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An Bord Pleanála
64 Marlborough Street
Dublin 1
D01 V902 18/12/2024

Re: Your Case Number ABP-314485-22, Planning Authority Reference Number : F20A/0668
A proposed development comprising the taking of a "relevant action" only within the meaning of section 34C of the Planning and Development Act 2000 as amended, which relates to the night time use of the runway system at Dublin Airport, Dublin Airport, Co. Dublin. Draft Decision in Accordance with Section 37(4) of the Planning and Planning and Development Act 2000, as amended.

Dear Sir/Madam

Further to your recent correspondence to us , please accept this submission with respect to the Draft Decision on the Relevant Action. Along with this hardcopy we have also attached a soft copy of this submission on usb. Please note that we confirm that our previous submission on this application is still valid, and we also confirm that we support the submission by St Margarets The Ward Residents Group submitted under separate cover .

1.0 INTRODUCTION AND FLIGHT PATHS

We Pearse and Evelyn Sutton reside at Ballystrahan, St. Margarets, Co Dublin and our house is as located on the attached map at Appendix A to this submission. We constructed our house on my wife's family farm holding and our 3 children grew up in our family home at Ballystrahan. Our daughter Sandra married Colm Barry, and they

reside at their home nearby on Shallon Lane as indicated on map A attached. We note that the 69dBa contour map as issued by DAA to give an idea of the effect of noise at these locations as indicated by DAA.

I Pearse Sutton C.Eng BScEng, FIEI, FIStructE, FConsEI, Dip Env.Eng, Dip Struct Eng,EURIng am a founder former director of O Connor Sutton Cronin and a current director of Cronin & Sutton Consulting Engineers who are leading Consulting Civil, Structural, Environmental and Transportation Engineers in Dublin and I have been in practice for over 40 years.
Both of us have actively participated in the local community of St Margarets The Ward as have or children who all live not far from us. We participated in the planning submission in 2004 for the new north runway and in the Regulatory decision by ANCA on the Relevant Action and the Planning Submission for the Relevant Action to Fingal County Council.

The reason for the above introduction is that when the North Runway opened for use in August 2022 we experienced a horrific onslaught of noise and disruption that was never communicated to us during any of the previous public consultations with DAA or that were brought to the attention of our communities during the 2004 planning application that obtained permission from ABP in 2007. We note that there is a revised EIAR Supplement submitted with the Significant Additional Information by DAA which explains that there are NOW revised flight paths which appear to be the major reason for this horrific change in our Environment which were not the subject of assessment of the 2007 permission nor are they consistent with the original EIAR submitted to Fingal County Council for this relevant action which again had indicated different flight paths from those of 2007 and those that are now being flown.

We note from the Inspectors report at section 12.11.4 that both the Inspector and Vanguardia have established that the flight paths being flown by departures off the North Runway are not those that obtained a grant of planning permission in 2007. Therefore the flight paths indicated as part of the Relevant Action application are not in accordance with the original grant of planning. We the residents of St Margarets The Ward have been shouting this from a high since the North Runway opened. However at every opportunity DAA have insisted up until now that they are operating

flight paths in compliance with the 2007 grant of planning which is totally untrue and incorrect

With respect to the recent Infrastructure Application by DAA to Fingal County Council Reg:Ref: F23A/0781 Part 1-B, Response to RFIs by Coakley O Neill it is acknowledged at page 58 that with respect to the 2007 grant of permission that “The flight routes assumed that the North Runway tracks would replicate those on the South Runway. These assumed aircraft turned after a straight segment of around 5nm from the end of the runway.”

At page 59 of this report it is stated that “Modelling agreed for operation of the noise mitigation schemes (2016) that the flight routes assumed that the North Runway tracks would replicate those on the south runway. These assumed that 25% of aircraft turned after a straight segment of around 5nm from the end of the runway with the remaining 75% turning earlier , around 2nm from the end of the runway. This was based on an analysis of a sample of radar flight tracks.” We note that these alterations were not a part of any planning application to alter the original 2007 grant of permission and no assessment within an EIAR was sent to Fingal County Council for a revised planning.

Again in the same report on p59 under the heading of IA EIAR December 2023 it is stated that “The flight routes were based on an analysis of actual radar tracks. For the south runway these were similar to previous assumptions for the North runway this meant an initial 30 degree turn shortly after the end of the runway. After the initial turn the routes are similar to previous assumptions.” Again this statement is unbelievable because of the 30 degree turn, the flights are on a completely different flight route than those presented in the 2007 grant of planning than those for the Relevant Action application.

Therefore DAA are now admitting that the flight paths that are being flown are now not those that were assessed in the grant of planning of 2007 and therefore operations are being admitted to being unauthorised development.

However the DAA are also misleading Fingal County Council and ABP when they say that the current flight paths are as a result of direction by AirNav and IAA. We refer to

emails attached at Appendix B from AirNav and IAA confirming discussions that members of St Margarets The Ward Residents Group had with both of them regarding how the flight paths were chosen. It can be seen quite clearly that DAA presented only one option for flight paths departing off the North Runway for AirNav to produce the required SIDs and STARs that were then sent to the IAA for statutory approval. AirNav and IAA confirm that there are a number of other options that the flight paths and runaway operations can be drawn up to meet ICAO safety requirements . Also note that neither AirNav nor IAA took any planning issues or noise abatement into account as this is a function for DAA as the airport operator and not a function of theirs.

We refer to Appendix C which contains an information leaflet circulated by DAA and available on their web site. Under the heading of Flight Paths it is stated “daa was granted planning permission for the construction and operation of North Runway. As part of this process, indicative flight paths were used, however these did not form part of the planning approval” However the flight paths submitted for the 2007 grant of permission were used to assess the noise situation and were presented in the EIS as part of the application. Condition 1 of the grant of planning by ABP clearly states that the runway is to be operated in accordance with the EIS as submitted. The Daa have not applied for permission to alter the flight paths and therefore the flight paths as granted permission do form part of the planning approval. The Daa deliberately tried to deceive the public on this matter and on the matter of choice of the flight paths.

We also refer to correspondence from Ms Michelle Molloy of DAA , which is also attached at Appendix C, to Meath County Councillors whereby she confirms that the DAA have not looked at alternative flight departure routes in any great detail and has confirmed that DAA has had discussions with other airports on this issue only recently. .However it is obvious that all of these alternatives needed to be reviewed and assessed and presented with the RA planning submission which has not been done. It should be noted unfortunately that it can be taken from this correspondence that DAA consider that the investigation of flight path alternatives is premature UNTIL the RA decision is given by ABP. The arrogance of this is incredible that the DAA openly admit that they did not look at or assess alternatives and then throw this back in the face of the public that if they get away with it then the flight path issue is etched in stone forever if ABP grant an unconditional planning consent for this RA application. .

Flight paths did not form a part of the change to the original permission of 2007 and therefore this must clearly be stated by ABP in any decision to grant permission to ensure that is crystal clear,

This is a very serious issue regarding the RA submission as no alternatives have been considered or presented as part of this application but more importantly the DAA have submitted this application stating that the chosen flight routes off the North Runway are as a result of safety as advised by AirNav and IAA which led the Inspector to conclude "that the new flight patterns and I consider it reasonable that these would be required for safe operation of aircraft operation of aircraft movements departing from the NR" is totally unfounded and not correct. IAA and AirNav can only take directions from the DAA, and it is the responsibility of the DAA to look at all of the alternatives, to present them , to assess them and for the public to be consulted on them. For example both AirNav and IAA have stated that the two parallel runways at Dublin Airport could be run in dependent mode which means that the 30 degree divergence is NOT required and flight paths off both runways can be straight out as per those submitted and were granted permission in 2007 by ABP.

Since the opening of the runway in August 2022 we knew there was something really wrong with the assessments previously given to the public and we therefore set about engaging experts in the field of acoustics to monitor the ACTUAL noise at our premises at:

1. Both inside and outside our house prior to the north runway becoming operational in July 2022 by iAcoustics. (Refer to Appendix D of this submission)
2. Both inside and outside our house in December 2022 when the North Runway was in use but not for the full 16 hour day by iAcoustics. (Refer to Appendix E of this submission)
3. For the entire 92 day Summer period of 2023 by Wave Dynamics. (Refer to Appendix F of this submission)
4. We also had the experience of night time flights operating off the North Runway for at least 3 periods of nights when the South Runway was closed for maintenance.

The reports on these noise monitoring events are included within this submission and are discussed later.

2.0 PUBLIC NOTICE

We refer to the public notice as published in a National Newspaper. It is noted that an Environmental Impact Assessment Report Supplement was received. No where in the notice does it identify that there are to be changes to the Flight Paths from the original Grant of Planning in 2007 OR that there are proposed changes to the flight paths that were submitted with the original Relevant Action Planning Submission to Fingal County Council on which they adjudicated on. Therefore, the Public Notice FAILS to notify the Public at large of modifications to the Planning Submission that could have Very Significant effects on them, their health and their wellbeing. In actual fact the Public Notice states that the Significant Additional Information is in relation to a request for additional information from An Bord Pleanála who in fact did not request a change to flight paths. We refer to section 1.2.1 of the EIAR Supplement which clearly states" The Applicant has identified a number of changes that have taken place since September 2021 that could affect the findings of the environmental assessments presented in the September 2021 EIAR. These changes include:

a. Actual flight paths from North Runway upon commencement differing from assumed flightpaths used for modelling/assessment purposes in the 2021 EIAR;
b. Updated air traffic forecast data;
c. Earlier fleet modernisation;
d. The north runway becoming operational in August 2022; and
e. Other passage of time changes that include changes to the environmental baseline conditions and changes to relevant aviation, planning and environmental legislation, policy, guidance and best practice.

None of these items are contained within the new Public Notice or the Original Public Notice submitted in December 2020, and which ALL are of MAJOR importance to the public affected by the operation of the Dublin Airport North Runway. The Public Notice reads as if DAA only want to change condition 3(d) and condition 5 and replace them with alternatives. IT does not ALERT the public to the other major changes from the

permission granted in 2007. We the public as the Bord is very aware were shocked beyond belief when the North Runway opened (and again we confirm it is operational and the planning conditions of ABP decision in 2007 do apply as the flight paths were completely different from those environmentally assessed during the 2007 planning process. Clearly from Section 1.2 of the EIAR Supplement the DAA are aware of the requirement to notify the Bord of major issues that affect the previous environmental assessments but also, they are obliged to inform the public and provide consultation on these matters so that the public are made aware of these issues and can make submissions and observations as provided under all current legislation. As set out by DAA we see this as an attempt to regularise retention of unauthorised use of the runway for which they have not informed the public nor carried out the process as required by current legislation requirements. In order to demonstrate this we point to p168 and p169 of the Planners Report from Fingal County Council (Copy attached at Appendix D). Under the heading of Flight Paths "The proposal under consideration in the Relevant Action as subject to the Regulatory Decision has no impact on nor consents any changes to flightpaths. It is outlined in the EIAR there will be no new flight paths in the proposed scenario." So, Fingal Planning Department were misled and understood that there are no new flight paths within the planning application and as per our correspondence on 2.0 "Flight Paths" above it is crystal clear that the flight paths have been altered significantly in this Relevant Action application. Given this fact and it is clear at section 1.2 of the EIAR supplement that there are indeed changes to flight paths and that unauthorised flight paths are being currently operated a new planning submission for retention must be provided by DAA and this application cannot be considered any further.

Furthermore, the Public Notice for the Significant Additional states" Conditions 3(d) and 5 have not yet come into effect or operation, as the construction of the North Runway on foot of the North Runway Planning Permission is ongoing". This is not correct. The North Runway opened in August 2022 and is in operation for in excess of one year now. Conditions 3(d) and 5 are very much in effect NOW. This error has major implications. Firstly, as noted it has misled the public. Secondly the runway since opening has been operated by the DAA in contravention of condition 5 and as a result Fingal County Council have issued enforcement proceedings against

DAA. Therefore, this Significant Additional Information is for RETENTION of an unauthorised development. The DAA also exceed the 32mppa cap as provided in planning conditions relating to Terminal 1 and 2, in 2019. However, in accordance with the amended Section 34 (12) of the Planning and Development Act because an AA nor EIAR was submitted for the use of the runway in breach of the planning granted, the planning Bord must refuse to deal with this application. We therefore request An Bord Pleanála to rectify the above wrong doings and inform the Public that the Public Notice is wrong so that they can contribute their concerns to this application. Many members of the local communities were not aware that the modifications as noted above were included in the proposed Relevant Action and took it on face value. They missed out on providing observations to these modifications that were unknown to them and are forced now to pay to contribute observations to ABP. And missed out on providing observations to Fingal County Council.

3.0 AIRCRAFT NOISE (DUBLIN AIRPORT) REGULATIONS ACT 2019.

We draw the Bords attention to section 37R of the Act (Extract at Appendix G) "Supplementary provisions relating to decisions on applications referred to in sections 34B(1) or 34C(1) which were not refused by virtue of section 34B(5) or 34C(5). At 37R 1(a) of the Act it states, "This section applies in addition to section 37 in the case of an appeal under section 37 against a decision of the planning authority under section 34 where, pursuant to section 34B(15) or 34C(16) that decision incorporates a regulatory decision of the competent authority under section 34B(13)(a) or 34C(14)(a) as the case may be" Therefore this applies to this case.

At 37R(2) it states" For the purposes of a relevant appeal the reference in section 37(1) to any person who made submissions or observations in writing in relation to the planning application to the planning authority includes any person who made submissions or observations in writing referred to in section 34B(11)(c) or 34C(12)(c) to the competent authority in relation to the draft regulatory decision or related report referred to in 34B(9) or (10) as the case may be, or section 34C(10) or (11) as the case may be" They were over 1300 submissions made by the public to the competent authority on their draft regulatory decision. HOWEVER, having checked with a number of these people NONE of them have been written to by the competent

authority or the Bord to inform them that they are entitled to make an observation or submission to this Significant Additional Information and are entitled to do so at no cost. This is not what the public notice states, nor does it inform those members of the public of their entitlements under the Aircraft Noise (Dublin Airport) Regulation ACT 2019

4.0 Aircraft Noise and vibrations

A completely new revised chapter on Aircraft Noise and Vibration was included within the EIAR Supplement at Chapter 13.0. This was not requested by ABP. At Section 1.2 it is noted that the changes are required due to actual flightpaths from North Runway upon commencement differing from assumed flightpaths used for modelling/assessment purposes in the 2021 EIAR, together with a number of other changes as per above. However, the relevant planning application never identified that the flightpaths as granted permission in 2007 were the proposed subject of change when the Relevant Action was submitted to Fingal County Council in December 2020 and the public were not informed within the Public Notices that the flight paths were proposed to be changed. Neither of the flight paths that were flown in August 2022 and February 2023 were included in the 2020 relevant Action submission and now DAA are proposing a 4th change to flight paths (i.e. original flight paths assessed in 2007, relevant action submission flight paths of December 2020, Actual flight paths flown in August 2022 and now the current flight paths being flown since February 2023) all of which are different, and which affect a different community population in different ways. We are amazed that the largest piece of infrastructure in Irish Aviation history which obtained planning consent in 2007, over 15 years ago, was constructed without taking into account the planning conditions associated with the development for the development of the flight paths that were assessed and furthermore that no revised application for the flight paths to be used has been made UNTIL the Supplementary EIAR recently submitted to ABP.

5.0 Legislation and Planning Policy Context.

We note the various legislation is set out in section 13.2 of the EIAR Supplement. However, we note that the glaring omission and is only given a passive

reference and that is Directive 2011/92/EU as amended by Directive 2014/52/EU which does not replace the earlier Directive with respect to Environmental Impact assessment. We note and are fully aware that an EIA in itself does not dictate the outcome of the development consent decision of the authority but is an IMPORTANT AND ESSENTIAL consideration in decision making procedures and the achievement of high quality, sustainable development. In fact condition 1 of the 2007 permission by ABP conditioned that the runway be operated as set out in the submitted EIS

The current flight paths are being operated since February 2023. The EIAR Supplement assessing these flight paths was submitted in late September 2023. So the EIAR Supplement is now being submitted as a fait accompli after the event. So the DAA are doing what they want to do changing planning conditions and retrospectively submitting an EIAR in an attempt to ratify what they are doing. This is completely wrong, and we urge the Bord to call out the DAA on this fact. They should have applied for a new planning permission or a retention permission.

We carried out noise monitoring at our house both before the North Runway opened for use and immediately after the opening of the North Runway. The noise monitoring was carried out by iAcoustics experts in the field of acoustics. We were approached by DAA some time around 2019 who notified us that in accordance with the grant of planning for the North Runway in 2007 that our house needed to be sound insulated in accordance with condition 7 for DAY time noise. They noted that as there was a restriction on night flights that the insulation was only for DAY noise and that this was in order to assist in reducing the health impacts of the noise to be generated by aircraft during the day. WE noted from the Compliance submission that was made to Fingal County Council that the predicted noise level at our house was on the 63dB contour. We had known this because when the planning submission in 2004 was going through the planning system, we had travelled to the South runway and stood at a distance equal to the distance that our house would be from the North Runway flight path and experienced what the noise was on the South runway departures. The documentation submitted for the north runway was that the departures off the North Runway would be similar to the South Runway which is straight out for 5nM before turning (or 3000 feet) Obviously in order to protect our health we agreed to have our house sound

insulated by DAA which we understood would reduce any impact from the flight paths of those assessed in the 2007 EIS and to reduce the impact of day time noise. Following the noise insulation works by DAA we therefore monitored noise outside in our garden and inside in our bedroom with all vents and windows closed. This report by iAcoustics is attached at Appendix E to this submission.

At section 8.5.7 of the Fingal Development Plan , National Policy Objective 65 is stated as “Promote the pro-active management of noise where it is likely to have significant adverse impacts on health and quality of life and support the aims of the environmental Noise regulations through national planning guidance and noise action plans” In order to achieve this Fingal development plan has incorporated a noise zoning system with the overarching objective to balance the potential impact of aircraft noise from Dublin Airport on both EXTERNAL and INTERNAL amenity. Guidance and standards are included in the Development Plan and ProPG planning & Noise – New Residential Development, May 2017 and British Standard BS8233:2014 Guidance on sound insulation and noise reduction for buildings, are specifically noted.

6.0 REGIONAL SPATIAL AND ECONOMIC STRATEGY

ABP quite rightly point out that the policies and objectives of the Fingal Development Plan (FDP) 2023-2029, are taken into consideration in the proposed Draft Decision . At section 1.9.2 the Regional Spatial and Economic Strategy (RSES) 2019-2031, the FDP states as part of the vision for the plan that the RSES identifies the regional challenges as the need to sustain economic growth whilst transitioning to a low carbon society and the requirements to align population growth with the location of homes and jobs whilst creating healthy attractive places and an enhanced quality of life. The RSES is underpinned by three cross cutting principles; healthy placemaking, climate action and economic opportunity , which is incorporated into all facets of our new development plan. Health is a fundamental issue running through all policies and objectives and is a key Sustainable Development Goal of the plan.

7.0 DETERMINING REPRESENTATIVE INTERNAL NOISE LEVELS AND ESTABLISHING ADEQUATE NOISE INSULATION PROTECTION.

For any awakenings assessment to accurately reflect the real-world impacts of nighttime noise, it must determine internal noise levels that represent an average over the year. This requires careful consideration of factors such as building insulation and the percentage of time windows are open, as these influence the degree of indoor noise reduction. The World Health Organization (WHO) Night Noise Guidelines for Europe provide a framework for this calculation and recommend an average insulation value of 21 dB.

The WHO explains that this value reflects conditions where windows may be open approximately 20% of the year, which reduces the insulation performance of even well-insulated homes. As stated in the guidelines:

"An average level difference of 21 dB has been chosen, as this takes into account that even in well-insulated houses windows may be open a large part of the year."

The logarithmic relationship between insulation and window-opening behaviour limits the effectiveness of insulation schemes in reducing annual average internal noise levels. For example:

- If windows are fully closed 100% of the time, an insulation value of 30 dB might be achieved.
- If windows are open 50% of the time, the effective insulation drops to approximately 18 dB.
- If windows are open only 20% of the time, the effective insulation is approximately 21 dB, aligning with the WHO’s assumption.

This logarithmic relationship means that even with advanced insulation measures, the average internal noise level is capped by the proportion of time windows are open. Consequently, insulation schemes have limited effectiveness in addressing noise impacts when windows are regularly opened for ventilation, temperature regulation, or personal preference.

The reliance on an average insulation value of 21 dB in assessments underscores the need to account for realistic living conditions. While insulation measures can reduce indoor noise during specific periods, they cannot fully mitigate the impacts of additional

awakenings over the year. This limitation highlights the necessity of operational restrictions, such as movement limits, to address the root cause of nighttime noise disturbance.

In order to protect the health of the Fingal Community the Development Plan includes policies and objectives on environmental adverse health effects such as aircraft noise. It is stated at Section 14.20.17 Noise, that noise assessments should follow the principles of good acoustic design in line therefore with Professional practice Guidance on Planning & Noise :New Residential Developments 2017 (proPG). Predicted internal & external noise levels should also be in keeping with BSI Standard BS 8233:2014 Guidance on Sound Insulation and noise reduction for Buildings, table 4 :Indoor Ambient Noise levels for dwellings

It should be noted that the Residential Noise insulation Scheme (RNIS) and the Home Sound Insulation Programme (HSIP) listed at section 2.3 Part 2 of condition 6 of the Draft Decision are sound insulation schemes required under ABP planning ref PL 06F.217429 to deal with “day time noise”. Due to the change in flight paths from those presented as part of that grant of planning the DAA have continually altered the eligibility contours for these schemes and are presently extending these schemes to deal with the adverse noise situation which is occurring in areas far extending beyond the submitted planning compliance contours for day time noise. It is most odd that ABP consider it appropriate to provide the statement at Section 2.3 that relates to day time noise WITHOUT clearly assessing the adequacy of such noise insulation for the effects of Night time noise when there is such a vast difference in the effects of night time noise v day time noise and the effectiveness of sound insulation suitable to protect against night time noise v day time noise.

As per the FDP guidance, at table 4 BS 8233 the internal ambient noise levels for night time noise should be considered in 3 parts. The first is that at night in bedrooms internal ambient noise should not exceed 30dB LAeq 8hours which with reference to the above of this report equates to an external noise exposure of 30 + 21 = 51 Laeq 8hours.

The second is with respect to note 4 at Table 4 and which is further expanded in the FDP referenced ProPG guidance at Note 4 which states that an LAmaxF of 45dBA should not be exceeded more than 10 times per night. Again with reference to above of this report this equates to 66dBA outside (21+45). As the criteria for acceptance to the RNIS and HSIP is 63dB Laeq 16 and given the monitoring results carried out at various locations on the North Runway the individual value of 66dB is being exceeded in most of the current noise Zones A and B as defined in the FDP. The reduction of 5dB is not applicable as to existing residents the noise from unplanned flight paths is neither acceptable nor desirable. Therefore even with noise insulation in the HSIP and RNIS areas they fail to meet the criteria of good acoustic design and therefore as recommended by ProPG, and the BS are deemed to be unacceptable. If unacceptable for proposed new residential development on health grounds it follows that it is unacceptable for existing residents. The proposed new flight paths therefore create an adverse noise problem which cannot protect the health of homeowners by incorporating adequate sound insulation and therefore the proposed economic growth is unsustainable unless alternative mitigation measures are provided. The proposal therefore is contrary to FDP policies and objectives in its current proposal.

The 3rd is the effect of awakenings at night as discussed in section 9.0 of this submission

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Under condition 6 of the Draft Decision at Part 1 “Target Performance” it is stated that “Where possible, the guidelines recommended in BS 8233:2014 for internal ambient noise levels shall be targeted” The “Where possible “ is not included in any of the guidance and diminishes completely the object of the assessment and implementation of adequate noise insulation to achieve the target Performance and in our opinion should be deleted . The FDP is clear when it states that “noise levels should be in keeping with the BS” and not “where possible in keeping with the BS” Both the BS and ProPG recommend such a “where possible” proposal as unacceptable.

Due to the Vernacular Housing characteristics associated with rural housing in Fingal such as dormer bungalows and 1and ½ storey houses are of a nature that the dormer

windows are typically located closer to the roof line and are therefore directly exposed to overhead noise sources,

Sloping roofs , angled walls and window protrusions create major challenges to providing adequate noise insulation and it is normal that bedrooms are located within the dormer roof area of these types of houses. Ventilation requirements to Building Regulation requirements render sound proofing virtually redundant when windows are opened.

Also under condition 6, part 5 step 5 (e) the statement “Through an elemental analysis the most effective combination of measures set out in Part 4 having regard for the Target Performance and the financial assistance grant shall be identified” This suggests that the financial grant maybe the limiting factor in not achieving the Target Performance. A standard is a standard and when recommended by the FDP must be adhered to in full. This is very important for those inside the HSIP and the RNIS and also outside of these locations. If this logic was applied in a planning submission it would immediately be rejected and planning refused as the proposal does not meet the stated FDP standards. The condition in our opinion should be altered remove the financial assistance target.

8.0 CASE STUDY OF ADEQUACY OF NOISE INSULATION AT OUR HOUSE.

In order to meet the standards and guidelines set out in the FDP for adequate noise insulation with respect to traditional Irish Domestic construction alternative mitigation measures are required. Our house is a dormer bungalow and was the subject of sound insulation by DAA.

Table 8.1 of the FDP notes the Aircraft Noise Zones, and it specifically states that “Good Acoustic Design means following the principles of assessment and design as described in ProPG: Planning & Noise – New Residential Development, May 2017”

At Section 2.28 of the ProPG Guidance the recommended internal noise guidelines are stated as being described in Figure 2 and that these guidelines reflect and extend

current practice contained in BS 8233:2014. The recommended LAmax between the hours of 23:00 – 07:00 is listed at 45 dB Sleeping in a bedroom location and at note 4 it is noted “Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or LAmaxF, depending on the character and number of events per night. Sporadic noise events could require separate values. In most circumstances in noise sensitive rooms at night (e.g. bedrooms) good acoustic design can be used so that individual noise events do not normally exceed 45dBLAmaxF , more than 10 times a night. However where this is not reasonably practicable to achieve this guideline then the judgement of acceptability will depend not only on the maximum noise levels but also on factors such as the source, number, distribution, predictability and regularity of noise events (see Appendix A of the ProPG document) Also Note 5 states “Designing the site layout and the dwellings so that the internal target levels can be achieved with open windows in as many properties as possible demonstrates good acoustic design etc..

With reference to the iAcoustic report and the indoor noise readings in the bedroom when the North Runway was in use in December 2022 of the 112 noise events monitored 42 of these results exceeded or equalled the 45 dBLAmaxf value This was with the windows closed and vents closed in our house which was sound insulated by DAA. We note that it is recommended that the vents be open during monitoring and therefore the actual peak noise levels inside the bedroom will be higher. If windows are open then the values will be very high inside. Note that the runway was not operational for the full 7am to 11pm period at that time. This is over 40% of the events. Therefore, if night flights are allowed on the North runway then the “Good Acoustic Design” criteria as set out in Fingal’s Development plan cannot be achieved. Also, we can testify that at present we are awoken just after 7am every morning when aircraft commence departures on the North runway and that we cannot go to bed before 11pm as the noise from aircraft does not allow us to fall asleep as the noise within the bedroom is too high. Therefore at our location the noise insulation provided by DAA cannot meet the target values they have set. This is primarily because of the change in flight paths from those granted permission in 2007 and which was a major shock to us when the North Runway opened.

I refer to Appendix H which is a copy of the Statement of need by Anderson Acoustics on behalf of DAA for our house . I note that They quote the LAeq 16 hour values of BS 8233;2014 of 35 for a bedroom during the day. However the figure for night time LAeq 8 hour is 30dB in a bedroom. The ProPG figures recommended for LAmax are not listed. Note that they list the external noise level at 65dB LAeq 16 hour based on an integrated Noise Model 2022 summer noise levels. We have no idea how they came up with these figures for external noise because as referenced in the Wave Dynamics report the external noise level based over the 2023 -92 Summer day period monitored at our house is at 70dB. With reference to the latest contours produced by DAA they indicate the 69 dB contour some 50m from our house to the south. However having obtained a recent report by Anderson Acoustics and with reference to the document and map at Appendix I we note that these contours are closer to the values SMTW have monitored over the 92 Summer periods for 2023 and 2024. This map from Anderson Acoustics confirms that the day time noise level at our house is 70dB which is the main reason why noise insulation for night time noise reduction is not being achieved to Fingal County Council Development Plan recommendations.

We also carried out continuous monitoring of noise outside our house for the full 92-day summer period and a noise monitoring report was prepared by Wave Dynamics and a copy of this report is attached at Appendix F.. Please note that under objective DA012 – Noise Zones and new housing for Farming Families it is stated that “Under no circumstances shall any dwelling be permitted within the predicted 69dB LAeq 16 hours noise contour. This restriction is stated as “within this zone may be potentially exposed to high levels of aircraft noise, which may be harmful to health or otherwise unacceptable” Note that the noise levels at our house exceeded the 69 dB Laeq 16 hours when flights are departing off the North Runway. So therefore with these new flight paths we are being exposed to levels of noise based on which Fingal County Council strongly resist development of housing due to the reasons noted above. But of course when Fingal County Council made their decision on the Relevant Action before them they did not have our evidence of ACTUAL noise monitoring nor were the flight paths as presented matching those as per the revised EIAR. Surely based on this they would have reached a different conclusion on their decision. What a mess! And again this is due to the change in flight paths from those that obtained permission

in 2007. We note that when the North Runway is in use for landings from the west that the noise situation at our house is very acceptable but unfortunately for over 80% of the time flights depart off the North runway to the west.

Please refer to the SEL results of the Wave Dynamics noise monitoring and note the significant variation in levels monitored and those predicted by DAA. The exceedances are in the order of a massive 7dB(A) with ranges been experienced between 93-99 dB(A). This clearly indicates that all predictions of noise at our residence by DAA are wrong by a considerable amount and are actually way higher than their predictions.

The reason for the discrepancy in noise levels at all houses adjacent to us is that there is no monitoring of noise by DAA at these locations as the nearest monitoring station closest to the north runway are some distance away. Due to the 30 degree divergence before flights leave the runway it can be clearly noted that the aircraft are not able to climb as fast and that the power to turn is creating more noise than if the original climb of straight out was being used. The aircraft are therefore lower and expending more fuel creating more noise as they turn 30 degrees off straight. The DAA have not provided any monitoring to verify if their PREDICTED noise levels adjacent to us are correct or not. Our monitoring is clear and is far more excessive than that predicted by DAA.

9.0 SIGNIFICANCE CRITERIA

The Lden at our house is measured at 68dB but with a significant amount of days over the 92 summer day period where LAeq 16 hours equalled and exceeded 69 dB with readings of LAeq 16hours of 71dB being recorded. From the iAcoustics report BEFORE the runway was operational the Lden was measured at 45dB outdoors which is an increase of 23dB.

Table 13-2 of the EIAR sets out the Air noise Impact Criteria (absolute) – residential. The scale description of our property is High as per this table.

Table 13-3 Air Noise Impact Criteria indicates that for a change in noise level greater than 9 dB the scale description is Very High.

Table 13-4 gives a Summary of Magnitude of effect – air noise which results in a "Profound"

The definition of "Profound Effects" as per the EPA EIAR Guidelines 2022 is "An effect which obliterates sensitive characteristics" and Figure 3.4 is a chart showing typical classifications of the significance of effects.. Our property is at the extreme top of the scale as being of PROFOUND SIGNIFICANCE.

Section 13.7 sets out the Assessment of Effects and Significance. We firstly note that there is continuous reference to "Permitted Scenarios". In our opinion none of these are permitted as the flight paths as proposed are considerably different from those assessed and presented in the EIS of the granted permission in 2007. We note at table 13-34 Air Noise (Lden) People by Magnitude of effect – 2025 Proposed vs Permitted that the number of people with an adverse effect with a Magnitude of effect of Very significant or Profound is 0 and at Section 13.7.13 it is stated that "Going from the 2025 Permitted Scenario" to the 2025 Proposed Scenario, 7060 people are assessed as having a significant beneficial effect and 119 people are assessed as having a significant adverse effect using the criteria detailed in Table 13-4. NO PEOPLE ARE ASSESSED AS HAVING THE HIGHEST EFFECT LEVELS i.e. VERY SIGNIFICANT AMD PROFOUND". This statement on its own is totally misleading and wrong. As demonstrated above my house Significance Criteria by their own criteria is PROFOUND and it would appear that DAA are really saying that because the house is insulated in accordance with their sound insulation program that this somehow mitigates the impact completely. This is totally untrue, and we urge the board to recognise the attempts by DAA to camouflage the real facts. No other mitigation measure is proposed by DAA within their EIAR Supplement and therefore the EIAR is deficient. I would point out to the board that we are not the only residence where DAA are attempting to compare apples with oranges due to change in flight paths and consequent changes to noise exposure with SIGNIFICANT PROFOUND EFFECTS. This as can be seen from the evidence of monitoring by noise experts is totally wrong. There is absolutely no way that the significance of the magnitude of effect is

going to decrease from Profound to significant within the space of 12 months from now and particularly with a proposed increase in nighttime flights and night time hours and as we have been informed increased day time flights above the proposed 32mppa cap. Section 13.7.13 states that “No people are assessed as having the highest effect levels i.e. very significant and profound” If it is the case that DAA are arguing here that if a household had a magnitude of significance rating of profound in the so called “permitted” scenario and still has a profound rating in the proposed scenario then there is no difference from one to the other and therefore there is no increase in effect, then this is extremely misleading and of course wrong. It appears that the mitigation measure is simply noise insulation and monitoring. As can be seen from the above noise insulation does not adequately deal with the noise at our home internally as the recommended targets as set out by Fingal county Council cannot be achieved and more particularly the level of day time noise is unbearable from the point of view of being able to enjoy the outdoors without being exposed to the very harmful health effects of aircraft noise as set out in the Fingal development plan and Noise guidance from ProPG and WHO. From the DAA own assessment the Significance of the effect of what they propose (and are currently doing) is of PROFOUND SIGNIFICANCE at our home and as pointed out by ALL EIAR guidance cannot be allowed without appropriate mitigation which of course House Sound Insulation is not in any form or fashion a n appropriate mitigation measure due to the significance of the effect. DAA do not propose any other remedial measure for our house and therefore have failed to adequately deal with the Environmental Impact in accordance with Statutory Legislation. To have an effect of “Profound”, an effect which obliterates sensitive characteristics of a residential home is not acceptable and the proposed minimalistic house insulation that forces you to be a prisoner in your own home AND subject to such a degree of noise internally that your health is profoundly affected is not an acceptable mitigation measure. And all of the above is WITHOUT looking at the significance rating of proposed nighttime flights which from table 13-39 there is a large increase in those to be profoundly affected and very significantly affected.

