An tÚdarás Inniúil um Thorann Aerárthaí
Aircraft Noise Competent Authority

Noise CONSULTANTS

Advice Report:
Aspects of a Potential Noise Problem associated with Planning Application F20A/0668

February 2021






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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

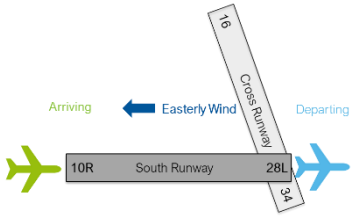
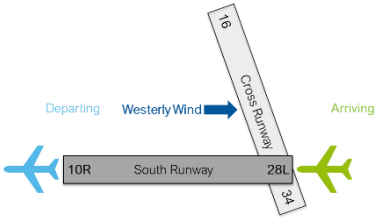
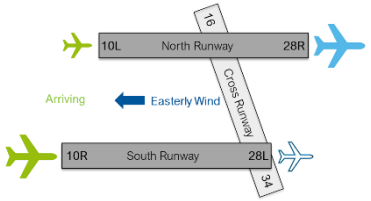
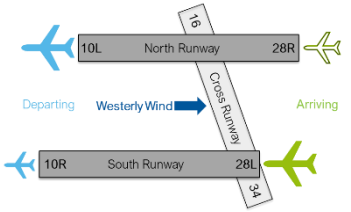
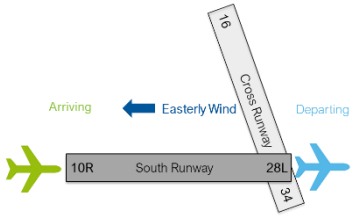
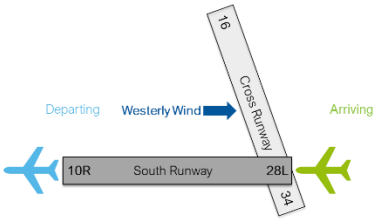
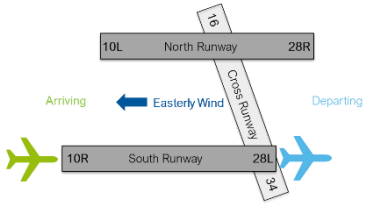
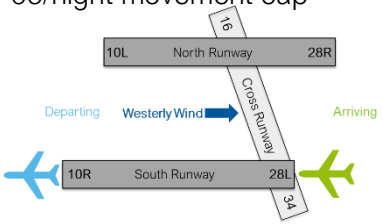
	All operations subject to a Passenger Cap of 32mppa			
	Current Two Runway Operations		Consented Three Runway Operations	
	Easterly	Westerly	Easterly	Westerly
Daytime 0700 – 2300				
Night-time 2300 - 0700			65/night movement cap 	65/night movement cap 

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.

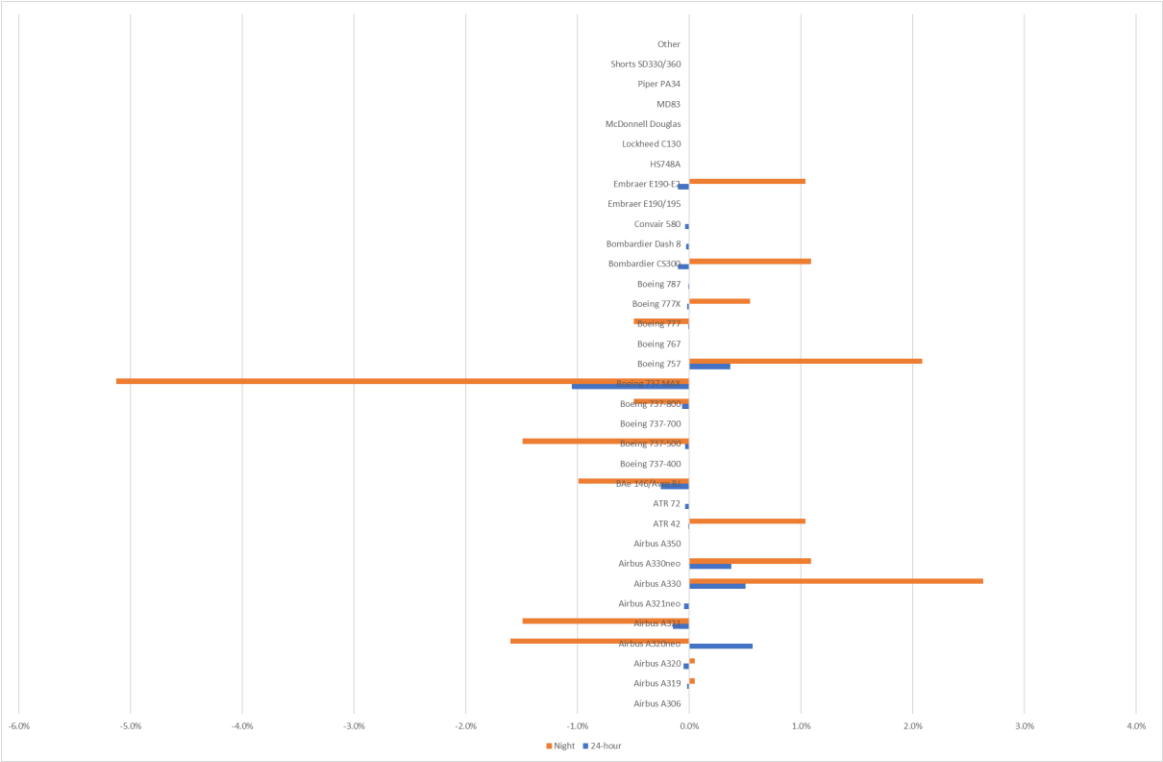
5.7 This shows that in 2025, the fleet mix operating at the Airport will be different. Figure 1 presents fleet mix in terms of the percentage of aircraft by type forecast in 2025 for scenarios with and without the Proposed Development.

