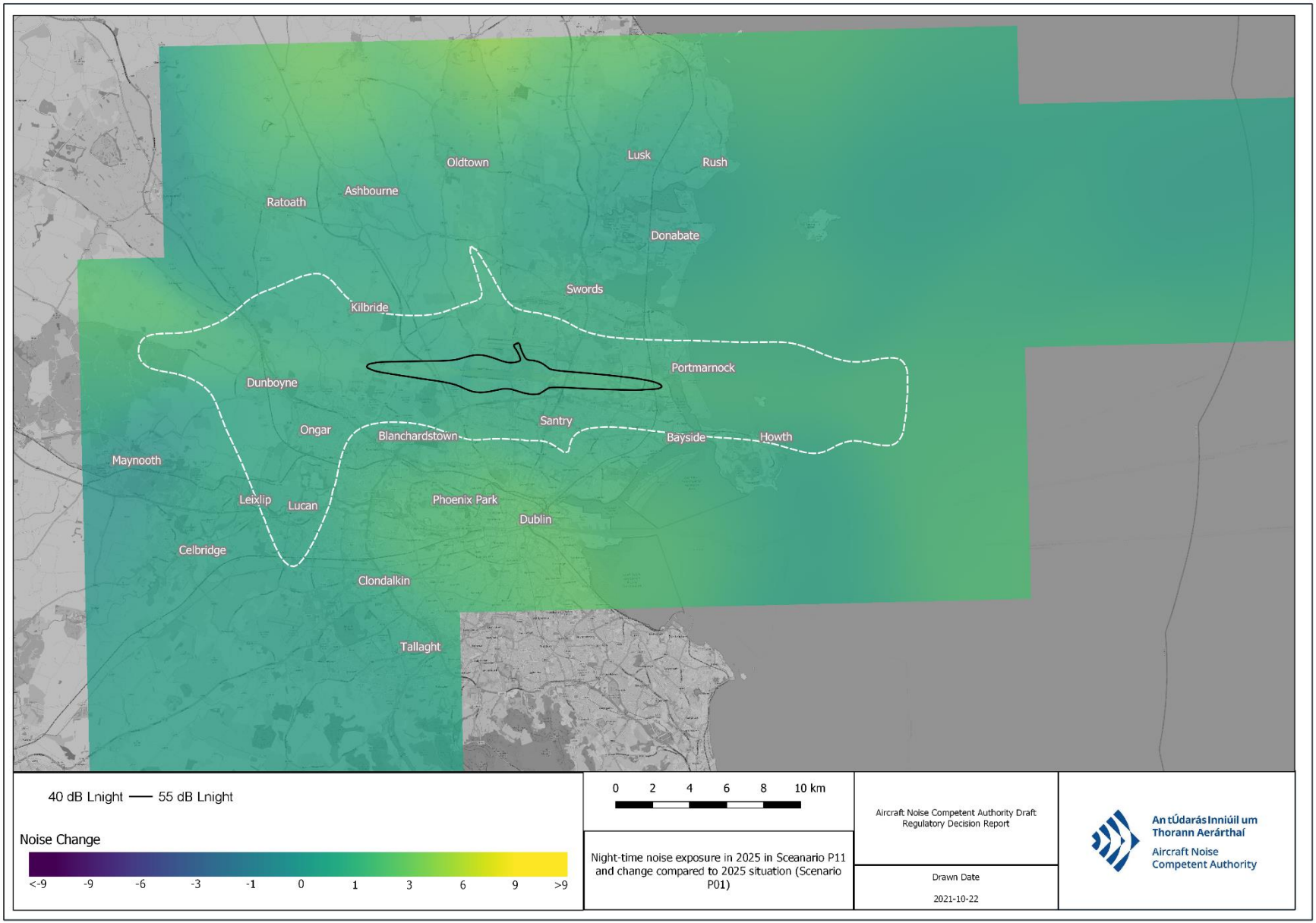
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Maynooth
Leixlip
Lucan
Phoenix Park
Dublin
Celbridge
Clondalkin
Tallaght
40 dB Lnight
55 dB Lnight
Noise Change
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0 2 4 6 8 10 km
Night-time noise exposure in 2025 in Sceanario P11 and change compared to 2025 situation (Scenario P01)
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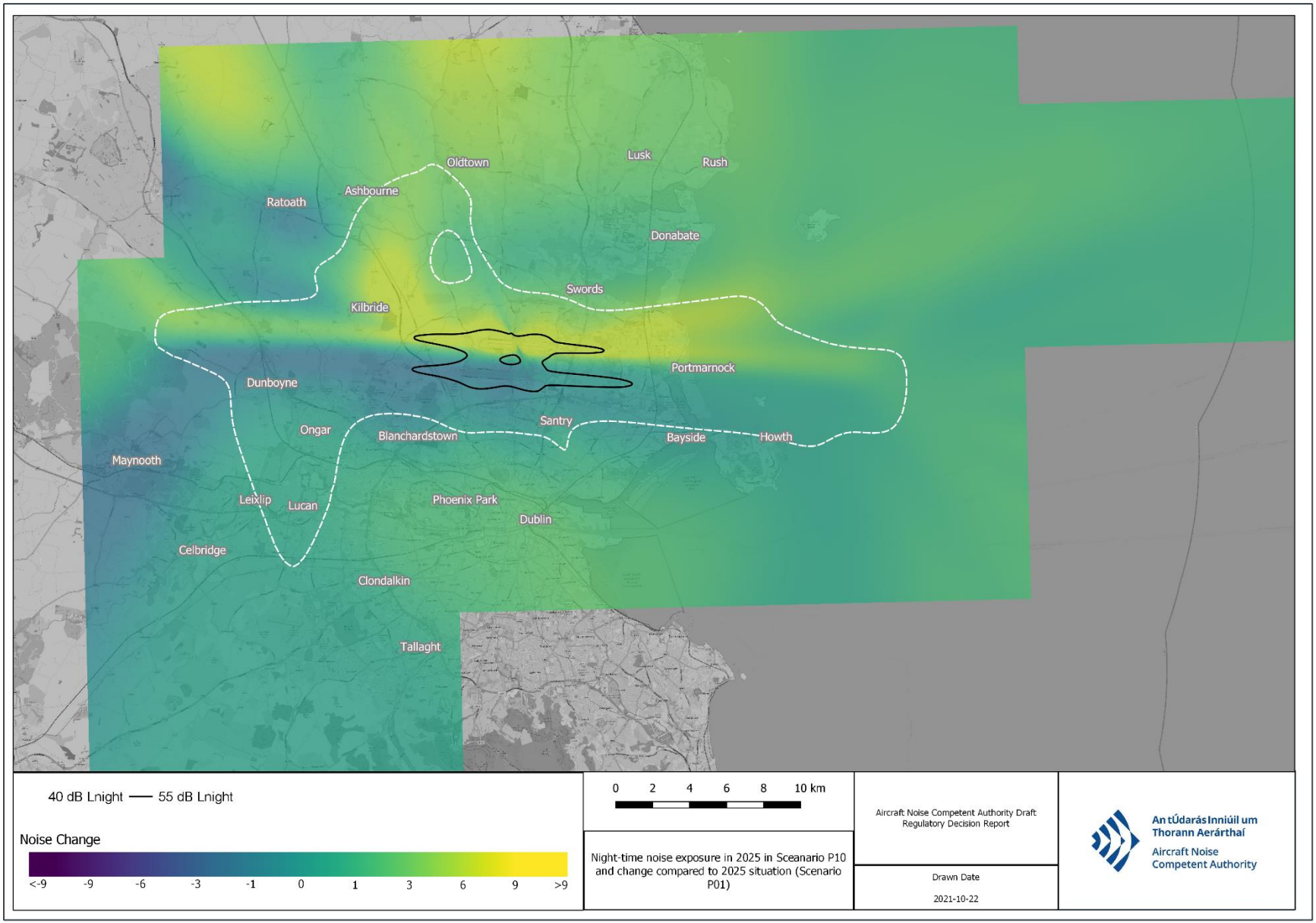
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Blanchardstown
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Lucan
Phoenix Park
Dublin
Celbridge
Clondalkin
Tallaght
40 dB Lnight
55 dB Lnight
Noise Change
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0 2 4 6 8 10 km
Night-time noise exposure in 2025 in Sceanario P10 and change compared to 2025 situation (Scenario P01)
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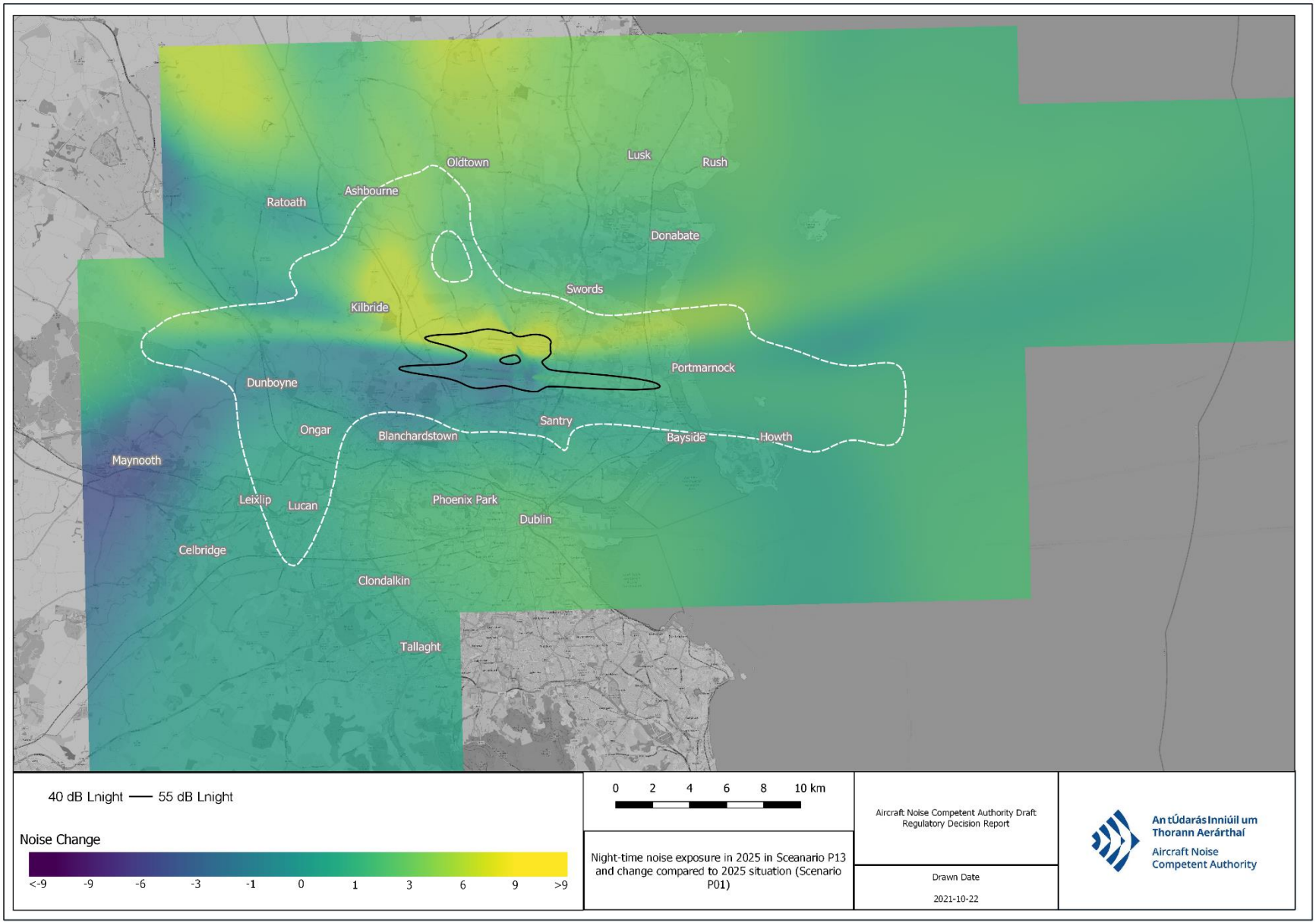
Drawn Date
2021-10-22
An tÚdarás Inniúil um Thorann Aerárthaí
Aircraft Noise Competent Authority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Aircraft Noise Competent Authority Draft Regulatory Decision Report
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An tÚdarás Inniúil um Thorann Aerárthaí
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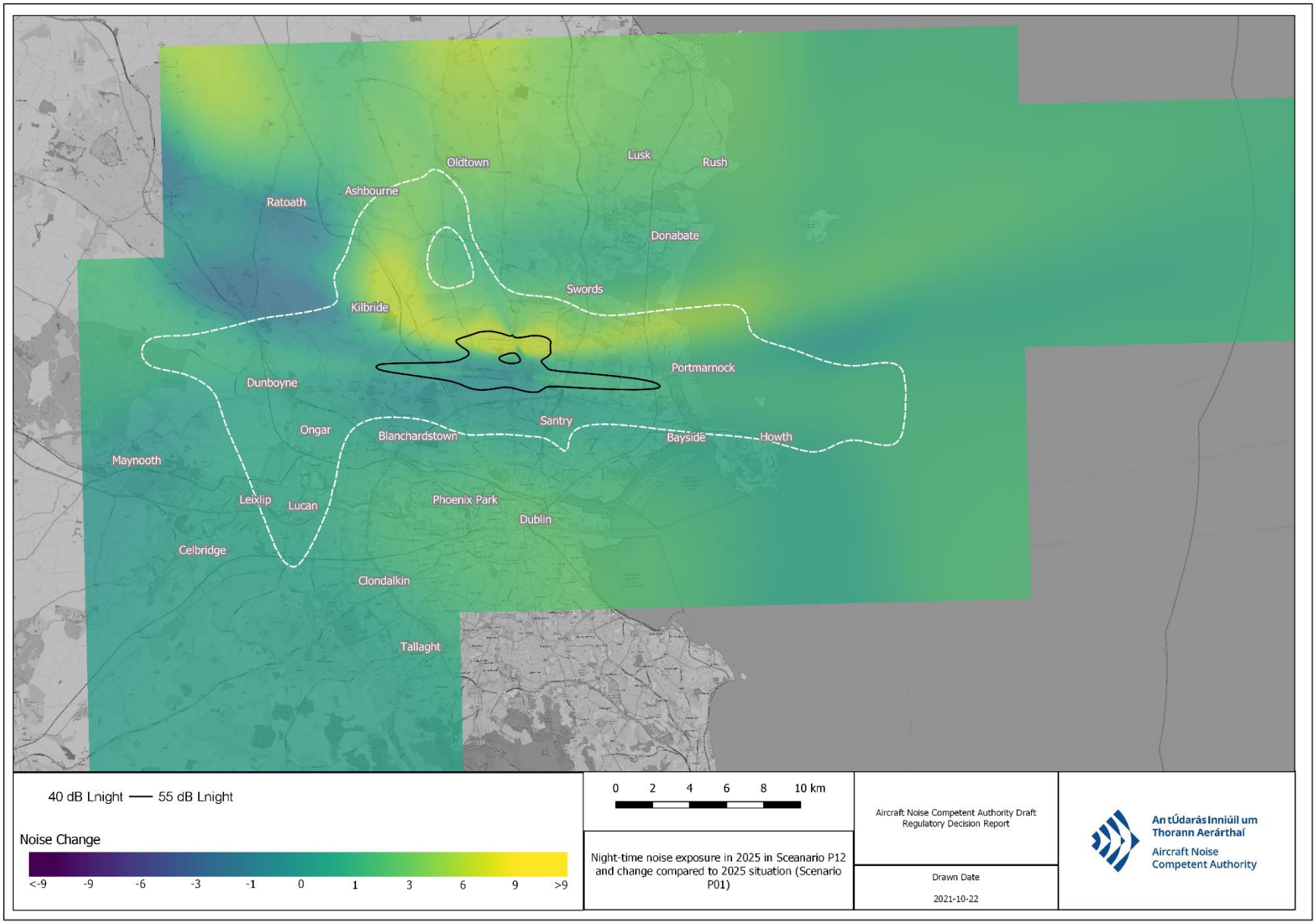
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Aircraft Noise Competent Authority

An tÚdarás Inniúil um Thorann Aerárthaí

Aircraft Noise Competent Authority

ANCA

Regulatory Decision

Appendix F - Assessment of Aircraft Noise Modelling

An tÚdarás Inniúil um Thorann Aerárthaí
Aircraft Noise Competent Authority

Noise CONSULTANTS

Statement in relation to aircraft noise modelling undertaken as part of Application F20A/0668

October 2021






Experts in noise and vibration assessment and management

Document Control

Client	Fingal County Council – Airport Noise Competent Authority	**Principal Contact**	Joe Mahon

Job Number	J20-12128A-20

Report Prepared By:	James Trow

Document Status and Review Schedule

Report No.	Date	Status	Reviewed by
J20-12128A-20/6/D1	27 October 2021	Final	George Gibbs

Noise Consultants Ltd operates a formal Quality Management System, which is certified to ISO 9001:2015 and a formal Environmental Management System, which is certified to ISO 14001:2015. NCL are an Associate Member of the Association of Noise Consultants (ANC).

When printed by Noise Consultants Ltd, this report will be on Evolve Office, 100% Recycled paper.

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3 Review of the Applicant's Modelling Approach 7
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1 Introduction

1.1 The Airport Noise Competent Authority (ANCA) has asked Noise Consultants Limited (NCL) to review the approach taken to the modelling of aircraft noise as part of Planning application F20A/0668 ('the Application') which was submitted by Dublin Airport Authority ('the Applicant') on 18 December 2020.

1.2 This statement of review has taken into account documents submitted by the Applicant with the Application, including documentation provided in response to a direction to provide information as issued by ANCA on 24 February 2021 ('Direction to Provide Information')[1].

1.3 ANCA has provided the Applicant with draft guidance in relation to aircraft noise information reporting to support and standardise the information issued as part of the Application. Further to this, a 'Reporting Template' was also provided and completed by the Applicant to relevant information relating to its noise exposure data and forecasts.

1.4 The draft guidance note provided to the Applicant which included a section (Section 4.5) concerning the aspects to be covered when describing their modelling methodology. This is reproduced below.

"4.5 Noise Modelling Report

All information should be accompanied by a modelling report describing the approach and supporting evidence for modelling works, including;

- *Confirmation of the noise assessment method I.e. ECAC Doc 29 4th Edition including the modelling software utilised;*
- *Confirmation of input datasets including:*
  - *Schedules / Flight Records including copies of relevant flight operations report*
  - *Meteorological conditions*
  - *Inputs to flight track assumptions including dispersions*
  - *Inputs to flight profile and aircraft type assumptions*
  - *Model Splits*
- *Validation Methodologies and Adjustments*
  - *Reporting of any validation activities including the preparation and evidencing of:*

[1] Appendix A, ANCA Direction to Tom Phillips

- *Customised procedures profiles; and/or*
- *NPD adjustments based on noise monitoring data.*

- *Calculation Settings, including:*
  - *Grid resolutions / dynamic grid settings*
  - *Receptor definitions*
  - *Application of meteorology*
  - *Use of band angle*
  - *Ground attenuation.*

1.5 The review summarised in Section 3 has had regard for the information provided by the Applicant taking into account the detail requested in the draft guidance and the requirements of the relevant legislation and other relevant standards and guidance which are described in Section 2.

2 Calculation of Aircraft Noise

2.1 Within the context of EU Regulation 598/2014[2] (the Aircraft Noise Regulation) and EC Directive 2002/49/EC[3] (END), it is necessary to undertake the calculation of aircraft noise using the methodology set out within EU Directive 2015/996[4] (CNOSSOS-EU:2015), which is the legal implementation of the calculation methodology set out in ECAC Doc 29 4th Edition 2016[5]. This is the latest version endorsed by the European Civil Aviation Conference (ECAC) and the International Civil Aviation Authority (ICAO).

2.2 The methodology is made up of several parts:

- Volume 1: Application Guide;
- Volume 2: Technical Guide; and
- Volume 3: Reference Cases and Verification Framework.

2.3 The calculation methodology set out in ECAC Doc 29 4th Edition is implemented within the US Federal Aviation Authority (FAA) Aviation Environmental Design Tool (AEDT) software. The software is accompanied by a Technical Manual which describes how the ECAC document has been implemented into a software environment.

2.4 Additional guidance on the application of the ECAC Doc 29 methodology has also been provided by the UK Civil Aviation Authority (CAA), through:

- CAP 1616a Airspace Design: Environmental Requirements Technical Annex[6];
- ERCD Report 1006 Measurement and Modelling of Aircraft Noise at Low Levels[7]; and

[2] REGULATION (EU) No 598/2014 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on the establishment of rules and procedures with regard to the introduction of noise-related operating restrictions at Union airports within a Balanced Approach and repealing Directive 2002/30/EC

[3] DIRECTIVE 2002/49/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL relating to the assessment and management of environmental noise

[4] COMMISSION DIRECTIVE (EU) 2015/996 establishing common noise assessment methods according to Directive 2002/49/EC of the European Parliament and of the Council

[5] ECAC.CEAC Doc 29 4th EDITION Report on Standard Method of Computing Noise Contours around Civil Airports

[6] Available here: http://publicapps.caa.co.uk/docs/33/CAP%201616a%20Environmental%20requirements%20technical%20annex.pdf

[7] Available here: http://publicapps.caa.co.uk/docs/33/ERCD%20Report%201006%20Low%20Level%20Monitoring%202nd%20Edition.pdf

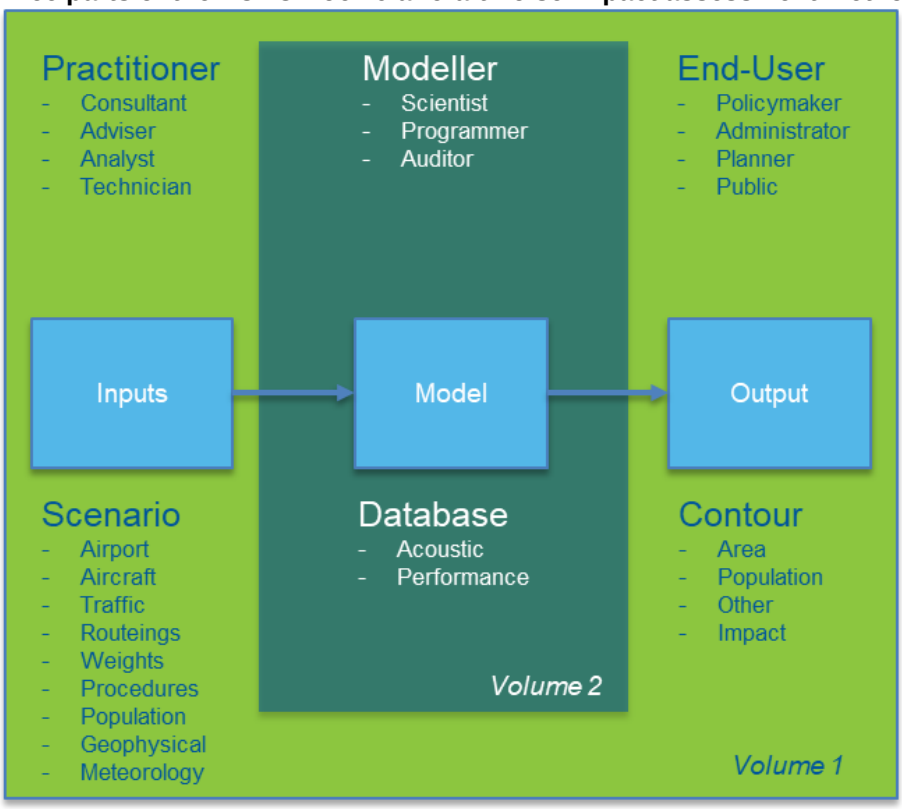
- CAP 2091 Policy on Minimum Standards for Noise Modelling[8].

2.5 These documents collectively may be used to describe the methodology and guidance on how an aircraft noise model can be prepared. However, any requirements which are described in EU Directive 2015/996 take primacy.

2.6 Figure 1 below provides an overview of the calculation process set out within ECAC Doc 29 and provides an overview of the input data required to develop a scenario, and the output data generated.

2.7 Figure 1 shows that most of the scenario input data is specific to the actual aircraft and how they operate at the airport. Details such as the specific use of arrival and departure routes, the aircraft take-off weight and vertical flight profiles can all affect the calculated noise levels, and the extent of the resulting contour areas.

Figure 1 - Three parts of the ECAC Doc 29 aircraft noise impact assessment methodology



2.8 Due to the specific details required within the calculation methodology, it is generally the case that aircraft noise calculations are undertaken in close collaboration with the airport, air navigation service and airspace designers, in order to gain access to the necessary input data.

[8] Available here: https://publicapps.caa.co.uk/docs/33/CAA%20Policy%20on%20Minimum%20Standards%20for%20Noise%20Modelling%20(CAP2091).pdf

2.9 This has led to the airports being the primary developers of aircraft noise contours, including the statutory designation of the Applicant as the noise mapping body for strategic noise maps under the European Communities (Environmental Noise) Regulations, S.I. No 549 of 2018[9], which transposes the END into Irish legislation.

[9] Available here: http://www.irishstatutebook.ie/eli/2018/si/549/made/en/pdf

3 Review of the Applicant's Modelling Approach

3.1 The latest documentation provided by the Applicant with respect to their approach to aircraft noise modelling as part of the Application is available within the document:

- Bickerdike Allen Partners, A11267_19_RP035_4.0, Dublin Airport North Runway Relevant Action Application, Noise Information – ANCA Request, February 2021

3.2 Section 5 and Appendix 2 of this document sets out the noise modelling, population and demographic assessment methodologies relied on by the Applicant.

3.3 Further information is also available within Appendix 13B of the Environmental Impact Assessment Report[10].

Choice of Noise Model

3.4 The Applicant has confirmed that the noise modelling software utilised as part of the Application is the 'Federal Aviation Authority Aviation Environmental Design Tool (AEDT) version 2d SP2'. This model is compliant with ECAC.CEAC Doc 29 4th Edition and therefore aligns with the requirements of EU Directive 2015/996[11].

3.5 The AEDT version relied on by the Applicant is not the most recent version and nor does it hold the most recent version of the Aircraft Noise and Performance Database (ANP)[12] which can be utilised by aircraft noise modellers for use with ECAC.CEAC Doc 29. However, this is not in itself problematic providing that the Applicant's model has been subject to a form of validation to account for new aircraft types. This is discussed in the following sections.

AEDT Study Settings

3.6 The documentation provided by the Applicant confirms that the noise modelling has utilised default weather settings for Dublin Airport and all-soft ground terrain for lateral attenuations. This is considered appropriate given a validation exercise has taken place as is discussed below.

3.7 Terrain data has also been incorporated into the study. This is again considered appropriate and in line with the guidance set out by the UK CAA[13] which states that terrain adjustments must be included.

[10] Dublin Airport North Runway Relevant Action Application, Environmental Impact Assessment Report, Volume 4 – Appendices, September 2021

[11] COMMISSION DIRECTIVE (EU) 2015/996 establishing common noise assessment methods according to Directive 2002/49/EC of the European Parliament and of the Council

[12] Available here: https://www.aircraftnoisemodel.org/

[13] Paragraph 1.20, CAP1616a

3.8 The Applicant confirms that the airfield layouts including the location of runways have been taken from the Airport's AIP[14]. From our review of the noise contour and associated grids provided with the Application there are no concerns with the airfield layouts adopted in the Applicant's modelling.

Aircraft Movements

3.9 The Applicant has provided an extensive breakdown of the aircraft movements which have been modelled in each of the scenarios considered. This has been provided in detail within a completed aircraft noise reporting template[15]. This includes historic records of aircraft movements by period and by type as well as those relating to the forecasts used within the Application.

3.10 The documentation notes that for the majority of aircraft types noise emissions have been based those provided within the ANP database[16] and where this has not been possible 'substitutes' have been adopted based on the aircraft's size and engine details. However as discussed below, this has been subject to a validation exercise.

3.11 Helicopters and military aircraft have not been included in the Applicant's modelling. This is in keeping with EU Directive 2015/996[17].

3.12 The aircraft noise modelling prepared by the Applicant has excluded activities such as taxiing, engine testing and the use of auxiliary power units as part of the considering various runway use and restriction scenarios. The Applicant notes that this is allowed under EU Directive 2015/996[18] providing that such activities *"do not contribute materially to the overall population exposure"*.

3.13 Having regard for the noise exposure statistics provided with the Application and within the EIAR[19], we consider this to be the case, however note the potential for some locations to the immediate north and south of the Airport to receive comparable levels of noise from departing and landing aircraft on the runway, to those which are taxiing.

[14] EIDW AD 2.24-1, dated 28 March 2019, http://iaip.iaa.ie/iaip/IAIP_Frame_CD.htm

[15] CA434_5.0 ANCA Reporting Template 2021 Update.xlsx

[16] Aircraft Noise and Performance Database, https://www.aircraftnoisemodel.org

[17] Para 2.7.5, EU Directive 2015/996

[18] Para 2.7.1, EU Directive 2015/996

[19] Dublin Airport North Runway Relevant Action Application, Environmental Impact Assessment Report, Volume 2 – Main Report, September 2021, Section 13

Runway Use

3.14 The runway usage data reported by the Applicant is based on historic analysis over a 10-year period. The assumptions made by the Applicant are reasonable and are supported by further material provided in Appendix 3B of the EIAR with respect to use of the crosswind runway.

Modelled Routes and Dispersion

3.15 The location and dispersion of arrival and departure routes is a critical part of an aircraft noise model and directly effects the number and location of receptors modelled as being exposed to aircraft noise.

3.16 NCL is broadly satisfied that the approach taken by the Applicant in modelling its arrival and departure routes is acceptable, however we have made the following observations:

- Limited data has been provided to demonstrate how the current situation has been modelled with respect to how the existing departure routes are flown. However, noise contours provided for 2016, 2018 and 2019 appear consistent with the location of flight paths reported in the Airport's Noise Action Plan[20].
- A single dispersion assumption has been used for all scenarios based on analysis that the Applicant undertook in 2016 and reviewed in 2018. It is of course impossible to consider dispersion in future forecast scenario, however NCL notes that the dispersion pattern adopted may not reflect RNAV procedures. This cannot be determined at this point therefore it is highly recommended that from the commencement of North Runway operations that dispersion patterns are remeasured and included in future modelling exercises.

Route Usage

3.17 For all historic modelling the Applicant has confirmed that movement logs have been used as the basis for assigning aircraft to routes. For future forecasts it is stated that departure route information has been provided for some movements but where this is not available, destination has been used as a proxy to determine the departure routing. This is considered appropriate and in the case of forecasts reduces some uncertainty by having data which indicates the associated departure route.

Flight Profiles and Departure Stage Lengths

3.18 CAP2091 requires airports with a certain noise exposure to prepare their noise models in line with a certain standard or 'category'. Considering reported exposure in 2019 at Dublin Airport as provided in the reporting template, and the guidance set out in CAP2091, NCL consider the airport to be a 'Category C' airport. This means that there is an expectation that flight profiles are prepared for major aircraft types having regard for local track-keeping data. Further to this, EU Directive 2015/996

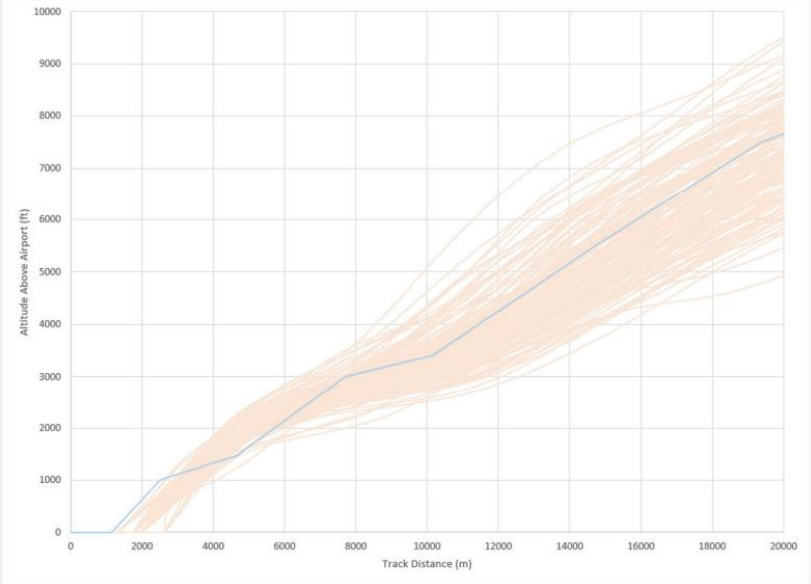
[20] Add ref

expresses caution towards adopting default profiles from the ANP as they may not reflect the procedures in place by operators at the Airport.

3.19 The Applicant has confirmed that flight profiles have been prepared using local track-keeping data. An example is provided in Appendix 13B of the EIAR. The examples provided (for the Airbus A320ceo) show that the modelled profile has been compared to flight profile data. However, in both examples (Charts 13B-1 and 13B-2), the modelled 'USER' profiles do not always reflect the radar track analysis. This is particularly the case for the example departure in Chart 13B-2 (reproduced below) before 6000m along the track. It is not clear to what extent that this may affect calculated noise exposure levels.

3.20 It is noted from other information provided by the Applicant that departure profiles have been modified to reflect the Noise Abatement Departure Procedure (NADP) in place at Dublin Airport[21].

Figure 2 – Chart 13B-2 as reproduced from Appendix 13B of the EIAR



3.21 Beyond the information summarised above the Applicant states that similar profiles have been developed for the A320neo, A321ceo, A321neo and Boeing 737max. These types reflect most operations occurring at Dublin Airport in 2019 and forecast to do so in the future.

3.22 The Applicant has confirmed that as part of adjusting the profiles, these have been extended from 10,000ft to 30,000ft. This is appropriate given the study area and need for the model to calculate down to levels of 40 dB L_{night} and 45 dB L_{den}.

3.23 The Applicant has not stated how, if at all, 'stage length' has been captured in the modelling or as part of the preparation of flight profiles for departing aircraft. 'Stage length' is an approach used in

[21] Dublin Airport North Runway Relevant Action Application, Draft – Initial Response to ANCA Request for Further Information, June 2021 – Appendix J

AEDT as a proxy for take-off weight. The concept is that the heavier the aircraft, the shallower the climb profile. The Applicant is however correct to identify that EU Directive 2015/996 states that *"Vertical dispersion is usually represented satisfactorily by accounting for the effects of varying aircraft weights on the vertical profiles"*.

3.24 The information reported by the Applicant confirms that adjustments have been made to flight profiles. Whilst NCL has identified improvements with respect to transparency and the potential representativeness of the profiles, these are considered observations rather than material issues with the modelling itself.

3.25 Having regard for the above, it is recommended that all future modelling present the profiles developed for each aircraft type having regard for the flight profiles observed from the radar data. This should take into account vertical dispersion through stage length.

Validation

3.26 Under UK CAA guidance set out in CAP2091, assuming Dublin Airport is a 'Category C' airport, the modelling could potentially rely on unadjusted noise data from the ANP. However, EU Directive 2015/996 states as part of its quality framework[22] that:

"All input values affecting the emission level of a source, including the position of the source, shall be determined with at least the accuracy corresponding to an uncertainty of ± 2dB(A) in the emission level of the source".

3.27 The Applicant has validated its modelling by comparing modelling aircraft noise event levels (in terms of Sound Exposure Level (SEL)) with those measured by the Airport's Noise and Track Keeping (NTK) System. The Applicant has relied on data measured at three of the airport's noise monitoring terminals (NMTs) over the period January and December 2018.

3.28 This approach is considered appropriate given the primary noise metrics considered are L_{eq}-based which rely on the calculation of aircraft SELs. This underpins the calculation of the L_{den}, L_{day}, $L_{evening}$, L_{night} and $L_{Aeq,16hr}$ metrics.

3.29 To ensure that this is complied with it is necessary for a form of validation to occur. This effectively is required in two parts: bespoke arrival and departure profiles to ensure that the activity as modelled is representative; and adjustments to the noise emission data for the modelled aircraft having regard for measurements.

3.30 The data provided by the Applicant shows that adjustments have been made to the underlying noise-power-distance (NPD) information which is held within the ANP. This shows that for the majority of aircraft types, the adjustments made are within ± 2dB(A) of the default data held within AEDT.

[22] Para 2.6.2, EU Directive 2015/996

However, for other aircraft types such as the Boeing 787-800 and Boeing 757-200, the adjustments are above 2dB.

3.31 The information provided by the Applicant shows that for the Airbus A320neo, that the NPD data used for this aircraft type is based on an adjustment made to data held within the AEDT version adopted by the Applicant for its predecessor, the A320-211. It should be noted that more recent versions of the ANP and AEDT include default data for the A320neo. The adjustments made for the A320neo in the Applicant's modelling are based on measurements taken at three of the Airport's noise monitoring terminals (NMTs). This is the case for all adjustments made with the exception of the ATR72 and the DH4 types.

3.32 In total the Applicant has modified NPD data for seventeen aircraft types as part of their modelling.

3.33 Where the adjustments have been made using data from the NMTs, no information has been provided to confirm exactly how the adjustments corresponding to what is likely a distribution of measured levels at the NMTs. It has to be assumed that the adjustments have been made to reflect an energetic average SEL from each aircraft type at the relevant NMTs. Wider considerations as to whether the validation has had regard for differing locations of overflight around the NMTs and whether data gathered under during high winds or rain has been excluded.

3.34 EU Directive 2015/996 states that:

"In cases where input data provided in Appendix F to Appendix I are not applicable or cause deviations from the true value that do not meet the conditions presented under 2.1.2 and 2.6.2, other values can be used, provided that the values used and the methodology used to derive them are sufficiently documented, including demonstrating their suitability. This information shall be made publicly available."

3.35 The methodology presented by the Applicant can be followed however details such as those described above are either not reported or are not clear. Nevertheless, adjustments made are broadly within the ± 2dB(A) quality framework and reflect NCL's experience of making similar adjustments at other airports.

3.36 It is recommended that in future rounds of modelling, particularly with the onset of North Runway operations where additional NMTs could be used to further validate the modelling that validation exercises occur regularly and in manner where the methodology and decisions made in the validation process are clear. This is particularly important with respect to demonstrating compliance with the Noise Abatement Objective for the Airport.

3.37 It is noted that the EIAR has prepared modelling of metrics which are underpinned by the calculation of L_{Amax} noise levels. Whilst such data has not been used by ANCA in its assessment work, metrics such as the N60 have been prepared within the EIAR for the Applicant's preferred scenario. Whilst this does not affect the assessments undertaken by ANCA within its draft regulatory decision, a

validation of L_{Amax} may need to be undertaken by the Applicant (if it has not already) if such metrics are to be used routinely.

Modernised Types

3.38 The modelling undertaken by the Applicant has made assumptions with reflect to the future performance of modernised aircraft types such as the Airbus A321LR and A350-900. The approach taken to modelling modernised types is consistent with modelling elsewhere by making adjustment to NPD data of existing aircraft to reflect expected performance.

3.39 The data sources cited as part of developing the adjustments are authoritative and in line with adjustments used elsewhere.

3.40 Over the period to 2025 and beyond the Applicant's forecasts anticipate the increased prevalence of these types, namely the A321neo and A330neo. There will be a requirement for these types to be the subject of a validation as and when they become established at Dublin Airport.

Population and Demographic Assessment Method

3.41 Noise exposure assessment requires the consideration of the location and number of noise sensitive receptors located around an airport. The Applicant has described its methodology for the considerations of this and has relied on data obtained from GeoDirectory 2019 Q2 as a basis. The Applicant states that their approach to estimating population is consistent with that used as part of the noise mapping of the Airport under the ENR. This is based on the Small Areas Population Statistics (SAPS) published by the Central Statistics Office (CSO), GeoDirectory delivery point data from Ordnance Survey Ireland (OSi) and An Post, and PRIME2 building data from OSi[23].

3.42 The Applicant's exposure assessment has included an assessment of how population may increase as a result of consented developments and zoned lands. This is considered appropriate.

[23] As described here: https://www.epa.ie/publications/monitoring--assessment/noise/epa-guidance-note-for-strategic-noise-mapping-for-the-environmental-noise-regulations-2006-version-2--august-2011.php

4 Conclusion

4.1 The review undertaken by Noise Consultant's Limited of the modelling prepared by the Applicant as part of the Application has identify broad compliance with EU Directive 2015/996.

4.2 Based on our review, the modelling is considered sufficient for the purposes assessing and evaluating the scenarios considered by the Application and its supporting material. However, potential improvements have been identified with respect to the transparency of the methodology utilised by the Applicant with respect to NPD validation and the development of flight profiles.

4.3 The assumptions made with respect to flight paths and dispersion are based on the best available information at the time of the Application. This is understandable given that at the time of the modelling North Runway operations are yet to commence. It is strongly recommended that upon commencement of North Runway operations that the Applicant revalidates its model entirely in line with the requirements set by the Noise Abatement Objective for measuring the NAO.

An tÚdarás Inniúil um Thorann Aerárthaí

Aircraft Noise Competent Authority

ANCA

Regulatory Decision

Appendix G - Review of Applicant's Fleet and Forecast Assumptions and Curfew Commentary

Projections of Future Aircraft Mix at Dublin Airport

03 September 2021

altitude aviation advisory

Disclaimer

- This report contains the results of our analysis in relation to the future aircraft mix at Dublin Airport (the "Work"). It has been prepared for Noise Consultants Limited (the "Client") in connection with the provision of aviation noise expert consultancy services for Fingal County Council ("the Project") and for no other purpose.
- The contents of this report are private and confidential. It is for the Client's exclusive use and is not to be relied on by or made available to any other party without our prior written consent.
- This report is not intended to be a comprehensive review of all potentially relevant issues relating to the Project. It is intended to draw attention to those issues which we, in our absolute discretion and in carrying out the Work, consider to be material in the context of the Project.
- W do not accept a duty of care to any person (including the Client) in respect of this report.

ALTITUDE AVIATION ADVISORY LIMITED
03 September 2021

We have developed forecasts of future aircraft mix, to provide a second opinion to the projections developed by the DAA's consultants.

Introduction

- The Aircraft Noise (Dublin Airport) Regulation Act 2019 designated Fingal County Council as the Competent Authority for the purposes of aircraft noise regulation at Dublin Airport. The Aircraft Noise Competent Authority (ANCA) has been established as a separate and independent Directorate within Fingal County Council.
- Altitude Aviation Advisory is supporting Noise Consultants Limited, which is providing the ANCA with an independent view of the possible future aircraft noise profiles at Dublin Airport.
- Altitude has produced detailed projections of the potential future aircraft mix at Dublin.
  - Annual projections 2020-27.
  - Further spot year 2037.
- The objective of this forecast is to provide a second opinion on the aircraft mix profile generated by the Dublin Airport Authority ("DAA") and its consultants, Mott MacDonald.
- These projections have been provided in a spreadsheet form, and include:
  - Airline (top 10 airlines individually + other).
  - Aircraft type.
  - MTOW category.
- This document accompanies the spreadsheet output, and:
  - Shares some of the background analysis that informed the forecast.
  - Provides a summary of the detailed aircraft assumptions.
  - Gives an overview of the overall forecast results.

Forecast Parameters

- We have not developed passenger forecasts for Dublin Airport.
  - Instead, **we have used the Mott MacDonald central unconstrained ATM forecast**.
  - Additionally, **we have adopted the Mott Macdonald 2019 ATM shares by airline**, reported for Aer Lingus, Ryanair and British Airways.
  - This allows some consistency of comparison between the two sets of projections.
- Our work has drawn on publicly available subscription data sources, namely the CAPA Centre for Aviation fleet database and OAG passenger schedules. We have also reviewed investor relations material from key airlines, especially in relation to fleet planning.
  - We have not had access to detailed data on actual flight operations at Dublin (only planned schedules) and have not been able to consult directly with the DAA or airlines on their plans.
- There are some discrepancies between the 2019 and 2020 ATM values reported in the Mott MacDonald outputs compared with the schedule database.
  - The schedules database does not have complete coverage of passenger charter flights and very limited coverage of cargo flights.
  - Furthermore, the database only reflects planned schedules not the actual operations (e.g. cancellations due to aircraft technical issues will not be removed from the database).
- For airlines outside the top 10, we have used the schedule database to provide aircraft type detail.
  - This is likely to understate the noise footprint, as cargo aircraft (not shown in schedules database) are often older aircraft types.

Our ATM mix forecast is developed individually for the largest 10 airlines at Dublin… These projections draw on published information regarding fleet orders (typically covering the next few years) as well as our own assumptions (based on a range of factors).

Aircraft Generations

- To aid comparisons, we have adopted the aircraft generation definitions used by Mott MacDonald in its analysis.
- Generation 0 (G0):
  - Older aircraft types, typically developed in the 1970s or 1980s and now generally out of production.
  - E.g. B737 Classic (300/400/500), B757, B767, A300, A310.
- Generation 1 (G1):
  - Current aircraft types, typically developed in the 1990s or 2000s and still in production.
  - E.g. B737NG (700/800/900), B777, A320 series, A330, A340, A380, Bombardier CRJ, Embraer EJets, Avro RJ, Bombardier Q400, ATR42/72.
- Generation 2 (G2):
  - Latest aircraft types recently entering production or under development.
  - E.g. B737MAX, B787, B777X, A320neo, A330neo, A350, A220 (aka Bombardier CSeries), Embraer EJet E2, Sukhoi Superjet.

Summary of Historic Trends

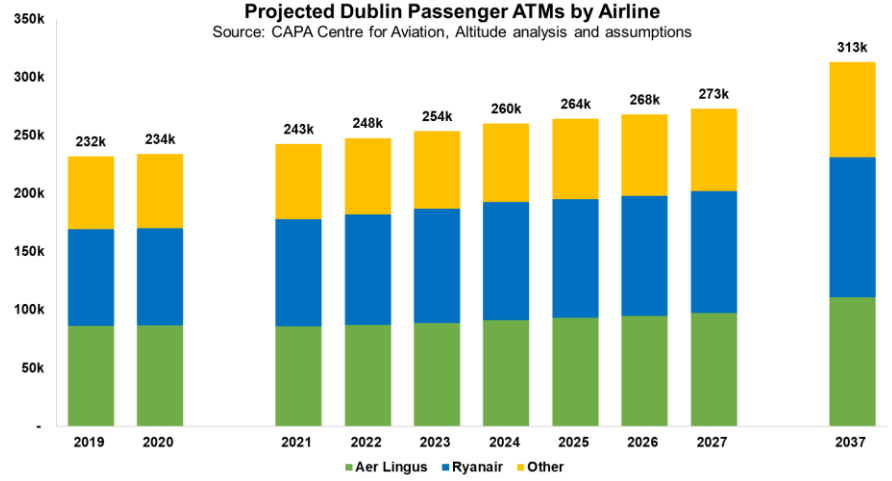
- We have analysed historic aircraft mix trends at both Dublin and for European airports overall.
  - *See Appendix 1 for details.*
- The trends across the European airport sector are clear cut:
  - Gradual reduction of Generation 0 aircraft types.
  - In recent years, gradual build up of Generation 2 aircraft types.
  - Consistent growth in average seats per flight, individually by haul (domestic, international short haul, long haul) and overall.
- The impact of the trends above is to reduce the per-passenger and per-ATM noise footprint of passenger growth – through greater utilisation of new generation aircraft and increases in passengers per flight (reducing the number of individual flights needed to support growth).
- The historic trends at Dublin are less consistent:
  - Mainly caused by some reductions in Aer Lingus aircraft size.
  - Also more variable transition from old to new aircraft types.

Forecast Methodology

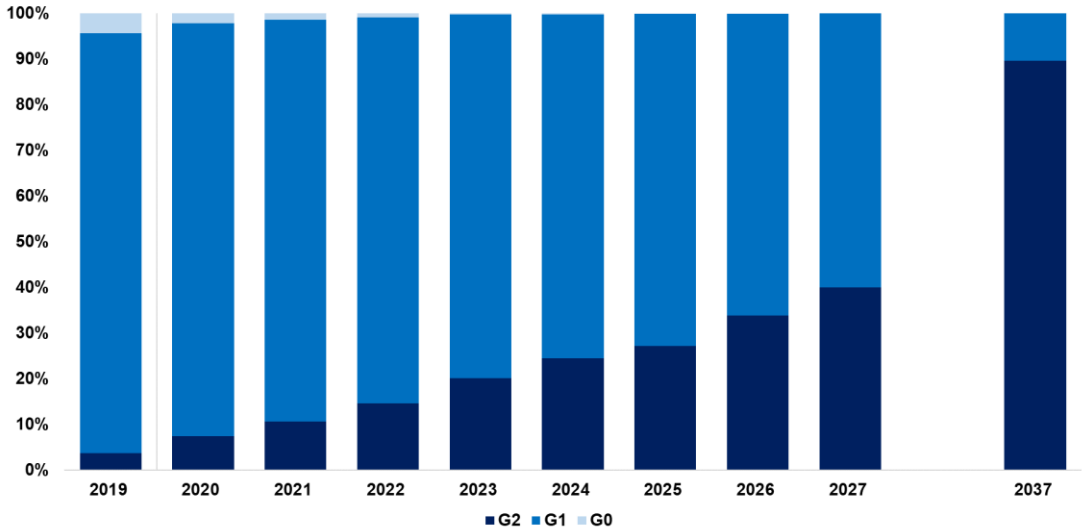
- Aer Lingus and Ryanair are the two largest airlines at Dublin (generating around 75% of scheduled passenger flights). For these two airlines, we have developed network-level fleet plans.
  - Based on the CAPA Centre for Aviation fleet database of historic and current fleet and outstanding aircraft orders.
  - Also considering investor relations guidance.
- We then make assumptions on the percentage of flying by each aircraft type that touches Dublin, to generate a projected PATM volume and aircraft mix.
- For the other airlines in the top 10 largest Dublin airlines and the remaining other airlines overall, we have made assumptions on the future mix of aircraft (without developing an overall fleet plan).
  - This also reflects known aircraft orders from the CAPA fleet database.
- While we have used insights from the fleet database, we have nevertheless still needed to make a range of assumptions:
  - For most airlines, there is little public information of aircraft retirement intentions. We have therefore made assumptions based on the age of the current aircraft in the fleet.
  - Information on aircraft orders does not always specify delivery dates, so we have needed to assume delivery schedules. Furthermore, existing aircraft orders only give insight on the next few years, requiring assumptions for medium and longer term fleet development.
- As previously noted, we have aligned total ATMs with the Mott MacDonald central unconstrained case.
  - In general, airline ATMs proportions are assumed not to change over the forecast period (kept flat at the 2019 values reported by Mott MacDonald for Aer Lingus, Ryanair, British Airways).
  - Within the remaining airlines, we do adjust ATM share for the permanent downsizing of Norwegian operations, and for some pandemic related swings in share over 2020-21 (returning by 2025 to a similar mix within this group to that seen in 2019).
- *See Appendix 2 for detailed assumptions.*

We have modelled new generation (G2) aircraft taking an increasing share of flying… The average aircraft size is forecast to grow moderately over the period to 2037.

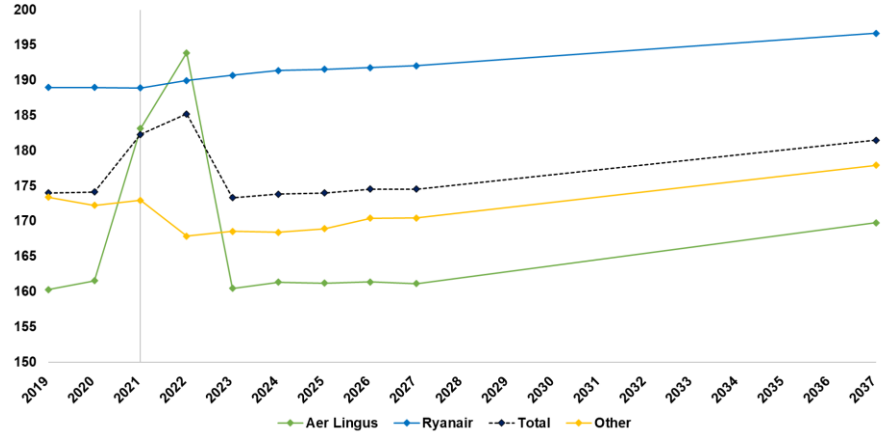
Projected Dublin Passenger ATMs by Airline
Source: CAPA Centre for Aviation, Altitude analysis and assumptions

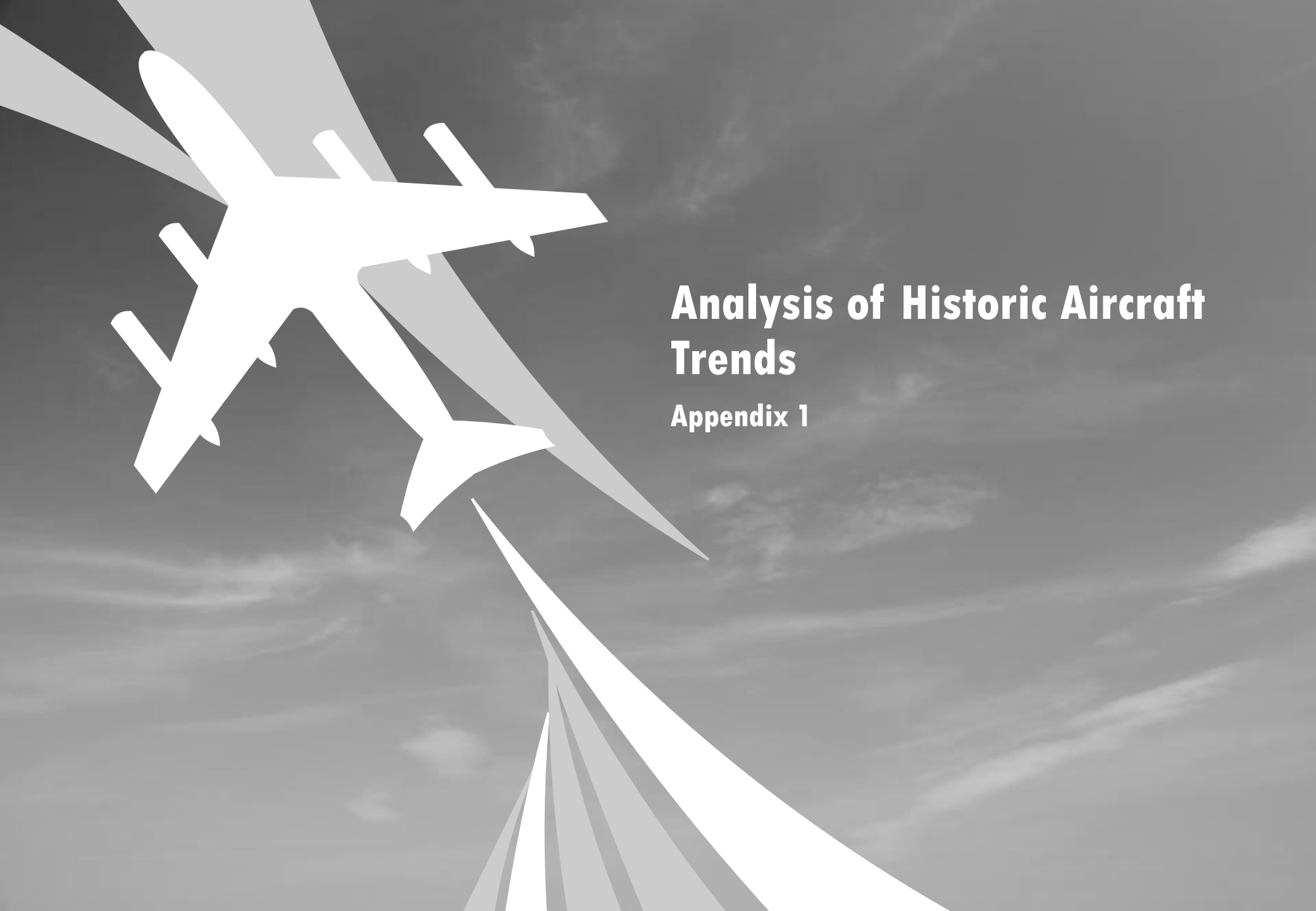


Projected Dublin Passenger ATMs by Aircraft Generation
Source: CAPA Centre for Aviation, Altitude analysis and assumptions



Projected Average Aircraft Size (# seats) at Dublin Airport
Source: CAPA Centre for Aviation, Altitude analysis and assumptions





Analysis of Historic Aircraft Trends

Appendix 1

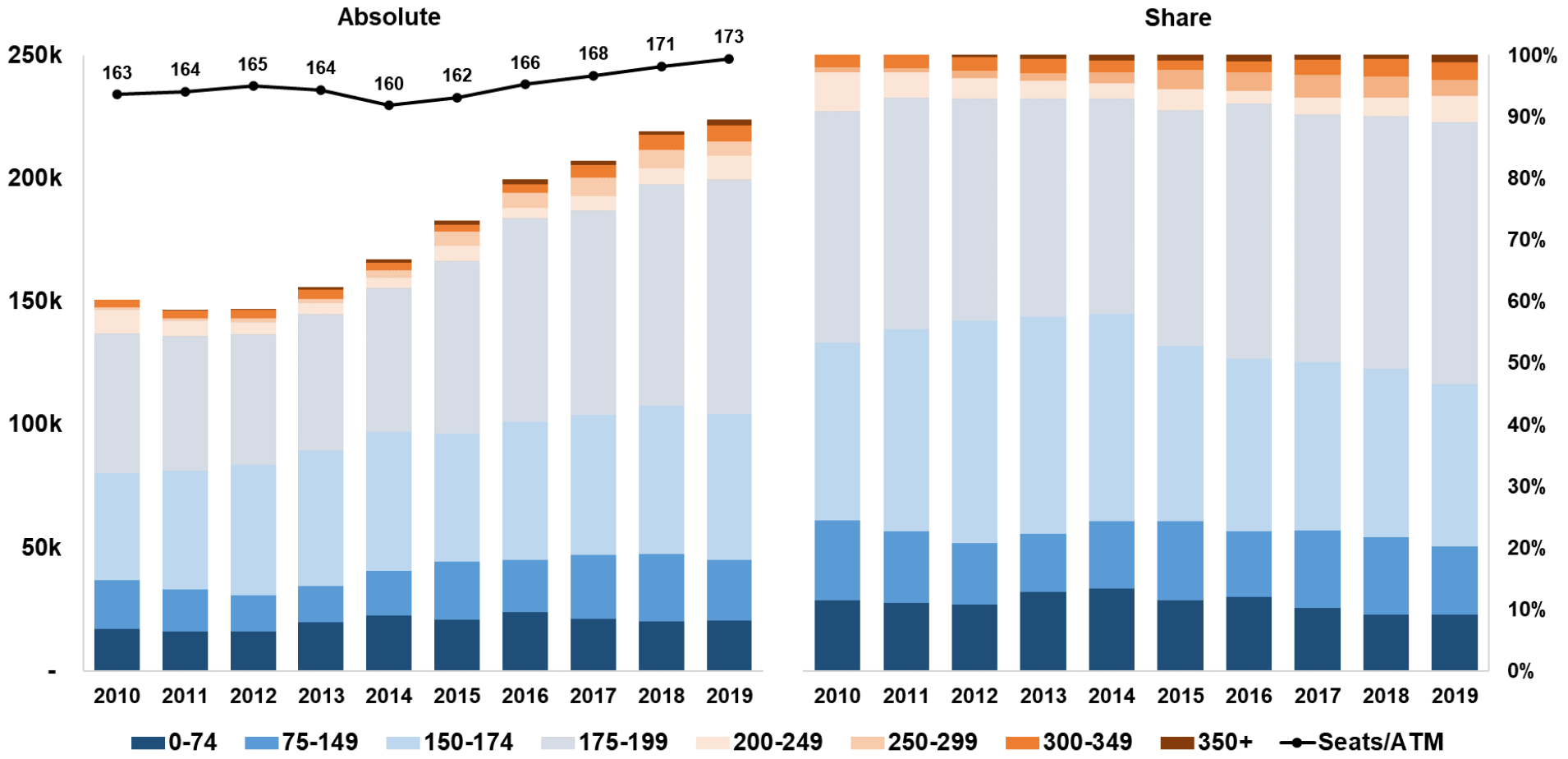
We have analysed schedule data from 2010-19 to identify aircraft mix trends at both Dublin specifically and across Europe… We have reviewed changes in average aircraft size and the evolution of ATMs by aircraft generation.

- As context to our forward looking aircraft projections, we have analysed published passenger flight schedules from 2010-19.
  - Aircraft schedules are publicly available and act as a reasonable proxy for actual flying activity.
- We have analysed schedules to/from Dublin Airport and also taken a wider view of trends across Europe.
  - In some cases, trends at Dublin have differed from European trends (due to specific fleet decisions by Dublin based airlines), so it is useful to understand wider developments when considering the future.
- We have focussed on two main areas:
  - Trends in average aircraft size (and what is driving the trends). Increases in average aircraft size (alongside seat factor improvements) reduces some of the requirement for additional flights to meet increasing passenger demand (with subsequent impact on overall noise footprint).
  - Trends in aircraft generation (based on technology). Broadly speaking, newer aircraft generations are quieter than their previous generation equivalents. Therefore, the speed with which new generation aircraft are adopted also influences noise footprints.
- In the analysis of Dublin Airport specifically, we have focussed on Aer Lingus and Ryanair, while grouping together all remaining airlines.
  - Aer Lingus and Ryanair are by far the largest airlines at Dublin, between them accounting for just over 75% of total scheduled passenger flights in 2019 (based on the OAG schedules database, reflecting planned flights rather than actual operations).
- Note: we have not included 2020-21 in this analysis as, due to the impact of COVID-19, demand has been very low. Aircraft mix through this period is likely to be significantly impact by tactical scheduling in response to the latest demand and restrictions; it is not thought to be representative of 'normal' activity expected in the post-pandemic period.

There has been a steady increase in average aircraft size since 2014… This was primarily driven by faster growth of the (larger-than-average) 175-199 seat aircraft category than of other categories.

Dublin Scheduled Passengers ATMs, by Aircraft Size (# Seats) Category

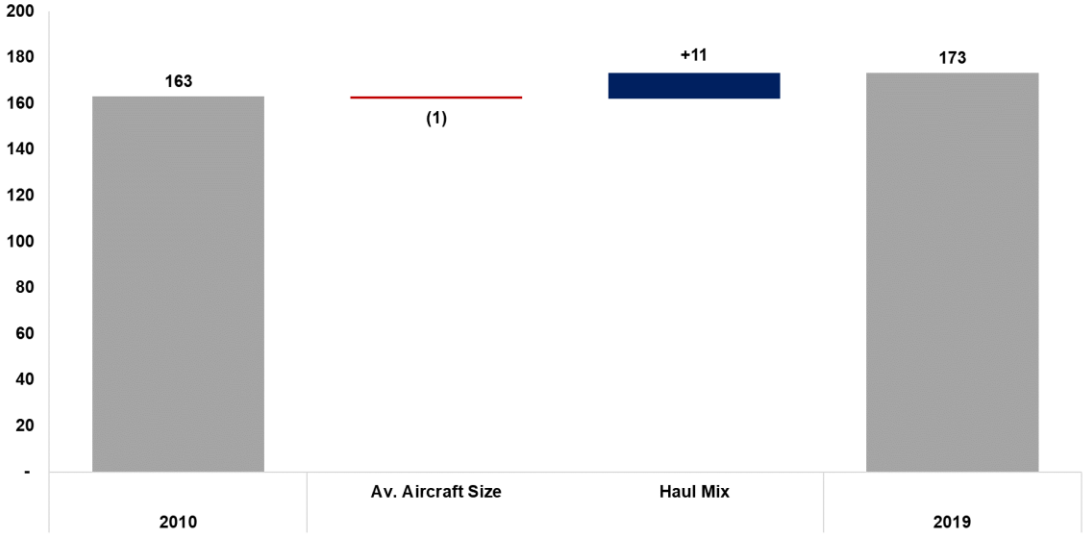
Source: OAG, Altitude Analysis



The increase in average aircraft size at Dublin has primarily been driven by an increase in the proportion of long haul flights and a major reduction in domestic flying… Within each haul category, average aircraft size has been increasing in recent years but longer term trends have been variable.

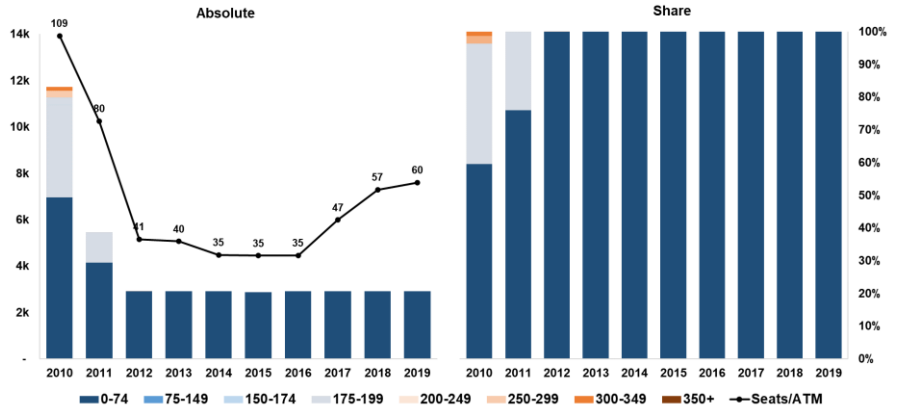
2010-19 Change in Average Seats per Scheduled PATM at Dublin

Source: OAG, Altitude Analysis



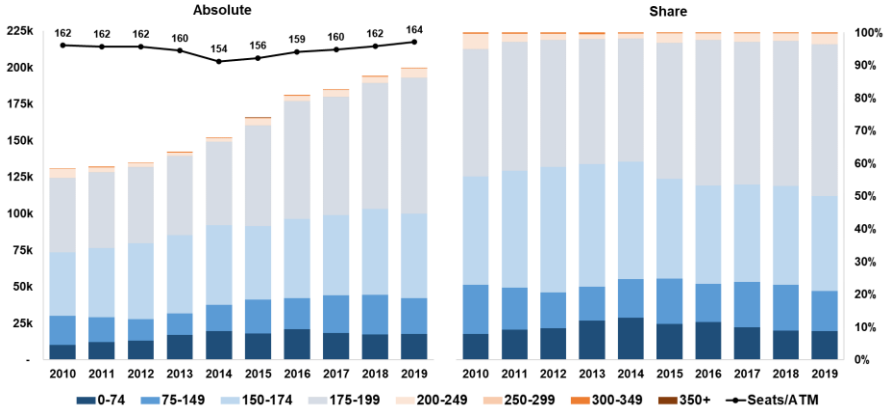
Dublin Scheduled Passengers ATMs, by Aircraft Size (# Seats) Category Domestic

Source: OAG, Altitude Analysis



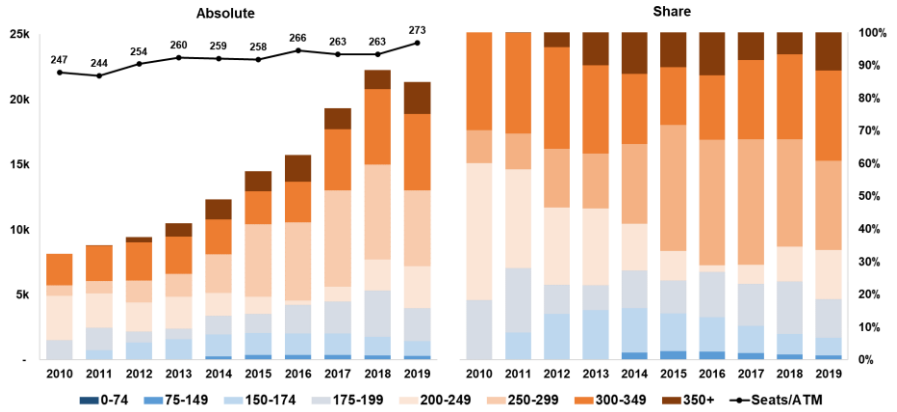
Dublin Scheduled Passengers ATMs, by Aircraft Size (# Seats) Category Int Short Haul

Source: OAG, Altitude Analysis

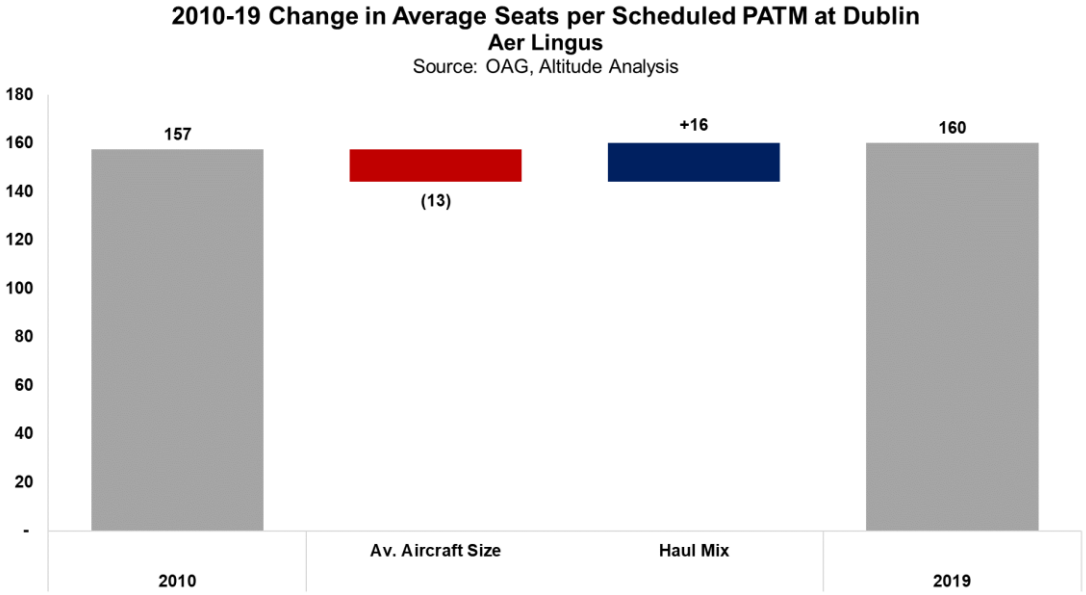


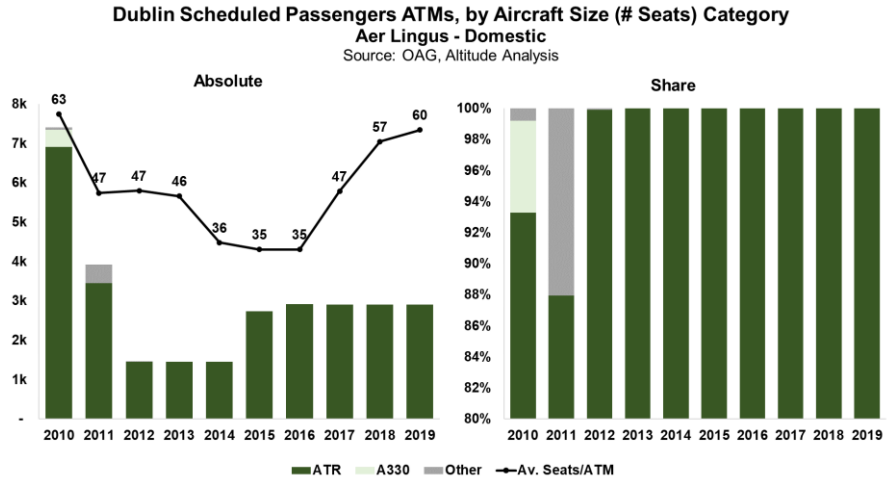
Dublin Scheduled Passengers ATMs, by Aircraft Size (# Seats) Category Long Haul

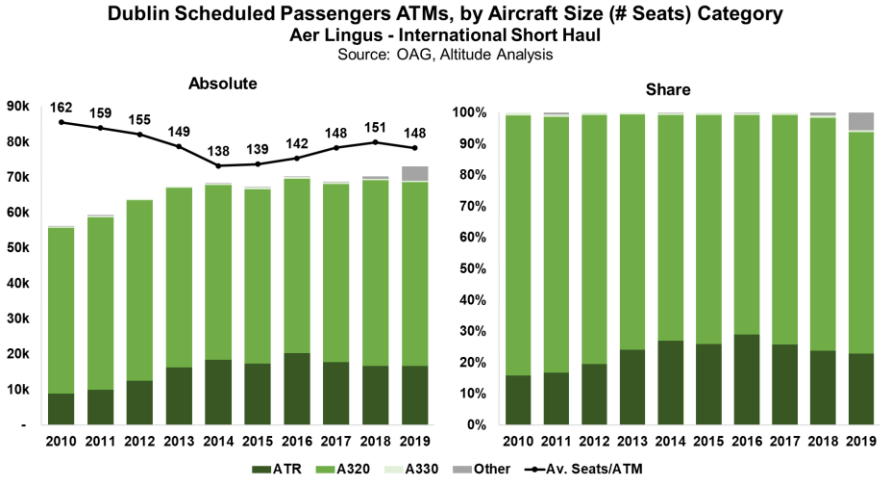
Source: OAG, Altitude Analysis

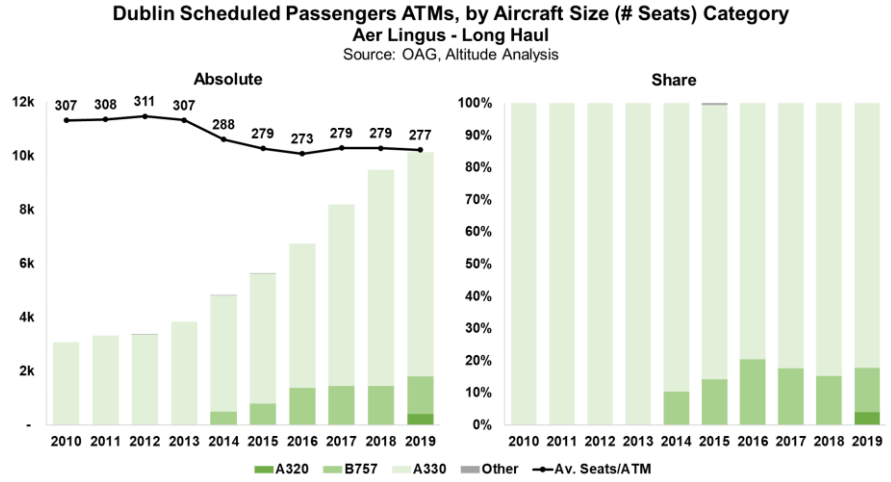


Within each haul category, Aer Lingus average aircraft size has fallen since 2010… However, this has been offset by an increase in the proportion of long haul flights (which use larger than average aircraft).