With respect to the “permitted” scenario we note that on p 39 of 102 of the ABP Inspectors planning report for the 2007(extract at Appendix J to this submission) permission it states “However of great import at this juncture is Mr. Thornly – Taylors view that as the noise section of the EIS fails to describe the likely “significant” effects

of the project it therefore fails to meet the requirements of the regulations. Undoubtedly noise is a material issue arising in the case and I note that the matter of significance was discussed at the oral hearing with further details sought by way of a section 132 notice consequent to same. Notwithstanding same Mr Thornly Taylors interpretation of the regulations in terms of the requirements of the EIS document appear to be correct and the failure to deal with same is certainly a notable omission." Therefore, significance was not dealt with in the "permitted" scenario and any attempt to try and retrospectively make the case on the basis of the granted permission with all the conditions and reference to the submitted EIS at the time cannot now be submitted some 17 years later and represented as "permitted" under that permission. It clearly is not and should not be accepted as such by the Board. Again DAA have failed to deal with the issue of Significance in terms of Environmental Impact on the local Communities and have failed to deal adequately with, Profound, Very significant and Significant Effects. They just act as if there is nothing to see here. I can assure the board that the effects are Profound and devastating in terms of enjoyment of our home. We would like to extend an invitation for the Board and its experts to visit our home and experience the level of noise and the devastating effect. If the board do not deem this appropriate to visit a private home then the ST Margarets GAA complex is immediately adjacent to our home, and which is accessible to the public where an appreciation of such devastation can also be experienced.

Fingal County Councils Noise Zone A has a restriction that no residential development shall be allowed other than active farming families. The reason for this is stated that residents would be exposed to harmful aircraft noise levels. However, as a result people in this noise zone A with existing houses are being subjected to similar new noise levels due to flight path changes and therefore their health are now at risk from the harmful health risks associated with aircraft noise that Fingal obviously are aware of by their actions. We also refer to the Health warnings submitted by the HSE and Fingal Environmental Health that were submitted with respect to this application. . It follows that the only mitigation measure open to DAA is to revert back to the flight paths which they received permission for or to submit a retention application which includes realistic mitigation measures which deal with those profoundly and significantly effected by the imposition of predominantly excruciating high levels of aircraft noise to be imposed by DAA.

Prior to 2005 there were no restrictions for local community members applying for permission to build housing in the area based on Noise Zones. Despite DAA continually stating that they restricted residential development in the area around the airport they did nothing to prevent local development. There was never any warning that the flight paths would change from those assessed in the EIAR of 2007. If DAA insist on these changes then they must properly assess the Significance of these changes and propose realistic alternative mitigation measures should they wish to proceed.

We have had used the time since the North Runway opened to carry out Actual Noise monitoring in Real time. Daa had been given the opportunity by a time extension to do the same but yet have chosen to use predicted noise models. The reasons are now quite obvious as the ACTUAL noise levels we have monitored are considerably greater than their predicted noise levels. We extended invitations to DAA to publicly attend meetings to discuss this matter, but they have refused time and time again. We have shown that the DAA noise predictions are wrong and that the ACTUAL noise levels are far higher than those predicted. The DAA own the lands adjacent to a number of houses at Ballystrahan and had ample opportunity to put noise monitors in these locations but chose not to. They are playing the card that they will reassess the noise situation over a two year period and if there are issues found then they may do something then. This is not acceptable. The Noise is now, the Profound Significance on our Amenity and Environment is Now and therefore appropriate mitigation and protection of our health is required now. The Chairman and CEO of DAA have written to the Taoiseach and Planners asking them to encourage ABP to adjudicate in favour of the DAA on this application as a matter of urgency BECAUSE if they don't the Irish Economy will lose an opportunity to make more Millions of Euro from Dublin Airport. However the same people show complete contempt with respect to our health and our constitutional right to enjoy a healthy Environment and our natural amenity without the imposition of Profound Significant effects which obliterates all environmental characteristics by their proposed development by them.

We note at section 7.7.3.2 of BS 8233 that it is desirable that the external noise level does not exceed 50dB LAeq 16hour for day time noise for amenity space and gardens

and patios. We know that this is for day time noise but in the Summer months by stretching the night operating hours from 11pm to 12am and from 6am to 8am this now means that there is absolutely no respite for us using our garden at any time as amenity given the monitored noise levels as appended to this submission. We are to be trapped inside our poorly insulated houses. This is not right and surely ABP can appreciate that due to the unwarranted change in flight paths which have no grant of planning that we are now being exposed to severe noise . DAA must provide more detailed and adequate noise insulation measures with a complete ventilation system that allows the internal targets of the Development Plan be met and must provide a sound proof and mechanically ventilated external glazed refuse building so we can enjoy our outdoor amenity of our house.

10.0 Public Safety Zones.

The current runways have included inner and outer public safety zones as advised by Environmental Resources Management Ireland Ltd. On behalf of The Department of Transport and Department of Environment heritage and Local government and which was published on 30th September 2003. The inner public safety zone is based on an accident occurring at 1 in 100,00 per annum. ERM point out that whilst the UK allow existing residential developments to remain in place the Dutch are removing all existing houses located within the inner PSZ for residents' health and safety reasons. Note that the inner PSZ for the new North Runway based on the submitted flight paths of straight out is 378m wide at the end of the runway and 3050m long. However, given the fact that departures are now diverging and have a large spread between actual paths flown these public safety zones must be changed to suit the proposed new flight paths. We note that all houses within the inner PSZ to the west of the new north Runway are included in the Voluntary Purchase scheme to ensure that all residents are protected from aircraft accidents on take-off and landing.

We note that the figures supplied in Chapter 8 of the EIAR relevant to the Public Safety zones are figures 8.2, 8.3, 8.5 and 8.6. Despite the departure flight paths being changed to have a 30 degree divergence off the North runway the public safety zones in the proposed scenario are indicated as being straight out. This is not correct and therefore any calculations provided are incorrect. The risk of major accidents off the

end of a runway which have divergent flight paths must follow the flight path until the aircraft has reached an altitude whereby the loss of a single engine or both engines would cause a crash on the ground under the flight path. This is not included in the figures and are obviously wrong. The landing psz are ok but the departures off the north runway are wrong.

We note that this particular health and safety risk has not been assessed nor has the significance rating been applied to houses such as ours which are within the parameters for the PSZ due to the change in flight paths. We are advised by pilots that the divergence of 30 degrees on take-off has a significant effect on rate of climb and the risk of engine failure on turning has an increased risk of accident should this happen on take-off. Whilst the Irish Aviation Authority are responsible for aircraft safety in the air and have produced SIDs for departures it would appear that no one has taken the responsibility for risk analysis and allocation of revised Public Safety Zones associated with the proposed revised flight paths. We are obviously very concerned for our safety given the safety concerns taken on board by the Dutch authorities in ensuring the safety of residents adjacent and along flight paths at the end of runways. Refer to the map at Appendix G which indicates the location of the previous PSZ for when flights were to depart straight out. Note as per the flight paths being currently flown obviously the Public Safety Zones must align with the flight paths.

11.0 AWAKENINGS

The Inspector's Report critically evaluates the Dublin Airport Authority (DAA) application to extend nighttime operations and examines its potential impact on the local population. A core issue identified is the failure of the DAA to adequately address the adverse effects of additional awakenings caused by increased aircraft movements. Noise disturbances during nighttime hours, particularly those causing awakenings, are known to have significant health and well-being implications, with long-term consequences for quality of life in affected areas

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The Inspector’s findings emphasise that the threshold of significance for additional awakenings is one additional awakening per night caused by aircraft noise. This seemingly small threshold reflects the acute and immediate nature of awakenings,

which are more impactful than other noise metrics such as L_{night} or Highly Sleep Disturbed (%HSD). Without robust mitigation measures, the Inspector concludes that the Relevant Action (RA) would result in adverse and significant impacts on sleep disturbance. This chapter details these findings, the inadequacies in the DAA's proposals, the critical importance of retaining the proposed movement limit, and the limitations of insulation measures in addressing noise impacts.

The Inspector's Report highlights the importance of evaluating noise impacts through the lens of additional awakenings, a metric that captures the immediate and conscious disturbance caused by aircraft noise. Unlike broader metrics such as %HSD or L_{night}, which aggregate impacts across populations or report generalised sleep disruption, the Additional Awakening Assessment (AA) focuses on tangible disruptions that affect individuals on a nightly basis.

As noted in the report, "Using the AA method, one additional awakening is rated as a significant effect, rather than the %HSD, where the relative change in ATMs would be predicted to have a nil to minor effect on sleep" (Paragraph 13.10.6). This distinction is critical because the AA method provides a more sensitive measure of noise impacts, particularly for communities near the airport where awakenings are more likely to occur due to higher noise exposure

.

The projected figures for 2035 illustrate the severity of this issue. With the Relevant Action in place, it is estimated that "4,449 more people will experience an additional awakening" compared to the permitted scenario, while "7,596 more Highly Sleep Disturbed (HSD)" individuals are expected (Paragraph 13.4.9). The report underscores that "the impact of one additional awakening is considerably more significant than the impact of one person HSD", highlighting the importance of addressing awakenings as a standalone impact (Paragraph 13.4.9). This finding reflects the immediate, conscious disruption caused by awakenings, which often lead to difficulty returning to sleep and cumulative health effects over time.

The World Health Organisation (WHO) also supports the use of noise metrics that account for single-event disturbances, such as L_{max} and additional awakenings, to assess the full impact of noise exposure. The Inspector notes that "the relationship

between a single event noise and long-term health outcomes remains tentative" but acknowledges that the available evidence justifies a precautionary approach to minimise additional awakenings (Paragraph 12.6.92).

Without effective mitigation measures, the cumulative impact of nightly awakenings will significantly degrade the health and well-being of affected communities, particularly those near the airport. As the report emphasises, "In the absence of a restriction on the aircraft movements the use of the NQS alone, during the nighttime hours, has the potential to have a significant negative impact on residents within the vicinity of the airport." (Paragraph 12.6.120).

The Inspector identifies several critical shortcomings in the DAA's application, which render it insufficient to mitigate the impacts of additional awakenings. These include:

1. Insufficient Consideration of Additional Awakenings: The Inspector concludes that "The information contained in the RD and the RA does not adequately demonstrate consideration of all measures necessary to ensure the increase in flights during the nighttime hours would prevent a significant negative impact on the existing population" (Paragraph 15.1.2). Insulation measures, while beneficial, cannot fully mitigate the recurring disruptions caused by awakenings, especially when considering the limitations of window-opening behaviour.

2. Over-Reliance on Broader Metrics: The DAA's reliance on %HSD and L_{night} metrics is criticised for failing to capture the acute and individualised impacts of additional awakenings. The Inspector notes that "the number of ATMs to induce one additional awakening on average doesn't follow the same trend as assumed by the %HSD approach", indicating that these broader metrics underestimate the disruption caused by individual events (Paragraph 13.10.6).

3. Projected Long-Term Impacts: The application projects significant increases in nighttime disruptions, with 4,449 additional awakenings and 7,596 more Highly Sleep Disturbed individuals expected by 2035 under the Relevant Action (Paragraph 13.4.9). These figures highlight the insufficiency of the proposed mitigation measures and underscore the need for operational restrictions

The Inspector's Report critiques the DAA's application for extending nighttime operations, noting its failure to adequately address the effects of additional awakenings caused by aircraft noise. Using data and methodologies from Basner and McGuire's systematic review in the WHO Environmental Noise Guidelines and noise monitoring reports from Dublin Airport, calculations were conducted to estimate the number of awakenings at key receptors for the 2025 Proposed Scenario. The results underscore the insufficiency of the mitigation measures proposed by the DAA.

Basner Equation: Probability of Awakening

The Basner equation provides a scientifically robust method for determining the probability of awakening due to aircraft noise. It is derived from the WHO Environmental Noise Guidelines (2018) and is expressed as:

$$\text{Prob. of Wake or S1} = -3.0918 - 0.0449 \cdot LAS_{max} + 0.0034 \cdot (LAS_{max})^2$$

For example, substituting a noise level of 40 dB into the equation:

$$\text{Prob. of Wake or S1 at 40 dB} = -3.0918 - 0.0449 \cdot 40 + 0.0034 \cdot (40)^2 = 0.55\% \text{ (rounded to}$$

To calculate the cumulative number of events required to produce one awakening, divide 100 by the probability for a single event: 100/0.55≈181 ATMs.

Data Sources

- Aircraft Movements: Information on nighttime aircraft movements was taken from the Environmental Impact Assessment Report (EIAR) Supplement Appendix 13B, which specifies the 2025 Proposed Scenario under Westerly Operations.
- Noise Monitoring: To identify the LASmax noise levels at the NMTs, we used the information contained in the Quarterly Noise Monitoring Reports from the daa that are published on their website. We used the data from page 15 of the April-June 2024 report: https://www.dublinairport.com/docs/default-source/noise-reports/noise-flight-track-report-april---june-2024.pdf.
- Key Receptors: Five Noise Monitoring Terminals (NMTs) were assessed:

- Kilcoskan National School (#26)
- Coast Road (#20)
- Newpark (#28)
- St. Doolaghs (#2)
- Bay Lane (#1)

The five locations provide two under the North Runway on departures Westerly, two under the South Runway for arrivals from the East and one for departures on the South Runway Westerly. The winds are generally 70% from the West. We used the daa's NMTs for the receptors. Figure 1 is a screenshot from WebTrak (https://webtrak.emsbk.com/dub1) showing the locations of the NMTs:

Figure 1 Noise Monitoring Locations

Results of Awakening Calculations

Aircraft Movement Data: The distribution of nighttime movements for runways 28L and 28R under Westerly Operations is shown below:

Table 1 Aircraft Movement Data for 2025 Proposed Scenario

Time Period	28L Movements	28R Movements

00:00-00:59	13	1
01:00-01:59	6	1
02:00-02:59	2	0
03:00-03:59	2	0
04:00-04:59	12	0
05:00-05:59	11	0
06:00-06:59	3	27
23:00-23:59	16	3
Night Total	**65**	**32**

Noise Event Distributions:
The percentage of noise events in each L_{ASmax} band for each NMT is shown below:

Table 2 Distribution of L_{ASMax} Levels at each NMT

NMT	60-64.9 dB	65-69.9 dB	70-74.9 dB	75-79.9 dB	80-84.9 dB	85-89.9 dB
26	1%	5%	39%	50%	5%	0%
20	0%	11%	81%	8%	0%	0%
28	0%	11%	21%	58%	9%	0%
2	0%	5%	47%	46%	1%	0%
1	0%	2%	22%	56%	20%	0%

Awakening Calculations: The number of awakenings was calculated by summing probabilities across all L_{ASmax} bands, converting outdoor to indoor noise levels using an insulation value of 21 dB as recommended by the WHO. Scenarios with 15 dB, representing an open window, and 22 dB representing an insulated property, as discussed in Section 1.3, were also evaluated.

Table 3 Number of Additional Awakenings for the 2025 Proposed Scenario

Insulation Reduction	KNS (#26)	Coast Road (#20)	Newpark (#28)	St. Doolaghs (#2)	Bay Lane (#1)
15 dB	1.8	2.6	1.9	3.0	0.6
21 dB	1.3	1.7	1.3	2.1	0.5
22 dB	1.3	1.7	1.3	2.1	0.5

Key Findings

- Four out of the five NMTs fail the “less than one additional awakening” criterion, even with insulation improvements.
- St. Doolaghs (NMT #2) and Coast Road (NMT #20) are most affected, with 2.1 to 3 awakenings per night under the proposed scenario.
- The limited improvement from enhanced insulation (22 dB) underscores the necessity of operational restrictions.

- This assessment has been done with the information available to SMTW Residents Group, however, the outcome can be applied to a much larger population who live in proximity to the NMT locations.
-

Recommendations

The analysis reveals that the 2025 Proposed Scenario would result in significant nighttime disruptions, exceeding acceptable thresholds for additional awakenings at multiple receptors. The findings strongly support the retention of strict operational limits as follows to safeguard public health and well-being.

1. Retain the 13,000-movement limit to minimize nighttime disruptions.
2. Revise Noise Abatement Objectives (NAO) to include a specific focus on additional awakenings, ensuring no increase in nighttime disruptions.
3. Recognize the limitations of insulation and prioritize operational measures as the primary mitigation strategy.

The proposed movement limit is identified as the only viable solution to mitigate the impacts of additional awakenings. As stated in the report, “The additional movement of aircraft during the nighttime hours can operate at Dublin Airport without significant adverse impact on the existing communities once the appropriate mitigation measures are in place” (Paragraph 15.1.9).

The inclusion of a movement limit is critical for ensuring that the frequency of nighttime flights remains manageable, minimising the disruption to residents. Without it, the impacts on sleep disturbance would remain adverse and significant, rendering the Relevant Action unacceptable.

The Inspector’s Report unequivocally concludes that the movement limit must be retained to address the significant impacts of additional awakenings on the population. As noted, “In the absence of additional operational restrictions and mitigation measures, it is considered that the proposed development would give rise to significant direct or indirect impacts on the population and human health” (Paragraph 16.2).

The reliance on insulation schemes is inherently limited by the real-world behaviour of window opening, as outlined by the WHO’s assumption of an average insulation value

of 21 dB. This highlights the necessity of pairing insulation with operational measures, such as movement limits, to ensure effective mitigation.

The Bord is urged to consider amendments to the Noise Abatement Objective (NAO) to include specific reference to additional awakenings. A new objective should ensure no increase in additional awakenings following the implementation of the movement limit. Retaining the movement limit, alongside such amendments, will be critical to balancing operational needs with the health and well-being of the surrounding population.

12.0 HA AND HSD NUMBERS.

In ANCA's Noise Abatement Objective for Dublin Airport, https://www.fingal.ie/sites/default/files/2023-08/Noise%20Abatement%20Objective%20for%20Dublin%20Airport.pdf, the expected outcomes are based on the number of people Highly Annoyed and Highly Sleep Disturbed and the number of people exposed to aircraft noise above 55dB Lnight and 65dB Lden.

The calculation of the number of people Highly Annoyed (HA) and Highly Sleep Disturbed (HSD) is defined by the Commission Directive 2020/367. This was transposed into Irish Law by S.I. No. 663/2021 – European Communities (Environmental) (Amendment) Regulations 2021, https://www.irishstatutebook.ie/eli/2021/si/663/made/en/print.

The Absolute Risk (AR) of a harmful effect due to High Annoyance and High Sleep Disturbance can be calculated by the following formulae:

$$AR_{HA,air} = \left(-50.9693 + 1.0168 * L_{den} + 0.0072 * L_{den}{}^{2}\right)/_{100} \qquad \text{(Formula 6)}$$

$$AR_{HSD,air} = \left(16.7885 - 0.9293 * L_{night} + 0.0198 * L_{night}^{\ 2}\right) / 100 \quad \text{(Formula 9)}$$

The total number N of people affected by the harmful effect y due to High Annoyance and High Sleep Disturbance is:

$$N_{x,y} = \sum_j \left[n_j * AR_{j,x,y}\right] \quad \text{(Formula 12)}$$

10.1 NOISE MITIGATION EFFECTIVENESS REVIEW REPORT

In ANCA's Noise Mitigation Effectiveness Review Report for 2023, https://www.fingal.ie/sites/default/files/2024-08/noise-mitigation-effectiveness-review-report-for-2023.pdf, it provides a comparison of the HA and HSD numbers between 2019 and 2023. 2019 is the comparison year used in the NAO. The expected outcomes in the NAO are:

The number of people highly sleep disturbed and highly annoyed shall reduce so that compared to conditions in 2019:

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

In ANCA's 2023 report, Figure 7 shows the comparison for number of people Highly Annoyed:

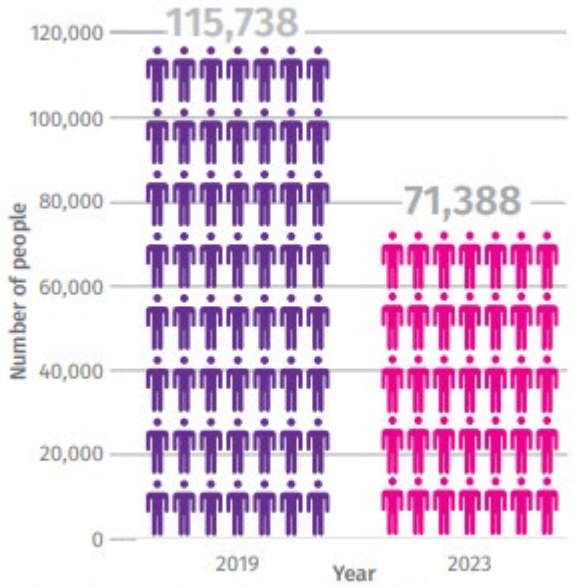


Figure 7 - Number of people highly annoyed by year

And Figure 12 shows the comparison for number of people Highly Sleep Disturbed:

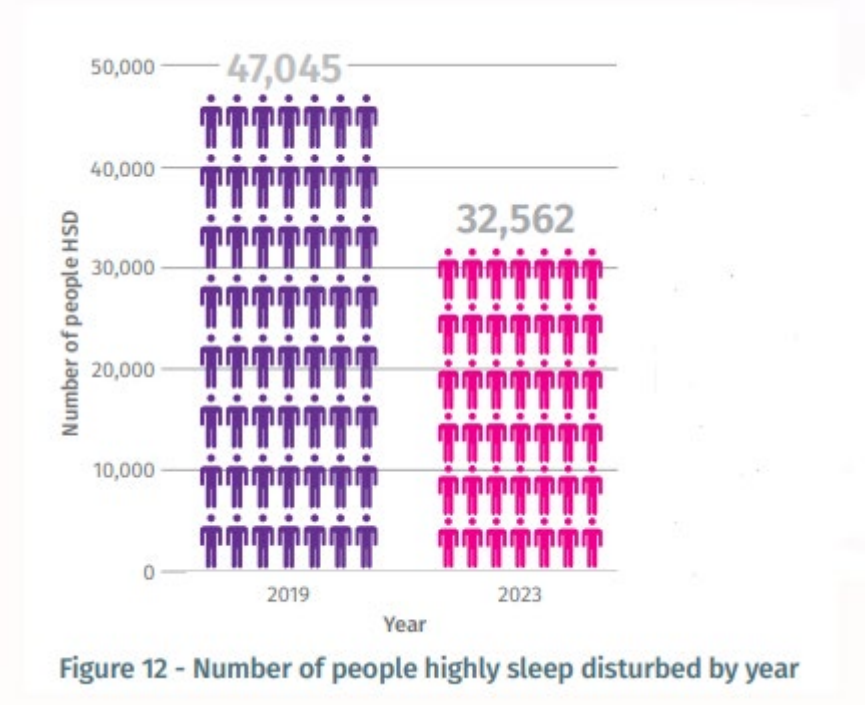


Figure 12 - Number of people highly sleep disturbed by year

By the above figures, the HA and HSD numbers are on track to meet the 30% reduction in 2030.

However, the numbers on their own are not that meaningful. The formulae above for HA and HSD are based on Exposure Response Functions that are described in the WHO 2018 Guidelines.

Table 30. The association between exposure to aircraft noise (L_{den}) and annoyance (%HA)

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

At 40dB Lden, 1.2% of the exposed population are highly annoyed, rising to 55.5% of the population exposed at 70dB Lden. The % increases as the noise increases.

Table 32. The association between exposure to aircraft noise (L_{night}) and sleep disturbance (%HSD)

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

At 40dB Lnight, 11.3% of the exposed population are highly sleep disturbed, rising to 40% of the population exposed at 65dB Lnight. Again the % increases as the noise increases.

The formulae for HA and HSD can be simplified as the sum of the population in each band multiplied by the %HA or %HSD for each band.

The ANCA 2023 report breaks down the number of people in each band for both HA and HSD:

HA:

	45-49 dB	50-54 dB	55-59 dB	60-64 dB	65-69 dB	70-74 dB	>75 dB
2019	74,905	29,814	8,546	2,328	126	15	4
2023	37,959	20,983	8,753	3,532	148	13	0

HSD:

	40-44 dB	45-49 dB	50-54 dB	55-59 dB	60-64 dB	65-69 dB	>70 dB
2019	36,339	7,622	2,665	380	34	5	0
2023	20,101	7,252	4,003	1,147	55	4	0

It's very evident that from 2019 to 2023 the number of people HA reduced in the bands 45-49dB and 50-54dB but increased in all other bands.

It's very evident that the number of people HSD reduced in the bands 40-44dB and 45-49dB but increased in other bands.

What this shows is that the numbers in the bands with the lowest noise levels have reduced but the numbers in the bands with the highest noise levels have increased

.

ANCA is fixated on reducing the numbers of HA and HSD and is not concerned about the makeup of these numbers. ANCA is quite content that the overall numbers are reducing but has no interest that the number of people exposed to the highest levels of noise are increasing.

This is clear evidence that the overall HA and HSD numbers mask the effect that higher noise levels are impacting a larger cohort of people.

A worthwhile exercise is to compute the HA and HSD number based on the END reporting limits of 50dB Lnight and 55dB Lden.

Using the tables in the ANCA 2023 report which were shown above and summing the numbers in the bands from 50-54dB Lnight upwards and from 55-59dB Lden upwards:

Year	HA	HSD
2019	11,019	3,084
2023	12,446	5,209

These values paint a different picture and show that the number of HA and HSD rose between 2019 and 2023 when you start counting at the END limit thresholds. The numbers being relied upon by ANCA in their NAO are skewed by the numbers in the lowest noise bands.

It's also worth highlighting that these lowest noise bands are where the largest populations in Dublin reside. A marginal effect at the lowest noise bands has a significant effect on the HA and HSD numbers.

The population counts for the Lden and Lnight metrics are given in tables 13C-51 and 13C-52 in Appendix 13C of the Supplementary EIAR:

Table 13C-51: Existing Population Counts, L_{den} Metric

Metric Value, dB L_{den}	Scenario and Existing Population Count				
	2018	2025 Permitted	2025 Proposed	2035 Permitted	2035 Proposed
≥ 45	716,725	345,385	326,176	188,630	219,839
≥ 50	184,777	94,752	110,778	49,812	65,770
≥ 55	35,482	22,162	21,618	10,507	13,512
≥ 60	4,717	2,411	4,329	1,512	2,938
≥ 65	257	191	254	77	188
≥ 70	31	6	19	0	6
≥ 75	6	0	0	0	0

From table 13C-51, 531,948 people were in the 45-49dB Lden band in 2018 which is 74% of the total population exposed to greater than 45dB Lden.

Table 13C-52: Existing Population Counts, L_{night} Metric

Metric Value, dB L_{night}	Scenario and Existing Population Count				
	2018	2025 Permitted	2025 Proposed	2035 Permitted	2035 Proposed
≥ 40	307,457	160,430	168,472	66,841	112,987
≥ 45	55,492	31,419	46,331	19,626	29,900
≥ 50	12,316	9,972	8,766	2,852	6,390
≥ 55	753	315	1,463	212	1,197
≥ 60	56	48	80	13	41
≥ 65	10	0	0	0	0
≥ 70	0	0	0	0	0

From table 13C-52, 251,965 people were in the 40-44dB Lden band in 2018 which is 82% of the total population exposed to greater than 40dB Lnight.

Therefore, it's evidently clear that the quietest bands have a disproportionate number of people residing in the bands and therefore have a huge effect on the HA and HSD numbers if the noise contours change ever so slightly at the lowest bands.

This is also very clear when comparing the size of the contours for 2019 and 2023 which are conveniently presented in tables 14 and 15 of the daa's 2023 Compliance Report, https://www.fingal.ie/sites/default/files/2024-09/d00001-daa-xxx-xx-xxx-rp-v-xxx-0003-annual-compliance-report-section-19-2023-v1.0_0.pdf:

Table 14 - Annual Lden Contour Areas

Metric Value, dB L_{den}	Contour Area, km²				
	2023	2022	2021	2020	2019
≥ 45	630.2	476.3	290.6	237.2	745.7
≥ 50	250.4	171.3	111	90.3	218.7
≥ 55	105.0	79.0	45.8	36.5	88.3
≥ 60	39.8	29.1	16	12.5	35.6
≥ 65	13.0	9.3	5.6	4.4	12.2
≥ 70	4.1	3.0	2	1.6	4.4
≥ 75	1.5	1.0	0.8	0.7	1.7

For Lden the size of the contour area >45dB is lower in 2023 but is higher in the >50dB contour which shows that the contour shrunk at the lowest noise level but grew for higher noise levels.

Table 15 - Annual Lnight Contour Areas

Metric Value, dB L_{night}	Contour Area, km²				
	2023	2022	2021	2020	2019
≥ 40	312.0	228.5	172.3	138.7	328.4
≥ 45	129.7	98.8	75.3	59.8	122.2
≥ 50	55.6	39.4	28.3	21.7	52.3
≥ 55	18.6	13.1	9.8	7.5	18.6
≥ 60	6.0	4.2	3.5	2.7	6.4
≥ 65	2.0	1.4	1.3	1.0	2.5
≥ 70	0.7	0.5	0.6	0.4	1.0

For Lnight the size of the contour area >40dB is marginally lower in 2023 but is higher in the >45dB contour which shows that the contour shrunk at the lowest noise level but grew for higher noise levels.

This is extremely important as the airport operators do not want the WHO limits of 40dB Lnight and 45dB Lden imposed as strict limits as they say that these noise levels are marginal and would shut down all airports if imposed. Yet the daa and ANCA are

relying on these same marginal noise bands to portray an image that the noise situation at Dublin Airport is improving which is definitely not the case as more people are exposed to higher noise levels. It's the higher noise levels that are more damaging to health and should be given a higher priority in Significance.

The effect at higher noise levels is also evident in the numbers exposed to greater than 55dB Lnight which is another metric that is part of ANCA's NAO. The numbers exposed to greater than 55dB Lnight grew from 1,533 in 2019 to 4,465 in 2023 which is a 191% increase. This is a staggering increase in people exposed to very damaging noise levels during the nighttime hours and shows the impact of existing nighttime use on the South Runway only. The Board cannot now expose further populations under the North Runway flight path to the same extreme levels of nighttime noise.

Even when presented with the 191% increase in people exposed to greater than 55dB Lnight, which is a very clear breach of the NAO, there has been no reaction from ANCA. The Dublin Airport Noise Action Plan has been published and it too contains no actions to curtail these escalating serious levels of noise.

Both ANCA and Fingal County Council cannot be relied upon to protect the health of Fingal and East Meath residents.

The only answer is a complete ban on nighttime flights, or a very restrictive movement limit as suggested in the draft report.

Figure 14 – Number of people exposed to aircraft noise above 55db L_{night}

13.0 SUMMARY

Our home has gone from a noise exposure of 45dB Lden to 68 dB Lden and average daily readings of 70dBLAeq 16 hr, following the opening of the North runway. The documentation submitted by DAA have not identified this fact NOR have the DAA carried out sufficient on-site noise monitoring to determine the ACTUAL noise levels despite the fact that the North Runway is in use since August 2022. We note that the lands adjacent to our house is in the ownership of DAA and they have had ample time since the request for additional information to carry out on site measurements of actual noise and which would have prevented the predicted results being wrongly presented as accurate.

On departures from the North Runway the noise levels at our house are in excess of 69dB LAeq 16 hours.

The noise insulation provided by DAA do not meet the requirements of “Good Acoustic Design” as set out by Fingal County Council Development Plan and therefore is totally inadequate at our home given the intensity of the external noise from aircraft.

The magnitude of significance under the criteria put forward by DAA at our house is “Profound” i.e. an effect that obliterates sensitive characteristics and yet no workable mitigation measures are provided by DAA. If left the way it is our health is in serious risk of immediate deterioration and the use of our family home is severely restricted to that of a prison like environment.

The additional information contains significant changes to the original planning submission and NOW includes proposed changes to flight paths which were not brought to the attention of the public at large. None of this information was requested by ABP but now DAA want to bulldoze their way through the planning procedures in order to get their way by using the POTENTIAL of losses by the Irish Economy of not increasing night flights and changing flight paths so that they and airlines can achieve even higher profits without adequately dealing with the Environmental Impacts that will Profoundly effect members of the local community such as us. This is precisely why Environmental Impact Assessment Legislation was put in place to protect and mitigate the public from profound adverse environmental impacts.

DAA saw fit to operate the North Runway using the current flight paths and then months later submit an EIAR to justify what they are doing. This is totally contrary to planning legislation and should not be allowed Proper planning and sustainable development including planning legislation must be adhered to

The North Runway is being operated as an unauthorised development as the DAA have exceeded the 65 flight per night cap and changed flight paths without obtaining planning permission. This application is therefore a retention permission and as such

does not meet the correct procedures as per the European Directives and Irish Legislation.