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



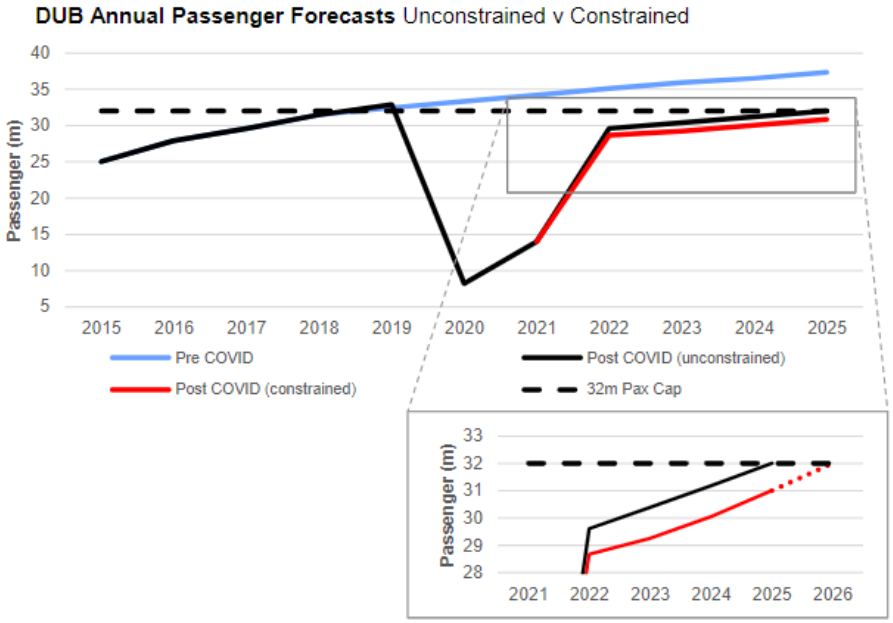
A change in the rate of growth

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

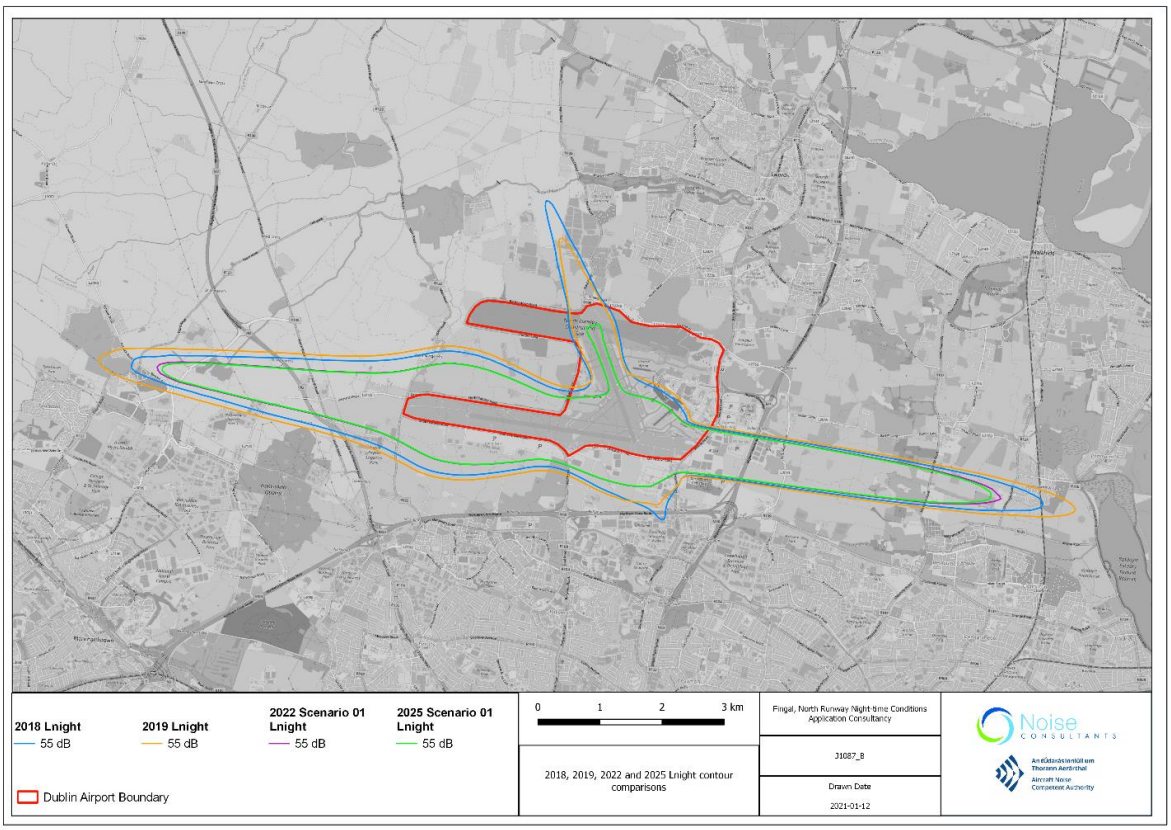
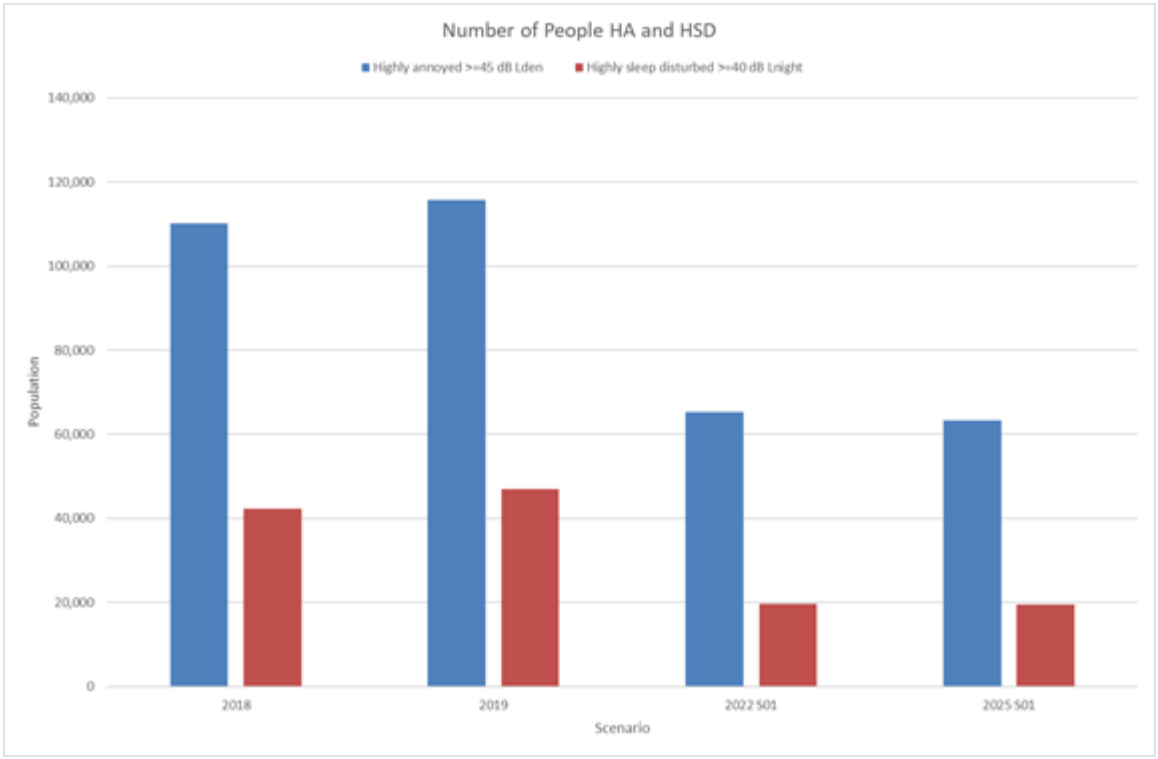


Table 8 Number of people HA and HSD for 2018 and 2019 and for scenarios/situations where the North Runway consent remains unchanged

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.

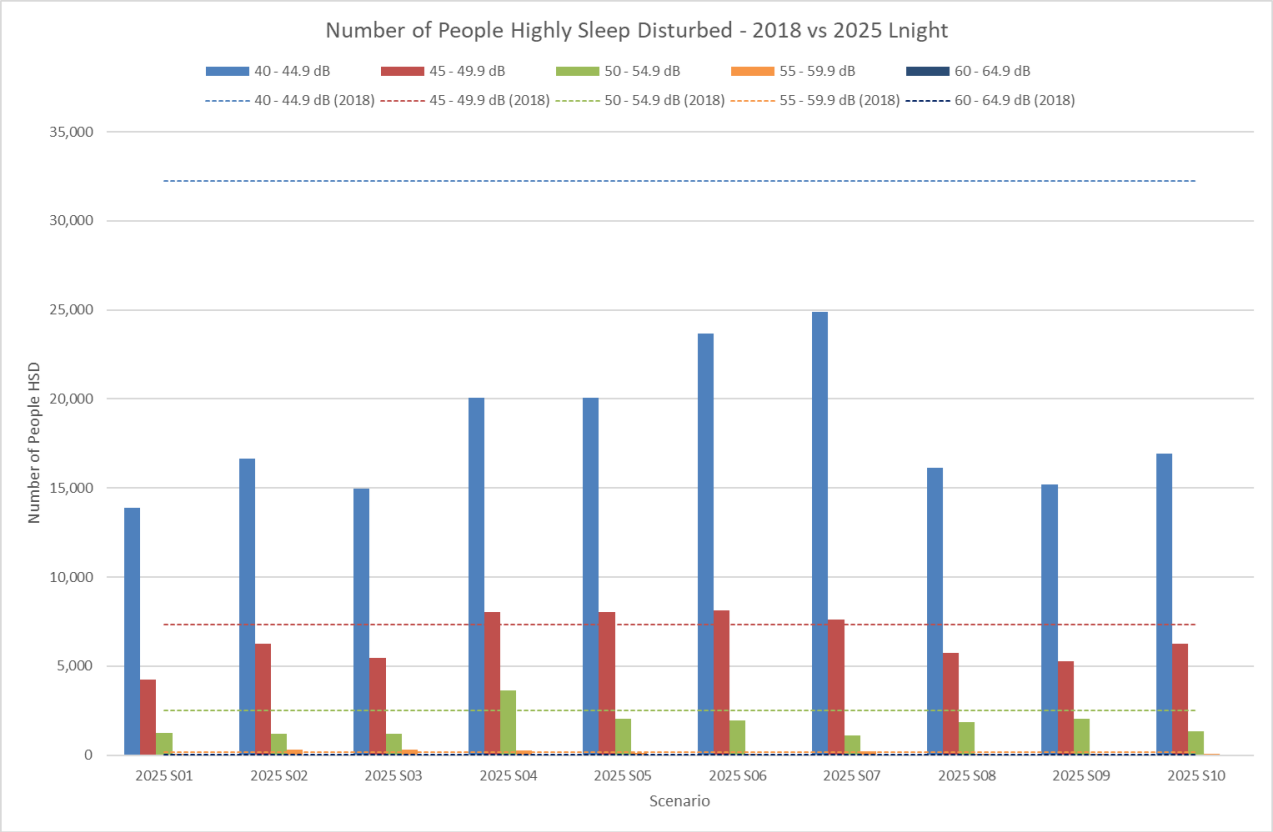
6.25 Figure 5 shows that with respect to the number of people HSD and HA all preferential runway use scenarios considered by the Applicant would result in lower exposure than those reported for 2018 and 2019.