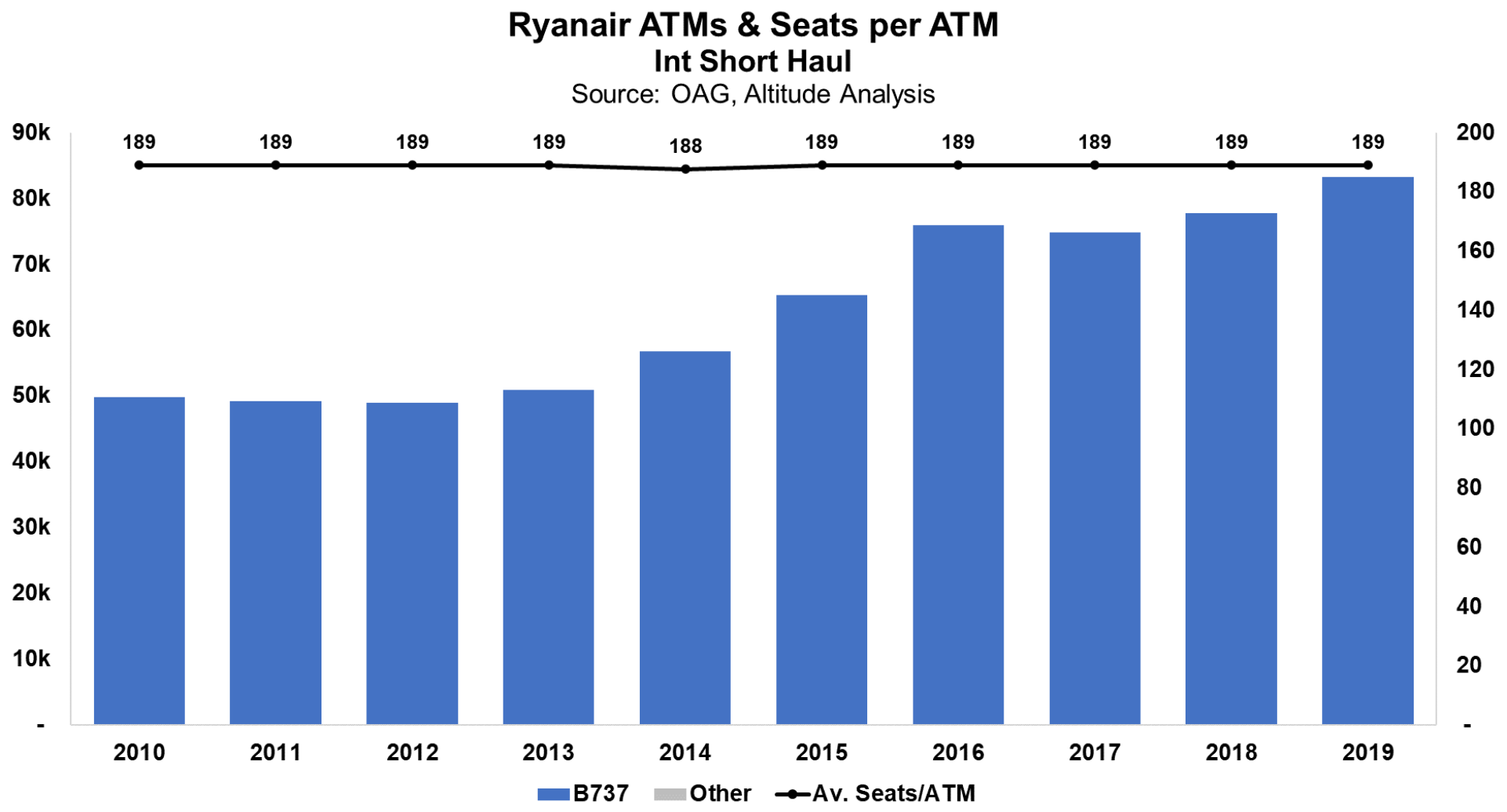






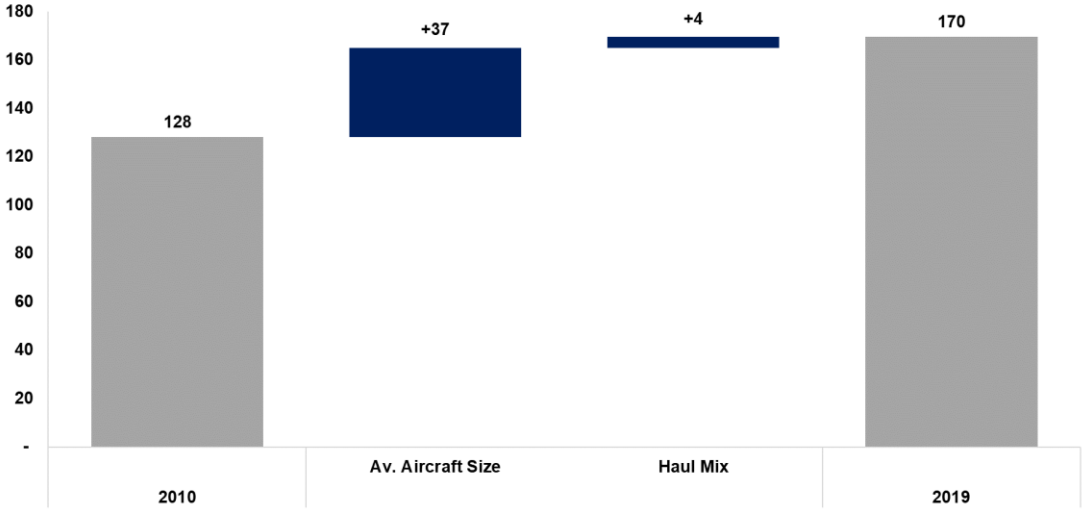


Ryanair has historically used a single aircraft type (B737-800) for almost all its flying from Dublin. As such, there has been no material change in average aircraft size since 2010.

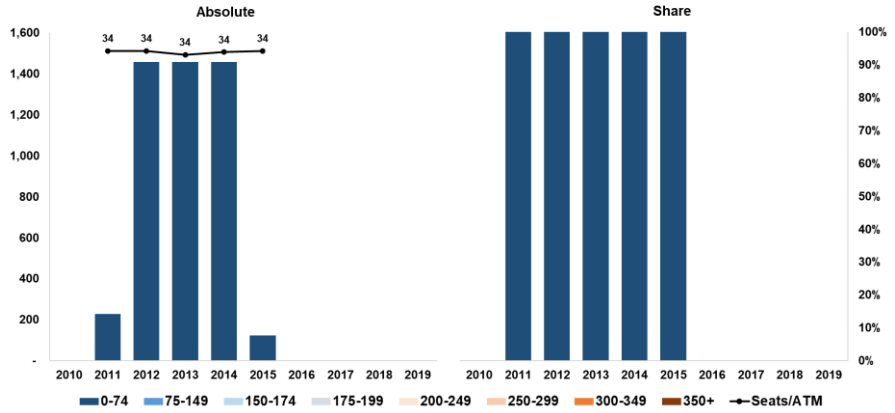


Within the other carrier category, there is a clear trend of increasing average aircraft size across both short haul and long haul flying… There is a small mix impact which has further increased overall average aircraft size.

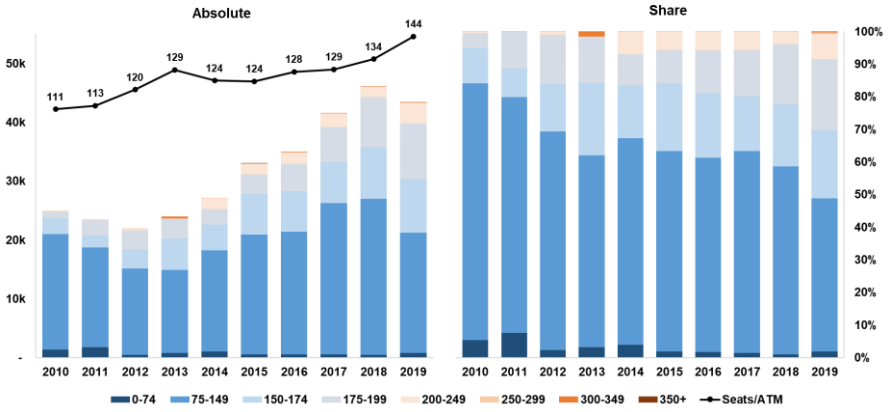
2010-19 Change in Average Seats per Scheduled PATM at Dublin
Excl. Ryanair & Aer Lingus
Source: OAG, Altitude Analysis



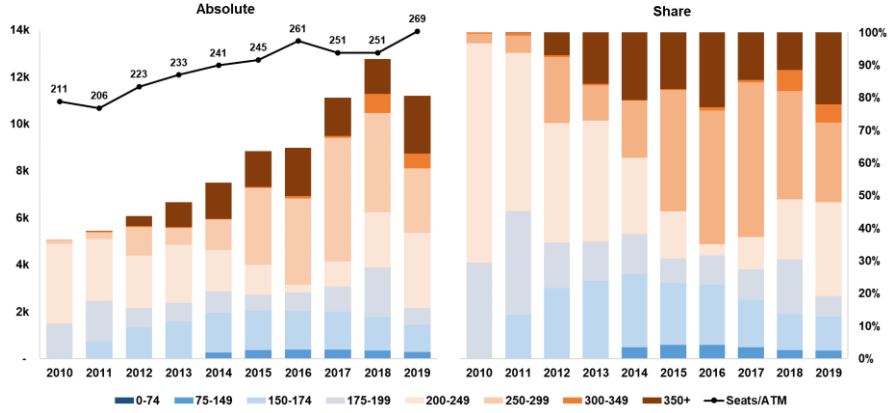
Dublin Scheduled Passengers ATMs, by Aircraft Size (# Seats) Category
Domestic - Excl. Ryanair, Aer Lingus
Source: OAG, Altitude Analysis



Dublin Scheduled Passengers ATMs, by Aircraft Size (# Seats) Category
International Short Haul - Excl. Ryanair, Aer Lingus
Source: OAG, Altitude Analysis



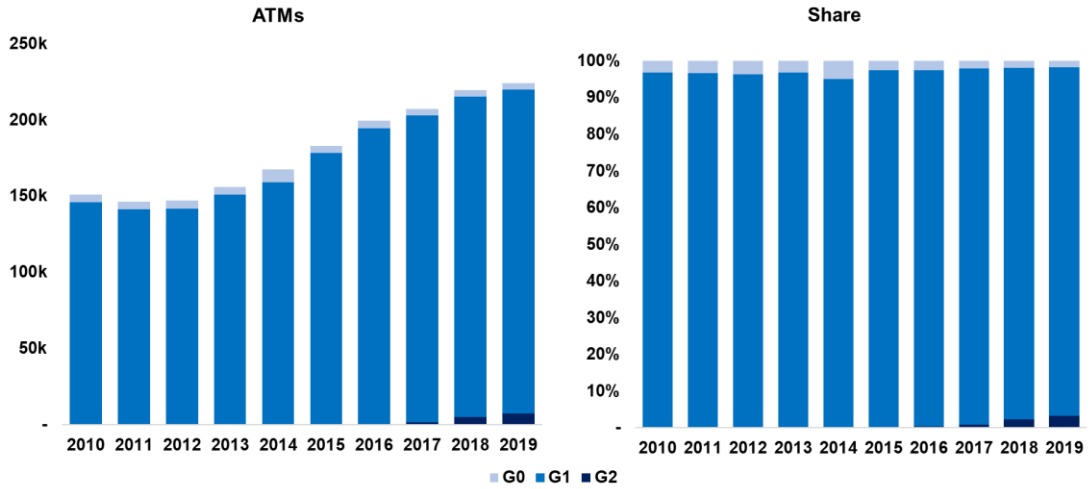
Dublin Scheduled Passengers ATMs, by Aircraft Size (# Seats) Category
Long Haul - Excl. Ryanair, Aer Lingus
Source: OAG, Altitude Analysis



Generation 0 aircraft (out of production aircraft types, typically from 1970s and 1980s) represent a small and declining proportion of flying at Dublin… Generation 1 aircraft (current aircraft types) dominate PATMs, while Generation 2 (latest aircraft types) are starting to enter the fleet.

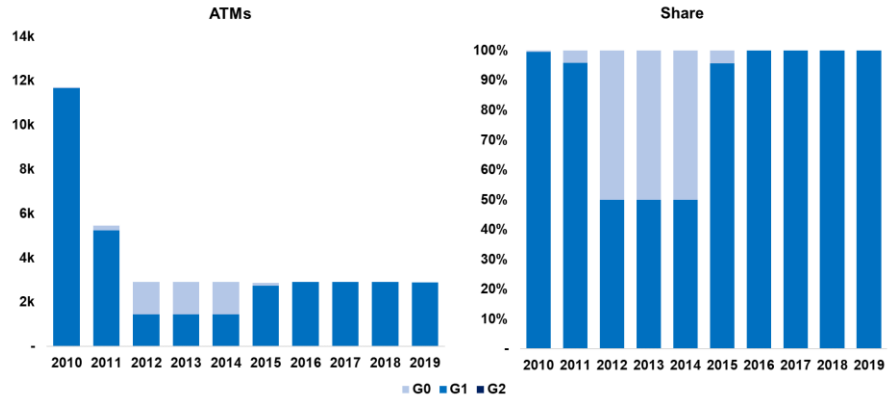
Dublin Scheduled Passengers ATMs, by Aircraft Technology Generation

Source: OAG, Altitude Analysis



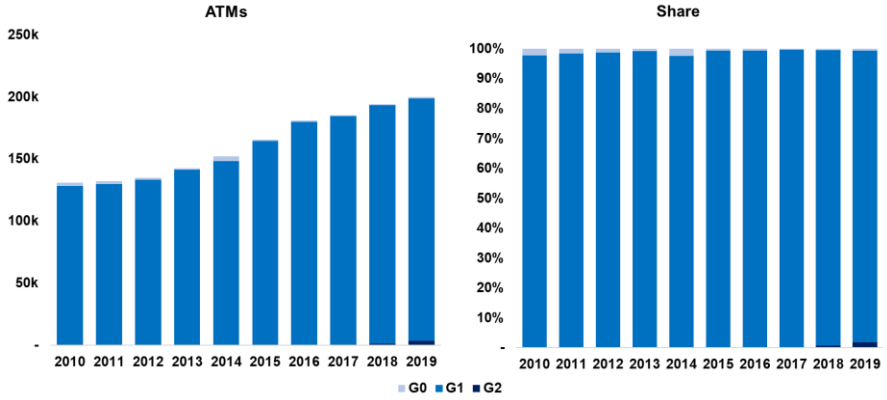
Dublin Scheduled Passengers ATMs, by Aircraft Technology Generation Domestic

Source: OAG, Altitude Analysis



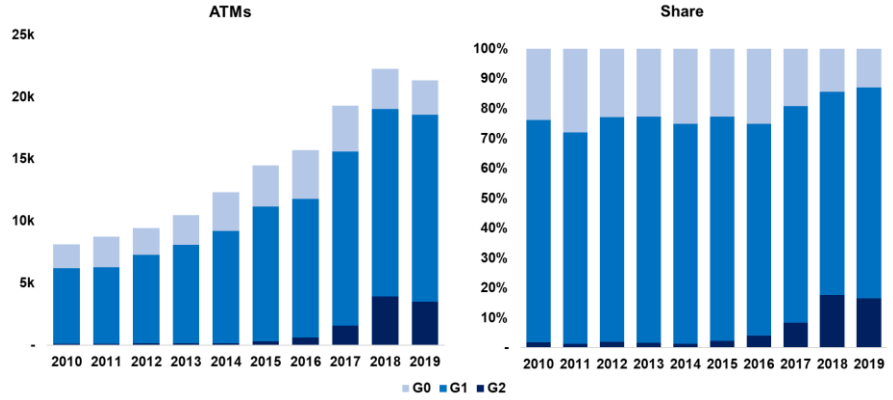
Dublin Scheduled Passengers ATMs, by Aircraft Technology Generation Int Short Haul ATMs

Source: OAG, Altitude Analysis

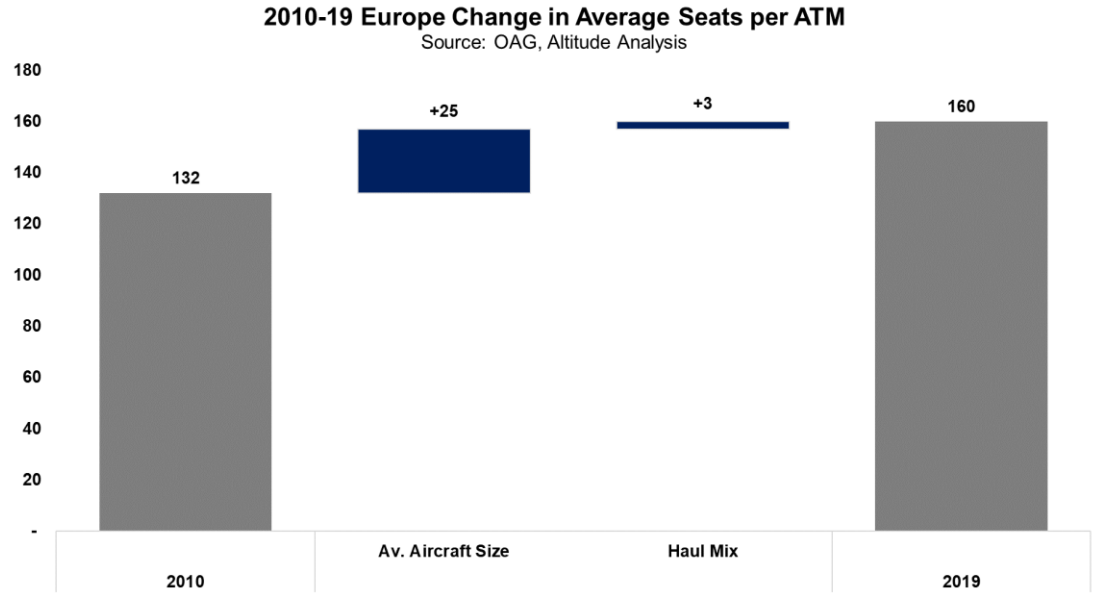


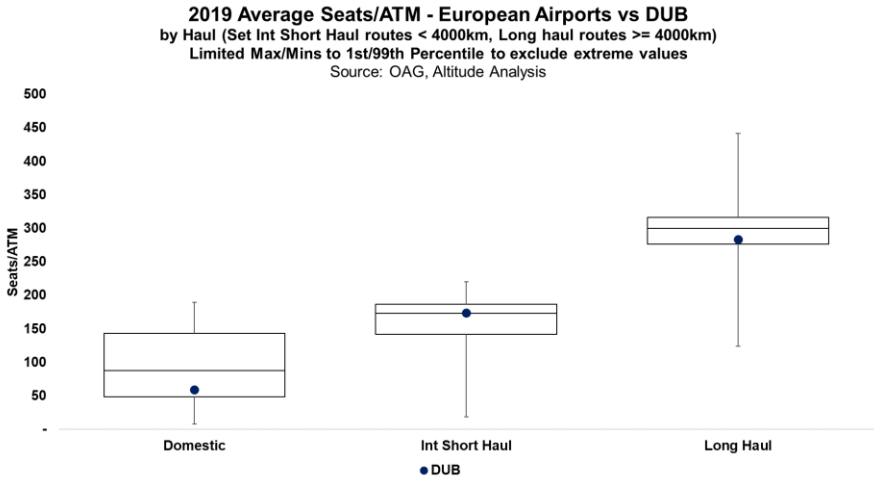
Dublin Scheduled Passengers ATMs, by Aircraft Technology Generation Long Haul

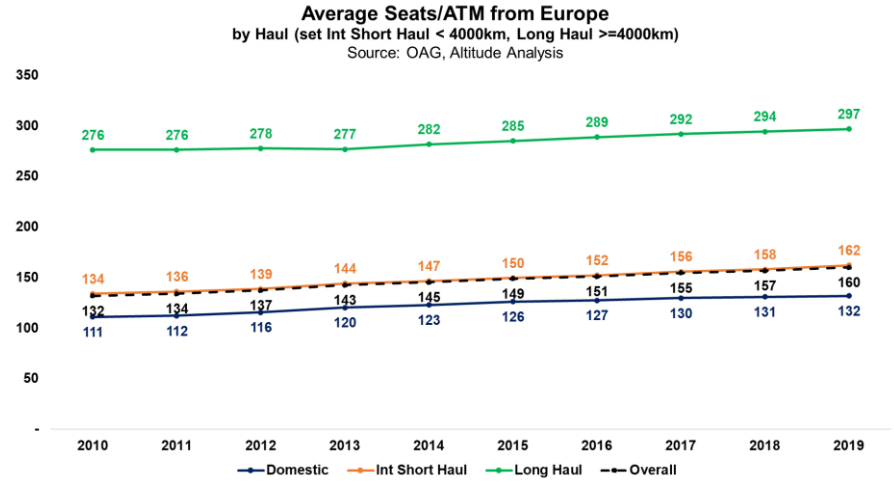
Source: OAG, Altitude Analysis



Within Europe, average aircraft size has been the main driver in average aircraft size growth (not haul mix)… Over the past decade, average aircraft size on domestic and international short haul routes has increased by nearly 30 seats, while the size of long haul aircraft has on average only increased by 20 seats.



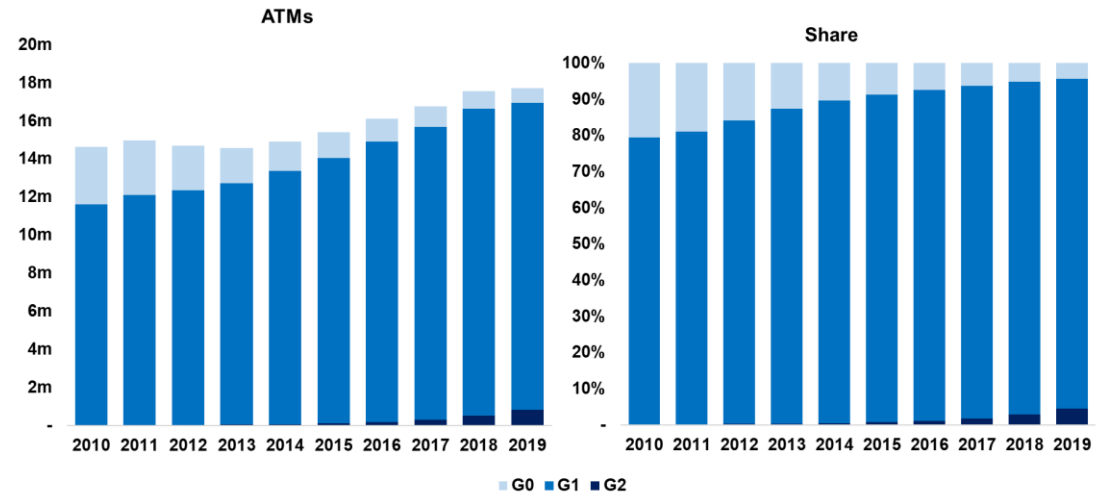




Compared to Dublin, Europe has a higher proportion of flying from both old aircraft types (Generation 0) and new aircraft technology (Generation 2)… Trends for transition from older to newer aircraft generations is more clear cut at the European level.

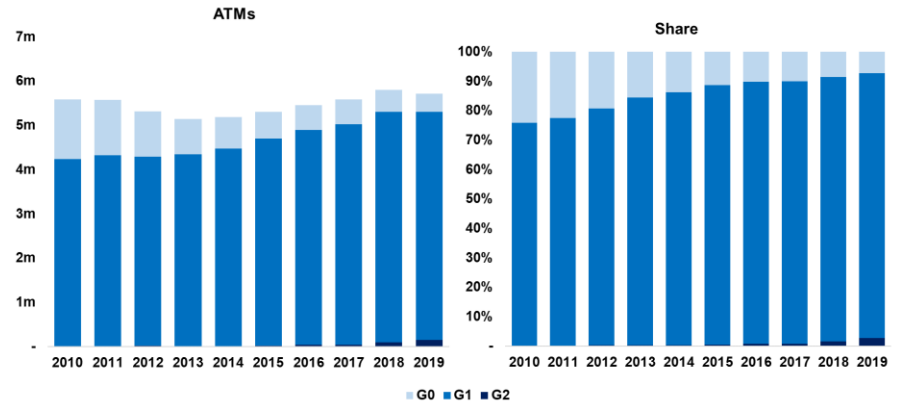
Europe Scheduled Passengers ATMs, by Aircraft Technology Generation

Source: OAG, Altitude Analysis



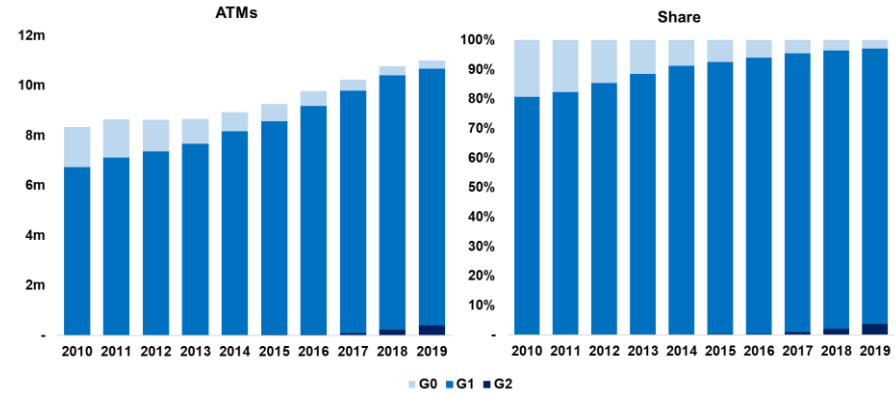
Europe Scheduled Passengers ATMs, by Aircraft Technology Generation Domestic

Source: OAG, Altitude Analysis



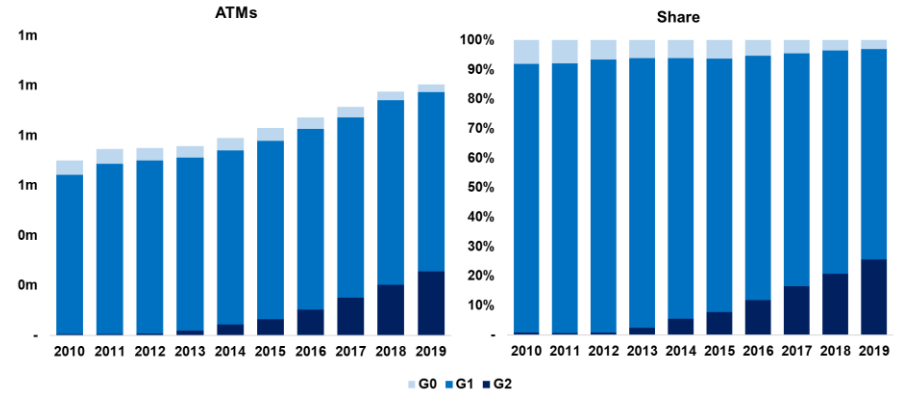
Europe Scheduled Passengers ATMs, by Aircraft Technology Generation Int Short Haul (Int Short Haul <= 4000km)

Source: OAG, Altitude Analysis



Europe Scheduled Passengers ATMs, by Aircraft Technology Generation Long Haul (Long Haul >= 4000km)

Source: OAG, Altitude Analysis



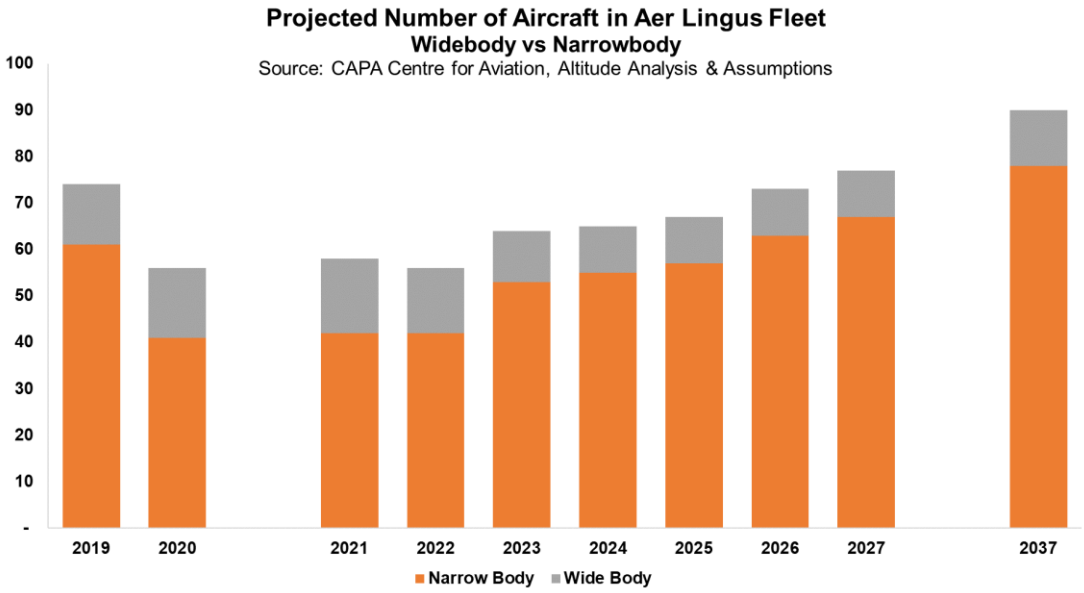
Detailed Aircraft Assumptions

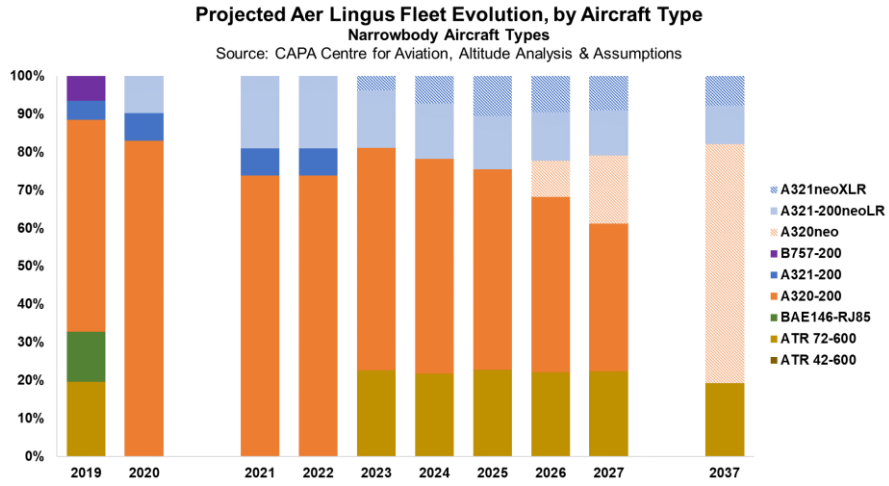
Appendix 2

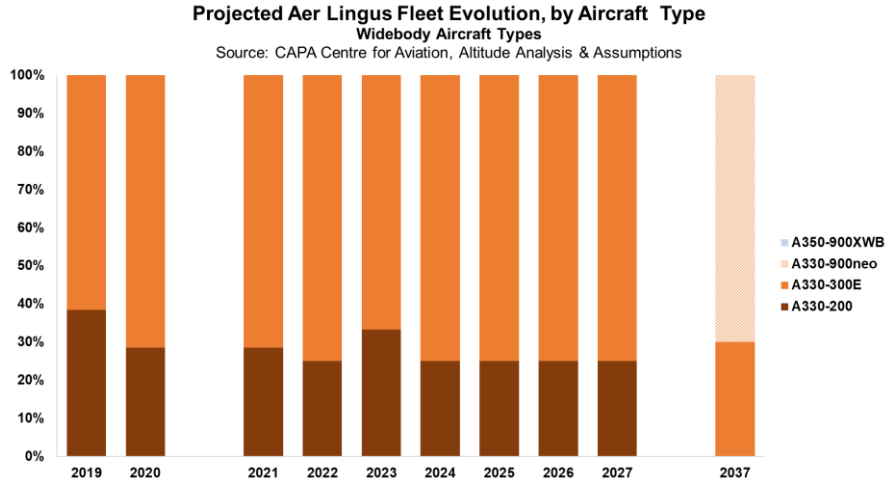
Aer Lingus

Detailed Aircraft Assumptions

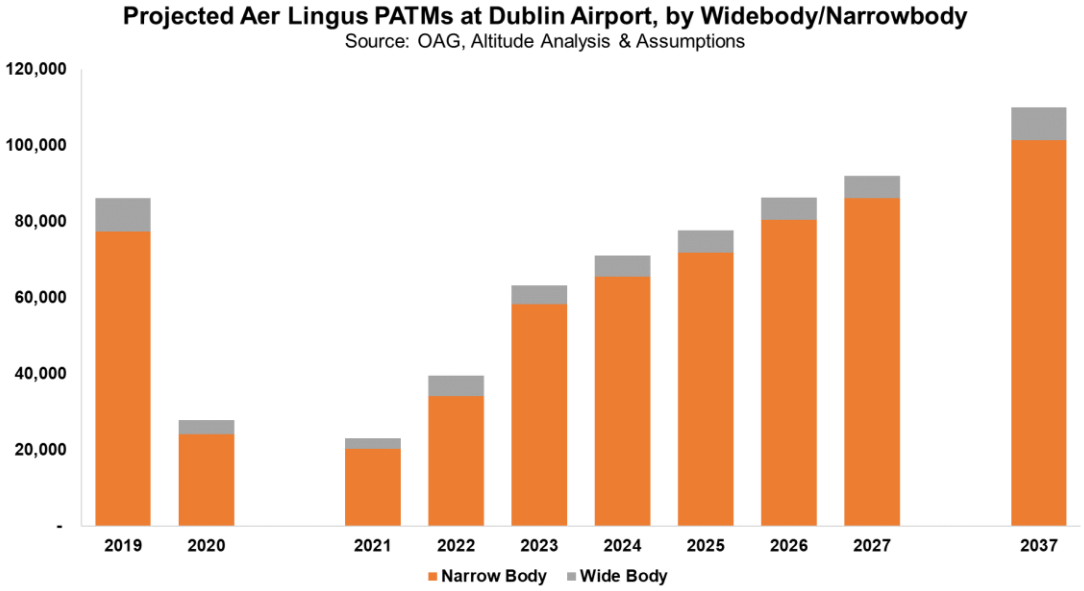
We have modelled the potential Aer Lingus fleet evolution to 2037... We model a shift towards narrow bodies, with long range A321s replacing some A330 flying.

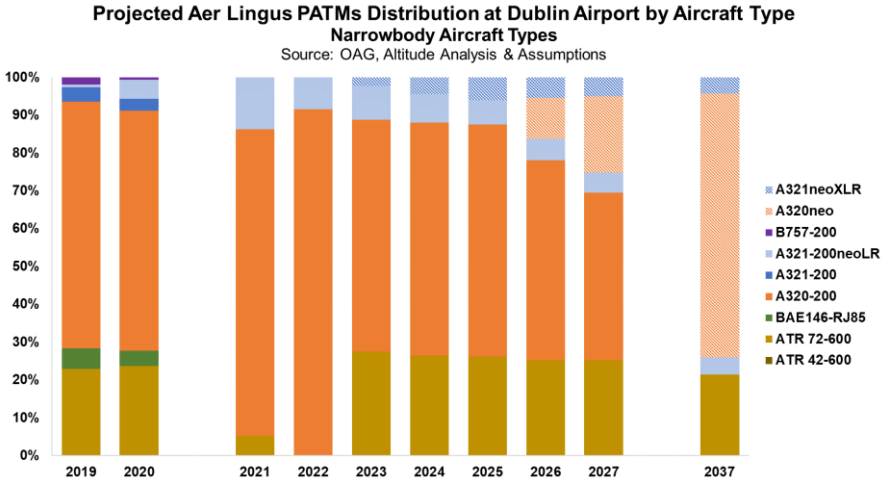


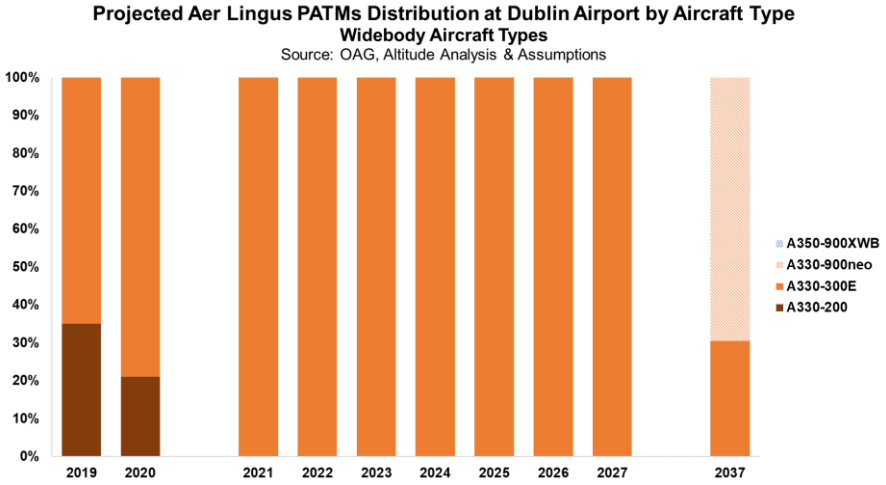




We also model Dublin's share of Aer Lingus flying to remain broadly similar to 2019 – both overall and for different aircraft types.







- Note that the aircraft type A321neoLR is shown on this slide to have a small share of Aer Lingus ATMs at Dublin in 2019, whereas the previous slide shows the type is not due to enter the Aer Lingus fleet until 2020.
- This is because the data on the previous page shows a snapshot of the fleet as at a single point in 2019 (30 June 2019), whereas the data on this page shows an aggregation of ATMs from across the whole of each year.
  - Aer Lingus had 4 A321neoLR aircraft delivered in 2019, but *after* 30 June. As such, they do not appear in the data on the previous slide until 2020, but these aircraft did operate in part of 2019.
  - The fleet snapshot date of 30 June was used as it enabled us to sidestep analytical complexities associated with aircraft being stored or leased out over the quiet winter period.
- Similar issue for the removal of ATR72 from the fleet in 2021.

Summary of key assumptions for Aer Lingus narrowbody aircraft at Dublin Airport.

Aircraft	Details
Bae146	▪ 2021: These aircraft were operated by CityJet for Aer Lingus. CityJet no longer provides services for Aer Lingus and so these aircraft are not part of the forecast.
ATR 42 / 72	▪ 2021: These aircraft were operated by Stobart Air for Aer Lingus, which has ceased operations. ▪ 2021-27: We assume Emerald Air services will begin in 2023 as announced and that they will use ATR-72 aircraft as announced.
A320 / A320neo	▪ 2021: Average age of existing A320 is ca. 14yrs with min age of ca. 10yrs and max age of ca. 20yrs. ▪ 2021-27: We assume A320 aircraft are used to cover capacity on some of the routes previously operated by Stobart/CityJet. ▪ 2021-27: We assume a gradual phase out of the existing A320 aircraft beginning 2023. ▪ 2021-31: We assume an order will be made for A320neo aircraft (or allocated to Aer Lingus from existing group capacity), and that these will begin to replace the A320 (with gradual growth of the combined A320/A320neo fleet). ▪ 2028-37: We assume continued gradual growth of the A320neo fleet.
A321-200	▪ 2021: The airline maintains a small sub-fleet of 3 A321-200 aircraft. These are over 20 years old. These aircraft are currently inactive and we assume they do not enter service again at DUB.
A321neoLR	▪ 2021: Aer Lingus had 8 aircraft in its fleet by mid 2021 (source: CAPA). ▪ 2021-37: With no further aircraft delivered, the share gradually reduces.
A321neoXLR	▪ 2021: This type is not currently operated by Aer Lingus, but the airline has an order for 6 aircraft. The delivery schedule is not known. The aircraft will enter service globally in 2023 (source: Airbus). There are many other airline customers, and hundreds of orders overall. ▪ 2021-27: We assume all 6 aircraft enter the fleet through this period (i.e. beginning shortly after the entry into service of the type). ▪ 2028-37 onwards: We assume no further changes in the net number of aircraft.
B757-200	▪ 2021: These aircraft were operated by ASL Airlines for Aer Lingus. We understand this lease deal ended in Q1 2020 and we assume the lease is not extended and the aircraft exit the fleet.

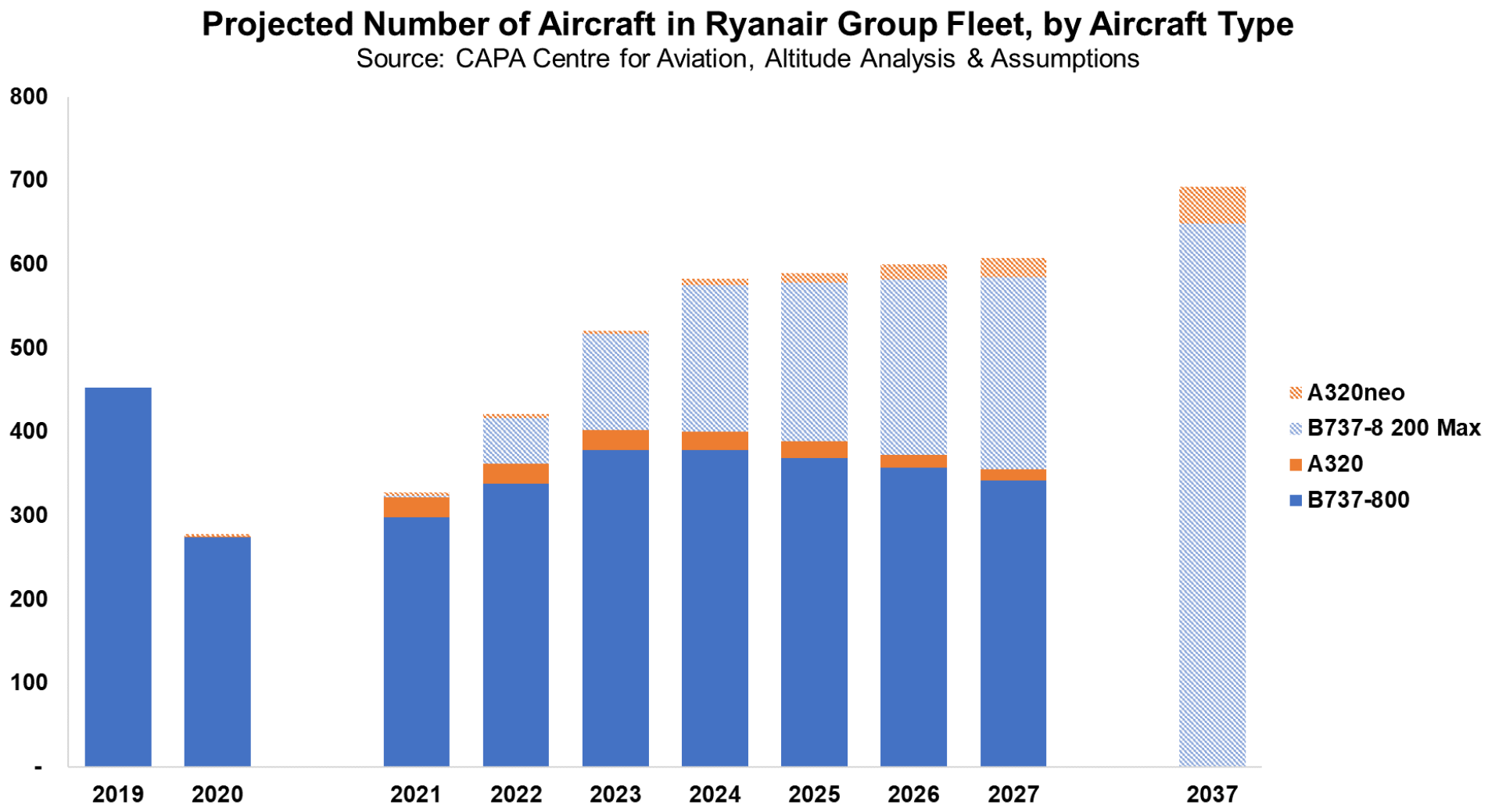
Summary of key assumptions for Aer Lingus widebody aircraft at Dublin Airport

Aircraft	Details
A330-200	▪ 2021: There were only 4 of these aircraft in the fleet as of 2021. They have an average age close to 20yrs. ▪ 2021-27: We assume the aircraft are retired from the fleet over this period.
A330-300E	▪ 2021: This aircraft makes up the majority of the widebody fleet. We understand the fleet has an average age of ca. 8yrs, but within that there are 4 older airframes (over 10 yrs old) and 6 young airframes (less than ca. 5yrs old). ▪ 2021-27: We assume the 4 older airframes will be retired over this period. ▪ 2028-37: We assume that a slow retirement of remaining airframes takes place through this period.
A350-900XWB	▪ 2021: This aircraft is not currently in the fleet. The carrier has an order for the aircraft, although the delivery date is unknown (source: CAPA). Previous A350 orders have been transferred to group airline Iberia. Aer Lingus investor relations materials do not make reference to a future fleet with A350 aircraft. ▪ 2021-37: We do not assume the type enters service with Aer Lingus.
A330-900neo	▪ 2021: This aircraft is not currently in the fleet and the carrier has not announced any orders for the type. However, we understand this type is now considered by Aer Lingus to be preferable in some ways to the A350. ▪ 2028-37: We assume this type enters the fleet over this period, partly to grow the long haul fleet and partly as replacement for the retiring A330-300E.

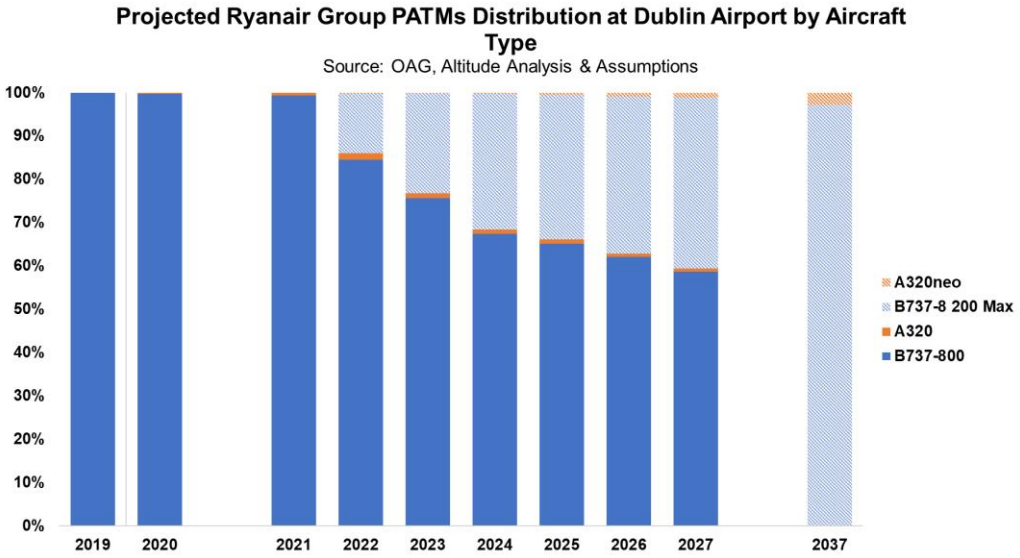
Ryanair

Detailed Aircraft Assumptions

The Ryanair fleet is anticipated to continue growing, with the B737-8 200 Max gradually replacing existing B737-800 aircraft.



Summary of key assumptions for Ryanair aircraft at Dublin Airport.

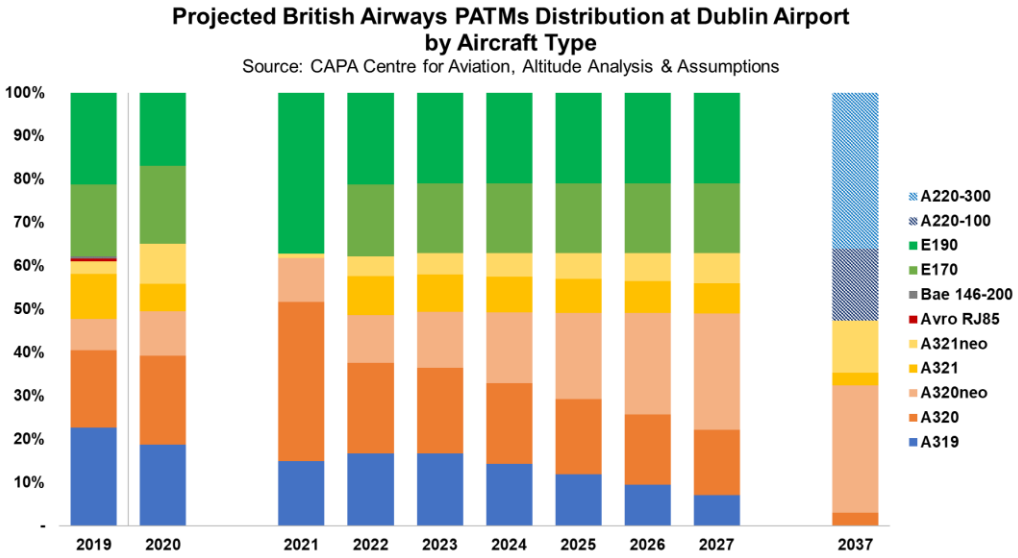


Aircraft	Details
B737-800	▪ 2021: This aircraft type makes up almost the entirety of Ryanair's fleet, and accounts for a large majority of operations at Dublin. A large proportion of the fleet is currently inactive due to the impact of the pandemic on demand. The carrier has no orders for this aircraft type. We understand that many of the airframes are new, but that the oldest are ca. 18 years old. ▪ 2021-27: We assume the carrier reintroduces several of the inactive airframes over 2022-23. We assume the carrier gradually retires older airframes over the period (as they approach 20 years of age). At network level, Ryanair has a recently-stated aim of operation a fleet of ca. 600 aircraft in 2026, and it is likely to temper retirements in line with deliveries of other types to meet this goal. ▪ 2028-37: We assume continued retirement of the type through the period, such that it has exited the fleet by 2037.
B737-8 200 MAX	▪ 2021: This aircraft is now certified for service once again. Ryanair has 173 outstanding orders for the type, with a schedule for deliveries over 2022-24 (source: CAPA). ▪ 2021-27: We assume the aircraft are delivered as per the schedule over this period. Further, we assume that Ryanair is able to secure delivery slots for further aircraft over 2025-27. ▪ 2028-37: We assume further aircraft of this type will be ordered, and that deliveries will continue over this period (gradually replacing B737-800 airframes). We assume deliveries come at a faster rate than retirements of other aircraft types, leading to net fleet growth consistent with short term projections by the company but at a lower rate than seen historically.
A320	▪ 2021: This type is operated by Ryanair Group airlines (the aircraft are inherited; Ryanair itself is unlikely to begin using Airbus aircraft in future, and has recently stated that it expects it future fleet to be largely comprised of B737 aircraft). ▪ 2021-37: We model a gradual phase-out of this type over the forecast period.
A320neo	▪ 2021: This type is not operated by Ryanair Group airlines. ▪ 2021-37: We model replacement of A320 by this type beginning ca. 2025.

Other Carriers

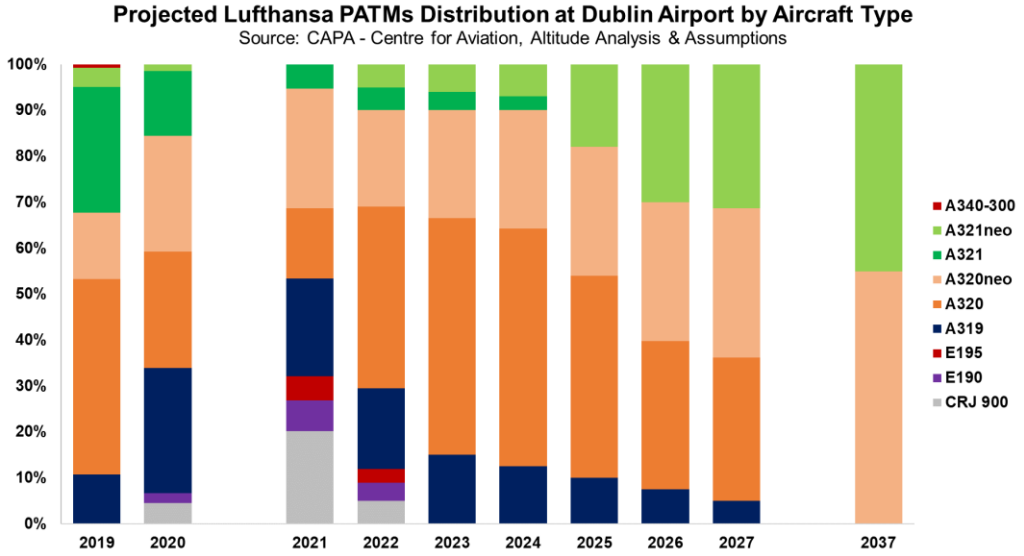
Detailed Aircraft Assumptions

Summary of key assumptions for British Airways aircraft at Dublin Airport.



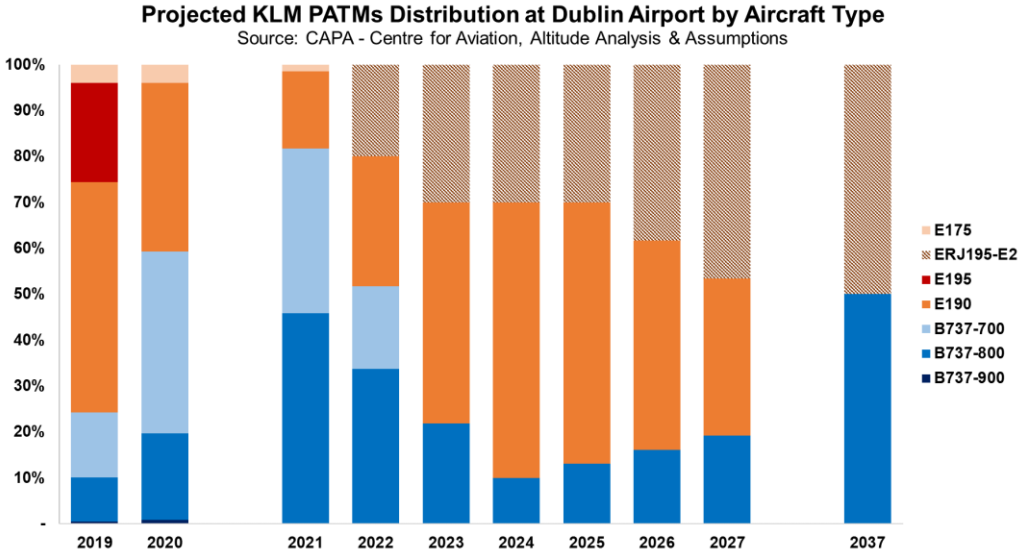
Aircraft	Details
E170/190	▪ 2021: E170 fleet is inactive as a result of the current low demand. ▪ 2021-27: We assume the E170 fleet returns to service in 2022. ▪ 2028-37: We assume the E170/190 fleet is phased out over the early part of the period, replaced by A220 aircraft.
A321 / A321neo	▪ 2021: Youngest of A321 aircraft is ca. 12yrs, with the neo airframes being relatively new (delivered since 2019). British Airways has orders for 3 more neo aircraft. ▪ 2021-37 onwards: We assume increasing share of the newer type used on DUB route with minimal flying by 2037 on A321 due retirements (orders for further neo aircraft have not yet made).
A320 / A320neo	▪ 2021: Youngest existing A320 ca. 7yrs. neo airframes are relatively new, with deliveries still in progress. ▪ 2021-37: We assume the A320 family is gradually replaced by A321neos. With in the A320 family, we assume continued retirement of A320 and replacement with A320neo.
A319	▪ 2021: Youngest aircraft age of ca. 14 yrs. ▪ 2021-27: We assume this type is gradually phased out. ▪ 2028-37: The aircraft is completely phased out early in this period.
A220-100/300	▪ 2021: This type is not currently operated by British Airways. ▪ 2027-37 onwards: We assume an order will be made for A220-100 and A220-300 aircraft, and these will replace the E170/E190 and A319 respectively.

Summary of key assumptions for Lufthansa aircraft at Dublin Airport.



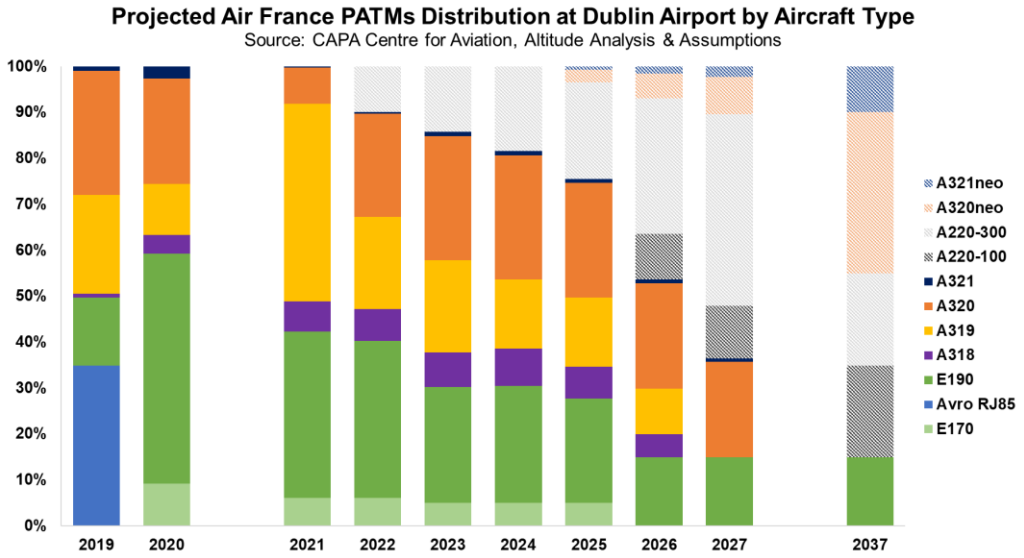
Aircraft	Details
CRJ 900	▪ 2021: This aircraft has historically not operated significant frequencies at DUB, but in the current low demand environment it accounts for a higher share of Lufthansa ATMs. ▪ 2021-27: We assume this aircraft will cease operations at DUB from 2023 as demand returns to normal.
E190/195	▪ 2021: This aircraft has historically not operated significant frequencies at DUB, but in the current low demand environment it accounts for a higher share of Lufthansa ATMs. ▪ 2021-27: We assume this aircraft will cease operations at DUB from 2023 as demand returns to normal.
A319	▪ 2021: Many airframes already over 20 years old. ▪ 2021-27: We assume a gradual phase out of the existing A319 aircraft over this period. ▪ 2028-37: The type is completely removed early in this period.
A320 / A320neo	▪ 2021: The airline is operating a mix of A320 and A320neo aircraft with aircraft ranging from new to 30 years old. ▪ 2021-27 onwards: We assume the type replaced the CRJ/E190//195 over by 2023 as demand returns to normal. We assume a gradual phase out of the existing A320 aircraft, which will be replaced with the A320neo aircraft over the forecast period.
A321 / A321neo	▪ 2021: Average age of existing A321 is over 10yrs. Lufthansa has begun to take delivery of the A321neo aircraft, with deliveries scheduled in 2022 and then 2025-27. ▪ 2021-27: We assume increasing share of A321neo aircraft as they come into the fleet. ▪ 2028-37: We assume further increasing share of the larger A321 type versus the A320 on the DUB route.

Summary of key assumptions for KLM aircraft at Dublin Airport.



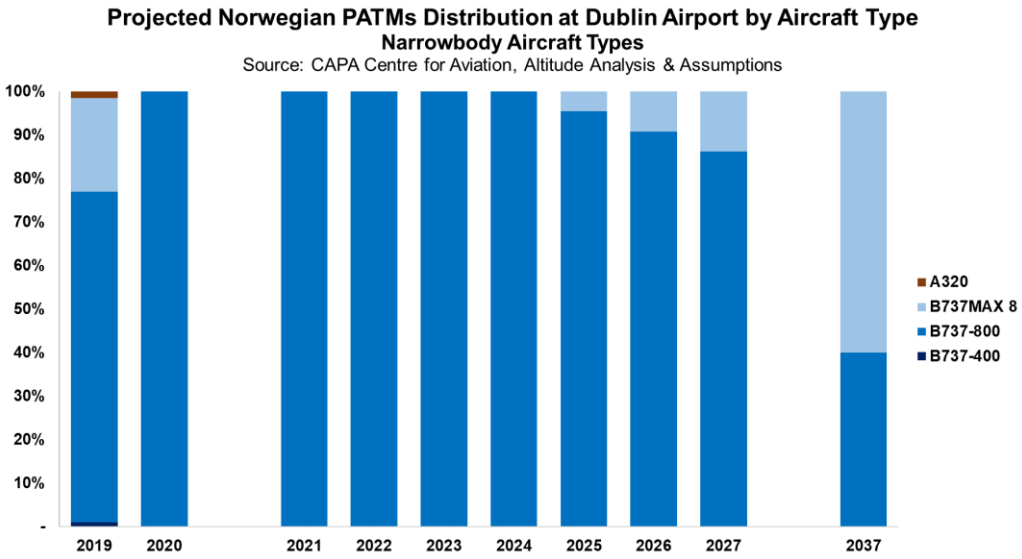
Aircraft	Details
E175	▪ 2021: Only a small fraction of capacity operated on this type. ▪ 2022: We assume this aircraft will no longer be operated at DUB, with focus on E190s.
E190	▪ 2021: Reduced share in low demand environment. Average age of existing E190 is ca. 10 years. The carrier has no existing orders for this type. ▪ 2021-27: We assume the share of E190 aircraft will return to 2019 levels by ca. 2024 as demand returns. In the later years of the period, the share will begin to reduce again as it is replaced by the E195-E2. ▪ 2028-37: We assume this type is completely replaced by the –E2 variant by the early part of this period.
ERJ195-E2	▪ 2021: Deliveries of this type have begun with ca. 5 aircraft in the fleet and ca/. 20 still to come (scheduled over the period to 2024). ▪ 2021-27: We assume the aircraft will start services at DUB in 2022, gradually replacing the E190. ▪ 2028-37: The aircraft will completely replace the E190 by the early part of the period.
B737-700	▪ 2021: Share has increased through pandemic period. ▪ 2021-27: We understand this aircraft is to be retired by 2022, and assume that it will be gradually phased out over this period.
B737-800	▪ 2021: Share has increased through the pandemic period. Large range of airframe ages (some relatively new). ▪ 2021-37: Share reverts to per-pandemic levels over 2021-24. Given the young age of some airframes, we assume continued operations of this aircraft type over the period. We assume capacity limitations at AMS will drive up seats/ATM strongly in the long term; increased flying of this type would be beneficial in that regard.

Summary of key assumptions for Air France aircraft at Dublin Airport.



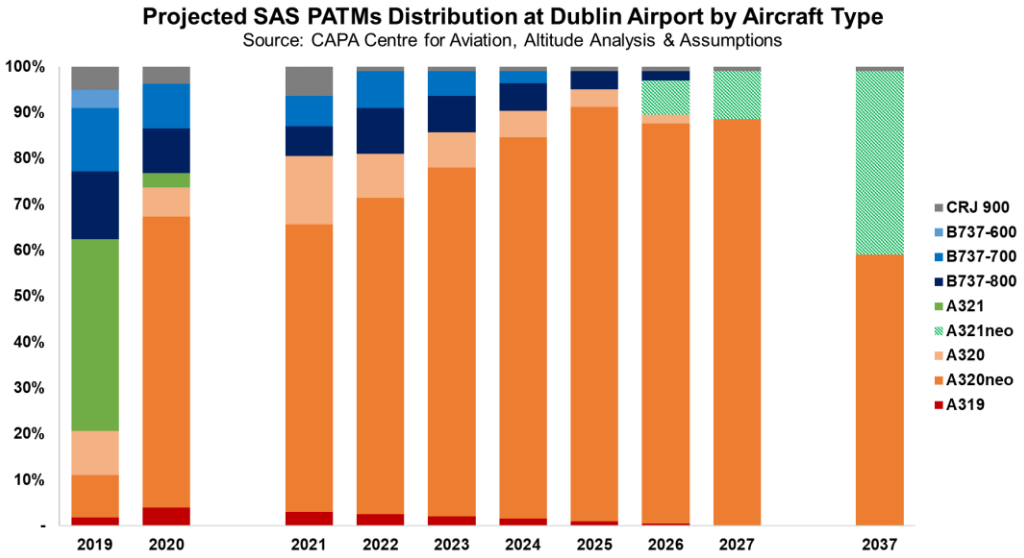
Aircraft	Details
A319	▪ 2021: Increased share through the pandemic period. ▪ 2021-27: We assume a reversion to pre-pandemic share level in 2022. We assume the type is phased out such that by 2027 it no longer operates to/from DUB.
A220-100 / A220-200	▪ 2021: This type is currently not operated by Air France, but the airline has an order for 60 aircraft, with deliveries scheduled from September 2021. ▪ 2021-27: We assume the A220-300 starts operating to DUB very soon after it is received into the fleet (effectively replacing the A319). Towards the latter end of the period, we assume entry of the A220-100 as E170/190 is phased out. ▪ 2028-37: We assume the A220-100 share grows and -300 share reduces.
E170 / E190	▪ 2021: Increased share through the pandemic period, including capacity on wet lease. ▪ 2021-27: We assume some of this increased share is retained, as the aircraft is used in replacement for RJ85s previously operated for Air France by CityJet. ▪ 2028-37: We assume a small share retained through period.
A320 / A321	▪ 2021: Reduced share through pandemic period. ▪ 2021-27: We assume reversion to pre-pandemic share level in 2022. We assume moderate growth in ATMs operated to/from DUB over the period. We assume replacement by neo equivalents begins towards the end of the period (no orders currently) for neo variants. ▪ 2028-37: We assume the gradually phasing out of aircraft by 2036, replaced by neo equivalents.
A320neo / A321neo	▪ 2021: These aircraft types are currently not operated by Air France. ▪ 2021-27: We assume the aircraft will enter the fleet towards the end of this period and start services at DUB. ▪ 2028-37: We assume the neo aircraft will replace current generation aircraft fully by 2037.

In 2021 Norwegian operates a significantly reduced schedule as a result of both the pandemic and its revised business plan, which focuses on short haul primarily from Scandinavia… We assume Norwegian does not operate any widebody flights in the period to 2037.



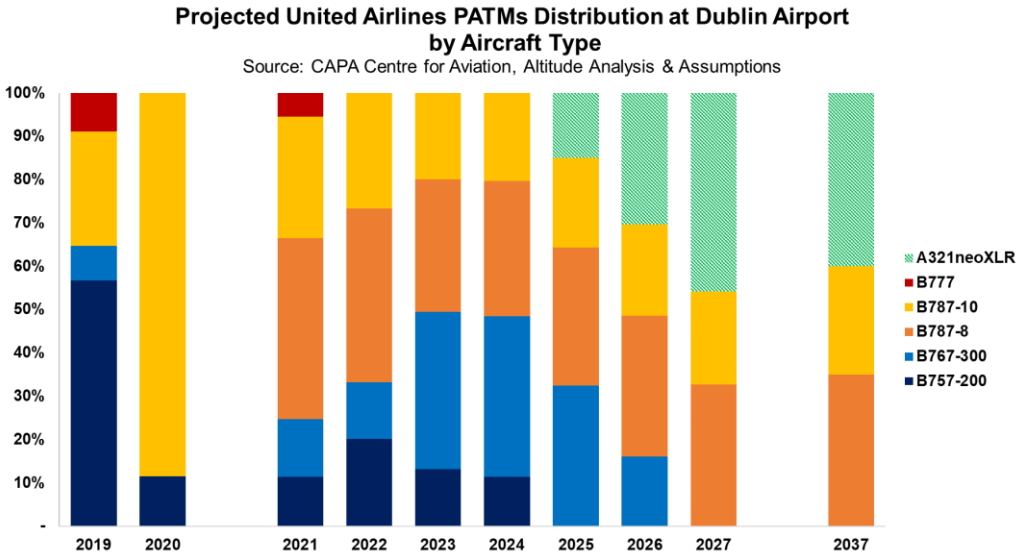
Aircraft	Details
B737-800	▪ 2021: The only type in the current fleet. There are no orders. ▪ 2021-27: We assume over the forecast period that this aircraft will begin to be phased out and replaced with the B737 MAX8.
B737MAX 8	▪ 2021: This aircraft is not in the current fleet. There are as yet no orders for this aircraft type. ▪ 2021-37: We assume that orders for this aircraft will be made as soon as is financially viable (due to superior operating economics).and that it will gradually replace the -800 version.

Summary of key assumptions for SAS at Dublin Airport.



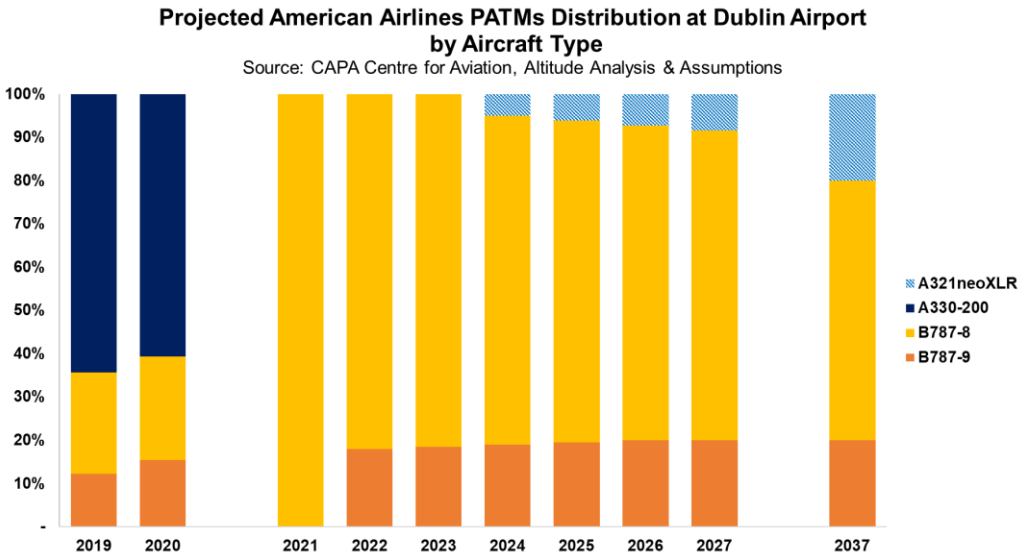
Aircraft	Details
CRJ 900	▪ 2021: We understand that this aircraft is leased from CityJet. ▪ 2021-37: We assume that this aircraft will continue to serve at DUB throughout the forecast period, albeit at a smaller proportion of SAS flights, closer to historic performance.
B737-700	▪ 2021: Average age of existing aircraft ca. 18yrs. The airline has announced its intention to operate a single-family narrowbody fleet (of A320neo aircraft). ▪ 2021-27: We assume the phase out of this aircraft before the end of the period.
B737-800	▪ 2021: Average age of existing aircraft is 14yrs. The youngest aircraft is ca. 7yrs (Source: CAPA). ▪ 2021-27: The airline has announced its intention to operate a single-family narrowbody fleet (of A320neo aircraft)…We assume the phase out of this aircraft by the end of the period.
A321 / A321neo	▪ 2021: A321 is not used in 2021 and we assume it is not used in future on the DUB route. A321neo is on order, but the LR version which is likely to be used for longer sectors. ▪ 2021-27: We assume that SAS will place orders for the A321neo (normal version) in to replace existing aircraft. We assume an entry on the DUB route towards the end of the period. ▪ 2028-37: Increasing proportion of ATMs operated by A320neo as demand increases.
A320 / A320neo	▪ 2021: Significant share increase over pandemic period. 35 neo aircraft scheduled for delivery over period to 2026. Carrier has stated intention to operate primarily A320neo narrowbody fleet. ▪ 2021-27: We assume the recent increased share will be largely maintained and grow further through the period as a result of SAS fleet strategy. A320 will gradually be phased out and replaced with A320neo equivalents. ▪ 2028-37: We assume reducing mix of A320neo as larger-capacity A321neo is rolled out.
A319	▪ 2021: Average age of aircraft ca. 15yrs. Small share in 2021. ▪ 2010-27: We assume this aircraft will be gradually phased out over this period due age.