Only one flight path is proposed within the EIAR supplement with no explanation as to why DAA changed their position from the planning granted in 2007 for straight out flight paths. AirNav and IAA have confirmed that DAA only presented one scenario for flight paths and have also confirmed that there are many other options for flight paths which meet safety requirements but that these were not assessed by DAA. So they made a conscience decision to go against the planning conditions knowing that they were breaching legislation. No other options were investigated despite it being a requirement of an effective EIAR nor were these assessed or presented within the EIAR. This blatant disregard for proper planning and sustainable development needs to be addressed by ABP and the DAA should be requested to carry out an analysis of the various options with all of the stakeholders so that the most suitable flight paths are assessed. This unfortunate delay is down to DAA trying to dismiss the procedures for proper planning and sustainable development.

Due to the significant changes in the noise environment submitted in the EIAR supplement and in order to mitigate the dangerous and serious effects of aircraft noise on current households within Noise Zone A as recognised by Fingal County Council in their Development Plan the only realistic mitigation measure that the DAA revert to the flight paths for which they obtained planning permission for in 2007 or provide realistic mitigation measures against the Profound effects being proposed at residents within St Margarets The Ward Community through a new retention permission application.

14.0 CONCLUSIONS AND RECOMMENDATIONS

The analysis reveals that the 2025 Proposed Scenario would result in significant nighttime disruptions, exceeding acceptable thresholds for additional awakenings at multiple receptors. The findings strongly support the retention of strict operational limits as follows to safeguard public health and well-being.

1.Retain the 13,000-movement limit to minimize nighttime disruptions.

2, Revise Noise Abatement Objectives (NAO) to include a specific focus on additional awakenings, ensuring no increase in nighttime disruptions.

3.Recognize the limitations of insulation and prioritize operational measures as the primary mitigation strategy

4. The adequacy of the proposed noise insulation scheme to be in strict accordance with the Fingal Development Plan recommendation of BS 8233:2014 and the 2017 ProPg guidelines . This is essential in the case of housing that is under the revised flightpaths where it has been demonstrated that the recommendations cannot be met due to the intensity of aircraft noise exposure. If adequate sound insulation cannot be provided to meet these recommendations then alternative mitigation measures such as relocation of these residents or an agreed purchase scheme must be provided by DAA as an alternative with no cut off date to enable residents to come to terms with the reality of having to move from their family home environments.

5. In the interest of Health and Safety the North Runway should not be used between 23:00 and 24:00 and 06:00 and 08:00

6. The DAA must be conditioned to revise the flight paths off the North Runway to those that were granted planning permission in 2007 in the absence of the DAA having not applied to alter condition 1 of the 2007 planning permission which is still valid. DAA have now admitted that they only presented one flight path alternative to AirNav and IIAA, who have both verified this in correspondence. DAA state that they presented alternatives in 2016, but they did not apply to the Planning Authority, nor did they provide a revised EIAR for these alternatives for public consultation in a planning process.

7. The current flight paths when examined in accordance with the EPA Guidelines on EIAR requirements categorize the significance of the effect on our home as profound which is the highest level of significance. Due to the change in flight paths from those granted permission in 2007 the noise levels at our home as predicted in the original EIS submitted with the 2007 planning submission were considerably less i.e. a minimum of 4 times less than what it is today, as an increase of 3dB of sound is a doubling of noise exposure. The Relevant Action has not adequately considered this fact and is therefore in contravention of the EU directive on Environmental Impact Assessment and is contrary to the Environmental Noise Directive..

8. The costs associated with Health Issues has not been taken into account by the DAA as a result of the imposed exposure to the affected communities. The Health

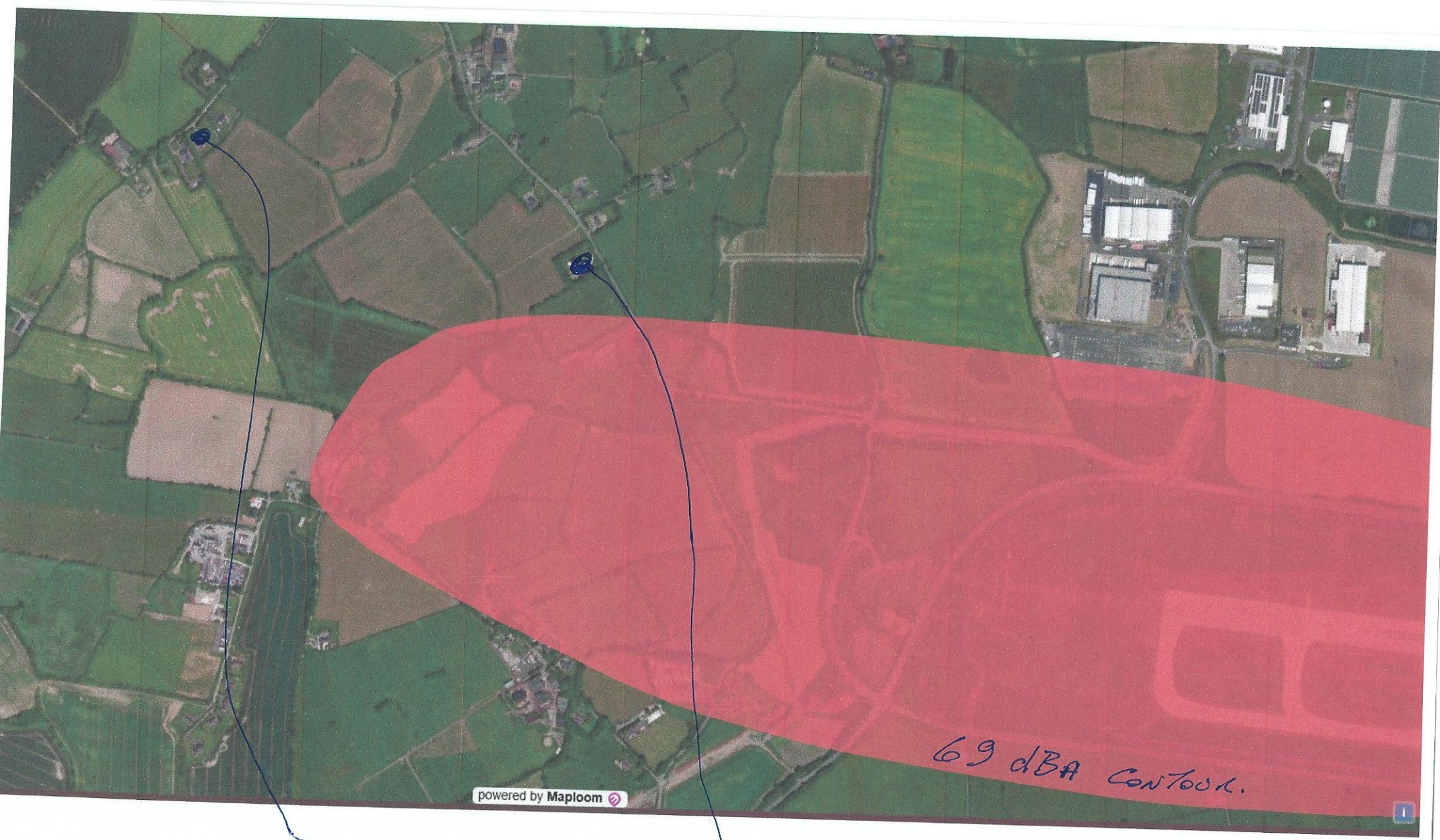
issues that result from exposure to such high and constant noise levels are well established and many papers written by Health experts. The HSE and Fingal Environmental Health have made submissions in this regard which cannot be ignored. The fact that the Fingal Development Plan recognises that housing within Noise Zone A should not be allowed on the basis that the noise impact will cause a health issue to such residents is testament that it follows that such a noise impact should not be forced on existing residents. These issues have not been addressed in the submission. How much are our lives worth?

Signed

Pearse Sutton

Evelyn Sutton

Appendix A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PEARSE & EVELYN SUTTON HOUSE

APPENDIX A.

Appendix B

---------- Forwarded message ---------
From: **B BEYER** <bbeyer2021@gmail.com>
Date: Tue 10 Dec 2024, 10:24 PM
Subject: Re: Meeting with St Margaret's The Ward Residents Group
To: Declan FITZPATRICK <declan.fitzpatrick@iaa.ie>

Many thanks for this Declan.

Kind regards,

Bernadette

On Tue 10 Dec 2024, 10:16 AM Declan FITZPATRICK, <declan.fitzpatrick@iaa.ie> wrote:

HI Bernadette

Apologies for the slow response.

I suggest the following as a summary:

1. The IAA's primary role is to ensure the safety and security of Aviation in Ireland, and that the IAA is the single aviation regulator for civil aviation in Ireland. Our regulatory roles, statement of strategy, etc is available on our website.
2. As per EU Regulation 139/2014, daa are responsible for the provision of Standard Instrument Departure procedures (SIDs) and other operating procedures at Dublin Airport. They currently do this by designating AIRNAV Ireland to provide the service at Dublin Airport.
3. AirNav and other ANSP providers in Ireland engage approved aviation procedure designers (approved by EASA) to draw up these procedures to meet relevant ICAO and EASA safety standards. These procedures are then presented to IAA who will review them from an aviation safety perspective and when satisfied all regulatory safety requirements are met, the IAA approve the procedures.
4. It is not the role of the regulatory authority to specify the design of the individual flight paths and flight procedures but is purely a regulatory role as noted above.
5. IAA do not take on board land use planning or environmental noise issues as these are outside the scope of IAA competent authority role.
6. IAA highlighted there are a number of requirements by ICAO and EASA regarding dual runway operations which include the need for flight path divergence for simultaneous operation independent runways (SOIR). IAA confirmed that divergence is not required if the runway is operated in dependent mode.
7. IAA highlighted that straight our parallel runway operations can be approved on the basis of dependent mode operations in order to meet ICAO requirements or through a suitable safety case demonstrating an equivalent level of safety.

8. IAA highlighted that the procedures for go arounds at Dublin Airport had to take into account other airspace operators in the vicinity of Dublin Airport.
9. IAA confirmed that if procedures are provided to them for the operation of flight paths at Dublin Airport by AirNav (as instructed by DAA) IAA would carry out a regulatory safety assessment of the procedures and if satisfied would approve them.
10. IAA confirmed that they approved the procedures put forward for the operation of the North Runway when it opened in August 2022 as submitted to them.
11. IAA also confirmed that they approved revised procedures which came into effect in February 2023 for the North runway as submitted to them.

Regards

Declan

From: B BEYER <bbeyer2021@gmail.com>
Sent: Thursday, December 5, 2024 10:10 AM
To: Declan FITZPATRICK <declan.fitzpatrick@IAA.ie>
Subject: Re: Meeting with St Margaret's The Ward Residents Group

Hi Declan,

I'm waiting to hear back from you on email below.

Thanks,

Bernadette

085-8640064

On Fri 29 Nov 2024, 8:35 AM Declan FITZPATRICK, <declan.fitzpatrick@iaa.ie> wrote:

Hi Bernadette

Apologies but I didn't. I'll try get some time over the weekend and respond to you then.

Regards

Declan

Declan Fitzpatrick

IAA

From: B BEYER <bbeyer2021@gmail.com>
Sent: Thursday, November 28, 2024 10:04:40 PM
To: Declan FITZPATRICK <declan.fitzpatrick@IAA.ie>
Subject: Re: Meeting with St Margaret's The Ward Residents Group

Hi Declan,

Did you get a chance to have a look at my email below?

Bernadette

085-8640064

On Sun 10 Nov 2024, 8:53 PM B BEYER, <bbeyer2021@gmail.com> wrote:

> Hi Declan,
>
> Once again, we would like to thank you for meeting members of our group (SMTW) at your offices on 21st February 2024.
>
> As we explained our community is being severely affected by the divergent flight path being used for departures off the new North Runway and you kindly agreed to meet with us to explain the

IAA role with respect to operations at Dublin Airport so that we as lay people could better understand how the flight paths were chosen and why they are operating in the current way.

We are meeting with local residents, Councillors, Politicians, members of Government, Department of Transport etc to inform them of our issues and we want to make sure that we have the facts of our meeting correct. We have listed below the main points that were discussed. Can you review to ensure they are accurate?

Attendees IAA: Declan Fitzpatrick, Paul Kennedy, Jim Gavin
Attendees SMTW: Bernadette Beyer-Conaty, Sean O'Carolan, Ian Carey Fingal County Councillor, Liam O'Gradaigh, Stephen Smyth, Pearse Sutton

1. IAA explained that their role which includes a regulatory role to provide the Safety of Aviation in Ireland, and that the IAA are the industry experts and the Authority in this field in Ireland.
2. IAA explained that now under Irish Legislation, AirNav are responsible for the design of Standard Instrument Departure procedures and other operating procedures at Dublin Airport.
3. IAA confirmed that AirNav engage approved aviation procedure designers (Approved by EASA) to draw up these procedures to meet ICAO and EASA standards. These procedures are then presented to IAA who will review them from an Aviation Safety point of view and if satisfied IAA approve the procedures. The IAA regulate to the highest professional standards to ensure a safe, secure and consumer focused aviation environment.
4. IAA noted that their role is not to provide the specification for the design of the flight paths and flight procedures but is purely a regulatory role as noted above.
5. IAA noted that to their knowledge DAA provided AirNav with the specification for the design of the flight paths at Dubin Airport. Therefore, IAA do not take on board land use planning or environmental noise issues as these are the responsibility of the Airport Operator, DAA.
6. IAA noted that there are a number of requirements by ICAO and EASA regarding dual runway operations which include for flight path divergence if a runway is to be operated in Independent Mode.
7. IAA noted however that divergence is not required if the runway is operated in dependent mode.
8. When asked by SMTW about correspondence from IAA to the planning authority during the original planning submission for the North Runway that indicated that all flights were to be straight out, and that the IAA supported that mode of operation it could only have been on the basis of Dependent mode operations in order to meet ICAO requirements.
9. IAA noted that the procedures for go arounds at Dublin Airport had to take into account other air space operators in the vicinity of Dublin Airport.
10. IAA again stated that if procedures are provided to them for the operation of flight paths at Dublin Airport by AirNav (as instructed by DAA) IAA would carry out a regulatory safety assessment of the procedures and if satisfied would approve them.
11. IAA confirmed that they approved the procedures put forward for the operation of the North Runway when it opened in August 2022 as submitted to them.
12. IAA also confirmed that they approved revised procedures which came into effect in February 2023 for the North runway as submitted to them.

We would kindly ask if you could read the above to ensure it's accurate and, if not, please point out any inaccuracies so we can correct them.

Looking forward to your reply,

Bernadette Conaty-Beyer

on behalf of St.Margaret's The Ward Residents Group

Mob: 085-8640064

On Tue, Feb 20, 2024 at 2:39 PM Declan FITZPATRICK <declan.fitzpatrick@iaa.ie> wrote:

> Hi Ian
>
> Primarily, it will be myself and Paul Kennedy, Manager Infrastructure (responsibility for safety of aerodromes, ANSPs and airspace/flight procedures). Paul will call in members of his team if needed. Jim Gavin may also join, we have some conflicting meetings.
>
> We may also try call some others in if something needs clarification.
>
> I'll have a copy of our submittal to the latest infrastructure application for you in the morning.
>
> Regards
>
> Declan

From: Ian Carey <Ian.Carey@cllrs.fingal.ie>
Sent: Tuesday, February 20, 2024 11:53 AM
To: Declan FITZPATRICK <declan.fitzpatrick@IAA.ie>
Cc: B BEYER <bbeyer2021@gmail.com>
Subject: RE: Meeting with St Margaret's The Ward Residents Group

Hi Declan,

The St Margarets group are asking who will be present from the IAA side tomorrow?

They are also wondering if it would be possible to get a copy of the IAA submission to Dublin Airport's latest infrastructure application? As it is not published on the Fingal planning portal.

Many thanks,

Ian

From: Declan FITZPATRICK <declan.fitzpatrick@IAA.ie>
Sent: Tuesday, February 13, 2024 1:12 PM
To: Ian Carey <Ian.Carey@cllrs.fingal.ie>
Subject: Re: Meeting with St Margaret's The Ward Residents Group
Importance: High

Hi Ian

We'll make that work. Can you let me know names in advance so that our security desk can do up badges, etc

Regards

Outlook

Fwd: Meeting request with Peter Kearney

From B BEYER <bbeyer2021@gmail.com>
To Pearse C. Sutton <pearse.sutton@csconsulting.ie>; Steve Smyth <steve.s.smyth@gmail.com>

---------- Forwarded message ---------
From: **B BEYER** <bbeyer2021@gmail.com>
Date: Fri, Nov 15, 2024 at 7:16 PM
Subject: Re: Meeting request with Peter Kearney
To: Annmarie Brogan <Annmarie.Brogan@airnav.ie>

Great Annmarie.

Many thanks,

Bernadette

On Fri, Nov 15, 2024 at 11:38 AM Annmarie Brogan <Annmarie.Brogan@airnav.ie> wrote:

> Hi Bernadette,
>
> Your amendments have been reviewed by AirNav attendees and the below is proposed.
>
> Thank you
>
> **Attendees AirNav**: Peter Kearney, Paul Johnson, Gwen Morgan, Paul McCann
>
> **Attendees SMTW**: Bernadette Conaty-Beyer, Serena Taylor, Niamh Maher, Sean O'Carolan, Stephen Smyth, Pearse Sutton
>
> 1. AirNav Ireland explained that its responsibilities are set out by ICAO and relate to (1) Preventing collisions (2) Expediting and maintaining an orderly flow of air traffic and (3) Providing relevant information and instructions to pilots.
> 2. AirNav explained that there is a requirement in line with EU 2014/139 (*laying down requirements and administrative procedures related to aerodromes pursuant to Regulation (EC) No 216/2008 of the European Parliament and of the Council*) that the aerodrome operator is required to provide the Instrument Flight Procedures (IFPs) for the airport and may delegate this responsibility, with daa delegating this task to AirNav Ireland in the past as permitted under the regulation. AirNav Ireland, as the Air Traffic Service Provider, will always have a role to play in relation to new operating procedures at Dublin Airport.
> 3. In line with the above, Dublin Airport (daa) has previously provided AirNav Ireland with the specification and brief to provide the design of the flight paths (under a delegation agreement) and procedures to meet the relevant brief and the requirements of ICAO and EASA.
> 4. AirNav Ireland does not have the competence in IFP design and therefore has engaged approved aviation procedure designers (i.e., approved by EASA) to design these procedures to meet the relevant regulatory standards (e.g. ICAO and EASA). These procedures are then presented to Irish safety regulator (IAA) who consider them for approval from an Aviation Safety point of view.
> 5. AirNav noted that there are a number of requirements by ICAO and EASA regarding dual runway operations which include for flight path divergence if a runway is to be operated in Independent Mode.
> 6. AirNav noted however that divergence is not required if the runway is operated in dependent mode.
> 7. When asked by SMTW if the dual runway system was to be operated in Dependent mode without divergence (as is the case in some other airports around the world) would AirNav Ireland then provide operating procedures to accommodate same, AirNav replied that they have not looked at dependent modes, nor have they been asked to.
> 8. AirNav noted that the procedures for go arounds at Dublin Airport had to take into account all other air space operators surrounding Dublin Airport.

9. AirNav Ireland confirmed that they do not have an approved designer and the procedures put forward to them, as requested by DAA, for the operation of the North Runway when it opened in August 2022 were provided by AirNav Ireland to a third party regulatory approved designer. This was in turn considered by the IAA as part of its approvals process.
10. Similarly, the revised procedures which came into effect in February 2023 followed the same process.
11. AirNav Ireland's role is to develop IFPs which are safe and compliant with ICAO and EASA regulations. Associated environmental noise or issues to do with noise abatement procedures is the responsibility of the aerodrome operator.
12. AirNav Ireland noted the concerns of SMTW and noted its preference for a comprehensive airspace review that considers all the possible flight paths and modes of operation.
13. AirNav Ireland noted it was of the understanding that daa is intending to initiate a comprehensive airspace review, which would of course have stakeholder involvement.

Regards,

Annmarie

Annmarie Brogan | EA to CEO AirNav Ireland

From: B BEYER <bbeyer2021@gmail.com>
Sent: Wednesday 13 November 2024 22:22
To: Annmarie Brogan <Annmarie.Brogan@airnav.ie>
Subject: Re: Meeting request with Peter Kearney

[This message originated from outside AirNav. Please treat hyperlinks, attachments and instructions in this email with caution.]

Thank you AnnMarie,

The following amendments have been made as requested. See updated version now below.

Again, I really appreciate your assistance on this.

Regards, Bernadette

Update below with amendments:

Attendees AirNav: Peter Kearney, Paul Johnston, Gwen Morgan, Paul McCann

Attendees SMTW: Bernadette Conaty-Beyer, Serena Taylor, Niamh Maher, Sean O'Carolan, Stephen Smyth, Pearse Sutton

1. AirNav explained that their role which includes a regulatory role to provide Air Traffic Management Services of all the airspace controlled by Ireland

2. AirNav explained that now under Irish Legislation, AirNav are responsible for the design of Standard Instrument Departure procedures and other operating procedures at Dublin Airport.

3. AirNav engage approved aviation procedure designers (Approved by EASA) to draw up these procedures to meet ICAO and EASA standards. These procedures are then presented to IAA who will review them from an Aviation Safety point of view and if satisfied IAA approve the procedures.

4. AirNav noted that as Airport Operator, DAA, provided AirNav with the specification and brief for AirNav to provide the design of the flight paths and procedures to meet that brief and the requirements of ICAO and EASA.

5. AirNav noted that there are a number of requirements by ICAO and EASA regarding dual runway operations which include for flight path divergence if a runway is to be operated in Independent Mode.

6. AirNav noted however that divergence is not required if the runway is operated in dependent mode.

7. When asked by SMTW if the dual runway system was to be operated in Dependent mode without divergence (as is the case in other airports around the world) would AirNav then provide operating procedures to accommodate same, AirNav replied that they have not looked at dependent modes, nor have they been asked to.

8. AirNav noted that the procedures for go arounds at Dublin Airport had to take into account other air space operators in the vicinity of Dublin Airport.

9. AirNav confirmed that they do not have an approved designer and the procedures put forward to them, as requested by DAA, for the operation of the North Runway when it opened in August 2022 were provided by AirNav to a third party approved designer.

10. AirNav also confirmed that they approved revised procedures, via a third party approved designer, which came into effect in February 2023 for the North runway as submitted to them again by DAA.

11. AirNav noted that their role does not take into account land use planning or associated environmental noise or issues to do with noise abatement procedures and that this is the responsibility of the Airport Operator DAA.

12. AirNav noted the concerns of SMTW and noted that their preference would be that an airspace review is carried out of all the possible flight paths and modes of operation be carried out before giving AirNav the brief and specification for the final flight path to be facilitated.

13. AirNav noted that they understand DAA has initiated this airspace review and it will take place with stakeholder involvement.

On Tue, Nov 12, 2024 at 9:08 AM Annmarie Brogan <Annmarie.Brogan@airnav.ie> wrote:

> Dear Bernadette,
>
> I hope you are well.
>
> On behalf of Peter and AirNav Ireland attendees present at the meeting, please find attached the slides presented by AirNav Ireland on the day – we would be very grateful if you could ensure your points attributed to AirNav Ireland are in line with this. Apologies for not getting these slides to you previously.
>
> In relation to the Q&A aspect of the meeting, the below amendments are requested:
>
> 7. Instead of stating that "we could", please amend to state we have not looked at dependent modes, nor have we been asked to.
>
> 9. Instead of stating that "we designed the procedures", please amend to state that AirNav does not have an approved designer and therefore took the procedures and provided them to a third party. This is also relevant for 10.
>
> 12. For this point, please specify AirNav's preference for avoiding constant changes by completing an airspace review for AirNav to then facilitate.
>
> 13. In line, with 12 please simply note that AirNav understands this will take place with stakeholder involvement.
>
> Regards,
>
> Annmarie

Annmarie Brogan | EA to CEO AirNav Ireland

From: B BEYER <bbeyer2021@gmail.com>
Sent: Sunday 10 November 2024 21:08
To: Annmarie Brogan <Annmarie.Brogan@airnav.ie>
Subject: Re: Meeting request with Peter Kearney

Hi AnnMarie,

I hope this email finds you well.

Please see my message below for Mr. Kearneys attention:

Dear Mr Kearney

Once again, we would like to thank you for meeting members of our group (SMTW) at the Control Tower, Huntstown, Cloghran, Dublin Airport on 30th September 2024.

As we explained our community is being severely affected by the divergent flight path being used for departures off the new North Runway and you kindly agreed to meet with us to explain the AirNav role with respect to operations at Dublin Airport so that we as lay people could better understand how the flight paths were chosen and why they are operating in the current way.

We are meeting with local residents, Councillors, Politicians, members of Government, Department of Transport etc to inform them of our issues and we want to make sure we have the facts of our meeting correct. We have listed below the main points discussed. Can you review to ensure they are accurate?

Attendees AirNav: Peter Kearney, Paul Johnston, Gwen Morgan, Paul McCann

Attendees SMTW: Bernadette Beyer-Conaty, Serena Taylor, Niamh Maher, Sean O'Carolan, Stephen Smyth, Pearse Sutton

1. AirNav explained that their role which includes a regulatory role to provide Air Traffic Management Services of all the airspace controlled by Ireland
2. AirNav explained that now under Irish Legislation, AirNav are responsible for the design of Standard Instrument Departure procedures and other operating procedures at Dublin Airport.
3. AirNav engage approved aviation procedure designers (Approved by EASA) to draw up these procedures to meet ICAO and EASA standards. These procedures are then presented to IAA who will review them from an Aviation Safety point of view and if satisfied IAA approve the procedures.
4. AirNav noted that as Airport Operator, DAA, provided AirNav with the specification and brief for AirNav to provide the design of the flight paths and procedures to meet that brief and the requirements of ICAO and EASA.
5. AirNav noted that there are a number of requirements by ICAO and EASA regarding dual runway operations which include for flight path divergence if a runway is to be operated in Independent Mode.
6. AirNav noted however that divergence is not required if the runway is operated in dependent mode.
7. When asked by SMTW if the dual runway system was to be operated in Dependent mode without divergence (as is the case in other airports around the world) would AirNav then provide operating procedures to accommodate same,

AirNav replied that they could but that any proposal to be put to AirNav must come from the Airport operator DAA.

8. AirNav noted that the procedures for go arounds at Dublin Airport had to take into account other air space operators in the vicinity of Dublin Airport.
9. AirNav confirmed that they designed the procedures put forward for the operation of the North Runway when it opened in August 2022 as submitted to them as requested by DAA.
10. AirNav also confirmed that they approved revised procedures which came into effect in February 2023 for the North runway as submitted to them again by DAA.
11. AirNav noted that their role does not take into account land use planning or associated environmental noise or issues to do with noise abatement procedures and that this is the responsibility of the Airport Operator DAA.
12. AirNav noted the concerns of SMTW and noted that their preference would be that all of the possible flight paths and mode of operation be fully examined prior to giving them the brief and specification for the final flight path to be put forward for them to design as the changing of flight paths is a time consuming and disruptive process.
13. AirNav noted that from their knowledge DAA in conjunction with the various stakeholders such as SMTW were to embark on such an analysis with a view to providing a final proposal to AirNav.

We would kindly ask if you could read the above to ensure they are accurate and, if not, please point out any inaccuracies so we can correct them.

Looking forward to your reply,

Bernadette Conaty-Beyer

on behalf of SMTW Residents Group

Mob: 085-8640064

On Tue, Oct 1, 2024 at 4:13 PM Annmarie Brogan <Annmarie.Brogan@airnav.ie> wrote:

> Hi Bernadette,
>
> Thank you for your email.
>
> The team said it was a pleasure to meet with you yesterday and they very much enjoyed the discussion.
>
> In relation to the slides, you'll appreciate it's a complex and technical matter that is best discussed as was yesterday. We would therefore prefer not to share the slides in abstract, but very much look forward to engaging with you again
>
> Regards,
>
> Annmarie
>
> **Annmarie Brogan | EA to CEO AirNav Ireland**

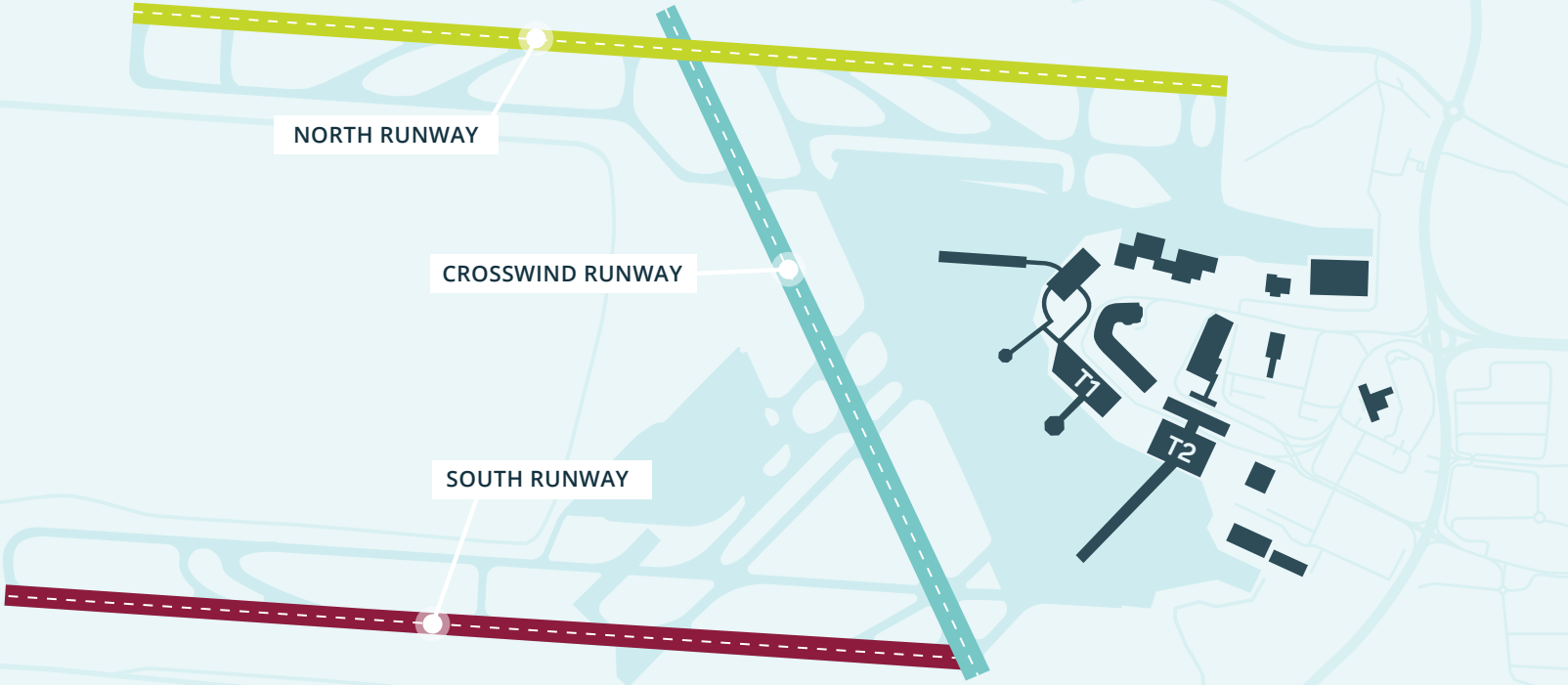
Appendix C1

Facts on Noise Management and Mitigation at Dublin Airport

Dublin Airport Runways

Dublin Airport has three runways. **North Runway** is new. It opened in August 2022. There were two prior runways: the **South Runway** which accounted for most flights and the **Crosswind Runway**, used in the event of cross-winds.

Neither overall flight volumes nor noise have changed as a result North Runway. Instead, flight volumes and noise are spread differently across the three runways. Since North Runway opened, flight volumes on the South Runway are lower and volumes on the Crosswind Runway have been substantially eliminated.



50% Reduction in Those Significantly Impacted by Noise

The number of people significantly impacted by aircraft noise at Dublin Airport has almost halved between 2019 and 2022. This is due to a number of factors, including fewer homes being overflown, more modern and quieter aircraft and the adoption of noise mitigation measures by daa. Aircraft movements in 2022 were just 10% lower than those in 2019 as the recovery in aviation accelerated post COVID-19.

99% Reduction in use of Crosswind Runway – flying over Santry and Dublin City

Since North Runway became operational, daa's Crosswind Runway (Runway 16/34) which brought flights over highly populated, major urban areas such as Santry and Dublin City, is now rarely used (usually only due to weather / wind or safety reasons as determined by AirNav Ireland). In the eight months to August 2023 there has been a 99% reduction in flights using this runway compared to 2017.

No Change in Night Time Noise (11pm to 7am) Since North Runway Opened

North Runway **does not** operate at night - i.e. between the hours of 23:00 and 07:00, other than in exceptional circumstances e.g. to facilitate essential maintenance. Typically, this amounts to 4 nights every two months or around 24 nights a year in these circumstances.

During these essential maintenance times, runway operations switch to North Runway rather than the Crosswind Runway whose flight paths are located over the highly populated areas of Santry and Dublin City. This formed part of the planning permission for North Runway whereby the default back-up runway in essential maintenance or emergency situations is North Runway.

Modern aircraft are up to 50% quieter

The fleet at Dublin Airport is one of the most modern in the world.