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

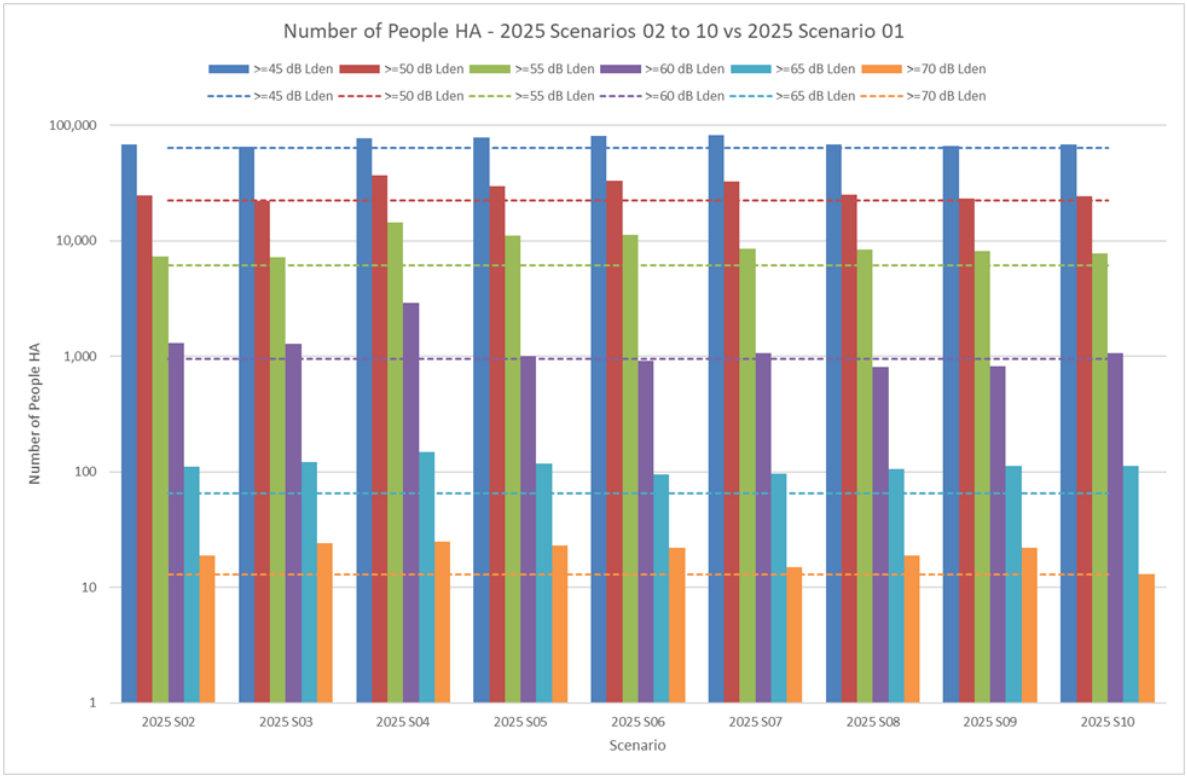
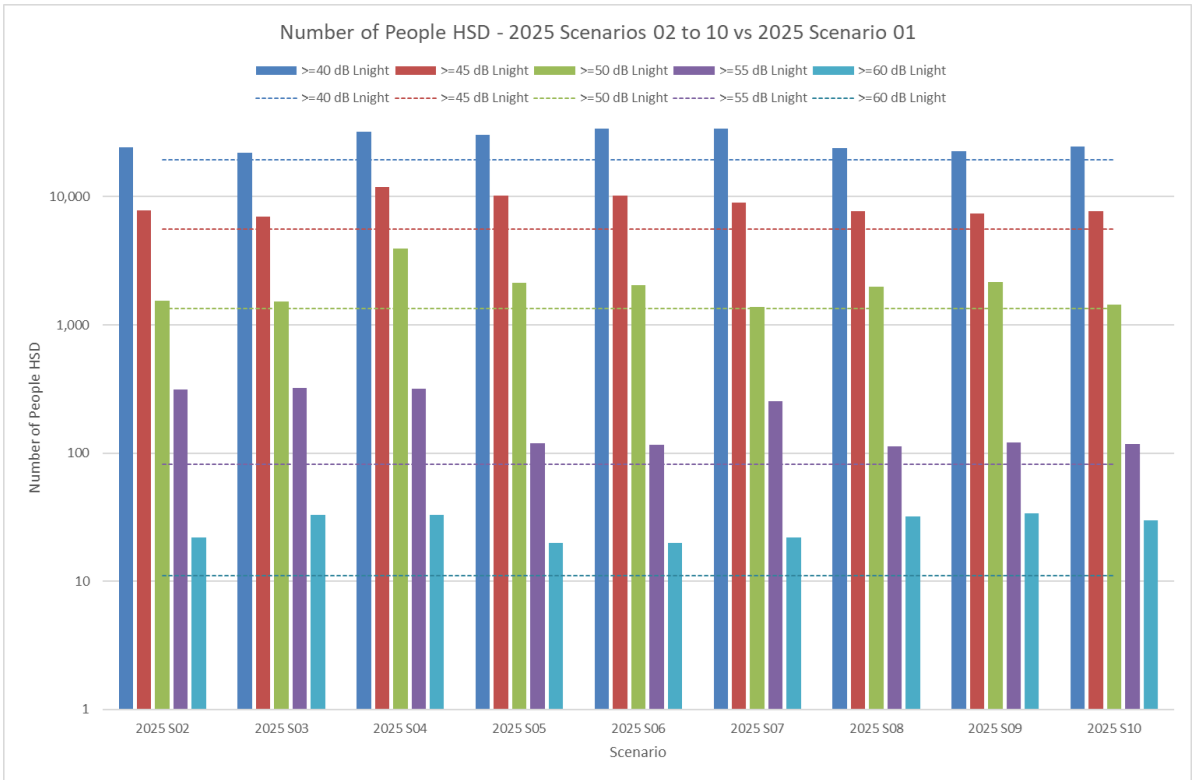


Figure 8 Cumulative number of people HSD for scenarios considered by the Application against the situation where the North Runway consent remains unchanged