Summary of key assumptions for United Airlines aircraft at Dublin Airport.



Aircraft	Details
B777	▪ 2021: large fleet of -200 aircraft with a wide range of airframe ages. We understand that United has much newer -300ER fleet. The proportion of this aircraft being used by United at DUB has been declining (Source: OAG). ▪ 2021-27: We assume the aircraft is not used post 2021.
B757-200	▪ 2021: Old aircraft, being replaced by 2024. ▪ 2021-27: We assume the aircraft will gradually get phased out before the end of the period.
B787-10	▪ 2021: New airframes with further deliveries to come in 2022. ▪ 2021-37: We assume that the aircraft will carry on operating throughout the forecast period.
B787-8	▪ 2021: Average age of existing aircraft ca. 8yrs. Type is used in place of retiring B757. ▪ 2021-37: We assume that the aircraft will carry on operating throughout the forecast period.
B767-300	▪ 2021: Average age of existing aircraft over 20yrs. We understand that the aircraft are being fitted with new seats, with that investment indicating it will remain in service for some years to come. ▪ 2021-27: We assume the aircraft will carry on operating at DUB until the latter part of this period.
A321neoXLR	▪ 2021: This type is currently not operated by United, but the airline has an order for 50 new A321neoXLR, scheduled for delivery in 2024 (source: United). ▪ 2021-37: We assume that United will start using the aircraft for services at DUB soon after it receives them from 2024.

Summary of key assumptions for American Airlines aircraft at Dublin Airport.

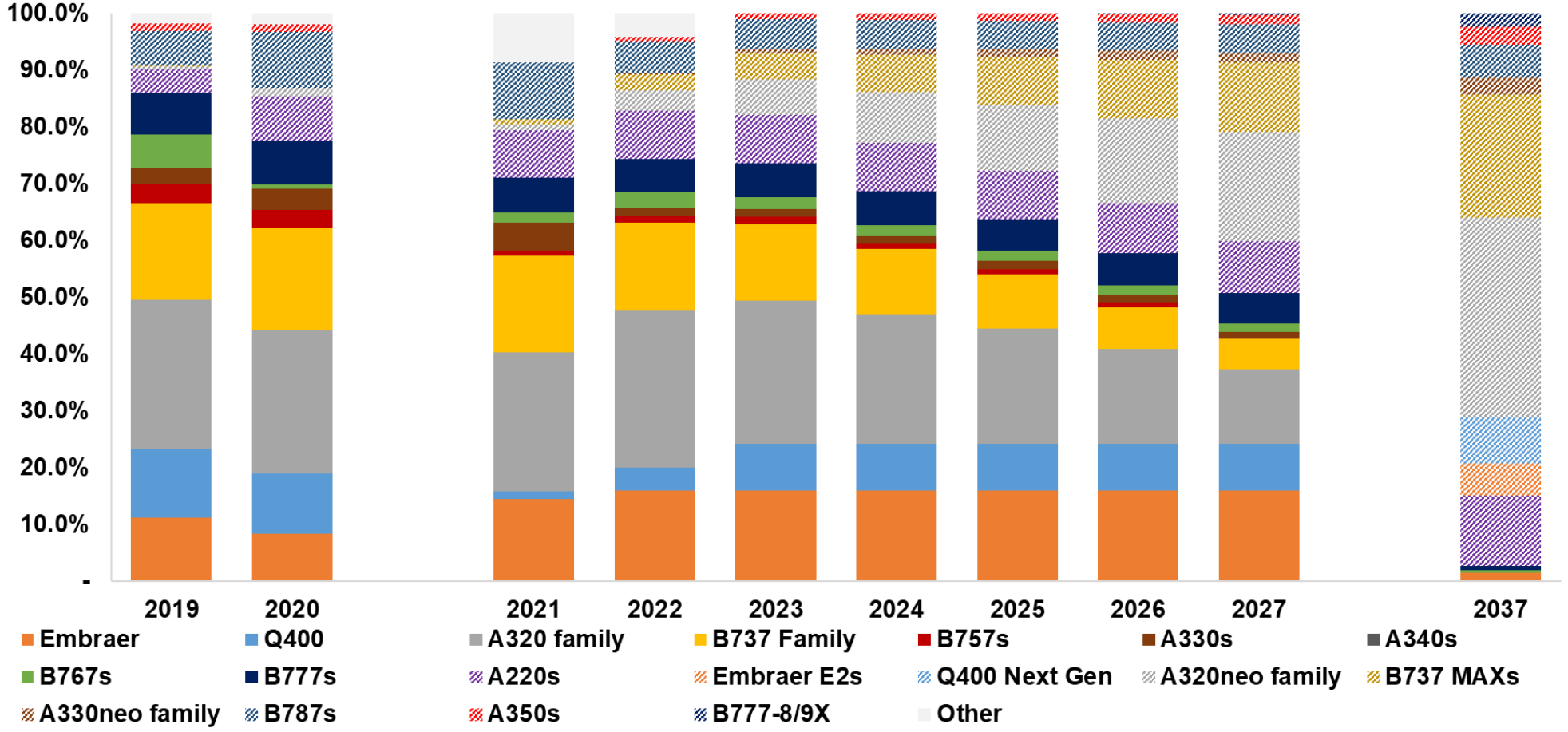


Aircraft	Details
A330-200	▪ 2021: This type has been retired.
B787-8 / B787-9	▪ 2021: B787-8 is the only aircraft being used on the route in the altered demand pandemic period. It has further deliveries scheduled over 2022-27. ▪ 2021-27: We assume that the aircraft share will continue to grow as the A330-200s are phased out.
A321neoXLR	▪ 2021: This type is currently not operated by American, but we understand the airline has orders, scheduled for delivery between 2024-27. ▪ 2021-37: We assume that American will start using the aircraft for services at DUB throughout the forecast period.

We have modelled airlines outside the top 10 as a consolidated group… We assume the gradual replacement of old and current generation aircraft by their new generation equivalents.

Projected Other Airlines PATMs Distribution at Dublin Airport by Aircraft Type

Source: CAPA Centre for Aviation, Altitude Analysis & Assumptions



Comments on Mott MacDonald Reports

Appendix 3

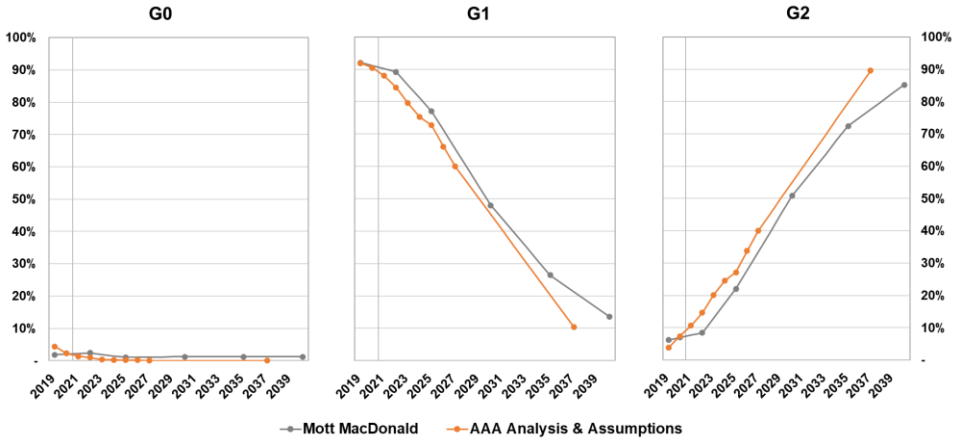
The Mott MacDonald forecast ATM mix does not appear to be significantly out of line with out own view… There may be greater upside potential than downside risk in the forecast ATM growth rate in the mid-long term.

- We have been provided the following reports prepared by Mott MacDonald (MM):
  Dublin Airport Operating Restrictions, May 2021 – version 1.2 (Final)
- While the report hints that the forecasts have been carried out in some detail, they convey relatively limited information as to the assumptions behind the unconstrained forecasts. On that basis it is hard for us to comment on the detail of the forecasts.

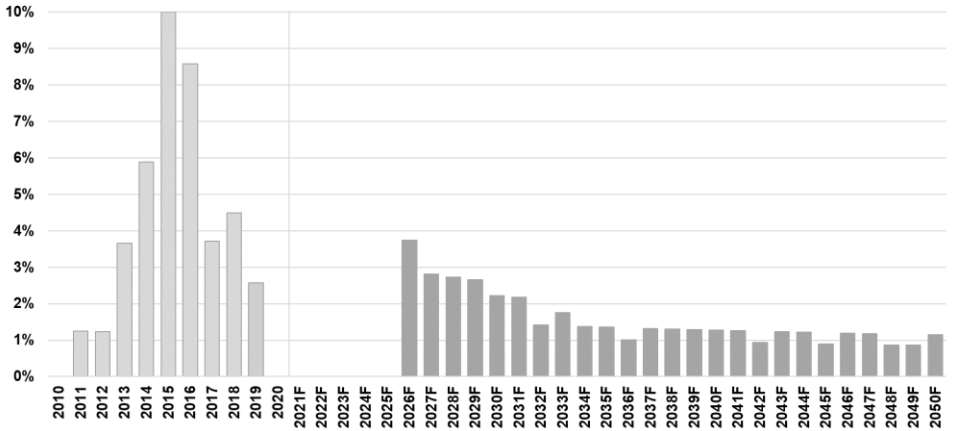
- The outcome by aircraft generation is presented, and we have aggregated our mix forecast to the same level (using the definition stated by MM on p29) and produced the comparison shown in the top right chart.
- Overall, our forecast has resulted in a similar mix change to that presented by MM.
  – We assume faster replacement of G1 aircraft with G2 aircraft in the first and last part of the forecast period, which may indicate scope for better noise performance (i.e. less noise generated by aircraft at the airport) than is implied by the MM forecast.

- Separately, a high level comparison of the MM forecast ATM growth vs historic ATM growth highlights a relatively low forecast growth rate especially in the mid-latter years of the forecast.
  – While the high growth rates over some of the historic period (particularly 2014-16) are not reflective of the level we would expect to see going forward, we still feel there is more upside potential than downside risk in the Mott MacDonald forecast long term.
  – Note that there is considerable uncertainty in the long term (e.g. the impact of climate change / climate-driven regulations on aviation are largely unknown).
  – Growth rates over the period 2020 to approximately 2025 are impacted by the pandemic and so not shown (2025 is the first year in the MM forecast in which 2019 ATMs are exceeded).

Aircraft Mix by Generation: Mott MacDonald Forecast versus Altitude Assumptions
Source: Dublin Airport Operating Restrictions, Altitude Analysis



Annual ATM Growth Rate at Dublin Airport
Comparison of Mott MacDonald Forecast Growth with Historic Growth
Mott MacDonald Unconstrained Centreline Case
Source: Dublin Airports Authority Annual Reports, Mott MacDonald



Comments on Potential Impact of Night Curfew at DUB

Appendix 4

An overly restrictive curfew at Dublin Airport has the potential to significantly impact airline operations, in particular profitability / future growth of low cost operators (Ryanair alone operates a significant proportion of capacity at DUB)… Competitiveness of Dublin as a hub and viability of some long haul routes to North America could also be negatively impacted.

Aircraft Utilisation

- Airlines, in particular low cost airlines which seek to maximise operational efficiency in order to offer low fares, seek to use their (expensive) aircraft assets as much as possible.
  - On any given day, they seek to maximise the number of sectors each aircraft operates.
  - For based aircraft, this usually requires early morning departures (from 06:00 onwards) and last flight sector returning back to the airport after 23:00.
- Having a fully utilised aircraft throughout the operational day, particularly in periods of peak demand, allows airlines to offer a balanced schedule with morning, lunchtime, and early evening departures.
- Not being able to return to the airport at night would have a knock on effect on the viability of other departures, particularly early evening flights which can negatively impact profitability of each aircraft's line of flying.
- As such, airport night time curfews can act to reduce airline profitability and make the airport less attractive for deploying capacity (compared to an airport with a limited or no curfew).
- Curfews can also negatively impact development of airline schedules where they need to be integrated into the available arrival and departure slots at destination airports.
  - This is particularly difficult for departures from popular holiday airports in the peak summer season when slot demand is high.
  - In these instances, reduced hours of operation at the home airport due to night time curfew restrictions reduces planning flexibility, and may even make a route impossible to operate on a commercial basis.

Hub Viability

- Aer Lingus has an established hub operation at Dublin. It is able to offer a range of long haul routes (primarily to North America) only because demand to/from Ireland is supplemented by demand to/from Europe.
- However, Aer Lingus must compete with direct services from major cities in Europe for the Europe-North America demand.
  - Direct services currently have an advantage in terms of flight time vs. connecting over a hub such as Dublin.
  - Aer Lingus attempts to offset this advantage through competitive pricing and having US pre-clearance at Dublin.
- An overly restrictive curfew would potentially result in an additional competitive disadvantage for Aer Lingus:
  - Direct services are able to offer overnight flights from North America that give a full working day in Europe.
  - Aer Lingus currently matches this proposition by having flights from North America arrive in Dublin very early in the morning. Europe-bound passengers can then connect on an early departure flight from Dublin to their final destination.
  - An overly restrictive curfew may result in Aer Lingus not being able to match the 'whole-day-in-Europe' proposition of direct North America–Europe services.
- Offsetting this new disadvantage through pricing is likely to diminish the profitability of long haul services, potentially to the point that some are no longer viable which could lead to reduced connectivity for the Irish market.

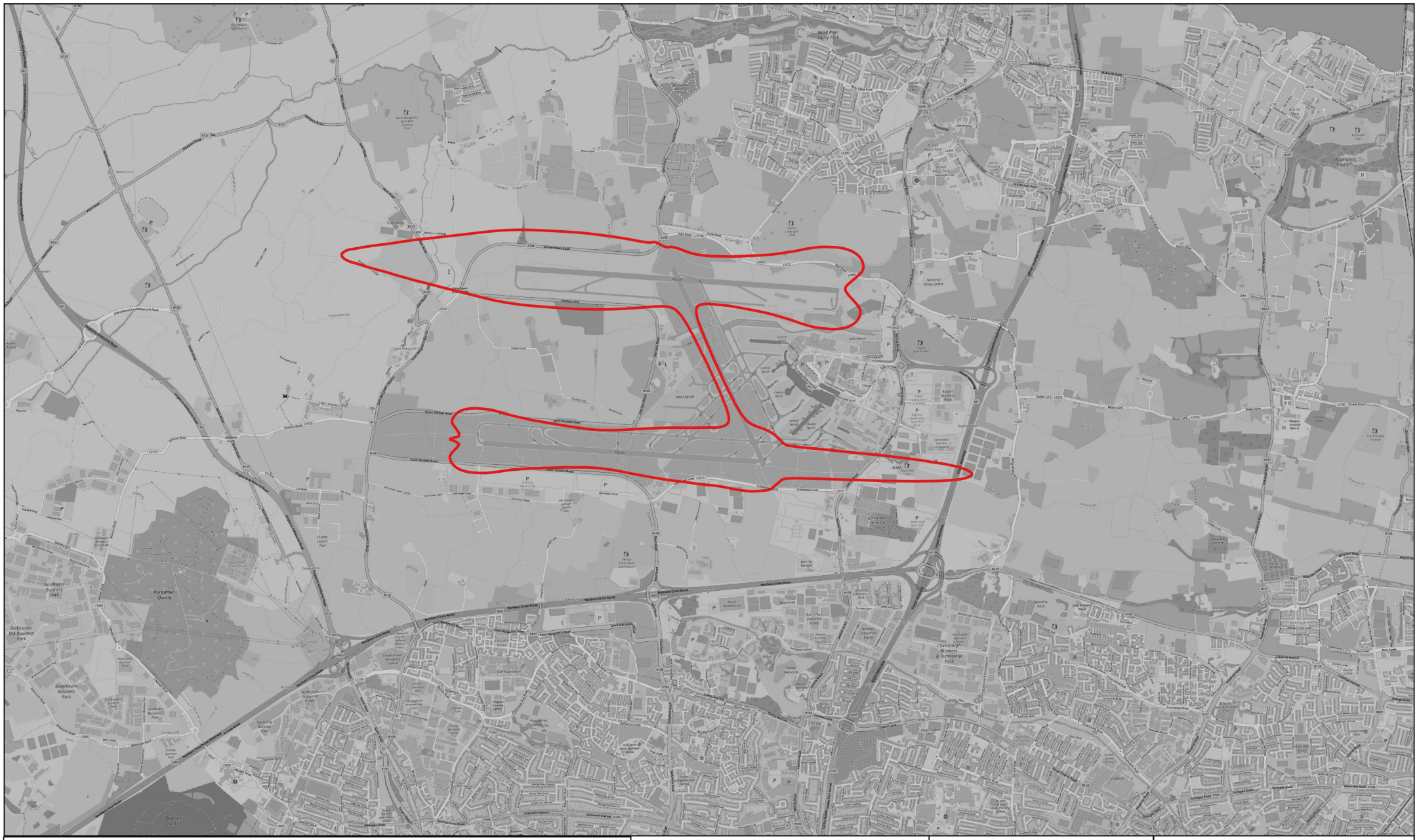
An tÚdarás Inniúil um Thorann Aerárthaí

Aircraft Noise Competent Authority

ANCA

Regulatory Decision

Appendix H- Existing Home Insulation and Property Purchase Schemes Contour Boundaries (F04A/1755)



Current Voluntary Dwelling Purchase Scheme (VDPS) Eligibility Boundary

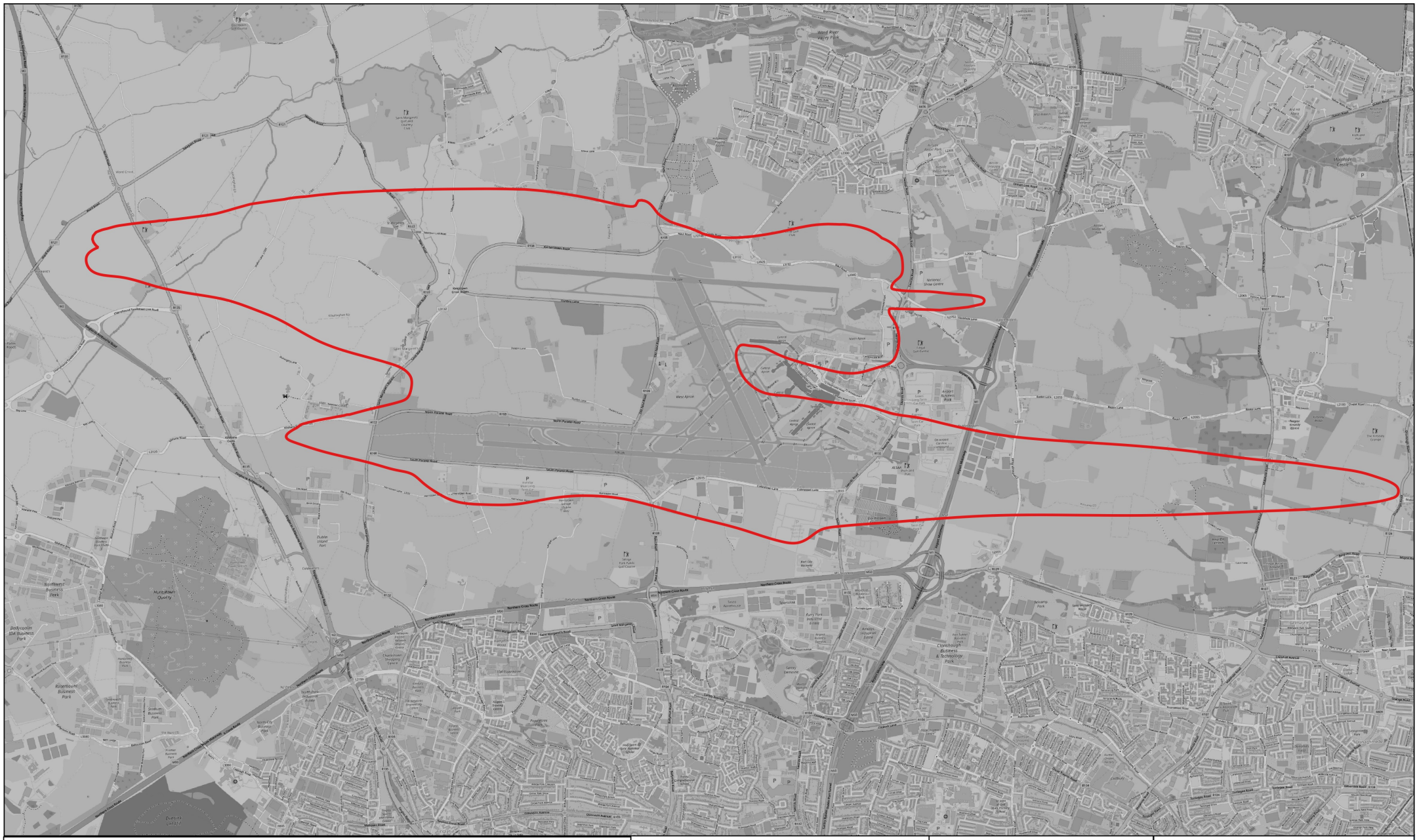
Aircraft Noise Competent Authority Draft Regulatory Decision Report

Drawn Date

2021-11-04

An tÚdarás Inniúil um Thorann Aerárthaí

Aircraft Noise Competent Authority



Current Residential Noise Insulation Scheme (RNIS) Eligibility Boundary

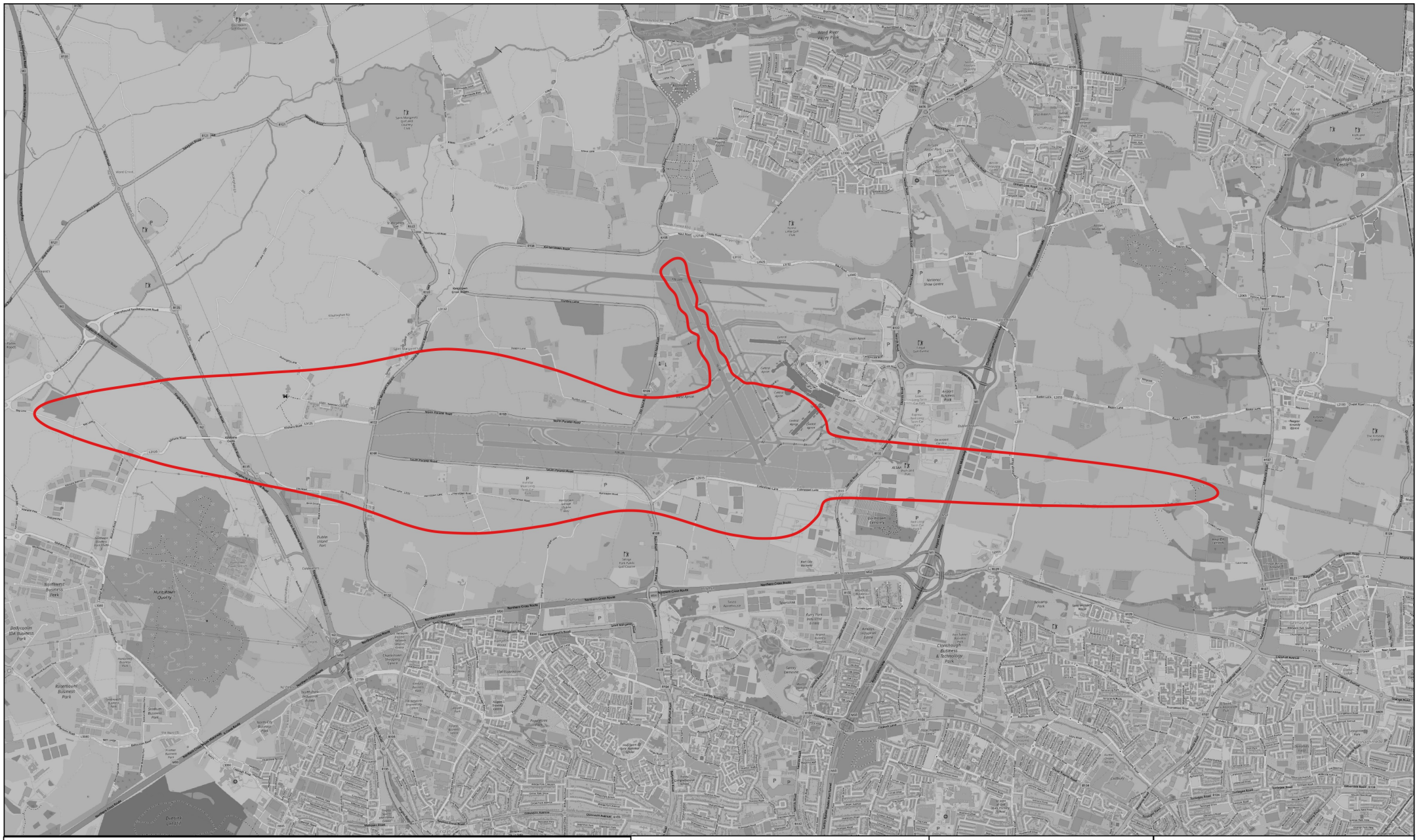
Aircraft Noise Competent Authority Draft Regulatory Decision Report

Drawn Date

2021-11-04

An tÚdarás Inniúil um Thorann Aerárthaí

Aircraft Noise Competent Authority



Current Home Sound Insulation Programme (HSIP) Eligibility Boundary

Aircraft Noise Competent Authority Draft Regulatory Decision Report

Drawn Date

2021-11-04

An tÚdarás Inniúil um Thorann Aerárthaí

Aircraft Noise Competent Authority

An tÚdarás Inniúil um Thorann Aerárthaí

Aircraft Noise Competent Authority

ANCA

Regulatory Decision

Appendix I - Draft Cost Effectiveness Guidance Note

An tÚdarás Inniúil um Thorann Aerárthaí

Aircraft Noise Competent Authority

Cost Effectiveness Assessment Advice under The Airport Noise (Dublin Airport) Regulation Act 2019

Draft Version 1

May 2020

Introduction

This advice has been prepared by the Airport Noise Competent Authority (ANCA) in support of the 'Process of Aircraft Noise Regulation' as defined in Part 2, Section 9 of the Aircraft Noise (Dublin Airport) Regulation Act 2019 ('the Act', S.I. No. 12 of 2019).

It provides detail on the information and evidence that ANCA will require to ensure the cost-effectiveness of noise mitigation measures and operating restriction has been evaluated thoroughly. It also provides advice on aspects of the methodology for undertaking a cost-effectiveness assessment, where ANCA considers such approaches are necessary to ensure the completeness of the evaluation.

At this stage of the process, ANCA is avoiding taking an overly prescriptive approach to the cost-effective methodology. Instead, this note discusses the key methodological decisions that require consideration by applicants when undertaking a cost-effectiveness assessment. ANCA will be reliant on a transparent presentation of methodological decisions, calculations, and results, in order to fulfil its scrutiny role as Competent Authority effectively. ANCA will also be developing a cost-effectiveness reporting template to help applicants with transparent presentation of the cost-effectiveness analysis.

ANCA also strongly advises applicants to follow, where appropriate, guidance provided within the Public Spending Code and associated documentation, and the precedent established by similar economic appraisals undertaken in Ireland and elsewhere in Europe. We recognise that in some instances, the applicant's approach will need to be tailored to the context of this specific cost-effectiveness assessment.

Context

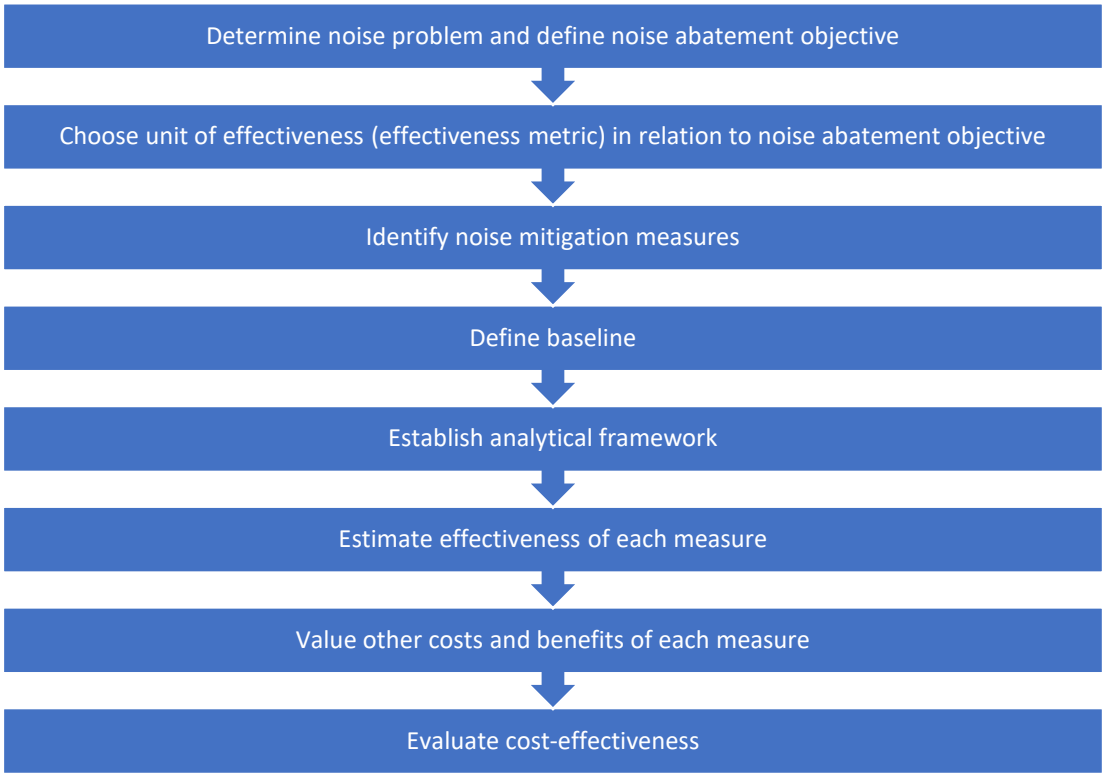
The broad outline of a cost-effectiveness assessment is as shown in Figure 1. This figure is a guide; provided all the steps are included within the cost-effectiveness assessment, the exact steps do not necessarily need to follow the structure shown.

Structure of this note

The note is presented so to describe the general methodological considerations required when undertaken cost-effectiveness assessment in line with the process set out in Figure 1.

In particular, the note discusses the issues relating to the definition of the baseline and decisions over the overall analytical framework for assessing the costs and benefits of each measure and the process for identifying and valuing the costs and benefits of each measure (other than the noise impact).

Figure 1: Steps for undertaking a cost-effectiveness assessment of noise mitigation measures



1. Determine noise problem and define noise abatement objective

Under the Act the process of aircraft noise regulation can proceed if ANCA identifies a *'noise problem'* and for *''any noise problem that would arise from carrying out… development as proposed''*.

A 'noise problem' will be determined considering the information provided by the applicant along with general reporting. Specifically, ANCA will have regard for information reported by the applicant within its 'Noise Information Report Template' along with the detail of any development as proposed.

Should a noise problem be determined, ANCA will ensure that a noise abatement objective is, as appropriate, defined, restated or amended. The noise abatement objective will comprise of several parts outlining the key objective, describing how the objective should be approached, and over the period for which the objective should apply or would be subject to review. The measurable aspects of the noise abatement objective will have regard to the information provided by the applicant within the 'Noise Information Report Template'.

2. Choose unit(s) of effectiveness (effectiveness metrics) in relation to noise abatement objective

The unit(s) of effectiveness (i.e. effectiveness metrics) for the noise abatement objective will be declared as part of the noise abatement objective. ANCA will state specifically how the noise abatement objective can be measured. This will comprise of a selection of metrics taken from the information provided by the applicant within the 'Noise Information Report Template'.

3. Identify noise mitigation measures

ANCA has a responsibility under the Act to ensure that the ICAO balanced approach that the measures available to reduce the noise impact are identified. ANCA's preferred approach for the demonstration of the ICAO 'Balanced Approach' with respect to identification of the 'measures available' is as follows.

(a) A comprehensive list of 'noise mitigation measures' should be identified under each of the pillars of the ICAO balanced approach. Such a list has already been provided for under the headings of 'Noise Management Information' within the Information Reporting Template as prepared by ANCA. For the avoidance of doubt, the pillars should refer to headings as presented in Reg598 Annex I 'Noise Management Information' i.e.

- Reduction of noise at source
- Land-use planning and management
- Noise abatement operational measures
- Operating Restrictions
- Financial instruments

(b) The feasibility of all measures excluding operating restrictions should be identified and where these are found to be unsustainable or impractical (due to factors such as safety) then these should not be considered further. However, evidence should be provided to demonstrate that such measures have been considered.

For measures relating to airspace or aircraft operating procedures ANCA expects a sufficient level of technical coordination has taken place between the applicant, its airlines and the air navigation service provider. To this end, ANCA has requested a 'Noise Mitigation Feasibility Report' (see Section 4.8 of the Aircraft Noise Information Reporting Template Guidance).

In identifying noise mitigation measures, it is emphasised that the applicant must identify and consider each in isolation before developing combinations of such measures.

4. Baseline and Analytical Framework

The following section describes key aspects of the overall analytical framework required undertake a cost-effectiveness assessment. Consideration of the topics covered in this section should be presented within a methodology report, alongside the applicant's reasoning and rationale, to allow ANCA to review the approach taken and determine its appropriateness.

Definition of the Baseline

In a cost-effectiveness assessment, a baseline is used as the counterfactual against which alternative options are compared. A typical baseline would use a 'forecast without new measures', which is referred to in Annex I of Reg598:

"A description of the effect on noise climate without further measures, and of those measures already planned to ameliorate the noise impact over the same period."

This definition of the 'forecast without new measures' implies the inclusion of all existing measures. This would be akin to the 'current consented north runway operation upon opening' and the 'future forecast north runway operation' as described within the Aircraft Noise Information Reporting Template Guidance. These scenarios describe what would happen if no changes are made to the Airport's existing noise management and restrictions. However, it is noted that the applicant may wish to replace some existing measures with alternatives. Consequently, including existing measures in the baseline would make it challenging to compare the 'consented situation' to other noise mitigation measures. ANCA therefore strongly recommends excluding existing noise mitigation measures and restrictions that the applicant is proposing to replace, from 'the forecast without new measures'.

In the context of development at Dublin Airport, ANCA therefore envisage two baselines to considered. A 'forecast without new measures' and future baseline scenario describing the situation should no changes be made to the airport's existing noise management and restrictions. This would enable the existing cost-effectiveness of the airport existing noise management and restrictions to be determined.

Appraisal Time Horizon

Cost-effectiveness assessments are typically appraised over a fixed time horizon. The appropriate time horizon is dependent on the context of the measures being assessed and should be chosen in a manner that avoids biasing the results of the cost-effectiveness assessment in favour of one measure over another. The selection of the time horizon should include a consideration of the expected life of the measures, taking into account when such measures may be reviewed in future, or be superseded.

It is expected that any approach or methodology description developed by the applicant will include consideration of the most appropriate time horizon for the assessment, informed by appraisal guidance within the Irish Public Spending Code, precedent from previous appraisals, and the context of the specific measures being assessed.

Evaluating the Baseline

To assess the cost-effectiveness of each measure, it is anticipated that there will be some consideration of what the costs and noise impacts would be in the baseline, and how they would change over the appraisal time horizon. This in turn will require a number of underlying assumptions to support the baseline forecasts. Such assumptions need to be a realistic reflection of the state of the world in the absence of the new / proposed measures.

Any material provided in relation to the cost-effectiveness assessment should include a presentation of the baseline scenario. This extends to providing the key assumptions that underlie the main costs and noise impacts. This should include but not necessarily be limited to:

(a) the number of flight movements in the night period,
(b) the number of passengers,

(c) improvements in aircraft technology that allow for lower noise emissions,
(d) expected pace of fleet replacement,
(e) the forecast number of households and population around the airport.

These are all matters for which information is required within the Aircraft Noise Information Reporting Template.

Basis for assessing noise-noise costs and benefits

The description of the cost-effectiveness methodology should clearly state the basis for assessing the costs and non-noise benefits of each measure. These could be assessed from several different perspectives, such as:

(a) The financial costs and benefits to the applicant only
(b) The financial costs and benefits to the aviation sector as a whole
(c) The costs and benefits to the Irish economy
(d) The social and economic costs to Ireland (i.e. socio-economic welfare)

In line with the Public Spending Code, ANCA advises that costs and benefits are assessed from a socio-economic welfare perspective. If an alternate basis for assessing costs and benefits is used, this will need to be explained and justified.

Geographical Constraints

Cost-effectiveness assessments often include geographic constraints around the assessment of costs and benefits. Any costs and benefits that are incurred by individuals or firms outside this geographic boundary, are excluded from the analysis.

Common practice in other appraisals in the aviation sector has been to:

(a) Include impacts on all passengers travelling to and from the country (i.e. costs and benefits to passengers when travelling to/from Irish airports)
(b) Include impacts on airlines during their operating within the country (i.e. costs and benefits to airlines when operating out of Irish airports, but not including any costs and benefits that occur through an airline operating at a non-Irish airport).
(c) For all other affected parties, only including costs and benefits occurring to Irish residents.

The cost-effectiveness methodology should include explicit consideration of the geographic constraints of the assessment. ANCA considers the precedent set by previous aviation appraisals is a helpful one and would suggest adopting a similar geographic constraint. If an alternate geographic constraint is used, this should be informed by guidance within the Irish Public Spending Code, precedent from previous appraisals, and the context of the specific measures being assessed.

5. Estimate effectiveness of each measure

The effectiveness of each measure and combinations of measures should be estimated with respect to the objective measures described within the noise abatement objective. The effectiveness should take into account the performance of measure(s) with respect to the baseline, any situations described by the noise abatement objective itself.

6. Assessment of Costs and Benefits

The following section begins with general recommendations relating to the process for identifying and valuing costs and benefits, before describing the information and evidence that ANCA requires in order to review the costs and benefits of each measure and the approach taken to estimating them.

In this section, when referring to costs and benefits, benefits in relation to noise impacts are excluded as they are considered within the effectiveness estimate covered in Section 5. The term benefit is also used to acknowledge

that some measures may be beneficial in terms of reducing costs for affected interdependent factors (e.g. by reducing air pollution).

General principles for estimating costs and benefits

ANCA advises that the guidance within the Irish Public Spending Code, and the precedent established by other appraisals, is followed wherever possible when identifying and valuing costs and benefits. This covers guidance in relation to what is considered a cost and benefit and using standard reference values where market values for costs and benefits do not exist.

There are five specific aspects of the Public Spending Code that are highlighted in the following paragraphs:

(a) Consistency and neutrality of assumptions – It is anticipated that there will be several assumptions and parameters that are used across the analysis of different measures, such as wage rates and labour costs. It is expected that these assumptions are applied consistently for all measures unless there is a reason for expecting them to be different. The choice of assumptions should also be realistic and neutral to the measure being assessed, with overly optimistic or overly pessimistic assumptions avoided.
(b) Additionality – When identifying and estimating costs and benefits, the additionality of such impacts should be addressed. In other words, the assessment should carefully consider whether the impacts are genuinely additional rather than double counting an effect that has been captured elsewhere, displacing or substituting impacts occurring elsewhere, or are costs and benefits that occur within the baseline.
(c) Proportionality – Over the course of an appraisal, there can be many potential costs and benefits that are identified. However, the overall effect of many of these may be negligible. ANCA recommends taking a proportionate approach to the analysis, and excluding monetary assessments of any costs and benefits where the effect is likely to be small.
(d) Non-monetised costs and benefits - For certain costs and benefits, it may not be possible to attach a monetary value to the effect, either because such values do not exist, or it is not proportionate to do so. In such instances, the cost or benefit should be described in detail, either qualitatively or quantitatively if possible, and an assessment made of the likely scale of the effect. Even in instances where it is considered that the cost and benefit is negligible, explicitly stating this provides completeness in the assessment and provides transparency during consultation.
(e) Clarity of presentation – Given the importance of the cost-effectiveness assessment in determining the preferred measure or package of measures, it is important that the analysis and results are presented clearly, transparently and comprehensively.

Identifying costs and affected parties

The cost-effectiveness assessment should identify all relevant costs and benefits. It should include a detailed description of the cost or benefit, the party or parties that incur the cost or receive the benefit, and whether the cost is one-off or recurring. Where the costs and benefits are indirect or second-order effects, the assessment should include an explicit consideration of the additionality of the impact, with supporting evidence provided as necessary.

Quantifying and valuing costs and benefits

The calculations underlying the costs and benefit values should be provided to a sufficient level of granularity such that the analysis is replicable. The analysis should ideally be provided in the form of an Excel spreadsheet model, with inputs, calculations and outputs presented clearly, transparently and comprehensively.

The valuation of costs and benefits will require a quantification of the effect and the attachment of a monetary value to that effect. It is anticipated that both stages will require the use of internally and externally sourced assumptions, parameters and data.

Where appropriate, values for costs and benefits should come from market prices and, where market values do not exist, from reference values within the Public Spending Code. They should also reflect consideration of

whether values are likely to increase in real terms over time, e.g. labour costs. All assumptions, parameters and data sources should be documented within material provided to ANCA, with links provided to sources or the underpinning evidence appended to the appraisal report.

7. Evaluating Cost-Effectiveness

This section describes how cost and effectiveness calculations are brought together and used to evaluate the cost-effectiveness of different measures

Calculating cost-effectiveness ratio

The cost-effectiveness ratio should be calculated as follows:

$$\textit{Cost effectiveness ratio} = \frac{\textit{Net cost}}{\textit{Total effectiveness}}$$

The net cost is estimated in *present* value terms – calculated by discounting future costs and benefits that occur over the appraisal period and then adding them up. The discount rate should be chosen in line with the context of this assessment and relevant appraisal guidance and should be explained in the methodology description.

Although the main cost-effectiveness ratio shows the cost-effectiveness of measures over the whole period that is appraised, it is possible that effects will vary over time. We recommend explicit consideration of whether the cost-effectiveness of measures varies over time. This can be done by presenting the cost-effectiveness ratio for spot years or by conducting a sensitivity test with a shorter time horizon.

The presentation of the cost-effectiveness ratio should also include explicit consideration of non-monetised costs and benefits, and an assessment of whether they are likely to be sufficiently substantial to change to conclusions of the analysis.

Sensitivity analysis

Valuing costs and benefits will often mean relying on assumptions that are uncertain. Developing a central scenario means picking a single figure for each assumption. However, a thorough cost-effectiveness assessment would normally take into account uncertainties around the assumptions and data, and risks surrounding individual measures.

Similarly, where measures impose requirements on other parties or are designed to change their behaviour, it may be the case that compliance is not 100% and as such the effect is diluted. For example, a measure that requires airlines to use a steeper approach on landing may not achieve full compliance.

ANCA strongly recommends that sensitivity analysis is undertaken and presented alongside the central result, to allow a full assessment of the uncertainty surrounding the cost-effectiveness ratio. ANCA also suggests that a sensitivity scenario is undertaken that assumes realistic levels of compliance with requirements and uptake for voluntary measures.

Identifying the most cost-effective measures

Once all the previous steps have been conducted, the cost-effectiveness ratio can be reviewed alongside the other evidence to select the most cost-effective measure or measures. In typical cost-effectiveness analyses, this is a one-stage process. The cost-effectiveness of all measures is compared against one another and the most cost-effective set of measures are chosen.

However, Reg598 states that operating restrictions should only be considered once all other measures under the Balanced Approach have been considered. The 2019 Act requires undertaking a cost-effectiveness analysis of each noise mitigation measure, using this to combine measures into packages, and then undertaking a second cost-effectiveness analysis of each package of measures.

The cost-effectiveness assessment should therefore include a detailed description of how the cost-effectiveness of individual measures has been evaluated and packaged, and how the cost-effectiveness of each package of measures has been evaluated to select the preferred option.

An tÚdarás Inniúil um Thorann Aerárthaí

Aircraft Noise Competent Authority

ANCA

Regulatory Decision

Appendix J - Cost Effectiveness Methodology and Results

METHODOLOGY FOR COST-EFFECTIVENES ANALYSIS

The following appendix details the cost-effectiveness evaluation, showing how it brings in the various inputs from other aspects of the noise assessment work that ANCA has undertaken. It sets out the cost-effectiveness analysis undertaken by the Applicant in support of the Application and reviews it against the guidance contained within Aircraft Noise Regulation, the Act of 2019, and the cost effectiveness guidance issued by ANCA as set out in Appendix J. ANCA has separately undertaken its own cost-effectiveness evaluation, also detailed in this appendix, making changes to the Applicant's methodology and assumptions as necessary to ensure robustness.

1.1. Background to cost-effectiveness analysis

In support of its application to replace Conditions 3(d) and 5, the Applicant has undertaken extensive modelling of noise impacts, air traffic and passenger volumes, and costs. This cost-effectiveness analysis builds on the modelling and assumptions provided to us by the Applicant. ANCA has undertaken a high-level review of the assumptions that the Applicant has used to estimate the costs of the different noise mitigation measures, and in some instances, replaced these with assumptions considered more appropriate.

All the monetary values in the cost-effectiveness analysis are presented in 2020 prices. The costs of each measure assessed within this cost-effectiveness analysis are presented in cumulative terms over the five-year period from 2022 to 2026 – 2022 has been selected as the start year as it is the year the North Runway is expected to become operational while 2026 has been selected as it is the final year that the operating restrictions are expected to impose a cost. This has allowed ANCA to compare the options on a consistent time basis. This appendix also notes where the use of a different time horizon for the cost-effectiveness evaluation may lead to differing results.

To present the effectiveness of the different mitigation measures, ANCA has chosen a single effectiveness year, 2025. This is because 2025 is the peak year for noise exposure and, therefore, the peak year for health effects from noise exposure, according to the Applicant's noise modelling. As a result, the cost-effectiveness ratios presented in the analysis below are in the format:

Cumulative cost between 2022 and 2026 per person no longer impacted in 2025.

The next section presents a discussion of the metrics used to determine the number of people no longer impacted under the various noise mitigation measures.

1.2. Noise Abatement Objective and effectiveness metric

ANCA has previously concluded that the Applicant's application to replace operating restrictions due to take effect once Dublin Airport's north runway opens, would create a noise problem as documented in Appendix C. ANCA, therefore, recommended the establishment of a NAO for Dublin Airport which is set out in Appendix D.

The policy objective set by ANCA for the NAO is to:

> Limit and reduce the long term adverse effects aircraft noise on health and quality of life, particularly at night, as part of the sustainable development of Dublin Airport.

The following explanatory text has also been included:

> Noise from Dublin Airport should be limited and reduced in line with principles of sustainable development. As the airport grows, the long-term adverse effects on health and quality of life should progressively reduce over the lifetime of this NAO. The Balanced Approach will be used to ensure that all practicable and sustainable measures are implemented to achieve this objective.

Finally, ANCA has determined that the following outcomes are expected to be achieved through the NAO:

> In context of its recovery from the global pandemic noise exposure from Dublin Airport is expected to increase up to 2025. Whilst the resultant health effects are expected to be lower than what occurred prior to the pandemic and in the years 2018 and 2019, these effects should continue to be reduced over the long-term so to improve the noise situation at the airport whilst allowing for sustainable growth. ANCA therefore expects the following outcomes to be achieved through this NAO as set against the measures described in Part 3.
>
> The number of people highly annoyed and highly sleep disturbed shall reduce so that compared to conditions in 2019:
>
> - the number of people chronically affected in 2030 has reduced by 30% compared to 2019;
> - the number of people chronically affected in 2035 has reduced by 40% compared to 2019;
> - the number of people chronically affected in 2040 has reduced by 50% compared to 2019
>
> and;
>
> - The number of people exposed to aircraft noise above 55 dB L_{night} and 65 dB L_{den} shall be limited and reduced compared to 2019.

As set out in the cost-effectiveness guidance presented by ANCA to the Applicant, it is necessary to select an appropriate metric (or metrics) to evaluate the noise benefit (or effectiveness) of different measures for achieving the NAO. The selected metric(s) must be related to the noise problem identified and consistent with the NAO.

1.2.1. Applicant's proposed effectiveness metrics

The Applicant proposed five metrics to assess the effectiveness of different noise mitigation measures:

- **Number of people highly sleep disturbed (HSD).** This metric is a measure of the harmful effects of night-time noise exposure and is estimated using the L_{night} noise indicator. The measure reflects a relationship where the proportion of people experiencing sleep disturbance increases as their exposure to night noise increases. It is estimated using a dose-effect formula recommended in WHO guidelines and endorsed by the European Commission through the amended EU Environmental Noise Directive.[1]
- **Number of people highly annoyed (HA).** This metric is a measure of the harmful effects of all-day noise exposure and is estimated used the L_{den} noise indicator. Similar to the HSD metric, the measure acknowledges that not all people experience annoyance at the same noise level but that generally, the proportion of people annoyed increases with greater noise. Again, it is estimated using a dose-effect formula presented in the amended EU Environmental Noise Directive.
- **Number of people exposed to a medium impact (over 50 dB L_{night})**. This is a relatively simple measure showing the number of people exposed to medium levels of night-time noise, based on the L_{night} indicator.
- **Number of people exposed to a high impact (over 55 dB L_{night})**. This is a relatively simple measure showing the number of people exposed to high levels of night-time noise, based on the L_{night} indicator.
- **Number of people significantly adversely affected (SAA).** This metric aims to show the number of people exposed to material increases in noise exposure compared with the 2018 situation and has also been used to compare with the noise situation in the same year as their forecasts with relevant action. The Applicant estimates it in two ways, using the L_{den} and L_{night} indicators, based on a series of thresholds (as presented in

[1] Directive 2020/367 https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32020L0367&from=EN

- Table 0-1).

Table 0-1: The Applicant's thresholds for determining if a person is significantly adversely affected

Noise indicator	Threshold based on absolute noise exposure and increase in noise exposure compared with a situation
L_{den}	Exposed to noise levels between 45 dB and 50 dB L_{den} and an increase at or higher than 9 dB
	Exposed to noise levels between 50 dB and 55 dB L_{den} and an increase at or higher than 6 dB
	Exposed to noise levels between 55 dB and 65 dB L_{den} and an increase at or higher than 3 dB
	Exposed to noise levels between 65 dB and 70 dB L_{den} and an increase at or higher than 2 dB
	Exposed to noise levels 70 dB L_{den} or higher and an increase at or higher than 1 dB
L_{night}	Exposed to noise levels between 40 dB and 45 dB L_{night} and an increase at or higher than 9 dB
	Exposed to noise levels between 45 dB and 50 dB L_{night} and an increase at or higher than 6 dB
	Exposed to noise levels between 50 dB and 55 dB L_{night} and an increase at or higher than 3 dB
	Exposed to noise levels between 55 dB and 60 dB L_{night} and an increase at or higher than 2 dB
	Exposed to noise levels 60 dB L_{night} or higher and an increase at or higher than 1 dB

Source: Ricondo, daa

The Applicant has used different metrics at different stages of its cost-effectiveness analysis. To assess the effectiveness of its proposals to vary the runway pattern during the night period, the Applicant has used the HSD and HA metrics. And after concluding that the various measures all performed equally well under these two metrics, the Applicant then assessed the performance of the measures against the two SAA metrics (using the L_{den} and L_{night} indicators. For its noise insulation proposals, the Applicant has used the number of people exposed to a high impact to assess the effectiveness. And finally, when comparing the operating restrictions against the Applicant's preferred alternative, the Applicant has used the HSD and HA metrics.

1.2.2. Effectiveness metrics used

ANCA disagrees with the Applicant's approach:

- There is no clear line of sight between the Applicant's candidate NAO and the choice of metrics. For example, the Applicant's candidate NAO makes no reference to minimising the number of people newly affected by noise, yet the SAA metric is used within the cost-effectiveness analysis.

- The use of different cost-effectiveness metrics at each stage of the process prevents us from comparing the performance of different types of noise mitigation measures, and understanding how various combinations of measures perform collectively.
- The use of five different metrics makes it difficult to derive any meaningful insights from the cost-effectiveness analysis.

ANCA has taken a different approach by assessing the cost-effectiveness of different measures under two metrics. The choice of metrics is aimed at assessing performance against the targets set within the NAO, while attempting to limit the number of metrics used. These same two metrics are used throughout the CEA:

- **Number of people Highly Sleep Disturbed (HSD) in 2025**. The NAO sets targets for the number of people HA and HSD by 2030, 2035 and 2040. ANCA has selected the HSD metric instead of the HA metric as it relates more directly to night-time noise exposure and, is therefore, a more relevant metric when assessing the performance of different measures for mitigating night-time noise. And ANCA has taken 2025 as our assessment year as it is the peak year for noise exposure according to the Applicant's noise modelling. As the peak year, 2025 is the year when health effects from night-noise are the highest.
- **Number of people exposed to noise levels over 55 dB L_{night} in 2025**. The NAO also sets targets for the number of people exposed to 55 dB L_{night} and 65 dB L_{den}. Again, ANCA has selected the 55 dB L_{night} metric over the 65 dB L_{den} metric as it relates more directly to night-time noise exposure.

ANCA has also had regard for the SSA metric but this has been assessed with respect to the third aspect of the noise problem declared by ANCA.

1.3. Forecast without new measures (baseline scenario)

The forecast without new measures (Scenario P06, FWNM) is used as the baseline scenario i.e. it is the counterfactual against which the costs and noise impacts of all noise mitigation measures are assessed for compliance with the NAO.

The FWNM scenario includes all existing and planned measures to manage aircraft noise, except for Conditions 3(d) and 5 in the planning permission granted to develop Dublin Airport's North Runway. Conditions 3(d) and 5 are excluded as these are operating restrictions that the Applicant has applied to replace; they are:

- Condition 3(d) – Runway 10L-28R (the North Runway) shall not be used for take-off or landing between 23:00 and 07:00 (i.e. the night period).
- Condition 5 – The average number of night-time aircraft movements at the Airport shall not exceed 65 per night (between 23:00 and 07:00) when measured over the 92-day modelling period.

In its FWNM the Applicant provided forecasts of future flight movements and passenger volumes. These are used to forecast both future noise levels around the airport, and to estimate the potential impact of operating restrictions on passenger volumes.

1.3.1. Baseline traffic and passenger volumes

Dublin Airport is currently subject to a planning cap of 32 million passengers per annum (mpaa). In its application to revise conditions 3(d) and 5, the Applicant has not applied to lift the planning cap and, as such, the forecast annual traffic movements (ATMs) and passenger volumes presented by the Applicant reflect this cap continuing to apply. The most recent forecasts presented by the Applicant assume the 32mppa cap will become a binding constraint on growth at the airport by 2025 in the forecast without new measures. The Applicant's forecasts are presented in Table J1 below.

Table J1: Applicant forecasts of ATMs and passenger volumes under the FWNM

	2018	2019	2022	2025	2030	2035	2040
ATMs (thousands)	232.3	238.0	175.7	235.9	235.9	235.9	235.9
Passengers (millions)	31.5	32.9	21.0	32.0	32.0	32.0	32.0

Source: daa

Note: As Dublin Airport exceeded 32 million passengers in 2019, it requested transfer passengers be excluded from the cap to avoid a formal breach.

As can be seen in the table, the Applicant assumes that passenger numbers gradually recover to 2019 levels by 2025, with long-term forecasts derived using the Applicant's internal passenger forecasting model. Although ANCA has not had sight of the Applicant's passenger forecasting model, it has been reviewed by the Applicant's consultants Mott MacDonald, who concluded that the forecasting methodology was 'robust' and formed 'a valid basis for planning airport developments.'

There remains substantial uncertainty around the pace at which traffic levels and passenger volumes will recover, given the continued impact of the COVID-19 pandemic, associated travel restrictions, and the potential for long-term structural changes in the demand for air travel. As such, it is possible that passenger numbers recover sooner than 2025, or substantially later than assumed by the Applicant. Nevertheless, the Applicant's assumption broadly matches the latest position taken by IATA, which sees passenger volumes recovering in Western Europe by 2024.[2] It is also within the range of forecasts developed by Eurocontrol and ACI, as presented to us by the Applicant.

1.3.2. Baseline noise scenarios

Using the forecast ATMs, the Applicant (and its consultant advisors) have estimated noise impacts by taking the following broad steps:

- Constructing a busy day schedule, reflecting a typical summer day, for each forecast year such that the annual movements align with the forecast ATMs. This was done by adapting a base day schedule (the 95th percentile busy day in 2019), and then adding or removing flights so that annual ATMs matched the forecast figure, assuming a common annualisation factor. The flights added or removed, and the origin/destination of those flights were based on market insights and engagement with airlines. Where flights have to be removed, to accommodate operating restrictions for example, flights have been

[2] IATA (2021) COVID-19: An almost full recovery of air travel in prospect. Available at https://www.iata.org/en/iata-repository/publications/economic-reports/an-almost-full-recovery-of-air-travel-in-prospect/

removed broadly in proportion with the existing allocation of night flights between airlines.

- Estimating the fleet mix associated with these busy day schedules, based on the historic fleet mix and likely aircraft upgrade patterns.
- Undertaking noise mapping to understand how households around the airport would be exposed to noise given the likely usage of runways. In its FWNM (Scenario P06), the Applicant's consultants modelled night-time departures as using either the north or south runway depending on destination, and arrivals as evenly split between the two runways unless runway capacity was exceeded.

Based on the noise mapping, the Applicant's estimates of the noise impacts are presented in **Error! Reference source not found.**, using the two core noise metrics.

Table J2: Noise impacts under the FWNM – number of people impacted

	2018	2019	2022	2025	2030	2035	2040
Highly sleep disturbed *(% change from 2019 levels)*	42,260	47,045	26,261 *(-44%)*	36,592 *(-22%)*	26,057 *(-45%)*	17,639 *(-63%)*	15,095 *(-68%)*
More than 55 dB L_{night} *(% change from 2019 levels)*	753	1,533	283 *(-82%)*	407 *(-73%)*	301 *(-80%)*	240 *(-84%)*	215 *(-86%)*

Source: daa

As can be seen in the table, noise exposure levels are expected to decline over time despite ATMs returning to close to 2019 levels by 2025. This is due to the Applicant's assumptions around the evolution of the fleet mix, with newer, quieter aircraft, gradually replacing older, noisier aircraft. **Importantly, the Applicant's analysis shows that the NAO targets can be met comfortably without Conditions 3(d) and 5.** The number of people HSD is expected to reduce by 45% by 2030 compared with 2019 (against a target of 30%), 63% by 2035 (against a target of 40%), and 68% by 2040 (against a target of 50%).

The Dublin Airport is currently subject to a planning cap of 32mppa, which is reflected in the number of people impacted by noise under both metrics in Table J2. The cap acts as a constraint to growth by 2025 and so the numbers presented after this year are impacted by this restriction. ANCA's assessment of the forecasts provided by the Applicant shows that, if the cap was lifted, the number of people exposed to noise under both metrics would increase, and diverge from these numbers by an increasing amount over the appraisal period. By 2040, there would be approximately 19,000 HSD people and 300 people exposed to L_{night} > 55dB without the cap under the FWNM.

Despite the Applicant's analysis showing that the NAO targets can be met comfortably without Conditions 3(d) and 5, ANCA recognises that these forecasts are uncertain. As a result, ANCA has considered as part of this cost-effectiveness analysis, the impact of a Noise Quota Scheme as a means of protecting against the noise reductions not materialising. This is considered in more detail alongside the cost-effectiveness assessment of the operating restrictions.

1.3.2.1 Noise mitigation measures already included in the FWNM

Dublin Airport currently operates two noise insulation schemes under existing noise mitigation measures:

- The Home Sound Insulation Programme (HSIP), launched in 2017, is a voluntary noise insulation scheme for residential dwellings located within the 2016 63 dB $L_{Aeq, 16\ hr}$ noise contour. In other words for dwellings exposed to noise levels that exceeded 63 dB on average in 2016, when assessed over the 07:00 to 23:00 period.
- The Residential Noise Insulation Scheme (RNIS) is a voluntary noise insulation scheme for residential dwellings located within the forecast 2022 63 dB $L_{Aeq, 16\ hr}$ noise contour.

The noise impacts presented in above, do not account for the reduction in noise levels from being insulated under these two schemes. The Applicant anticipates that by 2025, all eligible homes under both RNIS and HSIP will have been fully insulated. Based on this, and the Applicant's assumption that insulation typically leads to a 5 dB reduction in indoor noise levels noise levels, ANCA has estimated that the number of people highly sleep disturbed will be 36,564 by 2025, and the number of people exposed to a night-time noise priority will be 16 by 2025.

1.3.2.2 Night-time Preferential Runway Use and Runway Restrictions

Operational procedures aim to reduce noise pollution around airports by optimising how aircraft are used in day-to-day operations. The measures including using certain runways at certain times, directing aircraft to use certain routes over others (e.g. to avoid densely populated areas), and noise abatement procedures for take-off and landing. The appropriateness of each of these measures will depend on the physical layout of the airport and its surroundings.

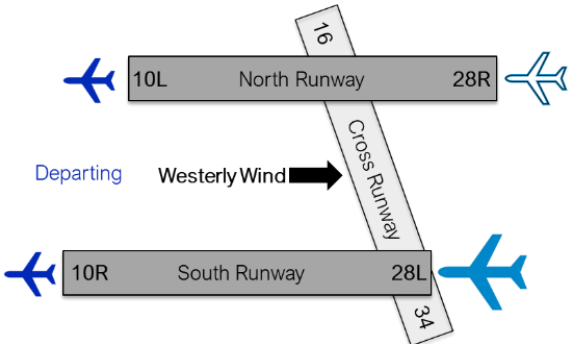
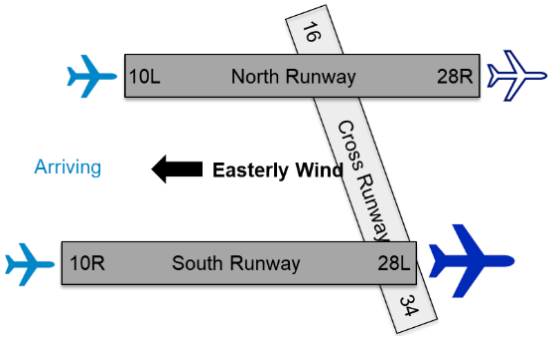
1.3.3. List of measures

Under this category of measures, the Applicant has tested the impact and cost-effectiveness of different preferential runway use patterns for the night period; changing how and when each runway is used for arrivals and departures as a means of minimising the noise impact on surrounding communities. The Applicant has also tested the cost-effectiveness of measures that restrict the use of certain runways for parts of the night period. Although such measures could be considered a form of operating restriction, they are not treated as such in this assessment as they do not affect the schedule airlines wish to operate.

Dublin Airport already has a form of permitted runway operations for the day period when the new runway becomes operational. This is presented in the table below, where:

- Runway 10L or 10R, as determined by air traffic control, is preferred for arriving during easterly winds, and Runway 28L is the preferred runway for arriving aircraft during westerly winds.
- Runway 10R is the preferred runway for departing aircraft during easterly winds and either Runway 28L or 28R is used for departing aircraft as determined by air traffic control during westerly winds.

Table J3: Overview of future daytime operations at Dublin Airport

Easterly Winds	Westerly Winds
	

Source: ANCA

In the FWNM, the Applicant assumes that the night-time operation is without any restrictions. Departures use either the north runway or south runway depending on destination. Arrivals are split evenly between the runways unless the capacity of a runway is exceeded. This is labelled as **Scenario P06.**

In addition to the runway use pattern assumed in the FWNM, the Applicant has assessed the cost-effectiveness of eight other runway use or runway restriction scenarios, and have undertaken noise modelling of two further scenarios following an information request from ANCA. These are presented in Table J4 below.

Table J4: Descriptions of measures relating to preferential runway use and runway restrictions

Measure	Description of runway use or runway restriction scenario
Applicant assessed measures	
FWNM (P06)	No restrictions. Departures use either the North or South runway depending on destination. Arrivals are split evenly between the runways unless the capacity of a runway is exceeded.
P02	During 00:00-06:00, only South runway is used. Otherwise, same usage pattern as day.
P03	Same usage pattern as day.
P04	Opposite use pattern to day pattern. Cross runway only used when wind dictates.
P05	Alternate between Scenarios 3 and 4 (i.e. alternate between day usage pattern and opposite to day usage pattern)
P07	Both runways used for departures depending on destination. Arrivals modelled as per day usage pattern.
P08	Departures modelled as per day usage pattern. Arrivals modelled as even split between two runways unless runway capacity exceeded.
P09	During 00:00-06:00, only North runway is used. Otherwise, same usage pattern as day.

P10	Alternate between using North and South runway during 00:00-06:00. Otherwise, same usage pattern as day.
Further measures modelled by the Applicant following request ANCA	
P12	During 23:00-06:00, only South runway is used. Otherwise, same usage pattern as day.
P13	During 23:30-05:00, only South runway is used. Otherwise, same usage pattern as day.

Note: Runway patterns P01 and P11 are excluded from this table as both include operating restrictions. Runway pattern P01 includes both conditions 3(d) and 5, while runway pattern P11 includes condition 3(d) only. Runway pattern P11 can be distinguished between other similar measures such as patterns P02, P09, P12 and P13 as it prevents airlines from operating the schedule they may wish to operate.

For each of the runway use or runway restriction scenarios presented in Table J4 (as well as the operating restrictions scenarios), the Applicant has undertaken the same noise modelling as it has with the FWNM. However, the Applicant has not presented noise impacts for each of the forecast years under every runway pattern. For four of the runway patterns, only 2025 noise impacts have been estimated.

1.3.4. Cost of measures

The different runway usage patterns do not themselves impose any direct financial cost on Dublin Airport or the aviation industry. However, the Applicant in its cost-effectiveness analysis identified two other impacts:

- **Cost-savings.** The Applicant estimated the potential for cost savings from operating mostly a single runway for parts of the night period rather than two runways. The main saving was from needing one fewer air traffic controller when only one runway is in operation.
- **Indirect costs associated with delays.** The Applicant also considered the potential for delays from managing air traffic movements over a single runway rather than two runways, but considered the impact to be negligible relative to the FWNM.

In its cost-effectiveness analysis, the Applicant only assessed the costs of its preferred runway usage pattern (Scenario P02), where the North runway is not used between 00:00 and 06:00. However, the analysis can be extended to all of the runway patterns described above.

1.3.4.1 Cost savings

The Applicant bases their estimate of the labour cost savings from needing fewer air traffic controllers on consultations with the Irish Aviation Authority (IAA), who is primarily responsible for these costs. The Applicant assumes that the operation of both runways during the night period will require three air traffic controllers, and calculate that the closure of one runway between 00:00 and 06:00 would result in a saving of €1,108,825 per year (in 2020 prices). This implies a saving of approximately €185,000 per hour of runway closure.

To validate these figures, ANCA has used a mixture of assumptions and publicly available sources of information to come up with an alternate estimate of the savings per hour of runway closure:

- The average annual salary of an IAA air traffic controller in 2020, has been estimated by using publicly available information on the average salary in 2010 (€160,000),[3] uprating it by an estimate of average real salary growth between 2010 and 2020 (41%),[4] and uprating it by inflation between 2010 and 2020 (6%).[5] This leaves us with an estimate of €238,000.
- A typical IAA air traffic controller can be expected to work 1,675 hours a year, based on a shift pattern of 8-hours a day, for five days in eight,[6] and assuming 30 days of leave. This implies an hourly salary of €142.
- Assuming there is a 30% premium for night shifts, and assuming one air traffic controller is no longer needed when the airport operates only a single runway, the implied annual saving is €67,500 per hour of runway closure. This is substantially lower than the Applicant's estimate of €185,000.

Based on the above analysis, it is ANCA's view that the Applicant's estimate of the cost savings is likely to be overstated. For example, the Applicant's assumption of €1.1 million savings per annum for Scenario P02 compares with ANCA's estimate of €0.4 million savings per annum. Table J5 below presents the cost savings for each of the runway use or runway restriction scenarios, including the cumulative savings over our appraisal period or 2022 to 2026. Note that several of the scenarios do not result in any reduction in runway operating hours and so do not have any associated cost savings.

Table J5: Cost savings under the different runway use or runway restriction scenarios (€ million, 2020 prices)

Runway use / runway restriction scenario	Applicant estimate		ANCA estimate	
	Annual saving	Total saving (2022-26)	Annual saving	Total saving (2022-26)
P02	- 1.1	- 4.4	- 0.4	- 1.7
P03	-	-	-	-
P04	-	-	-	-
P05	-	-	-	-
P07	-	-	-	-
P08	-	-	-	-
P09	- 1.1	- 4.4	- 0.4	- 1.7
P10	- 1.1	- 4.4	- 0.4	- 1.7
P12	- 1.3	- 5.2	- 0.5	- 2.0
P13	- 1.0	- 4.1	- 0.4	- 1.6

[3] https://www.independent.ie/irish-news/irish-controllers-get-double-the-us-pay-packet-26624932.html

[4] We assume GNI* per capita growth acts as a reasonable proxy for average salary growth, recognising this may be an overestimate. We take GNI* per capita growth data from the Central Statistics Office.

[5] Central Statistics Office

[6] https://www.irishtimes.com/life-and-style/people/this-is-not-a-playstation-game-1.598779

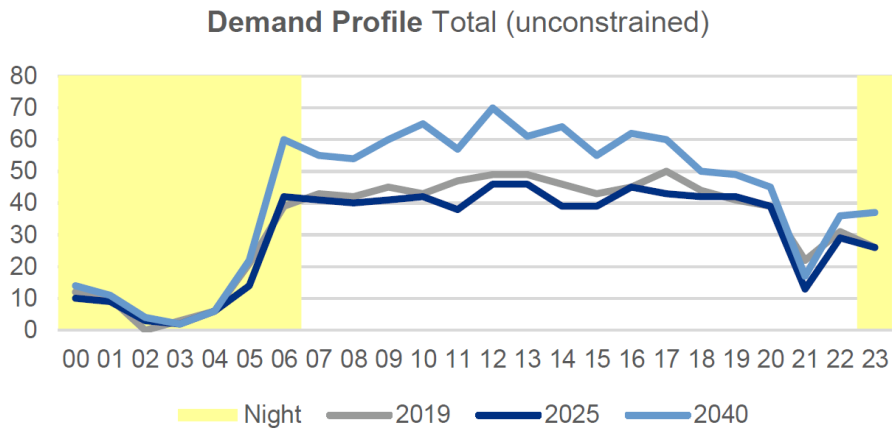
Source: CEPA analysis of daa figures

1.3.4.2 Delay cost

The Applicant assumes that using a single runway between 00:00 and 06:00 would not lead to significant delays compared with the FWNM and, therefore, assume there is no cost.

ANCA agrees with this conclusion. From the figure below, showing the forecast number of movements during a typical busy day in 2019, 2025 and 2040, it can be seen that the number of movements in the 00:00 to 06:00 period is substantially lower than the single runway capacity (as showcased by the 2019 demand profile).

Figure 0-1: Profile of flight movements during typical busy day in 2019, 2025 and 2040



Source: Mott MacDonald analysis

1.3.5. Effectiveness of measures

Changing how the runways are operated means certain areas are overflown more intensively and other areas are overflown less intensively. Certain runway operational patterns can reduce the number of people exposed to harmful effects from noise by limiting flights over densely populated areas, or by limiting how intensively certain areas are overflown.

Table J6 shows the number of people HSD under the different runway patterns outlined above, and Table J7 presents the number of people exposed to a night-time noise priority (i.e. more than 55 dB L_{night}) under the different runway patterns.