The significant rollout of Boeing 737 Max and Airbus A320 Neos – which are 50%[1] quieter than aircraft in operation in 2006 – has resulted in:

- **96.3% of aircraft in Dublin Airport meeting the ICAO Chapter 4[2] noise standard.**
- **32% of aircraft in Dublin Airport also meeting the more stringent ICAO Chapter 14[3] noise standard.**
- **Noisier aircraft (referred to as Chapter 2 aircraft) being banned from Dublin Airport.**
- **The original conditions attached to the grant of planning for North Runway were based on aircraft types which operated in 2003. None of Ryanair's current global fleet of 296 aircraft were in operation in 2003, while just three of Aer Lingus' 54 strong fleet were operating 20 years ago.**

[1] 50% reduction at start up.

[2] All aircraft are assigned a type certificate before they can be entered into operation and the noise produced by the aircraft is assessed. These standards are developed by the ICAO and enforced throughout the EU. The ICAO Noise 'Chapter' defines specific noise performance criteria to which aircraft must be certified.

[3] Chapter 14 of Annex 16 to the Chicago Convention, means that from 2017 new large civil aircraft types must be at least 7 EPNdB (Effective Perceived Noise in Decibels) quieter than the current Chapter 4 standard.

Promoting and Incentivising Quieter Aircraft & Penalising Airlines for Noise

We encourage and financially incentivise our airline partners to fly their quieter and more efficient aircraft fleet (Chapter 14). We have also introduced live charging for noise, which is actively being enforced and applied to invoices since last year.

Airlines operating at Dublin Airport will soon be able to avail of additional discounts of up to 25% on charges in a further bid by daa to incentivise airlines to operate newer, quieter and cleaner aircraft. daa is incorporating airline feedback into its proposals, with full details to be finalised over the coming weeks.

Among the changes being considered by daa are:

- **An extension of noise surcharging to 24 hours (from night only currently) and more penal surcharges for the noisier aircraft during the night period.**
- **The introduction of a new Nitrogen Oxide-based emissions runway surcharge.**
- **The introduction of an 12.5% discount on both published runway charges and passenger charges to attract cleaner and quieter aircraft.**

More Monitoring and Measurement

Aircraft noise can be measured using Noise Monitoring Terminals (NMTs). daa has increased the number of NMTs in operation by over 100% since the opening of North Runway in August 2022. We now have 15 permanent live monitors and expect a further 8 NMTs will be in place by the end of 2023. The noise levels from these NMTS are made publicly available on our WebTrak system. The data derived from the NMTs is used to correlate aircraft movements and aviation noise. This correlation and the readings are used to provide information to Aircraft Noise Competent Authority (ANCA), Final County Council (FCC) and others, as well as generating the annual noise contours. Noise event data from the NMTs is used in the published daa Annual Compliance report which is submitted to ANCA.

NMT Status:

- **15 Fixed NMTs.**
- **1 Mobile NMT, with a second to be added this month (October 2023).**
- **11 Temporary NMTs were deployed at various locations throughout the last year for approximately 2 weeks each time in recognition of the initial issue identified on the departure flightpaths off the North Runway, when it opened in August 2022.**

Fig. 01: A Noise Monitor Terminal (NMT) in situ

Noise and Flight Track Monitoring

daa introduced a community focused flight tracking system called WebTrak in 2021. WebTrak is a web-based service that monitors and provides information on flights and noise levels related to aircraft using Dublin Airport. It provides real-time information on flight origin and destination, aircraft type, altitude and flight path, as well as noise levels registered at Dublin Airport's noise monitoring terminals.

The system also provides a simplified way for members of the public to monitor flights and submit noise complaints.

Fig. 02: Map of Noise Monitor Terminals

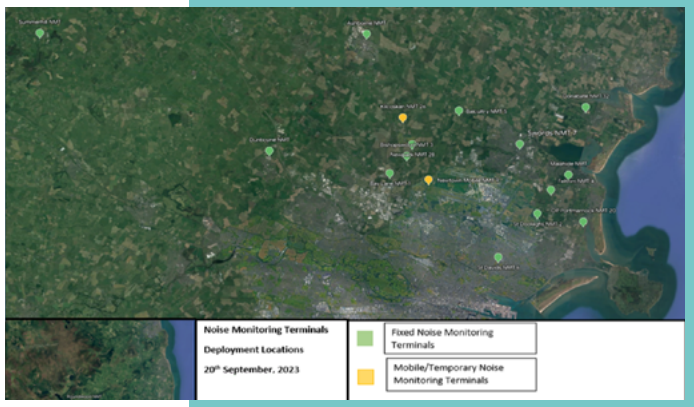
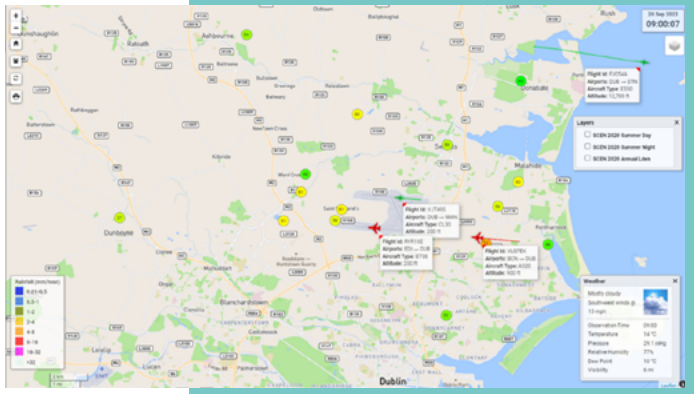


Fig. 03: Home screen with flight tags and layer selection options



Aircraft Noise Complaints

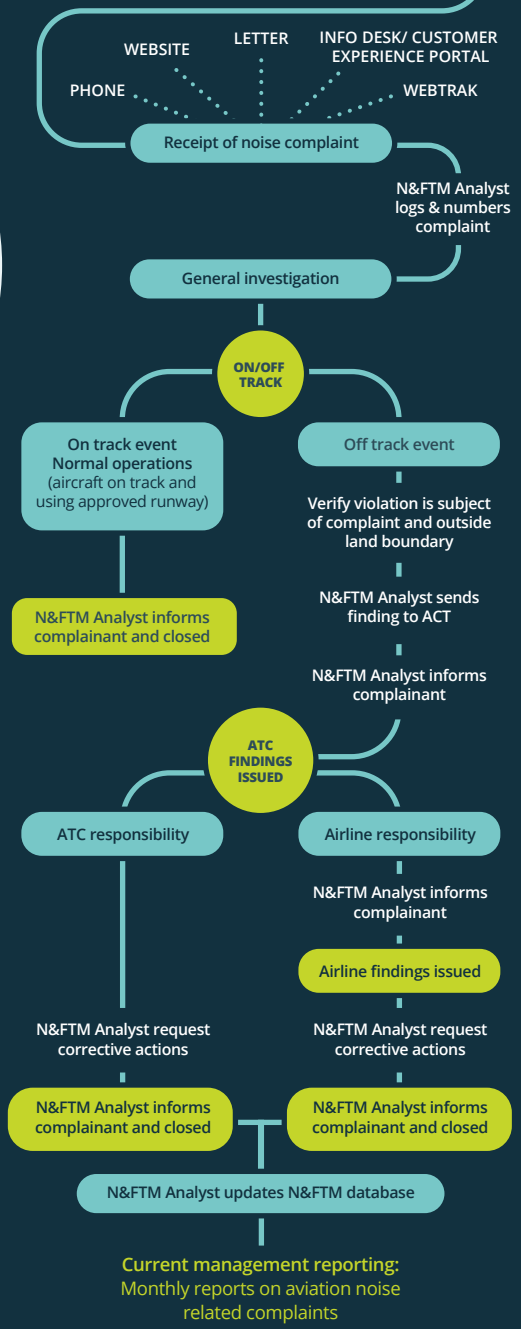
32,646
aircraft noise complaints were received by daa in 2022

90%
of complaints in 2022 came from 11 complainants

25,126
of all complaints received (77%) were from 1 serial complainant

83.8%
of complaints were responded to by daa

How daa deals with noise complaints



Adhering to Environmental Corridors

Noise Preferential Routes [NPRs], also known as Environmental Corridors enable daa to monitor the compliance of aircraft with their designated departure route. They are designed to minimise impact on surrounding communities. Unless directed otherwise by Air Traffic Control (ATC), all aircraft taking off are required to follow the NPRs.

Flight Paths

daa was granted planning permission for the construction and operation of North Runway.

As part of this process, indicative flight paths were used, however these did not form part of the planning approval.

It has been clear since 2016 that there would be a need for a diversion off North Runway to ensure a compliant and safe airspace in parallel runway operations.

Public information sessions were held to inform people about this and to show the indicative flight paths associated with the required divergence.

During the initial bedding-in period after North Runway operations commenced in August 2022, the initial departure flightpaths were not in line with modelling assumptions, resulting in some local communities being unexpectedly overflown.

Since February 2023, flight paths have been updated and are now substantially aligned with the information previously communicated by daa in 2016.

The Instrument Flight Procedures associated with North Runway were developed and designed by experts to align to the mode of operation stipulated in the planning conditions as well as international safety regulations. They were subsequently examined in detail and approved by the Irish Aviation Authority (IAA) in its role as regulator.

daa recognises that the introduction of the North Runway has brought aviation noise to new areas that previously were not affected. However the total level of aviation noise from Dublin Airport has not significantly changed since 2019 but is now distributed across a wider geographical area that has seen reductions in movements and noise levels in some areas and increases in others.

The number of people significantly impacted by aircraft noise at Dublin Airport, over two of the main classification groups, reduced by almost 50% between 2019 and 2022, as evidenced by the ANCA Review of Effectiveness for 2022.

Independent Oversight of Noise

ANCA (the Aircraft Noise Competent Authority) is the responsible agency for monitoring, and regulating where necessary, for the management of aircraft noise in the communities around Dublin Airport. daa is responsible for the implementation of mitigation measures and for the appropriate measuring systems to ensure compliance.

An tÚdarás Inniúil um Thorann Aerárthaí
Aircraft Noise Competent Authority

Noise Transparency and Reporting

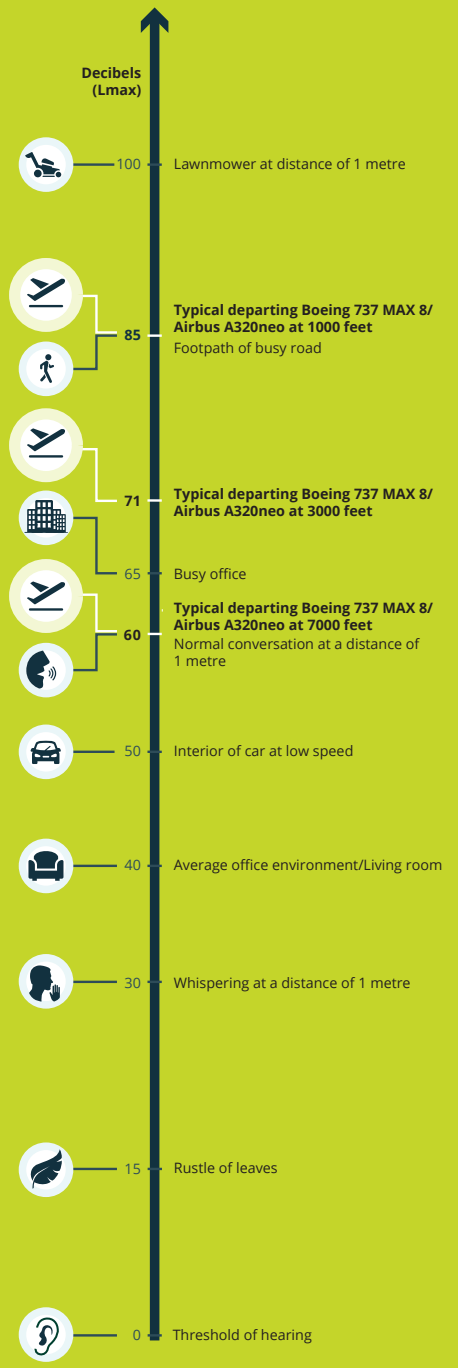
daa publishes relevant aviation noise data on a monthly and quarterly basis, as well as completing an annual report setting out the degree to which airport users are complying with the noise mitigation measures and operating restrictions.

Comparison of Noise From Various Sources

A comparison of noise from various sources is shown in the diagram to the right. These values are maximum sound levels that occur for each example.

This represents the new fleet of aircraft being used in 2023 namely the Boeing 737 Max 8 and the Airbus A320 neo. As outlined above, with the modernisation of Aircraft fleet, these noise levels will have reduced in 2023.

Understanding noise (decibel) levels



daa Actions to Mitigate Noise and Support Homeowners and the Community

Insulation

daa has extended comprehensive acoustic insulation schemes to 200 homes. This is three times the number of homes required under its 2007 grant of planning permission. This measure provides significant acoustic benefits as well as heat retention. Three schools have also benefitted from substantial insulation measures.

Scheme eligibility is reviewed every two years, however where eligibility emerges between reviews, custom and practice by daa has been to insulate homes much sooner following an eligibility assessment.

Voluntary Dwelling Purchase Scheme

For those closest to North Runway and most acutely impacted by noise, a voluntary scheme has been established that offers to buy out their homes at a 30% premium to their value pre North Runway, in addition to professional fees and relocation expenses. Almost 30 homes are, and remain eligible, for this scheme.

RESIDENTIAL NOISE INSULATION SCHEME

Eligible:	125
Opted In:	105

HOME SOUND INSULATION SCHEME

Eligible:	77
Opted In:	54

VOLUNTARY SCHOOLS SOUND INSULATION

Eligible:	4
Opted In:	3

VOLUNTARY DWELLING PURCHASE SCHEME

Eligible:	38
Opted In:	13

Changes to operating conditions

300 Homes become eligible for a €20,000 Insulation Grant

daa has sought changes to operating conditions to:

- **permit North Runway to be used between 11pm and midnight and between 6am and 7am i.e. for early morning outbound and end of day returning aircraft**
- **to move from measuring the number of aircraft movements to measuring their noise impacts i.e. to move from a movement cap to a noise quota system**

Fingal County Council has issued a notification to grant planning permission for changes to the conditions and this decision is now being considered by An Bord Pleanála. If approved and implemented, 300 homeowners will benefit from a €20,000 grant to insulate their homes.

Dublin Airport €10m Community Fund

In 2017, daa launched a €10 million Community Fund. To date, the Fund has supported over 450 projects and initiatives in the airport's locality, to a total value of over €1.8 million. Projects supported so far include sports and recreation, environment and sustainability, health and wellbeing, heritage and social inclusion.

daa also supports up to 20 local students per annum to attend university via DCU's Access programme. Since its launch in 2017, daa has supported 70 students to progress their education through this programme.

Community Engagement

Dublin Airport has a dedicated Community Engagement Team (CET) which is tasked with communicating through a number of channels with local residents impacted by airport operations.

To date in 2023, the CET has completed over 70 home visits and one-to-one meetings with residents on various issues including airport operations, flight paths and noise monitoring.

In addition, the team has actively participated in four Community Liaison Group [CLG] meetings and two Dublin Airport Environmental Group [DAEWG] meetings, as well as supporting and administrating Dublin Airport's voluntary dwelling purchase scheme and insulation schemes for eligible residents.

The following is a summary of total community engagement on North Runway:

2,000
local residents met

20
public events hosted, including major public information roadshows

43,000
leaflet drops

5,000+
emails sent

2,000+
letters sent

€10m
community fund rolled out

CLG & DAEWG
meetings held regularly

Regular meetings
with public representatives

Designated
community engagement team

Dublin Airport

Location	Lat. 532517N, Long. 0061612W (midpoint runway 10/28)
Elevation	242 ft. AMSL
Runway	Runway 10R/28L: Length 2,637 metres – width 45 metres plus 7.5 metre shoulders each side Surface asphalt Category III A (Runway 10)/Category III A (Runway 28) Runway 10L/28R : Length 3,110 metres – width 75 metres plus 7.5 metre shoulders on each side Surface concrete Category III B Runway 16/34: Length 2,072 metres – width 61 metres Surface asphalt Category I (Runway 16)/Non-precision (runway 34)
Refuelling	JET A1
Operational	24hrs
Postal address	THREE, The Green, Dublin Airport, Swords, Co. Dublin, K67 X4X5, Ireland
Fax number	(01) 814 1034 (09:00-17:00)
	(01) 814 5479 (24hrs)
Telephone number	National (01) 8141111 International 353 1 8141111
Web	www.dublinairport.com
Sita	DUBRN7X (Airport Administration) DUBYREI (Operations)

Appendix C2

From: Michelle Molloy <michelle.molloy@daa.ie>
Sent: 13 December 2024 08:01
To: Francis Regan <FRegan@meathcoco.ie>
Subject: Action from Ratoath and Ashbourne MD Councillors Meeting.

Dear Francis,

It was lovely to meet with you in person yesterday, and I would like to thank you and Kathryn for facilitating the meeting which we believe was very beneficial from our perspective; we hope the Councillors are of the same view too.

You will recall that Councillor Bonner asked that Dublin Airport provide a statement regarding the flight path review. In that regard, we wish to advise the following:

> Any change in flight paths is a very complicated process which involves many stakeholders, including local communities, and needs to be well-structured and planned. The situation has been made more complex by recent developments, namely An Bord Pleanála's (ABP's) public consultation regarding its draft decision on the North Runway Relevant Action application, which was launched in September and will remain open until December 23. ABP's final decision in these issues will have important implications for future airport operations and will need to be factored into any future considerations regarding flight paths.
>
> Nonetheless, we initiated steps by contacting airports who have conducted similar processes already to get a greater understanding of what would be involved and the best way to implement such a process. We are developing a plan around how this is best structured and it is our intention to keep you and the public updated as we move forward. It should, however, be considered that the outcome may not be vastly different from where we are today and may not make everyone happy, but it is virtually impossible for us to satisfy everybody in this matter as we cannot remove aircraft noise entirely. There are a wide range of factors that must be considered in the design of flight paths, and proposals from local groups - which may run contrary to each other - need to be considered in a structured and coherent manner and not in isolation.
>
> As discussed during our meeting, whilst we have been making preparations, it would be premature to commence this process before ABP's final decision on the Relevant Action. We committed to providing you with an update as soon as that determination is available, and we also reconfirm our commitment to ensure that all communities, including Meath East, are afforded the opportunity to fully participate in the consultation and express their views and preferences.

We are looking at the other actions from our meeting, and I will revert to you early next week with an update on same. As an immediate action, though, please find a link to the summer edition of our Dublin Airport News publication. Our winter edition is going to print shortly and we are working to expand the distribution to households in Ashbourne and Ratoath – I will update you further on that next week.

In the meantime, please do not hesitate to contact me if you or the Councillors have any queries.

All the best,

Michelle.

Michelle Molloy | **COMMUNICATIONS**
Community Engagement Manager

THREE The Green, Dublin Airport Central,
Dublin Airport, Swords, Co. Dublin, K67 X4X5

T: +353 1 944 2988
E: michelle.molloy@daa.ie

Appendix D

iAcoustics
INTEGRATED ACOUSTIC SOLUTIONS

Unit A1,
Kingswood Business Park,
Baldonnel, Dublin 22, Ireland

00353 1 452 1133
info@iacoustics.net
www.iacoustics.net

Air Traffic Noise Monitoring

iAcoustics

Report Issued: 16/11/2022

Project:	Pearse Sutton
Author:	Eoghan Tyrrell
Title:	Air Traffic Noise Monitoring
Reference Code:	J1950
Version Number:	2

Revision Tracker

Version	Date issued	Revision by	Reviewed by	Section(s) affected
V.1	12/09/2022	E. Tyrrell	G. Plunkett	-
V.2	16/11/2022	E. Tyrrell	-	Appendix III

Table of Contents

Glossary of Terms

A-weighted	Measurements that correlate well with the perceived noise level.
Background Noise (L90):	The in-situ, or ambient level of noise in the environment
Competent Person:	Someone with appropriate training, qualifications, experience, and skill. The person will normally have a diploma or degree in acoustics or a related subject.
Decibel (dB):	The decibel is used as a measure of acoustic units.
dB(A):	A single-figure rating to a sound, which represents the human-ear frequency response.
Frequency (Hz):	The number of sound waves to pass a point in one second. Correlated to the perceived pitch of a sound.
LAeq:	Commonly regarded as the A-weighted "average" noise level over a period of time.
LAFmax:	A-weighted, maximum, sound level measured with a fast time-constant - maximum is not peak.
Lday:	The A-weighted, Leq (equivalent noise level), over the 16-hour day period (07:00-23:00), also known as the day noise indicator.
Ldn:	The day-night noise level, the LAeq (equivalent noise level) over a 24 hour period, also known as the day night indicator.
Leq:	The linear (not A-weighted) equivalent continuous sound pressure level.
Lnight	The A-weighted, Leq (equivalent noise level) over the 8 hour night period of 23:00 to 07:00 hours, also known as the night noise indicator.
Noise intrusion:	Noise from external noise sources.
Octave bands:	A convenient division of the frequency scale, identified by their centre frequency. Typically, 63, 125, 250, 500, 1000, 2000, 4000, 8000 Hz.

1. Introduction

iAcoustics were engaged to carry out noise monitoring for the measurement of air traffic noise at the home of Pearse Sutton, Ballystrahan, St. Margaret's, Co. Dublin, K67 KN88. This dwelling location in relation to Dublin Airport is indicated in Figure 1 with a yellow dot. There is an approximate distance of 1.2 kilometres between the dwelling and the closest runway.

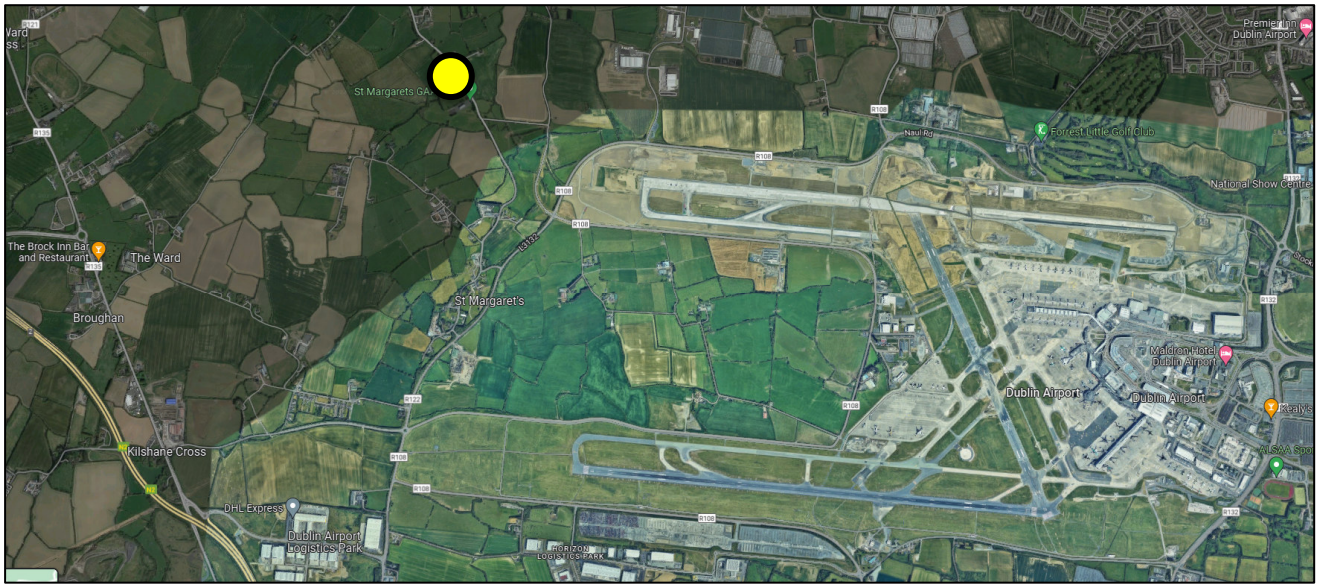


Figure 1: Dwelling Location

Unattended noise monitoring was carried out for approximately 24 hours, between 15:30 on 22nd July 2022 and 15:05 on 23rd July 2022. The survey was carried out prior to the launch and operation of the new North Runway (10L/28R) at Dublin Airport. Following a review of the audio recordings captured during the survey, air traffic was observed to be the dominant noise source.

1.1 Professional Competency

This report, including the noise survey element, has been undertaken and drafted by Eoghan Tyrrell, an Associate Member of the Institute of Acoustics (AMIOA), an accreditation gained through the completion of the Post-Graduate Diploma in Acoustics & Noise Control and MSc in Applied Acoustics. These qualifications comply with the requirements of a 'competent tester' under the EPA Guidance NG-4.

2. Instrumentation and Measurement Procedure

Measurements were captured through daytime and nighttime periods. All measurements were taken with calibrated precision grade, Type Approved (Class 1) sound level meters as per *IEC 61672-1:2013*. All equipment has calibration certificates traceable to the relevant standard. Measurements were captured in line with *ISO 1996-1:2016 Acoustics — Description, measurement and assessment of environmental noise — Part 1: Basic quantities and assessment procedures*.

Table 1: Measurement Equipment

Type	Make & Model	Serial No.
Sound Level Meter Outdoors	NTI XL2	A2A-06528-E0
Sound Level Meter Indoors	NTI XL2	A2A-12398-E0
Microphone / Preamp Outdoors	NTI M2230 / MA220	A22043 / 6471
Microphone / Preamp Indoors	NTI M2230 / MA220	A14300 / 6337
Calibrator	01dB CAL 01	11756

Two monitors were deployed for the survey period – one monitor outdoors and the other indoors.

The outdoor monitor was positioned on grass, 2 meters above ground, away from any reflective surfaces. The topography and surrounding areas were predominantly flat. An all-weather kit was employed on the monitor to ensure the wind did not interfere with the accuracy of the measurement microphone.

The indoor monitor was positioned in a bedroom on the first floor. All windows were closed. The façade-located wall vent was open to provide normal levels of ventilation. The indoor monitor was positioned 1.5 meters above the floor in the centre of the room.

Photographs of each monitor are presented in the appendix of this report. The meters were calibrated before and after the survey to ensure no drift in the measurement accuracy. Weather conditions were calm for the duration of the survey. On the morning of the survey at the dwelling location, with a hand-held Pro Anemometer (HP-866B), temperatures were measured at 24 degrees Celsius. Wind speeds were measured to be less than 1 meter per second. There was relatively little could cover. According to the Met Eireann data from the Casement weather station, temperatures ranged from 11.6 degrees Celsius to 20.9 degrees Celsius over the survey period. Wind speeds ranged from 1 knot (0.5 m/s) to 5 knots (4 m/s) over the survey period. The predominant wind direction on 22nd July was 310 degrees (North-West) with a change to 190 degrees (South) on 23rd July. 0.9mm of precipitation fell between 6am and 7am on 23rd July.

Figure 1 indicates the meter positions. The red circle indicates the outdoor monitoring position. The blue circle is positioned over the bedroom in which the indoor monitor was located.

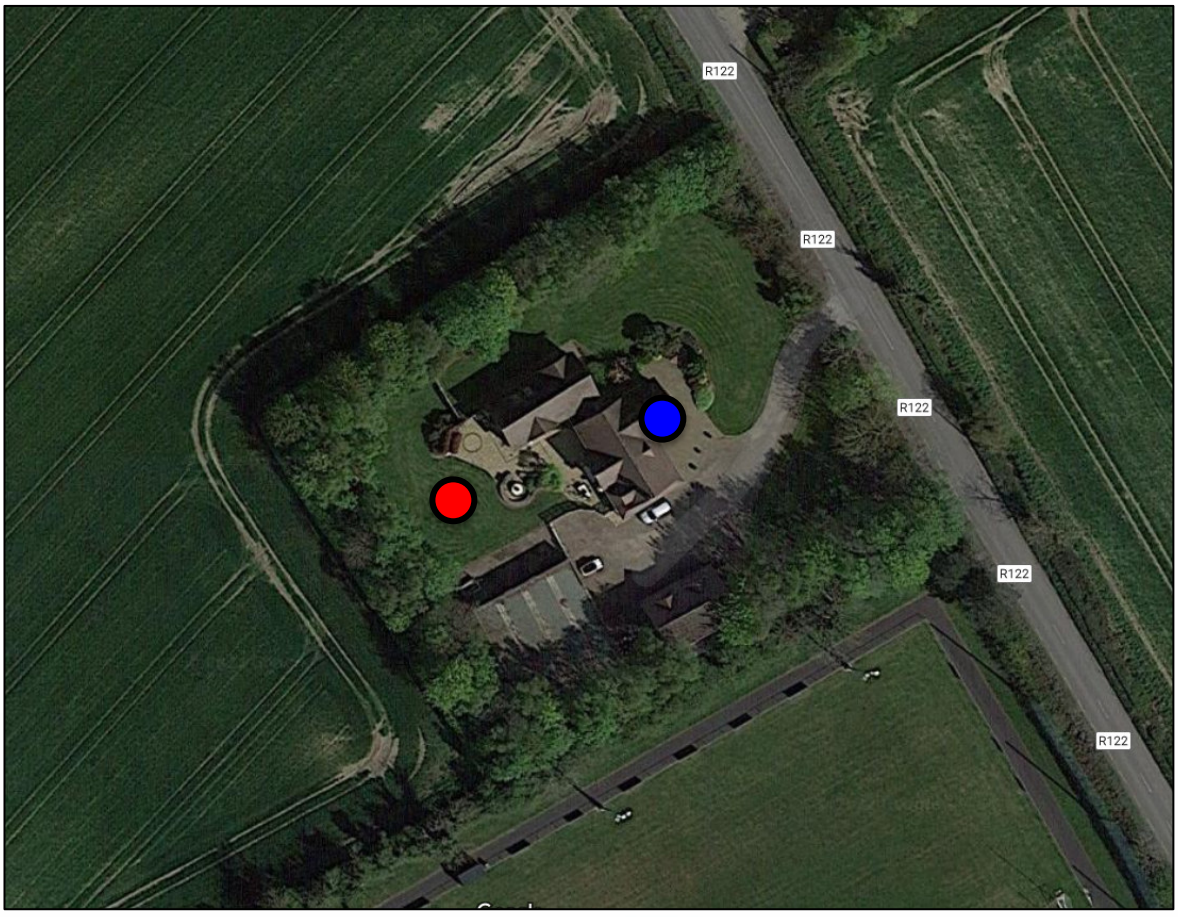


Figure 2: Monitoring Locations

Both meters were set to report on spectral data in one-third octaves at one-minute intervals. Each meter also logged noise levels every second. Audio recordings were captured so air traffic noise events could be identified, and the air traffic measurements dissociated from other potential noise occurrences.

3. Measurement Results

The daytime and nighttime equivalent noise levels are presented in Table 2 and Table 3. All detected air traffic noise events and associated levels are presented in Table 4 and Table 5. Each individual event from Table 4 and Table 5 were auditioned and verified as air traffic noise.