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}

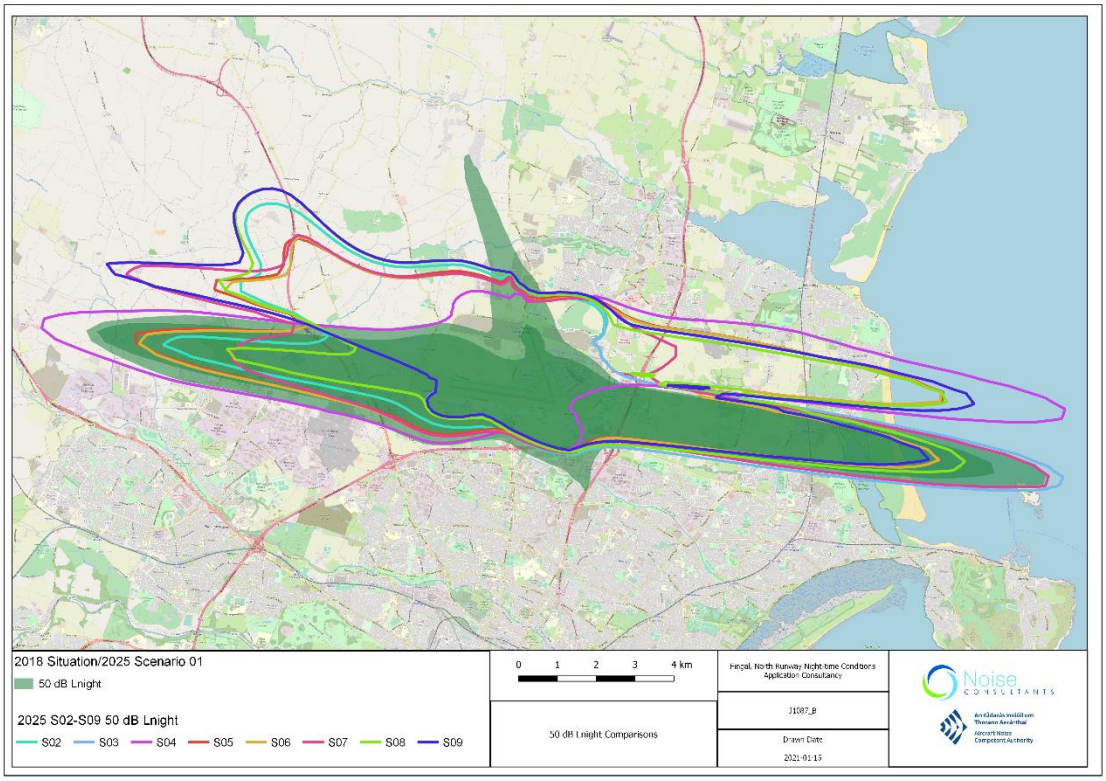


Figure 10 2025 Forecast Scenarios overlaid against 2018 and the situation which would arise without the Proposed Development , 55 dB Lnight

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






Experts in noise and vibration assessment and management

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Document Control

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Job Number	J1087

Report Prepared By:	Rupert Thornely-Taylor and James Trow

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Contents

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

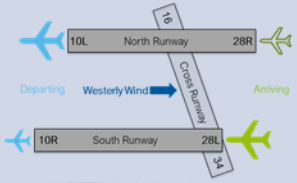
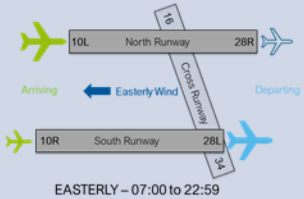
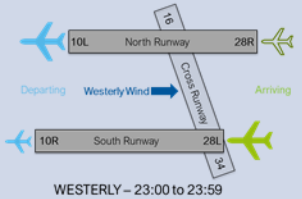
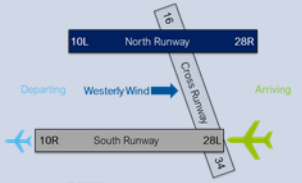
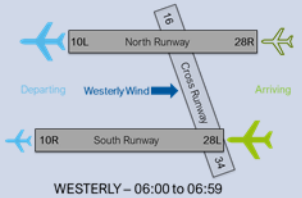
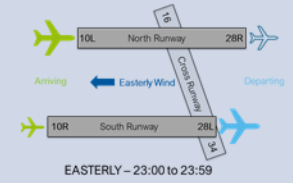
6.1 The review presented in this document is clear that Conditions 3 and 5 of the north-runway consent are restrictions that seek to manage and limit the noise impact from Dublin Airport with its north runway in operation. They are therefore noise-related operating restrictions as defined under relevant 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.

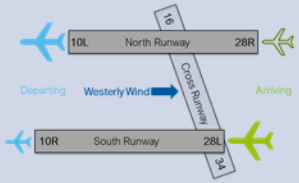
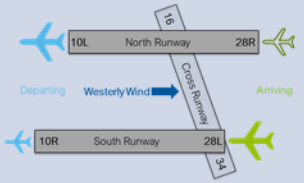
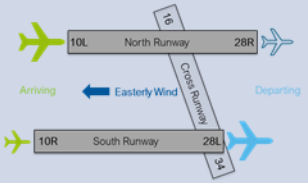
6.3 Based on the review presented in Sections 4 and 5 it appears that Condition 3 was volunteered by daa at the Oral Hearing. It is also clear that the main focus of the debate at the Oral Hearing was on daytime noise effects as it was accepted that with an operating scenario identical to that of Condition 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

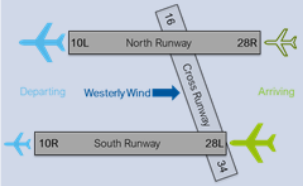
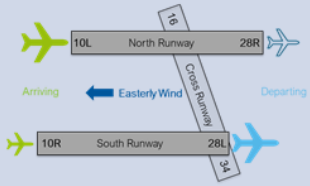
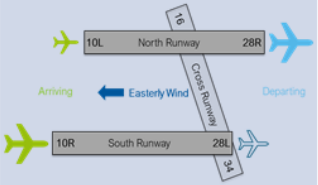
SCENARIO	DAY[1] – WESTERLY WINDS	DAY[1] – EASTERLY WINDS	NIGHT[2] – WESTERLY WINDS	NIGHT[2] – EASTERLY WINDS
SCENARIO 2 **Option 7b and South Runway Only between 0000 and 0559** **0700 to 2359:** When winds are westerly, Runway 28L shall be preferred for arriving aircraft. Either Runway 28L or 28R shall 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

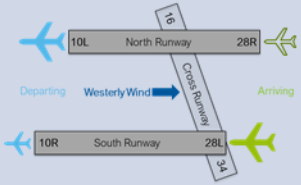
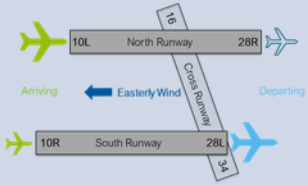
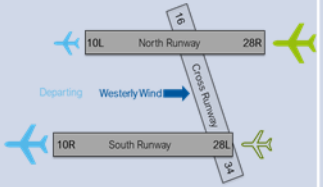
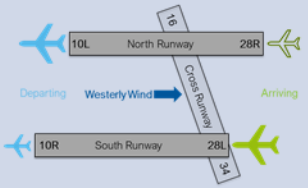
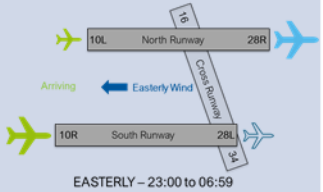
SCENARIO	DAY[1] – WESTERLY WINDS	DAY[1] – EASTERLY WINDS	NIGHT[2] – WESTERLY WINDS	NIGHT[2] – EASTERLY WINDS
SCENARIO 3 **Option 7b for 24-Hours** **24 hours:** When winds are westerly, Runway 28L shall be preferred for arriving aircraft. Either Runway 28L or 28R shall be used for departing aircraft 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

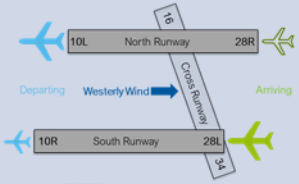
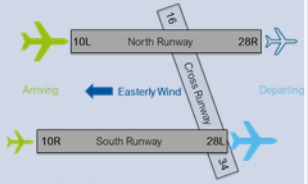
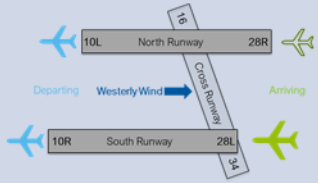
SCENARIO	DAY[1] – WESTERLY WINDS	DAY[1] – EASTERLY WINDS	NIGHT[2] – WESTERLY WINDS	NIGHT[2] – EASTERLY WINDS
SCENARIO 4 **Option 7b and Reverse Option 7b between 2300 and 0659** **0700 to 2259:** When winds are westerly, Runway 28L shall be preferred for arriving aircraft. Either Runway 28L or 28R shall 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

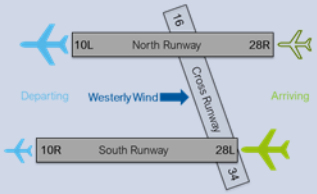
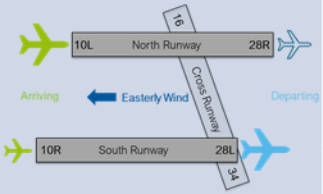
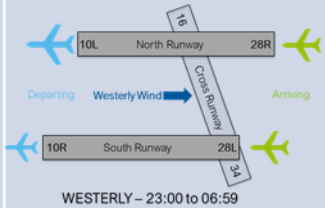
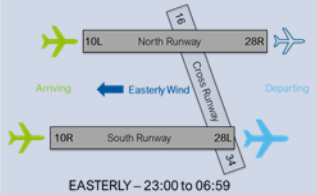
NOTES:
1. Day-time hours from 0700 to 2259
2. Night-time hours from 2300 to 0659