Table J6: Number of people highly sleep disturbed under each measure (before accounting for HNIS or RSIP)

Runway use / runway restriction scenario	2022	2025	2030	2035	2040
FWNM (P06)	**26,261**	**36,592**	**26,057**	**17,639**	**15,095**
P02	19,188	37,080	26,979	18,711	16,131
P03	16,227	35,757	25,054	15,431	13,834
P04	-	35,260	-	-	-

P05	-	36,363	-	-	-
P07	26,609	36,699	26,436	17,495	14,910
P08	18,204	35,784	25,321	15,720	13,950
P09	-	34,896	-	-	-
P10	-	36,463	-	-	-
P12	19,413	37,159	27,108	18,885	16,379
P13	17,902	36,275	25,958	16,704	14,585

Source: daa

Note: For scenarios P04, P05, P09 and P10, the Applicant has only undertaken noise mapping for the year 2025. As a result, estimates for the number of people HSD is only available for the one year under these runway patterns.

Table J7: Number of people exposed to noise greater than 55 dB L_{night} (before accounting for HNIS or RSIP)

Runway use / runway restriction scenario	2022	2025	2030	2035	2040
FWNM (P06)	283	407	301	240	215
P02	356	1,059	756	454	354
P03	386	1,055	696	385	296
P04	-	737	-	-	-
P05	-	412	-	-	-
P07	308	989	673	311	249
P08	243	422	303	194	170
P09	-	528	-	-	-
P10	-	426	-	-	-
P12	397	1,119	760	452	352
P13	347	1,055	753	445	316

Source: daa

Note: For scenarios P04, P05, P09 and P10, the Applicant has only undertaken noise mapping for the year 2025. As a result, estimates for the number of people exposed to noise greater than 55 dB L_{night} is only available for the one year under these runway patterns

The tables above show that there is no single runway use scenario that consistently minimises both metrics throughout the modelling period. Certain scenarios perform better in earlier years, but less so in the longer term. And some scenarios perform better at minimising the number of people highly sleep disturbed, but less so at minimising the number of people exposed to high noise levels.

When looking at the number of people HSD, in 2025 (the only year where data exists for all 11 scenarios), the runway usage pattern in Scenario P09 leads to the lowest noise impacts; in all the other years the runway pattern P03 leads to the lowest noise impacts. And when looking at the number of people exposed to noise levels higher than 55 dB L_{night}, the FWNM leads to the lowest number of people affected in 2025 and 2030, whereas runway pattern P08 leads to the lowest number of people affected for the remaining years.

It can also be seen from the tables that many of the runway patterns are in fact less effective than the FWNM in some years, as they lead to more people highly sleep disturbed or exposed to noise levels greater than 55 dB L_{night}. However, ANCA's overarching finding is that the differences between the various runway patterns are very small, and the targets set within the NAO continue to be comfortably met under each of the runway patterns.

The Applicant, in its cost-effectiveness analysis, also considered how the runway patterns perform at minimising the number of people significantly adversely affected; in other words, minimising the number of people affected by a substantial increase in noise compared with their noise exposure in 2018. The Applicant's preferred measure (Scenario P02) is the most effective under this metric, and is the Applicant's justification for proposing Scenario P02 over the other runway patterns. This can be seen in Table J8 below, which compares the effectiveness of the various runway patterns in 2025 compared to the FWNM.

Table J8: Effectiveness of the various scenarios in 2025 compared against the FWNM (before accounting for HNIS or RSIP)

Runway use / runway restriction scenario	HSD	Night-time noise priority	SAA
P02	487	652	-15,180
P03	-835	648	-13,370
P04	-1,332	330	6,347
P05	-230	6	497
P07	106	582	-12,418
P08	-808	15	-2,057
P09	-1,696	121	5,343
P10	-129	19	-2,003
P12	567	712	-
P13	-318	648	-

Source: daa

Note: The Applicant's analysis for number of people SAA was not extended to Scenarios P12 and P13. However, ANCA expects that compared with Scenario P02, Scenario P12 will perform slightly more strongly under the SAA metric while Scenario P13 will perform slightly less strongly.

The table shows show that there is a trade-off between minimising the overall health effects of noise (as showcased by the HSD and night-time noise priority metrics) and minimising the number of people newly affected (as showcased by the significantly adversely affected metric). The measures that perform strongly under the HSD metric do not perform as strongly under the significantly adversely affected metric, and vice versa.

1.3.6. Cost-effectiveness of measures

Table J9 shows the cost effectiveness of the runway patterns firstly in terms of reducing the number of people HSD in 2025, and secondly in terms of reducing the number of people exposed to high levels of night noise (i.e. greater than 55 dB L_{night}). ANCA has calculated these cost-effectiveness ratios by dividing the cumulative cost over the period 2022-26 by the effectiveness; where the effectiveness is number of people no longer HSD or exposed to night-time noise priority in 2025, when compared with the FWNM.

Where a scenario performs worse than the FWNM, i.e. it leads to more people HSD or exposed to night-time noise priority than the FWNM, no cost-effectiveness ratio is presented and instead, the item is highlight in red. As can be seen in the table, scenarios P02, P07 and P12 all perform worse than the FWNM under the HSD metric, and all of the scenarios perform worse than the FWNM under the night-time noise priority metric.

Where a scenario leads to cost savings relative to the FWNM, no cost-effectiveness ratio is presented and instead, the item is highlighted in red. These scenarios reduce costs and lead to lower noise impacts. As can be seen in the table, scenarios P09, P10 and P13 all the most cost-effective because they have runway closures for periods during the night, leading to cost savings.

Table J9 Cost effectiveness of different scenarios relative to the FWNM (€ per person, 2020 prices)

Runway use / runway restriction scenario	HSD	Night-time noise priority
P02	Performs worse than FWNM	Performs worse than FWNM
P03	0	Performs worse than FWNM
P04	0	Performs worse than FWNM
P05	0	Performs worse than FWNM
P07	Performs worse than FWNM	Performs worse than FWNM
P08	0	Performs worse than FWNM
P09	Leads to cost savings	Performs worse than FWNM
P10	Leads to cost savings	Performs worse than FWNM
P12	Performs worse than FWNM	Performs worse than FWNM
P13	Leads to cost savings	Performs worse than FWNM

Source: CEPA analysis of daa data and assumptions

Note: Items highlighted in red are measures that perform worse than the FWNM. Items highlighted in green are measures that lead to cost savings.

More importantly, however, all of the runway usage patterns continue to meet the 2030 targets as set out in the NAO. As this cost-effectiveness analysis does not show one scenario performing consistently better than the alternatives, ANCA considered that all of them could proceed to the next stage of the analysis.

Here, the approach taken by ANCA differs from that taken by the Applicant, which proceeded only with Scenario P02 on the basis that it performed most strongly under the significantly adversely affected metric. This metric is not part of the NAO but it is an aspect of the noise problem, and the evidence from the Applicant is that this scenario would be the best at reducing this aspect of

the problem albeit at the expense of more people being exposed to aircraft noise above the night-time priority set out in the NAO.

Scenario P13, which is similar to Scenario P02 but with a shorter restriction on the use of the North Runway, is also likely to perform well against the aspect of the noise problem related to minimising significant adverse effects. It is also cost-effective at reducing the number of people HSD but as with the other scenarios, performs worse than the FWNM in terms of minimising the number of people exposed to aircraft noise above the night-time priority.

1.4. Land-use planning and management measures

Land-use planning and management refers to a range of possible measures to ensure the activities that take place around an airport are compatible with aviation. This includes:

- Locating new airports away from noise-sensitive areas, such as densely populated areas; and
- Introducing land-use zoning around airports to minimise the number of houses and other noise-sensitive premises built around the airport.

Noise insulation schemes are also commonly considered under this category of measures.

1.4.1. List of measures

The Applicant have proposed a new Residential Sound Insulation Grant Scheme (RSIGS) for residential dwellings which fall within eligible noise contours near the airport, specifically to mitigate against additional noise from the operation of the North Runway.

Dwellings will be eligible for the RSIGS if noise exposure is forecast to exceed 55dB under the L_{night} metric in 2025.[7] For dwellings under this scheme, the Applicant will provide a €20,000 grant for insulating the bedrooms, which can be spent on a menu of insulation measures at the discretion of the recipient. The scheme will run in addition to the existing noise insulation scheme, RNIS, which the Applicant expects to be completed by 2022 when the new North Runway opens.

Table J9 presents the full list of land-use planning and management measures assessed in this cost-effectiveness analysis. In addition to the Applicant's proposed eligibility criteria for the RSIGS, we assess seven variants of the noise insulation scheme with different eligibility criteria. The key difference between noise insulation variants A, C1, C3, and C5 on one hand, and variants B, C2, C4, and C5 on the other, are that the former set eligibility based on 2022 forecast noise exposure levels whereas the latter set eligibility based on 2025 forecast noise exposure levels. Variants C1 to C6 extend eligibility to dwellings that experience a substantial increase in noise (+ 9 dB) relative to a base level.

[7] "Dublin Airport North Runway, Regulation 598/2014 (Aircraft Noise Regulation) Cost Effectiveness Analysis Report (Revision 1 – July 2021)" (2021), RICONDO on behalf of daa

Table J9: Noise insulation measures based on different RSIGS eligibility criteria

Measure	Insulation scheme eligibility criteria
Applicant assessed measures	
RSIGS B	A €20,000 grant for noise insulation given to dwellings exposed to noise levels exceeding 55dB L_{night} in 2025 and not eligible under existing noise insulation schemes
Additional measures assessed by ANCA	
RSIGS A	€20,000 grant for dwellings exposed to noise levels exceeding 55 dB L_{night} in 2022 and not eligible under existing noise insulation schemes
RSIGS C1	€20,000 grant for dwellings exposed to noise levels that, in 2022, either a) exceed 55 dB, or b) exceed 50 dB and are 9 dB higher than in 2018, provided they are not eligible under existing noise insulation schemes
RSIGS C2	€20,000 grant for dwellings exposed to noise levels that, in 2025, either a) exceed 55 dB, or b) exceed 50 dB and are 9 dB higher than in 2018, provided they are not eligible under existing noise insulation schemes
RSIGS C3	€20,000 grant for dwellings exposed to noise levels that, in 2022, either a) exceed 55 dB, or b) exceed 50 dB and are 9 dB higher than in 2019, provided they are not eligible under existing noise insulation schemes
RSIGS C4	€20,000 grant for dwellings exposed to noise levels that, in 2025, either a) exceed 55 dB, or b) exceed 50 dB and are 9 dB higher than in 2019, provided they are not eligible under existing noise insulation schemes
RSIGS C5	€20,000 grant for dwellings exposed to noise levels that, in 2022, either a) exceed 55 dB, or b) exceed 50 dB and are 9 dB higher than in a scenario with the operating restrictions, provided they are not eligible under existing noise insulation schemes
RSIGS C6	€20,000 grant for dwellings exposed to noise levels that, in 2025, either a) exceed 55 dB, or b) exceed 50 dB and are 9 dB higher than in a scenario with the operating restrictions, provided they are not eligible under existing noise insulation schemes

Source: daa, ANCA

1.4.2. Cost of measures

The costs of the noise insulation schemes consist of administrative costs, which are the same across all of the variants, and the costs of the grants, which will vary depending on the number of households eligible. The scheme will operate between 2022 and 2024. The Applicant assumes set-up costs will be €300,000 and annual administrative costs for 2023 and 2024 will be €100,000 per year.

ANCA has reviewed these costs based on the evidence provided under RFI 130.[8] The Applicant carried out a detailed analysis of its existing insulation schemes and benchmarked costs against comparable schemes operated by Heathrow Airport. While they acknowledge that the set-up and administrative costs are necessarily high-level estimates prior to final decisions being taken, they

[8] "Dublin Airport Grant Scheme Responses to RFI Nos. 92, 93, 130, 136 and 137," RFI 130, TFT on behalf of daa

consider the estimates to be based on a reasonable work programme and associated labour costs.

To calculate the €20,000 figure for the grant, the Applicant referred to tender rates for similar works carried out under the RNIS. In particular, given that this grant is specifically aimed at preventing disturbed sleep, they focussed on the price of a *"replacement primary window option, using high specification acoustically rated glazing."* This work would be covered by a €20,000 grant for dwellings with 1-3 bedrooms. The Applicant stated that a high-level review of these properties with Google Streetview suggests that 90-94% of eligible properties have between 1 and 3 bedrooms when having regard for those properties eligible under runway use and restriction Scenario P02.

ANCA considers the focus on insulating bedrooms is reasonable given the aspect of the NAO which is most pertinent under the Application relates to the health effects of sleep disturbance. ANCA also considers the Applicant's assumption around the majority of dwellings having between 1 and 3 bedrooms to be reasonable, given more general data we have on the average number of residents per dwelling.[9]

As the number of households eligible for noise insulation will depend on noise exposure levels, the costs of the insulation scheme will depend on both the eligibility criteria and the assumed runway use scenario. ANCA has estimated the number of dwellings eligible for insulation under each combination of runway use scenario and noise insulation measure. This is presented in Table J10. It is assumed there will be 100% take up of the grant, both as a simplifying assumption and because the Applicant's historic experience suggests high take-up of noise insulation schemes.

Table J10: Number of households insulated under each RSIGS scheme

Runway use / runway restriction scenario	RSIGS A	RSIGS B	RSIGS C1	RSIGS C2	RSIGS C3	RSIGS C4	RSIGS C5	RSIGS C6
P06	5	6	178	812	172	691	653	1,204
P02	21	247	41	249	38	247	77	265
P03	27	252	68	274	61	271	125	533
P04	-	227	-	2,048	-	2,017	-	2,504
P05	-	8	-	810	-	694	-	1,303
P07	7	230	22	249	7	247	31	430
P08	7	10	166	762	148	618	605	1,231
P09	-	59	-	1,387	-	1,317	-	2,143
P10	-	8	-	201	-	177	-	600
P12	21	337	39	337	36	337	75	346
P13	23	245	56	261	48	252	108	442

[9] Data from the CSO shows that the average household size in Fingal was 3.03 in 2016. See cso.ie

Source: CEPA analysis of daa data and assumptions
Note: As we do not have noise exposure data for 2022 under Scenarios P04, P05, P09 and P10, we are unable to estimate the number of households that would be eligible for noise insulation under variants A, C1, C3 and C5.

Following the Applicant's assumptions in its cost-effectiveness analysis, ANCA has then estimated the cost of the noise insulation schemes using the Applicant's cost assumptions as described above. These are presented in Table J11.

Table J11: Total costs associated with RSIGS scheme under different eligibility criteria, 2022-26 (€ million, 2020 prices)

Runway use / runway restriction scenario	RSIGS A	RSIGS B	RSIGS C1	RSIGS C2	RSIGS C3	RSIGS C4	RSIGS C5	RSIGS C6
P06	0.6	0.6	4.1	16.7	3.9	14.3	13.6	24.6
P02	0.9	5.4	1.3	5.5	1.3	5.4	2.0	5.8
P03	1.0	5.5	1.9	6.0	1.7	5.9	3.0	11.2
P04	-	5.0	-	41.5	-	40.8	-	50.6
P05	-	0.7	-	16.7	-	14.4	-	26.6
P07	0.6	5.1	0.9	5.5	0.6	5.4	1.1	9.1
P08	0.6	0.7	3.8	15.7	3.5	12.9	12.6	25.1
P09	-	1.7	-	28.2	-	26.8	-	43.4
P10	-	0.7	-	4.5	-	4.0	-	12.5
P12	0.9	7.2	1.3	7.2	1.2	7.2	2.0	7.4
P13	1.0	5.4	1.6	5.7	1.5	5.5	2.7	9.3

Source: CEPA analysis of daa data and assumptions
Note: As we do not have noise exposure data for 2022 under Scenarios P04, P05, P09 and P10, we are unable to estimate the costs for noise insulation under variants A, C1, C3 and C5.

These two tables show that eligibility criteria which are based on exposure levels in 2025, i.e. B, C2, C4, and C6, lead to more homes being eligible for insulation and, therefore, higher noise insulation costs. This is unsurprising as 2025 is the peak year for noise exposure according to the Applicant's noise modelling. This effect is most marked for noise insulation measure C6, where eligibility is extended to households that face an increase in noise exposure in 2025, when compared against a scenario where the operating restrictions, Conditions 3(d) and 5, are retained.

1.4.3. Effectiveness of measures

For the RSIGS, the Applicant assumes that the installation of noise insulation will lead to at least a 5 dB reduction in night-time noise exposure for affected dwellings and that *"[f]or the purposes of the EIAR it was considered a fair and reasonable approach to assign properties mitigated under the scheme with a benefit of 5 dB improvement in internal noise levels."*[10]

The Applicant's assumption is based on an assessment commissioned by them in 2020 which sought to understand the internal acoustic reductions resulting from the Residential Noise Insulation Scheme (RNIS). The RNIS has been in place since 2016 and is voluntary for dwellings

[10] "Dublin Airport Grant Scheme Responses to RFI Nos. 92, 93, 130, 136 and 137," RFI 93, TFT on behalf of daa

that are exposed to daytime 16-hour average sound levels of at least 63 dB. The assessment used recognised methods to undertake an acoustic assessment of sample properties before and after sound insulation had been installed.[11] For the surveyed properties, the average airborne sound insulation reduction was 7.7 dB, with a reduction of over 10 dB for several of the properties in the sample.

Although the Applicant states that all surveyed dwellings experienced a reduction of over 5 dB, it can be seen in Figure 93.1 of their RFI response that two out of twenty properties experienced reductions of 3 dB or less. Despite this inconsistency, the overall distribution of noise reduction presented in the graph suggests that assuming a typical 5 dB reduction remains reasonable.

1.4.3.1 Highly Sleep Disturbed

Table J12 below shows how many people are no longer HSD as a result of being insulated, under each variant of the scheme. This varies by runway pattern as the number of households eligible for insulation also varies by runway pattern.

Table J12: Change in people highly sleep disturbed following insulation, 2025

Runway use / runway restriction scenario	RSIGS A	RSIGS B	RSIGS C1	RSIGS C2	RSIGS C3	RSIGS C4	RSIGS C5	RSIGS C6
P06	-1	-1	-27	-123	-26	-105	-97	-181
P02	-4	-43	-7	-43	-6	-43	-12	-46
P03	-5	-44	-11	-48	-10	-47	-20	-85
P04	-	-40	-	-329	-	-324	-	-396
P05	-	-1	-	-123	-	-105	-	-196
P07	-1	-40	-4	-43	-1	-43	-5	-70
P08	-1	-2	-26	-115	-23	-94	-90	-185
P09	-	-10	-	-216	-	-205	-	-328
P10	-	-1	-	-31	-	-27	-	-89
P12	-4	-59	-6	-59	-6	-59	-12	-60
P13	-4	-43	-9	-45	-8	-44	-17	-72

Source: CEPA analysis of daa data and assumptions

Note: As we do not have noise exposure data for 2022 under Runway Patterns 4, 5, 9 and 10, we are unable to estimate the change in noise impacts for variants A, C1, C3 and C5.

It can be seen that the number of people no longer HSD is significantly smaller than the number of households receiving insulation. It can also be seen that the reduction in the number of people HSD in 2025 is modest compared with the overall numbers of people HSD and compared with the number of dwellings insulated under each combination of measures. The suggests that a reduction in indoor noise exposure of 5 dB, through the installation of insulation, is not very effective at reducing the number of people highly sleep disturbed.

[11] These methods were set out in BS EN ISO 16283-3:2016 Acoustics – Field measurements of sound insulation in buildings and of building elements. Part 3 – Façade sound insulation were followed to measure façade sound insulation performance.

The table above also shows that eligibility criteria measures based on exposure in 2025 (B, C2, C4 and C6) are the most effective in terms of total reduction in number of people HSD. Eligibility criteria C6 is the most effective overall. The rationale for this is the same as for costs, whereby more people are eligible for insulation under these criteria due to the peak in noise exposure during 2025.

1.4.3.2 Night-time noise priority (> 55 dB Lnight)

Table J13 shows the change in number of people exposed to aircraft levels exceeding the night-time noise priority – 55 dB L_{night} – following insulation under the different eligibility criteria.

Table J13 Change in people exposed to noise greater than 55 dB L_{night} following insulation, 2025

Runway use / runway restriction scenario	RSIGS A	RSIGS B	RSIGS C1	RSIGS C2	RSIGS C3	RSIGS C4	RSIGS C5	RSIGS C6
P06	-14	-16	-14	-16	-14	-16	-14	-16
P02	-62	-781	-62	-781	-62	-781	-62	-781
P03	-80	-796	-80	-796	-80	-796	-80	-796
P04	-	-517	-	-517	-	-517	-	-517
P05	-	-22	-	-22	-	-22	-	-22
P07	-20	-726	-20	-726	-20	-726	-20	-726
P08	-20	-27	-20	-27	-20	-27	-20	-27
P09	-	-168	-	-168	-	-168	-	-168
P10	-	-22	-	-22	-	-22	-	-22
P12	-61	-906	-61	-906	-61	-906	-61	-906
P13	-69	-774	-69	-774	-69	-774	-69	-774

Source: CEPA analysis of daa data and assumptions

As with the HSD results, the eligibility criteria which are based on noise exposure in 2025 lead to the lowest number of people exposed. However, as would be expected, extending eligibility to household exposed to less noise than 55 dB L_{night}, but experiencing an increase in noise exposure relative to what they were experiencing previously, has no effect.

1.4.4. Cost-effectiveness of measures

The tables below show the cost effectiveness of the noise insulation schemes, both in terms of reducing the number of people HSD in 2025, and in terms of reducing the number of people exposed to aircraft levels exceeding the night-time noise priority in 2025. The cost-effectiveness of each noise insulation scheme varies depending on the runway pattern in use.

The cost-effectiveness ratios in the table are presented as the cost per person who is no longer impacted, meaning that a lower cost-effectiveness ratio implies a measure is more cost-effective. The most cost-effective measure under each metric is highlighted in green.

Table J14: Cost effectiveness of insulation schemes (€ per person no longer HSD)

Runway use / runway restriction scenario	RSIGS A	RSIGS B	RSIGS C1	RSIGS C2	RSIGS C3	RSIGS C4	RSIGS C5	RSIGS C6
P06	663,000	555,000	149,000	136,000	150,000	137,000	140,000	136,000
P02	251,000	126,000	193,000	126,000	198,000	126,000	165,000	126,000
P03	220,000	126,000	165,000	126,000	169,000	126,000	151,000	131,000
P04	-	126,000	-	126,000	-	126,000	-	128,000
P05	-	450,000	-	136,000	-	137,000	-	136,000
P07	524,000	127,000	264,000	127,000	524,000	127,000	224,000	131,000
P08	517,000	388,000	149,000	136,000	151,000	137,000	140,000	136,000
P09	-	161,000	-	131,000	-	131,000	-	132,000
P10	-	459,000	-	147,000	-	149,000	-	140,000
P12	251,000	123,000	197,000	123,000	202,000	123,000	166,000	123,000
P13	239,000	126,000	174,000	126,000	182,000	126,000	155,000	130,000

Source: CEPA analysis of daa data and assumptions

Note: In each row, given the runway pattern, we highlight in green the noise insulation scheme that is most cost-effective

Table J15: Cost effectiveness of insulation schemes (€ per person no longer exposed to night-time noise priority)

Runway use / runway restriction scenario	RSIGS A	RSIGS B	RSIGS C1	RSIGS C2	RSIGS C3	RSIGS C4	RSIGS C5	RSIGS C6
P06	44,000	38,000	296,000	1,035,000	287,000	886,000	988,000	1,520,000
P02	15,000	7,000	21,000	7,000	20,000	7,000	33,000	7,000
P03	13,000	7,000	23,000	8,000	21,000	7,000	37,000	14,000
P04	-	10,000	-	80,000	-	79,000	-	98,000
P05	-	30,000	-	764,000	-	658,000	-	1,216,000
P07	32,000	7,000	48,000	8,000	32,000	7,000	57,000	13,000
P08	32,000	26,000	191,000	574,000	173,000	469,000	630,000	916,000
P09	-	10,000	-	169,000	-	160,000	-	259,000
P10	-	30,000	-	206,000	-	184,000	-	569,000
P12	15,000	8,000	21,000	8,000	20,000	8,000	33,000	8,000
P13	14,000	7,000	24,000	7,000	21,000	7,000	39,000	12,000

Source: CEPA analysis of daa data and assumptions

Note: In each row, given the runway pattern, we highlight in green the noise insulation scheme that is most cost-effective

From these two tables, ANCA has drawn one main conclusion; insulation schemes that are based on 2025 forecast exposure levels are more cost-effective than those that are based on 2022 forecast exposure levels. This are two reasons for this:

- More households are eligible under these schemes, which reduces the overall percentage of costs which are fixed, lowering the cost per person no longer HSD.
- Setting eligibility based on 2022 noise exposure results in the insulation of some households who would have benefitted from reduced noise exposure regardless (due to the background reduction in aircraft noisiness over time).

As a result, ANCA has proposed not proceeding with the noise insulation measures that are based on 2022 noise exposure levels.

1.5. Overall cost-effectiveness

We can now consider the combined effect of changing the runway use / runway restriction pattern and implementing a noise insulation scheme. Here, we also need to consider the impact of changing how the runways are used on existing noise insulation schemes. Changing the runway use scenario changes the numbers of households that are eligible for noise insulation under the existing schemes, which can increase insulation costs for Dublin Airport but also reduce the noise impact on households.

Table J16 shows the change in number of people HSD in 2025 when compared against the FWNM, after changing the runway pattern and insulating households (under one of RNIS, HSIP or RSIGS).

Table J16: Change in number of people HSD in 2025 compared against the FWNM, including impact of changing eligibility of existing insulation schemes

Runway use / runway restriction scenario	Highly Sleep Disturbed			
	B	**C2**	**C4**	**C6**
P06	-1	-123	-105	-181
P02	442	442	442	439
P03	-881	-885	-884	-922
P04	-1,367	-1,656	-1,651	-1,723
P05	-231	-352	-335	-425
P07	65	62	62	35
P08	-810	-924	-902	-993
P09	-1,704	-1,909	-1,898	-2,022
P10	-131	-161	-157	-219
P12	506	506	506	505
P13	-364	-366	-365	-393

Source: CEPA analysis of daa data and assumptions

Under the HSD metric, the most effective combination of measures is Scenario P09 with noise insulation variant C6, which results in just over 2,000 people no longer being highly sleep disturbed. However, this means there are still 34,542 people HSD in 2025.

Under the night-time noise priority metric, however, almost all of the measures are fully effective at reducing the number of people exposed to noise levels over 55 dB L_{night} to 0.

Table J17: Change in number of people exposed to night-time noise priority in 2025 compared against the FWNM, including impact of changing eligibility of existing insulation schemes

Runway use / runway restriction scenario	Night-time noise priority (>55 dB L_{night})			
	B	**C2**	**C4**	**C6**
P06	-16	-16	-16	-16
P02	-16	-16	-16	-16
P03	-16	-16	-16	-16
P04	-14	-14	-14	-14
P05	-16	-16	-16	-16
P07	-16	-16	-16	-16
P08	-16	-16	-16	-16
P09	-16	-16	-16	-16

P10	-16	-16	-16	-16
P12	-16	-16	-16	-16
P13	-16	-16	-16	-16

Source: CEPA analysis of daa data and assumptions

Table J18 and Table J19 below show the cost effectiveness of the combined measures in terms of reducing the number of people HSD and exposed to night-time noise priority. These also account for the additional cost of insulating homes that become eligible under existing schemes, that would not otherwise be eligible in the FWNM. Items highlighted in red are measures that do not have a cost-effectiveness ratio as they perform worse than the FWNM. Items highlighted in green are measures that do not have a cost-effectiveness ratio as they lead to cost savings.

Table J18: Cost-effectiveness per person no longer HSD in 2025, including impact of changing eligibility of existing insulation schemes (€ per person, 2020 prices)

Runway use / runway restriction scenario	RSIGS B	RSIGS C2	RSIGS C4	RSIGS C6
P06	520,000	136,000	137,000	136,000
P02	Worse than FWNM	Worse than FWNM	Worse than FWNM	Worse than FWNM
P03	6,000	7,000	7,000	13,000
P04	4,000	25,000	25,000	29,000
P05	3,000	47,000	43,000	63,000
P07	Worse than FWNM	Worse than FWNM	Worse than FWNM	Worse than FWNM
P08	1,000	17,000	14,000	25,000
P09	0	14,000	13,000	21,000
P10	Cost Savings	18,000	15,000	50,000
P12	Worse than FWNM	Worse than FWNM	Worse than FWNM	Worse than FWNM
P13	11,000	12,000	12,000	21,000

Source: CEPA analysis of daa data and assumptions provided in reporting template
Note: Items highlighted in red are measures that perform worse than the FWNM. Items highlighted in green are measures that lead to cost savings.

Table J19: Cost-effectiveness per person no longer exposed to night-time noise priority in 2025, including impact of changing eligibility of existing insulation schemes (€ per person, 2020 prices)

Runway use / runway restriction scenario	RSIGS B	RSIGS C2	RSIGS C4	RSIGS C6
P06	36,000	1,035,000	886,000	1,530,000
P02	242,000	245,000	242,000	277,000
P03	354,000	385,000	377,000	708,000
P04	363,000	2,987,000	2,942,000	3,644,000
P05	38,000	1,033,000	889,000	1,653,000
P07	325,000	350,000	346,000	580,000
P08	43,000	976,000	797,000	1,562,000
P09	Cost Savings	1,640,000	1,553,000	2,575,000
P10	Cost Savings	178,000	148,000	680,000
P12	333,000	333,000	333,000	346,000
P13	251,000	277,000	260,000	511,000

Source: CEPA analysis of daa data and assumptions

Note: Items highlighted in red are measures that perform worse than the FWNM. Items highlighted in green are measures that lead to cost savings.

Overall, the most cost-effective combination of measures is Scenario P10 with noise insulation variant B. This combination of measures leads to cost savings while reducing the number of people HSD and exposed to a night-time noise priority.

The above tables also show that insulating households exposed to noise exceeding 55 dB L_{night} (noise insulation variant B) is more cost-effective than extending the eligibility to households that experience a substantial increase in noise exposure relative to historical levels (noise insulation variants C2 and C4). It is also more cost-effective than insulating households that are expected to experience more noise than they would if Conditions 3(d) and 5 are retained (noise insulation variant C6),

The Applicant's preferred long-term measure is Scenario P02 with a noise insulation variant B. This results in an increase in the number of HSD people compared to the FWNM, but is relatively cost effective at minimising the number of people exposed to night-time noise priority.

1.6. Operating restrictions

Operating restrictions include measures such as restrictions on certain types of aircraft or periods of time when the number of flights is restricted.

1.6.1. List of measures

In this analysis, ANCA has assessed two operating restrictions, as presented in Table J20 below.

Table J20: Operating restrictions

Measure	Description
Applicant assessed measures	
Permitted Operations	Retail existing restrictions currently due to be introduced on the opening of the new north runway: Condition 3(d) – Runway 10L-28R shall not be used for take-off or landing between 23:30 and 06:59 Condition 5 – The average number of night-time aircraft movements at the Airport shall not exceed 65 per night (between 23:00 and 07:00) when measured over the 92-day modelling period.
DAA Noise Quota Scheme	Annual noise quota limit of 7,990 between the hours of 23:00 and 05:59, with noise related limits on aircraft permitted to operate at night.
Additional measures assessed by ANCA	
ANCA Noise Quota Scheme	Annual noise quota limit of 16,260 between the hours of 23:00 and 06:59, with noise related limits on aircraft permitted to operate at night.

Source: daa

The Noise Quota Scheme creates an annual limit on the volume of noise generated by aircraft during the night period, using the quota count (QC) system. Each aircraft type is given a QC rating depending on how much noise it generates. If there is a risk that the total QC rating of all the night flights flown in a year will breach the quota limit, it will impose an operating restriction. Airlines will either be required to fly a quieter aircraft with a lower QC rating, or not operate at all.

The Applicant proposed a Noise Quota Scheme that would create an annual noise quota limit for 6.5 hours of the night period. The limit was set such that it would not impose any operating restrictions based on the Applicant's forecasts of ATMs and the fleet mix. We assess an additional measure that extends the Noise Quota Scheme for an additional hour to cover the full night period. As we discuss below, the limit has been set such that it would not impose any operating restrictions based on the Applicant's forecasts of ATMs and the fleet mix.

1.6.2. Cost of measures

1.6.2.1 Permitted Operations

The Applicant assessed the cost of the permitted operations scenario to be €1,396m over the period 2022-25, based on their consultant's assessment of the economic impact of the operating restrictions. The Applicant used an economic impact methodology, attempting to value lost economic output as a result of the operating restrictions, estimating:

- the 'direct' loss in economic activity within the aviation sector from fewer flights and fewer passengers;

- ‘indirect’ losses in economic activity incurred by the wider supply chain; and
- ‘catalytic’ losses in economic activity based on the wider relationship between aviation and economic growth.

ANCA does not consider this approach to be robust. The Applicant’s consultants do not appear to have accounted for displacement effects – the idea that less spending on aviation would lead to more spending elsewhere in the economy. Without accounting for these effects, the Applicant’s estimates of the direct and indirect losses are likely to be significantly overstated. Additionally, the Applicant’s approach for assessing the costs of operating restrictions is inconsistent with its treatment of costs elsewhere in the CEA. Needing fewer air traffic controllers as a result of runway closures is treated as cost saving, whereas needing fewer airport and airline staff as a result of operating restrictions is treated as a cost due to lower economic output.

As a result of these deficiencies, which are somewhat inherent in economic impact methodologies, this approach is not commonly used for economic appraisal in Ireland (or globally). We have therefore used a different approach, although we retain the Applicant’s estimate of catalytic losses for our upper bound estimate. ANCA’s approach identifies four key impacts:

- **Loss in value to passengers no longer able to travel** – We estimate this by proxying how much ticket prices would have to rise to reduce demand by enough to meet the capacity constraints introduced by the operating restrictions.
- **Wider losses to the economy from having less connectivity** – There is evidence to suggest that improved air connectivity leads to higher economic growth. However, the precise relationship is highly uncertain. As we do not have detailed flight schedules from the Applicant, we are not able to separately estimate this effect, but we can use the Applicant’s estimate for the ‘catalytic impacts’ of the operating restrictions as our upper bound estimate.
- **Air traffic controller savings from only operating a single runway during the night period** – This was not assessed by the Applicant for the operating restrictions measures, but was assessed for the other measures.
- **Lower profits for airlines from higher airport charges** – As most of Dublin Airport’s other costs are fixed, they will have to spread those costs over a smaller passenger base meaning higher charges for everybody else. This will lead to lower profits for airlines.

The table below shows the reduction in ATMs and passenger volumes under the Permitted Operations scenario. Over the period 2022 to 2026, the Applicant estimates there will be 45,000 fewer flights and 7.1 million fewer passengers as a result of the restrictions placed in Conditions 3(d) and 5.

Table J21: Reduction in ATMs and passenger volumes under the Permitted Operations scenario

	2021	2022	2023	2024	2025	2026	2027
Without operating restrictions							
ATMs (thousands)	133.0	176.0	208.0	229.0	236.0	236.0	236.0
Passengers (millions)	7.9	21.0	26.7	30.8	32.0	32.0	32.0
Permitted Operations							
ATMs (thousands)	133.0	166.0	195.0	219.0	227.0	233.0	236.0
Passengers (millions)	7.9	19.6	24.9	29.3	30.4	31.2	32.0
Reduction as a result of operating restrictions in Permitted Operations scenario							
ATMs (thousands)	-	-10.0	-13.0	-10.0	-9.0	-3.0	-
Passengers (millions)	-	-1.4	-1.8	-1.5	-1.6	-0.8	-

Source: daa

To estimate the loss in value to passengers no longer able to travel, we assume prices have to rise to depress demand enough to meet the new capacity:

- We estimate that the average air fare at Dublin Airport was €115 in 2019, which we take as our best estimate for future air fares.[12]
- Using an estimate for passengers' price elasticity of demand of -0.6,[13] we can work out how much fares would have to rise so that 7.1 million fewer passengers fly over the period 2022 to 2026. This results in an average fare increase of €10.55.
- We then use a rule of thumb called the 'rule of a half' commonly used within transport appraisal, to estimate that each passenger no longer able to travel incurs a loss of half the €10.55 (i.e. €5.28).
- Aggregating this over 7.1 million passengers results in a total loss of €37.5 million.

As the precise relationship between airport connectivity and economic growth is uncertain, we use two estimates for the wider losses to the economy from having less connectivity:

- For our lower-bound estimate, we assume losses are zero.
- For our upper-bound estimate, we use the Applicant's estimate of the catalytic effects and extend it to included losses in 2026. This results in an estimate of €934 million.

[12] We estimate this using average revenue per passenger data from the 2019 annual accounts of Ryanair and Aer Lingus, as the two largest airlines operating from Dublin Airport.

[13] InterVISTAS / IATA (2017) Estimating Air Travel Demand Elasticities. https://www.iata.org/whatwedo/Documents/economics/Intervistas_Elasticity_Study_2007.pdf

We use the same approach as the noise abatement operational procedures to estimate the savings from not needing as many air traffic controllers during the night period, which we estimate to be €2.9 million.

Finally, to estimate the lower profits for airlines from higher airport charges, we need to estimate how much revenue Dublin Airport would lose from serving fewer passengers, which would then need to be recouped through higher airport charges. The average airport charge at Dublin Airport is currently set at €7.58 per passenger,14 which means that 7.1 million fewer passengers would result in €54 million less revenue.

Summing these results in our total cost estimate ranging from €88 million to €1,023 million over the period 2022-26.

1.6.2.2 Noise Quota Schemes

Whether the Noise Quota Scheme will impose a cost will depend on tight the restriction is and the state of technology available to airlines.

- If there is no risk of the quota limit being breached based on existing airline operating plans, there would be no cost to airlines.
- If there is a risk of the quota limit being breached, airlines may choose to shuffle their fleet so that their quietest aircraft are in use during the night period, with noisier aircraft in use during the day period or at other airports. This may impose a cost on airlines in terms of reduced operational efficiency. But fleet shuffling is less likely to be an option for airlines at Dublin Airport as many are based at the airport and, therefore, have less scope for shuffling their fleet.
- If airlines are unable to switch their fleet in order to meet the restrictions, their next option would be to bring forward investment in quieter aircraft. This would present an opportunity cost to airlines.
- If the technology does not exist for airlines to replace their existing fleet, their final option would be to schedule a smaller aircraft, which is typically quieter, or opt not to schedule a flight at that time.

The Applicant's modelling shows that the annual night quota count (i.e. over the period 23:00 to 06:59) will be highest in 2025, at 15,892. This suggests that the 8-hour alternative noise quota limit of 16,260 as suggested by ANCA can be met without imposing any restrictions on how an airline may wish to operate from the airport subject to more restrictive restrictions on aircraft QC from 2030 onwards.

Nevertheless, it is possible that ATM growth increases more quickly than forecast by the Applicant, and/or the Applicant's assumptions around fleet replacement are optimistic. Under such a scenario, there would be a cost to the Noise Quota Scheme.

1.6.3. Effectiveness of measures

As the Balanced Approach requires us to consider operating restrictions only after other alternatives have been fully considered, it is necessary for us to compare the performance of the measures that are operating restrictions against the alternatives. Below, we compare the

[14] Commission for Aviation Regulation (2021) Airport Charges. Available at aviationreg.ie

operating restrictions measures to three other measures that do not include operating restrictions: [15]

- **Most effective measure under the HSD metric**. This is the combination of runway pattern and noise insulation variant that results in the greatest reduction in number of people HSD. Based on our analysis, the most effective measure under the HSD metric is runway pattern P09 with noise insulation variant C6.
- **Most cost-effective measure.** This is the combination of runway pattern and noise insulation variant that results in the most cost-effective outcome under the given metric. We consider this to be runway pattern P10 with noise insulation variant B, based on the analysis in [Section 1.6].
- **The Applicant's preferred measure**, which is runway pattern P02 with noise insulation variant B.
- **A more effective variant of the Applicant's preferred measure.** The Applicant's preferred measure performs worse than the FWNM in terms of reducing the number of people HSD. We therefore consider a variant of this measure that performs better in terms of reducing the number of people HSD – runway pattern P13 with noise insulation variant C6.

Table J22 compares the effectiveness of the measures compared with the FWNM, and shows the number of people that remain HSD or exposed to night-time noise priority following the implementation of the measures

Table J22: Reduction in people impacted in 2025 under different measures

Measure	Number of people no longer impacted compared with FWNM		Number of people impacted following measure	
	HSD	Night-time noise priority	HSD	Night-time noise priority
Permitted Operations	-14,083	-16	22,481	0
The Applicant's Proposed Noise Quota Scheme	0	0	36,564	16
Alternative Noise Quota Scheme	0	0	36,564	16
Most effective measure under HSD metric	-2,022	-16	34,542	0
Most cost-effective measure	-219	-16	36,345	0
The Applicant's preferred measure	442	-16	37,006	0

[15] Note that it was not possible to derive effectiveness measure Permitted Operations Scenario for Significantly Adversely Affected people due to data not being available.

Scenario P13 with noise insulation C6	-393	-16	36,171	0

Source: CEPA analysis of daa data and assumptions

This table shows that the operating restrictions within the Permitted Operations scenario are by far the most effective at reducing the number of people HSD. The other measures do vary in their effectiveness, but the differences between them are relatively small.

1.6.4. Cost-effectiveness of measures

Below, we present the cost-effectiveness of the different measures against out two metrics. Given the uncertainty around the costs imposed by the Permitted Operations scenario, we present the cost-effectiveness as a range.

Table J23: Cost effectiveness of different measures relative to the FWNM (€ per person, 2020 prices)

Measure	HSD	Night-time noise priority
Permitted Operations	6,000 to 73,000	694,000 to 8,032,000
The Applicant's Proposed Noise Quota Scheme	0	0
Alternative Noise Quota Scheme	0	0
Most effective measure under HSD metric	21,000	2,575,000
Most cost-effective measure	Cost savings	Cost savings
The Applicant's preferred measure	Performs worse than FWNM	242,000
	21,000	511,000

Source: CEPA analysis of daa data and assumptions

The table above shows that runway pattern 10 (alternating between using the North Runway and South Runway over the period 00:00 and 06:00) with noise insulation variant B (insulating homes exposed to noise greater than 55 dB L_{night}) is the most cost-effective under both metrics. However, as discussed previously, it does not perform as well against the significantly adversely affected metric which is an aspect of the noise problem identified by ANCA.

The table also shows that when looking at the outcomes targeted by the NAO, particularly the HSD metric, the measure preferred by the Applicant does not perform well. However, it does perform well against minimising the number of people experiencing significant noise changes (i.e. significantly adversely affected).

Scenario P13, in isolation, is one of the most cost-effective runway use and restriction scenarios. When combined with insulation option C6, the combination of measures is not necessarily the most cost effective under the outcomes targeted by the NAO. However, it does achieve an improvement under both outcomes targeted by the NAO, and is likely to perform well when considering the significantly adversely affected metric.

Our lower bound estimate of the cost-effectiveness of the Permitted Operations scenario, suggests it is possible that the restrictions could be more cost-effective than some of the alternatives. But that is assuming the most optimistic outcome in terms of costs.

An tÚdarás Inniúil um Thorann Aerárthaí

Aircraft Noise Competent Authority

ANCA

Regulatory Decision

Appendix K - Draft Regulatory Decision

An tÚdarás Inniúil um Thorann Aerárthaí

Aircraft Noise Competent Authority

ANCA
Draft Regulatory Decision

November 11th 2021

An tÚdarás Inniúil um Thorann Aerárthaí

Aircraft Noise Competent Authority

DRAFT REGULATORY DECISION

OF THE AIRCRAFT NOISE COMPETENT AUTHORITY

PURSUANT TO

Section 34C(10) Planning and Development Act 2000

EU Regulation No 598/ 2014

Aircraft Noise (Dublin Airport) Regulation Act 2019

Planning Register Reference Number: F20A/0668

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Glossary of Terms

In this report:

Act of 2000 means the Planning and Development Act 2000, as amended

Act of 2019 means the Aircraft Noise (Dublin Airport) Regulation Act 2019

Aircraft Noise Regulation means Regulation (EU) No 598/2014 of the European Parliament.

ANCA means Aircraft Noise Competent Authority

Environmental Noise Directive means Directive 2002/49/EC of the European Parliament

Draft RD means this draft Regulatory Decision, issued pursuant to Section 34C(10) of the Act of 2019

Night time means 2300hrs – 0700hrs as defined in the Environmental Noise Directive

RD means the Regulatory Decision to be issued pursuant to Section 34C(10) of the Act of 2019 of which this is the draft

L_{night} Has the same meaning as ascribed to this term in the Environmental Noise Directive

L_{den} Has the same meaning as ascribed to this term in the Environmental Noise Directive

Proposed Development

The Applicant seeks planning permission for a proposed development comprising the taking of a 'relevant action' only within the meaning of Section 34C of the Planning and Development Act 2000, as amended, at Dublin Airport, Co. Dublin, in the townlands of Collinstown, Toberbunny, Commons, Cloghran, Corballis, Coultry, Portmellick, Harristown, Shanganhill, Sandyhill, Huntstown, Pickardstown, Dunbro, Millhead, Kingstown, Barberstown, Forrest Great, Forrest Little and Rock on a site of c. 580 ha.

The proposed relevant action, if permitted, relates to the night time use of the runway system at Dublin Airport. It involves the amendment of the operating restriction set out in condition no. 3(d) and the replacement of the operating restriction in condition no. 5 of the North Runway Planning Permission (Fingal County Council Reg. Ref. No. F04A/1755; ABP Ref. No. PL06F.217429 as amended by Fingal County Council F19A/0023, ABP Ref. No. ABP-305289-19), as well as proposing new noise mitigation measures. Conditions no. 3(d) and 5 have not yet come into effect or operation, as the construction of the North Runway on foot of the North Runway Planning Permission is ongoing.

The proposed relevant action, if permitted, would be to remove the numerical cap on the number of flights permitted between the hours of 23:00 and 07:00 daily that is due to come into effect in accordance with the North Runway Planning Permission and to replace it with an annual night time noise quota between the hours of 23:30 and 05:59. and also to allow flights to take off from and/or land on the North Runway (Runway 10L 28R) for an additional 2 hours i.e. 23:00 to 24:00 and 05:59 to 07:00. Overall, this would allow for an increase in the number of flights taking off and/or landing at Dublin Airport between 23:00 and 07:00 over and above the number stipulated in condition no. 5 of the North Runway Planning Permission, in accordance with the annual night time noise quota.

The relevant action pursuant to Section 34C (1) (a), seeks:

> To amend condition no. 3(d) of the North Runway Planning Permission (Fingal County Council Reg. Ref. No. F04A/1755; ABP Ref. No.: PL06F.217429 as amended by Fingal County Council F19A/0023, ABP Ref. No. ABP-305289-19).
>
> Condition 3(d) and the exceptions at the end of Condition 3 state the following:
>
> '*3(d). Runway 10L-28R shall not be used for take-off or landing between 2300 hours and 0700 hours except in cases of safety, maintenance considerations, exceptional air traffic conditions, adverse weather, technical faults in air traffic control systems or declared emergencies at other airports.'*

Permission is being sought to amend the above condition so that it reads:

> '*Runway 10L-28R shall not be used for take-off or landing between 0000 hours and 0559 hours except in cases of safety, maintenance considerations, exceptional air traffic conditions, adverse weather, technical faults in air traffic control systems or declared emergencies at other airports or where Runway 10L-28R length is required for a specific aircraft type.*'

The net effect of the proposed change, if permitted, would change the normal operating hours of the North Runway from the 07:00 to 23:00 to 05:59 to 00:00.

The relevant action also is:

To replace condition no. 5 of the North Runway Planning Permission (Fingal County Council Reg. Ref. No. F04A/1755; ABP Ref. No.: PL06F.217429 as amended by Fingal County Council F19A/0023, ABP Ref. No. ABP-305289-19) which provides as follows:

5. On completion of construction of the runway hereby permitted, the average number of night time aircraft movements at the airport shall not exceed 65/night (between 2300 hours and 0700 hours) when measured over the 92 day modelling period as set out in the reply to the further information request received by An Bord Pleanála on the 5th day of March, 2007.

Reason: To control the frequency of night flights at the airport so as to protect residential amenity having regard to the information submitted concerning future night time use of the existing parallel runway'.

With the following:

'*A noise quota system is proposed for night time noise at the airport. The airport shall be subject to an annual noise quota of 7990 between the hours of 2330hrs and 0600hrs'.*

In addition to the proposed night time noise quota, the relevant action also proposes the following noise mitigation measures:

- A noise insulation grant scheme for eligible dwellings within specific night noise contours
- A detailed Noise Monitoring Framework to monitor the noise performance with results to be reported annually to the Aircraft Noise Competent Authority (ANCA), in compliance with the Aircraft Noise (Dublin Airport) Regulation Act 2019.

The proposed relevant action does not seek any amendment of conditions of the North Runway Planning Permission governing the general operation of the runway system (i.e., conditions which are not specific to night time use, namely conditions no. 3 (a), 3(b), 3(c) and 4 of the North Runway Planning Permission) or any amendment of permitted annual passenger capacity of the Terminals at Dublin Airport. Condition no. 3 of the Terminal 2 Planning Permission (Fingal County Council Reg. Ref. No. F04A/1755; ABP Ref. No. PL06F.220670) and condition no. 2 of the Terminal 1 Extension Planning Permission (Fingal County Council Reg. Ref. No. F06A/1843; ABP Ref. No. PL06F.223469) provide that the combined capacity of Terminal 1 and Terminal 2 together shall not exceed 32 million passengers per annum.

The planning application is subject to an assessment by ANCA in accordance with the Aircraft Noise (Dublin Airport) Regulations Act 2019 and Regulation (EU) No 598/2014. The planning application was accompanied by information provided for the purposes of such assessment.

Process of Aircraft Noise Regulation

By Chief Executive Order ref. ANCA\002\2021 dated 10th February 2021, ANCA determined that a noise problem would arise at Dublin Airport from the taking of the Relevant Action as proposed in the Application and commenced the process of aircraft noise regulation as required by Section 34C of the Planning and Development Act 2000, as amended (the Act of 2000). The process of aircraft noise regulation in this context requires ANCA to define a Noise Abatement Objective (NAO), apply the

Balanced Approach, and, subject to Section 34C(5) of the Act of 2000, make a Regulatory Decision. The Regulatory Decision either sets out the noise mitigation measures or operating restrictions (if any) that ANCA proposes to direct the planning authority to include in the planning authority's decision, if any, to grant permission pursuant to F20A/0668 or confirms that no such conditions are required to be included in the planning authority's decision. This process reflects Ireland's obligations in relation to aircraft noise regulation under Article 5(2) of Regulation EU 598/2014 of the European Parliament and of the Council of 16 April 2014 on the establishment of rules and procedures with regard to the introduction of noise-related operating restrictions at Union airports within a Balanced Approach and repealing Directive 2002/30/EC.

ANCA issued a Direction to Provide Information on February 24, 2021 and daa furnished replies under cover of several responses, the last of which was dated September 13, 2021

Having applied the Balanced Approach to the noise problem identified on 10th February 2021, ANCA determined that one new noise mitigation measure and two new operating restrictions were required to address the noise problem that would arise as a result of the taking of the Relevant Action. As required by Section 34C(7) of the Act of 2000, ANCA assessed those proposed noise mitigation measures and the proposed operating restriction in accordance with the Balanced Approach.

Having undertaken the above analysis, ANCA issued a Notice to the applicant on 17th September 2021 in accordance with the provisions of Section 34C(8) of the Act of 2000. This Notice informed the applicant of the noise mitigation measure and operating restrictions restriction proposed to be required in a decision (if any) to grant the relevant application and the reasons for so proposing. The Notice also advised the Applicant that the Applicant would have an opportunity to make submissions or observations on the proposed noise mitigation measure and operating restrictions within the period from 17th September 2021 to 19th October 2021, in accordance with Section 34C(8)(b) of the Act of 2000. The Applicant provided observations on those noise mitigation measure and operating restrictions on 12 October 2021.

Matters Considered

In making this draft regulatory decision, the Aircraft Noise Competent Authority (ANCA) had regard to those matters to which, by virtue of the Aircraft Noise (Dublin Airport) Regulation Act 2019 (the Act of 2019), it was required to have regard, including:

- International aviation policy, and in particular the Balanced Approach of the International Civil Aviation Organization (ICAO);
- European policy and legislation, including EU Council Directive 2002/49/EC (the Environmental Noise Directive) (as amended), and Regulation EU 598/2014 (the Aircraft Noise Regulation). In a legislative context, EU Regulation No 598/2014 identifies sustainable development as a key objective of the common European transport policy. This requires an integrated approach aimed at ensuring both the effective functioning of transport systems and protection of the environment;
- Applicable domestic legislation, including the Environmental Noise Regulations 2018 and the Act of 2019;
- The findings of the Environmental Report prepared for the purposes of Strategic Environmental Assessment (SEA), and the Natura Impact Statement prepared for the purposes of Appropriate Assessment;

ANCA's consideration of these matters is set out in more detail in the Draft Regulatory Decision Report accompanying this Draft Regulatory Decision.

In making this draft regulatory decision, ANCA also had regard to National, Regional and Local Policy including as set out in: –

a) Project Ireland 2040 - National Planning Framework, 2017 (Government of Ireland)
b) National Development Plan 2018-2027, 2018 (Government of Ireland)
c) National Policy Statement on Airport Charges Regulation, 2017 (The Department of Transport, Tourism and Sport (DTTAS))
d) A National Aviation Policy for Ireland, 2015 (The Department of Transport, Tourism and Sport (DTTAS))
e) Regional Spatial and Economic Strategy for the Eastern and Midland Region (RSES) 2019 – 2031, 2019 (Eastern and Midland Regional Assembly)
f) Fingal Development Plan 2017 – 2023, March 2017, Fingal County Council.
g) Variation No. 1 of the Fingal Development Plan 2017 – 2023, September 2019, Fingal County Council.
h) Dublin Airport Local Area Plan, 2020 (LAP), Fingal County Council.
i) Dublin Airport Central Masterplan, 2016, Fingal County Council.
j) Dublin Airport Noise Action Plan 2019 – 2023, 2018 (NAP), Fingal County Council.
k) Dublin Airport Capital Investment Programme 2020+, 2019, daa.

These programmes and policies provide context for the development of Dublin Airport. These define the specific policy positions and actions to demonstrate Ireland's commitment to mitigate the impacts of aviation on the environment and facilitate the sustainable growth of the sector with actions that support the implementation of legislation. ANCA's consideration of these matters is set out in detail in the Draft Regulatory Decision Report accompanying this Draft Regulatory Decision.

Reasons and Considerations

The reasons and considerations for ANCA's regulatory decision are set out in detail in the Regulatory Decision Report accompanying this Draft Regulatory Decision.

Appropriate Assessment (AA)

ANCA undertook an AA Screening in respect of the Noise Abatement Objective and the draft Regulatory Decision arising from an assessment of the noise situation resulting from planning application F20A/0668.

The draft RD is a plan not directly connected with or necessary to the management of any European Site. However, ANCA considered that it could not be excluded, in view of best scientific knowledge and in view of the conservation objectives of the sites, that the draft RD, individually or in combination with other plans or projects, will have a significant effect on any European Site and accordingly determined that an Appropriate Assessment of the draft RD was required. For this reason, it was determined that draft RD must proceed to Stage 2 (AA) and a Natura Impact Statement (NIS) prepared.

Accordingly an NIS has been prepared and published for consultation alongside the Noise abatement Objective and the draft Regulatory Decision.

[PLACEHOLDER FOR THE APPROPRIATE ASSESSMENT DETERMINATION IN THE FINAL RD]

Strategic Environmental Assessment (SEA)

The draft RD may set the framework for future development consent of projects listed in Annex I and II to the EIA Directive, including changes or extensions to airfields and airports with a basic runway length of 2,100 metres or more.

ANCA is required to undertake a SEA in respect of a Noise Abatement Objective and draft Regulatory Decision arising from an assessment of the noise situation resulting from planning application F20A/0668.

Accordingly, a SEA Environmental Report has been prepared and published for consultation alongside the Noise abatement Objective and the draft Regulatory Decision.

[PLACEHOLDER FOR THE SEA DETERMINATION IN THE FINAL RD]

Conditions

This draft regulatory decision contains the following noise mitigation measures and operating restriction that ANCA proposes to direct the planning authority to include as conditions of the planning authority's decision (if any) to grant the relevant application (F20A/0668):

Condition 1:

The existing operating restriction, Condition 5, of the North Runway Planning Permission (FCC Reg. Ref: F04A/1755; ABP Ref: PL06F.217429) reading as:

On completion of construction of the runway hereby permitted, the average number of night time aircraft movements at the airport shall not exceed 65/night (between 2300 hours and 0700 hours) when measured over the 92 day modelling period as set out in the reply to the further information request received by An Bord Pleanála on the 5th day of March, 2007.

shall be revoked and replaced with an annual noise quota scheme operating restriction as follows:

The airport shall be subject to a Noise Quota Scheme (NQS) with an annual limit of 16,260 between the night time hours of 23:00 and 06:59 (inclusive, local time) with noise-related limits on the aircraft permitted to operate at night. The annual noise scheme shall be applied as detailed in Schedule A.

REASON:

To limit the impact of the aircraft noise at Dublin Airport on sleep disturbance in the interest of residential amenity and to ensure the effective implementation of the Noise Abatement Objective for the Dublin Airport by means of a noise-related limit on aircraft operations.

Condition 2:

The existing operating restriction imposed by Condition 3(d) and the exceptions at the end of Condition 3 of the North Parallel Runway Planning Permission (FCC Reg. Ref: F04A/1755; ABP Ref: PL06F.217429) reading:

'3(d). Runway 10L-28R shall not be used for take-off or landing between 2300 hours and 0700 hours. except in cases of safety, maintenance considerations, exceptional air traffic conditions, adverse weather, technical faults in air traffic control systems or declared emergencies at other airports.'

shall be amended as follows:

Runway 10L/28R shall not be used for take-off or landing between 00:00 and 05:59 (inclusive, local time) except in cases of safety, maintenance considerations, exceptional air traffic conditions, adverse weather, technical faults in air traffic control systems or declared emergencies at other airports or where Runway 10L/28R length is required for a specific aircraft type.

REASON:

To permit the operation of the runways in a manner which reduces the impacts on those newly affected by aircraft night time noise, whilst providing certainty to communities as to how they will be affected by night time operations from the North Runway, while also providing continuity with the day-time operating pattern set down by Conditions 3(a)-(c) of the North Runway Planning Permission.

Condition 3:

A voluntary residential sound insulation grant scheme (RSIGS) for residential dwellings shall be provided as detailed in Schedule B, for all homes forecast in 2025 to be exposed to aircraft noise at or above 55dB L_{night} contour or experience a 'very significant' effect i.e. exposure to aircraft noise at or above the 50dB L_{night} contour together with an increase in noise exposure of at least 9 dB compared to the forecast noise situation in 2025 (had the relevant action not been taken) as shown on the Initial Eligibility Area Contour. Dwellings exposed to levels at or above 55 dB L_{night} shall be reviewed every two years commencing in 2027 and if applicable be made eligible for the scheme. This scheme shall not apply to properties where works were undertaken under the existing Residential Noise Insulation Scheme (RNIS) or Home Sound Insulation Programme (HSIP) or to properties where a planning application was lodged after 09 December 2019, being the date of adoption of Variation No. 1 to the Fingal Development Plan 2017 – 2023 incorporating policies relating to development within Aircraft Noise Zones.

REASON:

To mitigate the impact of aircraft night time noise as a result of the use of the Airport's runways, in the interest of residential amenity and the proper planning and sustainable development of the area.

Schedule A – Requirements for the Discharge of Condition 1 (Noise Quota Scheme)

Part 1 Definitions

1.1 The following definitions shall apply with reference to the scheme described in Part 2.

Term	Meaning
Annual Quota Period	means the twelve month period from 1 April to 31 March inclusive each year
EASA Noise Certification Database	means the database of noise certification levels approved and as varied from time to time by the European Union Aviation Safety Agency (EASA) and published on its website. (https://www.easa.europa.eu/domains/environment/easa-certification-noise-levels). The noise levels are established in compliance with the applicable noise standards as defined by International Civil Aviation Organization (ICAO) Annex 16 Volume 1.
Night time	means the hours at night between 2300 (local time) to 0700 (local time)
Noise Classification Level (NCL)	means the noise level band in EPNdB assigned to an aircraft for take-off or landing, as the case may be, for the aircraft in question for the purposes of identifying the Quota Count of the aircraft. The Noise Classification Level for an aircraft taking off from and landing at the Airport shall be taken from the Flyover Level from the EASA Noise Certification Database: *NCL(Take-Off)* = EPNL(Flyover) *NCL(Landing)* = EPNL(Approach) −9 dB
Quota Count	means the amount of the quota assigned to one take-off or to one landing by an aircraft based on the Noise Classification Level for the aircraft having regard for engine type and take-off weight:

Noise Classification Level	Quota Count (QC)
Greater than 101.9 EPNdB	16.0
99-101.9 EPNdB	8.0
96-98.9 EPNdB	4.0
93-95.9 EPNdB	2.0
90-92.9 EPNdB	1.0
87-89.9 EPNdB	0.5
84-86.9 EPNdB	0.25
81-83.9 EPNdB	0.125
Less than 81 EPNdB	0

Part 2 – Noise Quota Scheme

2.1 Subject the dispensations described in Paragraph 2.2:

a. A take-off or landing at the Airport shall be determined to fall within the night time based on runway time
b. No aircraft with a Quota Count of 4.0 or more shall be permitted to take off at the Airport during the night time.
c. No aircraft with a Quota Count of 2.0 or more shall per permitted to land at the Airport during the night time.
d. No aircraft with a Quota Count of 2.0 or more shall be permitted to take off at the Airport during the night time from 1 January 2030
e. No aircraft with a Quota Count of 1.0 or more shall be permitted to land at the Airport during the night time from 1 January 2030
f. Each aircraft landing at or taking off from the Airport during the night time will be assigned a Quota Count based on their Noise Classification Level
g. The Noise Quota at the Airport shall be limited to 16,260 for the Annual Period

2.2 The restrictions set out in Paragraph 2.1 shall not apply in any of the following dispensations:

a. Where a take-off or landing of any aircraft at the Airport is made in an emergency, where there is an immediate danger to life or health, whether human or animal.
b. Where a take-off or landing of any aircraft at the Airport occurs as a result of a delay to that aircraft which is likely to lead to serious congestion at the Airport and/or serious hardship or suffering to passengers or animals.
c. Where a take-off or landing of any aircraft at the Airport occurs as a result of widespread and prolonged disruption of air traffic.
d. Flights for military, medical or humanitarian purposes or otherwise granted exemption by the Irish Government

Part 3 – Noise Quota Scheme Reporting Requirements

3.1 The Airport shall submit quarterly reports to the planning authority on its implementation of the Noise Quota Scheme. The reports shall include:

a. The number of aircraft operating during the Noise Quota Period and their type, including technical details including their engines and take-off weights, where applicable;
b. The Quota Count assigned to aircraft operating in the Noise Quota Period;
c. The total Noise Quota used during the quarter and in the Annual Period to date;
d. The total Noise Quota used by Quota Count in the quarter and in the Annual Period to date; and
e. Details of any dispensations pursuant to Paragraph 2.2 which have been relied upon during the quarter and in the Annual Period to date.

3.2 The quarterly reports shall be issued so that:

a. The first quarterly report considering activity over the period 1 April to 30 June each year is published by no later than the 30 September each year
b. The second quarterly report considering activity over the period 1 July to 30 September each year is published by no later than the 31 December each year

c. The third quarterly report considering activity over the period 1 October to 31 December each year is published by no later than the 31 March the following year
d. The fourth quarterly report considering activity over the period 1 January to 31 March each year is published by no later than the 30 June each year

Part 4 – Noise Performance Reporting

3.1 The Airport shall issue annual reports to the planning authority on its noise performance. The report for the previous Annual Period shall be published by no later than 31 March each year and comprise of:

a. Noise exposure statistics and contours as required to facilitate performance review of the Noise Abatement Objective including as a minimum:
    - Annual 55dB L_{night}
    - Annual 65dB L_{den}
    - through the number of people 'highly sleep disturbed' and 'highly annoyed' in accordance with the approach recommended by the World Health Organisation's Environmental Noise Guidelines 2018 as endorsed by the European Commission through Directive 2020/367, taking into account noise exposure from 45 dB L_{den} and 40 dB L_{night}.
    - Annual L_{night} contours from 40 dB in 5 dB increments
    - Annual L_{den} contours from 45 dB in 5 dB increments
    - Summer 60 dB $L_{Aeq,\ 16hr}$ and 63 dB $L_{Aeq,\ 16hr}$ (measured averaged across 92-day summer period from 16th June to 15th September).
b. Confirmation of the number of residential properties that (i) have benefitted from and (ii) are eligible for but yet to benefit from the Airport's noise insulation schemes.
c. Key Statistics with respect to aircraft operations in the preceding Annual and Summer Periods including but not limited to:
- aircraft movements including average hourly movements
- use of the Noise Quota Scheme
- movements by aircraft type
- passenger numbers
- aircraft destinations
- flight routings
- runway use
d. Summaries from noise monitoring terminals for the Airport in such format as ANCA shall stipulate
e. Details of all noise modelling undertaken in support of the Noise Performance Reporting describing compliance with the methodology set out in Directive 2015/996 (ECAC Doc.29 4th Edition). All noise modelling shall be validated using local noise and track keeping performance data from the Airport's systems.
f. Summary of complaints records for the preceding Annual Period categorised by the:
    - location of complaints; and
    - reason for complaint
g. Details of any anticipated changes or developments that may affect noise at the Airport in the current year, through for example airspace change or fleet modernisation.

Schedule B – Requirements for the Residential Sound Insulation Grant Scheme (RSIGS)

Part 1 Definitions

1.1 The following definitions shall apply with reference to the scheme described in Part 2.

Term	Meaning
Airport	daa PLC
Approved Contractor	Means a contractor procured and managed by the Airport and considered competent and appropriately qualified and have suitable levels of insurance coverage to install the sound insulation measures described in Part 4 in line with acceptable standards and in compliance with the Building Regulations.
Bedroom	A room other than in an attic or loft within an Eligible Dwelling which is used as sleeping accommodation.
Competent Surveyor	Means an appropriately qualified surveyor to inspect and determine relevant information in relation to the existing construction and elements of an Eligible Dwelling for the purposes of undertaking an Elemental Analysis as defined in Part 5.1, Step 5 below.
Eligibility Area	The Initial Eligibility Area as varied from time to time pursuant to the review process set out in Part 3.2 below.
Eligible Dwelling	A habitable dwelling built in compliance with the provisions of the building regulations and the Planning and Development Act within the Eligibility Area and which otherwise qualifies under the conditions set out under Part 3.1 below.
Index Linked	Means index-linked by reference to changes in the Consumer Price Index (CPI) maintained by the Central Statistics Office.
Initial Eligibility Area	The initial area of eligibility to the scheme based on all homes forecast in 2025 to be exposed to aircraft noise at or above 55dB L_{night} contour or experience a 'very significant' effect i.e. exposure to aircraft noise at or above the 50dB L_{night} contour together with an increase in noise exposure of at least 9 dB compared to the forecast noise situation in 2025 (had the relevant action not been taken) as shown on the Initial Eligibility Contour Area Map (which contours have been adjusted to accommodate local land boundaries that would otherwise be bisected by the contours).
Initial Eligibility Contour Area	The area shown on the Initial Eligibility Contour Area Map within this Schedule.

Relevant External Noise Level	This noise exposure level at the relevant Eligible Dwelling.
Statement of Need	The recommended measures identified from those available under the scheme as outlined in Part 4
Target Performance	means an improvement of at least 5 dB, where feasible, in the sound insulation of each bedroom of the Eligible Dwelling. Where possible, the guidelines recommended in BS8233:2014 for internal ambient noise levels shall be targeted.

Part 2 – Purpose of the Scheme

2.1 The purpose of the scheme is to provide financial assistance by the Airport to property owners in the form of a grant of up to and limited to €20,000 (Index Linked) towards the costs of noise insulation measures to Bedrooms in Eligible Dwellings (the **Grant**).

2.2 Bedrooms and properties may qualify only once for the financial assistance provided under this scheme.

2.3 Where a dwelling is eligible under this scheme but is also eligible for insulation under the Residential Noise Insulation Scheme (**RNIS**) and the Home Sound Insulation Programme (**HSIP**) best endeavours shall be made by the Airport to ensure that the dwelling receives insulation under RNIS and HSIP instead of this scheme.

Part 3 – Eligibility

3.1 Dwellings shall be determined to be Eligible Dwellings under this scheme if they are located within (i) the Initial Eligibility Contour Area as shown in the Initial Eligibility Contour Area Map or (ii) the Eligibility Contour Area (following any review carried out pursuant to Part 3.2 below) and:

a. Were constructed pursuant to a planning permission granted following a planning application lodged on or prior to 09th December 2019, being the date of adoption of Variation No. 1 to the Fingal Development Plan 2017 – 2023 incorporating policies relating to development within Aircraft Noise Zones and
b. Have not benefitted from noise insulation previously under this scheme; and
c. Have not benefitted from noise insulation under either the RNIS or HSIP schemes previously.

3.2 On 31 March 2027 and every two years thereafter, ANCA shall carry out a review exercise to ascertain whether any authorised habitable dwelling outside the Initial Eligibility Area or the Eligibility Area as at the date of that review (as appropriate) [was subject to aircraft noise level at or above 55dB L_{night} contour in the calendar year immediately preceding the review]. If there is/are any such authorised habitable dwelling/s, same shall as and from the date of the review be deemed to be an Eligible Dwelling/s and the Eligibility Area shall be amended to include such dwelling/s. Following each review, ANCA shall prepare a revised contour map showing the revised Eligibility Area following such review and shall publish same on its website.

Part 4 – Measures available under the Scheme

4.1 The owner of an Eligible Dwelling in accordance with Part 3 and following the procedure described in Part 5 shall be entitled to the Grant to be applied towards a selection of insulation measures to be applied to Bedrooms within an Eligible Dwelling as specified in Paragraphs 4.2 to 4.10 below.

4.2 The insulation measures referred to in Paragraph 4.1 must be installed by an Approved Contractor and comprise of the following unless the equivalent measure already exists within the Eligible Dwelling:

a. Primary Acoustic Glazing
b. Secondary Acoustic Glazing
c. Glazing Roof Light
d. Passive Ventilator
e. Mechanical Ventilator
f. Loft Insulation
g. Ceiling Overboarding

4.3 The sound installation measures provided under this scheme shall otherwise comply with the specification of the measures in place under the RNIS scheme as summarized in Part 5 below.

4.4 Where secondary acoustic glazing is to be installed, this shall meet the following specification, namely, 6.4mm laminated glass with minimum 100mm gap from the primary glazing unit. However, where this is not possible, the secondary glazing should be provided to account for the below variations.

Thickness of Glazing of the Inner Window	**Minimum Horizontal Distance**
Less than 4 mm and not less than 3 mm thick	200 mm
Less than 6 mm and not less than 4 mm thick	150 mm

4.5 Where secondary glazing is being installed reasonable endeavours will be made to repair the draft seals, catches and hinges to provide an air-tight seal on the existing primary glazing unit.

4.6 Where a replacement primary acoustic glazing is to be provided, this shall achieve a minimum R_w of 43 dB tested and rated to BS EN ISO 140-3 and BS EN ISO 717.

4.7 Where ventilators (passive or mechanical) are to be provided, a ventilation strategy for the bedrooms within each Eligible Dwelling shall be determined in accordance with Part F of the Building Regulations. Mechanical ventilation shall comprise of a ventilator unit consisting of a controlled variable- speed inlet fan with sound attenuating duct and cover that is capable of supplying fresh air to the room directly from outside by means of the supply duct and cowl (or grille).

4.8 Where no loft insulation is present in an Eligible Dwelling 200mm of fibrous acoustic insulation may be placed between ceiling joists, the insulation is to have a minimum density of 80kg/m3. Where insulation is already present but found to be unsatisfactory additional layers of insulation will be added to increase the total thickness to 200mm.

4.9 Any ceiling overboarding shall comprise of a continuous layer of mass to provide at least 12kg/m2 added above joists in attic, for example 22mm plywood (or similar approved).

4.10 In the event that loft Insulation or loft boards cannot be installed due to inaccessibility or other practical reasons, any ceiling overboarding shall comprise a dense plasterboard with a total minimum surface mass of 12 kg/m^2, i.e. 15mm SoundBloc (or similar approved).