Table 2: Outdoor Day Night Levels

Outdoors	
Period	Result
Daytime	51dB Lday
Nighttime	45dB Lnight
Day-Night	45dB Ldn

Table 3: Indoor Day Night Levels

Indoors	
Period	Result
Daytime	27dB Lday
Nighttime	18dB Lnight
Day-Night	25dB Ldn

Table 4: Individual Identified Air Traffic Noise Events and Associated Levels

Individual Air Traffic Noise Event Levels, Outdoors			
Time	Duration	LAeq	LAFmax
2022-07-22 16:38:00	0:00:25	50.8	58.5
2022-07-22 16:51:03	0:00:19	46.3	54.6
2022-07-22 16:53:31	0:00:40	47.6	58.7
2022-07-22 16:59:42	0:00:14	48.1	53.0
2022-07-22 17:02:33	0:00:16	50.0	55.8
2022-07-22 17:06:01	0:00:10	48.6	57.6
2022-07-22 17:11:50	0:00:27	50.3	55.9
2022-07-22 17:22:21	0:00:22	45.9	49.2
2022-07-22 17:24:57	0:00:31	46.6	50.3
2022-07-22 17:41:00	0:00:16	45.9	49.2
2022-07-22 17:45:03	0:00:14	46.9	50.4
2022-07-22 17:59:26	0:00:30	46.6	50.8
2022-07-22 18:00:52	0:00:42	47.8	54.9
2022-07-22 18:09:37	0:00:25	43.6	50.2
2022-07-22 18:35:17	0:00:30	45.4	51.7
2022-07-22 18:50:57	0:00:12	45.4	49.5
2022-07-22 19:01:26	0:00:28	44.7	49.7
2022-07-22 19:12:18	0:00:28	48.0	54.0
2022-07-22 19:12:58	0:00:25	44.3	49.1
2022-07-22 19:13:50	0:00:15	44.2	47.8

2022-07-22 19:14:37	0:00:22	45.2	48.8
2022-07-22 19:23:10	0:00:17	47.7	50.7
2022-07-22 19:32:05	0:00:07	45.7	48.4
2022-07-22 19:40:12	0:00:10	51.0	58.3
2022-07-22 19:44:14	0:01:02	53.5	64.9
2022-07-22 19:57:40	0:00:18	50.2	54.5
2022-07-22 20:08:57	0:00:11	46.8	50.3
2022-07-22 20:09:12	0:00:09	47.3	51.6
2022-07-22 20:20:25	0:00:09	48.8	52.8
2022-07-22 20:53:19	0:00:15	45.0	50.2
2022-07-22 20:54:34	0:00:33	49.3	56.5
2022-07-22 20:59:24	0:00:30	48.3	56.0
2022-07-22 21:05:26	0:00:15	46.4	52.3
2022-07-22 21:09:08	0:00:40	47.8	54.0
2022-07-22 21:10:13	0:00:09	49.6	55.4
2022-07-22 21:11:40	0:00:08	49.5	55.8
2022-07-22 21:12:48	0:00:08	56.1	59.8
2022-07-22 21:14:22	0:00:25	49.6	56.8
2022-07-22 21:20:14	0:00:17	45.4	52.2
2022-07-22 21:21:23	0:00:17	50.6	56.5
2022-07-22 21:26:04	0:00:45	47.3	55.4
2022-07-22 21:28:34	0:00:29	48.5	52.7
2022-07-22 21:29:05	0:00:06	45.6	51.1
2022-07-22 21:31:04	0:00:42	47.1	53.6
2022-07-22 21:39:11	0:00:45	49.2	59.6
2022-07-22 21:40:52	0:00:56	47.3	55.8
2022-07-22 21:44:19	0:00:38	48.3	53.7
2022-07-22 21:46:00	0:00:40	45.7	56.4
2022-07-22 21:53:14	0:00:21	47.8	54.2
2022-07-22 22:03:23	0:00:22	46.8	54.0
2022-07-22 22:05:16	0:00:30	46.7	50.8
2022-07-22 22:07:57	0:00:21	46.0	52.2
2022-07-22 22:09:26	0:00:20	51.8	57.3
2022-07-22 22:09:49	0:00:06	57.4	63.5
2022-07-22 22:12:07	0:00:11	51.0	55.4
2022-07-22 22:13:19	0:00:14	47.6	52.9
2022-07-22 22:14:45	0:00:38	49.3	56.0
2022-07-22 22:16:06	0:00:36	53.2	60.6
2022-07-22 22:25:03	0:00:18	48.7	56.6
2022-07-22 22:26:52	0:00:13	45.9	51.7
2022-07-22 22:28:57	0:00:25	49.3	55.9
2022-07-22 22:30:36	0:00:05	57.0	61.6
2022-07-22 22:50:43	0:00:49	52.6	62.7
2022-07-22 23:01:02	0:00:19	48.0	55.4
2022-07-22 23:29:30	0:01:19	50.3	60.8
2022-07-22 23:31:08	0:01:05	54.1	62.4
2022-07-22 23:34:42	0:00:18	47.9	55.0

2022-07-22 23:38:21	0:00:44	49.1	58.4
2022-07-22 23:41:07	0:00:34	43.1	49.1
2022-07-22 23:46:15	0:00:59	52.2	62.5
2022-07-23 00:06:18	0:00:15	50.5	57.0
2022-07-23 00:07:52	0:01:06	48.3	59.4
2022-07-23 00:10:58	0:00:58	40.1	45.5
2022-07-23 00:12:22	0:00:15	44.3	50.6
2022-07-23 00:30:06	0:00:55	54.8	66.6
2022-07-23 00:36:51	0:00:46	52.9	63.1
2022-07-23 00:51:54	0:01:17	49.7	62.3
2022-07-23 00:56:22	0:00:52	41.7	48.7
2022-07-23 01:19:07	0:00:55	46.6	53.5
2022-07-23 03:08:15	0:01:45	47.2	56.8
2022-07-23 03:58:20	0:01:20	46.9	55.5
2022-07-23 04:02:25	0:01:15	40.3	48.5
2022-07-23 04:19:36	0:00:05	56.1	60.7
2022-07-23 04:24:15	0:00:13	59.1	65.9
2022-07-23 04:36:18	0:00:31	48.3	58.6
2022-07-23 04:51:43	0:00:25	43.7	52.4
2022-07-23 05:32:40	0:00:32	42.9	49.5
2022-07-23 05:46:40	0:00:06	57.3	63.4
2022-07-23 05:48:38	0:00:48	51.3	59.3
2022-07-23 05:56:35	0:00:41	54.0	63.7
2022-07-23 06:02:02	0:01:08	54.7	64.4
2022-07-23 06:08:02	0:00:52	56.2	64.7
2022-07-23 06:13:13	0:01:00	53.6	61.5
2022-07-23 06:14:56	0:00:42	53.9	62.9
2022-07-23 06:18:04	0:01:39	50.6	60.2
2022-07-23 06:21:27	0:00:48	56.5	67.0
2022-07-23 06:23:07	0:00:39	58.1	67.8
2022-07-23 06:24:34	0:00:52	50.3	57.8
2022-07-23 06:27:14	0:00:48	52.2	64.1
2022-07-23 06:28:41	0:00:46	54.7	64.4
2022-07-23 06:30:16	0:00:22	57.7	65.1
2022-07-23 06:31:46	0:00:23	59.1	66.8
2022-07-23 06:33:02	0:00:45	55.5	64.1
2022-07-23 06:35:56	0:00:31	57.8	67.6
2022-07-23 06:38:16	0:00:48	56.9	67.6
2022-07-23 06:39:48	0:00:30	57.9	68.3
2022-07-23 06:41:12	0:00:31	58.9	68.5
2022-07-23 06:42:51	0:00:33	58.8	67.6
2022-07-23 06:44:02	0:00:40	51.7	59.7
2022-07-23 06:45:54	0:00:51	53.8	62.8
2022-07-23 06:49:05	0:00:53	53.7	64.7
2022-07-23 06:50:37	0:00:43	56.0	65.4
2022-07-23 06:52:02	0:00:43	56.5	65.4
2022-07-23 06:53:19	0:00:42	55.6	65.8

2022-07-23 06:54:47	0:00:38	57.2	68.0
2022-07-23 06:56:11	0:00:41	55.4	64.3
2022-07-23 06:57:37	0:00:31	50.7	60.4
2022-07-23 07:00:02	0:00:59	57.4	66.7
2022-07-23 07:03:19	0:00:30	58.6	68.7
2022-07-23 07:05:14	0:00:43	53.9	61.0
2022-07-23 07:06:27	0:00:26	52.7	58.5
2022-07-23 07:06:59	0:00:21	58.0	62.7
2022-07-23 07:07:39	0:00:52	55.3	64.7
2022-07-23 07:09:13	0:00:44	54.6	62.3
2022-07-23 07:10:30	0:00:50	57.3	65.7
2022-07-23 07:11:47	0:00:32	52.0	58.6
2022-07-23 07:13:07	0:00:54	50.1	58.6
2022-07-23 07:14:28	0:00:33	56.0	64.8
2022-07-23 07:15:34	0:00:38	53.6	60.5
2022-07-23 07:16:53	0:00:30	56.4	66.0
2022-07-23 07:19:10	0:00:19	50.9	56.7
2022-07-23 07:21:01	0:00:40	57.9	67.8
2022-07-23 07:22:44	0:00:26	56.0	63.5
2022-07-23 07:24:03	0:00:27	54.0	61.1
2022-07-23 07:25:32	0:00:23	58.6	66.0
2022-07-23 07:27:22	0:00:34	55.0	64.4
2022-07-23 07:28:41	0:00:09	51.9	55.7
2022-07-23 07:30:10	0:00:30	54.0	60.7
2022-07-23 07:31:43	0:00:51	56.4	65.3
2022-07-23 07:34:27	0:00:24	57.6	65.5
2022-07-23 07:35:43	0:00:16	52.5	57.6
2022-07-23 07:37:23	0:00:41	56.4	66.2
2022-07-23 07:39:11	0:00:37	50.5	57.9
2022-07-23 07:40:20	0:00:20	51.0	57.5
2022-07-23 07:40:45	0:00:43	56.1	64.8
2022-07-23 07:43:01	0:00:35	56.1	65.2
2022-07-23 07:43:38	0:00:31	51.2	56.8
2022-07-23 07:45:21	0:00:37	58.5	71.3
2022-07-23 07:46:53	0:00:38	59.8	68.3
2022-07-23 07:49:52	0:00:17	49.7	54.8
2022-07-23 07:52:54	0:00:33	50.8	58.8
2022-07-23 07:55:19	0:00:48	56.4	67.3
2022-07-23 07:57:37	0:00:59	55.2	64.4
2022-07-23 07:59:07	0:00:57	60.4	70.6
2022-07-23 08:01:32	0:01:02	56.7	67.0
2022-07-23 08:04:20	0:00:41	57.9	68.8
2022-07-23 08:06:18	0:00:44	58.5	66.9
2022-07-23 08:07:39	0:00:42	56.4	65.0
2022-07-23 08:08:33	0:00:23	51.5	60.6
2022-07-23 08:09:45	0:01:50	53.0	66.7
2022-07-23 08:13:50	0:01:20	54.5	68.5

2022-07-23 08:16:00	0:01:10	50.1	60.2
2022-07-23 08:27:55	0:01:15	54.7	65.1
2022-07-23 08:29:45	0:00:15	53.2	61.5
2022-07-23 08:31:20	0:02:35	54.0	66.7
2022-07-23 08:35:40	0:01:45	51.9	63.6
2022-07-23 08:40:35	0:01:20	53.0	62.9
2022-07-23 08:43:25	0:01:55	48.1	55.8
2022-07-23 08:52:20	0:00:30	54.6	64.2
2022-07-23 08:55:30	0:01:25	53.0	64.1
2022-07-23 08:58:50	0:01:10	47.8	54.1
2022-07-23 09:00:40	0:00:55	55.0	65.6
2022-07-23 09:02:00	0:00:55	54.3	63.5
2022-07-23 09:10:50	0:00:45	50.4	59.3
2022-07-23 09:14:50	0:00:25	52.7	60.8
2022-07-23 09:17:10	0:00:55	54.3	64.8
2022-07-23 09:18:39	0:00:41	51.8	62.8
2022-07-23 09:22:59	0:00:56	52.4	62.1
2022-07-23 09:24:59	0:01:42	52.1	61.2
2022-07-23 09:28:17	0:00:45	48.6	55.0
2022-07-23 09:30:49	0:00:42	58.1	70.6
2022-07-23 09:32:35	0:00:08	56.9	60.8
2022-07-23 09:39:28	0:00:48	54.4	64.5
2022-07-23 09:44:41	0:01:05	51.5	60.4
2022-07-23 09:47:41	0:00:42	56.7	66.5
2022-07-23 09:48:35	0:00:45	53.0	60.6
2022-07-23 09:50:10	0:01:30	56.1	71.5
2022-07-23 09:52:40	0:01:00	49.4	61.8
2022-07-23 09:55:15	0:00:50	47.8	55.5
2022-07-23 09:56:35	0:00:10	51.4	59.7
2022-07-23 09:58:10	0:00:45	53.1	60.7
2022-07-23 10:08:15	0:01:30	55.6	69.8
2022-07-23 10:12:45	0:01:25	51.7	64.5
2022-07-23 10:27:59	0:00:18	50.1	61.2
2022-07-23 10:31:53	0:00:40	56.6	65.5
2022-07-23 10:33:21	0:01:06	54.8	66.6
2022-07-23 10:38:25	0:00:20	49.6	57.9
2022-07-23 10:39:59	0:00:28	52.5	60.1
2022-07-23 10:44:06	0:00:13	51.7	61.8
2022-07-23 10:58:38	0:00:56	50.2	58.3
2022-07-23 11:00:20	0:00:55	55.4	64.7
2022-07-23 11:05:45	0:00:25	51.2	61.3
2022-07-23 11:07:15	0:01:05	53.1	62.2
2022-07-23 11:14:15	0:00:35	54.6	65.3
2022-07-23 11:15:35	0:00:25	50.9	61.5
2022-07-23 11:17:05	0:00:45	52.7	62.4
2022-07-23 11:19:50	0:00:25	48.0	55.9
2022-07-23 11:21:40	0:00:55	55.0	63.8

2022-07-23 11:23:00	0:00:45	47.1	56.5
2022-07-23 11:24:10	0:00:20	50.3	58.3
2022-07-23 11:29:05	0:01:20	52.3	61.4
2022-07-23 11:31:30	0:01:00	49.6	59.2
2022-07-23 11:33:05	0:00:25	48.5	56.6
2022-07-23 11:34:40	0:01:00	49.0	58.5
2022-07-23 11:36:55	0:00:55	56.1	69.6
2022-07-23 11:39:50	0:00:40	46.8	51.9
2022-07-23 11:42:55	0:01:05	53.3	64.1
2022-07-23 11:46:30	0:00:55	55.5	65.5
2022-07-23 11:48:25	0:00:50	46.7	56.3
2022-07-23 11:49:45	0:00:20	48.2	54.1
2022-07-23 11:51:15	0:00:35	49.9	61.5
2022-07-23 11:53:45	0:00:40	56.9	69.7
2022-07-23 11:56:40	0:00:50	55.0	64.7
2022-07-23 11:59:30	0:01:00	54.0	64.2
2022-07-23 12:02:25	0:01:05	55.1	65.5
2022-07-23 12:05:00	0:01:10	53.0	69.7
2022-07-23 12:12:55	0:01:00	55.8	65.9
2022-07-23 12:15:00	0:01:10	60.9	71.3
2022-07-23 12:17:25	0:01:20	58.5	69.6
2022-07-23 12:20:10	0:00:55	52.9	61.9
2022-07-23 12:21:40	0:01:25	53.5	64.5
2022-07-23 12:26:55	0:01:00	56.7	68.9
2022-07-23 12:30:30	0:01:40	53.6	66.4
2022-07-23 12:33:30	0:00:50	54.3	66.6
2022-07-23 12:38:25	0:01:35	50.4	59.3
2022-07-23 12:42:05	0:01:00	54.6	64.3
2022-07-23 12:43:30	0:00:50	56.6	65.9
2022-07-23 12:45:50	0:00:50	54.5	66.0
2022-07-23 12:49:00	0:01:05	52.3	61.4
2022-07-23 12:51:55	0:00:50	53.7	63.3
2022-07-23 12:59:22	0:00:35	63.5	72.4
2022-07-23 13:01:49	0:00:46	62.3	69.6
2022-07-23 13:04:10	0:01:10	54.5	65.8
2022-07-23 13:06:40	0:01:05	50.5	58.5
2022-07-23 13:08:50	0:01:10	51.1	59.0
2022-07-23 13:11:50	0:00:45	56.2	67.2
2022-07-23 13:14:00	0:01:05	62.6	74.2
2022-07-23 13:16:40	0:00:40	48.7	55.7
2022-07-23 13:18:40	0:00:40	48.9	53.2
2022-07-23 13:20:08	0:00:32	59.4	66.7
2022-07-23 13:22:30	0:00:40	55.3	64.4
2022-07-23 13:23:55	0:00:45	55.5	66.5
2022-07-23 13:27:10	0:00:50	53.3	60.8
2022-07-23 13:29:30	0:00:40	50.6	57.6
2022-07-23 13:34:35	0:01:00	55.3	65.6

2022-07-23 13:37:45	0:00:45	58.1	68.0
2022-07-23 13:39:15	0:00:40	56.0	66.1
2022-07-23 13:44:00	0:01:05	52.8	60.0
2022-07-23 13:45:55	0:00:40	52.0	56.7
2022-07-23 13:50:40	0:01:05	53.4	66.6
2022-07-23 13:53:50	0:00:50	57.2	71.1
2022-07-23 13:55:15	0:01:00	54.2	63.3
2022-07-23 13:59:05	0:01:00	54.3	66.2
2022-07-23 14:02:10	0:01:00	49.0	59.5
2022-07-23 14:05:20	0:01:00	53.5	63.9
2022-07-23 14:08:12	0:00:41	62.3	72.2
2022-07-23 14:09:50	0:00:50	55.5	65.7
2022-07-23 14:13:45	0:01:15	55.4	69.8
2022-07-23 14:16:40	0:00:40	55.3	64.8
2022-07-23 14:18:05	0:00:35	51.6	58.9
2022-07-23 14:19:30	0:00:40	52.9	62.6
2022-07-23 14:23:05	0:00:50	58.1	68.0
2022-07-23 14:24:35	0:00:50	56.4	64.4
2022-07-23 14:27:00	0:00:45	54.3	60.6
2022-07-23 14:28:25	0:00:55	49.9	56.6
2022-07-23 14:30:00	0:00:45	56.3	65.1
2022-07-23 14:31:35	0:00:35	58.3	67.2
2022-07-23 14:32:55	0:00:40	54.6	62.8
2022-07-23 14:34:25	0:01:15	50.1	59.2
2022-07-23 14:38:10	0:00:40	53.8	63.9
2022-07-23 14:40:10	0:00:55	54.1	63.3
2022-07-23 14:42:15	0:00:50	54.9	62.7
2022-07-23 14:44:50	0:00:45	52.9	62.4
2022-07-23 14:48:20	0:01:25	57.4	70.8
2022-07-23 14:52:45	0:00:55	56.9	70.3
2022-07-23 14:58:00	0:00:25	52.6	59.6
2022-07-23 15:00:25	0:00:40	56.6	66.0
2022-07-23 15:03:45	0:00:45	55.1	65.8

Table 5: Individual Air Traffic Noise Event Levels, Indoors

Individual Air Traffic Noise Event Levels, Indoors			
Time	Duration	LAeq	LAFmax
2022-07-22 16:37:05	0:00:25	23.3	35.0
2022-07-22 16:50:08	0:00:19	22.7	30.5
2022-07-22 16:52:36	0:00:40	23.7	30.3
2022-07-22 16:58:47	0:00:14	23.2	27.6
2022-07-22 17:01:38	0:00:16	24.1	29.7
2022-07-22 17:05:06	0:00:10	22.3	29.1
2022-07-22 17:10:55	0:00:27	25.5	31.6
2022-07-22 17:21:26	0:00:22	24.1	30.4
2022-07-22 17:24:02	0:00:31	22.9	33.0

2022-07-22 17:40:05	0:00:16	24.4	31.8
2022-07-22 17:44:08	0:00:14	25.1	29.9
2022-07-22 17:58:31	0:00:30	25.5	29.9
2022-07-22 17:59:57	0:00:42	23.5	30.7
2022-07-22 18:08:42	0:00:25	20.2	26.6
2022-07-22 18:34:22	0:00:30	22.1	28.4
2022-07-22 18:50:02	0:00:12	23.3	30.3
2022-07-22 19:00:31	0:00:28	20.1	25.9
2022-07-22 19:11:23	0:00:28	23.3	30.7
2022-07-22 19:12:03	0:00:25	21.3	25.6
2022-07-22 19:12:55	0:00:15	19.0	23.0
2022-07-22 19:13:42	0:00:22	23.5	33.2
2022-07-22 19:22:15	0:00:17	20.7	26.0
2022-07-22 19:31:10	0:00:07	25.6	32.0
2022-07-22 19:39:17	0:00:10	26.9	33.1
2022-07-22 19:43:19	0:01:02	26.3	34.0
2022-07-22 19:56:45	0:00:18	24.0	30.8
2022-07-22 20:08:02	0:00:11	26.5	31.9
2022-07-22 20:08:17	0:00:09	24.3	30.7
2022-07-22 20:19:30	0:00:09	22.1	27.3
2022-07-22 20:52:24	0:00:15	19.4	23.2
2022-07-22 20:53:39	0:00:33	24.9	35.0
2022-07-22 20:58:29	0:00:30	25.7	31.1
2022-07-22 21:04:31	0:00:15	24.6	33.4
2022-07-22 21:08:13	0:00:40	21.3	27.2
2022-07-22 21:09:18	0:00:09	20.1	22.5
2022-07-22 21:10:45	0:00:08	23.8	29.8
2022-07-22 21:11:53	0:00:08	29.2	34.2
2022-07-22 21:13:27	0:00:25	25.5	34.7
2022-07-22 21:19:19	0:00:17	20.7	25.0
2022-07-22 21:20:28	0:00:17	27.4	33.3
2022-07-22 21:25:09	0:00:45	23.0	32.0
2022-07-22 21:27:39	0:00:29	24.2	30.1
2022-07-22 21:28:10	0:00:06	23.2	30.3
2022-07-22 21:30:09	0:00:42	23.6	32.7
2022-07-22 21:38:16	0:00:45	22.8	31.3
2022-07-22 21:39:57	0:00:56	25.1	33.9
2022-07-22 21:43:24	0:00:38	23.8	30.0
2022-07-22 21:45:05	0:00:40	24.7	33.7
2022-07-22 21:52:19	0:00:21	16.9	18.7
2022-07-22 22:02:28	0:00:22	18.6	23.0
2022-07-22 22:04:21	0:00:30	20.4	29.7
2022-07-22 22:07:02	0:00:21	17.4	19.1
2022-07-22 22:08:31	0:00:20	26.5	32.4
2022-07-22 22:08:54	0:00:06	32.1	37.9
2022-07-22 22:11:12	0:00:11	21.0	27.2
2022-07-22 22:12:24	0:00:14	21.1	29.1

2022-07-22 22:13:50	0:00:38	25.4	32.4
2022-07-22 22:15:11	0:00:36	28.6	38.8
2022-07-22 22:24:08	0:00:18	20.1	24.1
2022-07-22 22:25:57	0:00:13	20.8	27.1
2022-07-22 22:28:02	0:00:25	24.4	33.2
2022-07-22 22:29:41	0:00:05	25.8	29.4
2022-07-22 22:49:48	0:00:49	21.7	32.2
2022-07-22 23:00:07	0:00:19	25.2	34.4
2022-07-22 23:28:35	0:01:19	20.2	29.1
2022-07-22 23:30:13	0:01:05	22.4	30.2
2022-07-22 23:33:47	0:00:18	21.4	28.2
2022-07-22 23:37:26	0:00:44	18.4	25.9
2022-07-22 23:40:12	0:00:34	17.1	20.3
2022-07-22 23:45:20	0:00:59	20.9	27.5
2022-07-23 00:05:23	0:00:15	24.4	28.9
2022-07-23 00:06:57	0:01:06	19.1	25.5
2022-07-23 00:10:03	0:00:58	17.6	27.7
2022-07-23 00:11:27	0:00:15	18.9	23.0
2022-07-23 00:29:11	0:00:55	21.7	32.1
2022-07-23 00:35:56	0:00:46	21.0	28.4
2022-07-23 00:50:59	0:01:17	19.7	27.5
2022-07-23 00:55:27	0:00:52	17.2	20.2
2022-07-23 01:18:12	0:00:55	22.2	28.6
2022-07-23 03:07:20	0:01:45	18.9	26.7
2022-07-23 03:57:25	0:01:20	22.7	33.0
2022-07-23 04:01:30	0:01:15	17.0	20.6
2022-07-23 04:18:41	0:00:05	30.8	35.9
2022-07-23 04:23:20	0:00:13	32.9	40.4
2022-07-23 04:35:23	0:00:31	23.0	34.6
2022-07-23 04:50:48	0:00:25	20.0	28.1
2022-07-23 05:31:45	0:00:32	17.0	19.3
2022-07-23 05:45:45	0:00:06	27.0	33.6
2022-07-23 05:47:43	0:00:48	21.9	28.0
2022-07-23 05:55:40	0:00:41	21.6	29.8
2022-07-23 06:01:07	0:01:08	23.2	30.6
2022-07-23 06:07:07	0:00:52	25.1	34.4
2022-07-23 06:12:18	0:01:00	22.1	28.1
2022-07-23 06:14:01	0:00:42	22.2	28.7
2022-07-23 06:17:09	0:01:39	21.4	29.5
2022-07-23 06:20:32	0:00:48	24.8	32.9
2022-07-23 06:22:12	0:00:39	24.4	33.6
2022-07-23 06:23:39	0:00:52	20.7	30.6
2022-07-23 06:26:19	0:00:48	22.2	33.9
2022-07-23 06:27:46	0:00:46	23.3	35.3
2022-07-23 06:29:21	0:00:22	25.2	31.0
2022-07-23 06:30:51	0:00:23	25.6	34.1
2022-07-23 06:32:07	0:00:45	23.3	30.7

2022-07-23 06:35:01	0:00:31	25.0	31.1
2022-07-23 06:37:21	0:00:48	25.0	33.2
2022-07-23 06:38:53	0:00:30	25.8	33.0
2022-07-23 06:40:17	0:00:31	25.5	34.5
2022-07-23 06:41:56	0:00:33	26.7	35.3
2022-07-23 06:43:07	0:00:40	22.2	28.6
2022-07-23 06:44:59	0:00:51	23.4	30.3
2022-07-23 06:48:10	0:00:53	21.7	28.2
2022-07-23 06:49:42	0:00:43	24.1	32.1
2022-07-23 06:51:07	0:00:43	25.4	34.3
2022-07-23 06:52:24	0:00:42	23.9	33.7
2022-07-23 06:53:52	0:00:38	24.7	32.3
2022-07-23 06:55:16	0:00:41	22.8	29.0
2022-07-23 06:56:42	0:00:31	20.3	26.0
2022-07-23 06:59:07	0:00:59	23.8	32.7
2022-07-23 07:02:24	0:00:30	24.8	31.5
2022-07-23 07:04:19	0:00:43	22.4	29.6
2022-07-23 07:05:32	0:00:26	29.0	38.7
2022-07-23 07:06:04	0:00:21	24.5	29.8
2022-07-23 07:06:44	0:00:52	22.8	29.2
2022-07-23 07:08:18	0:00:44	24.1	30.5
2022-07-23 07:09:35	0:00:50	25.9	36.2
2022-07-23 07:10:52	0:00:32	20.9	28.7
2022-07-23 07:12:12	0:00:54	23.3	43.5
2022-07-23 07:13:33	0:00:33	24.5	33.9
2022-07-23 07:14:39	0:00:38	23.9	33.1
2022-07-23 07:15:58	0:00:30	24.8	33.0
2022-07-23 07:18:15	0:00:19	23.7	30.8
2022-07-23 07:20:06	0:00:40	31.2	51.3
2022-07-23 07:21:49	0:00:26	23.6	31.2
2022-07-23 07:23:08	0:00:27	22.7	32.2
2022-07-23 07:24:37	0:00:23	25.2	31.3
2022-07-23 07:26:27	0:00:34	24.1	30.0
2022-07-23 07:27:46	0:00:09	25.5	29.8
2022-07-23 07:29:15	0:00:30	23.7	37.8
2022-07-23 07:30:48	0:00:51	26.2	34.8
2022-07-23 07:33:32	0:00:24	25.3	31.8
2022-07-23 07:34:48	0:00:16	25.4	34.3
2022-07-23 07:36:28	0:00:41	24.0	32.5
2022-07-23 07:38:16	0:00:37	20.3	27.8
2022-07-23 07:39:25	0:00:20	22.8	28.2
2022-07-23 07:39:50	0:00:43	23.7	34.4
2022-07-23 07:42:06	0:00:35	25.1	32.0
2022-07-23 07:42:43	0:00:31	26.9	40.8
2022-07-23 07:44:26	0:00:37	26.7	38.8
2022-07-23 07:45:58	0:00:38	26.4	36.6
2022-07-23 07:48:57	0:00:17	24.8	32.5

2022-07-23 07:51:59	0:00:33	20.4	26.5
2022-07-23 07:54:24	0:00:48	24.8	34.7
2022-07-23 07:56:42	0:00:59	24.6	32.7
2022-07-23 07:58:12	0:00:57	28.4	39.5
2022-07-23 08:00:37	0:01:02	24.5	32.1
2022-07-23 08:03:25	0:00:41	25.3	35.7
2022-07-23 08:05:23	0:00:44	25.3	33.3
2022-07-23 08:06:44	0:00:42	25.6	36.4
2022-07-23 08:07:38	0:00:23	23.6	29.3
2022-07-23 08:08:50	0:01:50	23.0	31.2
2022-07-23 08:12:55	0:01:20	24.7	37.3
2022-07-23 08:15:05	0:01:10	20.7	27.2
2022-07-23 08:27:00	0:01:15	23.5	31.0
2022-07-23 08:28:50	0:00:15	24.6	34.8
2022-07-23 08:30:25	0:02:35	23.8	35.5
2022-07-23 08:34:45	0:01:45	22.6	38.9
2022-07-23 08:39:40	0:01:20	23.3	31.4
2022-07-23 08:42:30	0:01:55	20.5	28.3
2022-07-23 08:51:25	0:00:30	23.7	29.3
2022-07-23 08:54:35	0:01:25	22.7	34.2
2022-07-23 08:57:55	0:01:10	20.0	28.9
2022-07-23 08:59:45	0:00:55	23.9	31.2
2022-07-23 09:01:05	0:00:55	23.0	30.4
2022-07-23 09:09:55	0:00:45	19.6	28.1
2022-07-23 09:13:55	0:00:25	26.3	35.4
2022-07-23 09:16:15	0:00:55	23.4	31.4
2022-07-23 09:17:44	0:00:41	20.8	27.5
2022-07-23 09:22:04	0:00:56	23.0	30.4
2022-07-23 09:24:04	0:01:42	23.8	34.9
2022-07-23 09:27:22	0:00:45	22.0	28.5
2022-07-23 09:29:54	0:00:42	25.9	36.7
2022-07-23 09:31:40	0:00:08	28.3	34.8
2022-07-23 09:38:33	0:00:48	24.2	33.5
2022-07-23 09:43:46	0:01:05	26.3	36.5
2022-07-23 09:46:46	0:00:42	26.5	34.7
2022-07-23 09:47:40	0:00:45	23.5	30.3
2022-07-23 09:49:15	0:01:30	25.7	36.9
2022-07-23 09:51:45	0:01:00	21.9	30.5
2022-07-23 09:54:20	0:00:50	19.2	27.8
2022-07-23 09:55:40	0:00:10	23.9	30.0
2022-07-23 09:57:15	0:00:45	27.0	40.7
2022-07-23 10:07:20	0:01:30	27.4	42.1
2022-07-23 10:11:50	0:01:25	22.5	35.4
2022-07-23 10:27:04	0:00:18	30.0	46.8
2022-07-23 10:30:58	0:00:40	26.3	35.9
2022-07-23 10:32:26	0:01:06	25.2	35.0
2022-07-23 10:37:30	0:00:20	23.8	31.1

2022-07-23 10:39:04	0:00:28	21.2	29.4
2022-07-23 10:43:11	0:00:13	24.4	32.5
2022-07-23 10:57:43	0:00:56	20.8	27.9
2022-07-23 10:59:25	0:00:55	25.1	34.8
2022-07-23 11:04:50	0:00:25	23.3	32.6
2022-07-23 11:06:20	0:01:05	22.5	30.5
2022-07-23 11:13:20	0:00:35	24.7	33.3
2022-07-23 11:14:40	0:00:25	22.4	29.4
2022-07-23 11:16:10	0:00:45	22.6	30.3
2022-07-23 11:18:55	0:00:25	25.8	39.8
2022-07-23 11:20:45	0:00:55	24.5	32.5
2022-07-23 11:22:05	0:00:45	26.1	38.2
2022-07-23 11:23:15	0:00:20	24.0	30.4
2022-07-23 11:28:10	0:01:20	24.4	31.3
2022-07-23 11:30:35	0:01:00	22.6	29.9
2022-07-23 11:32:10	0:00:25	21.4	27.7
2022-07-23 11:33:45	0:01:00	22.9	30.9
2022-07-23 11:36:00	0:00:55	27.5	38.2
2022-07-23 11:38:55	0:00:40	25.3	34.9
2022-07-23 11:42:00	0:01:05	25.2	34.6
2022-07-23 11:45:35	0:00:55	24.6	33.9
2022-07-23 11:47:30	0:00:50	21.7	28.4
2022-07-23 11:48:50	0:00:20	24.8	31.2
2022-07-23 11:50:20	0:00:35	27.4	34.4
2022-07-23 11:52:50	0:00:40	26.1	38.0
2022-07-23 11:55:45	0:00:50	26.0	34.9
2022-07-23 11:58:35	0:01:00	24.5	31.7
2022-07-23 12:01:30	0:01:05	25.6	34.3
2022-07-23 12:04:05	0:01:10	23.5	30.6
2022-07-23 12:12:00	0:01:00	25.7	35.0
2022-07-23 12:14:05	0:01:10	29.1	39.2
2022-07-23 12:16:30	0:01:20	27.8	37.1
2022-07-23 12:19:15	0:00:55	24.1	31.8
2022-07-23 12:20:45	0:01:25	25.9	33.9
2022-07-23 12:26:00	0:01:00	25.3	35.1
2022-07-23 12:29:35	0:01:40	24.1	35.1
2022-07-23 12:32:35	0:00:50	24.7	35.9
2022-07-23 12:37:30	0:01:35	24.2	36.2
2022-07-23 12:41:10	0:01:00	24.8	33.3
2022-07-23 12:42:35	0:00:50	26.0	36.5
2022-07-23 12:44:55	0:00:50	24.5	33.5
2022-07-23 12:48:05	0:01:05	22.0	32.8
2022-07-23 12:51:00	0:00:50	24.0	32.0
2022-07-23 12:58:27	0:00:35	31.2	40.9
2022-07-23 13:00:54	0:00:46	31.7	40.9
2022-07-23 13:03:15	0:01:10	24.5	34.2
2022-07-23 13:05:45	0:01:05	25.4	32.3

2022-07-23 13:07:55	0:01:10	19.6	26.0
2022-07-23 13:10:55	0:00:45	24.0	32.2
2022-07-23 13:13:05	0:01:05	31.4	45.1
2022-07-23 13:15:45	0:00:40	21.3	27.7
2022-07-23 13:17:45	0:00:40	28.4	42.2
2022-07-23 13:19:13	0:00:32	26.8	37.0
2022-07-23 13:21:35	0:00:40	23.6	32.4
2022-07-23 13:23:00	0:00:45	24.6	32.5
2022-07-23 13:26:15	0:00:50	22.6	30.4
2022-07-23 13:28:35	0:00:40	23.3	31.5
2022-07-23 13:33:40	0:01:00	24.3	33.2
2022-07-23 13:36:50	0:00:45	25.4	36.3
2022-07-23 13:38:20	0:00:40	24.9	32.3
2022-07-23 13:43:05	0:01:05	27.7	40.3
2022-07-23 13:45:00	0:00:40	20.3	30.2
2022-07-23 13:49:45	0:01:05	23.6	32.6
2022-07-23 13:52:55	0:00:50	24.8	34.2
2022-07-23 13:54:20	0:01:00	24.7	35.0
2022-07-23 13:58:10	0:01:00	22.1	32.8
2022-07-23 14:01:15	0:01:00	20.6	28.8
2022-07-23 14:04:25	0:01:00	21.2	33.3
2022-07-23 14:07:17	0:00:41	30.7	39.0
2022-07-23 14:08:55	0:00:50	26.2	36.4
2022-07-23 14:12:50	0:01:15	24.1	35.8
2022-07-23 14:15:45	0:00:40	24.8	34.9
2022-07-23 14:17:10	0:00:35	21.1	30.0
2022-07-23 14:18:35	0:00:40	23.6	32.5
2022-07-23 14:22:10	0:00:50	27.5	43.5
2022-07-23 14:23:40	0:00:50	26.4	33.8
2022-07-23 14:26:05	0:00:45	24.5	35.4
2022-07-23 14:27:30	0:00:55	22.2	30.0
2022-07-23 14:29:05	0:00:45	24.9	33.7
2022-07-23 14:30:40	0:00:35	27.2	36.7
2022-07-23 14:32:00	0:00:40	24.2	34.9
2022-07-23 14:33:30	0:01:15	21.5	30.6
2022-07-23 14:37:15	0:00:40	22.4	30.1
2022-07-23 14:39:15	0:00:55	23.8	35.3
2022-07-23 14:41:20	0:00:50	23.5	35.5
2022-07-23 14:43:55	0:00:45	23.1	32.5
2022-07-23 14:47:25	0:01:25	25.4	36.9
2022-07-23 14:51:50	0:00:55	26.0	36.2
2022-07-23 14:57:05	0:00:25	20.1	24.3
2022-07-23 14:59:30	0:00:40	25.9	35.5

The entire survey data is too large to append to this report. However, the full survey data set can be downloaded at the following link: https://www.iacoustics.net/house2_noisedata/

4. Appendix I – Equipment Calibration Certificates

4.1 Outdoor Meter

CERTIFICATE OF CALIBRATION

ISSUED BY	Gracey & Associates	BSI CERTIFICATE	FS 25913
DATE OF ISSUE	26 November 2021	CERTIFICATE NUMBER	2021-1139
DATE OF CALIBRATION	25 November 2021		
CALIBRATION INTERVAL	24 months	PAGE 1 OF 1	

Gracey & Associates
Barn Court Shelton Road
Upper Dean PE28 0NQ
Tel: 01234 708835
www.gracey.co.uk

TEST ENGINEER
Jamie Bishop

APPROVING SIGNATORY
Greg Rice

Equipment **NTi XL2, s/n: a2a-06528-e0**
Description Acoustic Analyser, NTi Audio

Customer iAcoustics
Unit A16, Kingswood Business Park, Clondalkin, Dublin, D22 A990

Standards
BS EN 61672

Conditions

Atmospheric Pressure	101.0 kPa
Temperature	22.0 °C
Relative Humidity	34.5 %

Calibration Reference Sources

Equipment	S/N	Last Cal	Equipment	S/N	Last Cal
Druck DPI 141	479	06-Aug-20	HP 34401	3146A16728	30-Mar-21
Vaisala HMP23	S2430007	03-Aug-20			

Notes

We certify that the above product was duly tested and found to be within the specification at the points measured (except where indicated). Measurements are traceable to reference sources calibrated to National Standards. Where no national or international standards exist, traceability is to standards maintained by the manufacturer. Our Quality Management System has been assessed to comply with BS EN ISO 9001:2015 - BSI Certificate number FS 25913. Tests were carried out in environmental conditions controlled to the extent appropriate to the instrument's specification. All relevant test certificates are available for inspection.
The uncertainties are for a confidence probability of not less than 95%.