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	

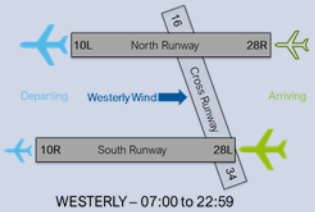
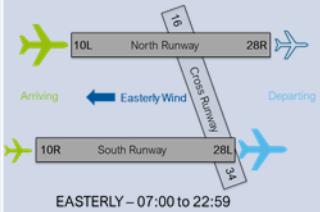
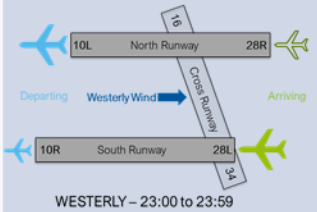
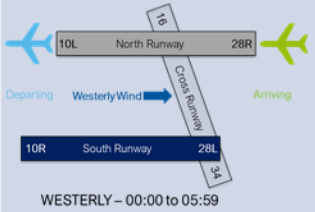
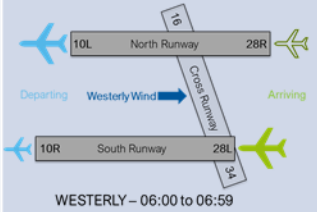
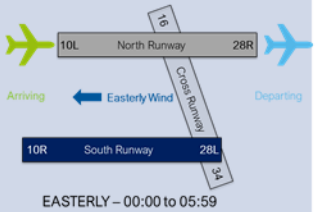
NOTES:
1. Day-time hours from 0700 to 2259
2. Night-time hours from 2300 to 0659

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

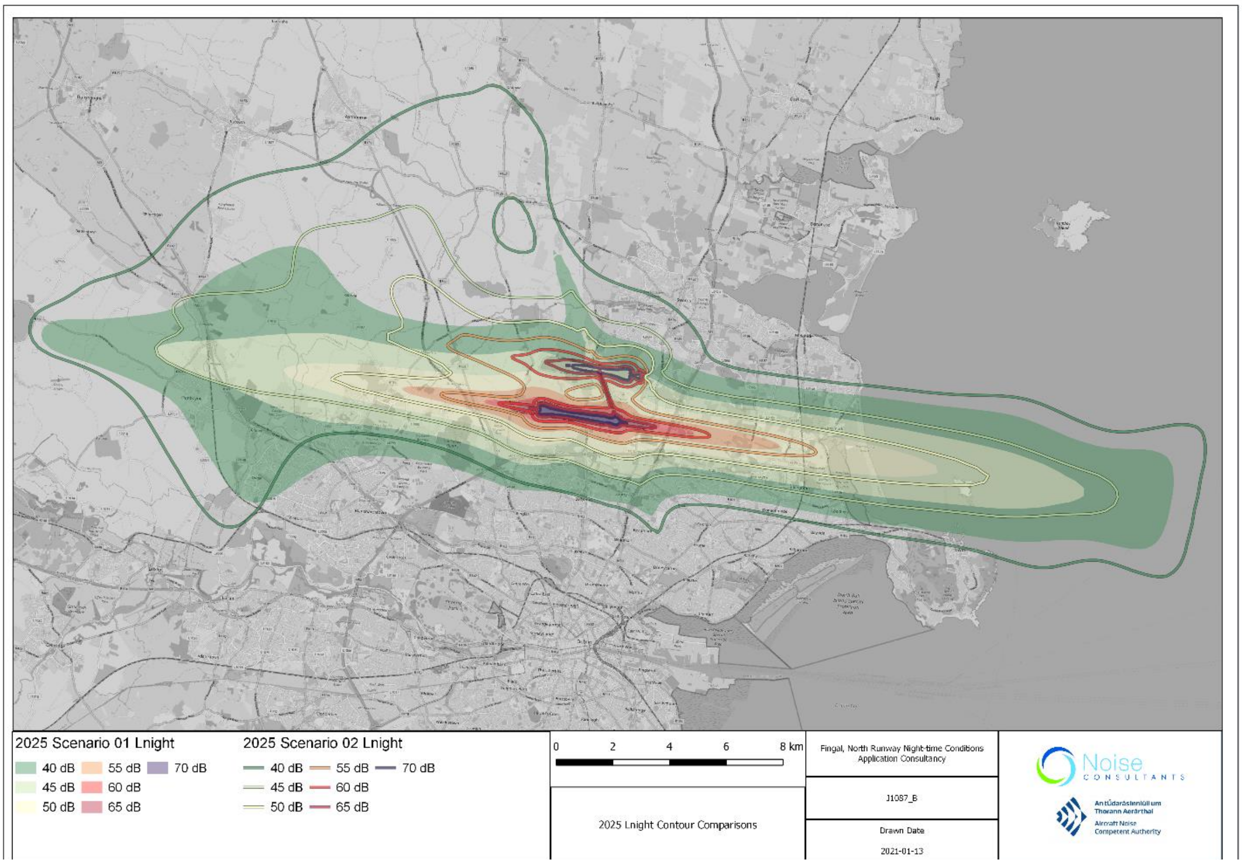
Scenario 6 represents the Forecast without New Measures scenario and was purposely excluded from this table
Mixed-Mode – both North Runway and South Runway can be used for arrivals and departures Segregated Mode – one runway is used for arrivals and the opposite runway is used for departures Single Runway – limit arrivals and departures to one runway
SOURCE: Bickerdike Allen Partners LLP, August 2020