Part 5 – Procedure

5.1. The Airport in operating this Scheme shall follow the procedure set out in this Part 5 as required in the discharge of the Airport's obligations under Condition 7 of the North Runway Consent, the discharge of which obligations is achieved through the RNIS.

Step 1 – Determine Eligibility - Eligible Dwellings shall be identified as per Part 3 of this Schedule.

Step 2 – Notification of Eligibility - The Owner of an Eligible Dwelling shall be notified of their eligibility under the scheme within six months of their eligibility being determined under Step 1.

Step 3 – Determine Relevant External Noise Level - The Relevant External Noise Level at the Eligible Dwelling shall be determined

Step 4 – Undertake Building Survey – The Airport shall use reasonable endeavours to arrange for the Eligible Dwelling to be inspected by the Competent Surveyor (and secure the necessary agreement to this from the owner of the Eligible Dwelling) within six months of eligibility being determined to record relevant information. The building survey shall be carried out by a Competent Surveyor appointed on behalf of the Airport. The survey shall record the location and number of Bedrooms, and for each Bedroom record the following relevant information:

- External wall constructions - where possible the construction type of the external walls will be recorded for example wall composition including inner leaf, cavity, and external leaf dimensions including all associated building materials;
- Window type – e.g. frame material, single glazing, double glazing, including key dimensions;
- Roof construction – including where possible roof construction type
- Details of chimneys and fireplaces
- Ventilation paths – e.g. existing wall and floor vent types, quantities and dimensions
- Details of any existing sound insulation measures which have been installed previously
- Dimensions of all Bedrooms including window, roof and wall dimensions
- Drawings and/or floor plans – if these are available from the owner
- Photographic records of the building

Step 5 – Elemental Analysis - An elemental analysis shall be undertaken to provide a technical assessment of the noise insulation required for the Eligible Dwelling. The following process shall be followed:

a. The existing sound insulation properties of each Bedroom shall be established
b. The anticipated future internal noise levels within each Bedroom having regard for the Relevant External Noise Level, presented in octave bands scaled from measurements taken around the Airport, and the existing noise insulation performance obtained from Step a.
c. A comparison shall be made between the anticipated internal noise level to the BS8233:2014 Targets for internal ambient noise;
d. An assessment will be undertaken to determine the required improvement in the noise insulation performance, having regard for the Target Performance.
e. Through an elemental analysis, the most effective combination of measures set out in Part 4 having regard for the Target Performance and the financial assistance grant shall be identified.

Step 6 – Statement of Need - A Statement of Need shall be prepared for each Eligible Dwelling. The Statement of Need will be a bespoke document for each Eligible Dwelling. The Statement of Need shall:

a. Describe the existing sound insulation performance for each Bedroom having regard for the Building Survey as described in Step 4
b. Identify the potential improvement in the existing sound insulation performance for each Bedroom as can be afforded within the Grant and whether the Target Performance can be met
c. Set out the recommended set of measures for the Eligible Dwelling in the form of a schedule of works and the associated measures on a bedroom-by-bedroom basis
d. Provide an opinion on the future internal noise level following the implementation of the noise insulation works and the ability of the works to the meet Target Performance.

The Statement of Need shall be issued to the owner of the Eligible Dwelling.

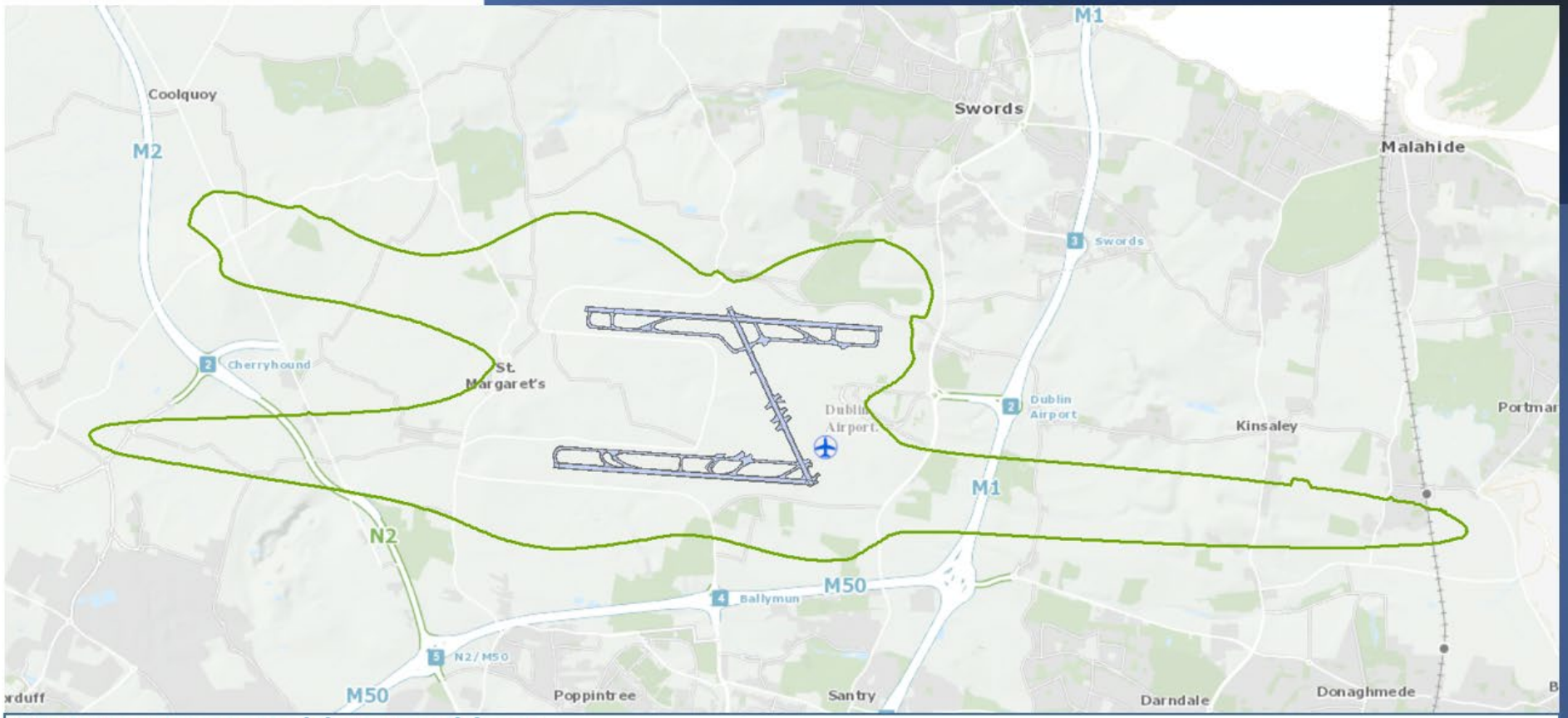
Step 7 – Acceptance - Subject to the owner of the Eligible Dwelling agreeing to the scope of works as defined under the Statement of Need, the engagement of the Approved Contractor and access to the dwelling by the Approved Contractor for the purposes of undertaking the works, the Airport will use reasonable endeavours to procure that the Approved Contractor undertakes the scope of works within six months of the owner's agreement to the same.

Step 8 – Works – The scope of works as defined by the Statement of Need shall be undertaken by the Approved Contractor [or a suitably qualified contractor procured by the home owner]. The Airport shall procure the Approved Contractor to ensure that the works are undertaken to the necessary standards and in compliance with the necessary regulations and that the Approved Contractor provides the owner with all appropriate certification and warranties relative to the works completed to the Eligible Dwelling. The Approved Contractor shall photograph the Eligible Dwelling before and after the works for record purposes.

5.2 In the event that a property owner declines to accept the scope of works as defined under the Statement of Need (Step 6) the Airport shall make a grant available towards the costs of sound

insulation measures through the Approved Contractor equal to the cost of the measures identified through the Statement of Need. This grant may be used by the owner to request alternative measures providing they as a minimum meet the Target Performance. Where the alternative measures are calculated to cost more than cost of the measures identified through the Statement of Need, any difference shall be at the expense of the owner.

5.3 In the event that a property owner wishes to appoint their own competent contractor, the Airport will provide a specification for the works. The property owner must provide a written quotation from their competent contractor for approval of both the identity of the contractor and the quotation by the Airport. Following approval, the property owner shall be responsible for managing the works and making payments to their contractor and the provisions of this Schedule B shall be deemed to be amended accordingly. Upon completion of the works, the Airport will carry out an inspection and issue payment to the property owner. Where works are not carried out in accordance with the approved specification, payment will not be made by the Airport.



Draft Regulatory Decision, Condition 3
Residential sound insulation grant scheme (RSIGS)
Initial Eligibility Contour Area Map

An tÚdarás Inniúil um Thorann Aerárthaí
Aircraft Noise Competent Authority

An tÚdarás Inniúil um Thorann Aerárthaí

Aircraft Noise Competent Authority

Comhairle Contae Fhine Gall
Fingal County Council

An tÚdarás Inniúil um Thorann Aerárthaí

Aircraft Noise Competent Authority

ANCA

Regulatory Decision

Appendix L - Section 34C(8) Notice to Applicant and Response

Áras an Chontae, Sord,
Co. Bhaile Átha Cliath, K67 X8Y2
County Hall, Swords,
Co. Dublin, K67 X8Y2

T. 01 890 5998
E. aircraftnoiseca@fingal.ie
www.fingal.ie/aircraftnoiseca/

An tÚdarás Inniúil um Thorann Aerárthaí
Aircraft Noise Competent Authority

Mr Gavin Lawlor,
Tom Phillips & Associates,
80 Harcourt Street,
Dublin D02 F449.

Our Ref. ANCA-F20A-0668
17th September 2021

Copy to:
Mr. Martin Doherty,
Environment and Planning Manager North Runway
daa Plc., Cargo 1,
Dublin Airport, County Dublin.

Re: Notice of proposed noise mitigation measures and operating restrictions pursuant to Section 34C(8) of the Planning and Development Act 2000 (the Act of 2000), as amended, that ANCA proposes to direct the planning authority to include in the planning authority's decision, if any, to grant permission pursuant to planning application F20A/0668 for a proposed relevant action (Section 34C of the Act of 2000) to amend/replace operating restrictions set out in conditions no. 3(d) & no. 5 of the North Runway Planning Permission (FCC Ref: No: F04A/1755, ABP Ref. No.: PL06F.217429) as well as proposing new noise mitigation measures

Dear Mr. Lawlor,

I refer to the application for planning permission ref. F20A/0668 (the Application) lodged by Tom Phillips & Associates on behalf of the airport authority for Dublin Airport (daa) on 18th December 2020.

On 10th February 2021, ANCA determined that a noise problem would arise at Dublin Airport from the taking of the Relevant Action as proposed in the Application and commenced the process of aircraft noise regulation as required by Section 34C of the Act of 2000. A summary of the reasons for that recommendation were as follows:

1. The Application proposes an increase in aircraft activity at night, when referenced against the situation that would otherwise pertain, which may result in higher levels of human exposure to aircraft noise;

2. The Application proposes a situation where some people will experience elevated levels of night-time noise exposure for the first time which may be considered harmful to human health; and

3. The Environmental Impact Assessment Report (EIAR) accompanying the Planning Application indicates that Relevant Action will give rise to significant adverse night-time noise effects. This indicates that noise effects of the Proposed Development are a material consideration.

The process of aircraft noise regulation in this context required ANCA to define a Noise Abatement Objective (NAO), apply the Balanced Approach, make a Regulatory Decision. The Regulatory Decision sets out the noise mitigation measures and operating restrictions that ANCA proposes to direct the

planning authority to include in the planning authority's decision, if any, to grant permission pursuant to F20A/0668 or confirm that no such conditions are required to be included in the planning authority's decision.

Section 9(2) of the Aircraft Noise (Dublin Airport) Act 2019 (the Act of 2019) requires Fingal County Council, in its capacity as Aircraft Noise Competent Authority, to "*ensure that the Balanced Approach is adopted where a noise problem at the airport has been identified and, to that end, shall further ensure that, as appropriate: (a) the noise abatement objective is, as appropriate, defined, restated or amended, taking into account, as appropriate, Article 8 of, and Annex V to, the Environmental Noise Directive*". That obligation reflects the obligation under Article 5(2) of Regulation EU 598/2014.

Having applied the Balanced Approach to the noise problem identified on 10th February 2021, ANCA proposes to, in the context of Section 34C(10) of the Act of 2000, make a draft regulatory decision. ANCA proposes to direct the planning authority to include the following conditions in their decision in respect of planning application F20A/0668. These have regard to the objectives and outcomes of the NAO as defined by ANCA.

Condition 1:

The existing operating restriction, Condition 5, of the North Runway Planning Permission (FCC Reg. Ref: F04A/1755; ABP Ref: PL06F.217429) reading as:

On completion of construction of the runway hereby permitted, the average number of night time aircraft movements at the airport shall not exceed 65/night (between 2300 hours and 0700 hours) when measured over the 92 day modelling period as set out in the reply to the further information request received by An Bord Pleanála on the 5th day of March, 2007.

shall be revoked and replaced with an annual night quota scheme operating restriction as follows:

The airport shall be subject to a Night Quota Scheme (NQS) with an annual limit of 16,260 between the night-time hours of 2300hrs and 0700hrs (local time) with noise-related limits on the aircraft permitted to operate at night. The annual noise scheme shall be applied as detailed in Schedule A.

REASON:

To limit the impact of the aircraft noise at Dublin Airport on sleep disturbance in the interest of residential amenity and to ensure the effective implementation of the Noise Abatement Objective for the Dublin Airport by means of a noise-related limit on aircraft operations.

Explanation:

ANCA's review of the material submitted with the Application and in response to ANCA's Further Information demonstrates that any revision or revocation to Condition 5 will increase noise exposure. However, noise exposure and health outcomes in 2025 and beyond would be better than those which occur in 2019. This is a key component of the NAO and this Condition will support this outcome.

ANCA has undertaken an independent cost-effectiveness assessment having regard to the restriction imposed by Condition 5 of the North Parallel Runway Planning Permission, and alternatives in the form of noise quota schemes having regard for the forecasts provided with the Application. ANCA's analysis has determined that a noise quota scheme is more cost-effective than the movement restriction imposed by Condition 5. It is ANCA's assessment that the NAO can be achieved by replacing Condition 5 with a noise quota scheme reflecting the forecasts submitted in support of the Application.

Although the Application proposes a night-time noise quota scheme effective over a period of 6.5 hours from 2330hrs to 0600hrs (local time), this does not cover the same night-time period as defined in European Union noise policy and against which the NAO has been set. The Application identifies demand for night flights in the context of 8-hour night-time movements rather than during discrete periods of the night, although it is accepted that demand is greatest during the 0600 to 0700 hour.

The Application has not proposed any specific restrictions on aircraft types which can operate during the night-time period. However, such restrictions are a common features of noise quota schemes in other jurisdictions. ANCA is of the view that such restrictions are warranted to set limits on individual aircraft noise events at night and to deliver the noise limiting aspects of the NAO. Recognising that the Application has not proposed such restrictions, ANCA has undertaken an analysis of the fleet mixes utilised within the Application forecasts and has concluded that a restriction on aircraft with a Quota Count (QC) of 4.0 on take-off and 2.0 on landing shall accompany the Night Quota Scheme (NQS) as it becomes effective. ANCA also requires that no aircraft with a QC of 2.0 or more on take-off and 1.0 or more landing shall operate during the night-time from 1 January 2030. This allows the Applicant to plan for this restriction to be implemented, with the aim of phasing out marginally compliant aircraft during the night.

The NQS sets an overarching night-time noise-related limit with the NAO requiring that overall outcomes in night time noise annoyance and sleep disturbance improve compared to 2019 with clear reductions set for 2030, 2035 and 2040. ANCA is conscious that the airport's compliance and performance against the NQS and NAO are inextricably linked. To this end, ANCA has set out a series of monitoring and reporting requirements which are outlined in Schedule A. These are in the spirit of the monitoring and reporting framework applied for in the Application.

Condition 2:

The existing operating restriction imposed by Condition 3(d) and the exceptions at the end of Condition 3 of the North Parallel Runway Planning Permission (FCC Reg. Ref: F04A/1755; ABP Ref: PL06F.217429) reading:

'3(d). Runway 10L-28R shall not be used for take-off or landing between 2300 hours and 0700 hours. except in cases of safety, maintenance considerations, exceptional air traffic conditions, adverse weather, technical faults in air traffic control systems or declared emergencies at other airports.'

shall be amended as follows:

Runway 10L/28R shall not be used for take-off or landing between 0000 hours and 0600 hours (local time) except in cases of safety, maintenance considerations, exceptional air traffic conditions, adverse weather, technical faults in air traffic control systems or declared emergencies at other airports or where Runway 10L/28R length is required for a specific aircraft type.

REASON:

To permit the operation of the runways in a manner which reduces the impacts on those newly affected by aircraft night-time noise, whilst providing certainty to communities as to how they will be affected by night-time operations from the North Runway, while also providing continuity with the day-time operating pattern set down by Conditions 3(a)-(c) of the North Runway Planning Permission.

Explanation:

Subsequent to ANCA's evaluation that Condition 5 can be revised and replaced with a noise-related operating restriction allowing the Airport to operate more than 65 aircraft per night, ANCA has considered the Application's proposals to amend Condition 3(d) of the North Runway Planning Permission.

In reviewing the documentation submitted in support of the Application, ANCA gave consideration for the following two approaches to Condition 3(d):

i. restate Condition 3(d); or
ii. amend Condition 3(d).

Restating Condition 3(d) would result in a majority of aircraft activity occurring on the South Runway. ANCA's review of the information provided in the Application indicates that overall health outcomes are likely to improve by using both the north and south runways at night. ANCA also recognises the Applicant's view that use of the north runway is necessary as part of meeting demand. It is concluded by ANCA that Condition 3(d) should be revised alongside replacing Condition 5.

A total of eleven alternatives scenarios to Condition 3(d) have been considered by ANCA. These constituted a mixture of modes of night-time runway operations and/or alternative restrictions to the use of the North Runway. For the purposes of this notice, these are described as 'runway patterns'.

Within the context of the Application and with the Airport operating up to its 32mppa passenger cap, all night-time runway patterns considered in the Application and as requested by ANCA through Further Information were found to meet the NAO in 2030, 2035 and 2040 with Condition 5 revoked and replaced with a noise quota scheme as described in Condition 1. This included a forecast which would allow the Airport to operate without any defined restriction on how it used its runways at night. Whilst such an operation may provide the Airport a great deal of flexibility, and whilst this could meet the NAO, it is not consistent with the existing arrangements for the North Runway as set out in Conditions 3(a)-(c) of the North Runway Planning Permission and does not reflect the Application.

Revising Condition 3(d) effectively means prescribing a form of night-time runway preference or prescribing scheduled use of the north or south runways over certain period of the night. The Application seeks to revise Condition 3(d) in a manner which would prohibit scheduled use of the North Runway between 0000hrs and 0600hrs (local time). ANCA's analysis shows that within the context of the Application all eleven of the runway patterns considered can meet the NAO.

The proposed runway pattern (Scenario 02), within the Application, effectively constitutes a shortening by 2 hours of the current restriction imposed by Condition 3(d). This would result in the Airport implementing the form of operation as described in Condition 3(a)-(c) of the North Runway Planning Permission at 0000hrs and recommencing this pattern at 0600hrs (local time). This will effectively provide some communities affected by North Runway operations with a break of 6 hours from aircraft noise during the hours of 0000hrs to 0600hrs (local time) as opposed to the 8-hours should Condition 3(d) be restated. In these additional 2 hours, the Airport would operate in line with the pattern described in Condition 3(a)-(c) of the North Runway Planning Permission providing a form of continuity in terms of airport operations and to those who are affected by aircraft noise.

ANCA has undertaken its own cost-effectiveness analysis (CEA) of each runway pattern and has studied their relative performance, noting that the CEA in the Application has only had regard for the Applicant's preferred option, Scenario 02, as applied for. ANCA's analysis has had regard for: the population highly sleep disturbed; the potential implications and costs arising from the number of properties eligible for sound insulation and its effectiveness; the change in night-time noise compared

the situation without Relevant Action; the number of people potentially experiencing significant effects; and the continuity of the night-time pattern with the daytime pattern described in Condition 3(a)-(c).

ANCA's analysis has shown that the runway pattern applied for in the Application may not be the most cost-effective when having regard for the total number of people highly sleep disturbed. Of the patterns considered by ANCA, the most cost-effective in this respect was found to be that described by Scenario 13 where the North Runway is restricted over the period 2330hrs to 0500hrs (local time).

The Applicant's proposed runway pattern could result in more people being exposed to levels of aircraft noise above the night-time priority value of 55 dB L_{night} as set out in the NAO than the other patterns considered. This is also an aspect of the noise problem arising from the Application as declared by ANCA.

A balance must be achieved however between the number of people exposed to aircraft noise, the number of people exposed above the priority value of 55 dB L_{night}, and those who may experience significant adverse night-time noise effects. The latter being the third reason summarised by ANCA for the noise problem arising from the Application.

The proposals in the Application are that priorities experiencing aircraft noise above 55 dB L_{night} would be subject to noise insulation under a new night-time noise insulation grant scheme. ANCA acknowledges this approach and would require a scheme addressing such priorities regardless of night-time runway pattern. This is further discussed as part of Condition 3.

Consideration was given within the Application and by ANCA to the numbers of people who may experience 'very significant' effects[1] arising from the Relevant Action. This was an aspect identified by ANCA in determining the noise problem arising from the Application. When applying such considerations, the proposed pattern would reduce the number of people 'very significantly' affected however as indicated above this would be at the expense of more people overall being classed as highly sleep disturbed. When having regard for the number of people experiencing 'very significant' effects, the Application has proposed that dwellings experiencing such effects would be captured by a proposed noise insulation grant scheme. This is further discussed in Condition 3. When considering these significant effects, ANCA's own CEA indicates that the proposed runway pattern (Scenario 02, as applied) is the most cost-effective in this regard.

In general, the differences between each pattern in health terms are relatively small compared to the overall number of people forecast to be highly sleep disturbed with the key differentiator being the number of people exposed above the night-time priority value of 55 dB L_{night}. However, exposure above this value would result in eligibility to a noise insulation grant scheme.

Overall, based on the evidence provided in the Application and ANCA's own analysis, taking into account the noise insulation proposals which are discussed as part of Condition 3, ANCA has not identified any material reason in the context of the Application for why an alternative to the proposals for revising Condition 3(d) should be further considered. ANCA therefore has no objection to the proposal to modify Condition 3(d) of the North Runway Planning Permission as set out in Condition 2.

[1] "very significant": arising from forecast noise levels of at least 50dB L_{night} with the Relevant Action and a change of at least +9dB when compared with the current permitted operation in the same forecast year.

Condition 3:

A voluntary residential sound insulation grant scheme (RSIGS) for residential dwellings shall be provided as detailed in Schedule B, for all homes forecast in 2025 to be exposed to aircraft noise at or above 55dB L_{night} contour and experience a 'very significant' effect. Dwellings exposed to levels at or above 55 dB L_{night} shall be reviewed every two years commencing in 2027 and if applicable be made eligible for the scheme. This scheme shall not apply to properties where works were undertaken under the existing Residential Noise Insulation Scheme (RNIS) or Home Sound Insulation Programme (HSIP) or to properties where a planning application was lodged after 09th December 2019, the date being the adoption of Variation No. 1 to the Fingal Development Plan 2017 – 2023 incorporating policies relating to development within Aircraft Noise Zones.

REASON:

To mitigate the impact of the impact of aircraft night-time noise as a result of the use of the Airport's runways, in the interest of residential amenity and the proper planning and sustainable development of the area.

Explanation:

The NAO has set a priority of 55 dB L_{night} to reflect levels of noise exposure which presents a clear risk to human health. ANCA agrees with the proposal to provide a noise insulation scheme for eligible dwellings found to be exposed to aircraft noise at or above this threshold. Exposure to aircraft noise above this threshold occurs due to operations from both the Airport's runways and not just the North Runway arising from Condition 2. As such, a noise insulation scheme set around the priority value of 55 dB L_{night} will help mitigate the effects on those who become newly exposed to potentially harmful levels of aircraft noise, as well as those who have already been exposed to noise above this value and would continue to do so in the future.

The evidence provided with the Application is that, with the airport operating at its 32mppa passenger cap, night-time noise exposure is forecast in the Application to peak in 2025 thus effectively setting the maximum foreseeable extents of the 55 dB L_{night} contour. Forecasts in 2030, 2035 and 2040 indicate that the number of people exposed above the night-time priority value will continue to fall over the period from 2025 but before 2030 it is possible that the extent of the 55 dB L_{night} contour could be larger than forecast in 2025. The Application has proposed a bi-annual review of the eligibility to this scheme. Such a review is consistent with the requirements of Condition 10 of the North Runway Planning Permission which requires noise insulation eligibility under the existing Residential Noise Insulation Scheme[2] (RNIS) scheme to be reviewed every two years. ANCA is supportive of this approach and for the reasons outlined above has determined that the Initial Eligibility Area of the scheme shall be based on the Application's 2025 forecasts with the first bi-annual review commencing in 2027 where the situation in 2026 shall be compared to the Application's 2025 forecast and eligibility updated accordingly.

The Application has proposed a second criterion for eligibility to the proposed scheme. These criterion seek to provide noise insulation grants for those who experience a 'very significant' effect as a result of the Relevant Action. This occurs where a dwelling is forecast to experience noise exposure of at least 50 dB L_{night} and an increase in noise exposure of at least 9 dB when compared to the current permitted operation in the equivalent year. The Application has proposed that the criteria and

[2] As established under Condition 7 of the North Runway Planning Permission

subsequent eligibility will be on forecasts for the first year of the Relevant Action and would be a 'one-off' in terms of the area of eligibility and would therefore not be subject to any annual review. ANCA recognises that a scheme of this nature would help mitigate the effect of those who become newly exposed to night-time aircraft noise below the priority value. However, such criteria could result in a situation where some dwellings receive insulation at lower levels of aircraft noise exposure than others. For example, a dwelling falling under Criterion 2 may result in a noise exposure level of 53 dB L_{night}, whereas elsewhere there may be dwellings experiencing 54 dB L_{night} which is not eligible under this criterion or as a result of being exposed to noise above the priority value.

ANCA's proposed approach is to set the eligibility of this criteria having regard for the first year the relevant action comes into effect. Although there is a rationale for this, based on the forecasts in the Application, the maximum extent of the 'very significant' effects attempted to be mitigated by the proposed scheme are forecast to occur in 2025. For clarity and to ensure that the initial eligibly of the scheme as a whole is set and aligned to its intended purpose, ANCA has determined that eligibility under this criterion should be based on the 2025 forecasts in the Application, in the same way as the 55 dB L_{night} aspect of the scheme.

Unlike the existing RNIS and the Airport's Home Sound Insulation Programme (HSIP) schemes, the proposed scheme is a financial assistance grant scheme which means that insulation measures and works under the proposed scheme will be subject to a €20,000. Furthermore, the proposed scheme applies to bedrooms only rather than all other habitable rooms. ANCA has reviewed insulations schemes in place at other airports and has identified that financial assistance schemes are not uncommon and form part of policies in other jurisdictions.

Information provided in the Application suggests that the measures available under the proposed scheme, could include primary or secondary glazing, rooflights, passive vents, mechanical vents and loft insulation. Information has also been provided showing that various combinations of these measures could be provided within the €20,000 limit for dwellings with a differing number of bedrooms. This has provided ANCA with confidence that within the limit, most properties which would be eligible under the scheme can be afforded an effective package of noise insulation measures. Analysis provided in the Application, having regard for the performance of such measures under the existing RNIS scheme, indicates that an improvement in the sound insulation of bedrooms of by at least 5 dB should be achieved by measures available under the proposed scheme and within the €20,000 limit. Such improvements would help reduce external noise exposure so that bedrooms would in effect experience aircraft noise exposure less than 55 dB L_{night} priority in 2025. Over time, and through forecast further reductions in aircraft noise, many of these dwellings would become exposed to levels less than the priority.

The Application does not provide detail on how the scheme shall function. However, ANCA is of the opinion that expertise will be required to ensure that the owners of eligible dwellings are given options for the most effective package of measures available within the €20,000 limit. Such an approach is already in place for the existing RNIS scheme which was subject to the approval of Fingal County Council in 2016 and makes provision for eligible dwellings to be subject to building survey and a statement of need. ANCA has concluded that such a procedure will be required under this scheme and has outlined such in Schedule B.

ANCA recognises however that some owners may wish to improve upon the measures which are afforded under such a scheme even if this results in the cost of these exceeding the limit. ANCA therefore made provision for this in Schedule B.

For the avoidance of doubt, the noise mitigation measures detailed in Condition 3) are in addition to the property insulation and purchase schemes contained within Conditions 6-9 of ABP Ref. No. PL06F.217429 (RNIS) and the Home Sound Insulation Scheme (HSIP) relating to the 2016 63 dB $L_{Aeq\ 16hr}$ contour as given statutory effect through Section 20(2) of the Act of 2019.

In accordance with Section 34C(8)(b) of the Act of 2019, daa may, within the period 17/9/2021 to 19/10/2021, (being a period of not less than 4 weeks) make submissions or observations on the noise mitigation measures or operating restrictions, or combination thereof, and on such reasons, including counterproposals, by notice in writing given to ANCA and copied to the planning authority.

In accordance with Section 34C(9) of the Act of 2019, ANCA will apply the Balanced Approach to its consideration of any counterproposals received within the above dates, prior to making a draft regulatory decision in accordance with the provisions of Section 34C of the Act of 2000.

Yours sincerely,

Ethna Felten

Aircraft Noise Competent Authority

Also sent to:

Fingal County Council Planning and Strategic Infrastructure Department as the Planning Authority for the administrative area of Fingal.

The Commission for Aviation Regulation

Irish Aviation Authority

Enclosures: Noise Abatement Objective for Dublin Airport. Date 17th September 2021

Noise Abatement Objective Report for Dublin Airport. Date 17th September 2021

Schedule A – Requirements for the Discharge of Condition 1 (Noise Quota Scheme)

Part 1 Definitions

1.1 The following definitions shall apply with reference to the scheme described in Part 2.

Term	Meaning
EASA Noise Certification Database	means the database of noise certification levels approved by the European Union Aviation Safety Agency (EASA) and published on its website. (https://www.easa.europa.eu/domains/environment/easa-certification-noise-levels). The noise levels are established in compliance with the applicable noise standards as defined by International Civil Aviation Organisation (ICAO) Annex 16 Volume 1.
Annual Period	means the calendar year from 1 January to 31st December inclusive
Night-Time	means the hours at night between 2300 (local time) to 0700 (local time)
Noise Classification Level (NCL)	means the noise level band in EPNdB assigned to an aircraft for take-off or landing, as the case may be, for the aircraft in question for the purposes of identifying the Quota Count of the aircraft. The Noise Classification Level for an aircraft taking off from the Airport shall be taken from the Flyover Level from the EASA Noise Certification Database: $NCL(Take\text{-}Off) = EPNLdB(Flyover)$ The Noise Classification Level for an aircraft landing at the Airport shall be taken from the arithmetic average of the Lateral and Approach Levels from the EASA Noise Certification Database minus 9 dB: $NCL(Landing) = \frac{EPNL(Lateral) + EPNL(Approach)}{2} - 9\ dB$
Quota Count	means the amount of the quota assigned to one take-off or to one landing by an aircraft based on the Noise Classification Level for the aircraft having regard for engine type and take-off weight:

Noise Classification Level	Quota Count (QC)
Greater than 101.9 EPNdB	16
99-101.9 EPNdB	8
96-98.9 EPNdB	4
93-95.9 EPNdB	2
90-92.9 EPNdB	1
87-89.9 EPNdB	0.5
84-86.9 EPNdB	0.25

81-83.9 EPNdB	0.125
Less than 81 EPNdB	0

Part 2 – Noise Quota Scheme

2.1 Subject the dispensations described in Paragraph 2.2:

a. A take-off or landing at the Airport shall be determined to fall within the Noise Quota Period based on runway time

b. No aircraft with a Quota Count of 4.0 or more shall be permitted to take off at the Airport during the Noise Quota period.

c. No aircraft with a Quota Count of 2.0 of more shall per permitted to land at the Airport during the Noise Quota Period.

d. No aircraft with a Quota Count of 2.0 or more shall be permitted to take off at the Airport during the Noise Quota Period from 1 January 2030

e. No aircraft with a Quota Count of 1.0 or more shall be permitted to land at the Airport during the Noise Quota Period from 1 January 2030

f. Each aircraft landing at or taking off from the Airport during the Noise Quota Period will be assigned a Quota Count based on their Noise Classification Level

g. The Noise Quota at the Airport shall be limited to 16,260 for the Annual Period

2.2 The restrictions set out in Paragraph 2.1 shall not apply in any of the following dispensations:

a. Where a take-off or landing of any aircraft at the Airport is made in an emergency, where there is an immediate danger to life or health, whether human or animal.

b. Where a take-off or landing of any aircraft at the Airport occurs as a result of a delay to that aircraft which is likely to lead to serious congestion at the Airport and/or serious hardship or suffering to passengers or animals.

c. Where a take-off or landing of any aircraft at the Airport occurs as a result of widespread and prolonged disruption of air traffic.

d. Flights for military, medical or humanitarian purposes or otherwise granted exemption by the Irish Government

Part 3 – Night Quota Scheme Reporting Requirements

3.1 The Airport shall submit quarterly reports to the planning authority on its implementation of the Night Quota Scheme. The reports shall include:

a. The number of aircraft operating during the Noise Quota Period and their type, including technical details including their engines and take-off weights, where applicable;

b. The Quota Count assigned to aircraft operating in the Noise Quota Period;

c. The total Noise Quota used during the quarter and in the Annual Period to date;

d. The total Noise Quota used by Quota Count in the quarter and in the Annual Period to date; and

e. Details of any dispensations pursuant to Paragraph 2.2.

3.2 The quarterly reports shall be issued so that:

a. The first quarterly report considering activity over the period 1 January to 31 March each year is published by no later than the 30 June each year

b. The second quarterly report considering activity over the period 1 April to 30 June each year is published by no later than the 30 September each year

c. The third quarterly report considering activity over the period 1 July to 30 September each year is published by no later than the 31 December each year

d. The fourth quarterly report considering activity over the period 1 October to 31 December each year is published by no later than the 31 March the following year

Part 4 – Noise Performance Reporting

3.1 The Airport shall issue annual reports to the planning authority on its noise performance. The report for the previous Annual Period shall be published by no later than 31 March each year and comprise of:

a. Noise exposure statistics and contours as required to facilitate performance review of the Noise Abatement Objective including as a minimum:

- Annual 55dB L_{night}
- Annual 65dB L_{den}
- through the number of people 'highly sleep disturbed' and 'highly annoyed' in accordance with the approach recommended by the World Health Organisation's Environmental Noise Guidelines 2018 as endorsed by the European Commission through Directive 2020/367, taking into account noise exposure from 45 dB L_{den} and 40 dB L_{night}.
- Annual L_{night} contours from 40 dB in 5 dB increments
- Annual L_{den} contours from 45 dB in 5 dB increments
- Summer 60 dB $L_{Aeq,\ 16hr}$ and 63 dB $L_{Aeq,\ 16hr}$ (measured averaged across 92-day summer period from 16th June to 15th September).

b. Any residential properties that have benefits and are eligible for and yet to benefit from the Airport's noise insulation schemes.

c. Key Statistics with respect to aircraft operations in the preceding Annual and Summer Periods including but not limited to:

- aircraft movements including average hourly movements
- use of the Night Quota Scheme
- movements by aircraft type
- passenger numbers
- aircraft destinations
- flight routings
- runway use

d. Summaries from noise monitoring terminals for the Airport

e. Details of all noise modelling undertaken in support of the Noise Performance Reporting describing compliance with the methodology set out in Directive 2015/996 (ECAC Doc.29 4th Edition). All noise modelling shall be validated using local noise and track keeping performance data from the Airport's systems.

f. Summary of complaints records for the preceding Annual Period categorised by the:
- location of complaints; and
- reason for complaint

g. Details of any anticipated changes or developments that may affect noise at the Airport in the current year, through for example airspace change or fleet modernisation.

Schedule B – Requirements for the Residential Sound Insulation Grant Scheme (RSIGS)

Part 1 Definitions

1.1 The following definitions shall apply with reference to the scheme described in Part 2.

Term	Meaning
Airport	daa PLC
Bedroom	A room within an Eligible Dwelling which is used as sleeping accommodation and meets the requirements of the Building Regulations for that purpose.
Initial Eligibility Area	The initial area of eligibility to the scheme based on the following information as provided with the Application (adjusted to accommodate local land boundaries that would be bisected by the contours). A combined contour shall be prepared for: - The area enclosed by the 55 dB L_{night} contour based on 2025 Scenario 02 noise exposure data provided by the Applicant to ANCA on 18 June 2021 - The area exposed to 50 dB L_{night} as a result of Relevant Action and an increase in noise exposure of at least 9dB compared to the situation in 2025 by comparing 2025 Scenario 02 to 2025 Scenario 01 as provided by the Applicant to ANCA on 18 June 2021. A combined contour shall be prepared by ANCA for the initial eligibility area.
Competent Surveyor	Means a surveyor considered competent and appropriately qualified to inspect and determine relevant information in relation to the existing construction and elements of an Eligible Dwelling for the purposes of undertaking an Elemental Analysis as defined in Part 5, Step 5.
Approved Contractor	Means a contractor procured and managed by the Airport and considered competent and appropriately qualified and have suitable levels of insurance coverage to install the sound insulation measures described in Part 4 in line with acceptable standards and in compliance with the Building Regulations.
Review Contour	The extents and supporting data for the 55 dB L_{night} contour representative of noise exposure in the previous calendar year of the bi-annual review, as agreed by ANCA
The Relevant External Noise Level	This is the noise exposure level at the dwelling underpinning its eligibility as defined by the data used to determine the Initial Eligibility Area or the Review Contour.
Target Performance	means an improvement of at least 5 dB, where feasible, in the sound insulation of each bedroom of the Eligible Dwelling. Where

	possible, the guidelines recommended in BS8233:2014 for internal ambient noise levels shall be targeted.
Statement of Need	The recommended measures identified from those available under the scheme as outlined in Part 4
The Grant	means a financial assistance grant of up to and limited to €20,000 (index linked) towards the costs of noise insulation measures to made available to Eligible Dwellings by the Airport through the Approved Contractor
Index linked	means Consumer Price Index (CPI)

Part 2 – Purpose of the Scheme

2.1 The purpose of the scheme is to provide financial assistance in the form of a financial assistance grant of up to and limited to €20,000 (index linked) towards the costs of noise insulation measures to Eligible Dwellings located within the Initial Eligible Area and as may be the case through bi-annual review through the Review Contour as described in Paragraph

2.2 The financial assistance provided under the scheme applies to bedrooms and properties may qualify only once under this scheme.

2.2 Where a dwelling is eligible under this scheme but is also eligible for insulation under the Residential Noise Insulation Scheme (RNIS) and the Home Sound Insulation Programme (HSIP) best endeavours shall be made to ensure that the dwelling receives insulation under RNIS and HSIP instead of this scheme.

Part 3 – Eligibility

3.1 Eligible Dwellings under this scheme are determined as follows:

a. The property is used as and where a planning application was lodged after 09th December 2019, the date being the adoption of Variation No. 1 to the Fingal Development Plan 2017 – 2023 incorporating policies relating to development within Aircraft Noise Zones.

b. Has not benefitted from noise insulation previously under this scheme;

c. Has not benefitted from noise insulation under either the RNIS or HSIP schemes previously;

d. Is located within the Initial Eligibility Area contour.

3.2 From the 31 March 2027 and every two years thereafter, where the extents of the Review Contour is found to exceed the extents of the Initial Eligibility Area, any dwellings fulfilling the provisions of Paragraph 3.1(a)-(c) inclusive shall be considered Eligible Dwellings under the scheme.

Part 4 – Measures available under the Scheme

4.1 The owner of an Eligible Dwelling in accordance with Part 3 and following the procedure described in Part 5 will may benefit from a selection of insulation measures as specified in Paragraphs 4.2 to 4.8 below as is determined.

4.2 The insulation measures referred to in Paragraph 4.1 must be installed by an Approved Contractor and comprise of the following unless the equivalent measure already exists within the Eligible Dwelling:

a. Primary Acoustic Glazing
b. Secondary Acoustic Glazing
c. Glazing Roof Light
d. Passive Ventilator
e. Mechanical Ventilator

f. Loft Insulation
g. Ceiling Overboarding

4.3 The specification of the sound insulation measures provided under this scheme shall generally comply with the specification of the measures in place under the RNIS scheme, as is summarised below.

4.4 Where secondary acoustic glazing is to be installed, this shall generally meet the following specification, namely, 6.4mm laminated glass with minimum 100mm gap from the primary glazing unit. However, where this is not possible, the secondary glazing should be provided to account for the below variations.

Thickness of Glazing of the Inner Window	Minimum Horizontal Distance
Less than 4 mm and not less than 3 mm thick	200 mm
Less than 6 mm and not less than 4 mm thick	150 mm

4.5 Where secondary glazing is being installed reasonable endeavours will be made to repair the draft seals, catches and hinges to provide and air-tight seal on the existing primary glazing unit.

4.6 Where a replacement primary acoustic glazing is to be provided, this shall achieve a minimum R_w of 43 dB tested and rated to BS EN ISO 140-3 and BS EN ISO 717.

4.7 Where ventilators (passive or mechanical) are to be provided, a ventilation strategy for each building shall be determined in accordance with Part F of the Building Regulations. Mechanical ventilation shall comprise of a ventilator unit consisting of a controlled variable- speed inlet fan with sound attenuating duct and cover that is capable of supplying fresh air to the room directly from outside by means of the supply duct and cowl (or grille).

4.8 Where no loft insulation is present 200mm of fibrous acoustic insulation will be placed between ceiling joists, the insulation is to have a minimum density of 80kg/m3. Where insulation is already present but found to be unsatisfactory additional layers of insulation will be added to increase the total thickness to 200mm.

4.9 Ceiling overboarding shall comprise of a continuous layer of mass to provide at least 12kg/m2 added above joists in attic, for example 22mm plywood (or similar approved). In the event that this is not possible due to inaccessibility or other practical reasons, loft Insulation or loft boards cannot be installed, ceiling overboarding shall comprise a dense plasterboard with a total minimum surface mass of 12 kg/m^2, i.e. 15mm SoundBloc (or similar approved).

Part 5 – Procedure

5.1. The procedure set out in this Part is based on the procedure in place in the discharge of the Airport's its obligations under Condition 7 of the North Runway Consent, as is employed as part of the RNIS.

Step 1 – Determine Eligibility - The Eligible Dwelling shall be identified as per Part 3 of this Schedule.

Step 2 – Notification of Eligibility - The Owner of the Eligible Dwelling shall be notified of their eligibility under the scheme within three months of their eligibility being determined under Step 1.

Step 3 – Determine Relevant External Noise Level - The Relevant External Noise Level at the Eligible Dwelling shall be determined

Step 4 – Undertake Building Survey – The Airport shall use reasonable endeavours to arrange for the Eligible Dwelling to be inspected by the Competent Survey (and secure the necessary agreement to this from the owner of the eligible dwelling) within three months of eligibility being determined to record relevant information. The building survey shall be carried out by a Competent Surveyor appointed on behalf of the Airport. The survey shall record the location and number of Bedrooms, and for each Bedroom record the following relevant information:

- External wall constructions - where possible the construction type of the external walls will be recorded for example wall composition including inner leaf, cavity, and external leaf dimensions including all associated building materials;
- Window type – e.g. frame material, single glazing, double glazing, including key dimensions;
- Roof construction – including where possible roof construction type
- Details of chimneys and fireplaces
- Ventilation paths – e.g. existing wall and floor vent types, quantities and dimensions
- Details of any existing sound insulation measures which have been installed previously
- Dimensions of all rooms including window, roof and wall dimensions
- Drawings and/or floor plans – if these are available from the owner
- Photographic records of the building

Step 5 – Elemental Analysis - An elemental analysis shall be undertaken to provide a technical assessment of the noise insulation for the Eligible Dwelling. The following process shall be followed:

a. The existing sound insulation properties of each Bedroom shall be established
b. The anticipated future internal noise levels within each Bedroom having regard for the Relevant External Noise Level, presenting in octave bands scaled from measurements taken around the Airport, and the existing noise insulation performance obtained from Step a.
c. A comparison shall be made between the anticipated internal noise level to the BS8233:2014 Targets for internal ambient noise;
d. An assessment is undertaken to determine the required improvement in the noise insulation performance, having regard for the Target Performance.

e. Through an elemental analysis, the most effective combination of measures set out in Part 4 having regard for the Target Performance and the financial assistance grant shall be identified.

Step 6 – Statement of Need - A Statement of Need shall be prepared for each Eligible Dwelling. The Statement of Need will be a bespoke document for each Eligible Dwelling. The Statement of Need shall:

a. Describe the existing sound insulation performance for each Bedroom having regard for the Building Survey as described in Step 4
b. Identify the potential improvement in the existing sound insulation performance for each Bedroom as can be afforded within the Grant and whether the Target Performance can be met
c. Set out the recommended set of measures for the Eligible Dwelling in the form of a schedule of works and the associate measures on a bedroom-by-bedroom basis
d. Provide an opinion on the future internal noise level following the implementation of the noise insulation works and the ability of the works to the meet Target Performance.

The Statement of Need shall be issued to the owner of the Eligible Dwelling.

Step 7 – Acceptance - Subject to the owner of the Eligible Dwelling agreeing to the scope of works as defined under the Statement of Need, the engagement of the Approved Contractor and access to the dwelling by the Approved Contractor for the purposes of undertaking the works, the Airport will use reasonable endeavours to procure that the Approved Contractor undertakes the scope of works within three months of the owner's agreement to the same.

Step 8 – Works – The scope of works as defined by the Statement of Need shall be undertaken by the Approved Contractor. The Airport shall procure so that the Approved Contractor uses reasonable endeavours to protect landscaping and gardened areas and all other property within each eligible dwelling and takes all reasonably necessary precautions to protect the existing structures, finishes, fittings and all other property within each eligible dwelling from weather and any other damage caused by or during the works. The Airport shall procure so that the Approved Contractor uses reasonable endeavours to ensure that the works are undertaken to the necessary standards and in compliance with the necessary regulations. The Approved Contractor shall photograph the Eligible Dwelling before and after the works for record purposes.

5.2 In the event that a property owner declines to accept the scope of works as defined under the Statement of Need (Step 6) the Airport shall make a grant available towards the costs of sound insulation measures through the Approved Contractor equal to the cost of the measures identified through the Statement of Need. This grant may be used by the owner to request alternative measures providing they as a minimum meet the Target Performance. Where the alternative measures are calculated to cost more than cost of the measures identified through the Statement of Need, any difference shall be at the expense of the owner.

5.3 In the event that a property owner wishes to appoint their own competent contractor, the Approved Contractor will provide a specification for the works. The property owner must provide a written quotation from their competent contractor for approval by the Airport. Following approval, the property owner shall be responsible for managing the works and making payments to their contractor. Upon completion of the works, the Airport will carry out an inspection and issue payment to the property owner. Where works are not carried out in accordance with the approved specification, payment will not be made by the Airport.

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Joe Mahon
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12 October 2021
[By Email & Express Post]

Re: Notice of proposed noise mitigation measures and operating restrictions pursuant to Section 34C(8) of the Planning and Development Act 2000 (the Act of 2000), as amended, that ANCA proposes to direct the planning authority to include in the planning authority's decision, if any, to grant permission pursuant to planning application F20A/0668 for a proposed relevant action (Section 34C of the Act of 2000) to amend/replace operating restrictions set out in conditions no. 3(d) & no. 5 of the North Runway Planning Permission (FCC Ref: No: F04A/1755, ABP Ref. No.: PL06F.217429) as well as proposing new noise mitigation measures

Dear Joe,

Tom Phillips + Associates (TPA) continues to act on behalf of daa plc (the Applicant) in relation to the above referenced proposal as part of a multi-disciplinary project team including AECOM, Bickerdike Allen Partners (BAP), Ricondo, Mott MacDonald, InterVISTAS and Anderson Acoustics.

Thank you for your recent correspondence dated 17th September 2021 setting out ANCA's proposed draft regulatory decision under Section 34C(10) of *the Act of 2000,* arising from the Applicant's application under that section (the Relevant Action application).

In addition to ANCA's proposed draft regulatory decision, we note that the *Noise Abatement Objective for Dublin Airport, Date 17th September 2021* and *Noise Abatement Objective Report for Dublin Airport, Date 17th September 2021* have also been provided.

The Applicant has long been advocating for the implementation of EU Regulation 598 of 2014, which has been brought into effect by way of the Aircraft Noise (Dublin Airport) Regulation Act 2019 (the "2019 Act") and which now brings Ireland in step with European regulations on aircraft noise. In that regard, the development of a Noise Abatement Objective for Dublin Airport, in line with the aircraft

noise regulation process set out in the 2019 Act and the application of the Balanced Approach thereunder is a significant milestone now achieved. The Applicant intends to provide feedback on the draft NAO through the public consultation process as provided for in the 2019 Act.

In terms of the proposed regulatory decision, the Applicant has reviewed ANCA's correspondence and notes that whilst there are points of commonality, there are some significant points where ANCA has opted not to approve the approach as advocated for by the Applicant. Whilst it is considered that the Relevant Action application as submitted to the planning authority provides for an outcome that equally achieves the 'Balanced Approach' pursuant to Section 9(2) of the 2019 Act, it is disappointing that ANCA's proposed approach introduces an 8-hour quota count restriction which is not the case at European airports where similar quota count schemes are in place and are more in line with the 6.5-hour period proposed by the Applicant.

However, notwithstanding the above the applicant does not wish to put forward any counter proposals at this juncture.

The Applicant does wish to make the following observations and requests for clarification in relation to the above referenced material:

Condition 1

The existing operating restriction, Condition 5, of North runway Planning Permission (FCC Reg. Ref: F04A/1755; ABP Ref: PL06F.217429) reading as:
On completion of construction of the runway hereby permitted, the average number of night time aircraft movements at the airport shall not exceed 65/night (between 2300 hours and 0700 hours) when measured over the 92 day modelling period as set out in the reply to the further information request received by An Bord Pleanála on the 5th day of March, 2007.

shall be revoked and replaced with an annual night quota scheme operating restriction as follows:

The airport shall be subject to a Night Quota Scheme (NQS) with an annual limit of 16,260 between the night-time hours of 2300hrs and 0700hrs (local time) with noise related limits on aircraft permitted to operate at night. The annual noise scheme shall be applied as detailed in Schedule A.

REASON
To limit the impact of the aircraft noise at Dublin Airport on sleep disturbance in the interest of residential amenity and to ensure the effective implementation of the Noise Abatement Objective for Dublin Airport by means of a noise-related limit on aircraft operations.

daa Submission

The Applicant welcomes the proposed revocation of Condition 5 and its replacement with a noise-based limit in the form of a Night Quota Scheme (NQS). The Applicant agrees that the replacement of Condition 5 with an NQS will ensure effective implementation of the Noise Abatement Objective. However, as referenced in the Relevant Action application, the Applicant is of the view that a restriction on the full eight-hour period of night is not the most appropriate means to achieve this.

As stated in the Relevant Action application, demand for night flights between 23:00 and 07:00 is driven mainly by short haul services operated by aircraft based at Dublin. In order to achieve the high levels of aircraft utilisation necessary for airline competitiveness, Dublin-based aircraft such as those operated by Aer Lingus and Ryanair tend to operate with first departure between 06:00 and 07:00 and last arrival after 23:00. Other 23:00 to 07:00 period flights are long haul arrivals in the early morning, and a small number of cargo flights mainly operated by the time-critical package delivery integrators (e.g., FedEx, DHL, TNT and UPS).

The one-hour time difference between Ireland and mainland Europe means that flights need to leave early (before 07:00) to arrive in time for business passengers to have a full working day at their destination.

The geographical position of Dublin Airport means that there are longer distances to many European destinations than from other European hubs. This means that Dublin Airport requires longer operating days than competing European hubs. Similarly, Dublin Airport's shorter flight time to North America compared to the rest of Europe means that transatlantic flights arrive earlier in Dublin than at other European airports.

Dublin Airport is also unusual in that the operating restrictions of the North Runway Planning Permission (Conditions 3d and 5) include a peak hour of demand for departures at the airport, being 06:00-07:00.

The Relevant Action application proposed an NQS for the period 23:30 hrs to 06:00 hrs (known as the Night Quota Period) which is consistent with airports operating similar QC based systems.

The eight-hour NQS as proposed by ANCA is not in accordance with NQS in other airports. Whilst it is recognised that the NQS aligns to the eight-hour night period as defined in WHO guidance and EU policy, to our knowledge there are no examples where such a restriction is imposed at any other airports in Europe. Other airports and jurisdictions do define their night over an eight-hour period, but operating restrictions (where they exist) are imposed on subsets of the night-period. The Applicant considers that there is little or no precedent for having restrictions apply across the full eight-hour night period. The Applicant is of the opinion that the 6.5-hour NQS as proposed in the relevant action is the most appropriate balance for such an NQS.

In terms of the proposed noise related limits on aircraft permitted to operate at night, the Applicant also considers that the period of these proposed restrictions is not in accordance with similar restrictions at other airports, where these types of restrictions are typically implemented over a sub-set of the eight-hour night period. The applications of such restrictions throughout the full eight-hour night period may disproportionately affect certain operators and may unfairly limit their ability to operate a service at Dublin Airport.

We have some observations with regards to the Noise Quota Scheme (NQS) implementation phase as set out in Schedule A. Please see details of these in the below Observations on Schedule A and B.

Condition 2

The existing operating restriction imposed by Condition 3(d) and the exceptions at the end of Condition 3 of the North Parallel Runway Permission (FCC Reg. Ref: F04A/1755; ABP Ref: PL06F.217429) reading: Runway 10L-28R shall not be used for take-off or landing between 2300 hours and 0700 hours, except in cases of safety, maintenance considerations, exceptional air traffic conditions, adverse weather, technical faults in air traffic control systems or declared emergencies at other airports.

shall be amended as follows:

Runway 10L-28R shall not be used for take-off or landing between 0000 hours and 0600 hours except in cases of safety, maintenance considerations, exceptional air traffic conditions, adverse weather, technical faults in air traffic control systems or declared emergencies at other airports or where Runway 10L-28R length is required for a specific aircraft type.

daa submission

The Applicant notes that ANCA has undertaken an independent cost effectiveness assessment and taking into account the noise insulation proposals discussed in Condition 3, ANCA has not identified any material reason why an alternative to the proposals for revising Condition 3(d) should be further considered. The Applicant notes and accepts the proposed amendments to Condition 3(d).

The Applicant would however seek one clarification in respect of the proposed Condition 2. The Applicant had requested that any condition make clear that time period during which Runway 10L-28R could not be used, should be 0000 to 0559, in order that Runway 10L-28R could be used starting at 0600. Can ANCA please confirm that Runway 10L-28R could be used from 0600 and that the draft proposed restriction would not apply in any of the 0600 hour. This will allow for more efficient scheduling for runway use.

Condition 3

A voluntary residential sound insulation scheme (RSIGS) for residential dwellings shall be provided as detailed in Schedule B, for all homes forecast in 2025 to be exposed to aircraft noise at or above 55dB L_{night} contour and experience a 'very significant' effect. Dwellings exposed to levels at or above 55dB L_{night} shall be reviewed every two years commencing in 2027 and if applicable be made eligible for the scheme. This scheme shall not apply to properties where works were undertaken under the existing Residential Noise Insulation Scheme (RNIS) or Home Sound Insulation Programme (HSIP) or to properties where a planning application was lodged after 09th December 2019, the date being the adoption of Variation No.1 to the Fingal Development Plan 2017-2023 incorporating policies relating to development within Aircraft Noise Zones.

daa submission

The Applicant notes that ANCA agrees with the proposal for a noise insulation grant scheme based on 55 L_{night} threshold and the Applicant accepts that the eligibility for the scheme will be reviewed every two years commencing in 2027.

The Applicant also notes ANCA comments on the proposed eligibility based on 'very significant' effects. The Applicant has no objection to the year of eligibility for this being set at 2025.

The Applicant has reviewed the Initial Eligibility Area requirements as presented in Schedule B, Part 1 Definitions and is in the process of preparing a combined contour for the purposes of illustrating the likely extent of eligibility for the scheme based on these criteria. The contour is being prepared and will be adjusted to accommodate local land boundaries that would be bisected by the contour. The combined eligibility contour will be issued to ANCA prior to the 17th October.

We have some observations with regards to the implementation phase of the scheme as set out in Schedule B. Please see details of these in the below Observations to Schedule A and B.

Observations to Schedule A and B

Schedule A, Part 1 Definitions:
'Noise Classification Level (NCL)'

The Applicant wishes to request clarification of the Noise Classification level definition presented.

The definition of Noise Classification Level (NCL) in *Schedule A* states the following:

NCL(Take-Off) = EPNLdB(Flyover)
NCL(Landing) = $EPNL(Lateral)$+$EPNL(Approach)$/2 – 9 dB

Could ANCA please clarify if this should read:

NCL(Take-Off) = $EPNL$(Flyover)+$EPNL(Lateral)$/2
NCL(Landing) = EPNL(Lateral) – 9 dB

Part 2 – Noise Quota Scheme and Part 3- Night Quota Scheme Reporting Requirements:

The Applicant is cognisant that under the 2019 Act, Operating Restrictions can only take effect after the notification period in Article 8 of EU Regulation 598 of 2014 is complied with. The Applicant expects that ANCA will take account of these obligations in setting a commencement date for any Operating Restrictions, reflecting the need to comply with such obligations, and the need for restrictions to be applied from the commencement of a scheduling period.

This would also allow the airport and airlines prepare for the introduction of any operating restrictions for that season as opposed to the beginning of the calendar year and would also allow the slot coordination process take account of such restrictions more effectively.

This issue would equally apply to the introduction of the annual quota count i.e that this is introduced at the beginning of a season and not the beginning of a calendar year. Starting this at the beginning of an IATA season (or close to the beginning, e.g. April 1st) as opposed to a calendar year would be in line with other airports which have a similar scheme. It will also ensure it is aligned with the seasonal slot coordination process, of which the night quota count will become a part of, and removes the complexity of managing this over three seasons each year. In accordance with Part 3.1, the Airport would submit quarterly reports to the planning authority on the implementation of the Night Quota Scheme thereafter.

Schedule B

'Part 1.1'

In terms of implementation of the scheme the Applicant wishes to make the following observations.

'Part 2, Paragraph 2.1', should the term 'bi-annual review' be 'biennial review' to correspond with the requirements of Condition 3.

- 'Part 3.1' states that **eligible dwellings under this scheme are** determined as follows:
  a. *'The property is used as and where a planning application was lodged **after** 09th December 2019'.* (our emphasis)

  Whereas Condition 3 of the ANCA Notice states:

  '*This scheme **shall not** apply to properties…..where a planning application was lodged **after** 09th December 2019'. (our emphasis)*

Can ANCA please clarify Part 3.1a and confirm that the intention is that the scheme does not apply to properties where the planning application was lodged after 09th December 2019.

'Part 5.1'

- 'Step 2 – Notification of Eligibility' requires the Applicant to notify property owners of their eligibility under the scheme within three months of their eligibility being determined under Step 1. If this period is intended to include the time required to obtain all Eligible Dwelling property owner details, including Land Registry Ireland searches and the preparation of all property owner correspondence, the Applicant is concerned that this timeline is unworkable. The Applicant would suggest that a six-month timeline would be more appropriate.

- 'Step 4 – Undertake Building Survey', requires the Applicant to have the Eligible Dwelling inspected by the Competent Surveyor within three months of eligibility being determined. Based on the Applicant's experience of the Residential Noise Insulation Scheme (RNIS), it will not be possible to gain all owners agreement to survey within three months of notifying of eligibility. During implementation of the RNIS, several information meetings were held with eligible homeowners which afforded the opportunity to explain the insulation scheme, show typical product samples and answer any technical questions homeowners had relating to their individual dwellings. The Applicant requests this timeline be six months in order to undertake similar engagement with eligible homeowners, so they are fully informed.
  In addition, please can ANCA clarify 'Dimensions of all rooms…' applies to bedrooms only?

- 'Step 7 – Acceptance' requires the Applicant to use reasonable endeavours to procure that the Approved Contractor undertakes the scope of works within three months of the owner's agreement to the same. The Applicant has reviewed this timeline against the possible requirement to provide sound insulation measures for a significant number of dwellings and considers it unachievable.

  The Applicant received extensive feedback from participants in the RNIS, both before and after approval of that Scheme, regarding the importance of aesthetics in replacement of external windows and doors. As the proposed scheme relates to bedrooms, most if not all

households (particularly single-storey dwellings) may seek to replace the remaining windows at their own expense during the installation works.

In this regard, the Applicant suggests that the proposed scheme allows for the eligible participating household to engage their own suitably qualified contractor (or select from a list of contractors that have been selected and vetted by the Applicant) to undertake the works contained in the Statement of Need.

On completion of works, the Applicant would then undertake an inspection of the insulation measures in bedrooms and will pay the grant amount to the participating homeowner provided that the completed works meet the required standard and specification. By employing this approach, the participating homeowner is given the flexibility to undertake the works at a cost and time which is suitable to their individual circumstances, whilst availing of the grant.

The Applicant believes that this approach will also allow for works to be delivered to all eligible participating dwellings in a shorter timeframe than that which could be achieved by the Applicant, whilst simultaneously ensuring the standards as specified in the Statement of Need are achieved, thus delivering the aim of the proposed scheme.

Should Step 7 be revised by ANCA as per this suggestion, then Step 8, Part 5.2 and 5.3 would no longer be relevant.

We look forward to ANCA's consideration of the above observations, and as no counterproposals have been made, the Applicant trusts ANCA will be in a position to issue a draft regulatory decision without undue delay. Should you have any queries in relation to the above please feel free to contact the undersigned.

Yours sincerely

_____

Gavin Lawlor
Director
Tom Phillips + Associates
cc. Fingal Planning Department, Martin Doherty daa plc

Residential Sound Insulation Grant Scheme (RSIGS); Relevant Action proposed eligibility areas

Criteria 1 Dwellings: The dwellings within the area enclosed by the 55 dB L_{night} contour based on 2025 Scenario 02 noise exposure data provided by the Applicant to ANCA on 18 June 2021; and

Criteria 2 Dwellings: The dwellings within the area exposed to 50 dB L_{night}, as a result of Relevant Action and an increase in noise exposure of at least 9 dB compared to the situation in 2025 by comparing 2025 Scenario 02 to 2025 Scenario 01 as provided by the Applicant to ANCA on 18 June 2021.

Where the eligibility contour bisects a local land boundary, the contour has been amended to reflect this.