Gracey & Associates is the trading name of W T Gracey Ltd. Registered in Upper Dean England No 1176412. Est. 1972
Hire and calibration of noise and vibration instruments under a BSI ISO 9001 quality management system, Cert No. FS 25913.

4.2 Indoor Meter

CERTIFICATE OF CALIBRATION

ISSUED BY	Gracey & Associates	BSI CERTIFICATE	FS 25913
DATE OF ISSUE	19 February 2021	CERTIFICATE NUMBER	2021-0302
DATE OF CALIBRATION	19 February 2021		
CALIBRATION INTERVAL	24 months		PAGE 1 OF 1

Gracey & Associates
Barn Court Shelton Road
Upper Dean PE28 0NQ
Tel: 01234 708835
Fax: 01234 252332
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TEST ENGINEER: Greg Rice

APPROVING SIGNATORY: Greg Rice

Equipment: **NTi XL2, s/n: a2a-12398-e0**

Description: Hand Held Acoustic Analyser - Class 1, NTi Audio

Customer: iAcoustics
Unit A16, Kingswood Business Park, Clondalkin, D22 A990

Standards
IEC 61672 Class 1

Conditions

Atmospheric Pressure	99.9 kPa
Temperature	24.8 °C
Relative Humidity	34.6 %

Calibration Reference Sources

Equipment	S/N	Last Cal	Equipment	S/N	Last Cal
Druck DPI 141	479	06-Aug-20	HP 34401	3146A29376	11-Feb-20
Vaisala HMP23	S2430007	03-Aug-20			

Notes

We certify that the above product was duly tested and found to be within the specification at the points measured (except where indicated). Measurements are traceable to reference sources calibrated to National Standards. Where no national or international standards exist, traceability is to standards maintained by the manufacturer. Our Quality Management System has been assessed to comply with BS EN ISO 9001:2015 - BSI Certificate number FS 25913. Tests were carried out in environmental conditions controlled to the extent appropriate to the instrument's specification. All relevant test certificates are available for inspection.
The uncertainties are for a confidence probability of not less than 95%.

Gracey & Associates is the trading name of W T Gracey Ltd. Registered in Upper Dean England No 1176412. Est. 1972
Hire and calibration of noise and vibration instruments under a BSI ISO 9001 quality management system, Cert No. FS 25913.

4.3 Outdoor Microphone / Preamplifier

Manufacturer Calibration Certificate

The following instrument has been tested and calibrated to the manufacturer specifications.
The calibration is traceable in accordance with ISO/IEC 17025 covering all instrument functions.

- Device Type: **M2230** **Measurement Microphone**
  consisting of
  PreAmp Serial Number: **6471**
  Capsule Serial Number: **A22043**

- Customer: **Integrated Acoustic Solution**
  Kingwood Business Park
  Baldonell, Dublin
  Ireland

- Date of Calibration: **08 March 2022**

- Certificate Number: **44628-A22043-M2230**

- Results: **PASSED**
  (for detailed report see next page)

Tested by: B.Dohmen

Signature:

Stamp:

NTi Audio GmbH
Frielingsdorfweg 4
45239 Essen
info@nti-audio.de
+49 (0)201 6470 1900

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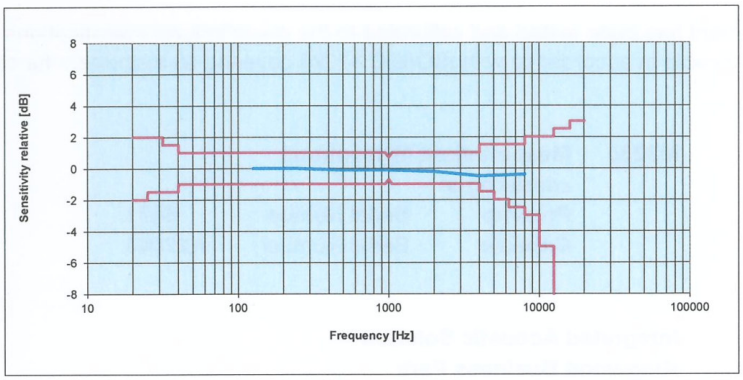
Date: 08 March 2022
Calibration of: M2230 consisting of
PreAmp Serial Number: 6471
Capsule Serial Number: A22043

- Peformance on receipt: **defect**

- Detailed Calibration Test Results:

				calibration uncertainty[1]
System calibration		before	actual	
Sensitivity @ 1 kHz, 114 dBSPL		41,4 mv/Pa	**45,2 mV/Pa**	±2.85%
Frequency response		Class 1	acc. IEC 61672	



- Test Conditions:

Temperature:	**23,9 °C**	±0.5 °C
Relative Humidity:	**27,4%**	±2%
Air Pressure:	**1008,9 hPa**	±0.25 kPa

- Calibration Equipment Used:

  - MTG Sound Calibrator, Type 4000, S/No. 32519
    Last Calibration: 09.09.2021, Next Calibration: 09.09.2022
    Kalibrierschein D-K-15008-01-00 2021-09
  - NTi Audio Microphone M2230, S/No. 10485
    Last Calibration: 21.12.2021, Next Calibration: 21.12.2022
    Calibrated by NTi Audio meeting product specifications
  - NTi Audio Flexus FX 100, SN 11347
    Last Calibration: 03.09.2021, Next Calibration: 03.09.2022
    Calibrated by NTi Audio meeting product specifications
  - NTi Audio XL2, S/No. A2A-14907-E0

[1] The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with the regulations of the GUM.

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www.nti-audio.de • info@nti-audio.de

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4.4 Indoor Microphone / Preamplifier

CERTIFICATE OF CALIBRATION

ISSUED BY	Gracey & Associates	BSI CERTIFICATE	FS 25913
DATE OF ISSUE	19 February 2021	CERTIFICATE NUMBER	2021-0303
DATE OF CALIBRATION	19 February 2021		
CALIBRATION INTERVAL	24 months		PAGE 1 OF 2

Gracey & Associates
Barn Court Shelton Road
Upper Dean PE28 0NQ
Tel: 01234 708835
Fax: 01234 252332
www.gracey.com

TEST ENGINEER	APPROVING SIGNATORY
Greg Rice	Greg Rice

Equipment	**NTi MC230, s/n: A14300**
Description	Microphone - 1/2" FF 48V, NTi Audio
Customer	iAcoustics Unit A16, Kingswood Business Park, Clondalkin, D22 A990

Standards
BS EN 61672 Class 1

Conditions

Atmospheric Pressure	99.9 kPa
Temperature	24.8 °C
Relative Humidity	34.6 %

Calibration Data

Sensitivity -27.44 dB

Calibration Reference Sources

Equipment	S/N	Last Cal	Equipment	S/N	Last Cal
B&K 4134 L	1675305	14-Jul-20	Druck DPI 141	479	06-Aug-20
HP 34401	3146A29376	11-Feb-20	Nor 1253	20848	14-Jul-20
Stanford DS36	33213	17-Aug-20	Vaisala HMP23	S2430007	03-Aug-20

Notes

We certify that the above product was duly tested and found to be within the specification at the points measured (except where indicated). Measurements are traceable to reference sources calibrated to National Standards. Where no national or international standards exist, traceability is to standards maintained by the manufacturer. Our Quality Management System has been assessed to comply with BS EN ISO 9001:2015 - BSI Certificate number FS 25913. Tests were carried out in environmental conditions controlled to the extent appropriate to the instrument's specification. All relevant test certificates are available for inspection.
The uncertainties are for a confidence probability of not less than 95%.

Gracey & Associates is the trading name of W T Gracey Ltd. Registered in Upper Dean England No 1176412. Est. 1972
Hire and calibration of noise and vibration instruments under a BSI ISO 9001 quality management system, Cert No. FS 25913.

CERTIFICATE OF CONFORMANCE

ISSUED BY	Gracey & Associates	BSI CERTIFICATE	FS 25913
DATE OF ISSUE	19 February 2021	CERTIFICATE NUMBER	2021-0304
DATE OF CALIBRATION	19 February 2021		
CALIBRATION INTERVAL	24 months	PAGE 1 OF 1	

Gracey & Associates
Barn Court Shelton Road
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Fax: 01234 252332
www.gracey.com

TEST ENGINEER
Greg Rice

APPROVING SIGNATORY
Greg Rice

Equipment: **NTi MA220, s/n: 6337**
Description: Preamplifier - XL2, NTi Audio

Customer: iAcoustics
Unit A16, Kingswood Business Park, Clondalkin, D22 A990

Standards
Manufacturer's Original Specifications

Conditions

Atmospheric Pressure	99.9 kPa
Temperature	24.8 °C
Relative Humidity	34.6 %

Calibration Reference Sources

Equipment	S/N	Last Cal	Equipment	S/N	Last Cal
Druck DPI 141	479	06-Aug-20	HP 34401	3146A29376	11-Feb-20
Vaisala HMP23	S2430007	03-Aug-20			

Notes

We certify that the above product was duly tested and found to be within the specification at the points measured (except where indicated). Measurements are traceable to reference sources calibrated to National Standards. Where no national or international standards exist, traceability is to standards maintained by the manufacturer. Our Quality Management System has been assessed to comply with BS EN ISO 9001:2015 - BSI Certificate number FS 25913. Tests were carried out in environmental conditions controlled to the extent appropriate to the instrument's specification. All relevant test certificates are available for inspection.
The uncertainties are for a confidence probability of not less than 95%.

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Hire and calibration of noise and vibration instruments under a BSI ISO 9001 quality management system, Cert No. FS 25913.

4.5 Calibrator

Unit 2, Goldenbridge Industrial Estate, Tyrconnell Rd, Inchicore, Dublin, D08 YY38
www.sonitussystems.com Email: info@sonitussystems.com

SONITUS SYSTEMS

Calibration Report

Equipment Information

Model: CAL01
Serial Number: 11756

Ambient Conditions

Measurement conditions were within the tolerances defined in BS EN 60942.

Barometric Pressure: 1030 hPa
Temperature: 21.0 °C
Relative Humidity: 49 %

Results

Calibrator Setting	Measured Parameter	Measured Value	Tolerance +/-	Uncertainty +/-
94 dB, 1kHz	Sound pressure level (dB)	94.26	0.4 dB	0.14 dB
	Frequency (Hz)	1000.06	10 Hz	0.25 Hz
	Distortion (%)	0.20	3.0 %	0.3 %
114 dB, 1kHz	Sound pressure level (dB)	114.20	0.4 dB	0.14 dB
	Frequency (Hz)	1000.06	10 Hz	0.25 Hz
	Distortion (%)	0.35	3.0 %	0.3 %

RESULT: PASS

As public evidence was available, from a testing organization responsible for approving the results of pattern evaluation tests, to demonstrate that the model of sound calibrator fully conformed to the requirements for pattern evaluation described in Annex A of IEC 60942:2003, the sound calibrator tested is considered to conform to all the Class 1 requirements of IEC 60942:2003

The manufacturers guidelines concerning free-field correction should be obvserved when using the calibrator.

Notes
1. All measurements were made with the half-inch configuration of the calibrator in place.
2. The measurement uncertainty is reported as a standard uncertainty multiplied by a coverage factor k=2 which, for a normal probabbility distribution, corresponds to a coverage probability of approximately 95%.
3. The given uncertainty corresponds to measured values only and does not relate to the long term stability of the device under test.
4. The user manual for the device under test was obtained from the manufacturer's website.

DA315.2 Acoustic Calibrator Calibration Certificate 2

5. Appendix II – Noise Monitor Photographs

6. Appendix III – Daytime Noise Monitoring Survey, October 17th, 2022

iAcoustics were engaged to carry out a second noise monitoring survey for the measurement of air traffic noise at the home of Pearse Sutton, Ballystrahan, St. Margaret's, Co. Dublin, K67 KN88.

Unattended noise monitoring was carried out for approximately 8 hours, between 08:30 on 17th October 2022 and 16:00 on 17th October 2022. The survey was carried out following the launch of the new North Runway (10L/28R) at Dublin Airport. Following a review of the audio recordings captured during the survey, air traffic was observed to be the dominant noise source.

The instrumentation employed and the methodology implemented exactly matched that of the original noise survey on the 22nd July 2022. In this instance, an outdoor monitor was established only.

On the morning of the survey at the dwelling location, with a hand-held Pro Anemometer (HP-866B), temperatures were measured at 12 degrees Celsius. Wind speeds were measured to be less than 7 meters per second. According to the Met Eireann data from the Casement weather station, temperatures ranged from 5 degrees Celsius to 15 degrees Celsius over the survey period. Wind speeds ranged from 4 knots (2 m/s) to 25 knots (13 m/s) over the survey period. The predominant wind direction on 17th October was 220 degrees (Southwest). No rain fell during the survey.

The entire survey data is too large to append to this report. However, the full survey data set can be downloaded at the following link: https://www.iacoustics.net/pearse_outdoors_october2022/

The following table provides a summary of the Daytime levels. Table 7 presents the noise levels captured between the hours of 09:00 – 13:00 on the 17th October 2022. All detected air traffic noise events and their respective measurements are listed in Table 8. Each individual event was auditioned and verified as air traffic noise.

Table 6: Survey 2, Outdoor Daytime Levels

Outdoors	
Period	Result
Daytime	66 dB $L_{Aeq,8hrs}$

Table 7: Outdoor Levels, 9am - 1pm

Outdoors			
Time	Duration	L_{Aeq}	L_{AFmax}
2022-10-17 09:00:00	04:00:00	68 dB	94 dB

Table 8: Survey 2, Individual Air Traffic Noise Events, Outdoors

Individual Air Traffic Noise Event Levels, Outdoors			
Time	Duration	LAeq	LAFmax
2022-10-17 08:35:15	0:00:29	63.2	66.4
2022-10-17 08:48:35	0:00:21	62.8	65.9
2022-10-17 09:00:52	0:00:38	61.3	67.6
2022-10-17 09:03:48	0:00:35	73.2	81.1
2022-10-17 09:06:59	0:00:29	75.5	85.4
2022-10-17 09:11:05	0:00:33	74.6	86.0
2022-10-17 09:12:48	0:00:35	71.8	81.7
2022-10-17 09:25:45	0:01:50	64.7	75.6
2022-10-17 09:29:16	0:00:38	77.1	85.9
2022-10-17 09:33:38	0:00:28	72.7	84.3
2022-10-17 09:36:24	0:00:36	71.5	79.6
2022-10-17 09:38:56	0:00:43	75.4	87.8
2022-10-17 09:40:53	0:00:37	73.5	83.1
2022-10-17 09:46:31	0:00:27	72.8	80.7
2022-10-17 09:48:53	0:00:35	76.3	88.3
2022-10-17 09:52:35	0:00:27	75.3	84.4
2022-10-17 09:59:11	0:00:45	66.6	74.7
2022-10-17 10:03:08	0:00:30	68.2	78.1
2022-10-17 10:04:53	0:00:43	74.4	84.5
2022-10-17 10:10:26	0:00:23	68.5	74.7
2022-10-17 10:12:02	0:00:39	67.1	73.4
2022-10-17 10:17:58	0:00:40	73.6	82.3
2022-10-17 10:19:26	0:00:49	73.1	83.2
2022-10-17 10:22:09	0:00:36	65.5	73.5
2022-10-17 10:23:52	0:00:45	68.8	81.9
2022-10-17 10:25:35	0:00:36	68.4	77.1
2022-10-17 10:27:31	0:00:20	67.4	73.4
2022-10-17 10:29:05	0:00:50	72.7	81.3
2022-10-17 10:31:04	0:00:28	74.1	82.4
2022-10-17 10:40:18	0:00:42	71.7	80.5
2022-10-17 10:42:16	0:00:26	71.5	77.2
2022-10-17 10:44:08	0:00:41	67.2	76.6
2022-10-17 10:47:47	0:00:43	74.7	85.0
2022-10-17 10:49:32	0:00:33	66.9	73.7
2022-10-17 10:59:12	0:00:32	68.8	79.5
2022-10-17 11:00:54	0:01:00	73.3	84.3
2022-10-17 11:03:53	0:00:52	71.3	82.2
2022-10-17 11:05:42	0:00:30	74.3	86.6
2022-10-17 11:17:41	0:00:23	65.8	72.2
2022-10-17 11:20:47	0:00:38	72.0	81.2
2022-10-17 11:24:44	0:00:50	66.3	75.3
2022-10-17 11:29:07	0:00:48	70.2	80.9
2022-10-17 11:30:56	0:00:39	68.1	76.0
2022-10-17 11:32:38	0:00:57	79.2	90.7

2022-10-17 11:37:38	0:00:24	68.2	76.5
2022-10-17 11:39:36	0:00:45	80.2	90.3
2022-10-17 11:42:02	0:00:43	75.0	85.0
2022-10-17 11:45:55	0:01:02	73.1	84.3
2022-10-17 11:47:48	0:00:29	71.4	80.4
2022-10-17 11:49:22	0:00:59	73.7	84.0
2022-10-17 11:50:35	0:01:07	71.4	83.1
2022-10-17 11:52:45	0:00:36	76.4	85.5
2022-10-17 11:55:19	0:00:47	82.3	92.9
2022-10-17 12:01:09	0:00:50	73.2	83.0
2022-10-17 12:03:09	0:00:33	71.3	79.7
2022-10-17 12:08:29	0:00:58	73.9	87.1
2022-10-17 12:10:26	0:00:26	71.6	82.7
2022-10-17 12:12:16	0:00:27	65.1	73.5
2022-10-17 12:13:51	0:00:35	74.6	85.1
2022-10-17 12:15:38	0:00:59	75.1	87.3
2022-10-17 12:17:51	0:00:42	83.1	93.6
2022-10-17 12:21:51	0:00:38	70.0	77.5
2022-10-17 12:24:08	0:00:35	77.1	86.9
2022-10-17 12:26:48	0:00:31	71.7	80.5
2022-10-17 12:29:32	0:00:33	71.8	81.1
2022-10-17 12:31:18	0:00:38	75.0	86.0
2022-10-17 12:35:59	0:00:33	70.9	78.5
2022-10-17 12:43:29	0:00:38	74.1	83.6
2022-10-17 12:45:35	0:00:30	74.8	82.2
2022-10-17 12:49:01	0:00:24	64.5	66.5
2022-10-17 12:51:39	0:00:25	71.6	81.1
2022-10-17 12:53:20	0:00:40	63.9	74.3
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2022-10-17 13:14:25	0:00:50	58.7	65.2
2022-10-17 14:12:45	0:00:40	65.4	71.3
2022-10-17 14:48:07	0:00:22	66.9	73.8
2022-10-17 15:16:20	0:00:50	64.2	74.4
2022-10-17 15:22:28	0:00:33	65.9	74.4
2022-10-17 15:26:10	0:00:38	61.3	69.1
2022-10-17 15:29:15	0:00:35	61.2	64.4
2022-10-17 15:32:06	0:00:39	57.7	64.3
2022-10-17 15:35:24	0:00:40	63.4	68.7
2022-10-17 15:36:59	0:00:45	61.5	67.5
2022-10-17 15:40:08	0:00:31	59.3	63.5
2022-10-17 15:43:23	0:00:27	60.0	66.2
2022-10-17 15:51:44	0:00:32	59.0	64.7
2022-10-17 15:54:29	0:00:22	67.5	75.9

2022-10-17 08:35:15	0:00:29	63.2	66.4
2022-10-17 08:48:35	0:00:21	62.8	65.9
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2022-10-17 11:52:45	0:00:36	76.4	85.5
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2022-10-17 15:22:28	0:00:33	65.9	74.4
2022-10-17 15:26:10	0:00:38	61.3	69.1
2022-10-17 15:29:15	0:00:35	61.2	64.4
2022-10-17 15:32:06	0:00:39	57.7	64.3
2022-10-17 15:35:24	0:00:40	63.4	68.7
2022-10-17 15:36:59	0:00:45	61.5	67.5
2022-10-17 15:40:08	0:00:31	59.3	63.5
2022-10-17 15:43:23	0:00:27	60.0	66.2
2022-10-17 15:51:44	0:00:32	59.0	64.7
2022-10-17 15:54:29	0:00:22	67.5	75.9

Appendix E

iAcoustics
INTEGRATED ACOUSTIC SOLUTIONS

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Air Traffic Noise Monitoring

iAcoustics

Project:	Pearse Sutton, Ballystrahan, St. Margaret's, Co. Dublin
Author:	Luke Coffey
Title:	Air Traffic Noise Monitoring
Reference Code:	J2026
Version Number:	1

Revision Tracker

Version	Date issued	Revision by	Reviewed by	Section(s) affected
1	06/12/22	Luke Coffey		

Table Of Contents

1 Introduction

iAcoustics were engaged to carry out noise monitoring for the measurement of air traffic noise at the home of Pearse Sutton, Ballystrahan, St. Margaret's, Co. Dublin, K67 KN88. This dwelling location in relation to Dublin Airport is indicated in Figure 1 with a yellow dot. There is an approximate distance of 1.2 kilometres between the dwelling and the closest runway.

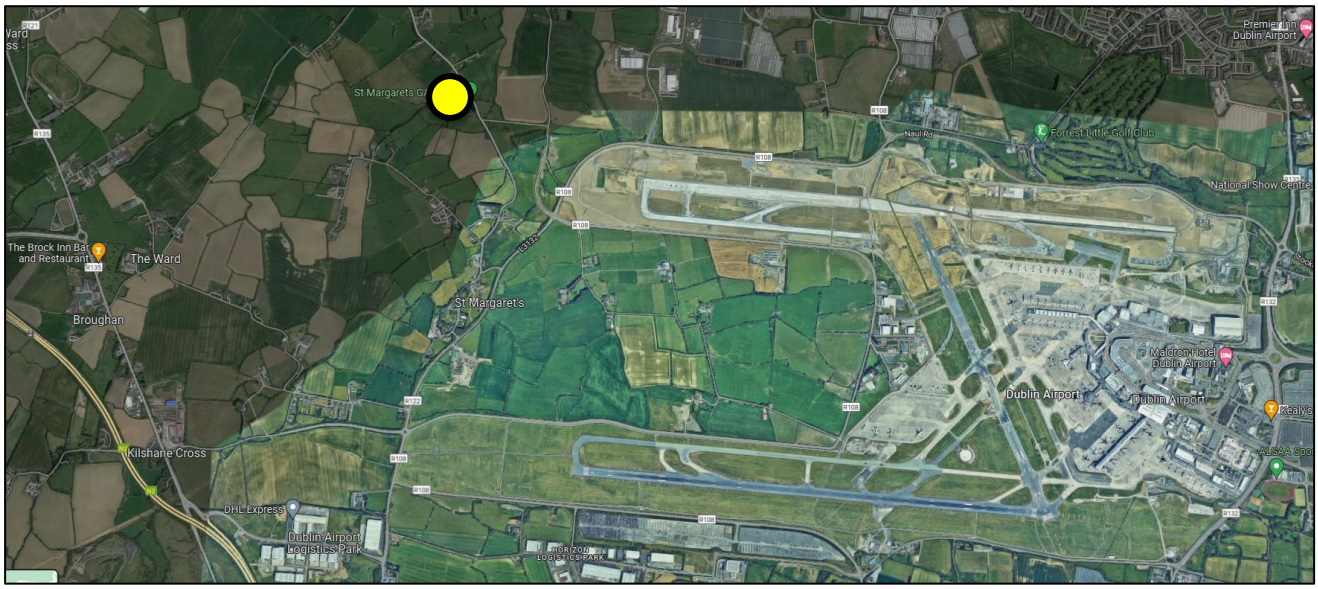


Figure 1: Dwelling Location

Unattended noise monitoring was carried out for approximately 6 hours, between 08.10am 15.05pm on 2nd of December 2022. The survey was carried after the launch of the new North Runway (10L/28R) at Dublin Airport. Following a review of the audio recordings captured during the survey, air traffic was observed to be the dominant noise source.

1.1 Terminology

A-weighted	Measurements that correlate well with the perceived noise level.
Background Noise (L90):	The in-situ, or ambient level of noise in the environment
Competent Person:	Someone with appropriate training, qualifications, experience, and skill. The person will normally have a diploma or degree in acoustics or a related subject.
Decibel (dB):	The decibel is used as a measure of acoustic units.
dB(A):	A single-figure rating to a sound, which represents the human-ear frequency response.
Frequency (Hz):	The number of sound waves to pass a point in one second. Correlated to the perceived pitch of a sound.
LAeq:	Commonly regarded as the A-weighted "average" noise level over a period of time.
LAFmax:	A-weighted, maximum, sound level measured with a fast time-constant - maximum is not peak.
Lday:	The A-weighted, Leq (equivalent noise level), over the 16-hour day period (07:00-23:00), also known as the day noise indicator.
Ldn:	The day-night noise level, the LAeq (equivalent noise level) over a 24 hour period, also known as the day night indicator.
Leq:	The linear (not A-weighted) equivalent continuous sound pressure level.
Lnight	The A-weighted, Leq (equivalent noise level) over the 8 hour night period of 23:00 to 07:00 hours, also known as the night noise indicator.
Noise intrusion:	Noise from external noise sources.
Octave bands:	A convenient division of the frequency scale, identified by their centre frequency. Typically, 63, 125, 250, 500, 1000, 2000, 4000, 8000 Hz.

2 Methodology

2.1 Test Equipment

Measurements were captured during the operation of the new North runway. All measurements were taken with calibrated precision grade, Type Approved (Class 1) sound level meters as per IEC 61672-1:2013. All equipment has calibration certificates traceable to the relevant standard. Measurements were captured in line with ISO 1996-1:2016 Acoustics — Description, measurement and assessment of environmental noise — Part 1: Basic quantities and assessment procedures.

Table 1: Measurement Equipment

Type	Make & Model	Serial No.
Sound Level Meter Outdoors	NTI XL2	A2A-06528-E0
Sound Level Meter Indoors	NTI XL2	A2A-12398-E0
Microphone / Preamp Outdoors	NTI M2230 / MA220	A22043 / 6471
Microphone / Preamp Indoors	NTI M2230 / MA220	A14300 / 6337
Calibrator	01dB CAL 01	11756

Two monitors were deployed for the survey period – one monitor outdoors and the other indoors.

The outdoor monitor was positioned on grass, 2 meters above ground, away from any reflective surfaces. The topography and surrounding areas were predominantly flat. An all-weather kit was employed on the monitor to ensure the wind did not interfere with the accuracy of the measurement microphone.

The indoor monitor was positioned in a bedroom on the first floor. All windows were closed. The façade-located wall vent was open to provide normal levels of ventilation. The indoor monitor was positioned 1.5 meters above the floor in the centre of the room.

Photographs of each monitor are presented in the appendix of this report. The meters were calibrated before and after the survey to ensure no drift in the measurement accuracy. Weather conditions were calm for the duration of the survey. On the morning of the survey at the dwelling location, with a hand-held Pro Anemometer (HP-866B), temperatures were measured at 13.1 degrees Celsius. Wind speeds were measured to be less than 1 meter per second. There was relatively little cloud cover. According to the Met Eireann data from the Casement weather station, temperatures ranged from 4.2 degrees Celsius to 10.7 degrees Celsius over the survey period. The mean wind speed was 4.1 knots. The predominant wind direction 160 degrees ranging to 90 degree over the survey period.

Figure 2 indicates the meter positions. The red circle indicates the outdoor monitoring position. The blue circle is positioned over the bedroom in which the indoor monitor was located.

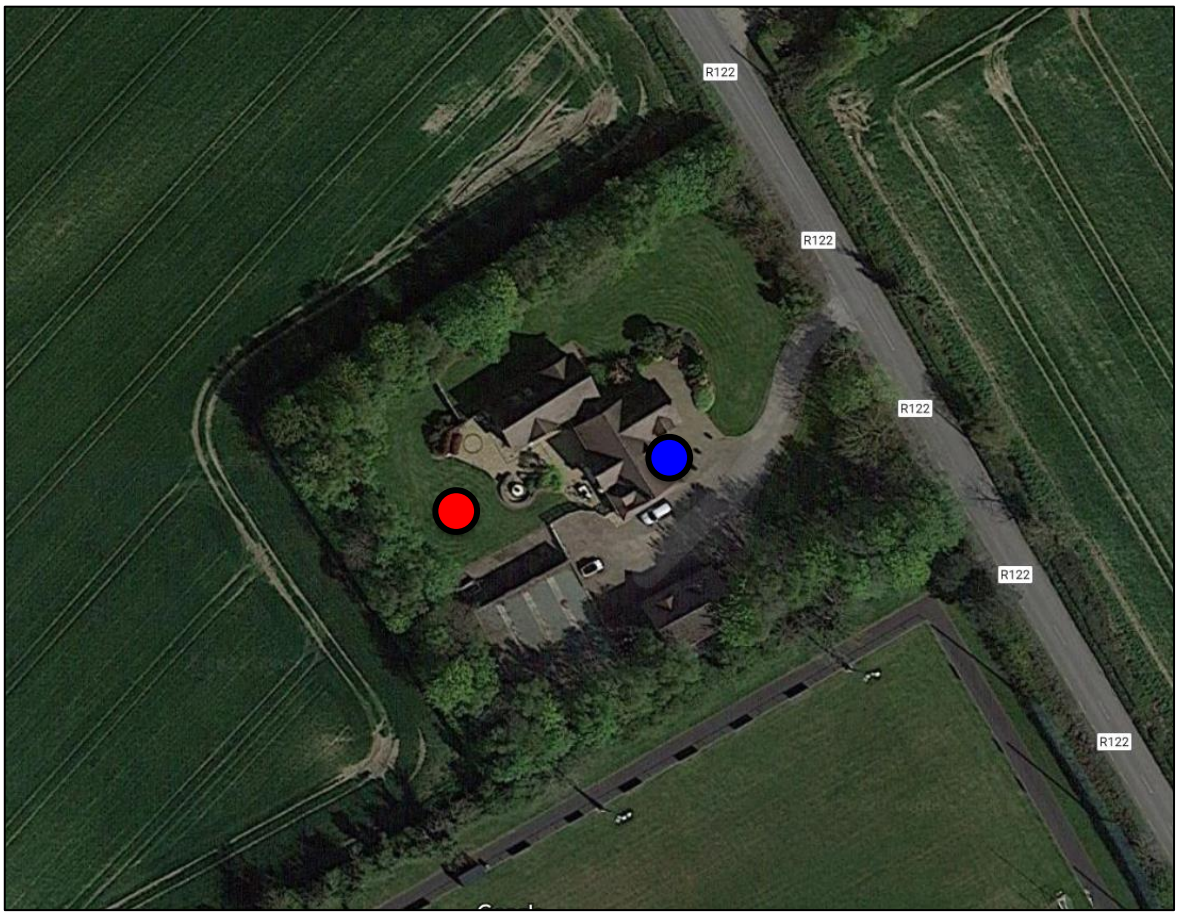


Figure 2: Monitoring Locations

Both meters were set to report on spectral data in one-third octaves at one-minute intervals. Each meter also logged noise levels every second. Audio recordings were captured so air traffic noise events could be identified, and the air traffic measurements dissociated from other potential noise occurrences.