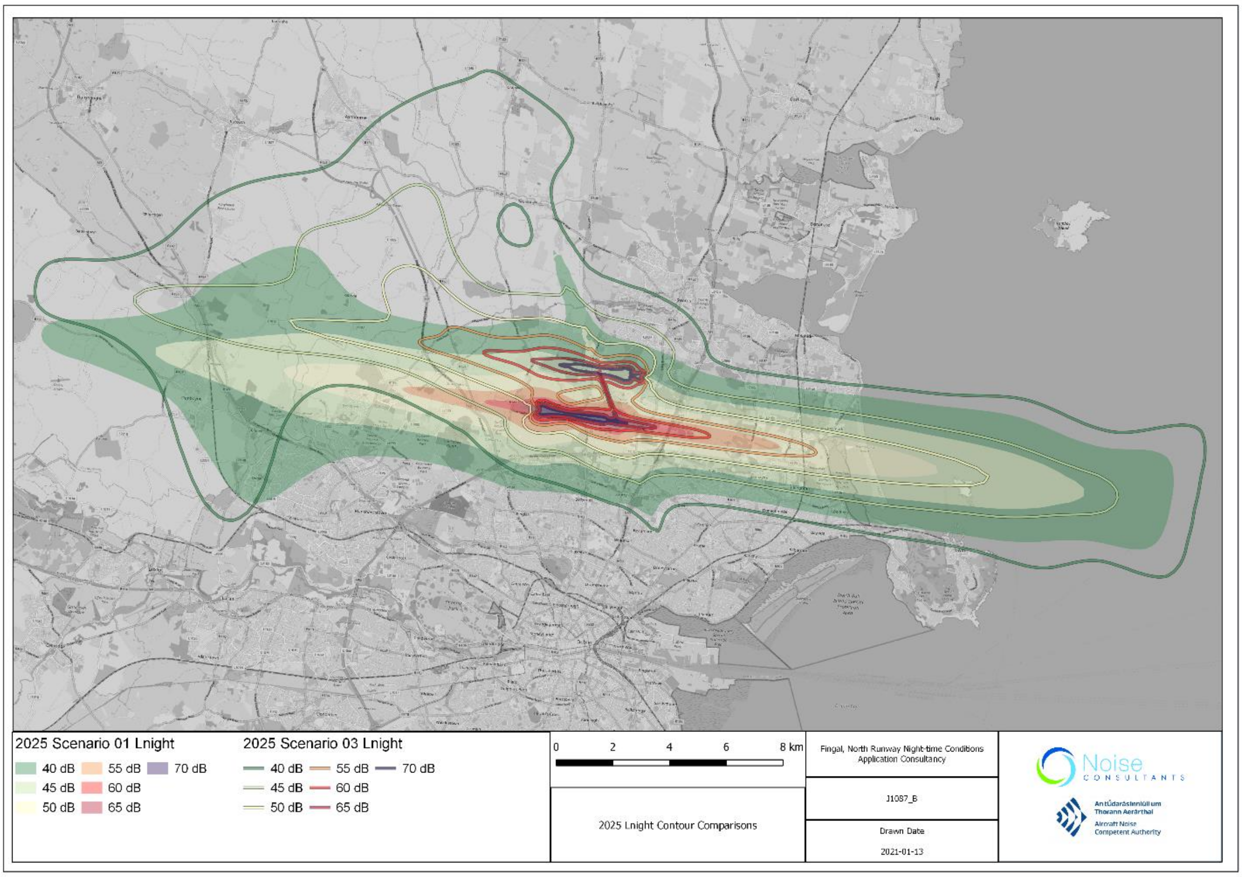
SCENARIO	DAY[1] – WESTERLY WINDS	DAY[1] – EASTERLY WINDS	NIGHT[2] – WESTERLY WINDS	NIGHT[2] – EASTERLY WINDS
SCENARIO 9 **Option 7b and North Runway Only between 0000 and 0559** **0600 to 2359:** When winds are westerly, Runway 28L shall be preferred for arriving aircraft. Either Runway 28L or 28R shall 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
55 dB
70 dB
45 dB
60 dB
50 dB
65 dB
2025 Scenario 02 Lnight
40 dB
55 dB
70 dB
45 dB
60 dB
50 dB
65 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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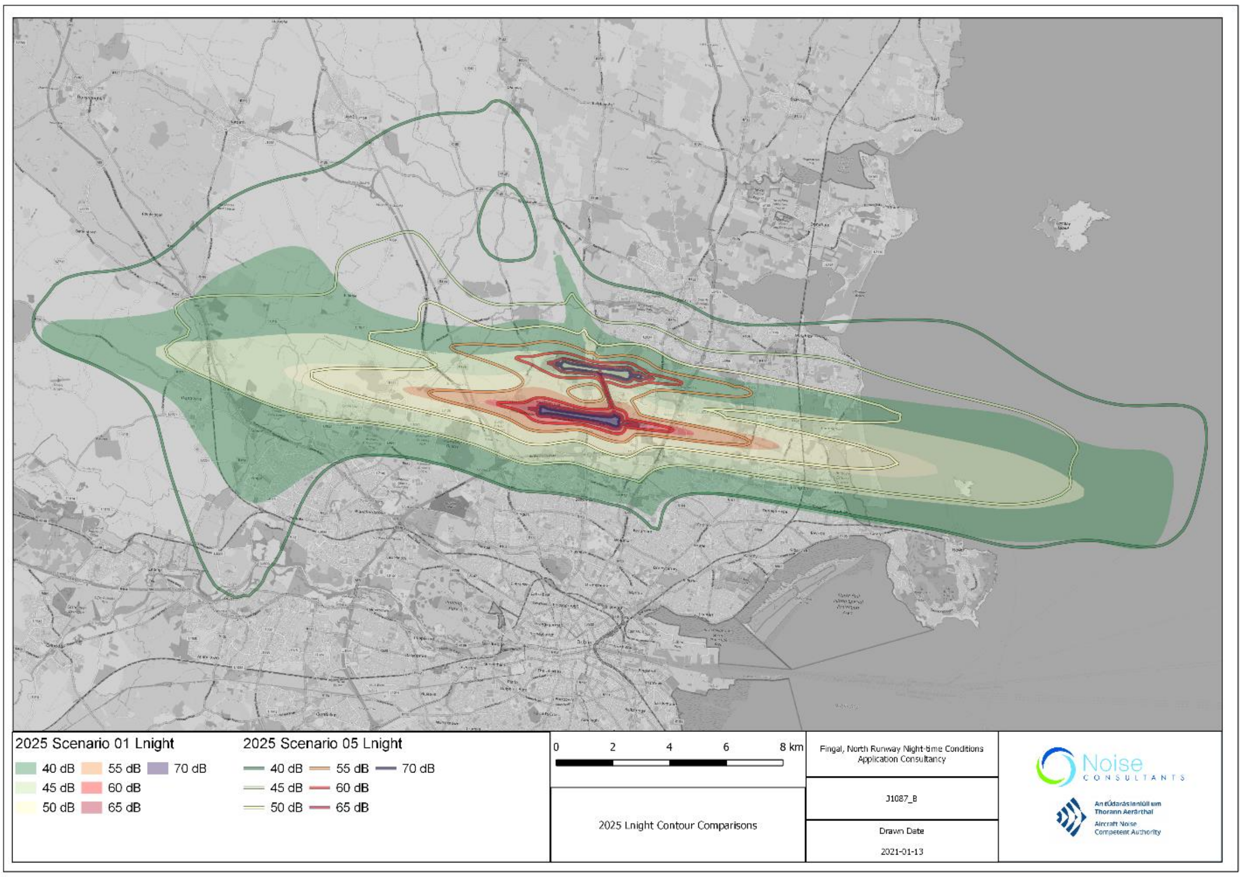
40 dB
55 dB
70 dB
45 dB
60 dB
50 dB
65 dB
2025 Scenario 03 Lnight
40 dB
55 dB
70 dB
45 dB
60 dB
50 dB
65 dB
0
2
4
6
8 km
Fingal, North Runway Night-time Conditions Application Consultancy