N

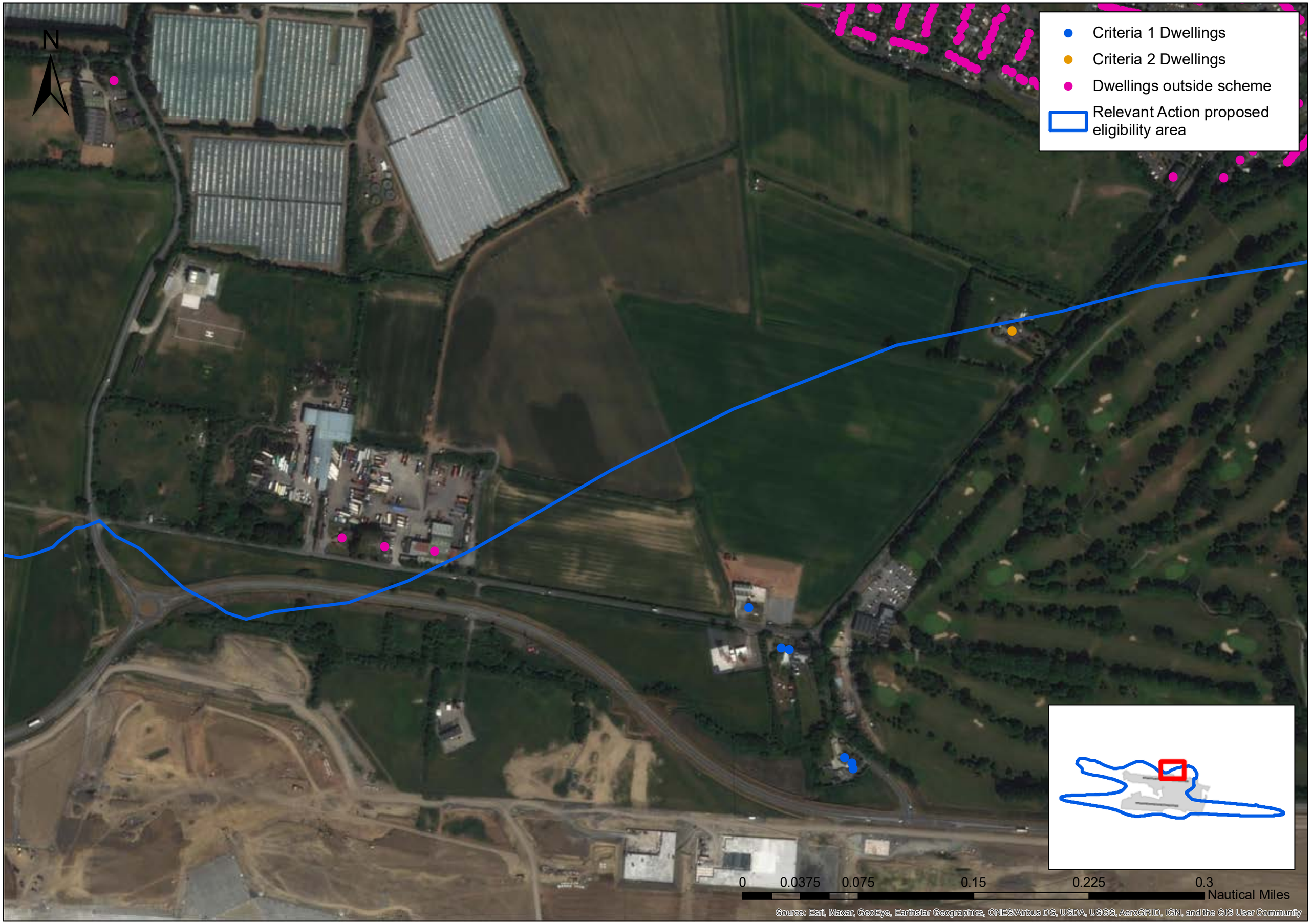
Criteria 1 Dwellings

Criteria 2 Dwellings

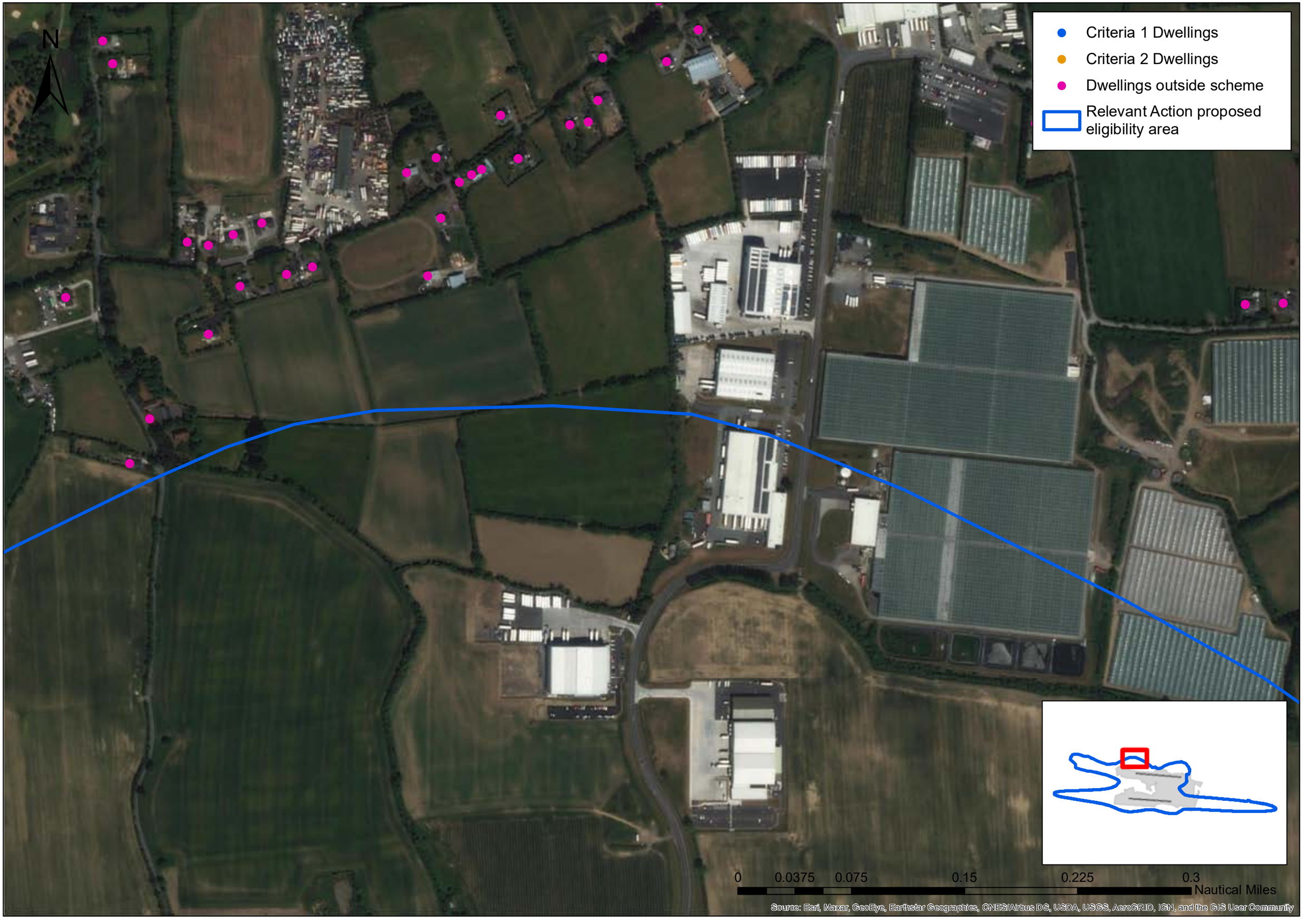
Relevant Action proposed eligibility area

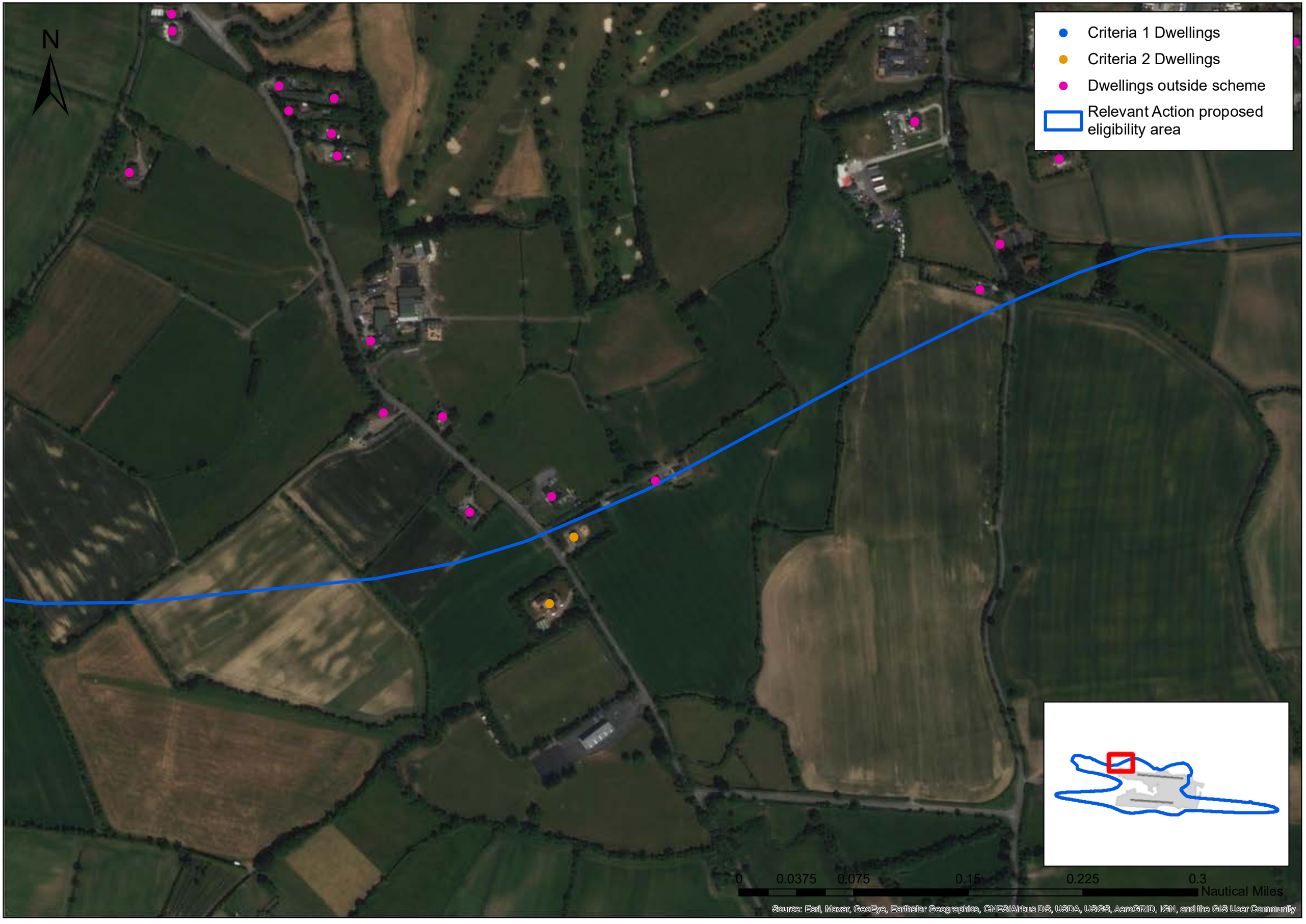
0 1.5 3 6 9 12

Nautical Miles


N
Criteria 1 Dwellings
Criteria 2 Dwellings
Dwellings outside scheme
Relevant Action proposed eligibility area
0
0.0375
0.075
0.15
0.225
0.3
Nautical Miles
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community


N
Criteria 1 Dwellings
Criteria 2 Dwellings
Dwellings outside scheme
Relevant Action proposed eligibility area
0
0.035
0.07
0.14
0.21
0.28
Nautical Miles
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community


N
Criteria 1 Dwellings
Criteria 2 Dwellings
Dwellings outside scheme
Relevant Action proposed eligibility area
0
0.0375
0.075
0.15
0.225
0.3
Nautical Miles
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community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Criteria 1 Dwellings
Criteria 2 Dwellings
Dwellings outside scheme
Relevant Action proposed eligibility area
0
0.0375
0.075
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0.225
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Nautical Miles
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community


N
Criteria 1 Dwellings
Criteria 2 Dwellings
Dwellings outside scheme
Relevant Action proposed eligibility area
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Nautical Miles
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

N

Criteria 1 Dwellings
Criteria 2 Dwellings
Dwellings outside scheme
Relevant Action proposed eligibility area

0 0.0375 0.075 0.15 0.225 0.3
Nautical Miles

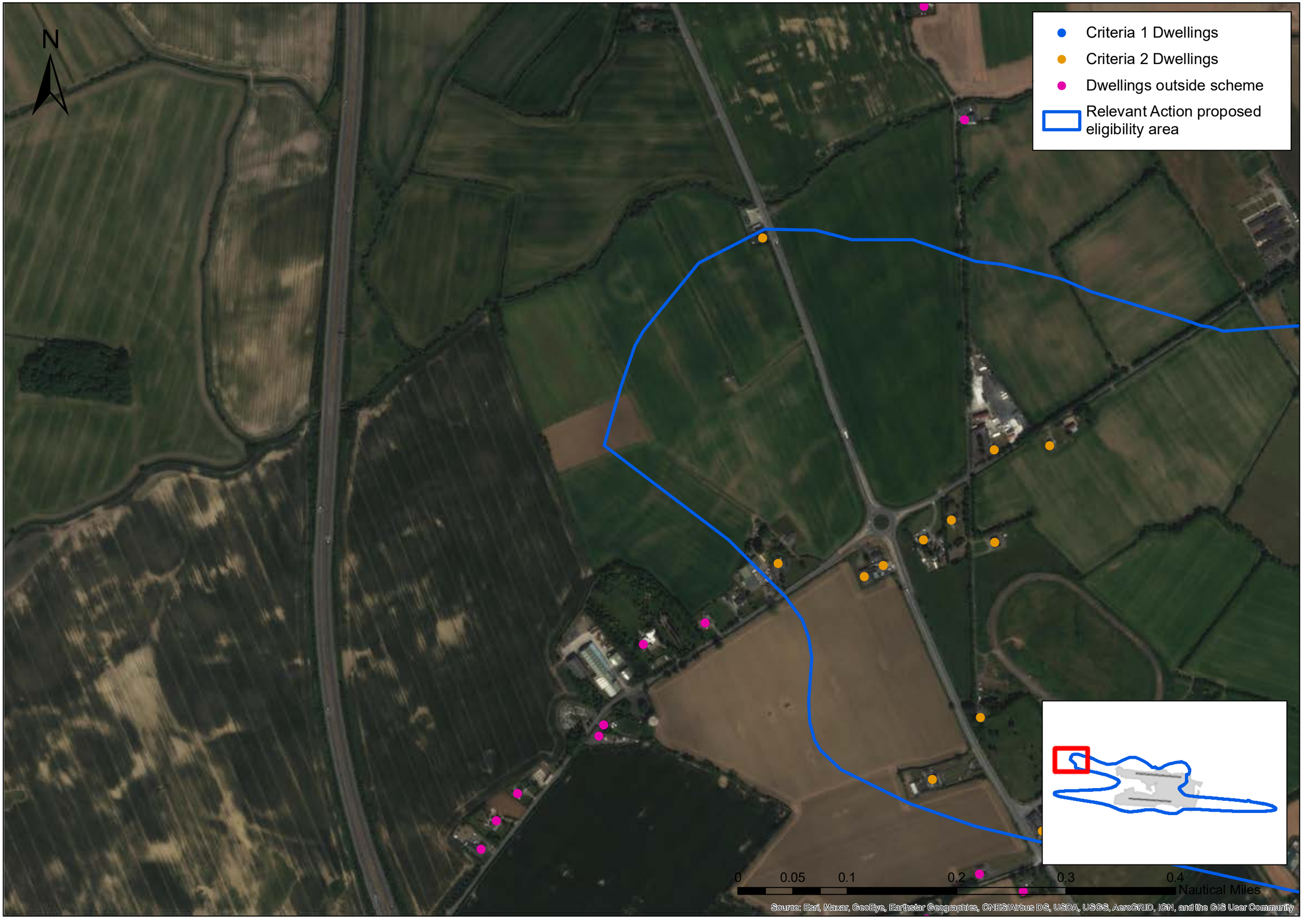
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

N

Criteria 1 Dwellings
Criteria 2 Dwellings
Dwellings outside scheme
Relevant Action proposed eligibility area

0 0.0375 0.075 0.15 0.225 0.3
Nautical Miles

Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community


N
Criteria 1 Dwellings
Criteria 2 Dwellings
Dwellings outside scheme
Relevant Action proposed eligibility area
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Nautical Miles
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community


N
Criteria 1 Dwellings
Criteria 2 Dwellings
Dwellings outside scheme
Relevant Action proposed eligibility area
0
0.045
0.09
0.18
0.27
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Nautical Miles
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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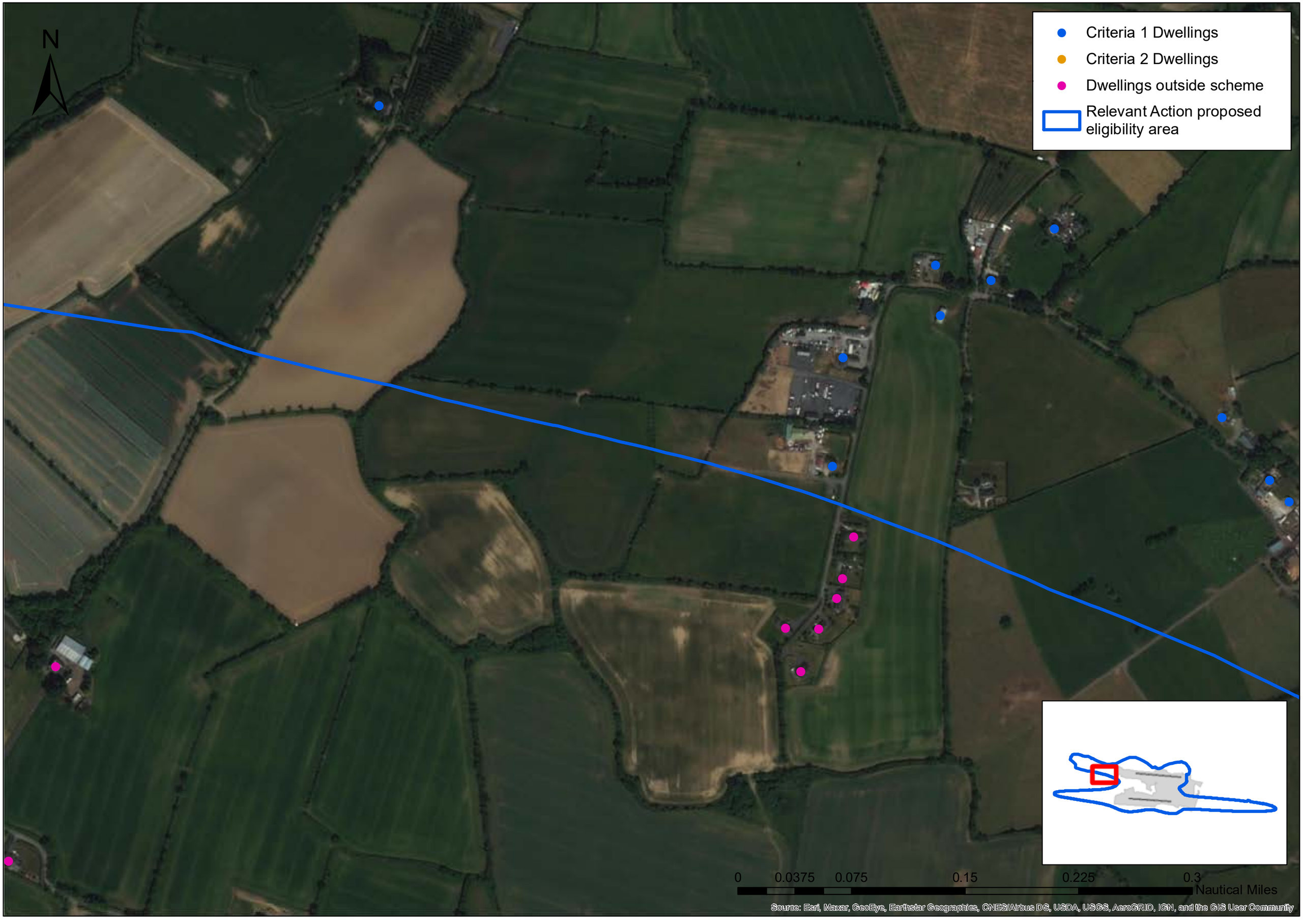
Criteria 1 Dwellings
Criteria 2 Dwellings
Dwellings outside scheme
Relevant Action proposed eligibility area

0 0.0375 0.075 0.15 0.225 0.3
Nautical Miles

Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community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Criteria 1 Dwellings
Criteria 2 Dwellings
Dwellings outside scheme
Relevant Action proposed eligibility area
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Nautical Miles
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community


N
Criteria 1 Dwellings
Criteria 2 Dwellings
Dwellings outside scheme
Relevant Action proposed eligibility area
0
0.0425
0.085
0.17
0.255
0.34
Nautical Miles
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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Criteria 1 Dwellings
Criteria 2 Dwellings
Dwellings outside scheme
Relevant Action proposed eligibility area

0 0.0375 0.075 0.15 0.225 0.3
Nautical Miles

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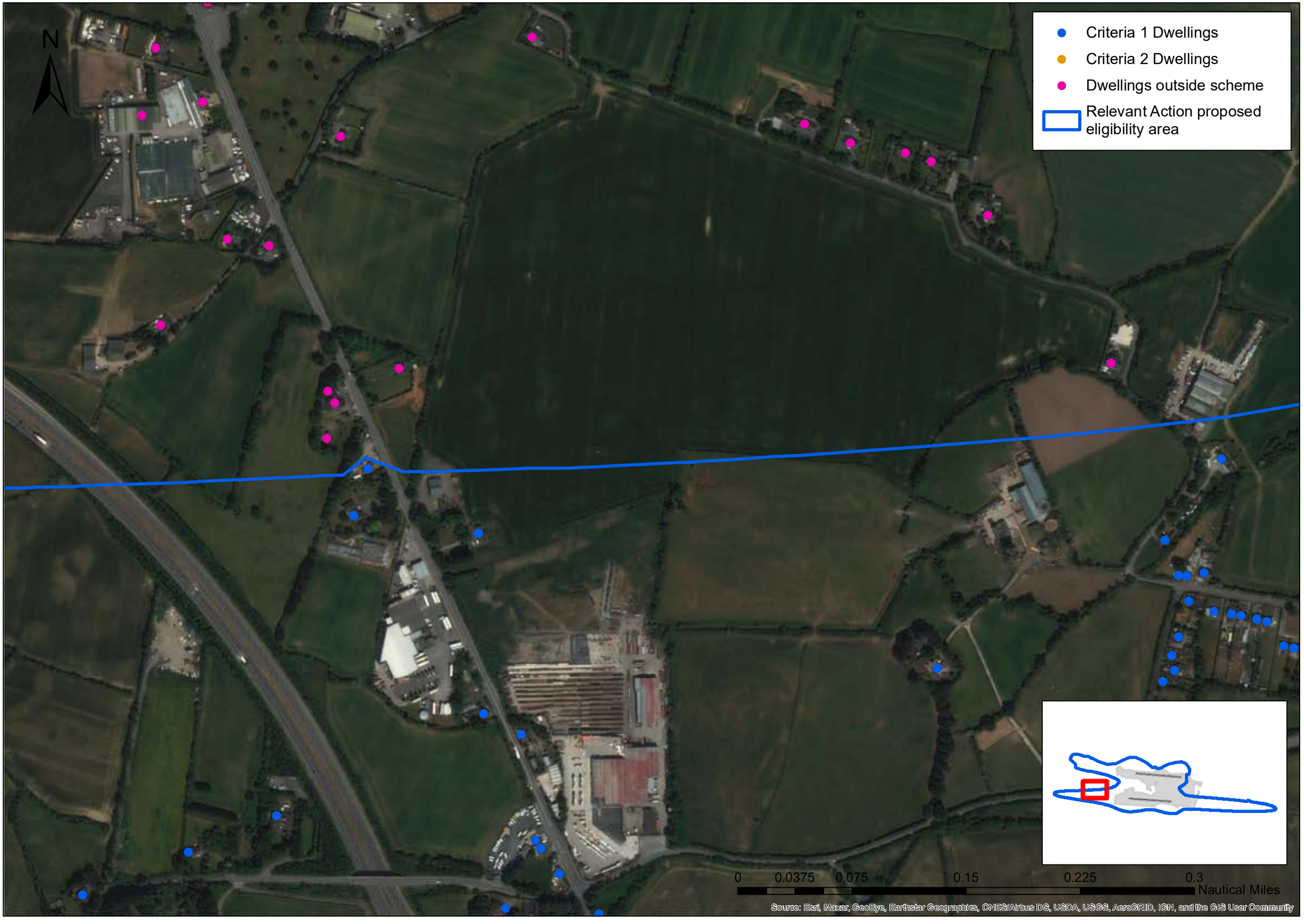
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Criteria 1 Dwellings
Criteria 2 Dwellings
Dwellings outside scheme
Relevant Action proposed eligibility area
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Nautical Miles
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community


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Dwellings outside scheme
Relevant Action proposed eligibility area
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Nautical Miles
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Criteria 1 Dwellings

Criteria 2 Dwellings

Dwellings outside scheme

Relevant Action proposed eligibility area

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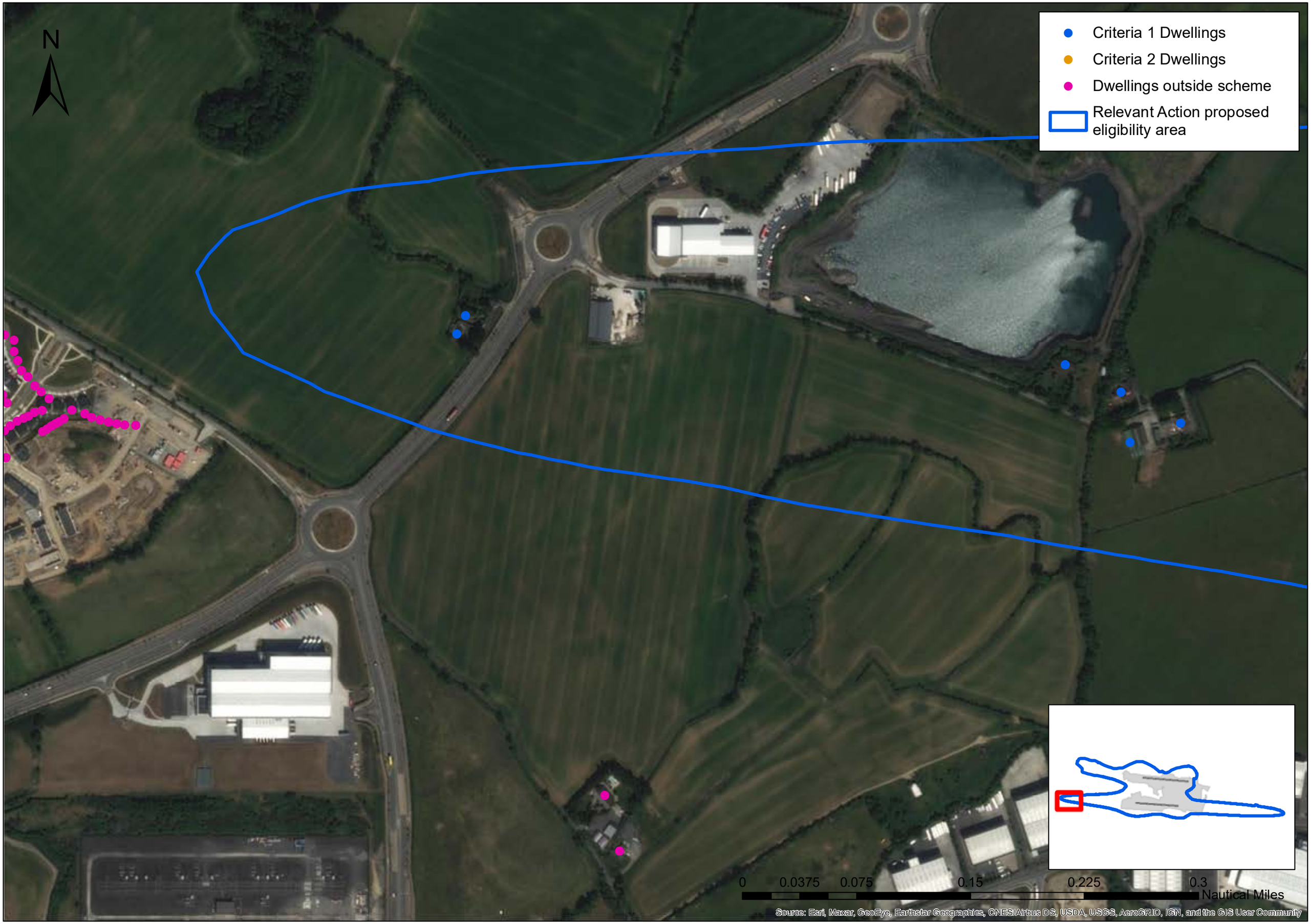
Nautical Miles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Criteria 1 Dwellings
Criteria 2 Dwellings
Dwellings outside scheme
Relevant Action proposed eligibility area
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Nautical Miles
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community


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Criteria 1 Dwellings
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Relevant Action proposed eligibility area
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Nautical Miles
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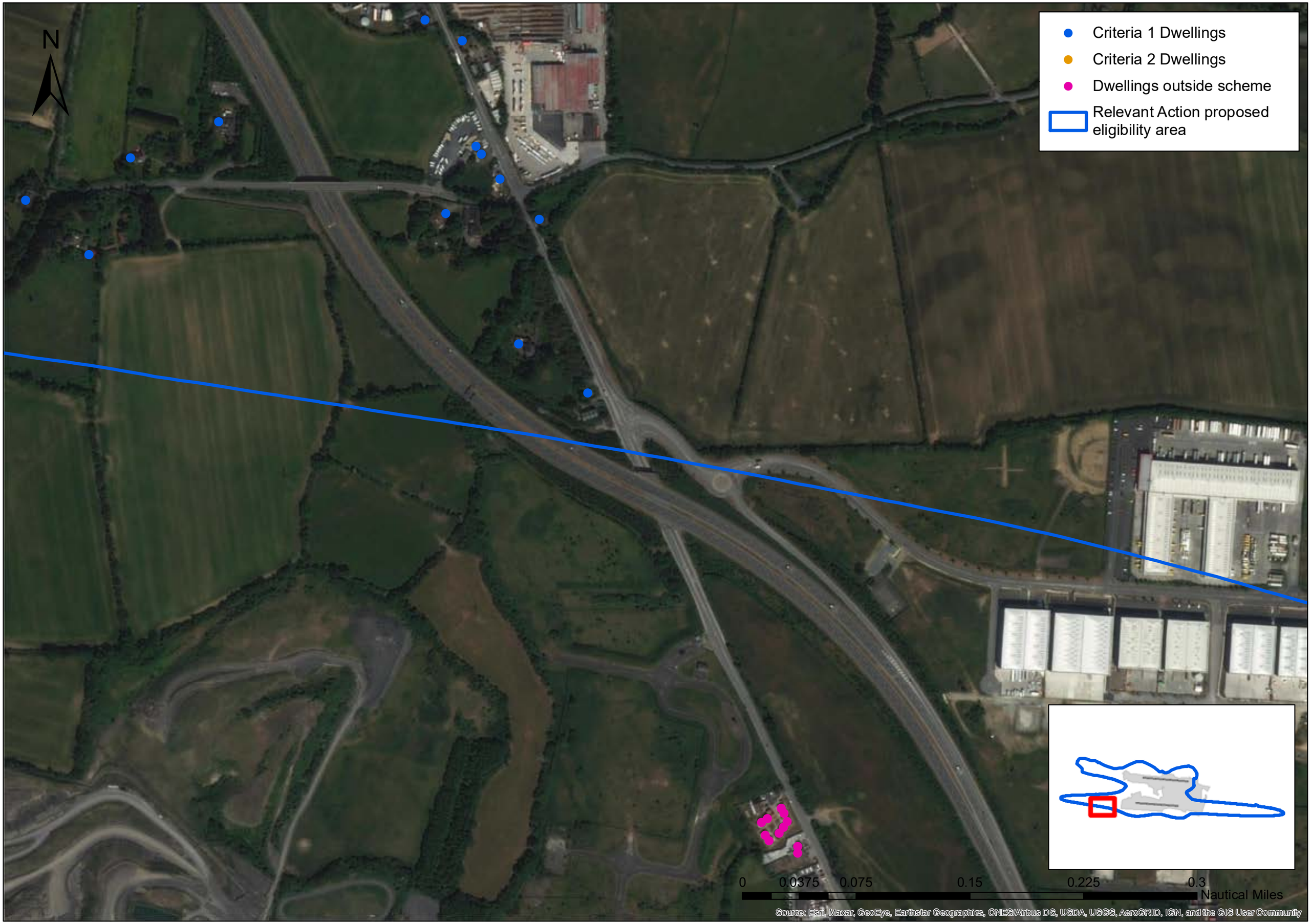
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Criteria 1 Dwellings
Criteria 2 Dwellings
Dwellings outside scheme
Relevant Action proposed eligibility area
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Nautical Miles
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community


N
Criteria 1 Dwellings
Criteria 2 Dwellings
Dwellings outside scheme
Relevant Action proposed eligibility area
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Nautical Miles
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community


N
Criteria 1 Dwellings
Criteria 2 Dwellings
Dwellings outside scheme
Relevant Action proposed eligibility area
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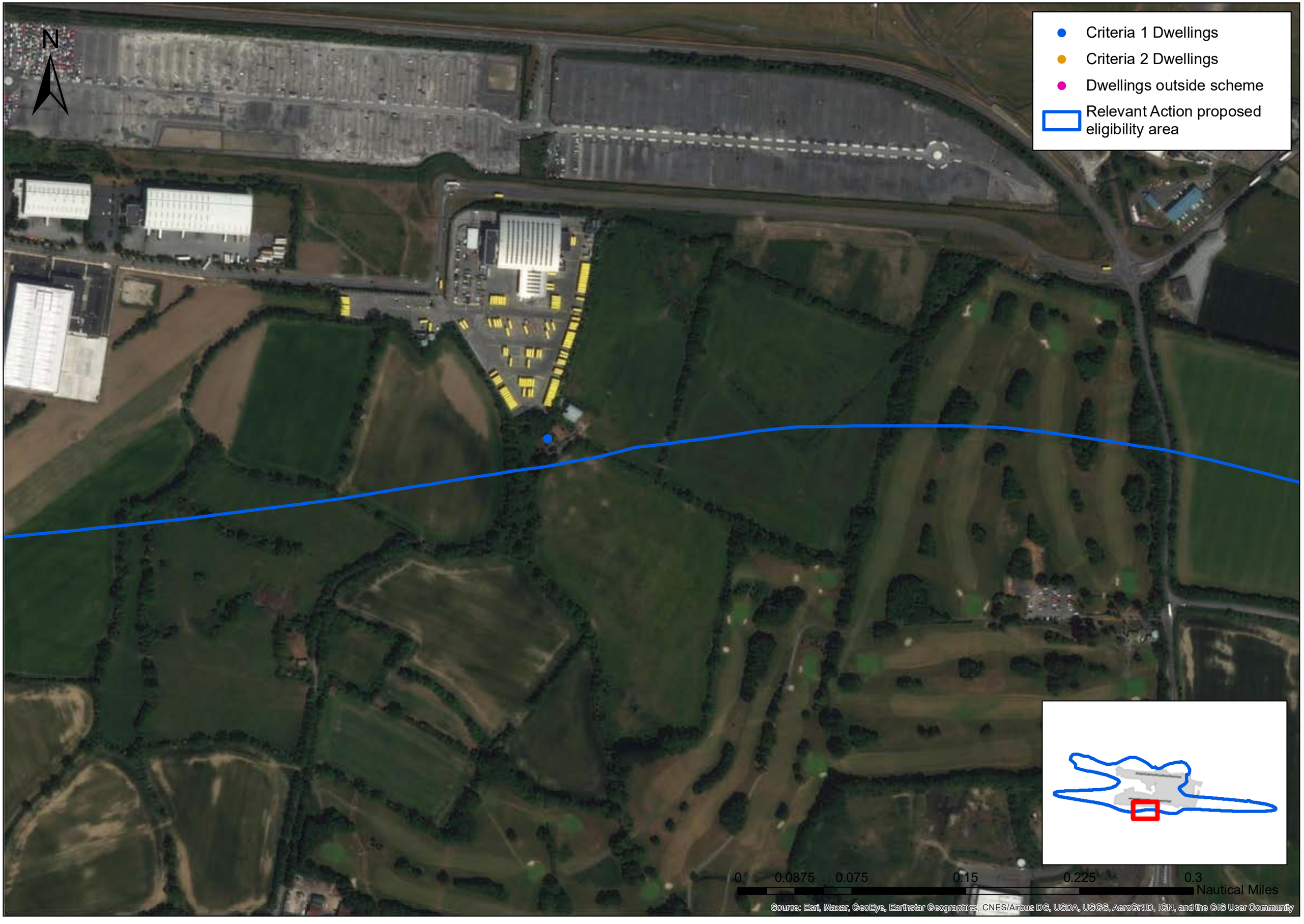
Nautical Miles
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community


N
Criteria 1 Dwellings
Criteria 2 Dwellings
Dwellings outside scheme
Relevant Action proposed eligibility area
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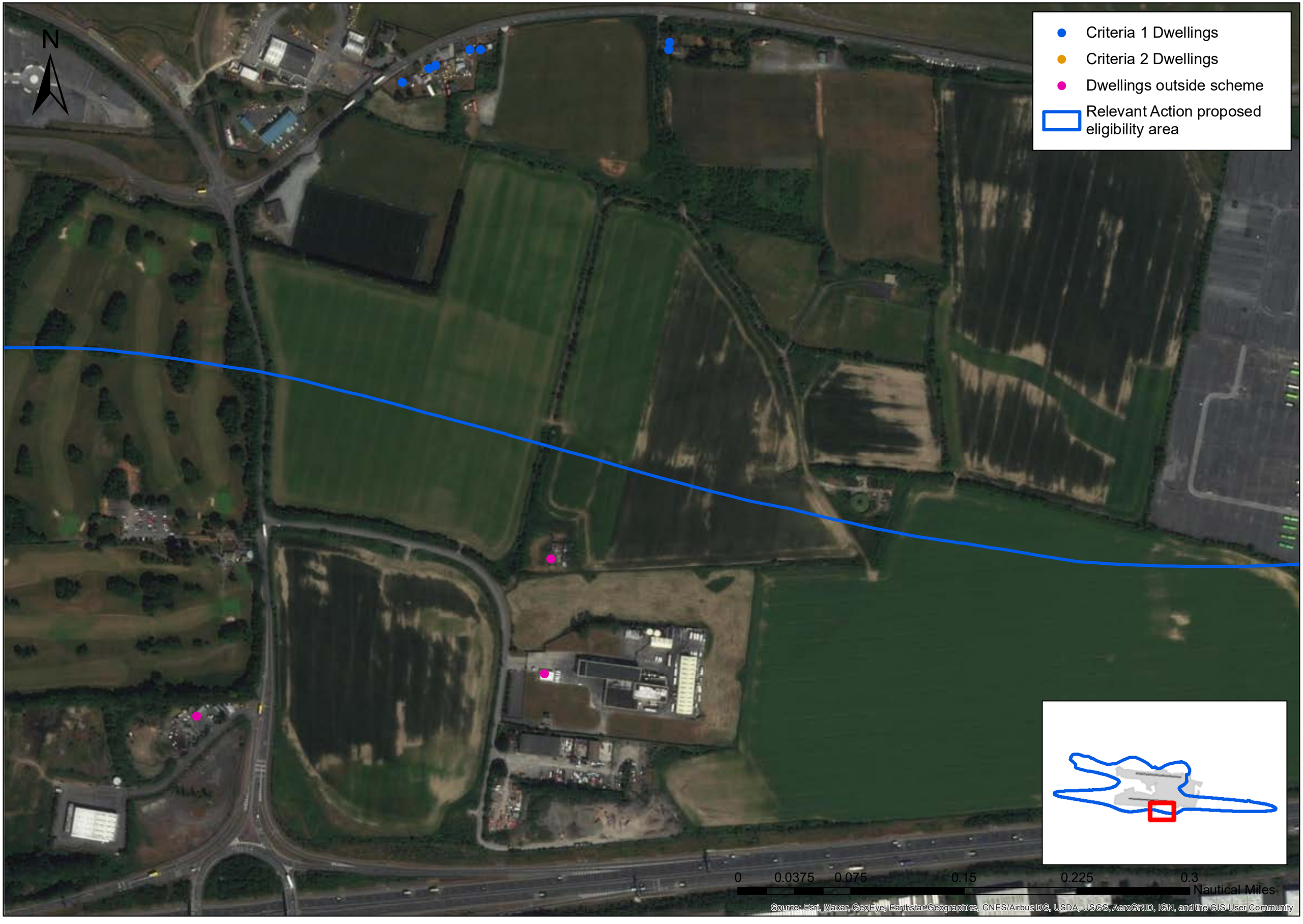
Nautical Miles
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community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Criteria 1 Dwellings
Criteria 2 Dwellings
Dwellings outside scheme
Relevant Action proposed eligibility area
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Nautical Miles
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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Criteria 1 Dwellings
Criteria 2 Dwellings
Dwellings outside scheme
Relevant Action proposed eligibility area

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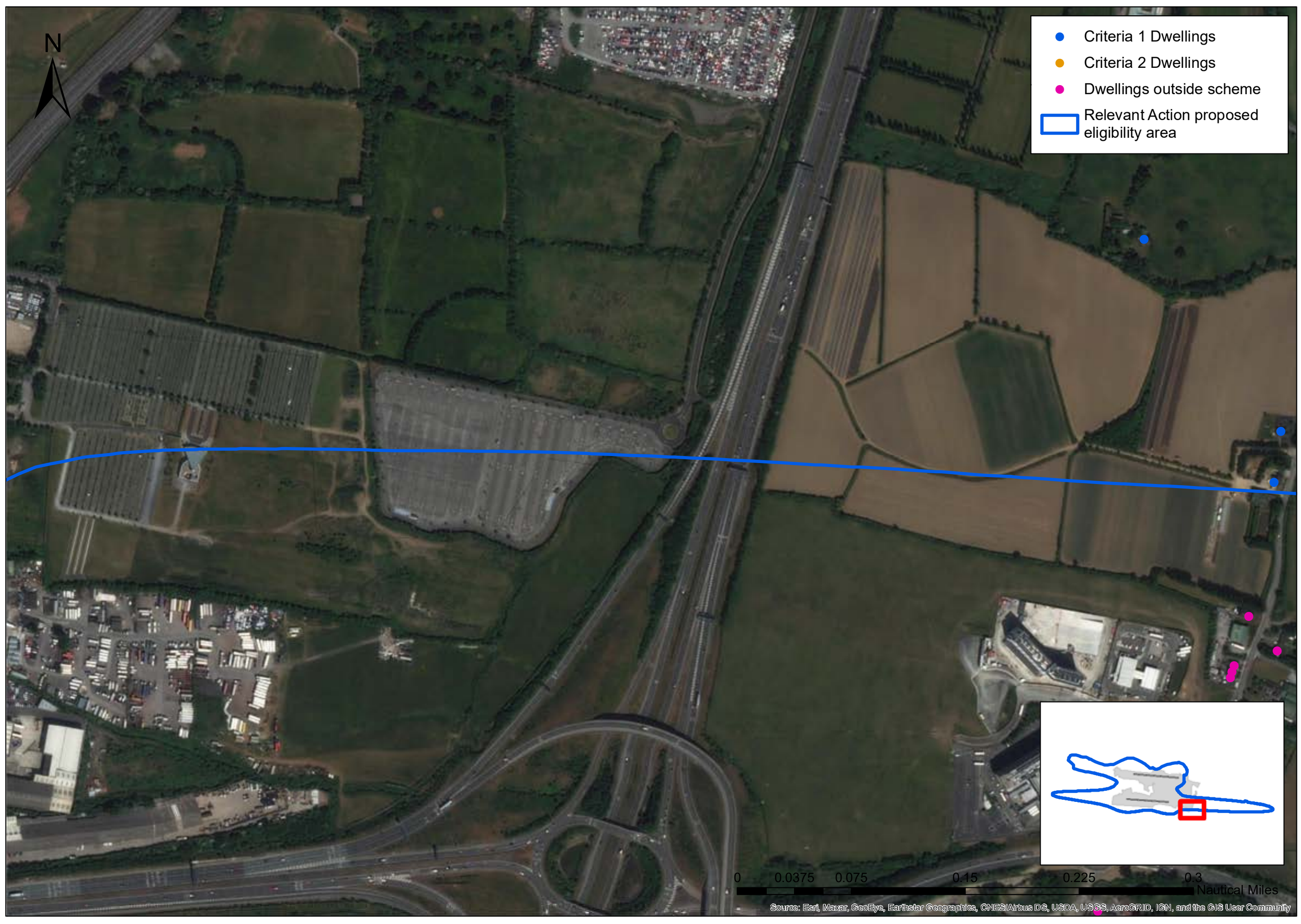
Nautical Miles

Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community


N
Criteria 1 Dwellings
Criteria 2 Dwellings
Dwellings outside scheme
Relevant Action proposed eligibility area
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Nautical Miles
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community


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Criteria 1 Dwellings
Criteria 2 Dwellings
Dwellings outside scheme
Relevant Action proposed eligibility area
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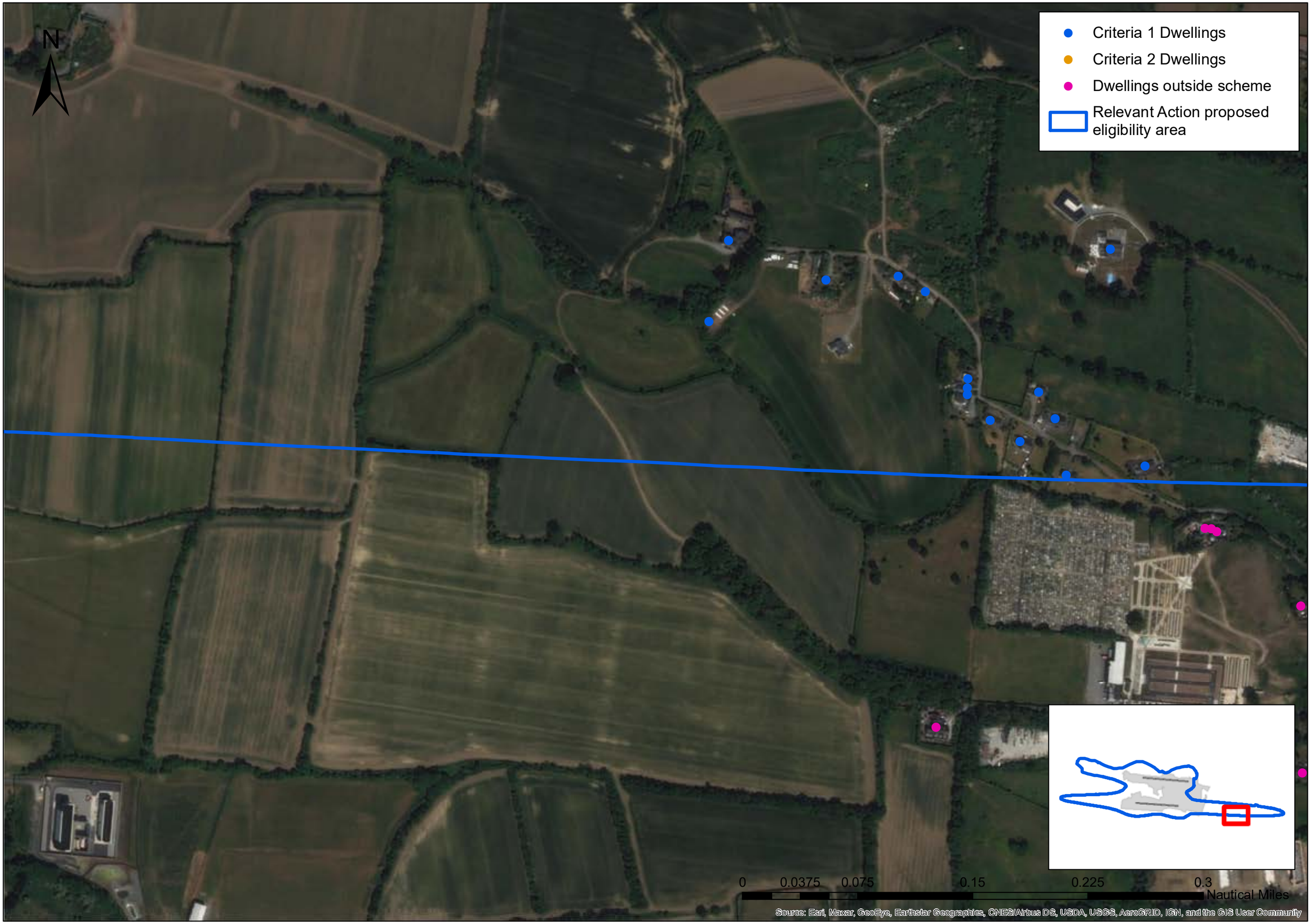
Nautical Miles
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community


N
Criteria 1 Dwellings
Criteria 2 Dwellings
Dwellings outside scheme
Relevant Action proposed eligibility area
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Nautical Miles
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Criteria 1 Dwellings
Criteria 2 Dwellings
Dwellings outside scheme
Relevant Action proposed eligibility area
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Nautical Miles
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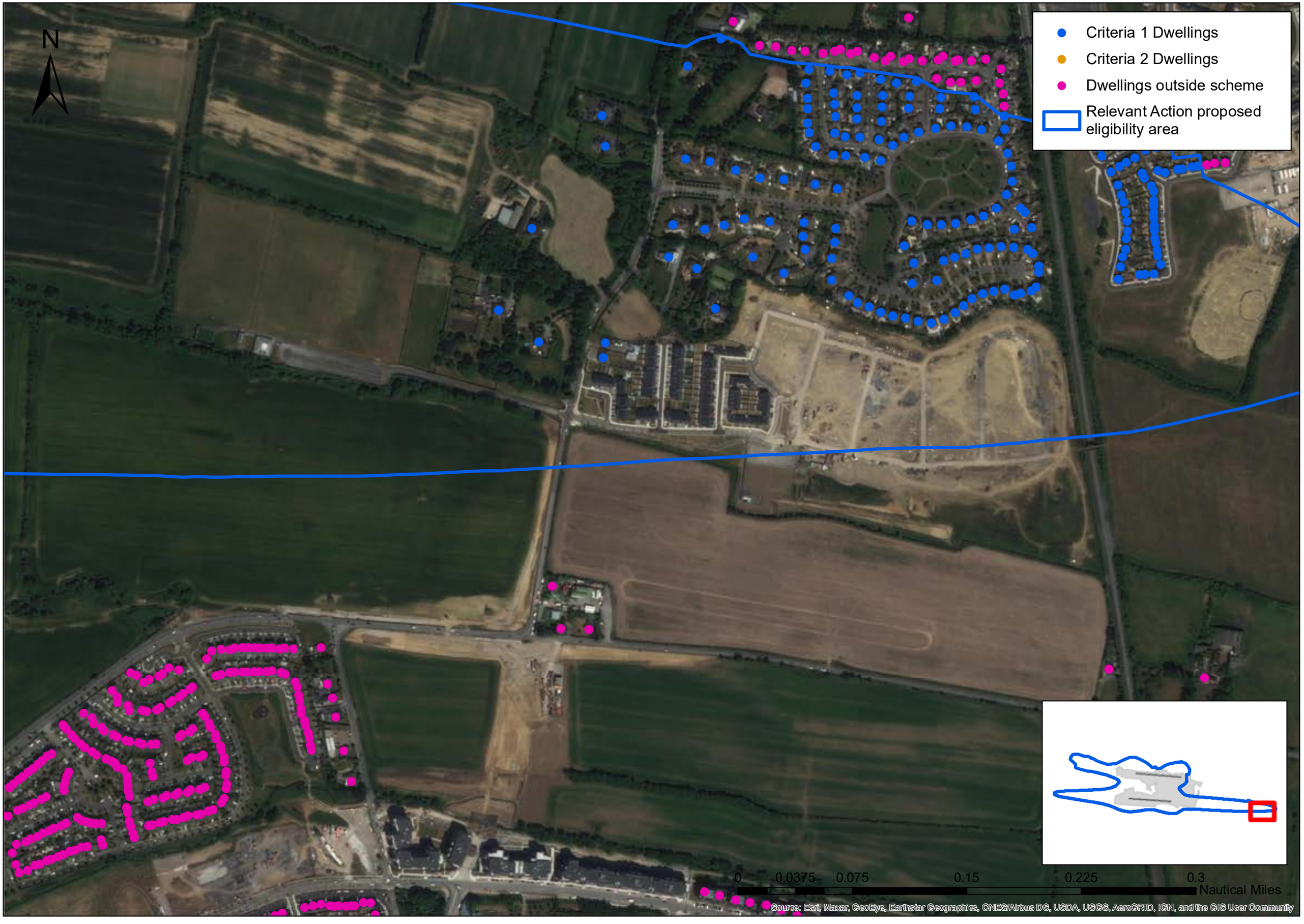
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Criteria 1 Dwellings
Criteria 2 Dwellings
Dwellings outside scheme
Relevant Action proposed eligibility area
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Nautical Miles
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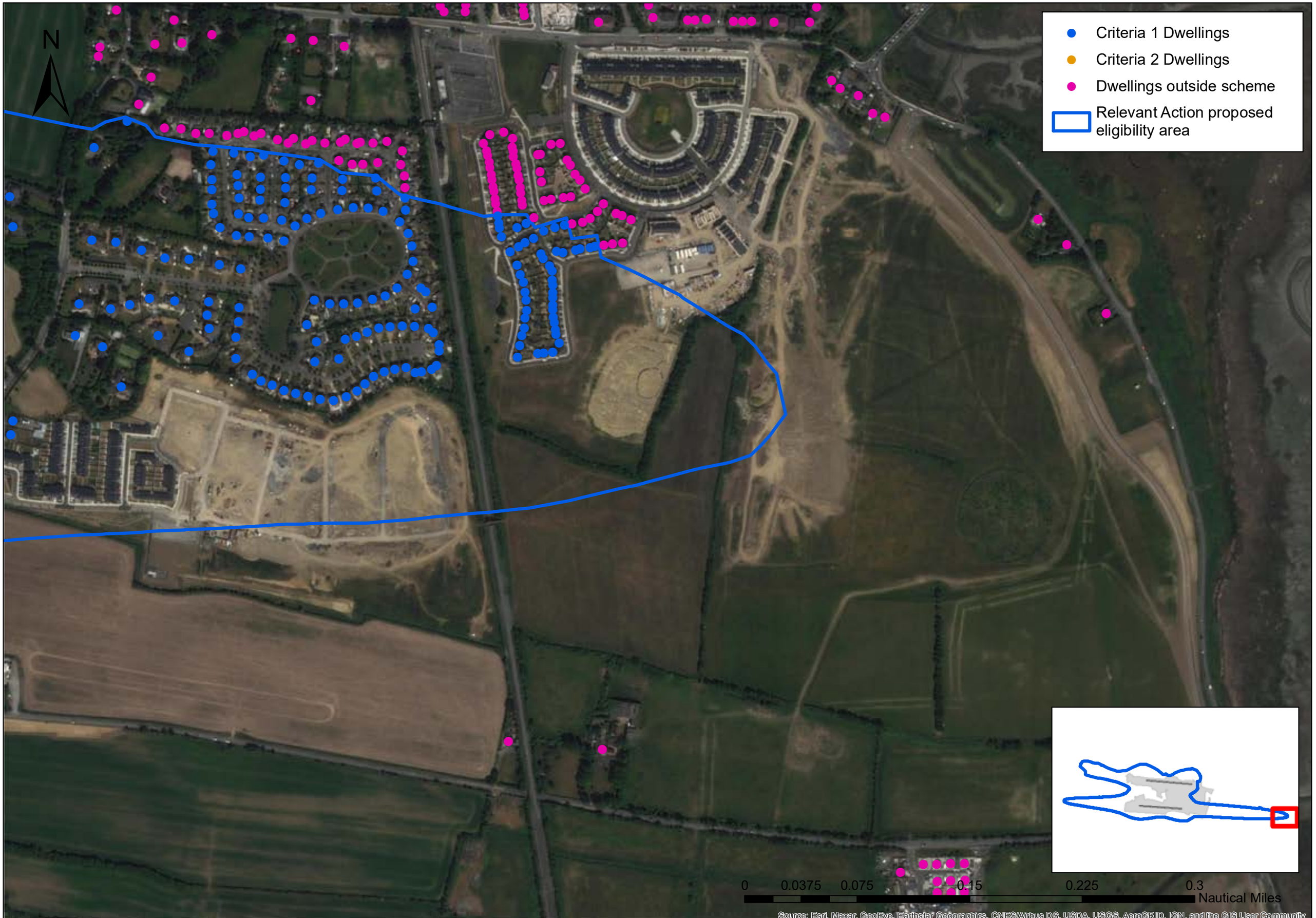
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Criteria 1 Dwellings
Criteria 2 Dwellings
Dwellings outside scheme
Relevant Action proposed eligibility area
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Nautical Miles
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community


N
Criteria 1 Dwellings
Criteria 2 Dwellings
Dwellings outside scheme
Relevant Action proposed eligibility area
0
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Nautical Miles
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community


N
Criteria 1 Dwellings
Criteria 2 Dwellings
Dwellings outside scheme
Relevant Action proposed eligibility area
0
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Nautical Miles
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

N

Criteria 1 Dwellings

Criteria 2 Dwellings

Dwellings outside scheme

Relevant Action proposed eligibility area

0 0.0375 0.075 0.15 0.225 0.3

Nautical Miles

Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community


N
Criteria 1 Dwellings
Criteria 2 Dwellings
Dwellings outside scheme
Relevant Action proposed eligibility area
0
0.0375
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Nautical Miles
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

N

Criteria 1 Dwellings

Criteria 2 Dwellings

Dwellings outside scheme

Relevant Action proposed eligibility area

0 0.0375 0.075 0.15 0.225 0.3

Nautical Miles


N
Criteria 1 Dwellings
Criteria 2 Dwellings
Dwellings outside scheme
Relevant Action proposed eligibility area
0
0.035
0.07
0.14
0.21
0.28
Nautical Miles
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

N

Criteria 1 Dwellings

Criteria 2 Dwellings

Dwellings outside scheme

Relevant Action proposed eligibility area

0 0.05 0.1 0.2 0.3 0.4

Nautical Miles

Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community


N
Criteria 1 Dwellings
Criteria 2 Dwellings
Dwellings outside scheme
Relevant Action proposed eligibility area
0
0.0475
0.095
0.19
0.285
0.38
Nautical Miles
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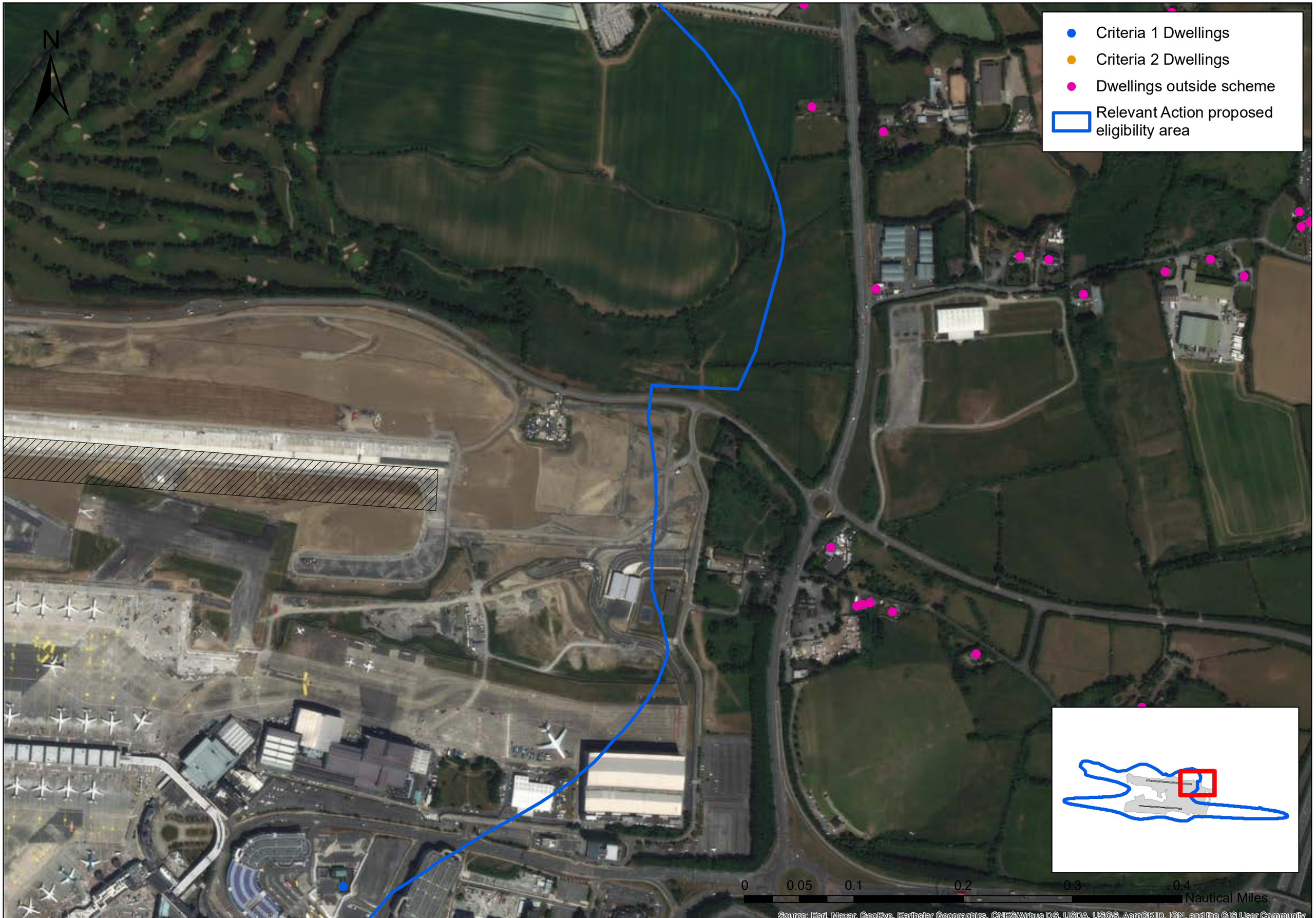
N
Criteria 1 Dwellings
Criteria 2 Dwellings
Dwellings outside scheme
Relevant Action proposed eligibility area
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0.05
0.1
0.2
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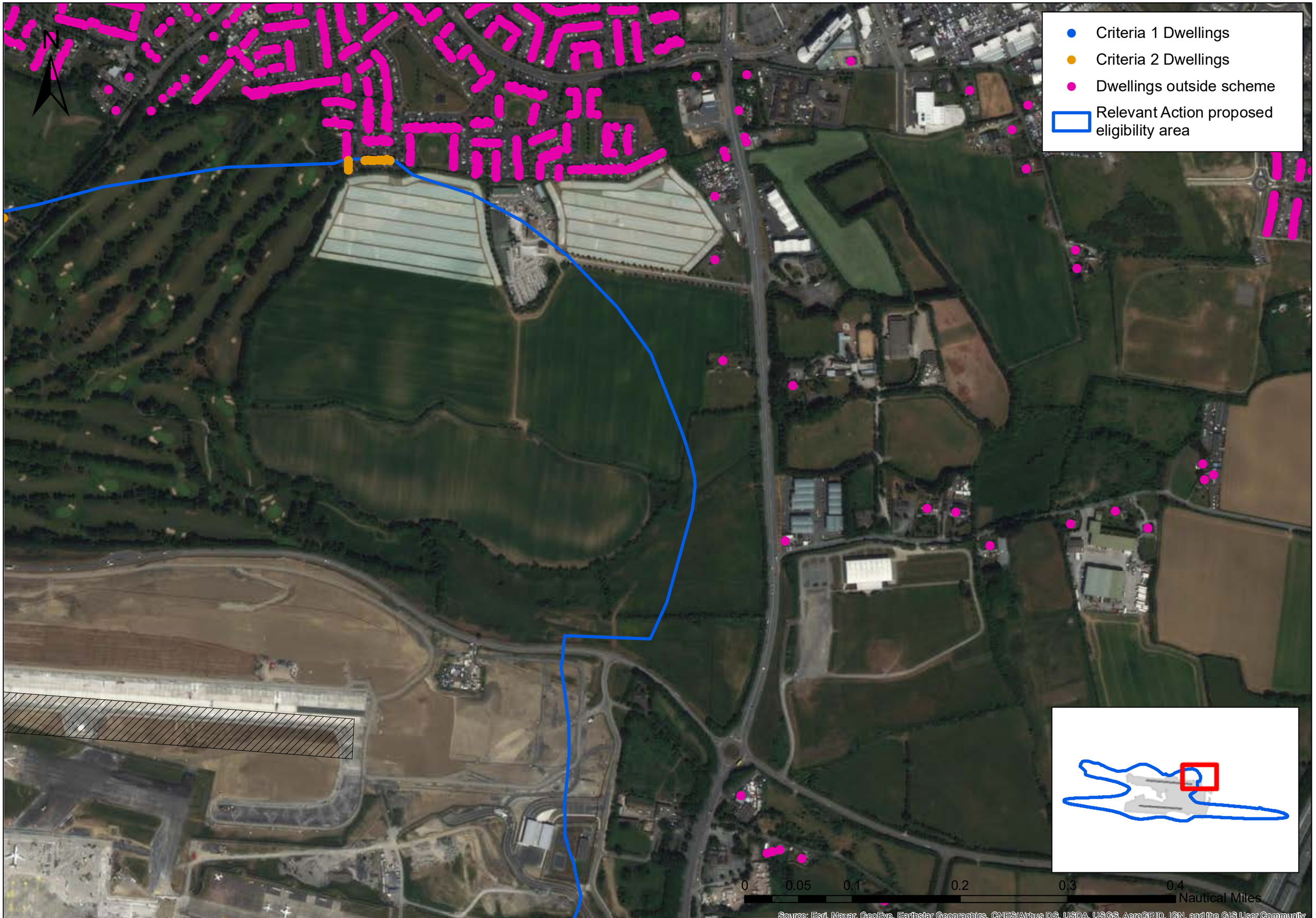
Nautical Miles
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community


N
Criteria 1 Dwellings
Criteria 2 Dwellings
Dwellings outside scheme
Relevant Action proposed eligibility area
0
0.05
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0.3
0.4
Nautical Miles
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community


N
Criteria 1 Dwellings
Criteria 2 Dwellings
Dwellings outside scheme
Relevant Action proposed eligibility area
0
0.0375
0.075
0.15
0.225
0.3
Nautical Miles
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

N

Criteria 1 Dwellings
Criteria 2 Dwellings
Dwellings outside scheme
Relevant Action proposed eligibility area

0 0.0375 0.075 0.15 0.225 0.3
Nautical Miles

Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

An tÚdarás Inniúil um Thorann Aerárthaí

Aircraft Noise Competent Authority

ANCA

Regulatory Decision

Appendix M - Section 34C(10) Consultation with other Authorities and response

Áras an Chontae, Sord,
Co. Bhaile Átha Cliath, K67 X8Y2
County Hall, Swords,
Co. Dublin, K67 X8Y2

T. 01 890 5998
E. aircraftnoiseca@fingal.ie
www.fingal.ie/aircraftnoiseca/

An tÚdarás Inniúil um Thorann Aerárthaí
Aircraft Noise Competent Authority

Commission for Aviation Regulation
Earlsfort Centre,
6 Earlsfort Terrace,
Dublin 2
D02 W773

Our Ref: ANCA F20A/0668
17th September 2021

RE: Noise assessment at Dublin Airport by the Aircraft Noise Competent Authority (ANCA)

For the attention of: Ms. Cathy Mannion Commissioner for Aviation Regulation

Dear Ms. Mannion,

On 18th December 2020, the daa submitted an application for planning permission (ref. F20A/0668) seeking the amendment of the operating restriction set out in condition no. 3(d) and the replacement of the operating restriction in condition no. 5 of the North Runway Planning Permission (Fingal County Council Reg. Ref. No. F04A/1755; ABP Ref. No. PL06F.217429 as amended by Fingal County Council F19A/0023, ABP Ref. No. ABP-305289-19), as well as proposing new noise mitigation measures.

Condition 3 (d):

3(d). Runway 10L-28R shall not be used for take-off or landing between 2300 hours and 0700 hours. except in cases of safety, maintenance considerations, exceptional air traffic conditions, adverse weather, technical faults in air traffic control systems or declared emergencies at other airports.

Condition 5:

On completion of construction of the runway hereby permitted, the average number of night time aircraft movements at the airport shall not exceed 65/night (between 2300 hours and 0700 hours) when measured over the 92 day modelling period as set out in the reply to the further information request received by An Bord Pleanála on the 5th day of March, 2007.

ANCA has undertaken an assessment of the aircraft noise implications of the application and, having determined that a noise problem would occur, set a noise abatement objective for the airport and applied the Balanced Approach of the International Civil Aviation Organization to determine the optimum measures required to address the noise problem. These measures may form the basis for a draft regulatory decision by ANCA and are detailed in the attached report together with the Noise Abatement Objective and the Noise Abatement Objective report.

ANCA hereby invites any observations that the Commission for Aviation Regulation may wish to make in the context of the areas of regulation within the remit of your Commission. Any submission in this context should be made to the address above before 19th October, 2021. This opportunity does not preclude the Commission for Aviation Regulation from making a submission or observation during the statutory period of 14-weeks following the making of a draft regulatory decision by ANCA in relation to this matter.

Yours sincerely,

Ethna Felten

Aircraft Noise Competent Authority

Áras an Chontae, Sord,
Co. Bhaile Átha Cliath, K67 X8Y2
County Hall, Swords,
Co. Dublin, K67 X8Y2

T. 01 890 5998
E. aircraftnoiseca@fingal.ie
www.fingal.ie/aircraftnoiseca/

An tÚdarás Inniúil um Thorann Aerárthaí
Aircraft Noise Competent Authority

Irish Aviation Authority
The Times Building
11-12 D'Olier street
Dublin 2
D02 T449

Our Ref: ANCA F20A/0668
17th September 2021

RE: Noise assessment at Dublin Airport by the Aircraft Noise Competent Authority (ANCA)

For the attention of: Mr. Duirmuid O'Conghaile

Dear Mr. O'Conghaile,

On 18th December 2020, the daa submitted an application for planning permission (ref. F20A/0668) seeking the amendment of the operating restriction set out in condition no. 3(d) and the replacement of the operating restriction in condition no. 5 of the North Runway Planning Permission (Fingal County Council Reg. Ref. No. F04A/1755; ABP Ref. No. PL06F.217429 as amended by Fingal County Council F19A/0023, ABP Ref. No. ABP-305289-19), as well as proposing new noise mitigation measures.

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ANCA has undertaken an assessment of the aircraft noise implications of the application and, having determined that a noise problem would occur, set a noise abatement objective for the airport and applied the Balanced Approach of the International Civil Aviation Organization to determine the optimum measures required to address the noise problem. These measures may form the basis for a draft regulatory decision by ANCA and are detailed in the attached report together with the Noise Abatement Objective and the Noise Abatement Objective report.

ANCA hereby invites any observations that the Irish Aviation Authority may wish to make in the context of the areas of regulation within the remit of your Authority. Any submission in this context should be made to the address above before 19th October, 2021. This opportunity does not preclude the Irish Aviation Authority from making a submission or observation during the statutory period of 14-weeks following the making of a draft regulatory decision by ANCA in relation to this matter.

Yours sincerely,

Ethna Felten

Ethna Felten

Aircraft Noise Competent Authority

Ethna Felten
Director
Aircraft Noise Competent Authority
County Hall, Swords
County Dublin, K67 X8Y2

18 October 2021

Re: Measures to Address Noise Problem at Dublin Airport

Dear Ethna,

Thank you for your letter dated 17 September, accompanied by the report setting out potential noise abatement measures to address the *Noise Problem* at Dublin Airport, arising from the daa application to change certain operating restrictions associated with the North Runway.

As you are aware, the Commission for Aviation Regulation is the competent authority in Ireland for the implementation of the EU Slot Regulation 95/93. Specifically, we are responsible for:

- The designation of airports located in Ireland as Schedules Facilitated or Coordinated, where necessary.
- The appointment a Schedules Facilitator or Coordinator as necessary.
- The declaration of capacity at Coordinated airports.
- Administering the slots sanctions scheme, which provides for financial sanctions for air carriers who misuse slots.

Dublin Airport is a Coordinated airport. This designation leads to the imposition of a mandatory system for the scheduling of aircraft movements at the airport. The Commission declares capacity limits on potentially constraining airport processors, such as the number of aircraft which can be scheduled to use the runway over particular periods. The Coordinator, appointed by the Commission, is responsible for the allocation of slots to individual air carriers, based on those limits set by the Commission and various principles for prioritizing slot requests. Thus, in broad terms, the Commission is responsible for determining how many aircraft can be scheduled to operate at Dublin Airport. The Coordinator then determines how this capacity is divided among air carriers and aircraft types.

Should ANCA put in place a measure or measures which would potentially impact on aircraft movements at Dublin Airport, this would therefore need to be translated by the Commission into scheduling constraints for the relevant seasons. It would then need to be implemented by the Coordinator in relation to individual aircraft movements.

As a separate regulatory body, we will not be commenting on topics such as the appropriate level of a night noise quota, or the time period over which it applies, as this is a matter for ANCA in its

role as competent noise authority. Our only observations would therefore relate to the practical implementation of whatever measures you put in place.

The worldwide airport slot scheduling calendar is based on two distinct scheduling seasons - the Summer season (which spans seven months from March to October) and the Winter season (which spans five months from October to March). The transitions between summer and winter seasons must be aligned with the clock changes between Summertime and Wintertime. This occurs on the last Sunday of March and the last Sunday of October. The capacity is set by the Commission approximately six months before the start of each season, with initial coordination and slot allocation to air carriers then completed by the Coordinator five months before the start of season.

We note that the defined Annual Period for assessing compliance against the noise quota is proposed to be based on the calendar year from January to December, which means that each compliance period would split the winter scheduling season in two. This would pose a significant challenge from an implementation perspective, due to the misalignment between the timing of when scheduling and slot allocation occurs, and the compliance period for noise related capacity limits. There would be a consequent annual interplay required to implement the noise limits on a cross - seasonal basis.

For example, the Commission will issue a final decision on the Winter 2022 capacity (October 2022 to March 2023) in May 2022. If the first compliance period for a noise quota system were to be 1 January to 31 December 2023, a decision would need to be taken on how to split the noise quota between Winter 2022 (in part) and Summer 2023, but also Winter 2023 (in part). The Winter 2023 season will finish in March 2024. In the absence of airline scheduling inputs that far in advance, estimating demand and the consequent extent to which noise quota should optimally be reserved for the Winter 2023 season almost two years in advance of that season concluding would be difficult.

If, on the other hand, the compliance period was to be aligned with the scheduling seasons (i.e. from April to March inclusive) , there would just need to be one high level split of the annual quota between a summer and winter season, while each period would still cover the same set of twelve months.

We are available to discuss the practicalities of implementing this measure, or any other measures which you may be considering. It may also be useful to include the appointed Coordinator, Airport Coordination Limited, in that engagement.

Yours sincerely,

_____

Cathy Mannion
Commissioner

An tÚdarás Inniúil um Thorann Aerárthaí

Aircraft Noise Competent Authority

ANCA

Regulatory Decision

Appendix N - Dublin Airport Forecast Analysis: Potential Impact of Quota Count Restrictions

altitude aviation advisory

Dublin Airport Forecast Analysis

Potential Impact of Quota Count Restrictions

9th March 2022

- This report contains the results of our analysis in relation to the future aircraft mix at Dublin Airport (the "Work"). It has been prepared for Noise Consultants Limited (the "Client") in connection with the provision of aviation noise expert consultancy services for Fingal County Council ("the Project") and for no other purpose.
- The contents of this report are not to be relied on by any other party without our prior written consent.
- This report is not intended to be a comprehensive review of all potentially relevant issues relating to the Project. It is intended to draw attention to those issues which we, in our absolute discretion and in carrying out the Work, consider to be material in the context of the Project.
- W do not accept a duty of care to any person (including the Client) in respect of this report.

ALTITUDE AVIATION ADVISORY LIMITED
9th March 2022

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Impact Assessment	5
Conclusions	19

Introduction & Executive Summary

The proposed noise conditions appear to be more of a potential issue for cargo flights (potentially lesser impacts on passenger flights)

Introduction

We understand that the noise management policy in use at Dublin Airport may be modified with the aim of preventing access in the Night Period* for aircraft which cause noise above a certain level.

We understand this would be achieved by assigning each aircraft movement a noise Quota Count value. There would then be upper limits on the maximum Quota Count allowed for any movement, as per the below:

B. No aircraft with a Quota Count of 4.0 or more shall be permitted to take off at the Airport during the night time.
C. No aircraft with a Quota Count of 2.0 or more shall per permitted to land at the Airport during the night time.
D. No aircraft with a Quota Count of 2.0 or more shall be permitted to take off at the Airport during the night time from 1 January 2030
E. No aircraft with a Quota Count of 1.0 or more shall be permitted to land at the Airport during the night time from 1 January 2030

Altitude has been engaged to assess the potential impact of the Quota Count limits on future operations at Dublin Airport, focusing on the years 2025 and 2030.

- In making this assessment, we have analysed forecasts developed by Mott McDonald on behalf of Dublin Airport.

Executive Summary

Condition B and Condition C

- Based on the provided forecasts, neither Condition B nor Condition C would have any negative impact on traffic at the airport (no Night Period movements in 2025 or 2030 are forecast to be on non-compliant aircraft types).
- We have also analysed scheduled passenger operations from 2019 and 2021, plus a short snapshot of cargo flights from selected days in February 2022.
  - This indicates that the conditions are unlikely to impact future passenger operations to/from Dublin.
  - However, there are some current cargo arrivals on B767-200 aircraft that would be in breach of Condition C. While these aircraft are unlikely to continue to operate into the long term, they could plausibly still be flying in 2025 and 2030.

Condition D and Condition E

- The provided forecasts include ca. 3,250 Night Period flights in 2030 – for which the departures (an unknown share) would breach of Condition D.
  - Furthermore, the forecast also includes ca. 2,300 Night Period flight, where the arrivals (an unknown share) would breach Condition E.
- We do not have details of whether these flights in the forecast are envisaged to be passenger aircraft, cargo aircraft or a mix of both.
- Our own analysis suggests that conditions D and E are likely to have minimal impact on most scheduled passenger carriers at Dublin.
  - Nevertheless, the conditions could prevent a small number of such carriers from expanding their schedules into the Night Period on non-compliant types.
- However, the impacts of conditions D and E are more significant for cargo operations at the airport.
  - The extent of the impact will be dependent on how cargo airline fleets evolve between now and 2030 and how willing airlines are to adapt to the proposed noise restrictions.

Note that the analysis of potential impacts on cargo operators is materially affected by the lack of data available to us in relation to historic cargo flights to/from Dublin.

*We understand that movements between 23:00-06:59 would fall into the Night Period.

Impact Assessment

We have used a mix of data sources in our study – but there are some important information gaps that limit our analysis

- Our assessment of the potential impact of the proposed restrictions is based on high level schedule forecasts produced by Mott McDonald (on behalf of Dublin Airport), provided to us by the Airport Noise Competent Authority for Dublin Airport, ANCA (via Noise Consultants Ltd):

  A11267_19_CA434_5.0 ANCA Reporting Template 2021 Update (Reviewed).xlsx

- This forecast contains multiple scenarios, of which we have been asked to consider the following:
  - Scenario 0026 (for the year 2025).
  - Scenario 0039 (for the year 2030).

- Each of these scenarios contains a forecast number of Night Period ATMs by aircraft type (amongst other metrics).

- We have also been provided with QC values by aircraft type (source: Annex B QC Reference Tables – Forecast and Historic, Dublin Airport Night Quota System Proposal – DRAFT RFI Update).

- This information has enabled us to identify the aircraft types that are forecast to have Night Movements in 2025/2030 and which would be non-compliant with any of the proposed conditions.

- However we do not have access to all of the forecast detail we consider necessary to provide a complete impact assessment:
  1) There is no information as to which carriers are expected to operate the forecast Night Period ATMs: This makes it hard to determine e.g. whether or not the operator has the ability to switch out a non-compliant aircraft for a compliant aircraft.
  2) There is no split of Night Period ATMs by arrivals/departures: as an aircraft's QC value differs depending on whether it is taking off or landing, this split may materially impact the number of Night Period ATMs at Dublin Airport that would be impacted.

- In order to mitigate item 1, we have used schedule data to identify a list of operators that have historically used non-compliant aircraft types on routes to/from Dublin Airport, and conducted an impact assessment for each of those carriers.
  - This list may include carriers which are not forecast to have night period ATMs on non-compliant aircraft types in 2025/2030.
  - Similarly, the forecast of Night Period ATMs on non-compliant aircraft types may include operators not on our list.

- Item 2. is particularly relevant for charter and cargo operators (for which the schedule data used to mitigate Item 1. does not provide useful insight, as charter / cargo movements are not normally included).
  - We note that the extent to which dedicated cargo movements are included in the forecast is not clear, and that this is particularly problematic as cargo operators tend to operate older aircraft (and older aircraft are more likely to be non-compliant with the proposed noise regulations).

- We have used data from flightradar24.com in order to better understand the cargo operators that are currently operating non-compliant aircraft at Dublin.
  - However we have only been able to collect data for movements over a relatively short (weather-affected) period in February 2022.
  - Note that this data source does not provide any further insights for Charter operators, as Charter flying is typically weighted towards the summer period.

- Finally, we have used QC values as provided i.e. a single value for an arrival and a single value for a departure, for each aircraft type (e.g. B767-300).
  - We understand that this is an approximation and that in practice different airframes of the same type may have different noise footprints.
  - This is another factor which causes uncertainty in our conclusions.