3 Results

All detected air traffic noise events and associated levels are presented in Table 2 and Table 3. Each individual event from Table 2 and Table 3 were auditioned and verified as air traffic noise.

3.1 Outdoor Meter Results

Table 2: Individual Identified Air Traffic Noise Events and Associated Levels

Individual Air Traffic Noise Event Levels, Outdoors			
Start	Duration	LAeq [dB]	LAFmax [dB]
2022-12-02 08:58:38	0:00:40	74.9	83.0
2022-12-02 09:00:27	0:00:42	74.9	83.2
2022-12-02 09:04:56	0:00:39	75.2	83.5
2022-12-02 09:07:08	0:00:45	76.1	84.8
2022-12-02 09:09:16	0:00:33	70.2	77.1
2022-12-02 09:10:58	0:00:51	76.9	86.4
2022-12-02 09:15:29	0:00:42	74.3	82.6
2022-12-02 09:17:18	0:00:44	73.4	81.8
2022-12-02 09:20:31	0:00:31	71.3	77.8
2022-12-02 09:24:22	0:00:42	70.9	79.0
2022-12-02 09:29:36	0:00:33	71.8	79.2
2022-12-02 09:33:30	0:00:35	64.8	70.7
2022-12-02 09:37:04	0:00:34	65.5	71.0
2022-12-02 09:38:55	0:00:40	73.8	82.1
2022-12-02 09:40:42	0:00:35	69.7	78.2
2022-12-02 09:42:18	0:00:50	77.0	86.2

2022-12-02 09:43:52	0:00:37	73.1	81.3
2022-12-02 09:47:18	0:00:48	72.0	80.9
2022-12-02 09:48:56	0:00:37	74.5	82.5
2022-12-02 09:50:41	0:00:41	71.4	79.1
2022-12-02 10:10:46	0:00:43	74.3	82.3
2022-12-02 10:14:52	0:00:30	69.9	76.5
2022-12-02 10:16:53	0:00:31	65.1	71.7
2022-12-02 10:20:12	0:00:43	74.0	81.6
2022-12-02 10:27:08	0:00:48	75.2	83.9
2022-12-02 10:28:42	0:00:45	66.1	76.8
2022-12-02 10:34:21	0:00:32	66.2	72.3
2022-12-02 10:40:26	0:00:30	65.2	72.2
2022-12-02 10:43:37	0:00:32	68.6	75.1
2022-12-02 10:47:15	0:00:30	68.6	76.7
2022-12-02 10:51:43	0:00:39	69.9	76.4
2022-12-02 10:55:03	0:00:35	64.0	68.8
2022-12-02 11:01:44	0:00:34	78.7	86.8
2022-12-02 11:07:06	0:00:32	70.7	80.1
2022-12-02 11:11:47	0:00:45	72.6	79.9
2022-12-02 11:22:52	0:00:40	75.2	83.0
2022-12-02 11:24:16	0:00:46	74.3	82.9
2022-12-02 11:25:46	0:00:48	78.4	87.4
2022-12-02 11:28:08	0:00:43	74.8	82.1
2022-12-02 11:29:47	0:00:37	75.3	82.1

2022-12-02 11:32:27	0:00:56	71.2	81.1
2022-12-02 11:34:19	0:00:42	72.6	81.3
2022-12-02 11:35:55	0:00:30	71.5	79.3
2022-12-02 11:37:32	0:00:31	65.4	71.4
2022-12-02 11:41:14	0:00:45	72.9	80.9
2022-12-02 11:42:43	0:00:43	73.3	83.1
2022-12-02 11:44:15	0:00:30	71.0	77.4
2022-12-02 11:45:41	0:00:53	78.2	87.9
2022-12-02 11:47:40	0:00:46	77.3	86.6
2022-12-02 11:50:00	0:00:41	73.2	80.6
2022-12-02 11:53:18	0:00:48	76.3	85.6
2022-12-02 11:56:14	0:00:45	75.1	84.1
2022-12-02 12:03:00	0:00:34	74.2	80.4
2022-12-02 12:04:30	0:00:42	73.2	81.1
2022-12-02 12:05:58	0:00:57	74.2	84.0
2022-12-02 12:13:18	0:00:47	76.1	84.4
2022-12-02 12:18:49	0:00:30	75.6	82.3
2022-12-02 12:20:27	0:00:44	74.9	83.2
2022-12-02 12:27:48	0:00:31	71.5	82.0
2022-12-02 12:29:21	0:00:32	69.5	76.9
2022-12-02 12:37:12	0:00:47	73.7	81.3
2022-12-02 12:38:52	0:00:32	69.6	77.2
2022-12-02 12:40:32	0:00:36	63.5	67.9
2022-12-02 12:43:51	0:00:27	70.3	79.1

2022-12-02 12:45:34	0:00:34	72.5	79.3
2022-12-02 12:47:09	0:00:40	72.5	80.2
2022-12-02 12:48:41	0:00:35	72.2	80.4
2022-12-02 12:50:14	0:00:40	72.6	80.4
2022-12-02 12:54:06	0:00:42	83.7	93.8
2022-12-02 12:56:39	0:00:41	74.1	82.5
2022-12-02 12:58:26	0:00:33	63.6	68.0
2022-12-02 13:01:43	0:00:36	64.9	70.1
2022-12-02 13:03:15	0:00:35	69.6	77.8
2022-12-02 13:05:39	0:00:43	74.5	83.4
2022-12-02 13:07:17	0:00:37	75.2	81.9
2022-12-02 13:14:09	0:00:33	75.1	82.8
2022-12-02 13:16:18	0:00:31	72.4	78.6
2022-12-02 13:21:41	0:00:35	68.3	80.0
2022-12-02 13:23:26	0:00:41	73.4	81.0
2022-12-02 13:29:21	0:00:39	75.6	82.1
2022-12-02 13:30:56	0:00:43	75.9	84.3
2022-12-02 13:37:00	0:00:50	75.2	84.4
2022-12-02 13:41:03	0:00:34	69.8	75.8
2022-12-02 13:43:16	0:00:40	76.0	83.7
2022-12-02 13:45:00	0:00:25	73.1	80.9
2022-12-02 13:47:10	0:00:20	74.5	80.6
2022-12-02 13:48:41	0:00:44	74.3	82.0
2022-12-02 13:51:12	0:00:33	62.7	66.8

2022-12-02 13:54:36	0:00:39	68.5	75.6
2022-12-02 13:59:15	0:00:30	63.7	68.3
2022-12-02 14:01:32	0:00:33	69.6	76.7
2022-12-02 14:03:29	0:00:31	66.3	72.6
2022-12-02 14:06:38	0:00:33	69.5	75.9
2022-12-02 14:10:05	0:00:40	77.5	84.7
2022-12-02 14:11:41	0:00:40	69.2	75.4
2022-12-02 14:14:04	0:00:47	73.1	80.9
2022-12-02 14:15:32	0:00:47	75.6	82.7
2022-12-02 14:17:11	0:00:44	72.1	79.7
2022-12-02 14:19:12	0:00:48	71.8	80.0
2022-12-02 14:21:22	0:00:32	77.6	85.9
2022-12-02 14:26:16	0:00:34	69.3	77.8
2022-12-02 14:30:57	0:00:54	71.8	79.5
2022-12-02 14:34:25	0:00:45	73.1	81.0
2022-12-02 14:36:28	0:00:55	72.4	80.3
2022-12-02 14:38:12	0:00:51	72.1	79.5
2022-12-02 14:40:02	0:00:53	72.5	81.2
2022-12-02 14:41:37	0:00:39	72.3	79.1
2022-12-02 14:44:54	0:00:47	75.9	84.2
2022-12-02 14:54:29	0:00:34	69.2	75.9
2022-12-02 14:59:40	0:00:35	75.8	84.6
2022-12-02 15:04:55	0:00:30	70.6	78.6
2022-12-02 15:06:40	0:01:09	75.7	84.8

2022-12-02 15:09:39	0:00:37	62.8	67.4

3.2 Indoor

Table 3: Individual Identified Air Traffic Noise Events and Associated Levels

Individual Air Traffic Noise Event Levels, Indoors			
Start	Duration	LAeq [dB]	LAFmax [dB]
2022-12-02 08:58:07	0:00:40	38.8	46.8
2022-12-02 08:59:56	0:00:42	37.7	43.9
2022-12-02 09:04:25	0:00:39	40.0	47.1
2022-12-02 09:06:37	0:00:45	39.5	46.2
2022-12-02 09:08:45	0:00:33	33.6	39.5
2022-12-02 09:10:27	0:00:51	40.8	49.7
2022-12-02 09:14:58	0:00:42	37.8	45.0
2022-12-02 09:16:47	0:00:44	36.9	44.2
2022-12-02 09:20:00	0:00:31	33.3	40.3
2022-12-02 09:23:51	0:00:42	32.9	39.5
2022-12-02 09:29:05	0:00:33	35.2	42.1
2022-12-02 09:32:59	0:00:35	35.1	42.6
2022-12-02 09:36:33	0:00:34	31.6	37.5
2022-12-02 09:38:24	0:00:40	37.2	43.5
2022-12-02 09:40:11	0:00:35	32.5	40.2
2022-12-02 09:41:47	0:00:50	39.8	48.5
2022-12-02 09:43:21	0:00:37	39.7	46.3
2022-12-02 09:46:47	0:00:48	35.6	42.5
2022-12-02 09:48:25	0:00:37	38.0	44.1
2022-12-02 09:50:10	0:00:41	35.3	42.7

2022-12-02 10:10:15	0:00:43	35.5	42.2
2022-12-02 10:14:21	0:00:30	33.0	39.3
2022-12-02 10:16:22	0:00:31	35.6	44.8
2022-12-02 10:19:41	0:00:43	37.1	44.8
2022-12-02 10:26:37	0:00:48	37.3	45.6
2022-12-02 10:28:11	0:00:45	32.9	41.1
2022-12-02 10:33:50	0:00:32	36.8	45.1
2022-12-02 10:39:55	0:00:30	37.0	44.5
2022-12-02 10:43:06	0:00:32	32.1	37.4
2022-12-02 10:46:44	0:00:30	29.0	35.3
2022-12-02 10:51:12	0:00:39	32.9	39.7
2022-12-02 10:54:32	0:00:35	34.3	43.0
2022-12-02 11:01:13	0:00:34	43.1	51.5
2022-12-02 11:06:35	0:00:32	36.1	45.0
2022-12-02 11:11:16	0:00:45	36.1	43.2
2022-12-02 11:22:21	0:00:40	36.6	43.5
2022-12-02 11:23:45	0:00:46	38.7	46.3
2022-12-02 11:25:15	0:00:48	41.6	48.4
2022-12-02 11:27:37	0:00:43	37.7	43.9
2022-12-02 11:29:16	0:00:37	37.8	44.0
2022-12-02 11:31:56	0:00:56	35.1	43.9
2022-12-02 11:33:48	0:00:42	36.4	44.4
2022-12-02 11:35:24	0:00:30	32.2	38.4
2022-12-02 11:37:01	0:00:31	35.5	44.0

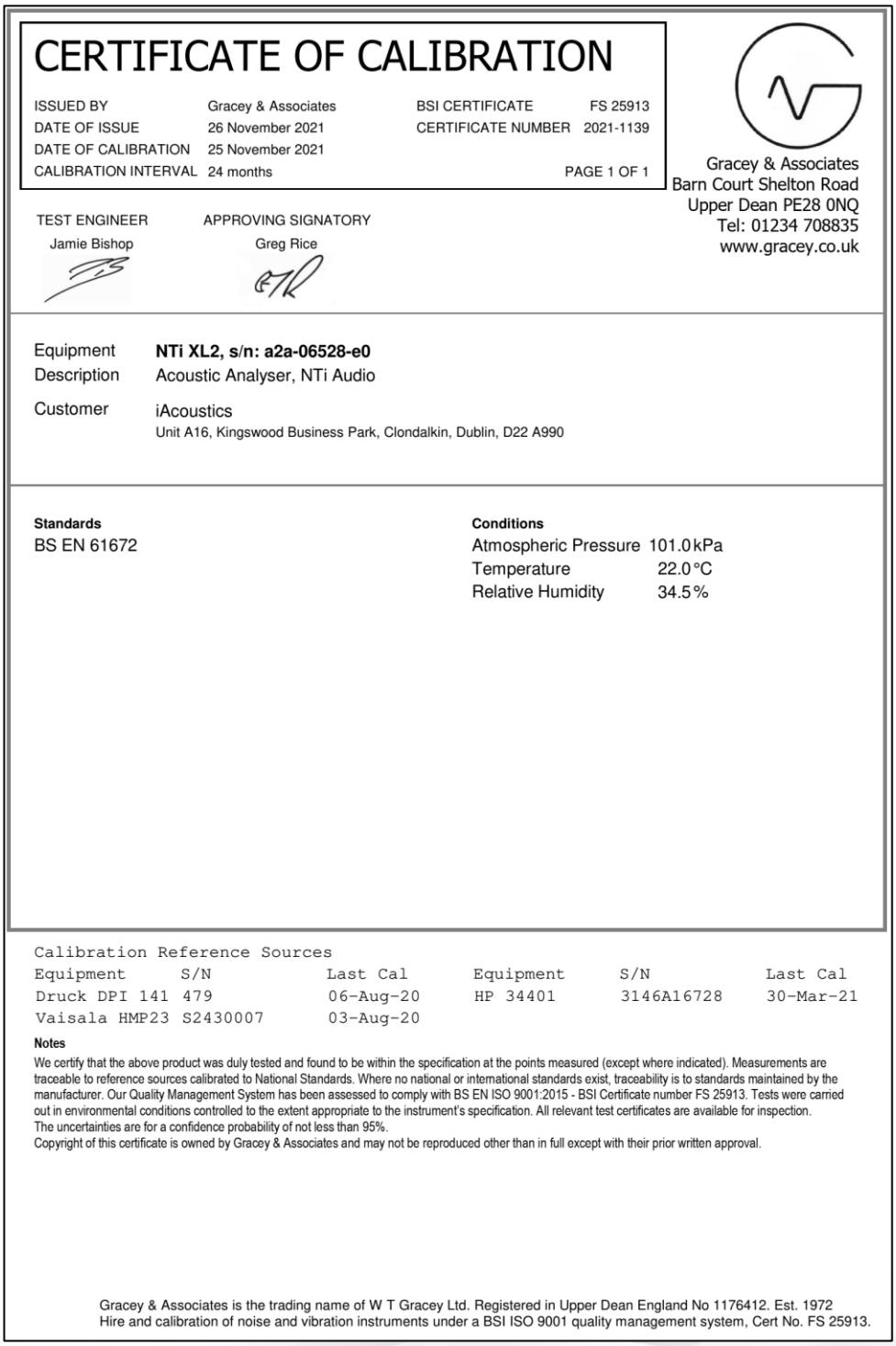
2022-12-02 11:40:43	0:00:45	38.3	46.6
2022-12-02 11:42:12	0:00:43	37.3	45.3
2022-12-02 11:43:44	0:00:30	38.9	49.2
2022-12-02 11:45:10	0:00:53	42.1	51.4
2022-12-02 11:47:09	0:00:46	40.8	49.9
2022-12-02 11:49:29	0:00:41	37.6	44.5
2022-12-02 11:52:47	0:00:48	39.9	46.6
2022-12-02 11:55:43	0:00:45	38.4	46.3
2022-12-02 12:02:29	0:00:34	36.3	41.8
2022-12-02 12:03:59	0:00:42	37.4	44.8
2022-12-02 12:05:27	0:00:57	38.8	48.8
2022-12-02 12:12:47	0:00:47	40.6	48.7
2022-12-02 12:18:18	0:00:30	41.3	48.4
2022-12-02 12:19:56	0:00:44	38.3	46.1
2022-12-02 12:27:17	0:00:31	36.8	46.3
2022-12-02 12:28:50	0:00:32	32.6	40.0
2022-12-02 12:36:41	0:00:47	35.5	41.1
2022-12-02 12:38:21	0:00:32	33.4	39.9
2022-12-02 12:40:01	0:00:36	32.8	42.8
2022-12-02 12:43:20	0:00:27	36.9	45.2
2022-12-02 12:45:03	0:00:34	35.6	43.3
2022-12-02 12:46:38	0:00:40	36.5	43.6
2022-12-02 12:48:10	0:00:35	35.9	42.3
2022-12-02 12:49:43	0:00:40	37.0	44.0

2022-12-02 12:53:35	0:00:42	47.3	56.0
2022-12-02 12:56:08	0:00:41	38.2	45.1
2022-12-02 12:57:55	0:00:33	30.3	38.8
2022-12-02 13:01:12	0:00:36	28.1	33.7
2022-12-02 13:02:44	0:00:35	33.4	40.2
2022-12-02 13:05:08	0:00:43	38.8	46.0
2022-12-02 13:06:46	0:00:37	37.6	44.0
2022-12-02 13:13:38	0:00:33	42.3	50.5
2022-12-02 13:15:47	0:00:31	34.3	39.9
2022-12-02 13:21:10	0:00:35	34.2	41.7
2022-12-02 13:22:55	0:00:41	37.6	44.9
2022-12-02 13:28:50	0:00:39	37.4	43.5
2022-12-02 13:30:25	0:00:43	39.4	46.2
2022-12-02 13:36:29	0:00:50	36.2	42.2
2022-12-02 13:40:32	0:00:34	33.4	39.2
2022-12-02 13:42:45	0:00:40	38.1	44.8
2022-12-02 13:44:29	0:00:25	34.9	41.2
2022-12-02 13:46:39	0:00:20	37.1	41.5
2022-12-02 13:48:10	0:00:44	39.0	47.4
2022-12-02 13:50:41	0:00:33	32.3	42.8
2022-12-02 13:54:05	0:00:39	32.2	39.2
2022-12-02 13:58:44	0:00:30	33.5	41.9
2022-12-02 14:01:01	0:00:33	33.1	39.8
2022-12-02 14:02:58	0:00:31	36.5	45.0

2022-12-02 14:06:07	0:00:33	33.3	40.2
2022-12-02 14:09:34	0:00:40	43.7	50.7
2022-12-02 14:11:10	0:00:40	33.6	40.3
2022-12-02 14:13:33	0:00:47	37.0	45.2
2022-12-02 14:15:01	0:00:47	38.3	45.2
2022-12-02 14:16:40	0:00:44	35.7	43.0
2022-12-02 14:18:41	0:00:48	36.0	43.6
2022-12-02 14:20:51	0:00:32	44.2	53.3
2022-12-02 14:25:45	0:00:34	32.6	38.8
2022-12-02 14:30:26	0:00:54	35.7	42.9
2022-12-02 14:33:54	0:00:45	37.5	45.2
2022-12-02 14:35:57	0:00:55	36.3	44.0
2022-12-02 14:37:41	0:00:51	36.0	43.7
2022-12-02 14:39:31	0:00:53	36.3	44.0
2022-12-02 14:41:06	0:00:39	36.5	43.8
2022-12-02 14:44:23	0:00:47	38.0	45.2
2022-12-02 14:53:58	0:00:34	32.8	38.9
2022-12-02 14:59:09	0:00:35	42.0	50.3
2022-12-02 15:04:24	0:00:30	36.8	45.0
2022-12-02 15:06:09	0:01:09	39.3	48.2

Appendix I – Equipment Calibration Certificates

1.1 OUTDOOR METER



CERTIFICATE OF CALIBRATION

ISSUED BY	Gracey & Associates	BSI CERTIFICATE	FS 25913
DATE OF ISSUE	26 November 2021	CERTIFICATE NUMBER	2021-1139
DATE OF CALIBRATION	25 November 2021		
CALIBRATION INTERVAL	24 months	PAGE 1 OF 1	

Gracey & Associates
Barn Court Shelton Road
Upper Dean PE28 0NQ
Tel: 01234 708835
www.gracey.co.uk

TEST ENGINEER: Jamie Bishop

APPROVING SIGNATORY: Greg Rice

Equipment: **NTi XL2, s/n: a2a-06528-e0**
Description: Acoustic Analyser, NTi Audio

Customer: iAcoustics
Unit A16, Kingswood Business Park, Clondalkin, Dublin, D22 A990

Standards
BS EN 61672

Conditions

Atmospheric Pressure	101.0 kPa
Temperature	22.0 °C
Relative Humidity	34.5 %

Calibration Reference Sources

Equipment	S/N	Last Cal	Equipment	S/N	Last Cal
Druck DPI 141	479	06-Aug-20	HP 34401	3146A16728	30-Mar-21
Vaisala HMP23	S2430007	03-Aug-20			

Notes

We certify that the above product was duly tested and found to be within the specification at the points measured (except where indicated). Measurements are traceable to reference sources calibrated to National Standards. Where no national or international standards exist, traceability is to standards maintained by the manufacturer. Our Quality Management System has been assessed to comply with BS EN ISO 9001:2015 - BSI Certificate number FS 25913. Tests were carried out in environmental conditions controlled to the extent appropriate to the instrument's specification. All relevant test certificates are available for inspection.
The uncertainties are for a confidence probability of not less than 95%.

Gracey & Associates is the trading name of W T Gracey Ltd. Registered in Upper Dean England No 1176412. Est. 1972
Hire and calibration of noise and vibration instruments under a BSI ISO 9001 quality management system, Cert No. FS 25913.

1.2 INDOOR METER

CERTIFICATE OF CALIBRATION

ISSUED BY	Gracey & Associates	BSI CERTIFICATE	FS 25913
DATE OF ISSUE	19 February 2021	CERTIFICATE NUMBER	2021-0302
DATE OF CALIBRATION	19 February 2021		
CALIBRATION INTERVAL	24 months	PAGE 1 OF 1	

Gracey & Associates
Barn Court Shelton Road
Upper Dean PE28 0NQ
Tel: 01234 708835
Fax: 01234 252332
www.gracey.com

TEST ENGINEER
Greg Rice

APPROVING SIGNATORY
Greg Rice

Equipment **NTi XL2, s/n: a2a-12398-e0**
Description Hand Held Acoustic Analyser - Class 1, NTi Audio

Customer iAcoustics
Unit A16, Kingswood Business Park, Clondalkin, D22 A990

Standards
IEC 61672 Class 1

Conditions

Atmospheric Pressure	99.9 kPa
Temperature	24.8 °C
Relative Humidity	34.6 %

Calibration Reference Sources

Equipment	S/N	Last Cal	Equipment	S/N	Last Cal
Druck DPI 141	479	06-Aug-20	HP 34401	3146A29376	11-Feb-20
Vaisala HMP23	S2430007	03-Aug-20			

Notes

We certify that the above product was duly tested and found to be within the specification at the points measured (except where indicated). Measurements are traceable to reference sources calibrated to National Standards. Where no national or international standards exist, traceability is to standards maintained by the manufacturer. Our Quality Management System has been assessed to comply with BS EN ISO 9001:2015 - BSI Certificate number FS 25913. Tests were carried out in environmental conditions controlled to the extent appropriate to the instrument's specification. All relevant test certificates are available for inspection.
The uncertainties are for a confidence probability of not less than 95%.

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Hire and calibration of noise and vibration instruments under a BSI ISO 9001 quality management system, Cert No. FS 25913.

1.3 OUTDOOR MICROPHONE / PREAMPLIFIER

Manufacturer Calibration Certificate

The following instrument has been tested and calibrated to the manufacturer specifications.
The calibration is traceable in accordance with ISO/IEC 17025 covering all instrument functions.

- Device Type: **M2230** **Measurement Microphone**
  consisting of
  PreAmp Serial Number: **6471**
  Capsule Serial Number: **A22043**

- Customer: **Integrated Acoustic Solution**
  Kingwood Business Park
  Baldonell, Dublin
  Ireland

- Date of Calibration: **08 March 2022**

- Certificate Number: **44628-A22043-M2230**

- Results: **PASSED**
  (for detailed report see next page)

Tested by: B.Dohmen

Signature:

Stamp: NTi Audio GmbH
Frielingsdorfweg 4
45239 Essen
info@nti-audio.de
+49 (0)201 6470 1900

NTi Audio GmbH • Frielingsdorfweg 4 • 45239 Essen • Tel: +49 (0)201 6470 1900
www.nti-audio.de • info@nti-audio.de

1/2

Date: 08 March 2022

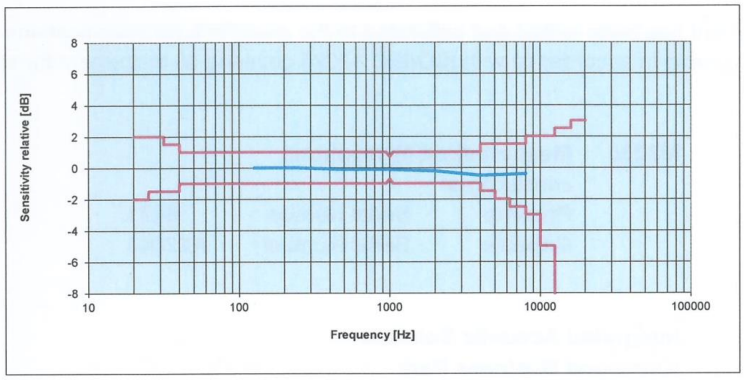
Calibration of: M2230 consisting of

PreAmp	Serial Number:	6471
Capsule	Serial Number:	A22043

- Peformance on receipt: **defect**

- Detailed Calibration Test Results:

System calibration	before	actual	calibration uncertainty[1]
Sensitivity @ 1 kHz, 114 dBSPL	41,4 mv/Pa	**45,2 mV/Pa**	±2.85%
Frequency response	Class 1	acc. IEC 61672	



- Test Conditions:

Temperature:	**23,9 °C**	±0.5 °C
Relative Humidity:	**27,4%**	±2%
Air Pressure:	**1008,9 hPa**	±0.25 kPa

- Calibration Equipment Used:

  - MTG Sound Calibrator, Type 4000, S/No. 32519
    Last Calibration: 09.09.2021, Next Calibration: 09.09.2022
    Kalibrierschein D-K-15008-01-00 2021-09

  - NTi Audio Microphone M2230, S/No. 10485
    Last Calibration: 21.12.2021, Next Calibration: 21.12.2022
    Calibrated by NTi Audio meeting product specifications

  - NTi Audio Flexus FX 100, SN 11347
    Last Calibration: 03.09.2021, Next Calibration: 03.09.2022
    Calibrated by NTi Audio meeting product specifications

  - NTi Audio XL2, S/No. A2A-14907-E0

[1] The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with the regulations of the GUM.

NTi Audio GmbH • Frielingsdorfweg 4 • 45239 Essen • Tel: +49 (0)201 6470 1900
www.nti-audio.de • info@nti-audio.de

1.4 INDOOR MICROPHONE / PREAMPLIFIER

CERTIFICATE OF CALIBRATION

ISSUED BY	Gracey & Associates	BSI CERTIFICATE	FS 25913
DATE OF ISSUE	19 February 2021	CERTIFICATE NUMBER	2021-0303
DATE OF CALIBRATION	19 February 2021		
CALIBRATION INTERVAL	24 months	PAGE 1 OF 2	

Gracey & Associates
Barn Court Shelton Road
Upper Dean PE28 0NQ
Tel: 01234 708835
Fax: 01234 252332
www.gracey.com

TEST ENGINEER
Greg Rice

APPROVING SIGNATORY
Greg Rice

Equipment	**NTi MC230, s/n: A14300**
Description	Microphone - 1/2" FF 48V, NTi Audio
Customer	iAcoustics Unit A16, Kingswood Business Park, Clondalkin, D22 A990

Standards
BS EN 61672 Class 1

Conditions

Atmospheric Pressure	99.9 kPa
Temperature	24.8 °C
Relative Humidity	34.6 %

Calibration Data

Sensitivity -27.44 dB

Calibration Reference Sources

Equipment	S/N	Last Cal	Equipment	S/N	Last Cal
B&K 4134 L	1675305	14-Jul-20	Druck DPI 141	479	06-Aug-20
HP 34401	3146A29376	11-Feb-20	Nor 1253	20848	14-Jul-20
Stanford DS36	33213	17-Aug-20	Vaisala HMP23	S2430007	03-Aug-20

Notes

We certify that the above product was duly tested and found to be within the specification at the points measured (except where indicated). Measurements are traceable to reference sources calibrated to National Standards. Where no national or international standards exist, traceability is to standards maintained by the manufacturer. Our Quality Management System has been assessed to comply with BS EN ISO 9001:2015 - BSI Certificate number FS 25913. Tests were carried out in environmental conditions controlled to the extent appropriate to the instrument's specification. All relevant test certificates are available for inspection.
The uncertainties are for a confidence probability of not less than 95%.

Gracey & Associates is the trading name of W T Gracey Ltd. Registered in Upper Dean England No 1176412. Est. 1972
Hire and calibration of noise and vibration instruments under a BSI ISO 9001 quality management system, Cert No. FS 25913.

CERTIFICATE OF CONFORMANCE

ISSUED BY	Gracey & Associates	BSI CERTIFICATE	FS 25913
DATE OF ISSUE	19 February 2021	CERTIFICATE NUMBER	2021-0304
DATE OF CALIBRATION	19 February 2021		
CALIBRATION INTERVAL	24 months	PAGE 1 OF 1	

Gracey & Associates
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Upper Dean PE28 0NQ
Tel: 01234 708835
Fax: 01234 252332
www.gracey.com

TEST ENGINEER
Greg Rice

APPROVING SIGNATORY
Greg Rice

Equipment **NTi MA220, s/n: 6337**
Description Preamplifier - XL2, NTi Audio

Customer iAcoustics
Unit A16, Kingswood Business Park, Clondalkin, D22 A990

Standards
Manufacturer's Original Specifications

Conditions

Atmospheric Pressure	99.9 kPa
Temperature	24.8 °C
Relative Humidity	34.6 %

Calibration Reference Sources

Equipment	S/N	Last Cal	Equipment	S/N	Last Cal
Druck DPI 141	479	06-Aug-20	HP 34401	3146A29376	11-Feb-20
Vaisala HMP23	S2430007	03-Aug-20			

Notes

We certify that the above product was duly tested and found to be within the specification at the points measured (except where indicated). Measurements are traceable to reference sources calibrated to National Standards. Where no national or international standards exist, traceability is to standards maintained by the manufacturer. Our Quality Management System has been assessed to comply with BS EN ISO 9001:2015 - BSI Certificate number FS 25913. Tests were carried out in environmental conditions controlled to the extent appropriate to the instrument's specification. All relevant test certificates are available for inspection.
The uncertainties are for a confidence probability of not less than 95%.

1.5 CALIBRATOR

Unit 2, Goldenbridge Industrial Estate, Tyrconnell Rd, Inchicore, Dublin, D08 YY38
www.sonitussystems.com Email: info@sonitussystems.com

SONITUS SYSTEMS

Calibration Report

Equipment Information

Model: CAL01
Serial Number: 11756

Ambient Conditions

Measurement conditions were within the tolerances defined in BS EN 60942.

Barometric Pressure: 1030 hPa
Temperature: 21.0 °C
Relative Humidity: 49 %

Results

Calibrator Setting	Measured Parameter	Measured Value	Tolerance +/-	Uncertainty +/-
94 dB, 1kHz	Sound pressure level (dB)	94.26	0.4 dB	0.14 dB
	Frequency (Hz)	1000.06	10 Hz	0.25 Hz
	Distortion (%)	0.20	3.0 %	0.3 %
114 dB, 1kHz	Sound pressure level (dB)	114.20	0.4 dB	0.14 dB
	Frequency (Hz)	1000.06	10 Hz	0.25 Hz
	Distortion (%)	0.35	3.0 %	0.3 %

RESULT: PASS

As public evidence was available, from a testing organization responsible for approving the results of pattern evaluation tests, to demonstrate that the model of sound calibrator fully conformed to the requirements for pattern evaluation described in Annex A of IEC 60942:2003, the sound calibrator tested is considered to conform to all the Class 1 requirements of IEC 60942:2003

The manufacturers guidelines concerning free-field correction should be obvserved when using the calibrator.

Notes
1. All measurements were made with the half-inch configuration of the calibrator in place.
2. The measurement uncertainty is reported as a standard uncertainty multiplied by a coverage factor k=2 which, for a normal probabbility distribution, corresponds to a coverage probability of approximately 95%.
3. The given uncertainty corresponds to measured values only and does not relate to the long term stability of the device under test.
4. The user manual for the device under test was obtained from the manufacturer's website.

DA315.2 Acoustic Calibrator Calibration Certificate 2

2. Appendix II – Noise Monitor Photographs

Appendix G

"Supplementary provisions relating to decisions on applications referred to in section 34B(1) or 34C(1) which were not refused by virtue of section 34B(5) or 34C(5)

37R. (1)(a) This section applies in addition to section 37 in the case of an appeal under section 37 against a decision of the planning authority under section 34 where, pursuant to section 34B(15) or 34C(16), that decision incorporates a regulatory decision of the competent authority under section 34B(13)(a) or 34C(14)(a), as the case may be.

(b) The competent authority shall be a party to the appeal notwithstanding section 34B(15)(b) or 34C(16)(b).