J1087_B
2025 Lnight Contour Comparisons
Drawn Date
2021-01-13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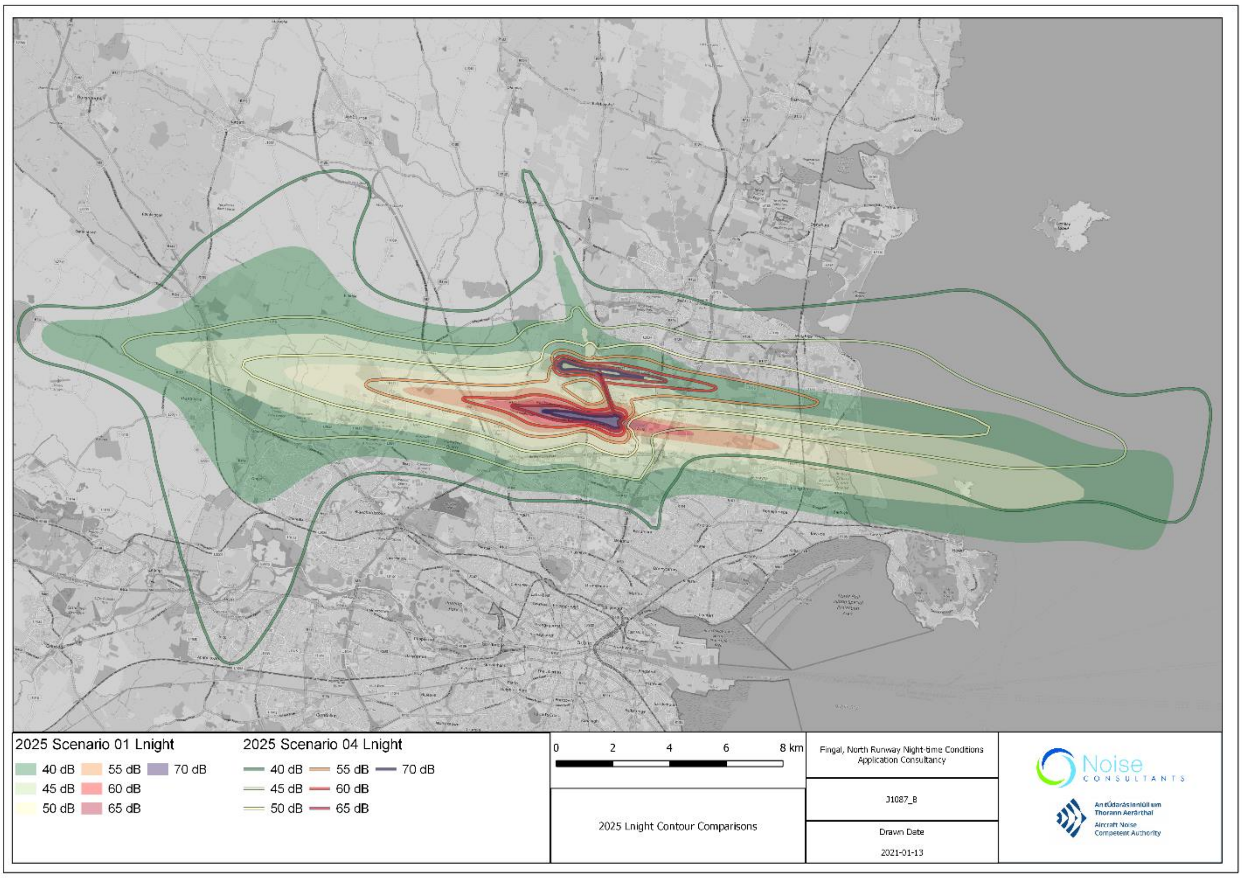
40 dB
45 dB
50 dB
55 dB
60 dB
65 dB
70 dB
2025 Scenario 05 Lnight
40 dB
45 dB
50 dB
55 dB
60 dB
65 dB
70 dB
0 2 4 6 8 km
Fingal, North Runway Night-time Conditions Application Consultancy
J1087_B
2025 Lnight Contour Comparisons
Drawn Date
2021-01-13
Noise Consultants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45 dB
50 dB
55 dB
60 dB
65 dB
70 dB
2025 Scenario 04 Lnight
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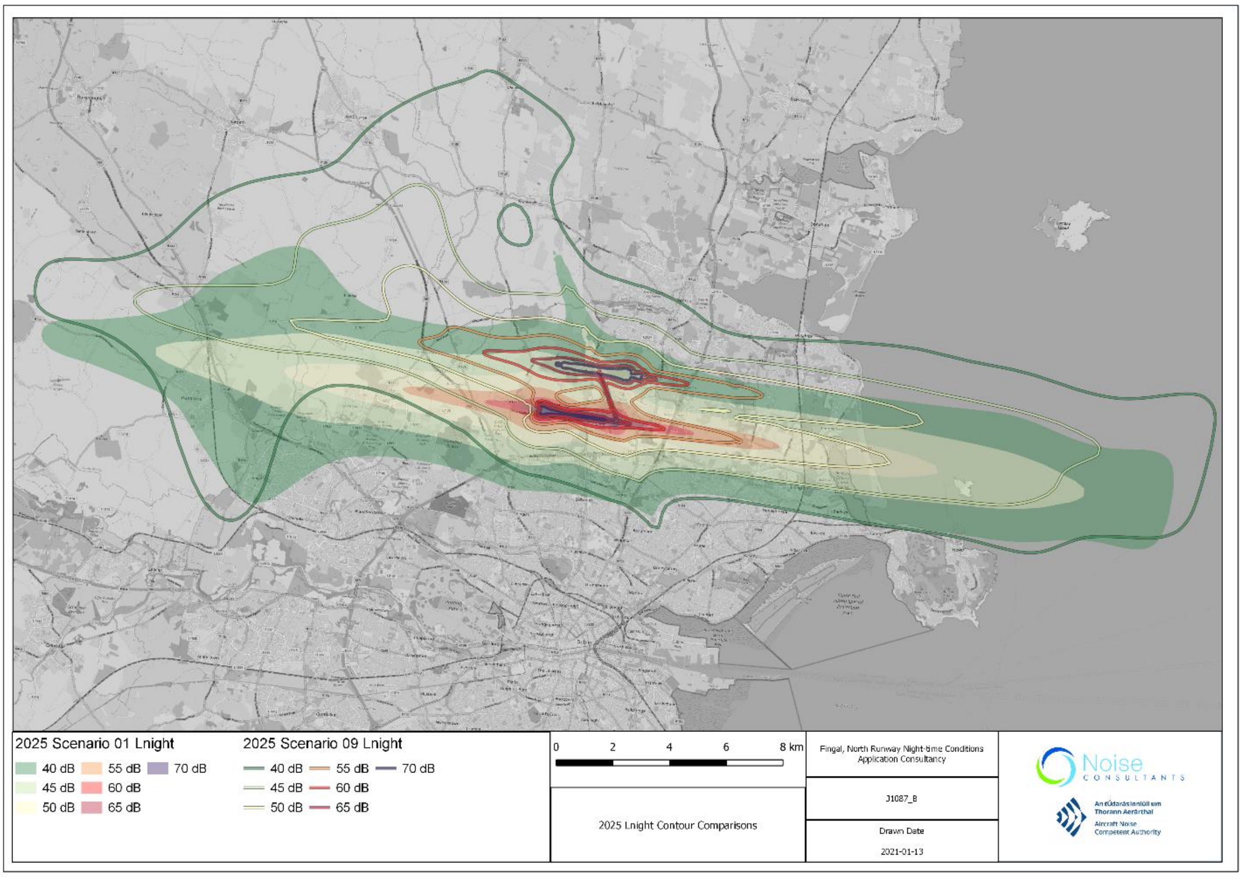
45 dB
50 dB
55 dB
60 dB
65 dB
70 dB
0 2 4 6 8 km
Fingal, North Runway Night-time Conditions Application Consultancy
J1087_B
2025 Lnight Contour Comparisons
Drawn Date
2021-01-13
Noise Consultants