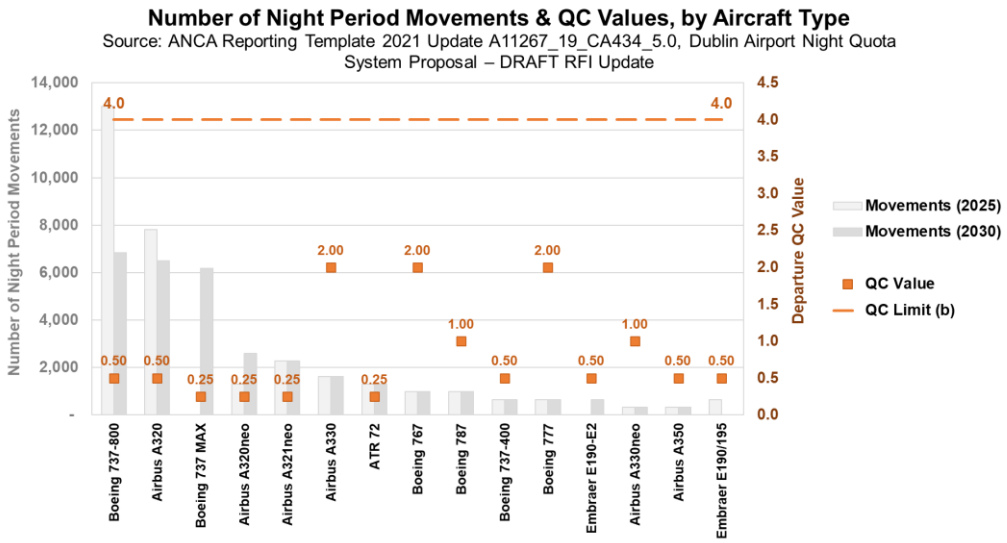
Condition B

Departures from the Airport during the Night Period.

There appears to be limited risk that Condition B will have a significant impact on Dublin flight operations

- Based on the provided forecast for 2025 and 2030, all ATMs are expected to be on aircraft with QC values below the proposed QC limit.
- The maximum expected Night Period departure QC value is 2.0 (compared to the proposed limit value of 4.0), driven by the following aircraft types:
  - A330.
  - B767.
  - B777.
- As previously noted, it is not clear that cargo movements (and the aircraft types used for them, which are typically older/noisier than passenger aircraft) are included in the forecast.
- However, from a short snapshot of selected days in February 2022, there did not appear to be any cargo flights operating in the Night Period that would breach Condition B.
- Therefore, there appears to be limited risk that the proposed condition would have a significant impact on Dublin flight operations.

Aircraft Type	Departure QC/ATM	Departure QC Limit (b)	Night Period ATMs	
			2025	2030
Airbus A330	2.00	4.00	1,627	1,627
Boeing 767	2.00		976	976
Boeing 777	2.00		651	651
Boeing 787	1.00		976	976
Airbus A330neo	1.00		325	325
Boeing 737-800	0.50		13,014	6,832
Airbus A320	0.50		7,809	6,507
Boeing 737-400	0.50		651	651
Embraer E190/195	0.50		651	-
Airbus A350	0.50		325	325
Embraer E190-E2	0.50		-	651
Airbus A321neo	0.25		2,277	2,277
Airbus A320neo	0.25		1,301	2,603
ATR 72	0.25		1,301	1,301
Boeing 737 MAX	0.25		-	6,182
			31,884	**31,884**



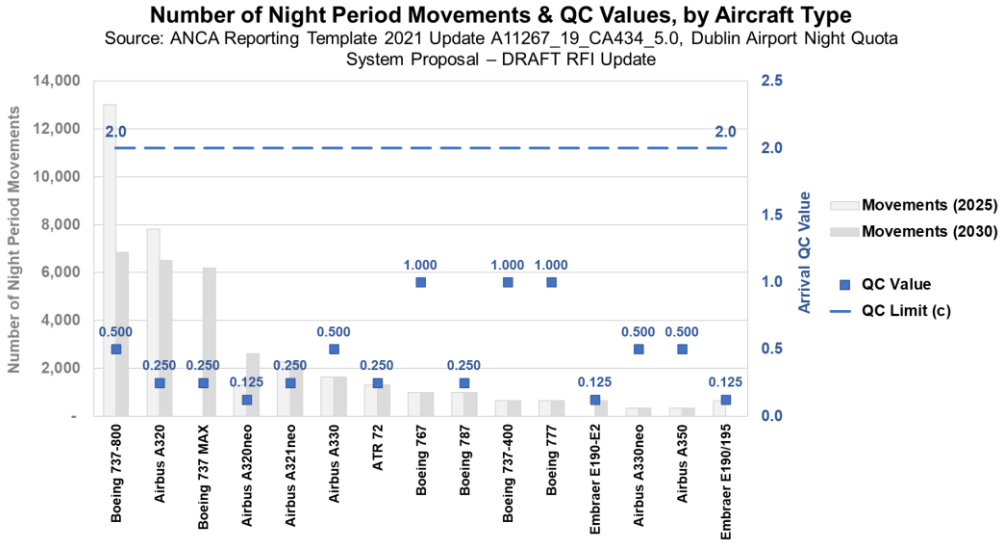
Condition C

Arrivals at the Airport during the Night Period.

Provided schedules indicate no flights breaching Condition C; however, there are currently cargo flights that would be non-compliant

- Based on the provided forecast for 2025 and 2030, all ATMs are expected to be on aircraft with QC values below the proposed QC limit.
- The maximum expected Night Period arrival QC value is 1.0 (compared to the proposed limit value of 2.0), driven by the following aircraft types:
  - B767.
  - B737-400.
  - B777.
- As previously noted, it is not clear that cargo movements (and the aircraft types used for them, which are typically older/noisier than passenger aircraft) are included in the forecast.
  - From a short snapshot of selected days in February 2022, there were some cargo arrivals on B767-200 aircraft which would be in breach of Condition C.
  - These aircraft were operated by Star Air. B767-200 aircraft in their fleet are between 28 years and 39 years old.
  - While the airline fleet also includes B767-300 aircraft (which would be compatible with Condition C), the fleet is heavily weighted to the B767-200 variant.
- Therefore, there may some risk that Condition C would be a deterrent to Star Air – or other cargo operators not identified in the snapshot of flights – in 2025 or 2030.
  - However, the impact could be relatively small – with other cargo operators (with "compliant" aircraft) potentially backfilling any "lost" services.

Aircraft Type	Arrival QC/ATM	Arrival QC Limit (c)	Night Period ATMs	
			2025	2030
Boeing 767	1.000	2.000	976	976
Boeing 737-400	1.000		651	651
Boeing 777	1.000		651	651
Boeing 737-800	0.500		13,014	6,832
Airbus A330	0.500		1,627	1,627
Airbus A330neo	0.500		325	325
Airbus A350	0.500		325	325
Airbus A320	0.250		7,809	6,507
Boeing 737 MAX	0.250		-	6,182
Airbus A321neo	0.250		2,277	2,277
ATR 72	0.250		1,301	1,301
Boeing 787	0.250		976	976
Airbus A320neo	0.125		1,301	2,603
Embraer E190-E2	0.125		-	651
Embraer E190/195	0.125		651	-
			31,884	**31,884**



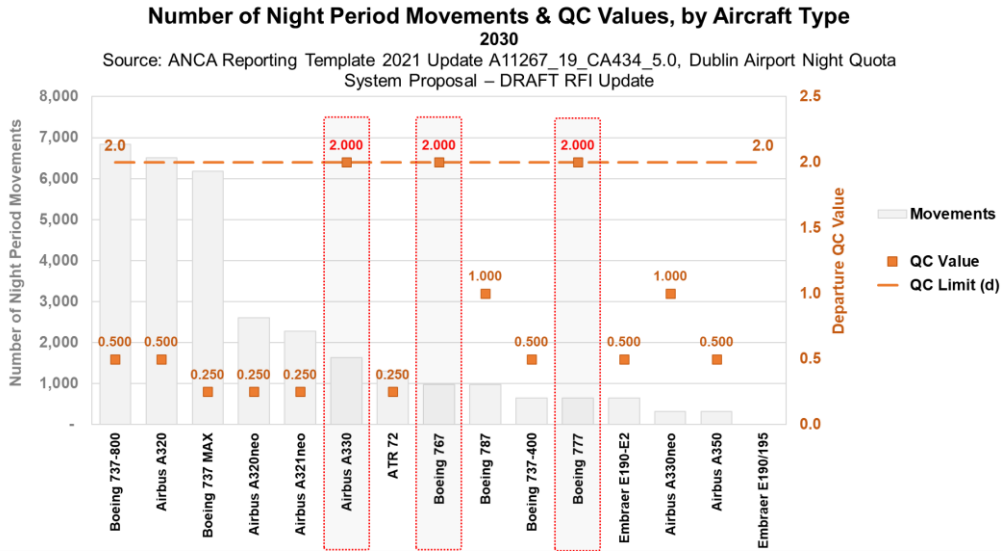
Condition D

Departures from the Airport during the Night Period from 2030

The provided forecasts for 2030 include three aircraft types modelled in the Night Period that would breach Condition D

- Based on the provided forecast for 2030, Night Period movements are expected on 3 aircraft types that have a departure QC value above the proposed limit:
  - A330.
  - B767*.
  - B777.
- The total number of Night Period flights (both departures and arrivals) on these aircraft is 3,254 in the provided forecast.
  - However, we have not been provided with the departure versus arrival split.
  - Departure flights (a subset of this total) would be in breach of Condition D.
- On the following pages:
  - We identify passenger carriers that have historically scheduled one of these non-compliant aircraft types on the DUB route, and consider the potential impact in 2030 of Condition D on those operators.
  - We discuss potential impacts of Condition D on cargo operators.

Aircraft Type	Departure QC/ATM	Departure QC Limit (d)	Night Period ATMs 2030
Airbus A330	**2.00**	2.00	**1,627**
Boeing 767	**2.00**		**976**
Boeing 777	**2.00**		**651**
Boeing 787	1.00		976
Airbus A330neo	1.00		325
Boeing 737-800	0.50		6,832
Airbus A320	0.50		6,507
Boeing 737-400	0.50		651
Airbus A350	0.50		325
Embraer E190-E2	0.50		651
Embraer E190/195	0.50		-
Airbus A320neo	0.25		2,603
Airbus A321neo	0.25		2,277
Boeing 737 MAX	0.25		6,182
ATR 72	0.25		1,301
			31,884



*As previously noted, we have not been provided with the split of forecast Night Period ATMs by carrier. The B767 is non-compliant with condition d for departures, but is compliant with condition e for arrivals (see upcoming section). As such it may not be impacted at all (if all if its forecast Night Period movements are all arrivals).

Our analysis indicates some potential impacts on scheduled passenger aircraft – but generally appears manageable

Carrier	Airbus A330 Impact Assessment
Aer Lingus	**LOW** ▼ 4-6 airframes likely still to be in fleet by 2030. ▼ Close to 100% of flying touches DUB, so cannot simply swap to a compliant aircraft. ▲ However, OAG schedules show no Night Period departure ATMs on this type over 2019/21; indicates Night Period ATMs are not essential for Aer Lingus on this type. ▲ As fleet is gradually being retired, it is unlikely that growth (of frequencies or new routes) means Night Period ATMs become essential in future. ▲ This is especially true given the significant time before potential implementation.
American Airlines	**NO IMPACT** ▲ Type already retired. ▲ New aircraft types likely to be compliant with proposal (incl. B787-8/9 already in fleet, A321XLR deliveries 2023-25).
Norwegian	**MINIMAL** ▲ Change of strategy means airline now operates narrowbody aircraft only. ▲ If widebody operations return in future, cost-focus means these are likely to be new (i.e. compliant) aircraft types.
Air Canada	**MINIMAL** ▼ Current fleet of ca. 16 airframes. ▲ Only 1 airframe <10 years old (and this is leased not owned); type likely to be retired by 2030. ▲ Alternative (compliant) types already in fleet (B787-8/9).
Turkish Airlines	**MINIMAL** ▼ Large current fleet (ca. 50 airframes; ca. 35 airframes <10 years old). ▲ Alternative (compliant) types already in fleet (B787-9, A350-900).
Delta Airlines	**MINIMAL** ▼ Large current fleet (ca. 40 airframes; ca. 10 airframes <10 years old). ▲ Alternative (compliant) types already in fleet (A330-900, A350-900).
Etihad	**MINIMAL** ▲ Type already retired. ▲ New aircraft types likely to be compliant with proposal.

Carrier	Boeing 767 Impact Assessment
Delta Airlines	**LOW** ▼ Large fleet of ca. 60 airframes. ▼ All are old but being refitted; investment means they may still be in fleet in 2030. ▼ No like-for-like replacement in fleet/on order. ▲ Compliant type A330-900 is already in fleet and is slightly larger capacity than B767… demand growth between now and 2030 may make this is the appropriate aircraft for DUB by that time. ▲ Even if this is not that case, significant time remains before 2030 for a replacement to enter fleet; any aircraft ordered going forward and intended for use in 2030 is likely to be compliant with the proposed conditions. ▲ No Night Period departure ATMs in 2019/2021 schedules indicates non Night Period timings can work commercially for routes to/from the region.
United Airlines	**MINIMAL** ▼ Large fleet of ca. 50 airframes, currently being refitted; investment means they are likely to still be in the fleet in 2030. ▲ Alternative (compliant) types already in fleet (B787-8/9, A350-900), plus A321XLR from 2024.
Air Canada	**NO IMPACT** ▲ Type already retired. ▲ Alternative (compliant) type already in fleet (B787-8).
Icelandair	**NO IMPACT** ▲ Existing fleet being retired. ▲ Alternative (compliant) type already in fleet (B737 MAX 8/9).

Carrier	Boeing 777 Impact Assessment
United Airlines	**MINIMAL** ▼ Large current fleet (ca. 100 airframes; ca. 20 are <10 years old). ▲ Alternative (compliant) types already in fleet (B787-9/10) plus A350-900 from 2027.
Turkish Airlines	**MINIMAL** ▼ Large current fleet (ca. 30 airframes; majority are <10 years old). ▲ Alternative (compliant) types already in fleet (B787-9, A350-900).
Emirates	**MINIMAL** ▼ Large current fleet (>100 airframes; majority are <10 years old). ▲ Alternative (compliant) types on order (A350-900 & B787-9 from 2023, B777X from 2027).
Etihad	**NO IMPACT** ▲ Type being retired by 2022. ▲ Alternative (compliant) types already in fleet (A350-1000, B787-10), plus B777-9 on order.
Ethiopian Airlines	**MINIMAL** ▲ Type makes up a relatively small proportion of the widebody fleet and existing orders will see this decrease further; may not be in fleet in 2030. ▲ Alternative (compliant) types already in fleet (A350-900, B787-9).

Analysis based on 2019 and 2021 schedules at Dublin Airport.

B767-300 are common cargo aircraft with no obvious alternative in the same size category – and are not compliant with Condition D

- Based on data from flightradar24.com, we have identified cargo carriers that operated at Dublin Airport through a relatively short period in February 2022.
- The table shows the total number of departure movements each operator had in the Night Period*, as well as the number of departure movements that would be non-compliant from 2030 (assuming the aircraft type was not changed over the next 8 years).
- UPS is the only carrier seen to be operating departures on an aircraft type that would become non-compliant in 2030; a Boeing 767-300.
  - This aircraft type makes up a central part of the UPS fleet, and the operator is taking further deliveries over the period to 2025; it is very likely to still be in the UPS fleet in 2030 (and for some time afterwards).
  - UPS does not have a compliant like-for-like type in its fleet, or on order.
- Its departure time is 05:35 (c.a. 06:00 actual).
  - A delay to 07:00 *may* still be commercially viable –feedback from UPS on this would be needed to determine the potential impact.
  - However, a delayed departure may not be compatible with the express cargo requirements; obtaining a slot at 07:00 may also be difficult.
  - We note UPS has another movement outside of the Night Period (Arr 23:35; Dep 21:20).
- It *may* be possible for UPS to make targeted changes to their aircraft in order to ensure compliance with the proposed regulations at Dublin (e.g. different/upgraded engines, a lower MTOW certification); with aircraft on order but not yet delivered, there may be an opportunity for these to be built in.
  - If these actions were viable, they are likely to also have a knock-on impact on operational profitability.
  - Further guidance needed (e.g. from carriers or manufacturers).
- More generally, the B767-300 is a common aircraft for cargo airlines with no current alternative in a similar size category.
  - Condition D may – therefore – constrain some cargo demand at Dublin.
- Of the cargo airlines for which we saw movements in the period, we note that UPS and DHL have both submitted responses to ANCA's recommendations.
  - See appendix for specific comments regarding these submissions.

	# of Night Period Departures	o/w Non-compliant
Bluebird Nordic	9	-
UPS	**5**	**5**
Airest	4	-
NyxAir	4	-
Zimex Aviation	4	-
ASL Airlines	4	-
DHL	1	-

*Operational delays do not impact the analysis ('planned' movement time used), although a window of bad weather was known in advance though the period of data collection; planned flight times may have been adjusted accordingly.

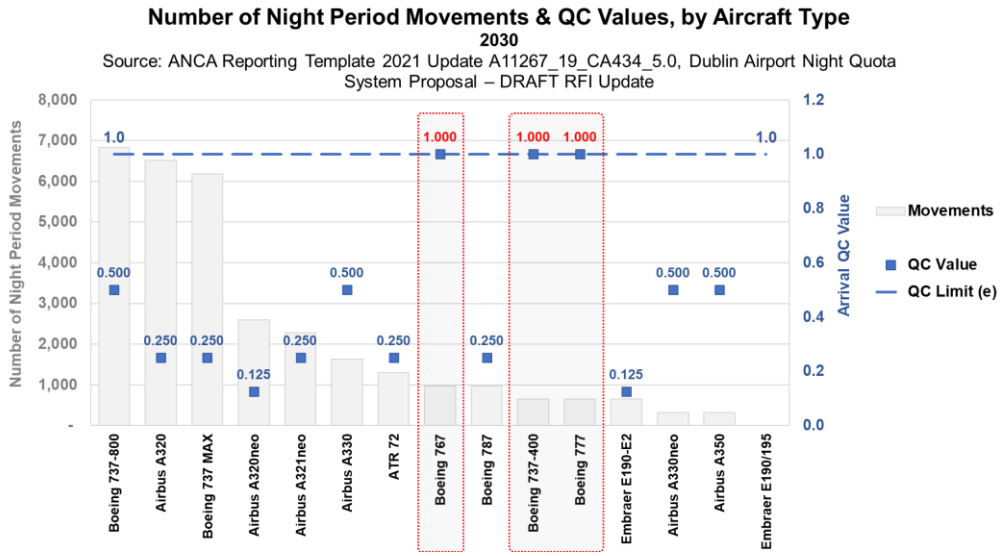
Condition E

Arrivals at the Airport during the Night Period from 2030

The provided forecasts for 2030 include three aircraft types modelled in the Night Period that would breach Condition E

- Based on the provided forecast for 2030, 3 aircraft types with QC values above the proposed limit are expected to operate in the Night Period:
  - B767.
  - B737-400.
  - B777.
- The total number of Night Period flights (both departures and arrivals) on these aircraft is 2,279 in the provided forecast.
  - However, we have not been provided with the departure versus arrival split.
  - Arrival flights (a subset of this total) would be in breach of Condition E.
- On the following pages:
  - We identify passenger carriers that have historically scheduled one of these non-compliant aircraft types on the DUB route, and consider the potential impact in 2030 of Condition D on those operators.
  - We discuss potential impacts of Condition E on cargo operators.
- We note that the arrival QC value for the B737-400 is greater than its departure QC value, and that this is unusual compared with the QC values we have been provided with for other aircraft types.

Aircraft Type	Arrival QC/ATM	Arrival QC Limit (e)	Night Period ATMs 2030
Boeing 767	**1.000**	1.000	**976**
Boeing 737-400	**1.000**		**651**
Boeing 777	**1.000**		**651**
Boeing 737-800	0.500		6,832
Airbus A330	0.500		1,627
Airbus A330neo	0.500		325
Airbus A350	0.500		325
Airbus A320	0.250		6,507
Boeing 737 MAX	0.250		6,182
Airbus A321neo	0.250		2,277
ATR 72	0.250		1,301
Boeing 787	0.250		976
Airbus A320neo	0.125		2,603
Embraer E190-E2	0.125		651
Embraer E190/195			0



Our analysis indicates minimal potential impacts on scheduled passenger aircraft

Carrier	Boeing 737-400 Impact Assessment
Norwegian	**MINIMAL** ▲ Type already retired and replaced with newer (compliant) type/s.
Blue Air	**MINIMAL** ▲ Type already retired and replaced with newer (compliant) type/s.

Carrier	Boeing 767 Impact Assessment
Delta Airlines	**LOW** See comments for 'condition d'. ▲ No Night Period arrival ATMs in 2019/2021 schedules.
United Airlines	**MINIMAL** See comments for 'condition d'.
Air Canada	**NO IMPACT** See comments for 'condition d'.
Icelandair	**NO IMPACT** See comments for 'condition d'.

Carrier	Boeing 777 Impact Assessment
United Airlines	**MINIMAL** See comments for 'condition d'.
Turkish Airlines	**MINIMAL** See comments for 'condition d'.
Emirates	**MINIMAL** See comments for 'condition d'.
Etihad	**NO IMPACT** See comments for 'condition d'.
Ethiopian Airlines	**MINIMAL** See comments for 'condition d'.

Analysis based on 2019 and 2021 schedules at Dublin Airport.

Relatively high proportion of current cargo arrivals in the Night Period are on aircraft that would breach Condition E

- Based on data from flightradar24.com, we have identified cargo carriers that operated at Dublin Airport through a relatively short period in February 2022.
- The table shows the total number of arrival movements each operator had in the Night Period*, as well as the number of arrival movements that would be non-compliant from 2030 (assuming the aircraft type was not changed over the next 8 years).
- The arrival QC limit is significantly more impactful that that departure limit, with 5 cargo carriers currently operating aircraft that would become non-compliant in 2030:
  - B737-400: Bluebird Nordic and ASL Airlines.
  - B767-300: UPS and FedEx.
  - B767-200: Star Air.
- None of these carriers has a like-for-like (and in most cases, any) alternative aircraft type in their fleets or on order.
  - The B767-300 in particular is still being delivered in large numbers to cargo carriers, and is likely to be a central part of cargo fleets past 2030.
- As previously noted, the arrival QC value for the B737-400 is greater than its departure QC value; this is unusual compared with the QC values we have been provided with for other aircraft types.
- It *may* be possible for carriers to make targeted changes to their aircraft in order to ensure compliance with the proposed regulations at Dublin (e.g. different/upgraded engines, a lower MTOW certification).
  - If these actions were viable, they are likely to also have a knock-on impact on profitability.
  - Further guidance needed (e.g. from carriers or manufacturers).
- Nevertheless, it is likely that Condition E could place relatively significant downward pressure on cargo demand at Dublin.
  - Ca. 60% of current Night Period arrivals (based on a very short snapshot) would not be compliant.
  - Of the non-compliant aircraft, B676-200 and B767-300 aircraft do not have any obvious like-for-like replacement aircraft on the horizon. These aircraft operated ca. one-third of current Night Period arrivals (again, based on a limited snap shot).

	# of Night Period Arrivals	o/w Non-compliant
Bluebird Nordic	8	8
ASL Airlines	5	5
UPS	5	5
Star Air	5	5
DHL	5	-
FedEx	5	5
Airest	4	-
NyxAir	4	-
Zimex Aviation	4	-

*Operational delays do not impact the analysis ('planned' movement time used), although a window of bad weather was known in advance though the period of data collection; planned flight times may have been adjusted accordingly).

Conclusions

Cargo carriers are likely to face the most meaningful impacts from the proposed regulations

Our conclusions are presented below, and should be considered in the context of the data limitations previously highlighted.

Impact on Scheduled Passenger Carriers

- We have not identified any scheduled passenger operators that are likely to be significantly impacted in either 2025 or 2030 by any of the proposed QC limits.
- Several airlines *are* operating types on routes to/from Dublin Airport that would become non-compliant in 2030 due to conditions D and/or E.
  - However the large majority are away-based carriers and already have like-for-like compliant types in their fleets (or already have such types on order for delivery before 2030).
- Aer Lingus *is* likely to have non-compliant aircraft based at Dublin Airport in 2030 (A330).
  - However, the carrier currently* does not schedule departures on this aircraft type in the Night Period (while it does schedule arrivals in the Night Period, the type would be compliant for arrivals).
  - As such, any impact would be limited to preventing the carrier from expanding its departures schedule on the A330 aircraft into the Night Period.
  - As the type is being slowly retired from Aer Lingus' fleet, this is not thought likely.
- Delta Airlines currently operates a B767 to Dublin, which is likely to still be in its fleet in 2030.
  - However, the flights to/from Dublin in current* schedules are outside of the Night Period.
  - Therefore any impact on Delta Airlines would be limited to preventing the carrier from expanding its schedule on the type into the Night Period.
  - We note that the carrier currently does not have a like-for-like compliant type in its fleet or on order, but that it *does* already have a slightly larger compliant type in its fleet (demand growth between now and 2030 could make this larger compliant type the preferred aircraft for the DUB route by 2030).

Impact on Cargo Carriers

- A large proportion of Night Period cargo flights we have identified currently operate on aircraft types that would become non-compliant in 2030.
- Many of the impacted cargo carriers do not have alternative compliant aircraft in their fleet.
  - In the case of the B767, these aircraft are still being delivered in large numbers to cargo carriers, and are likely to be central elements of the fleets of many cargo operators past 2030.
  - With enough notice, cargo carriers *may* be able to adapt parts of their fleet to ensure compliance (advice from e.g. manufacturers should be sought on this aspect).
- We note that it is not clear how many of the forecast Night Period ATMs are expected to be cargo movements (it is possible that the balance between cargo and passenger ATMs is different in the Night Period in 2030).
- Overall, conditions D and E have the potential to significantly impact cargo operations at Dublin Airport if the affected operators do not adapt their fleets between now and 2030.

Impact on Charter/Other Carriers

- From the information available to use we do not see a material impact on Charter/Other carriers.
- However we do not have the information necessary to state this with confidence.

*Analysis based on 2019 and 2021 schedules at Dublin Airport.

Appendix I

Comments on Cargo Carrier Consultation Responses

Consultation Summary

Introduction

- Fingal County Council (ANCA) has been running a consultation on the proposed changes to airport regulations. ANCA introduces the consultation as follows:

  "On 18th December 2020, the airport authority for Dublin Airport (daa) submitted a planning application to Fingal County Council Planning Authority seeking to amend prior planning conditions associated with night-time aircraft activity at the airport. The application relates to night time use of the new north parallel runway and changes to permitted night-time aircraft movements across the entire airport. The application was referred to the Aircraft Noise Competent Authority (ANCA) for an assessment of the aircraft noise impact of the application as presented.

  ANCA has now completed this noise assessment and we are now providing the opportunity for all interested individuals, groups, business or organisations to have a say in influencing the outcome of this assessment."

- Subsequent to the completion of the main body of this report, we have been provided with responses to this consultation, from UPS, FedEx and DHL.

- We have been asked to review these responses in order to confirm (or otherwise) that the statements made are consistent with the findings of our independent analysis as presented in the main body of this report.

- We note that the consultation considers the planned regulatory changes as a whole, while this report considers only a single element of these changes (the arrival and departure QC limit on flights in the Night Period).

Conclusions

- The three submissions generally cover similar ground, with the points most relevant to the proposed QC limit for Night Flights being:

  – The importance of night movements to Express cargo.
  – The lack of procurement options for compliant widebody cargo aircraft, even by 2030.

- Both points are broadly consistent with our findings and are reflected in the main body of this report.

- It is clear that the proposed regulations will reduce flexibility for cargo operators and potentially lead to additional costs. However, it is difficult to quantify the impact/cost of adjusting operations to be compliant with the proposed regulations.

  – It is not clear whether the regulatory changes would lead to a reduction in cargo services or services would be broadly maintained but with additional costs and/or worse service for end customers.

  – The submissions from the carriers themselves do touch on this issue at a high level, although there is relatively little discussion of the specific impacts/costs associated with fielding a compliant fleet to DUB by 2030.

Selected extract from consultation submissions

FedEx

"By choosing to eliminate Airbus 300, MD-11, and Boeing 767 and 777 aircraft from the cadre of aircraft allowed to serve DUB at night, the Council will be making the choice to eliminate flexibility to FedEx to respond to changes in market conditions and consumer needs"

"…choosing to ban landing at night of aircraft rated QC1 or greater from January 2030 onward, the Council will be making the choice to eliminate many Boeing 757 aircraft from serving Dublin at night because, depending on the configuration, the Boeing 757 may have a noise profile equal to the proposed QC1 standards."

"FedEx also request reconsideration of the proposed 8-year timeframe for further QC restrictions. Eight years is a fraction of the life-cycle of an aircraft and carriers' fleet renewal plans."

UPS

"UPS currently operates a daily (Mon-Fri) Boeing 767-300 flight at Dublin Airport which connects Dublin and Shannon to our main air gateway in Cologne, Germany:

Arrives 04:50 from Cologne and Departs 05:35 to Shannon
Arrives 20:35 from Shannon and Departs 21:20 to Cologne"

"With customers requiring late afternoon collections and early morning deliveries, the only time we can move export and import shipments is by air and at night."

"…we do feel that the associated aircraft restrictions (Schedule A, Part 2.1) outlined will have a disproportionate impact on air express operators…"

"UPS promotes the development, testing and use of noise mitigation procedures to reduce noise on arrival and departure. These can successfully contribute to actual noise reductions, still allowing the competitive and efficient fleet utilisation of global cargo carriers."

"…express carriers have to use wide-bodied intercontinental freighters which are larger and have a higher QC rating than the aircraft operated by low-cost airlines. With one larger aircraft, we can carry more volume, more efficiently, than a smaller, poorly utilised aircraft.

"…the economic model of the express sector necessitates the use of aircraft for around 25 years"

DHL

"DHL recognizes the need to minimise the environmental impact of the flights we operate. We do this by using techniques such as continuous descent approach, reduced power take offs, re-equipping our air fleet with quieter engines and investing in air fleet improvements"

"DHL notes the modelling which sits behind the NQS proposal is more than two years old."

"DHL is already moving the same volume of cargo in commercial bellyhold as we did in 2019."

"…there is no aircraft projected to come to the freighter market which could meet a 40 tonne payload capacity need for our short haul routes quieter than a QC2 on departure."

"It is our expectation that the majority of aircraft used by all-cargo operators today will still be in operation in 2030".

"…airport specific aircraft restrictions significantly reduce our flexibility to respond to peaks in demand or unforeseen events."

"DHL's analysis of the 2019 fleet suggests 75% of cargo aircraft arriving into DUB have a QC of 1.0 or more...

Similarly, 44% of departing cargo aircraft have a QC of 2.0…"

An tÚdarás Inniúil um Thorann Aerárthaí

Aircraft Noise Competent Authority

ANCA

Regulatory Decision

Appendix O - Regulatory Decision of the Aircraft Noise Competent Authority

An tÚdarás Inniúil um Thorann Aerárthaí

Aircraft Noise Competent Authority

Regulatory Decision

of The Aircraft Noise Competent Authority Pursuant to

Section 34C(14) Planning and Development Act 2000
EU Regulation No 598/ 2014
Aircraft Noise (Dublin Airport) Regulation Act 2019
Planning Register Reference Number: F20A/0668

20th June 2022

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Glossary of Terms

In this report:

Act of 2000 means the Planning and Development Act 2000, as amended

Act of 2019 means the Aircraft Noise (Dublin Airport) Regulation Act 2019

Airport has the same meaning as ascribed to this term by the Act of 2019

Aircraft Noise Regulation means Regulation (EU) No 598/2014 of the European Parliament.

ANCA means Aircraft Noise Competent Authority

Applicant means Dublin Airport Authority plc (daa)

Application means the application made by the Applicant for the taking of a "relevant action" only within the meaning of Section 34C of the Act of 2000 bearing Planning Register Reference No: F20A/0668

Environmental Noise Directive means Directive 2002/49/EC of the European Parliament

Draft RD means the draft regulatory decision, issued by ANCA pursuant to Section 34C(14) of the Act of 2019 on 11 November 2021

Night time means 23:00 hours – 07:00 hours as defined in the Environmental Noise Directive

RD means this regulatory decision to be issued pursuant to Section 34C(14) of the Act of 2019

$\mathbf{L_{night}}$ has the same meaning as ascribed to this term in the Environmental Noise Directive

$\mathbf{L_{den}}$ has the same meaning as ascribed to this term in the Environmental Noise Directive

Preamble

Proposed Development

The Applicant seeks planning permission for a proposed development comprising the taking of a 'relevant action' only within the meaning of Section 34C of the Planning and Development Act 2000, as amended, at Dublin Airport, Co. Dublin, in the townlands of Collinstown, Toberbunny, Commons, Cloghran, Corballis, Coultry, Portmellick, Harristown, Shanganhill, Sandyhill, Huntstown, Pickardstown, Dunbro, Millhead, Kingstown, Barberstown, Forrest Great, Forrest Little and Rock on a site of c. 580 ha.

The proposed relevant action, if permitted, relates to the night time use of the runway system at Dublin Airport. It involves the amendment of the operating restriction set out in condition no. 3(d) and the replacement of the operating restriction in condition no. 5 of the North Runway Planning Permission (Fingal County Council Reg. Ref. No. F04A/1755; ABP Ref. No. PL06F.217429 as amended by Fingal County Council F19A/0023, ABP Ref. No. ABP-305289-19), as well as proposing new noise mitigation measures. Conditions no. 3(d) and 5 have not yet come into effect or operation, as the construction of the North Runway on foot of the North Runway Planning Permission is ongoing.

The proposed relevant action, if permitted, would be to remove the numerical cap on the number of flights permitted between the hours of 23:00 and 07:00 daily that is due to come into effect in accordance with the North Runway Planning Permission and to replace it with an annual night time noise quota between the hours of 23:30 and 06:00 and also to allow flights to take off from and/or land on the North Runway (Runway 10L 28R) for an additional 2 hours i.e. 23:00 to 24:00 and 06:00 to 07:00. Overall, this would allow for an increase in the number of flights taking off and/or landing at Dublin Airport between 23:00 and 07:00 over and above the number stipulated in condition no. 5 of the North Runway Planning Permission, in accordance with the annual night time noise quota.

The relevant action pursuant to Section 34C (1) (a), seeks:

> To amend condition no. 3(d) of the North Runway Planning Permission (Fingal County Council Reg. Ref. No. F04A/1755; ABP Ref. No.: PL06F.217429 as amended by Fingal County Council F19A/0023, ABP Ref. No. ABP-305289-19).
>
> Condition 3(d) and the exceptions at the end of Condition 3 state the following:
>
> *'3(d). Runway 10L-28R shall not be used for take-off or landing between 2300 hours and 0700 hours except in cases of safety, maintenance considerations, exceptional air traffic conditions, adverse weather, technical faults in air traffic control systems or declared emergencies at other airports.'*

Permission is being sought to amend the above condition so that it reads:

> *'Runway 10L-28R shall not be used for take-off or landing between 0000 hours and 0559 hours except in cases of safety, maintenance considerations, exceptional air traffic conditions, adverse weather, technical faults in air traffic control systems or declared emergencies at other airports or where Runway 10L-28R length is required for a specific aircraft type.'*

The net effect of the proposed change, if permitted, would change the normal operating hours of the North Runway from the 07:00 to 23:00 to 06:00 to 00:00.

The relevant action also is:

> To replace condition no. 5 of the North Runway Planning Permission (Fingal County Council Reg. Ref. No. F04A/1755; ABP Ref. No.: PL06F.217429 as amended by Fingal County Council F19A/0023, ABP Ref. No. ABP-305289-19) which provides as follows:

5. 'On completion of construction of the runway hereby permitted, the average number of night time aircraft movements at the airport shall not exceed 65/night (between 2300 hours and 0700 hours) when measured over the 92-day modelling period as set out in the reply to the further information request received by An Bord Pleanála on the 5th day of March, 2007.'

Reason: To control the frequency of night flights at the airport so as to protect residential amenity having regard to the information submitted concerning future night time use of the existing parallel runway'.

With the following:

> *'A noise quota system is proposed for night time noise at the airport. The airport shall be subject to an annual noise quota of 7990 between the hours of 2330hrs and 0600hrs'.*

In addition to the proposed night time noise quota, the relevant action also proposes the following noise mitigation measures:

- A noise insulation grant scheme for eligible dwellings within specific night noise contours
- A detailed Noise Monitoring Framework to monitor the noise performance with results to be reported annually to the Aircraft Noise Competent Authority (ANCA), in compliance with the Aircraft Noise (Dublin Airport) Regulation Act 2019.

The proposed relevant action does not seek any amendment of conditions of the North Runway Planning Permission governing the general operation of the runway system (i.e., conditions which are not specific to night time use, namely conditions no. 3 (a), 3(b), 3(c) and 4 of the North Runway Planning Permission (Fingal County Council Reg. Ref. No. F04A/1755; ABP Ref. No. PL06F.217429) or any amendment of permitted annual passenger capacity of the Terminals at Dublin Airport. Condition no. 3 of the Terminal 2 Planning Permission (Fingal County Council Reg. Ref. No. F06A/1248; ABP Ref. No. PL06F.220670) and condition no. 2 of the Terminal 1 Extension Planning Permission (Fingal County Council Reg. Ref. No. F06A/1843; ABP Ref. No. PL06F.223469) provide that the combined capacity of Terminal 1 and Terminal 2 together shall not exceed 32 million passengers per annum.

The planning application is subject to an assessment by ANCA in accordance with the Aircraft Noise (Dublin Airport) Regulations Act 2019 and Regulation (EU) No 598/2014. The planning application was accompanied by information provided for the purposes of such assessment.

Process of Aircraft Noise Regulation

By Chief Executive Order ref. ANCA\002\2021 dated 10 February 2021, ANCA determined that a noise problem would arise at Dublin Airport from the taking of the Relevant Action as proposed in the Application and commenced the process of aircraft noise regulation as required by Section 34C of the Act of 2000. The process of aircraft noise regulation in this context requires ANCA to define a Noise Abatement Objective, apply the Balanced Approach, and, subject to Section 34C(5) of the Act of 2000, make a regulatory decision. The regulatory decision either sets out the noise mitigation measures or operating restrictions (if any) that ANCA proposes to direct the planning authority to include in the planning authority's decision, if any, to grant permission pursuant to F20A/0668 or confirms that no such conditions are required to be included in the planning authority's decision. This process reflects Ireland's obligations in relation to aircraft noise regulation under Article 5(2) of Regulation EU 598/2014 of the European Parliament and of the Council of 16 April 2014 on the establishment of rules and procedures with regard to the introduction of noise-related operating restrictions at Union airports within a Balanced Approach and repealing Directive 2002/30/EC.

ANCA issued a Direction to Provide Information on 24 February 2021 and daa furnished replies under cover of several responses, the last of which was dated September 13, 2021.

ANCA issued a Notice to the Applicant on 17 September 2021 in accordance with the provisions of Section 34C(8) of the Act of 2000. This Notice informed the Applicant of the noise mitigation measure and operating restrictions. The Notice also advised that the Applicant would have an opportunity to make submissions or observations on the proposed noise mitigation measure and operating restrictions within the period from 17 September 2021 to 19th October 2021, in accordance with Section 34C(8)(b) of the Act of 2000. The Applicant provided observations on those noise mitigation measure and operating restrictions on 12 October 2021.

A DRD and related report was published and made available for submissions and observations through a public consultation process from 11 November 2021 to 28 February 2022, in accordance with Section 34C(12) of the Act of 2000.

Matters Considered

In making this regulatory decision, ANCA had regard to all submissions and observations received during this consultation in addition to those matters to which, by virtue of the Aircraft Noise (Dublin Airport) Regulation Act 2019 (the Act of 2019), it was required to have regard, including:

- International aviation policy, and in particular the Balanced Approach of the International Civil Aviation Organization (ICAO);
- European policy and legislation, including EU Council Directive 2002/49/EC (the Environmental Noise Directive) (as amended), and Regulation EU 598/2014 (the Aircraft Noise Regulation). In a legislative context, EU Regulation No 598/2014 identifies sustainable development as a key objective of the common European transport policy. This requires an integrated approach aimed at ensuring both the effective functioning of transport systems and protection of the environment;
- Applicable domestic legislation, including the Environmental Noise Regulations 2018 and the Act of 2019;
- The findings of the Environmental Report prepared for the purposes of Strategic Environmental Assessment (SEA), and the Natura Impact Statement prepared for the purposes of Appropriate Assessment;

ANCA's consideration of these matters is set out in more detail in the regulatory decision report accompanying this regulatory decision.

In making this regulatory decision, ANCA also had regard to National, Regional and Local Policy including as set out in: –

a) Project Ireland 2040 - National Planning Framework, 2017 (Government of Ireland)

b) National Development Plan 2018-2027, 2018 (Government of Ireland)

c) National Policy Statement on Airport Charges Regulation, 2017 (The Department of Transport, Tourism and Sport (DTTAS))

d) A National Aviation Policy for Ireland, 2015 (The Department of Transport, Tourism and Sport (DTTAS))

e) Regional Spatial and Economic Strategy for the Eastern and Midland Region (RSES) 2019 – 2031, 2019 (Eastern and Midland Regional Assembly)

f) Fingal Development Plan 2017 – 2023, March 2017, Fingal County Council.

g) Variation No. 1 of the Fingal Development Plan 2017 – 2023, September 2019, Fingal County Council.

h) Dublin Airport Local Area Plan, 2020 (LAP), Fingal County Council.

i) Dublin Airport Central Masterplan, 2016, Fingal County Council.

j) Dublin Airport Noise Action Plan 2019 – 2023, 2018 (NAP), Fingal County Council.

k) Dublin Airport Capital Investment Programme 2020+, 2019, daa.

These programmes and policies provide context for the development of Dublin Airport. These define the specific policy positions and actions to demonstrate Ireland's commitment to mitigate the impacts of aviation on the environment and facilitate the sustainable growth of the sector with actions that support the implementation of legislation. ANCA's consideration of these matters is set out in detail in the regulatory decision report accompanying this regulatory decision.

Appropriate Assessment (AA)

ANCA undertook an AA Screening in respect of the Noise Abatement Objective and the regulatory decision arising from an assessment of the noise situation resulting from planning application F20A/0668.

The RD is a plan not directly connected with or necessary to the management of any European Site. However, ANCA considered that it could not be excluded, in view of best scientific knowledge and in view of the conservation objectives of the sites, that the RD, individually or in combination with other plans or projects, will have a significant effect on any European Site and accordingly determined that an Appropriate Assessment of the RD was required. For this reason, it was determined that RD must proceed to Stage 2 (AA) and a Natura Impact Statement (NIS) prepared.

Accordingly, an NIS has been prepared and published for consultation alongside the Noise abatement Objective and the draft regulatory decision.

ANCA had regard to all submissions and observations received during this consultation prior to making the NIS and AA determination.

Strategic Environmental Assessment (SEA)

The RD may set the framework for future development consent of projects listed in Annex I and II to the EIA Directive, including changes or extensions to airfields and airports with a basic runway length of 2,100 metres or more. ANCA is therefore required to undertake an SEA in respect of a Noise Abatement Objective and regulatory decision arising from an assessment of the noise situation resulting from planning application F20A/0668.

Accordingly, an SEA Environmental Report has been prepared and published for consultation alongside the Noise abatement Objective and the draft regulatory decision.

ANCA had regard to all submissions and observations received during this consultation prior to making an SEA Final Environmental Report and SEA Statement.

Reasons for Regulatory Decision

A Noise Abatement Objective (NAO) has been set for Dublin Airport which seeks to *"Limit and reduce the long-term adverse effects of aircraft noise on health and quality of life, particularly at night, as part of the sustainable development of Dublin Airport."*. The NAO sets outcomes which are required with respect to the harmful effects of aircraft noise. The NAO is the relevant policy which applies for decision making in relation to aircraft noise management at Dublin Airport.

The Application as proposed was screened by ANCA and it was determined that a noise problem would arise from the application due to three aspects:

1. The Application proposes an increase in aircraft activity at night, when referenced against the situation that would otherwise pertain, which may result in higher levels of human exposure to aircraft noise.
2. The Application proposes a situation where some people will experience elevated levels of night time noise exposure for the first time which may be considered harmful to human health.
3. The EIAR accompanying the Application indicates that the proposed relevant action will give rise to significant adverse night time noise effects.

Having followed the process of aircraft noise regulation as set out in Section 11 of the Aircraft Noise (Dublin Airport) Regulation Act 2019 which inserts Section 34C into the Planning and Development Act 2000 (as amended) , ANCA has made a regulatory decision requiring the inclusion of three conditions in any planning permission that the planning authority may grant for the proposed development for the reasons set out in the regulatory decision report which accompanies the regulatory decision, including the following principal reasons:

First Condition: Condition 5 of the North Runway Planning Permission shall be revoked and replaced with a Night-time Noise Quota Scheme as described in the First Condition.

The Noise Quota Scheme will limit the impact of aircraft noise at Dublin Airport on communities surrounding the airport in accordance with the NAO. ANCA's Cost Effectiveness Assessment (CEA) identified that while it reduced the population highly sleep disturbed and population exposed above the NAO night-time priority of 55 dB L_{night}, condition 5 was more costly than other means of achieving those aspects of the NAO. Replacing Condition 5 with a Night-Time Noise Quota and associated aircraft type restrictions is a much more cost-effective means of managing and limiting aircraft noise impacts in line with the NAO. It allows the airport to meet its movement forecasts whilst guarding against any risk that the Applicant's noise forecasts are optimistic with respect to fleet modernisation. For example, should the aircraft fleet mix not improve as forecast, the Night-Time Noise Quota will limit the number of night flights. Overall, the Night-Time Noise Quota will place a limit on night-time aircraft noise.

Second Condition: Condition 3(d) of the North Runway Planning Permission shall be revised to apply over the period 00:00 to 05:59 as set out in the Second Condition.

The revision to Condition 3(d) of the Northern Runway Planning Permission will facilitate the operation of runways at Dublin Airport in a manner that minimises the impact of night time noise on communities surrounding Dublin Airport, particularly those newly affected by aircraft night time noise. Although a series of runway use and restriction scenarios were considered by ANCA, the scenario which allows the preferred pattern of operation (Option 7b) as described in Condition 3(a)-(c) of the North Runway Planning Permission to be extended by 2 hours to commence from 06:00 and cease at 00:00 was considered by ANCA to strike a balance between the number of people forecast to be exposed to night time aircraft noise, including the number of people exposed above the NAO night-time priority value of 55 dB L_{night}, and those who may experience significant adverse changes in night time noise exposure. Whilst other options were found to further reduce the number of people exposed above the NAO night-time priority value, these would have resulted in a much greater number experiencing significant adverse changes, and vice versa. The balance struck by extending the preferred pattern of operation also provides continuity between daytime operations and those occurring between 23:00-00:00, and 06:00-07:00.

Third Condition: A Night-Time Residential Sound Insulation Grant Scheme shall be provided in line with Third Condition

The NAO night-time priority of 55 dB L_{night} reflects levels of noise exposure which presents a clear risk to human health. The Residential Sound Insulation Grant Scheme is therefore designed to mitigate the impact of night time aircraft noise in the vicinity of Dublin Airport. Although noise insulation is a relatively costly measure, a noise insulation scheme comprising of suitable measures with eligibility set around the priority value of 55 dB L_{night} will help to mitigate effects on those who become newly exposed to potentially harmful levels of aircraft noise as per the second aspect of the noise problem. It will also benefit those who have already been exposed to noise above this priority value and would continue to do so in the future. By further allowing those who are forecast to experience very significant effects in 2022 and 2025 to benefit from insulation under the scheme will further reduce the number of people highly sleep disturbed.

Pursuant to Section 34C(10) and (14) of the Planning and Development Act 2000, ANCA directs the planning authority to include the noise mitigation measure and operating restrictions specified in this regulatory decision as conditions of any decision that the planning authority may make on planning permission for the proposed development the subject of planning register reference F20A/0668.

Conditions

First Condition:

The existing operating restriction, Condition 5, of the North Runway Planning Permission (FCC Reg. Ref: F04A/1755; ABP Ref: PL06F.217429) reading as:

'On completion of construction of the runway hereby permitted, the average number of night time aircraft movements at the airport shall not exceed 65/night (between 2300 hours and 0700 hours) when measured over the 92 day modelling period as set out in the reply to the further information request received by An Bord Pleanála on the 5th day of March, 2007'

shall be revoked and replaced with an annual noise quota scheme operating restriction as follows:

The Airport shall be subject to a Noise Quota Scheme (NQS) with an annual limit of 16,260 between 23:00 and 06:59 (inclusive, local time) with noise-related limits on the aircraft permitted to operate at night. The NQS shall be applied as detailed below.

Part 1 Definitions

1.1 The following definitions shall apply with reference to the scheme described in Part 2.

Term	Meaning
Annual Quota Period	The twelve-month period from 1 April to 31 March inclusive each year
EASA Noise Certification Database	The database of noise certification levels approved and as varied from time to time by the European Union Aviation Safety Agency (EASA) and published on its website. (https://www.easa.europa.eu/domains/environment/easa-certification-noise-levels). The noise levels are established in compliance with the applicable noise standards as defined by International Civil Aviation Organization (ICAO) Annex 16 Volume 1.
Night time	The hours at night between 23:00 (local time) to 07:00 (local time)
Noise Classification Level (NCL)	The noise level band in EPNdB assigned to an aircraft for take-off or landing, as the case may be, for the aircraft in question for the purposes of identifying the Quota Count of the aircraft. The Noise Classification Level for an aircraft taking off from and landing at the Airport shall be taken from the Flyover Level from the EASA Noise Certification Database: *NCL(Take-Off) = EPNL(Flyover)* *NCL(Landing) = EPNL(Approach) –9 dB*

Quota Count

The amount of the quota assigned to one take-off or to one landing by an aircraft based on the Noise Classification Level for the aircraft having regard for engine type and take-off weight:

Noise Classification Level	Quota Count (QC)
Greater than 101.9 EPNdB	16.0
99-101.9 EPNdB	8.0
96-98.9 EPNdB	4.0
93-95.9 EPNdB	2.0
90-92.9 EPNdB	1.0
87-89.9 EPNdB	0.5
84-86.9 EPNdB	0.25
81-83.9 EPNdB	0.125
Less than 81 EPNdB	0

Part 2 – Noise Quota Scheme

2.1 Subject the dispensations described in Paragraph 2.2:

a. A take-off or landing at the Airport shall be determined to fall within the night time based on runway time.

b. No aircraft with a Quota Count of 4.0 or more shall be permitted to take off at the Airport during the night time.

c. No aircraft with a Quota Count of 2.0 or more shall per permitted to land at the Airport during the night time.

d. Each aircraft landing at or taking off from the Airport during the night time will be assigned a Quota Count based on its Noise Classification Level.

e. The Noise Quota at the Airport shall be limited to 16,260 for the Annual Quota Period.

2.2 The restrictions set out in Paragraph 2.1 shall not apply in any of the following dispensations:

a. Where a take-off or landing of any aircraft at the Airport is made in an emergency, where there is an immediate danger to life or health, whether human or animal.

b. Where a take-off or landing of any aircraft at the Airport occurs as a result of a delay to that aircraft which is likely to lead to serious congestion at the Airport and/or serious hardship or suffering to passengers or animals.

c. Where a take-off or landing of any aircraft at the Airport occurs as a result of widespread and prolonged disruption of air traffic.

d. Flights for military, medical or humanitarian purposes granted exemption by the Irish Government

Part 3 – Noise Quota Scheme Reporting Requirements

3.1 The Applicant shall submit quarterly reports to the planning authority and ANCA on its implementation of the Noise Quota Scheme. The reports shall include:

a. The number of aircraft operating during the Noise Quota Period and their type, including technical details including their engines and take-off weights, where applicable;

b. The Quota Count assigned to aircraft operating in the Noise Quota Period;

c. The total Noise Quota used during the quarter and in the Annual Period to date;

d. The total Noise Quota used by Quota Count in the quarter and in the Annual Period to date; and

e. Details of any dispensations pursuant to Paragraph 2.2 which have been relied upon during the quarter and in the Annual Period to date.

3.2 The quarterly reports shall be issued so that:

a. The first quarterly report considering activity over the period 1 April to 30 June each year is published by no later than the 30 September each year

b. The second quarterly report considering activity over the period 1 July to 30 September each year is published by no later than the 31 December each year

c. The third quarterly report considering activity over the period 1 October to 31 December each year is published by no later than the 31 March the following year

d. The fourth quarterly report considering activity over the period 1 January to 31 March each year is published by no later than the 30 June each year

Part 4 – Noise Performance Reporting

4.1 The Applicant shall issue annual reports to the planning authority and ANCA on its noise performance. The report for the previous Annual Period (1 January to 31 December) shall be issued by no later than 31 March each year, for the first full Annual Period to which this regulatory decision applied and comprise of:

a. Noise exposure statistics and contours as required to facilitate performance review of the Noise Abatement Objective including as a minimum:

- Annual 55dB L_{night}
- Annual 65dB L_{den}
- the number of people 'highly sleep disturbed' and 'highly annoyed' in accordance with the approach recommended by the World Health Organisation's Environmental Noise Guidelines 2018 as endorsed by the European Commission through Directive 2020/367, taking into account noise exposure from 45 dB L_{den} and 40 dB L_{night}.
- Annual L_{night} contours from 40 dB in 5 dB increments
- Annual L_{den} contours from 45 dB in 5 dB increments
- Summer 60 dB $L_{Aeq.\ 16hr}$, 63 dB LAeq. 16hr and 69 dB $L_{Aeq.\ 16hr}$ (measured averaged across 92-day summer period from 16th June to 15th September).

b. Confirmation of the number of residential properties that (i) have benefitted from and (ii) are eligible for but yet to benefit from the Applicant's noise insulation schemes.

c. Key Statistics with respect to aircraft operations in the preceding Annual and Summer Periods including but not limited to:

- aircraft movements including average hourly movements
- use of the Noise Quota Scheme
- movements by aircraft type
- passenger numbers
- aircraft destinations
- flight routings
- runway use

d. Summaries from noise monitoring terminals for the Airport in such format as ANCA shall stipulate

e. Details of all noise modelling undertaken in support of the Noise Performance Reporting describing compliance with the methodology set out in Directive 2015/996 (ECAC Doc.29 4th Edition). All noise modelling shall be validated using local noise and track keeping performance data from the Airport's systems.

f. Summary of complaints records for the preceding Annual Period categorised by the:

- location of complaints; and
- reason for complaint

g. Details of any anticipated changes or developments that may affect noise at the Airport in the current year, through for example airspace change or fleet modernisation.

REASON:

To limit the impact of the aircraft noise at Dublin Airport on sleep disturbance in the interest of residential amenity and to ensure the effective implementation of the Noise Abatement Objective for the Dublin Airport by means of a noise-related limit on aircraft operations.

Second Condition

The existing operating restriction imposed by Condition 3(d) and the exceptions at the end of Condition 3 of the North Parallel Runway Planning Permission (FCC Reg. Ref: F04A/1755; ABP Ref: PL06F.217429) reading:

3(d). Runway 10L-28R shall not be used for take-off or landing between 2300 hours and 0700 hours. except in cases of safety, maintenance considerations, exceptional air traffic conditions, adverse weather, technical faults in air traffic control systems or declared emergencies at other airports.'

shall be amended as follows:

Runway 10L/28R shall not be used for take-off or landing between 00:00 and 05:59 (inclusive, local time) except in cases of safety, maintenance considerations, exceptional air traffic conditions, adverse weather, technical faults in air traffic control systems or declared emergencies at other airports or where Runway 10L/28R length is required for a specific aircraft type.

REASON:

To permit the operation of the runways in a manner which reduces the impacts of aircraft night time noise, whilst providing certainty to communities as to how they will be affected by night time operations from the North Runway, while also providing continuity with the day-time operating pattern set down by Conditions 3(a)-(c) of the North Runway Planning Permission.

Third Condition:

A voluntary residential sound insulation grant scheme (RSIGS) for residential dwellings shall be provided. Initial eligibility to the scheme shall apply to all residential dwellings situated within the Initial Eligibility Contour Area as shown in Figure 3.1 - regulatory decision, Third Condition. Residential Sound Insulation Grant Scheme (RSIGS) - Initial Eligibility Contour Area – June 2022.

Eligibility to the scheme shall be reviewed every 2 years commencing in 2027 with residential dwellings situated in the 55 dB L_{night} contour being eligible under the scheme as detailed below.

Part 1 Definitions

1.1 The following definitions shall apply with reference to the scheme described in Part 2.

Term	Meaning
Approved Contractor	A contractor procured and managed by the Applicant and considered competent and appropriately qualified and have suitable levels of insurance coverage to install the sound insulation measures described in Part 4 in line with acceptable standards and in compliance with the Building Regulations.
Bedroom	A room other than in an attic or loft within an Eligible Dwelling which is used as sleeping accommodation.
Competent Surveyor	An appropriately qualified surveyor to inspect and determine relevant information in relation to the existing construction and elements of an Eligible Dwelling for the purposes of undertaking an Elemental Analysis as defined in Part 5.1, Step 5 below.
Eligibility Contour Area	The 55 dB L_{night} contour area as varied from time to time pursuant to the review process set out in Part 3.2 below.
Eligible Dwelling	A habitable dwelling built in compliance with the provisions of the building regulations and the Planning and Development Act within the Eligibility Contour Area and which otherwise qualifies under the conditions set out under Part 3.1 below.
Index Linked	Index-linked by reference to changes in the Consumer Price Index (CPI) (maintained by the Central Statistics Office) in the period between the Application and the date of the Statement of Need.
Initial Eligibility Contour Area	The area shown on the map Figure 3.1 - regulatory decision, Third Condition. Residential Sound Insulation Grant Scheme (RSIGS) - Initial Eligibility Contour Area – June 2022.
Relevant External Noise Level	The noise exposure level at the relevant Eligible Dwelling.
Statement of Need	The recommended measures identified from those available under the scheme as outlined in Part 4
Target Performance	An improvement of at least 5 dB, where feasible, in the sound insulation of each bedroom of the Eligible Dwelling. Where possible, the guidelines recommended in BS8233:2014 for internal ambient noise levels shall be targeted.

Part 2 – Purpose of the Scheme

2.1 The purpose of the scheme is to provide financial assistance by the Applicant to property owners in the form of a grant in the sum of €20,000 (Index Linked) towards the costs of noise insulation measures to Bedrooms in Eligible Dwellings (the Grant).

2.2 Bedrooms and properties may qualify only once for the financial assistance provided under this scheme.

2.3 Where a dwelling is eligible under this scheme but is also eligible for insulation under the Residential Noise Insulation Scheme (RNIS) and the Home Sound Insulation Programme (HSIP) best endeavours shall be made by the Applicant to ensure that the dwelling receives insulation under RNIS and HSIP instead of this scheme.

Part 3 – Eligibility

3.1 Dwellings shall be determined to be Eligible Dwellings under this scheme if they are located within (i) the Initial Eligibility Contour Area as shown in Figure 3.1 - regulatory decision, Third Condition. Residential Sound Insulation Grant Scheme (RSIGS) - Initial Eligibility Contour Area – June 2022 or (ii) the Eligibility Contour Area (following any review carried out pursuant to Part 3.2 below) and:

a. Were constructed pursuant to a planning permission granted following a planning application lodged on or prior to 09th December 2019, being the date of adoption of Variation No. 1 to the Fingal Development Plan 2017 – 2023 incorporating policies relating to development within Aircraft Noise Zones and

b. Have not benefitted from noise insulation previously under this scheme; and

c. Have not benefitted from noise insulation under either the RNIS or HSIP schemes previously.

3.2 By 31 March 2027 and every two years thereafter, the Applicant shall update and publish a revised Eligibility Contour Area map identifying all authorised habitable dwellings within the 55 dB L_{night} contour in the calendar year immediately preceding the review.

Part 4 – Measures available under the Scheme

4.1 The owner of an Eligible Dwelling in accordance with Part 3 and following the procedure described in Part 5 shall be entitled to the Grant to be applied towards a selection of insulation measures to be applied to Bedrooms within an Eligible Dwelling as specified in Paragraphs 4.2 to 4.10 below.

4.2 The insulation measures referred to in Paragraph 4.1 must be installed by an Approved Contractor and comprise of the following unless the equivalent measure already exists within the Eligible Dwelling:

a. Primary Acoustic Glazing
b. Secondary Acoustic Glazing
c. Glazing Roof Light
d. Passive Ventilator
e. Mechanical Ventilator
f. Loft Insulation
g. Ceiling Overboarding

4.3 The sound installation measures provided under this scheme shall otherwise comply with the specification of the measures in place under the RNIS scheme as summarized in Part 5 below.

4.4 Where secondary acoustic glazing is to be installed, this shall meet the following specification, namely, 6.4mm laminated glass with minimum 100mm gap from the primary glazing unit. However, where this is not possible, the secondary glazing should be provided to account for the below variations.

Thickness of Glazing of the Inner Window	Minimum Horizontal Distance
Less than 4 mm and not less than 3 mm thick	200 mm
Less than 6 mm and not less than 4 mm thick	150 mm

4.5 Where secondary glazing is being installed reasonable endeavours will be made to repair the draft seals, catches and hinges to provide an air-tight seal on the existing primary glazing unit.

4.6 Where a replacement primary acoustic glazing is to be provided, this shall achieve a minimum Rw of 43 dB tested and rated to BS EN ISO 140-3 and BS EN ISO 717.

4.7 Where ventilators (passive or mechanical) are to be provided, a ventilation strategy for the bedrooms within each Eligible Dwelling shall be determined in accordance with Part F of the Building Regulations. Mechanical ventilation shall comprise of a ventilator unit consisting of a controlled variable- speed inlet fan with sound attenuating duct and cover that is capable of supplying fresh air to the room directly from outside by means of the supply duct and cowl (or grille).

4.8 Where no loft insulation is present in an Eligible Dwelling 200mm of fibrous acoustic insulation may be placed between ceiling joists, the insulation is to have a minimum density of 80kg/m3. Where insulation is already present but found to be unsatisfactory additional layers of insulation will be added to increase the total thickness to 200mm.

4.9 Any ceiling overboarding shall comprise of a continuous layer of mass to provide at least 12kg/m^2 added above joists in attic, for example 22mm plywood (or similar approved).

4.10 In the event that loft Insulation or loft boards cannot be installed due to inaccessibility or other practical reasons, any ceiling overboarding shall comprise a dense plasterboard with a total minimum surface mass of 12 kg/m2, i.e. 15mm SoundBloc (or similar approved).

Part 5 – Procedure

5.1. The Applicant in operating this Scheme shall follow the procedure set out in this Part 5 as required in the discharge of the Applicant's obligations under Condition 7 of the North Runway Consent, the discharge of which obligations is achieved through the RNIS.

Step 1 – Determine Eligibility - Eligible Dwellings shall be identified as per Part 3 of this Schedule.

Step 2 – Notification of Eligibility - The Owner of an Eligible Dwelling shall be notified of their eligibility under the scheme within six months of their eligibility being determined under Step 1.

Step 3 – Determine Relevant External Noise Level - The Relevant External Noise Level at the Eligible Dwelling shall be determined

Step 4 – Undertake Building Survey – The Applicant shall use reasonable endeavours to arrange for the Eligible Dwelling to be inspected by the Competent Surveyor (and secure the necessary agreement to this from the owner of the Eligible Dwelling) within six months of eligibility being determined to record relevant information. The building survey shall be carried out by a Competent Surveyor appointed on behalf of the Applicant. The survey shall record the location and number of Bedrooms, and for each Bedroom record the following relevant information:

- External wall constructions - where possible the construction type of the external walls will be recorded for example wall composition including inner leaf, cavity, and external leaf dimensions including all associated building materials;
- Window type – e.g. frame material, single glazing, double glazing, including key dimensions;
- Roof construction – including where possible roof construction type
- Details of chimneys and fireplaces
- Ventilation paths – e.g. existing wall and floor vent types, quantities and dimensions
- Details of any existing sound insulation measures which have been installed previously
- Dimensions of all Bedrooms including window, roof and wall dimensions
- Drawings and/or floor plans – if these are available from the owner
- Photographic records of the building

Step 5 – Elemental Analysis - An elemental analysis shall be undertaken to provide a technical assessment of the noise insulation required for the Eligible Dwelling. The following process shall be followed:

a. The existing sound insulation properties of each Bedroom shall be established

b. The anticipated future internal noise levels within each Bedroom having regard for the Relevant External Noise Level, presented in octave bands scaled from measurements taken around the Airport, and the existing noise insulation performance obtained from Step a.

c. A comparison shall be made between the anticipated internal noise level to the BS8233:2014 Targets for internal ambient noise;

d. An assessment will be undertaken to determine the required improvement in the noise insulation performance, having regard for the Target Performance.

e. Through an elemental analysis, the most effective combination of measures set out in Part 4 having regard for the Target Performance and the financial assistance grant shall be identified.

Step 6 – Statement of Need - A Statement of Need shall be prepared for each Eligible Dwelling. The Statement of Need will be a bespoke document for each Eligible Dwelling. The Statement of Need shall:

a. Describe the existing sound insulation performance for each Bedroom having regard for the Building Survey as described in Step 4

b. Identify the potential improvement in the existing sound insulation performance for each Bedroom as can be afforded within the Grant and whether the Target Performance can be met

c. Set out the recommended set of measures for the Eligible Dwelling in the form of a schedule of works and the associated measures on a bedroom-by-bedroom basis

d. Provide an opinion on the future internal noise level following the implementation of the noise insulation works and the ability of the works to the meet Target Performance.

The Statement of Need shall be issued to the owner of the Eligible Dwelling.

Step 7 – Acceptance - Subject to the owner of the Eligible Dwelling agreeing to the scope of works as defined under the Statement of Need, the engagement of the Approved Contractor and access to the dwelling by the Approved Contractor for the purposes of undertaking the works, the Airport will use reasonable endeavours to procure that the Approved Contractor undertakes the scope of works within six months of the owner's agreement to the same.

Step 8 – Works – The scope of works as defined by the Statement of Need shall be undertaken by the Approved Contractor or a suitably qualified contractor procured by the home owner. The Applicant shall procure the Approved Contractor to ensure that the works are undertaken to the necessary standards and in compliance with the necessary regulations and that the Approved Contractor provides the owner with all appropriate certification and warranties relative to the works completed to the Eligible Dwelling. The Approved Contractor shall photograph the Eligible Dwelling before and after the works for record purposes.

5.2 In the event that a property owner declines to accept the scope of works as defined under the Statement of Need (Step 6) the Applicant shall make a grant available towards the costs of sound insulation measures through the Approved Contractor equal to the cost of the measures identified through the Statement of Need. This grant may be used by the owner to request alternative measures providing they as a minimum meet the Target Performance. Where the alternative measures are calculated to cost more than the cost of the measures identified through the Statement of Need, any difference shall be at the expense of the owner.

5.3 In the event that a property owner wishes to appoint their own competent contractor, the Applicant will provide a specification for the works. The property owner must provide a written quotation from their competent contractor for approval of both the identity of the contractor and the quotation by the Applicant. Following approval, the property owner shall be responsible for managing the works and making payments to their contractor and the provisions of this Schedule B shall be deemed to be amended accordingly. Upon completion of the works, the Applicant will carry out an inspection and issue payment to the property owner. Where works are not carried out in accordance with the approved specification, payment will not be made by the Applicant. Where works are not carried out in accordance with the approved specification, payment will not be made by the Applicant. The Applicant must act reasonable in the approvals process, but if the Applicant does not approve of the contractor or the quotation, payment will not be made by the Applicant.

REASON:

To mitigate the impact of aircraft night time noise as a result of the use of the Airport's runways.