2025 Scenario 01 Lnight
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
2025 Lnight Contour Comparisons
Drawn Date
2021-01-13
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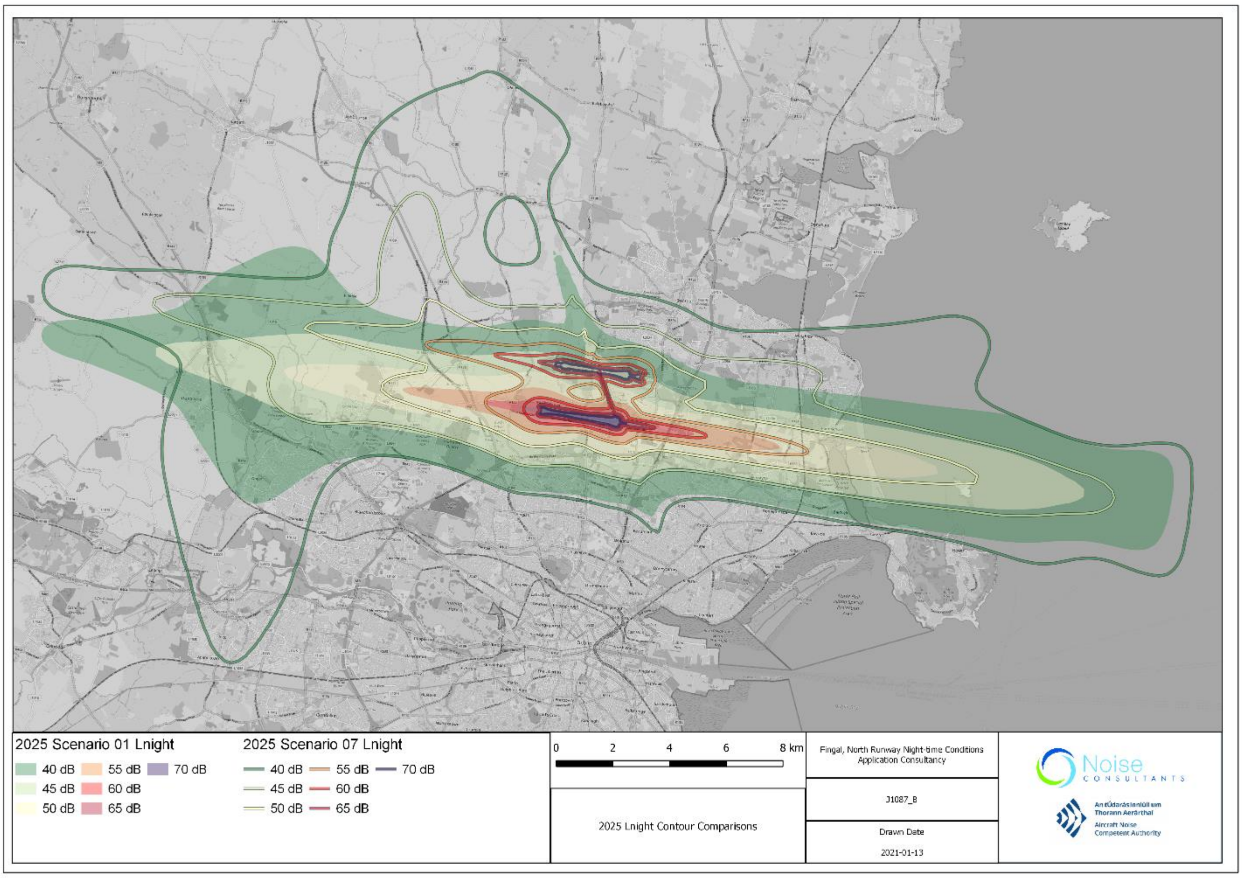
Aircraft Noise Competent Authority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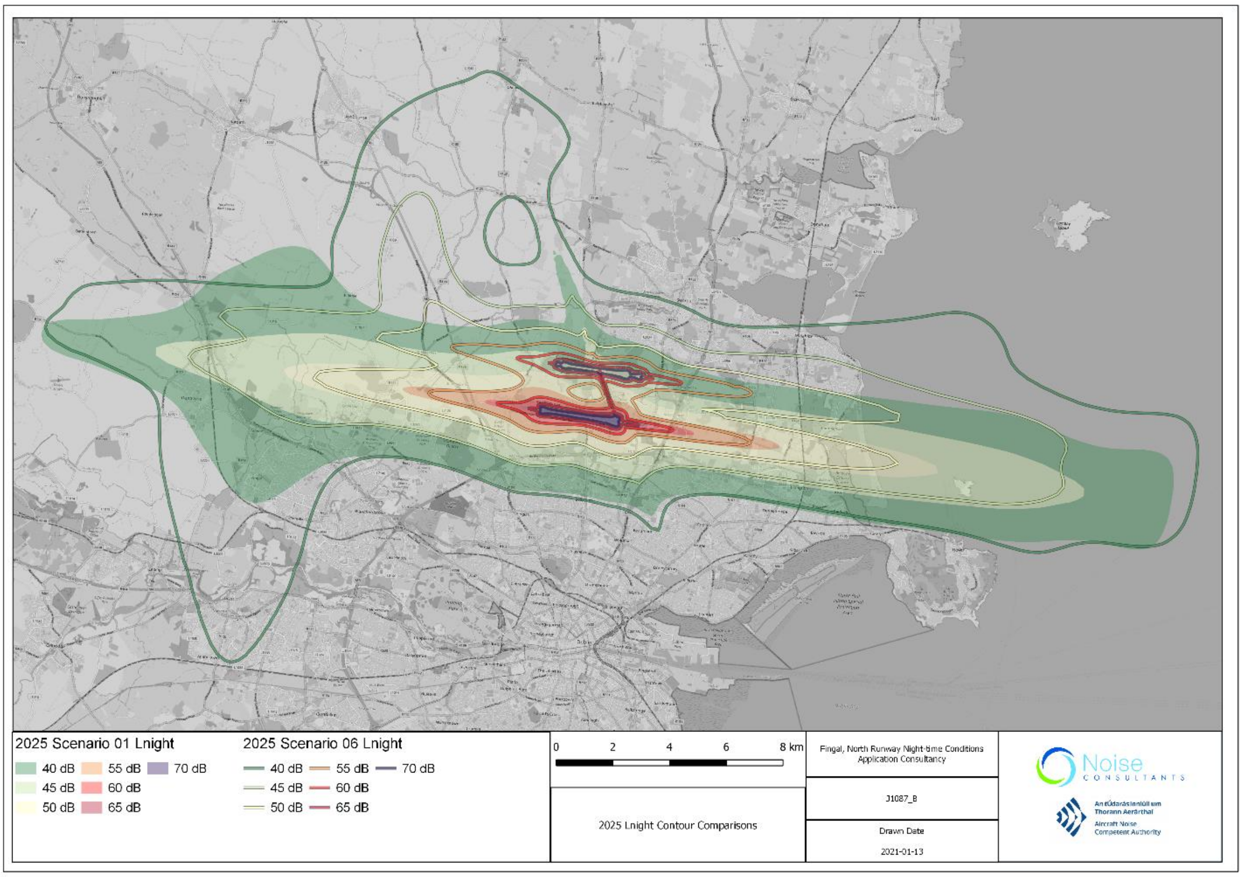
40 dB
45 dB
50 dB
55 dB
60 dB
65 dB
70 dB
2025 Scenario 07 Lnight
40 dB
45 dB
50 dB
55 dB
60 dB
65 dB
70 dB
0 2 4 6 8 km
Fingal, North Runway Night-time Conditions Application Consultancy
J1087_B
2025 Lnight Contour Comparisons
Drawn Date
2021-01-13
Noise CONSULTANTS
An tÚdarás Inniúil um Thorann Aerárthaí
Aircraft Noise Competent Authority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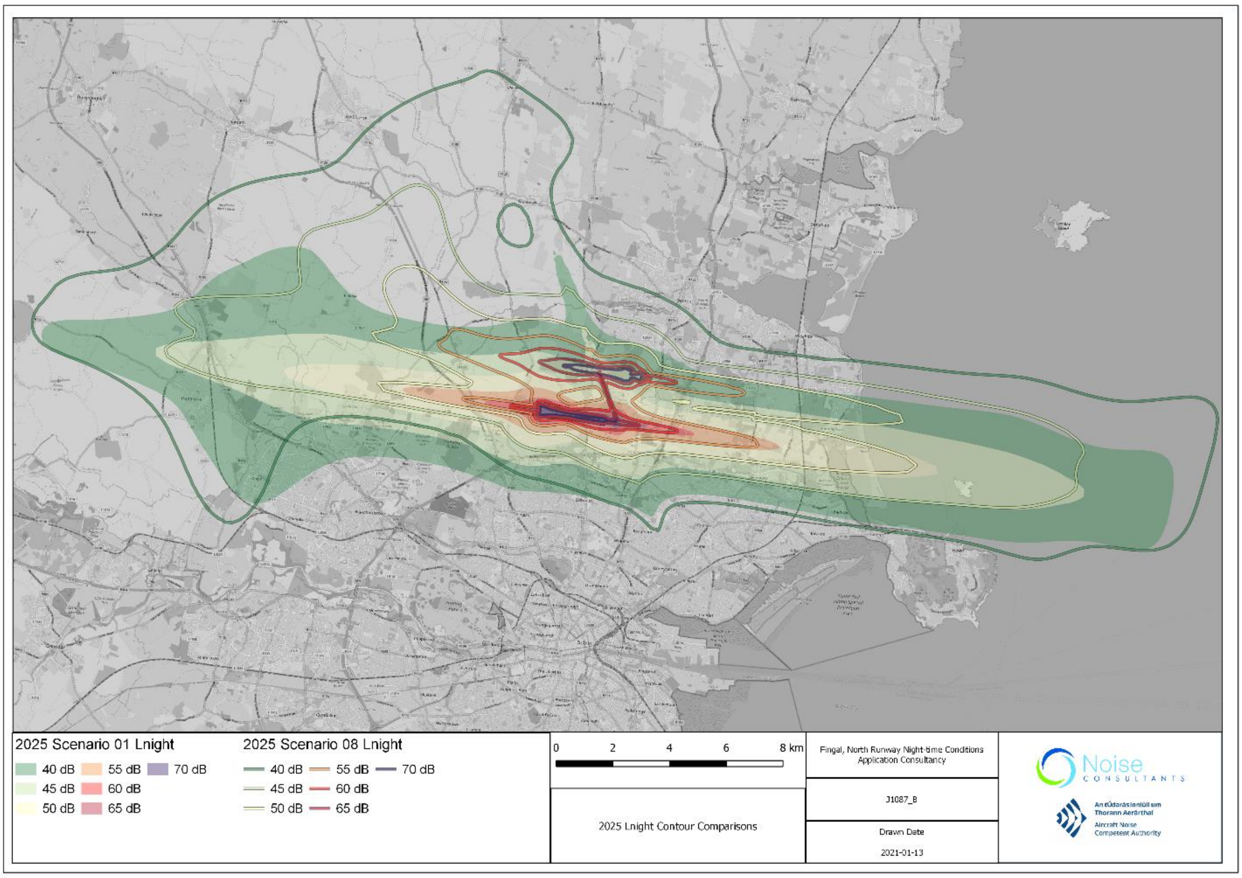
40 dB
45 dB
50 dB
55 dB
60 dB
65 dB
70 dB
2025 Scenario 06 Lnight
40 dB
45 dB
50 dB
55 dB
60 dB
65 dB
70 dB
0 2 4 6 8 km
2025 Lnight Contour Comparisons
Fingal, North Runway Night-time Conditions Application Consultancy
J1087_B
Drawn Date
2021-01-13
Aircraft Noise Competent Authority


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
2025 Lnight Contour Comparisons
Fingal, North Runway Night-time Conditions Application Consultancy
J1087_B
Drawn Date
2021-01-13
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