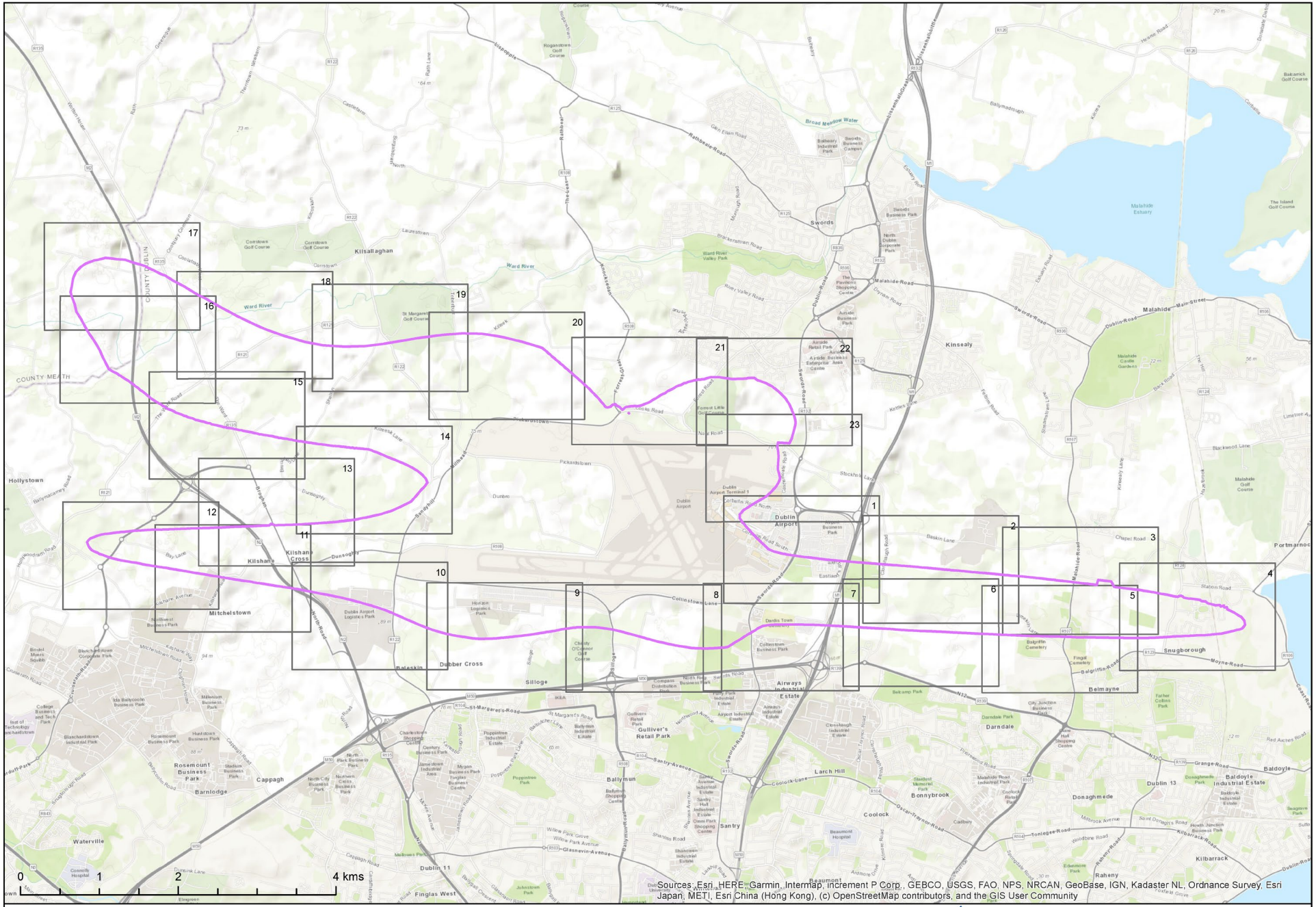

Figure 3.1 – Regulatory Decision, Third Condition.
Residential Sound Insulation Grant Scheme (RSIGS) - Initial Eligibility Contour Area - June 2022

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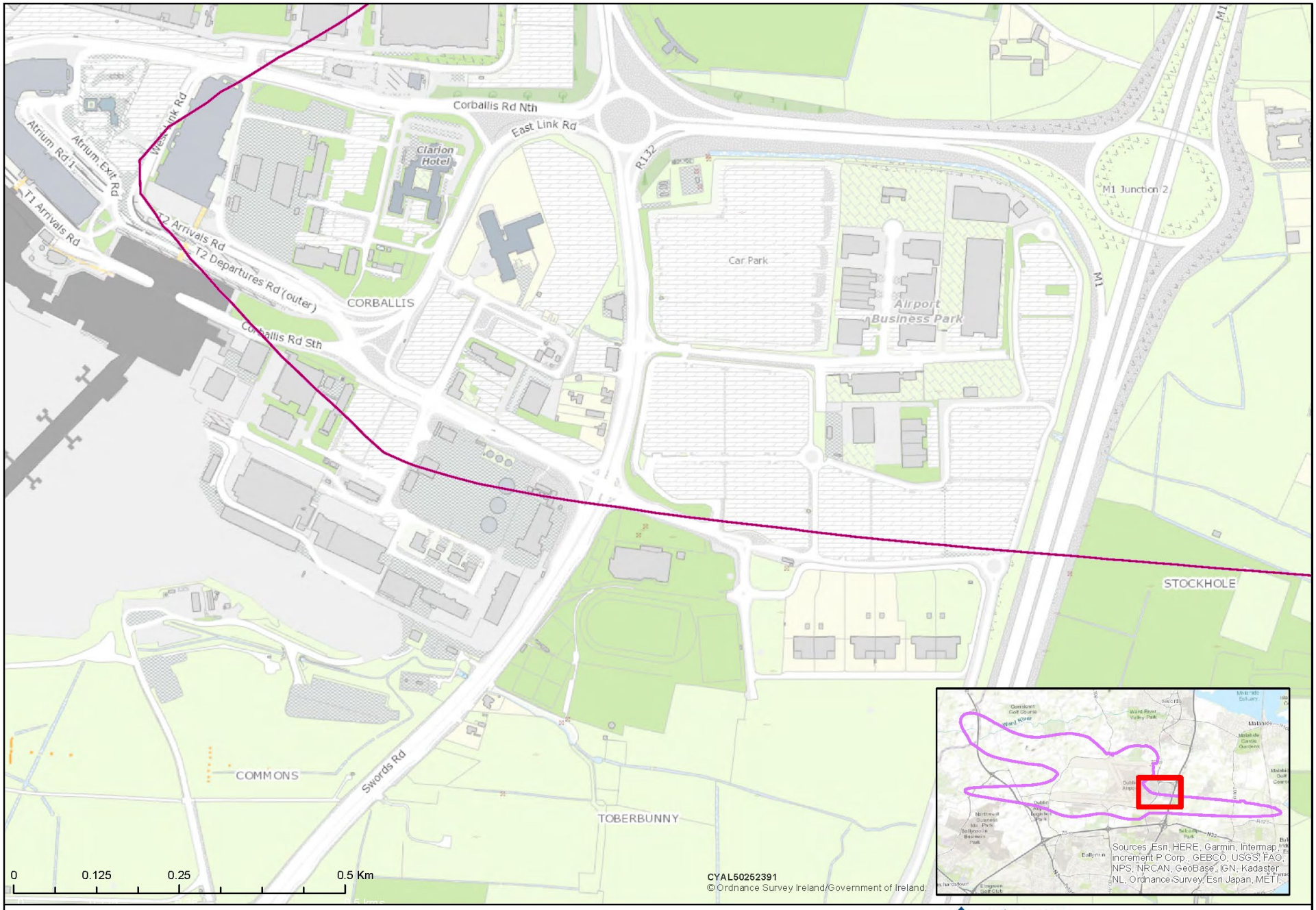
The following maps are provided for clarity and are enlarged elements of the Figure 3.1 Regulatory Decision, Third Condition. Residential Sound Insulation Grant Scheme (RSIGS) - Initial Eligibility Contour Area – June 2022



Residential Sound Insulation Grant Scheme (RSIGS) - Initial Eligibility Contour Area - June 2022

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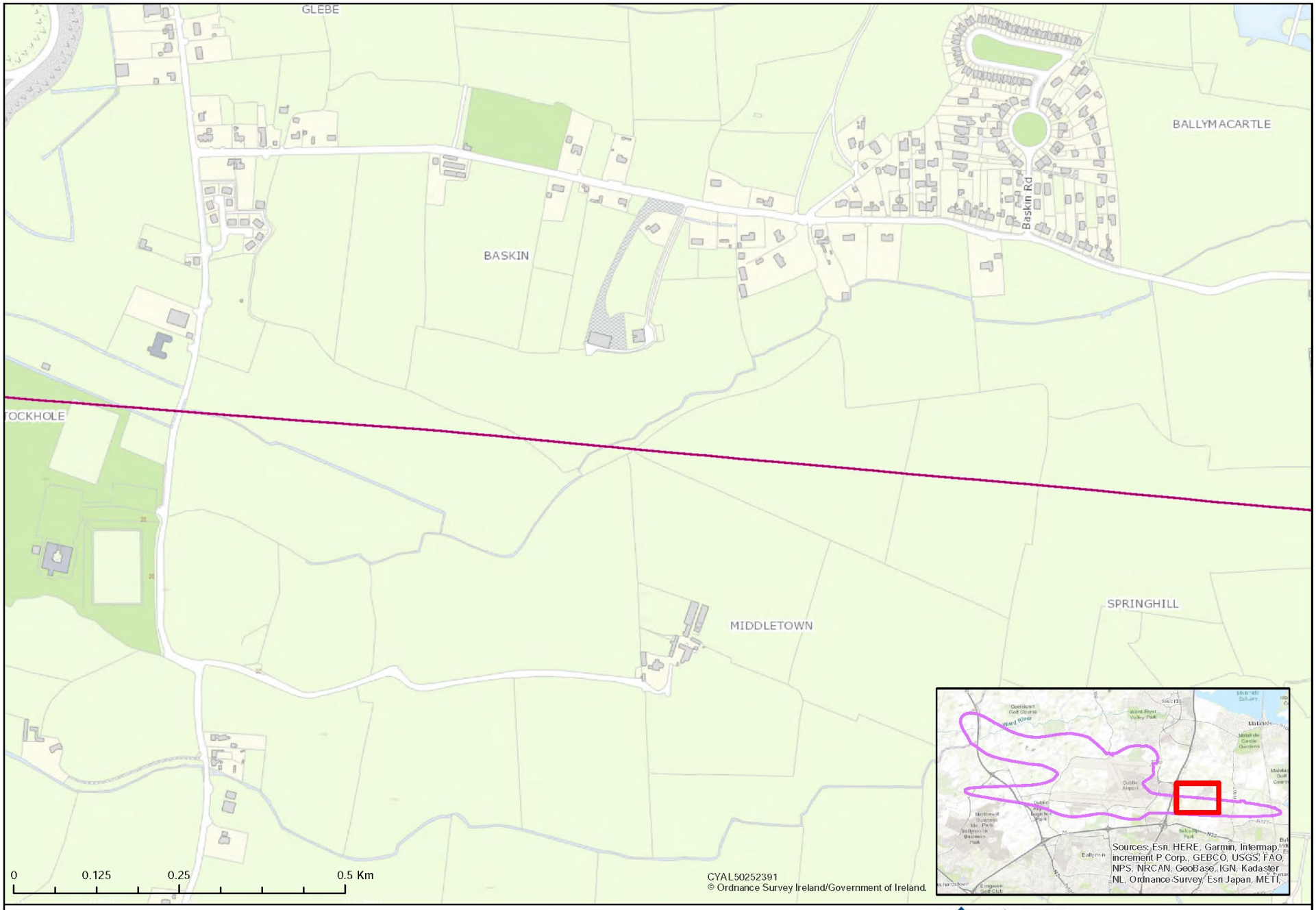
Map 1



Residential Sound Insulation Grant Scheme (RSIGS) - Initial Eligibility Contour Area - June 2022

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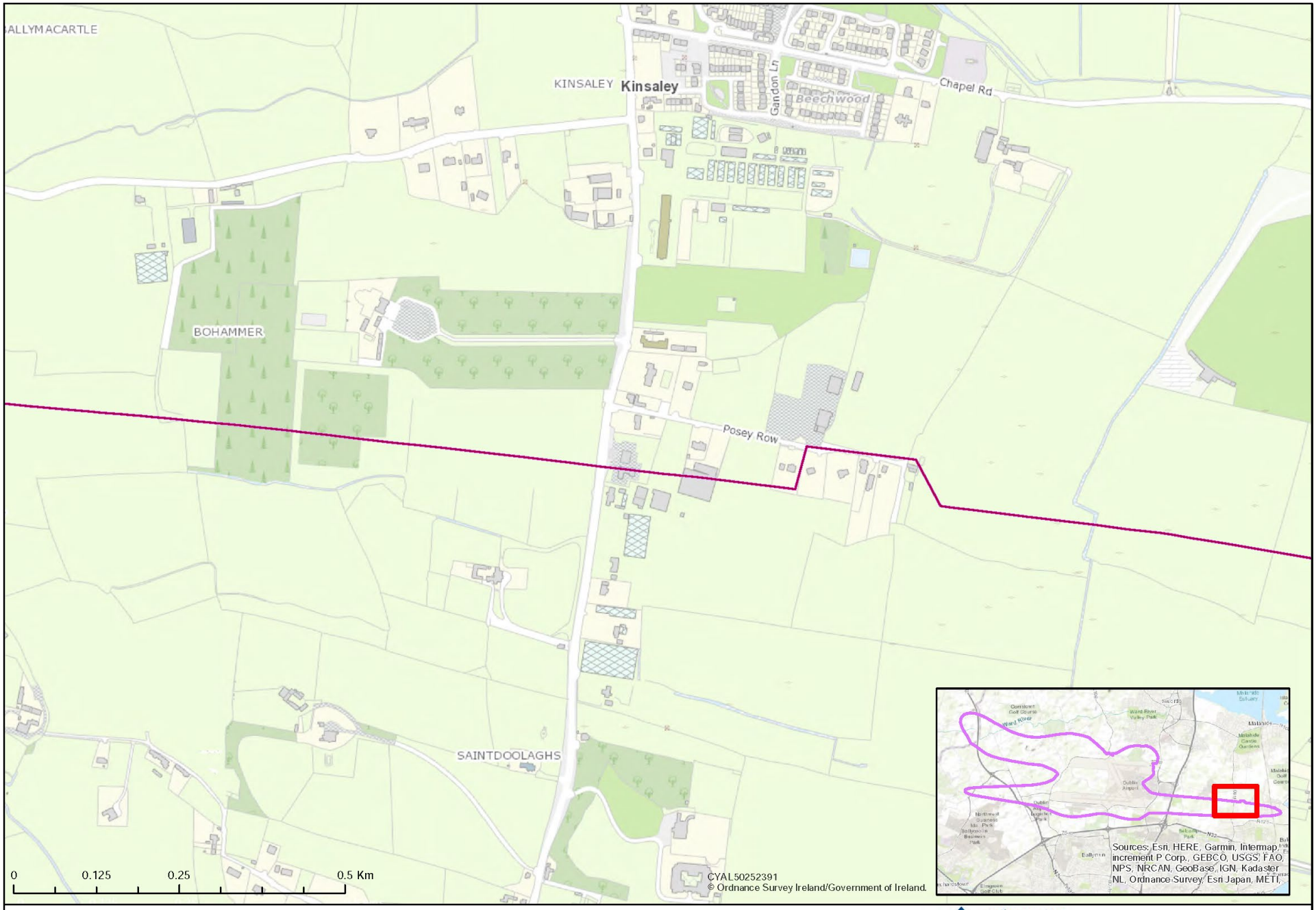
Map 2



Residential Sound Insulation Grant Scheme (RSIGS) - Initial Eligibility Contour Area - June 2022

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Map 3

Residential Sound Insulation Grant Scheme (RSIGS) - Initial Eligibility Contour Area - June 2022

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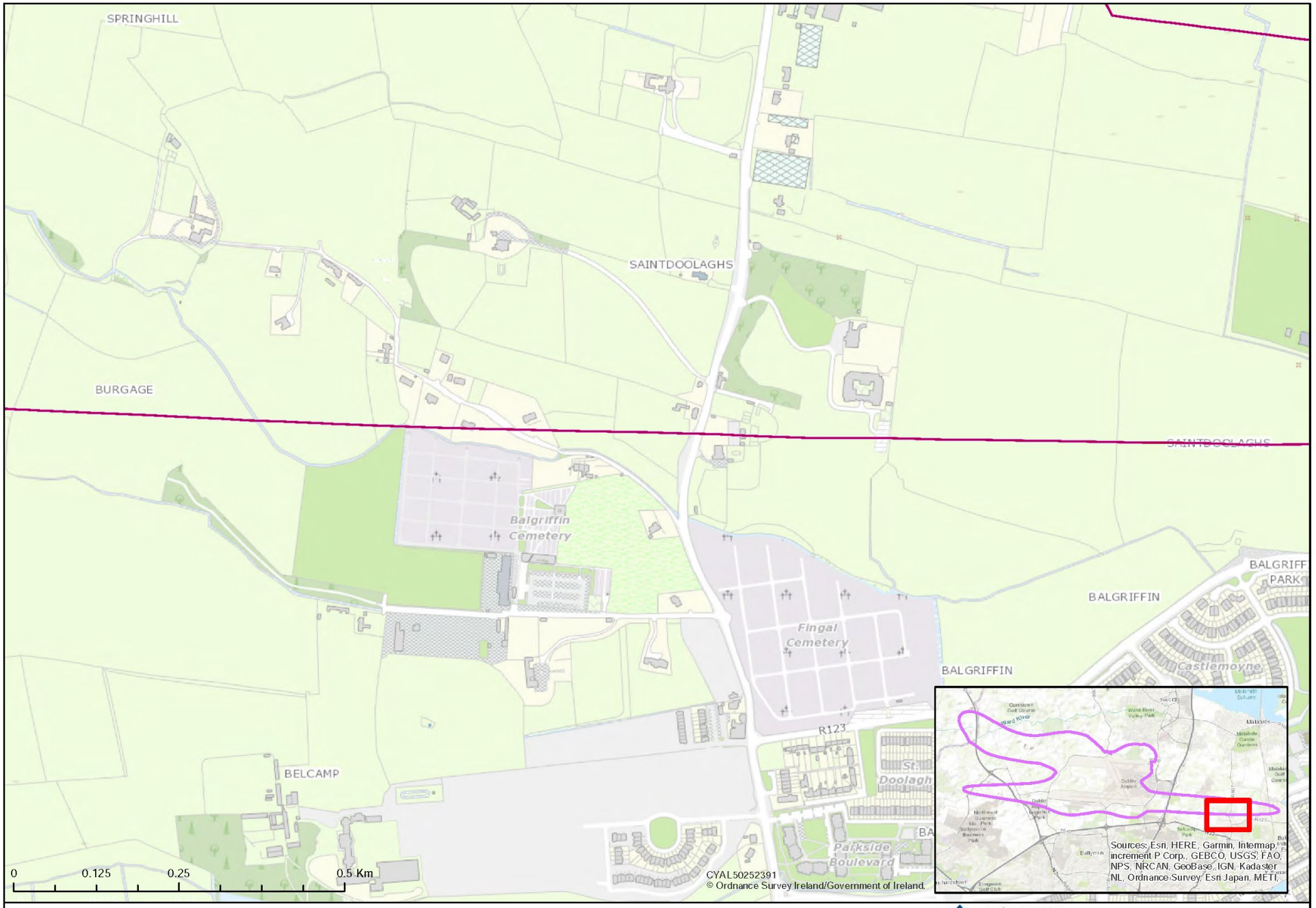
Map 4



Residential Sound Insulation Grant Scheme (RSIGS) - Initial Eligibility Contour Area - June 2022

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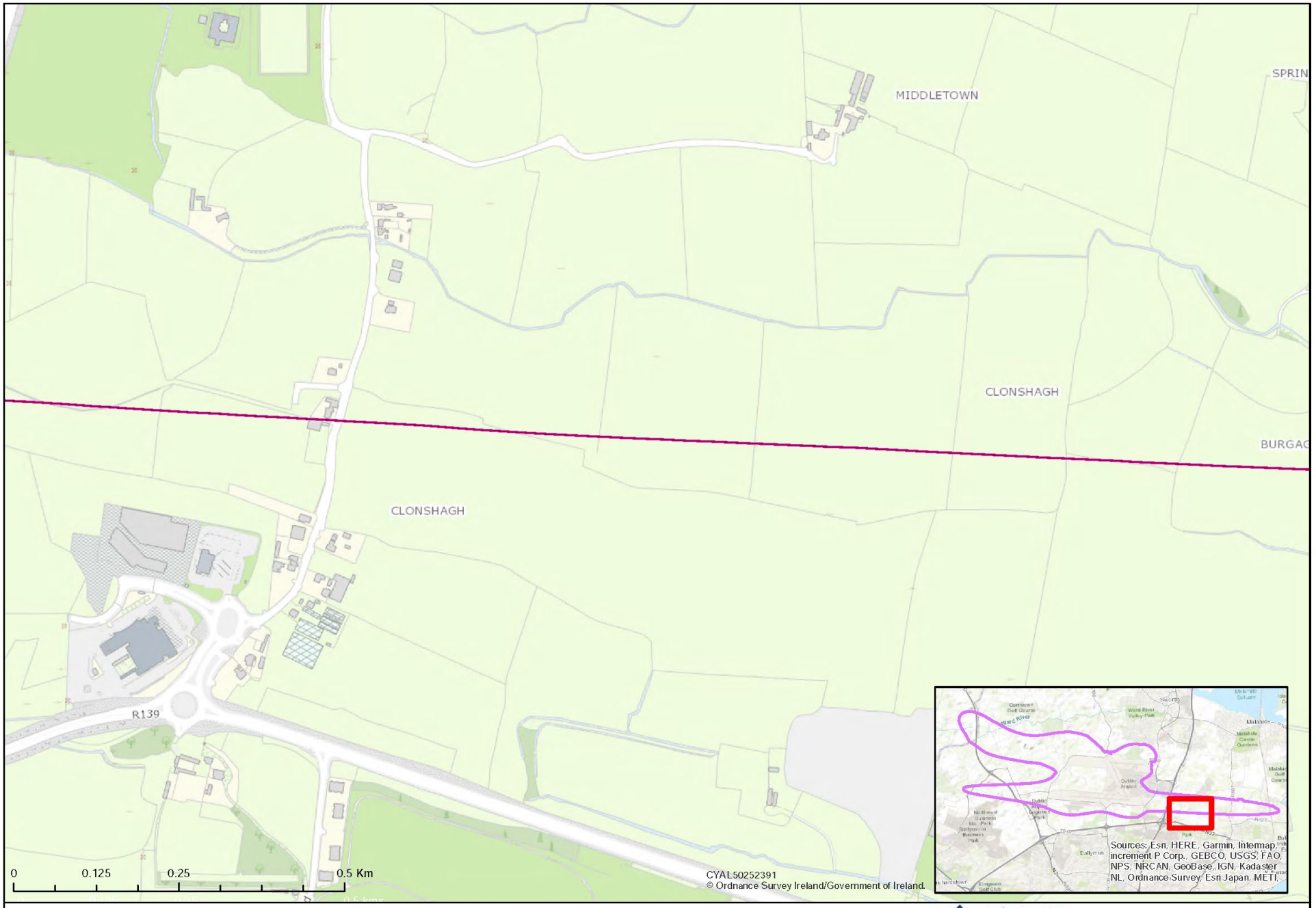
Map 5



Residential Sound Insulation Grant Scheme (RSIGS) - Initial Eligibility Contour Area - June 2022

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Map 6

Residential Sound Insulation Grant Scheme (RSIGS) - Initial Eligibility Contour Area - June 2022

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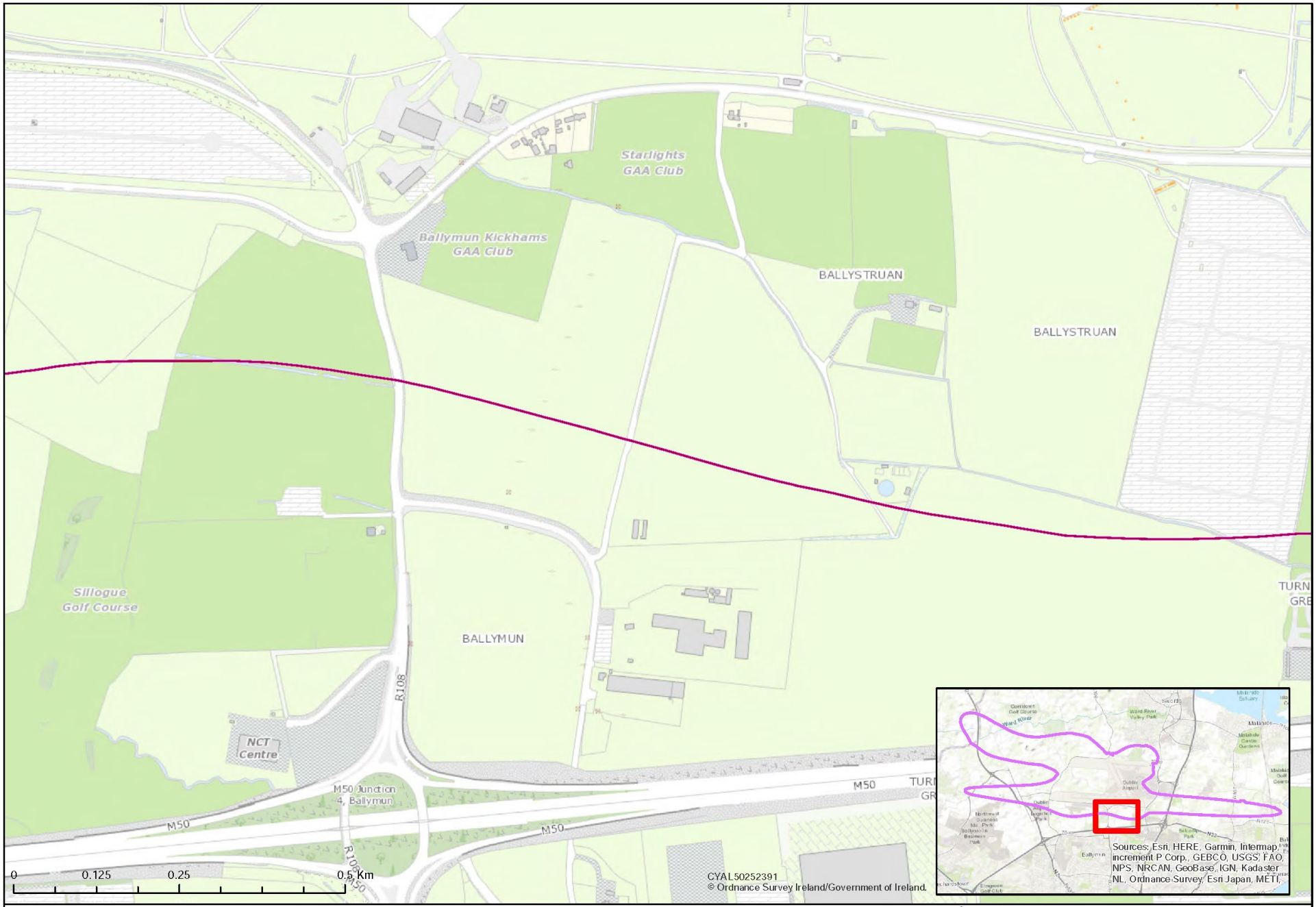
Map 7



Residential Sound Insulation Grant Scheme (RSIGS) - Initial Eligibility Contour Area - June 2022

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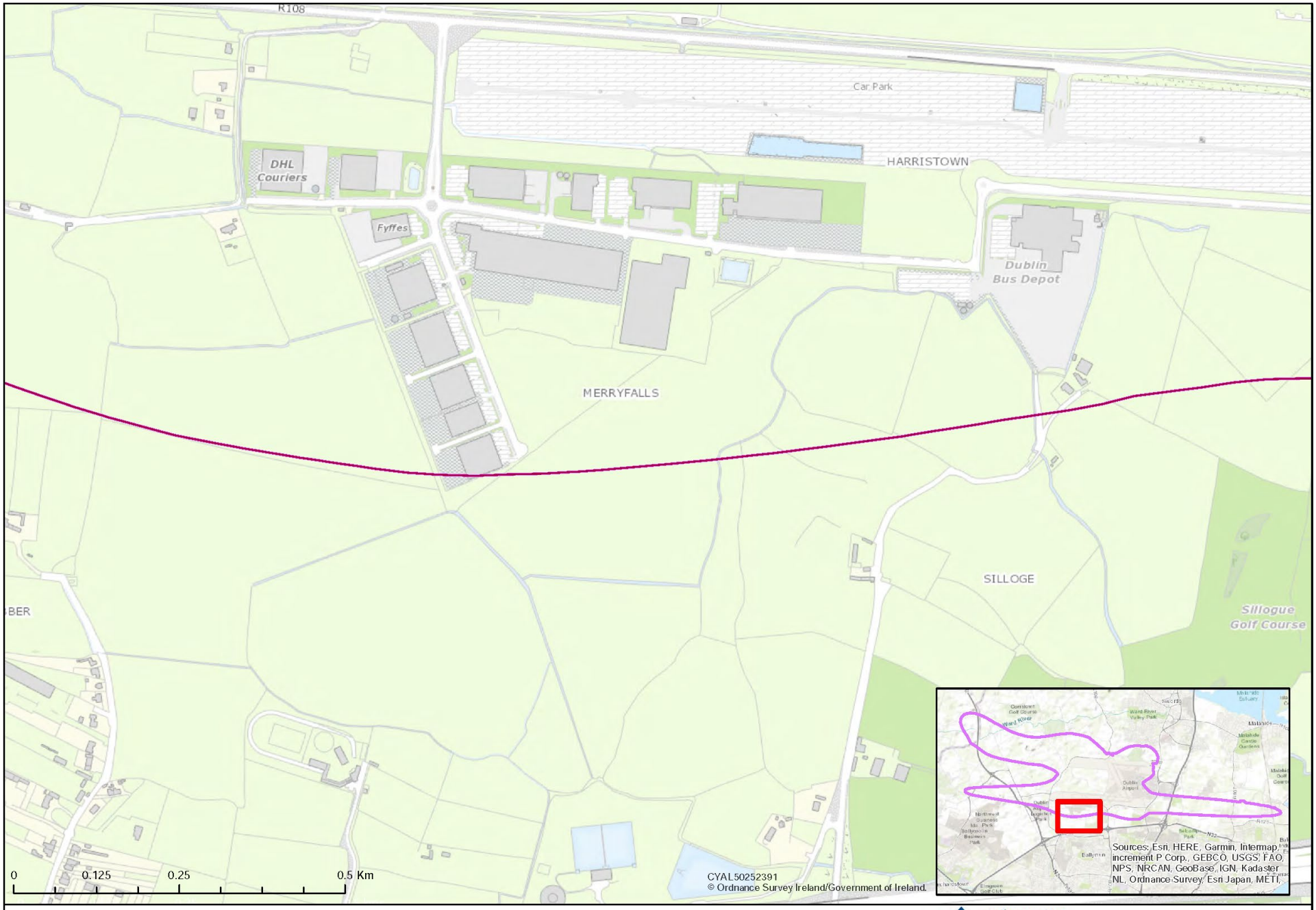
Map 8



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Map 9

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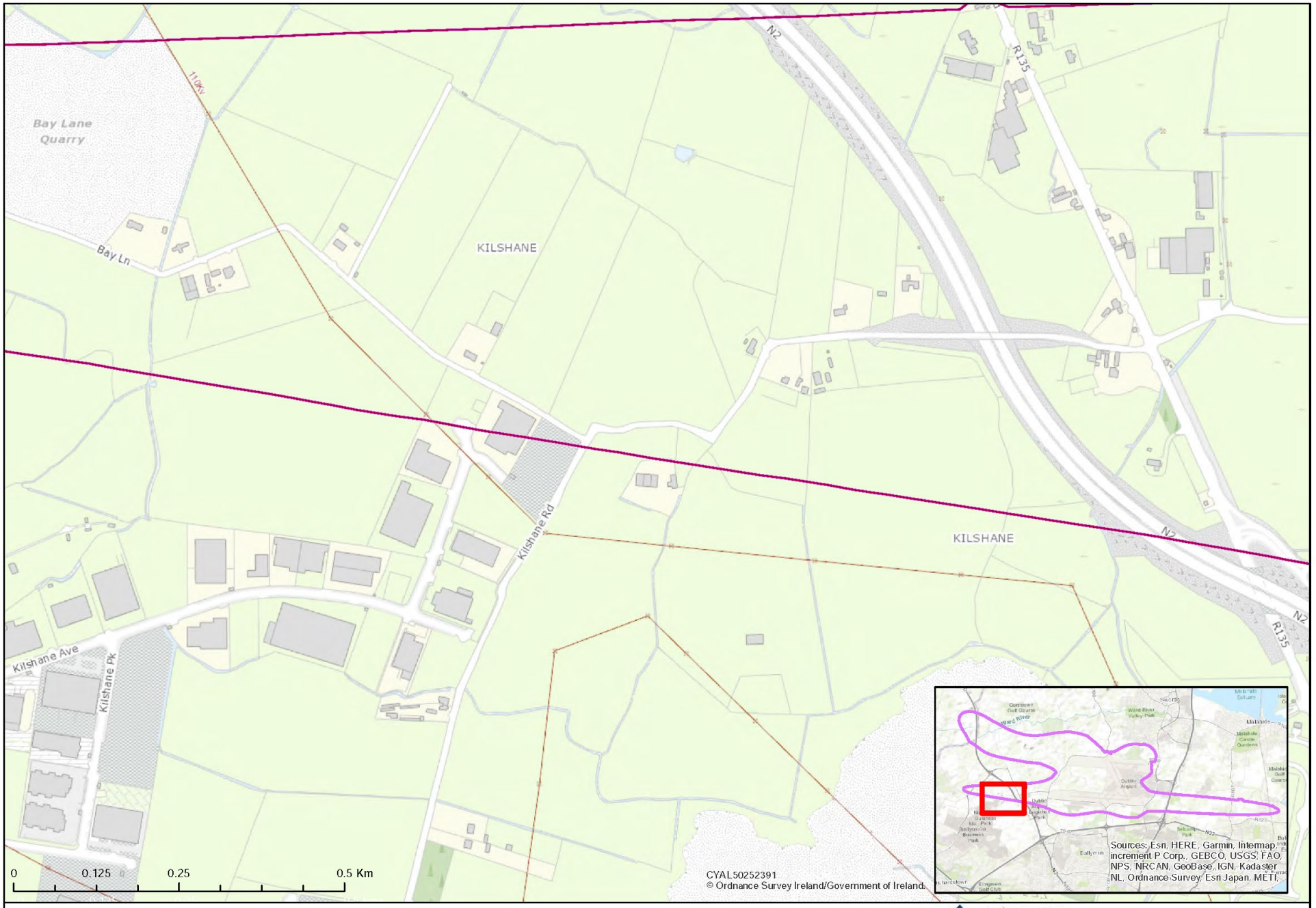
Map 10



Residential Sound Insulation Grant Scheme (RSIGS) - Initial Eligibility Contour Area - June 2022

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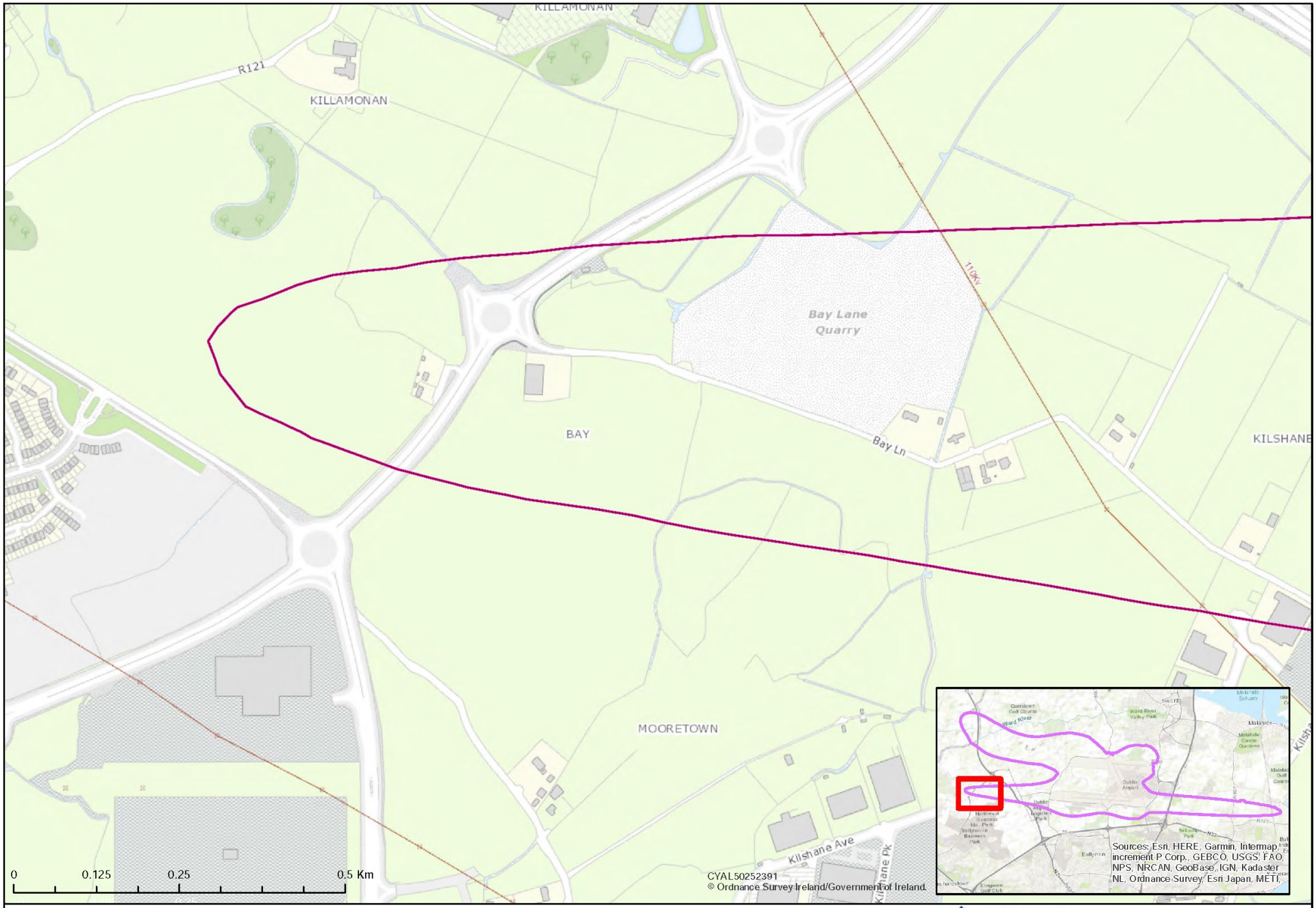
Map 11



Residential Sound Insulation Grant Scheme (RSIGS) - Initial Eligibility Contour Area - June 2022

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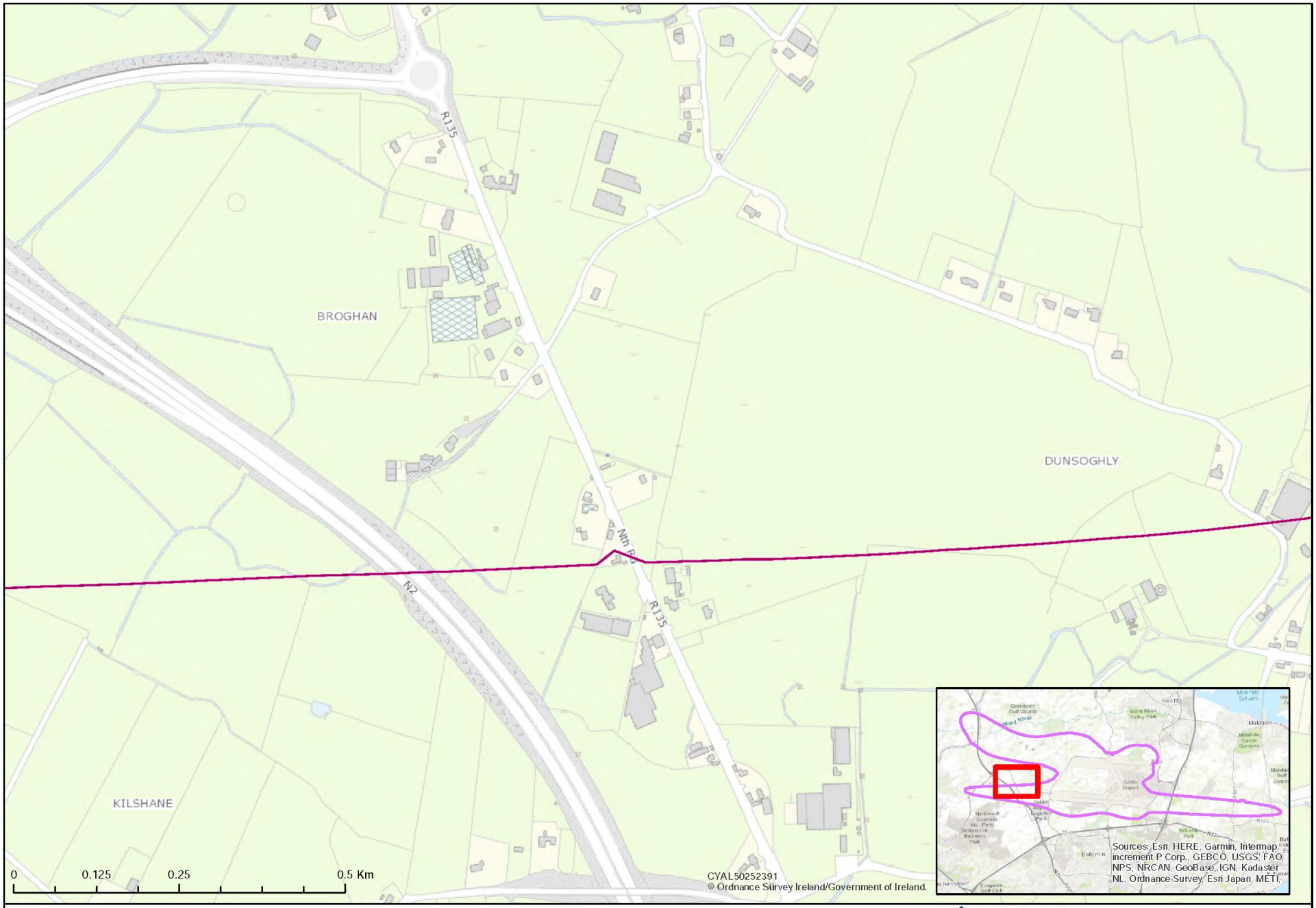
Map 12



Residential Sound Insulation Grant Scheme (RSIGS) - Initial Eligibility Contour Area - June 2022

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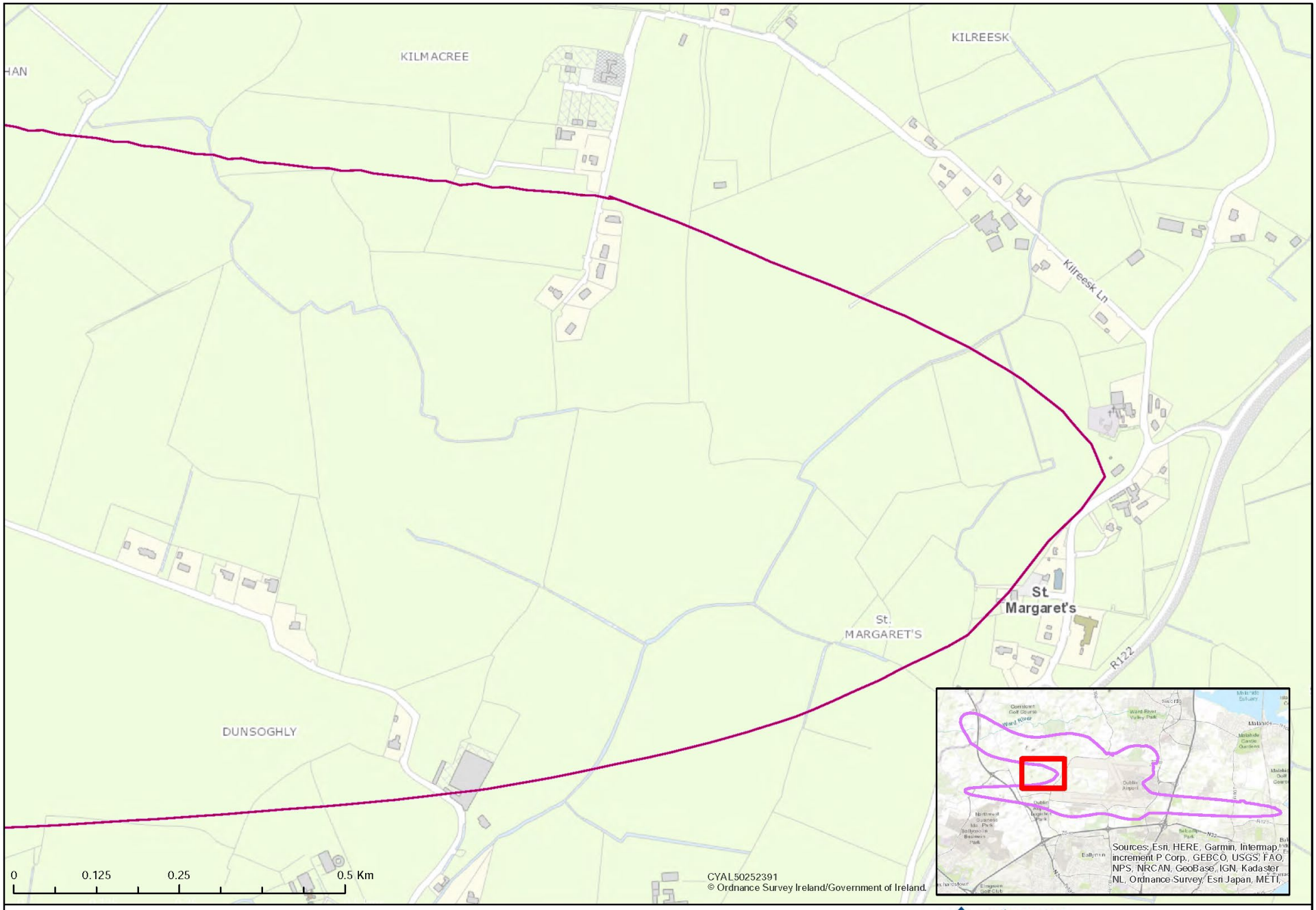
Map 13



Residential Sound Insulation Grant Scheme (RSIGS) - Initial Eligibility Contour Area - June 2022

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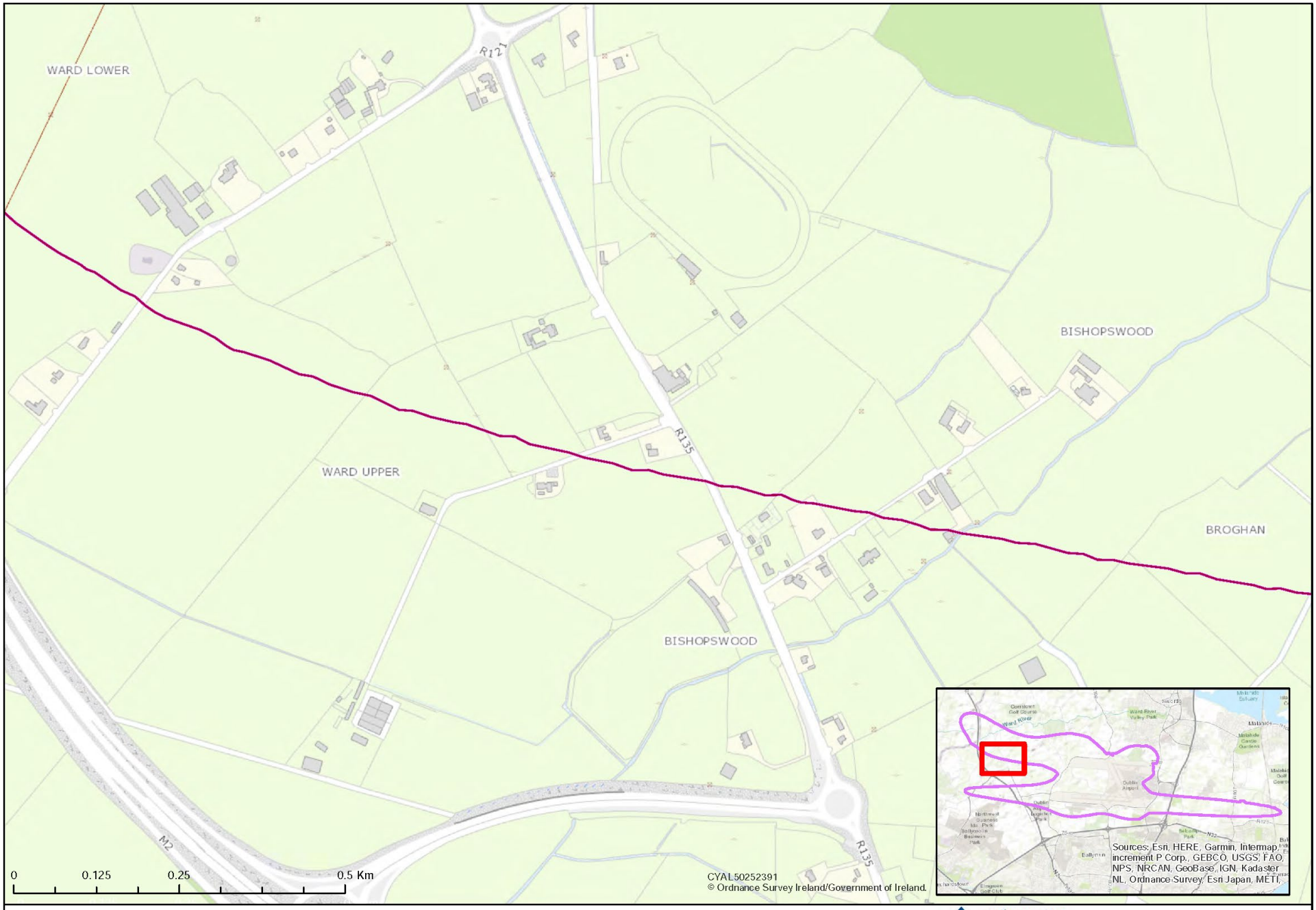
Map 14



Residential Sound Insulation Grant Scheme (RSIGS) - Initial Eligibility Contour Area - June 2022

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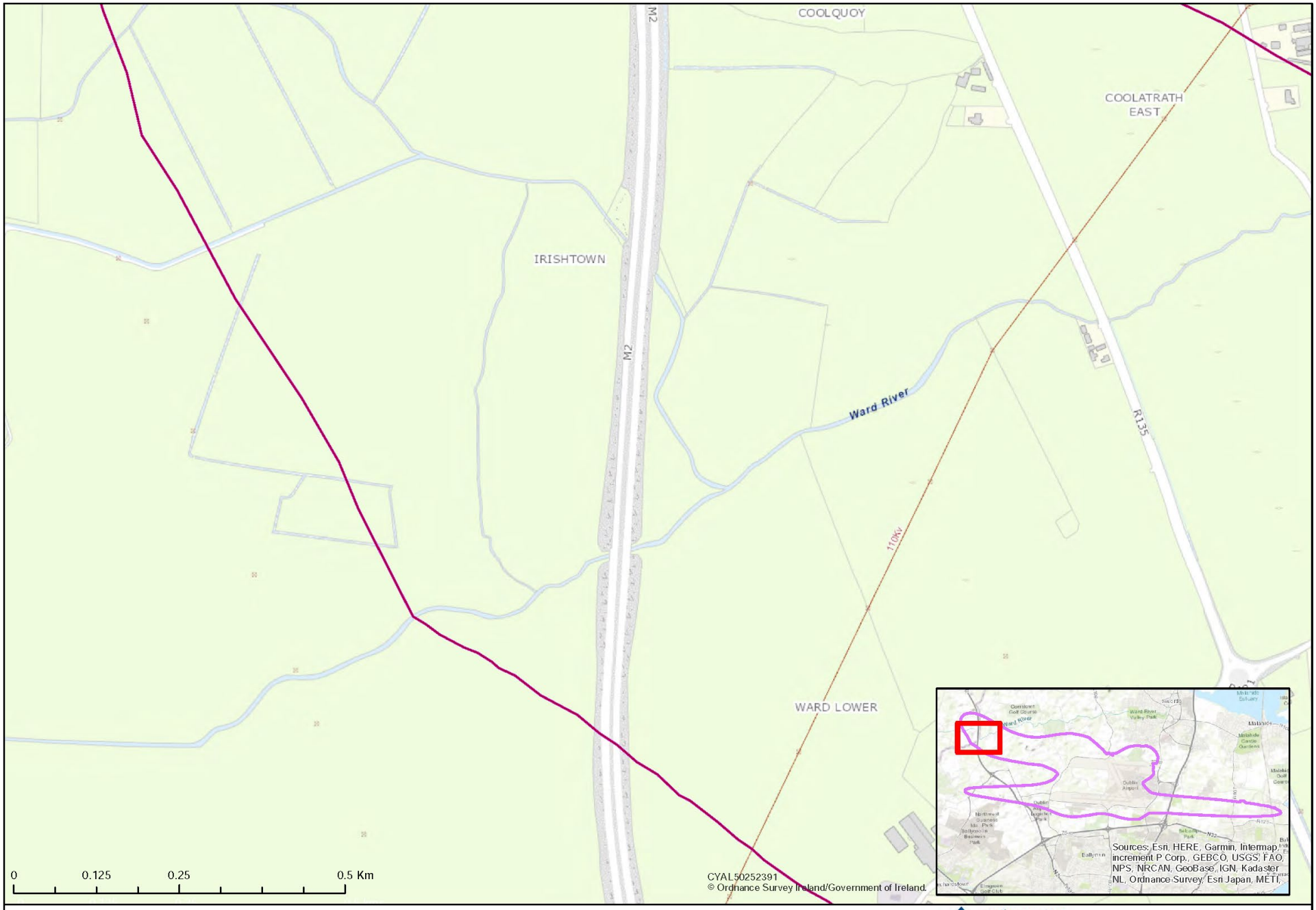
Map 15



Residential Sound Insulation Grant Scheme (RSIGS) - Initial Eligibility Contour Area - June 2022

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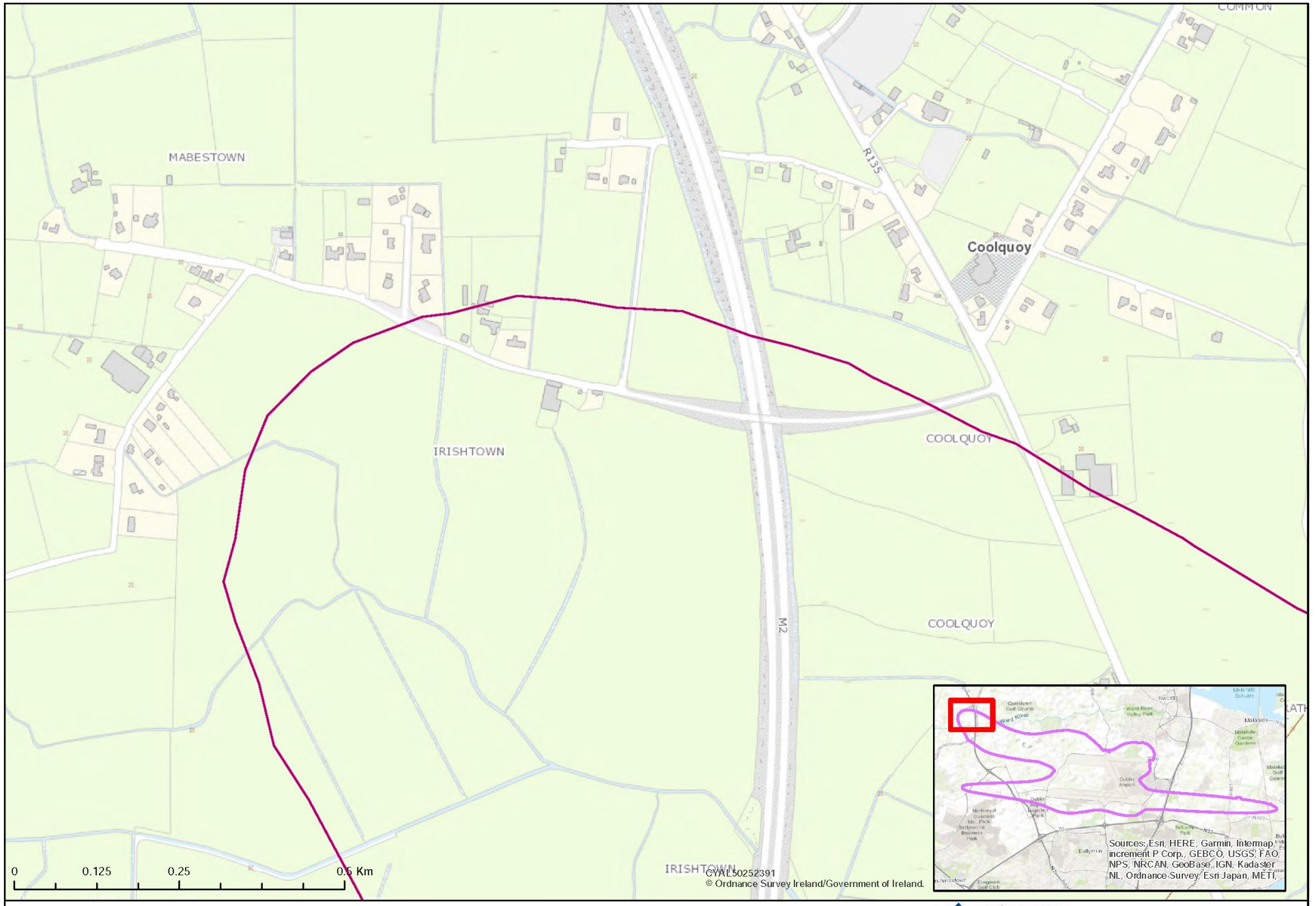
Map 16



Residential Sound Insulation Grant Scheme (RSIGS) - Initial Eligibility Contour Area - June 2022

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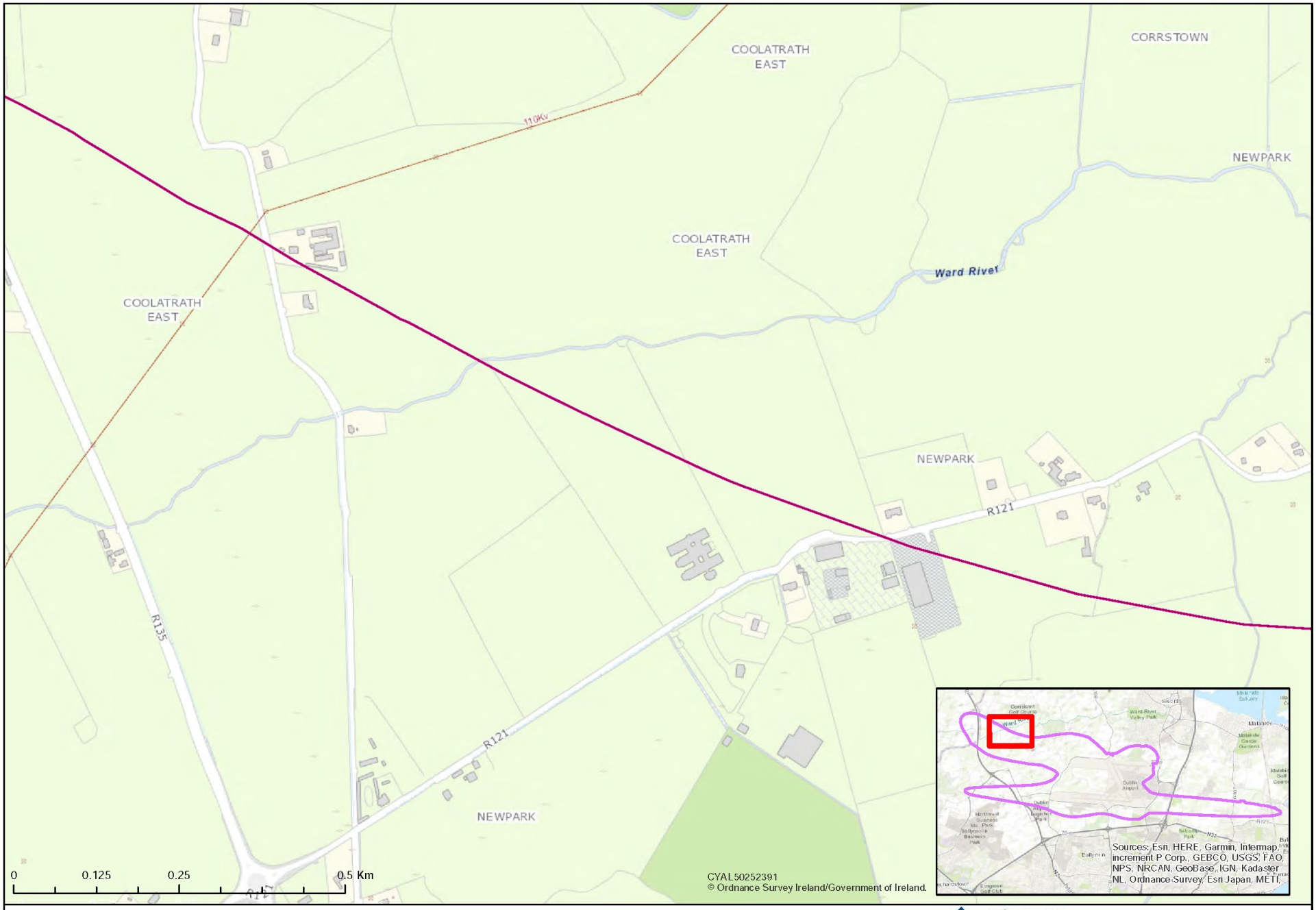
Map 17



Residential Sound Insulation Grant Scheme (RSIGS) - Initial Eligibility Contour Area - June 2022

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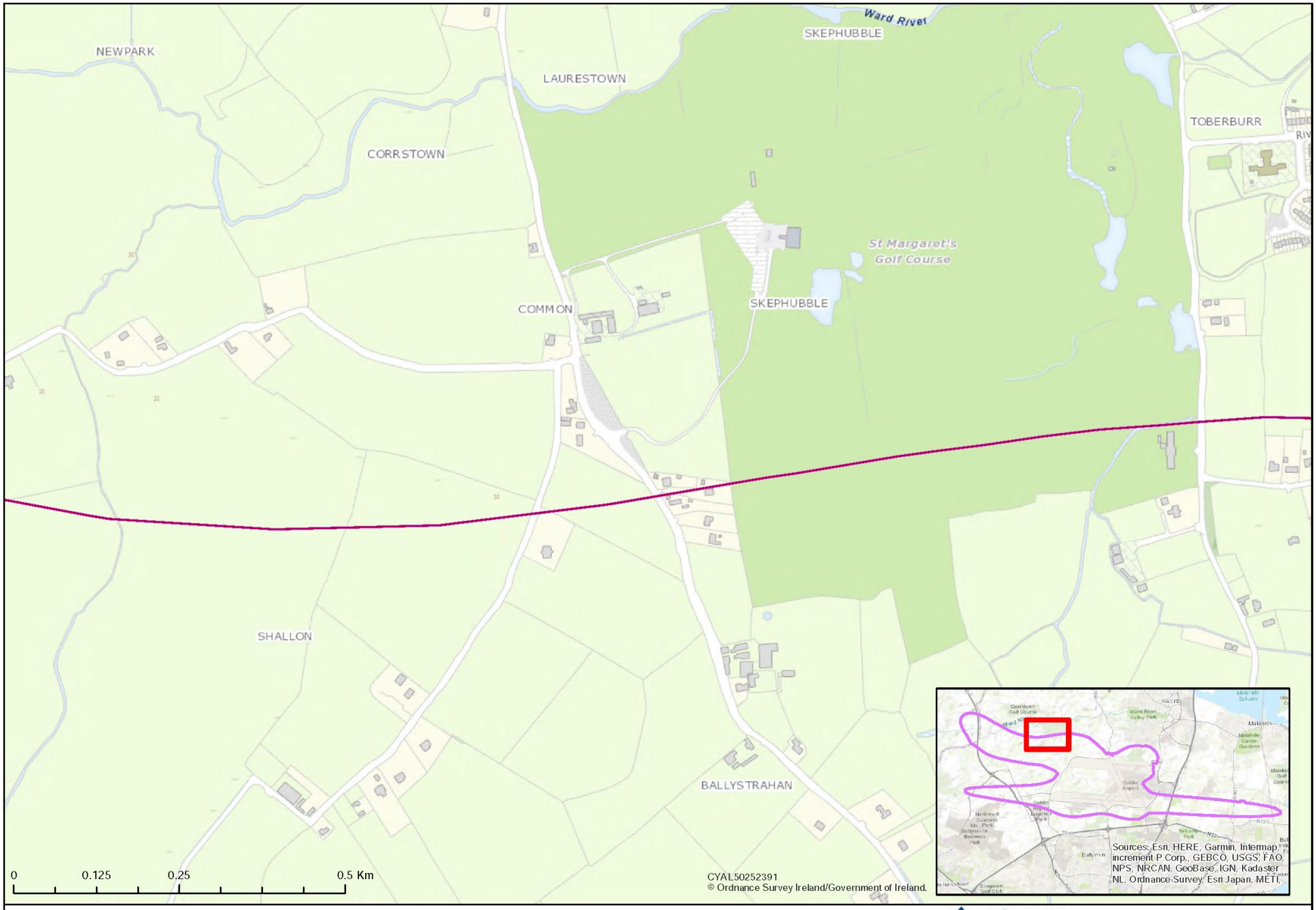
Map 18



Residential Sound Insulation Grant Scheme (RSIGS) - Initial Eligibility Contour Area - June 2022

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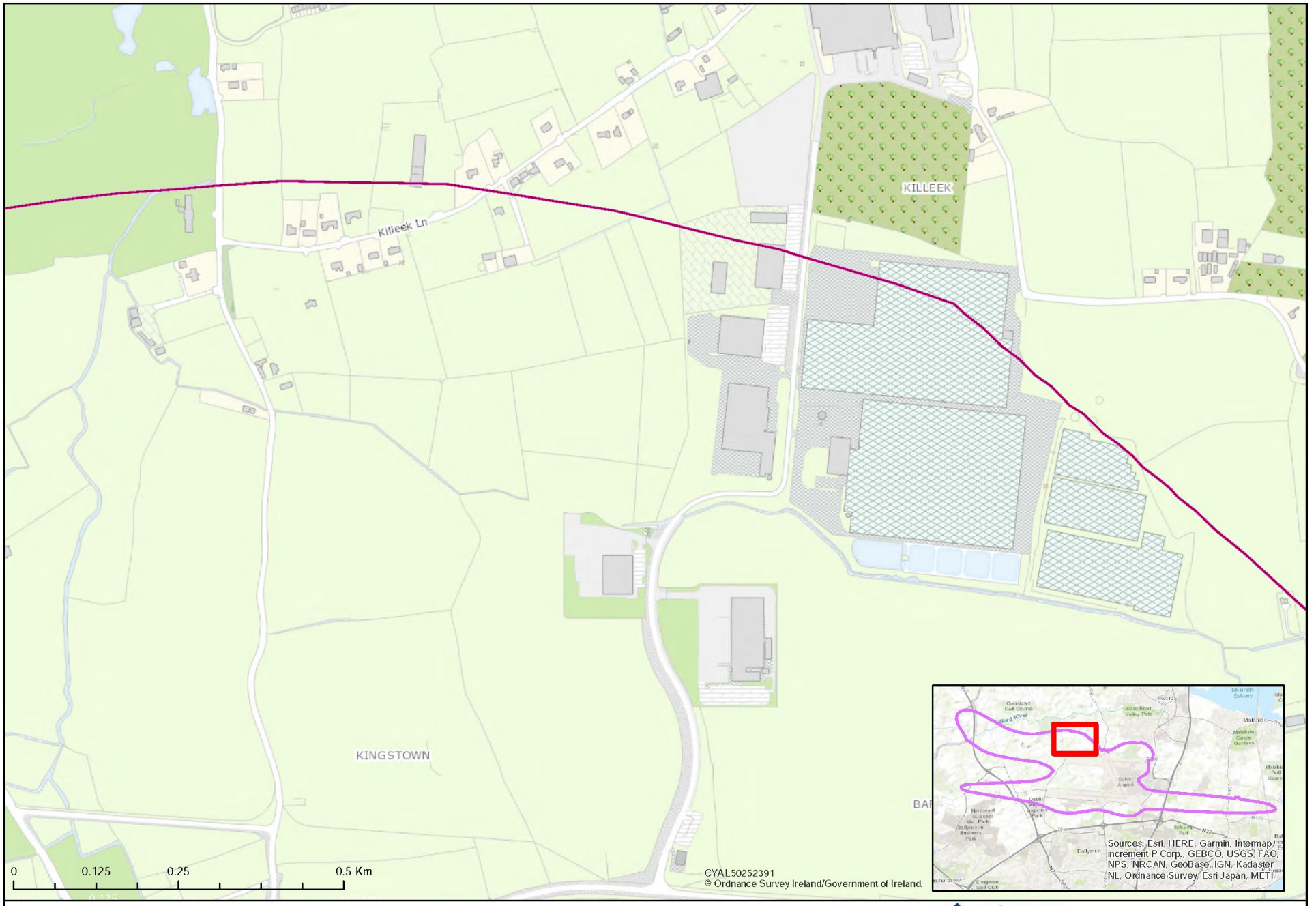
Map 19



Residential Sound Insulation Grant Scheme (RSIGS) - Initial Eligibility Contour Area - June 2022

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Map 20

Residential Sound Insulation Grant Scheme (RSIGS) - Initial Eligibility Contour Area - June 2022

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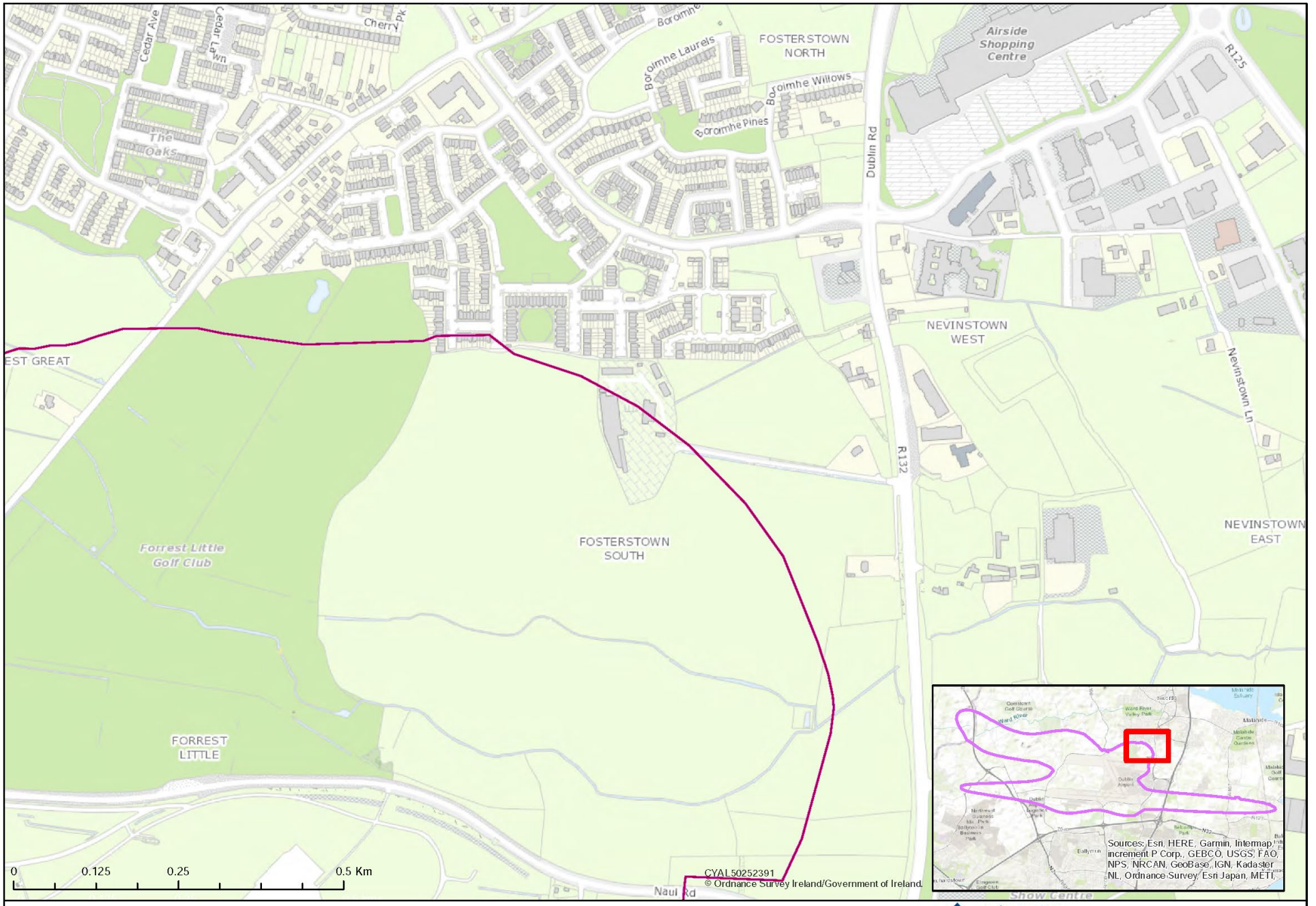
Map 21



Residential Sound Insulation Grant Scheme (RSIGS) - Initial Eligibility Contour Area - June 2022

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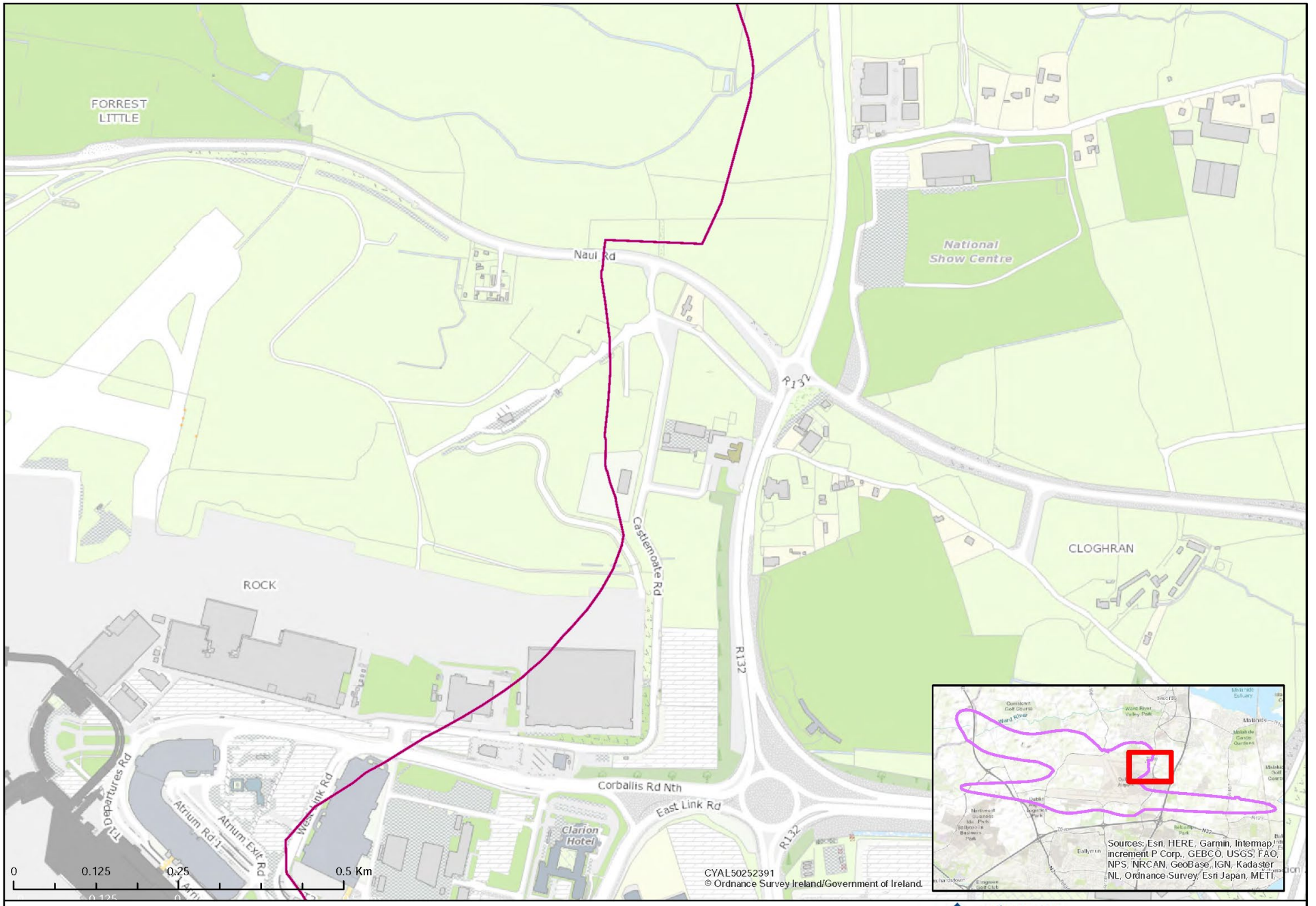
Map 22



Residential Sound Insulation Grant Scheme (RSIGS) - Initial Eligibility Contour Area - June 2022

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Map 23

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Aircraft Noise Competent Authority

Comhairle Contae Fhine Gall
Fingal County Council