(2) For the purposes of a relevant appeal, the reference in section 37(1) to 'any person who made submissions or observations in writing in relation to the planning application to the planning authority' includes any person who made submissions or observations in writing referred to in section 34B(11)(c) or 34C(12)(c) to the competent authority in relation to the draft regulatory decision or related report referred to in section 34B(9) or (10), as the case may be, or section 34C(10) or (11), as the case may be.

(3) (a) *Subsections (1)* to *(3)* of *section 9* of the *Aircraft Noise (Dublin Airport) Regulation Act 2019* shall, with all necessary modifications, apply to the Board's consideration of the relevant appeal as if any reference to the competent authority in those subsections were a reference to the Board.

(b) *Subsections (4)* to *(7)* of *section 9* of the *Aircraft Noise (Dublin Airport) Regulation Act 2019* shall, with all necessary modifications, apply to measures and restrictions forming part of the Board's consideration of the relevant appeal as those subsections apply to measures and restrictions referred to in those subsections.

(c) The Board may, in its decision on the relevant appeal and its related report (subsection (7)(a)), accept or reject all or any part of either or both—

(i) the relevant regulatory decision the subject of the appeal, or

(ii) the report prepared under section 34B(10) and revised under section 34B(13)(b), or prepared under section 34C(11) and revised under section 34C(14)(b), as appropriate, which relates to such relevant regulatory decision.

(4) (a) Paragraphs (b) and (c) apply where the Board is considering, in its determination of the relevant appeal in so far as the appeal relates to the relevant regulatory decision, adopting noise mitigation measures or operating restrictions (if any), or a combination

thereof, which were not, during the process that gave rise to the relevant regulatory decision, the subject of previous consultation conducted by the competent authority pursuant to section 34B or 34C, as the case may be.

(b) *Subsection (12)* of *section 9* of the *Aircraft Noise (Dublin Airport) Regulation Act 2019* shall, with all necessary modifications, apply to the Board and the decision it is minded to make on the relevant appeal as if any reference to the competent authority in that subsection were a reference to the Board and as if any reference in that subsection to the draft regulatory decision were a reference to the decision that the Board is minded to make on the relevant appeal.

(c) The Board shall—

(i) publish on its website a draft of the decision it is minded to make on the relevant appeal in so far as the decision relates to the relevant regulatory decision—

(I) identifying all the noise mitigation measures and operating restrictions (if any) proposed to be adopted by the Board and not just such measures and restrictions (if any) referred to in paragraph (a), and

(II) stating, at a minimum, the Board's reasons for the draft decision and having annexed to it the related report (subsection (4)(b)),

and

(ii) on the same date as complying with subparagraph (i) (or as soon as is practicable thereafter), publish a notice on its website and in a national newspaper—

(I) stating that the Board has made a draft decision under paragraph (c)(i) on the relevant appeal in so far as the appeal relates to the relevant regulatory decision and prepared the related report (subsection (4)(b)),

(II) stating particulars of how persons may view or otherwise have access to the draft decision and related report (subsection (4)(b)) (which shall include being able to view the decision or report, or purchase a copy of the decision or report at a reasonable cost, at the offices of the Board during office hours),

(III) inviting persons to make submissions or observations in writing (and to provide a return address with such submissions or observations) in the specified form (if any) on the draft decision (including any annex thereto) before

the expiration of 14 weeks beginning on the date on which the notice was so published in the national newspaper, and

(IV) stating particulars of the addresses (which shall include an electronic address) to which such submissions or observations may be sent.

(5) (a) The Board shall, as soon as is practicable after it complies with subsection (4), give each of the appellant and the other parties to the relevant appeal a copy of the draft decision referred to in subsection (4)(c)(i).

(b) For the avoidance of doubt, it is hereby declared that the appellant and the other parties to the relevant appeal may each make submissions or observations referred to in subsection (4)(c)(ii)(II) in accordance with that subsection.

(6) (a) Where subsection (4) applies, the Board shall, as soon as is practicable after it complies with paragraph (c) of that subsection, by notice in writing direct the airport authority to—

(i) engage in discussions with the Irish Aviation Authority and operators of aircraft in the airport concerning the technical feasibility of, and other alternatives to, the noise mitigation measures or operating restrictions (if any), or the combination thereof, the subject of the draft decision referred to in subsection (4)(c)(i), and

(ii) inform the Board of the outcome of those discussions before the expiration of the 14 weeks referred to in subsection (4)(c)(ii)(II).

(b) The airport authority shall comply with a direction given to it under paragraph (a).

(7) The Board shall, as soon as is practicable after it makes a decision on the relevant appeal in so far as the appeal relates to the relevant regulatory decision—

(a) publish on its website the first-mentioned decision, in so far as it so relates, to which is annexed a report prepared by the Board in relation to such decision stating the Board's reasons for such decision and including therein—

(i) such of the matters referred to in paragraphs (a) to (j) of subsection (10) of section 34B or paragraphs (a) to (j) of subsection (11) of section 34C, as the case may be, as are appropriate (which inclusion may be achieved, at the Board's discretion, by the adoption by it of any part of the report concerned referred to in subsection (3)(c)(ii)), and

(ii) if subsection (4) applies, the related report (subsection (4)(b)) revised by the Board to take into account all documents, submissions or observations (if any), and such other information, given to it pursuant to a provision of this section and to take into account the first-mentioned decision in so far as it so relates,

(b) on the same date as complying with paragraph (a) (or as soon as is practicable thereafter), publish a notice on its website and in a national newspaper stating—

(i) that it has made a decision on the relevant appeal in so far as the appeal relates to the relevant regulatory decision,

(ii) particulars of how persons may view or otherwise have access to such decision (including any annex thereto) in so far as it so relates (which shall include being able to view the decision, or purchase a copy of the decision at a reasonable cost, at the offices of the Board during office hours), and

(iii) that a person may question the validity of the Board's decision on the relevant appeal (including such decision in so far as it relates to the relevant regulatory decision) by way of an application for judicial review, under Order 84 of the Rules of the Superior Courts (S.I. No. 15 of 1986), in accordance with section 50,

(c) send a copy of such decision (whether with or without any annex thereto), together with the notice referred to in paragraph (b) (whether before or after the notice is published), to the appellant, the other parties to the relevant appeal and (if the airport authority is neither the appellant nor another party to the relevant appeal) the airport authority, and

(d) if subsection (4) applied, send a copy of such decision (whether with or without any annex thereto), together with the notice referred to in paragraph (b) (whether before or after the notice is published), to the return addresses of the persons who have made submissions or observations referred to in subsection (4)(c)(ii)(II) in accordance with that subsection on the draft decision concerned.

(8) Where the Board has failed to make a decision under section 37 as read with this section in relation to the relevant appeal within the period it is required to do so by a provision of this Act and becomes aware, whether through notification by the appellant or otherwise, that it has so failed, the Board shall nevertheless proceed to make such decision and the decision so made shall be considered to have been made under section 37 notwithstanding such failure.

(9) Subject to subsection (10), a noise mitigation measure to be introduced by virtue of a decision on the relevant appeal in so far as the decision relates to the relevant regulatory decision shall—

(a) come into effect on the day immediately following the day on which, pursuant to subsection (7), that first-mentioned decision is published on the website of the Board, and

(b) after coming into effect, remain in effect until revoked, or revoked and replaced, by the competent authority or the Board.

(10) The Board may, by notice published on its website on the same date as the decision first-mentioned in subsection (9) is, pursuant to subsection (7), also so published—

(a) authorise, for reasons stated in the notice, a lead in time for the coming into effect of a noise mitigation measure to be introduced by virtue of that decision, and

(b) specify the date, or the occurrence of the event, on which such noise mitigation measure shall come into effect.

(11) Subject to *section 26(b)* of the *Aircraft Noise (Dublin Airport) Regulation Act 2019*, the Board shall, in relation to an operating restriction to be introduced by virtue of a decision on the relevant appeal in so far as the decision relates to the relevant regulatory decision, take such steps as it considers appropriate to cause Article 8 of the Aircraft Noise Regulation to be complied with as soon as is practicable after it applies to such restriction.

(12) Subject to subsection (13), an operating restriction to which subsection (11) applies shall—

(a) come into effect on the day immediately following the day on which the operation of Article 8 of the Aircraft Noise Regulation ceases to further prevent the coming into effect of the operating restriction, and

(b) after so coming into effect, remain in effect until revoked, or revoked and replaced, by the competent authority or the appeal body.

(13) The Board may, by notice published on its website at any time before the day first-mentioned in subsection (12)(a)—

(a) authorise, for reasons stated in the notice, a lead in time for the coming into effect of the operating restriction to which subsection (12) applies, and

(b) specify the date, or the occurrence of the event, on which such operating restriction shall come into effect.

(14) In this section—

'related report (subsection (4)(b))' means the report (if any) prepared by the Board pursuant to subsection (4)(b);

'related report (subsection (7)(a))' means the report prepared by the Board pursuant to subsection (7)(a);

'relevant appeal' means an appeal referred to in subsection (1)(a);

'relevant regulatory decision', in relation to a relevant appeal, means the relevant regulatory decision referred to in subsection (1) which is incorporated into the planning authority's decision under section 34 that is the subject of the relevant appeal.

Supplementary provisions relating to decisions on applications referred to in section 34B(1) or 34C(1)

37S. (1) (a) This section applies in addition to section 37 in the case of an appeal under section 37 against a decision of the planning authority under section 34 where—

(i) pursuant to section 34B(1)(a), the competent authority concludes that it is not of the opinion referred to in section 34B(1)(a)(iii), or

(ii) pursuant to section 34B(5) or 34C(5), that decision is to refuse the application concerned.

(b) The competent authority shall be a party to the appeal notwithstanding section 34B(5)(d) or 34C(5)(d).

(2) Without prejudice to the generality of the Board's powers under section 37, or under section 37 as read with any other provision of this Act, the Board shall, in determining the appeal—

(a) where subsection (1)(a)(i) applies, take into account such of the provisions of section 34B following subsection (1) of such section 34B, and of *section 26(b)* (with all necessary modifications) of the *Aircraft Noise (Dublin Airport) Regulation Act 2019*, as are, in the Board's opinion, relevant to the appeal,

(b) where the refusal referred to in subsection (1)(a)(ii) arises from the operation of section 34B(5), take account of such of the provisions of section 34B following subsection (5) of such section 34B, and of *section 26(b)* (with all necessary modifications) of the *Aircraft Noise (Dublin Airport) Regulation Act 2019*, as are, in the Board's opinion, relevant to the appeal, or

(c) where the refusal referred to in subsection (1)(a)(ii) arises from the operation of section 34C(5), take account of such of the provisions of section 34C following subsection (5) of such section 34C, and of *section 26(b)* (with all necessary modifications) of the *Aircraft*

Appendix H

DUBLIN AIRPORT
NOISE INSULATION PROGRAMME
Statement of Need

Building ID	**80468136**
Address	Ballystraan Developments K67 KN88
Conservation area	No
Protected structure	No
Dwelling description	A two-storey dwelling with a side extension comprising a living room / kitchen, dining room, front room, study, five bedrooms, three bathrooms, a large extension living space and utility areas. The external wall is cavity masonry with a pitched tiled roof and loft insulation (thickness unknown). The majority of windows are uPVC double glazed except the extension which features timber frame double glazing, with additional timber frame Velux windows in one bedroom and the extension area. There are open fireplaces in the Living Room and Front Room. There are currently no background ventilators in any habitable rooms.
External noise level	65dB $L_{Aeq,16hour}$ (from Integrated Noise Model (INM) 2022: summer noise levels at dwellings)

Owner	Ms. Evelyn Sutton

Statement of Need	An assessment has been carried out to determine the specification of products available under the daa Noise Insulation Programme that are most suitable for the property. These are detailed on pages 4 and 5.

Survey date & time	09:14 to 10:45 on 04/12/2019
Personnel	Kasia Bosiak
Survey & assessment methodology	On behalf of daa, Anderson Acoustics Ltd has carried out an analysis of the property dimensions and building elements applicable to each habitable room. Together with the external noise level from the INM these have been used to estimate the overall sound insulation performance of the building envelope and the internal aircraft noise level using the method set out in BS EN 12354-3:2017. Upgrade measures have been applied with estimations of the subsequent improvement in sound insulation performance. As part of the programme's quality control measures a representative sample of properties will be acoustically surveyed before and after the upgrade works in general accordance with BS EN ISO 16283-3:2016 to confirm that the noise reduction targets have been achieved.
Internal ambient noise level targets	Where possible, the daa Noise Insulation Programme aims to achieve a 5 to 10 dB improvement in sound insulation performance and to meet the World Health Organisation and BS 8233:2014 recommended daytime internal ambient noise levels of 35 to 40 dB $L_{Aeq,16hr}$ within dwellings, depending on room type.

Appendix I - 1

Dublin Airport

Departure profiles noise investigation

October 2024

Jack Naumann MIOA

Ref: 7669_001R_1-0_JN

Contents

Objective of this study

To provide an understanding of the implications for noise exposure of flights using ICAO A or ICAO B for local communities relative to today's operation and relative to one another.

The approach (using AEDT 3G throughout):

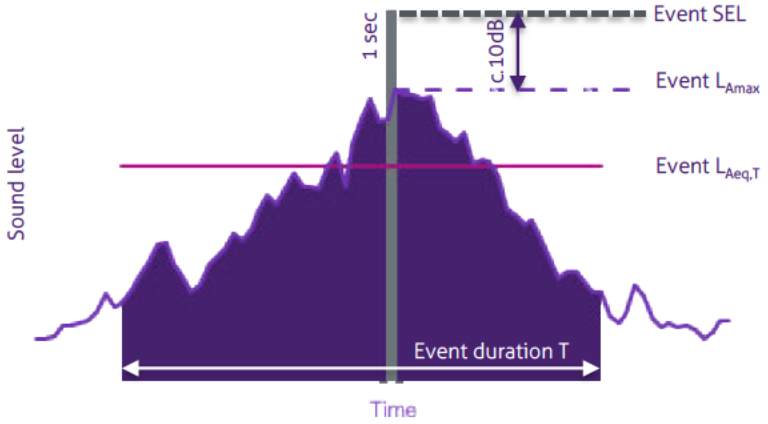
1. To identify and understand the sound level differences between the ICAO A and ICAO B procedures for individual aircraft types.
   - We have selected the 737-800 and A320 as the two most common aircraft operating at Dublin Airport in addition to the 777-300ER as the loudest aircraft.
2. To model today's baseline scenario on one full day of easterly and one full day of westerly operations in summer 2024 to generate single day $L_{Aeq,16hr}$ sound levels;
   - Westerly day: 15/08/2024
   - Easterly day: 31/08/2024
3. To use track analysis tools to understand the degree to which ICAO A and ICAO B are used across the days provided;
4. Apply the ICAO A procedures to the full day selected, and apply the ICAO B procedures to the full day selected;
5. Throughout the above identify communities where change may occur.

Metrics:

Long-term average ($L_{Aeq,16hr}$) and event based (SEL) descriptors of noise exposure.

Noise events

As an aircraft passes over a location, noise levels slowly increase from ambient levels, reach a maximum and decrease back down to ambient levels. An example flyover is shown below.



There are a number of metrics that can then be used to characterise a noise event and are generally present in measurements and can also be derived from modelling:

- The L_{Amax} is the highest sound pressure level during the event, it is an instantaneous value, this is used typically with noise limits;
- The $L_{Aeq,t}$ is the continuous sound pressure level that would generate the same energy as that of the fluctuating noise level during the event of period T. It is in effect the average noise level over the time of the event;
- The SEL (sound exposure level or single event level), is the sound pressure that would arise for if all the energy of the event were to be delivered in 1 second it is useful for comparing events.
- The SEL for individual aircraft events has been derived using modelling for this analysis. This analysis has not used measured data.

Long term noise exposure

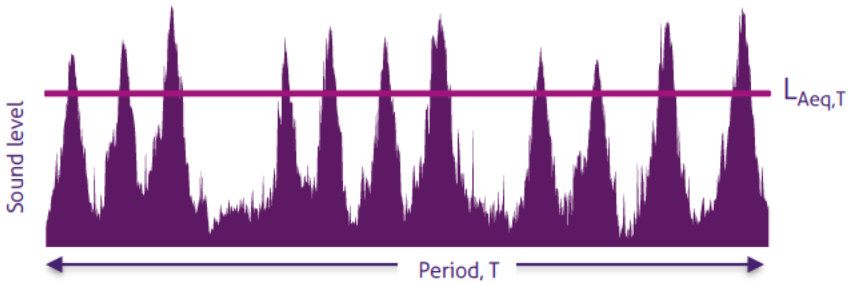
The standard approach for describing noise exposure is to use the Equivalent Continuous Sound Pressure Level ($L_{Aeq,T}$).

The $L_{Aeq,T}$ is used to describe the equivalent continuous and steady sound level which would contain the same sound energy as the time varying sound over that time T.

An example, showing typical sound levels over time under a busy flight path is given in the figure below.

This metric can be applied to any period. In UK aviation policy the average 92 day Summer Contours are the $L_{Aeq,16hr}$ average over the official summer period. It is also used with the L_{den} metric.

In the work reported herein the $L_{Aeq,16hr}$ has been derived for single westerly and easterly 16hr days (07:00-23:00) and is used to describe overall/average noise exposure on a single day.

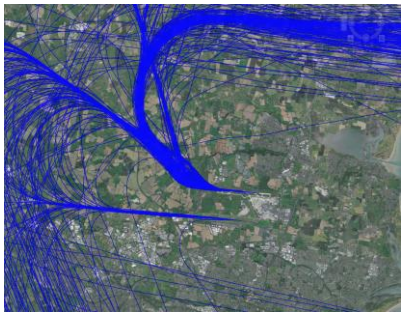


Contents

Methodology.

Modelled not measured:

The differences between the procedures are likely to be experienced over a wide area. This investigation has therefore used modelling techniques to understand theoretical differences between the two procedures.

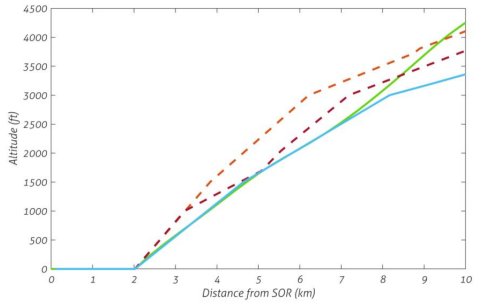


AEDT model:

AEDT 3G has been used for the analysis (see the following slide for a summary of our approach to modelling). AEDT is the US FAA's commercially available noise model tool. It is the most commonly used noise modelling software.

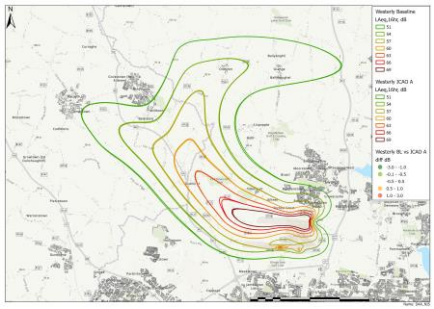
Aircraft Events:

We have derived and reviewed differences between SELs for events of specific aircraft types with ICAO A and ICAO B comparing them on the same easterly and westerly tracks. The differences between each procedure will vary depending on stage length and aircraft type, typical examples have been used to illustrate.



On the day average noise levels:

$L_{AEq,16hr}$ noise levels for one day of westerly and one of easterly operations have been modelled. The "as-is" (using the "best-fit" approach) has been compared with two scenarios – one where all departures have been shifted to be on an equivalent ICAO A procedure & another if all tracks were using ICAO B.



Best fit climb profiles:

Flight track analysis tools have been used to infer which is the best fit climb profile from the actual track.

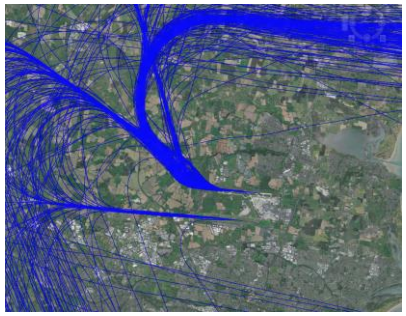
Note: This is not, nor is it intended to be, an exhaustive analysis – it is to provide indicative understanding of potential differences between departure procedures.

Our approach to noise modelling.

Traditional approach:

Noise modelling of departures is based on a set of "backbone" tracks and climb profiles derived from the distance to the destination (city-pair distance).

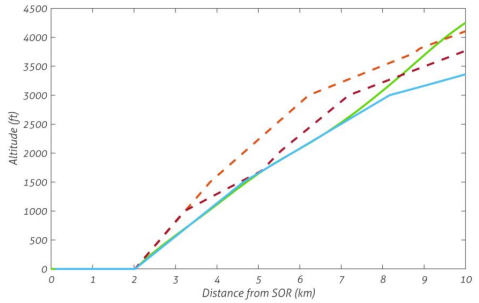
Aircraft are distributed across the backbone tracks based on analysis of NTK system data to derive dispersion; and, climb profiles (which determine thrust characteristics) are determined based on city-pair distances to derive groups of stage length, (used as a proxy for weight) - the selection of ICAO A or B is based on assumptions understanding an airline's procedure.



Our track-based modelling:

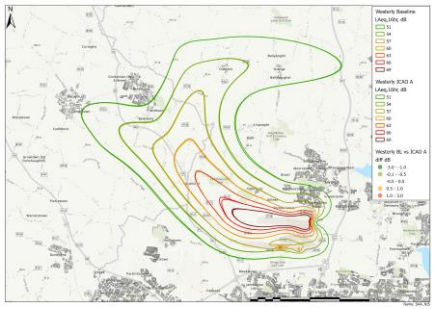
Every departure track is modelled – dispersion "backbones" are not used. Our tools enable us to identify the AEDT climb profile that best fits the actual and determine whether the procedure was closest to ICAO A or ICAO B.

This provides, on average, significantly more reliable and accurate noise level for each aircraft.



Independently verified:

Our track-based approach has been verified in our work at Heathrow and has been found to reliably reflect average measured noise levels at a variety of distances from the airport.



"Best-fit" profile matching enables us to derive the procedure adopted and, on average, much more reliable noise level prediction.

A key element in the process of predicting noise levels is to select the right stage length and procedure.

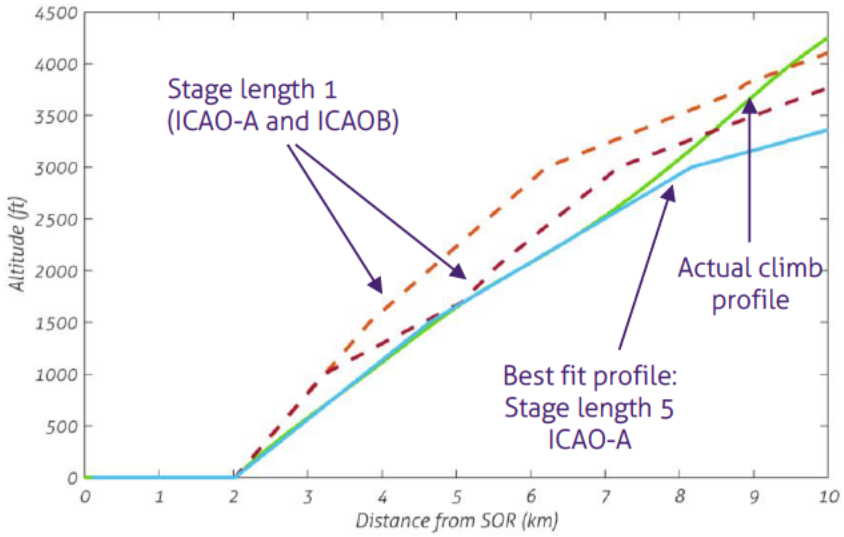
The traditional approach has generally been found to underestimate noise levels as the profile selected is often a lower stage length - aircraft are higher and therefore modelled noise levels lower.

An example of the improved reliability of our "best fit" profile matching is presented here using a 737-800 flying to Edinburgh.

The green line is the actual climb profile from the radar track data. The orange and red lines are the climb profiles that would have resulted from traditional city-pair distance approach (Stage length 1).

The selected "best-fit" profile was the ICAO A SL5 which can be seen to be a much better fit than the standard city-pair profile.

It should be noted that whilst this process is not 100% accurate (in this example the two profiles deviate beyond 8km from SOR) it significantly improves noise level predictions on average.



Contents

What are NADP-1 and NADP-2?

There are two standard families of noise abatement departure procedures developed by ICAO:

- The NADP-1 family is designed to reduce noise levels for those communities considered close-in;
- The NADP-2 family is designed to reduce noise levels for those communities further out.

The principal difference is the order in which thrust is cutback to climb thrust relative to flap/slat retraction and acceleration.

NADP-1 – 'close in'

- Based on the application of thrust cutback before flaps and slats retraction. Climb thrust is selected at reaching a certain altitude (typically around 1,000-1,500 ft).
- At another altitude (often around 3,000 ft), pitch angle is reduced such that the aircraft will climb and accelerate simultaneously. As speed increases, flaps and slats are retracted on schedule.
- Aims to deliver noise reduction for areas located close to the airport.

NADP-2 – 'further out'

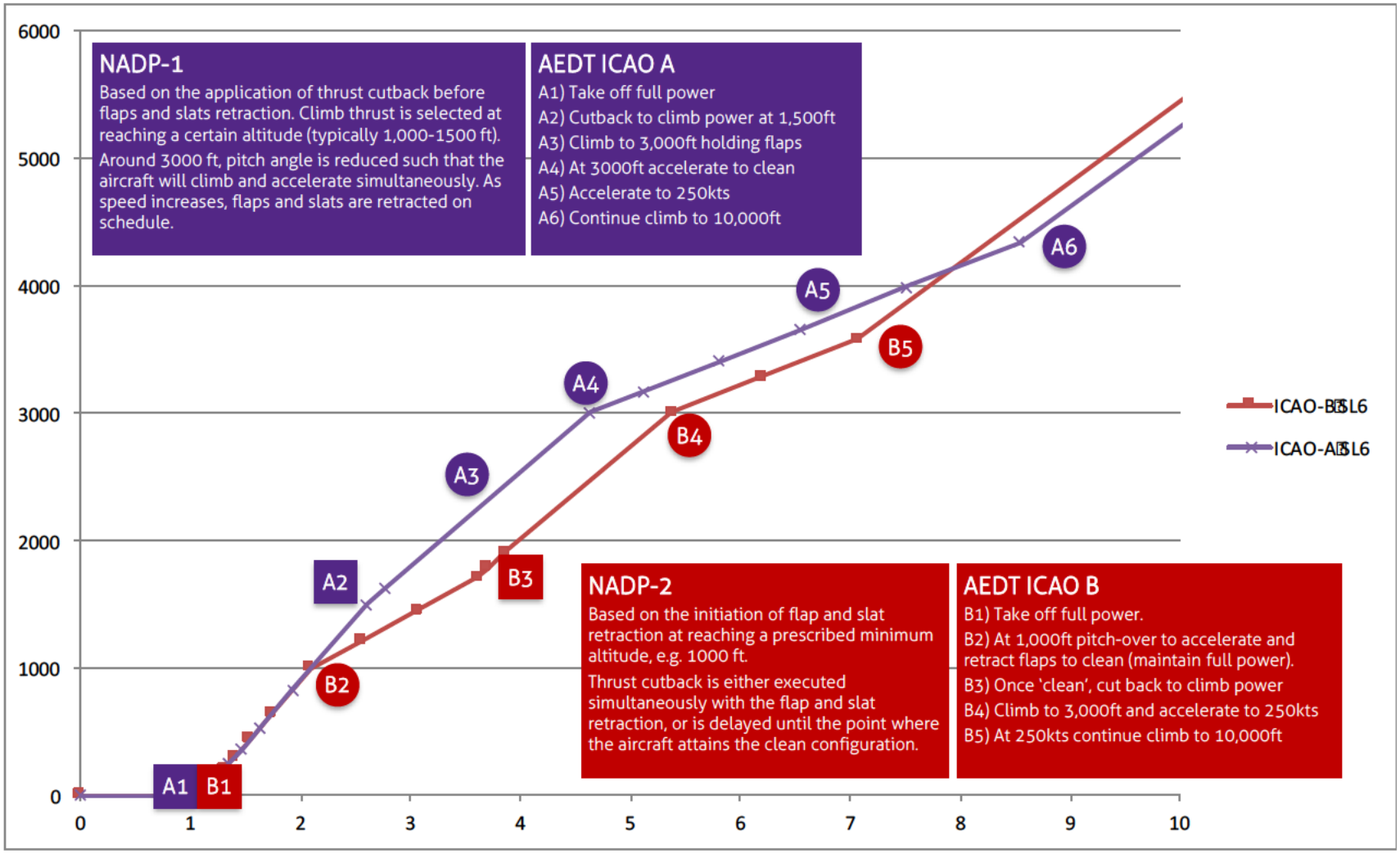
- Based on the initiation of flap and slat retraction at reaching a prescribed minimum altitude, e.g. 1,000 ft.
- Thrust cutback is either executed simultaneously with the flap and slat retraction, or is delayed until the point where the aircraft attains the clean configuration.
- This procedure intends to provide noise reduction areas further from the airport.

ICAO A

ICAO B

What do these procedures look like?

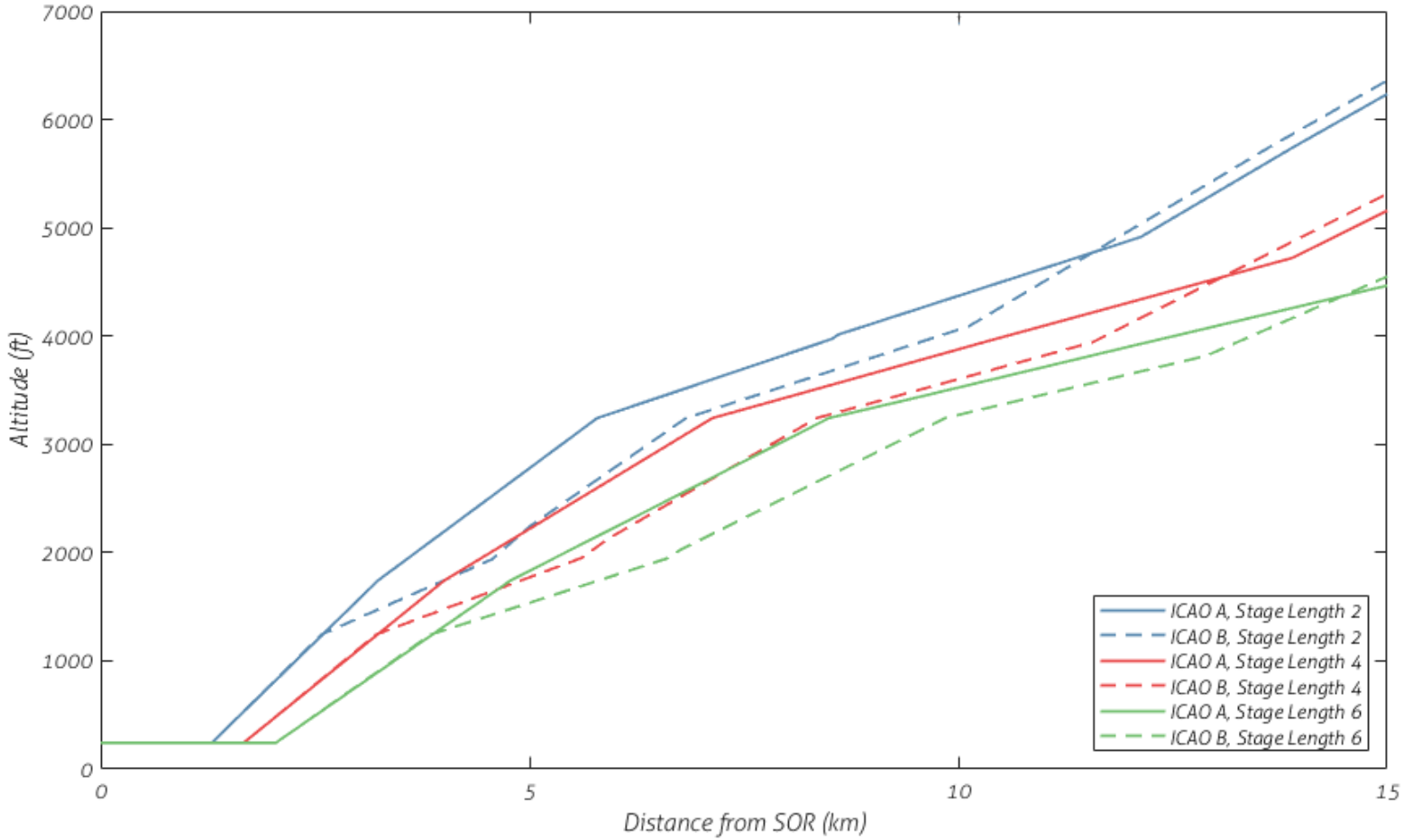
Two typical profiles for the same aircraft and flight distance are presented below for ICAO-A and ICAO-B



Climb profile and Stage Length.

AEDT uses the concept of a Stage Length (SL) as a proxy for the weight of the aircraft – higher SL, greater distance, heavier aircraft, reduced climb gradient.

The figure below presents the effect of SL on the climb profile for the ICAO A and ICAO B procedures. For a given SL the profile is the same to 1,000ft and they broadly come back together again around 4,000ft .



What difference does procedure make to aircraft event noise levels? Presentation of results using GIS.

Aircraft events: SEL contours:

On the following pages we present typical 90 dBA (pink) and the 80 dBA SEL contour (blue) for the ICAO A (solid) and ICAO B (dashed) procedures for specific aircraft types on a NW heading, derived from our model (an example is shown to the right).

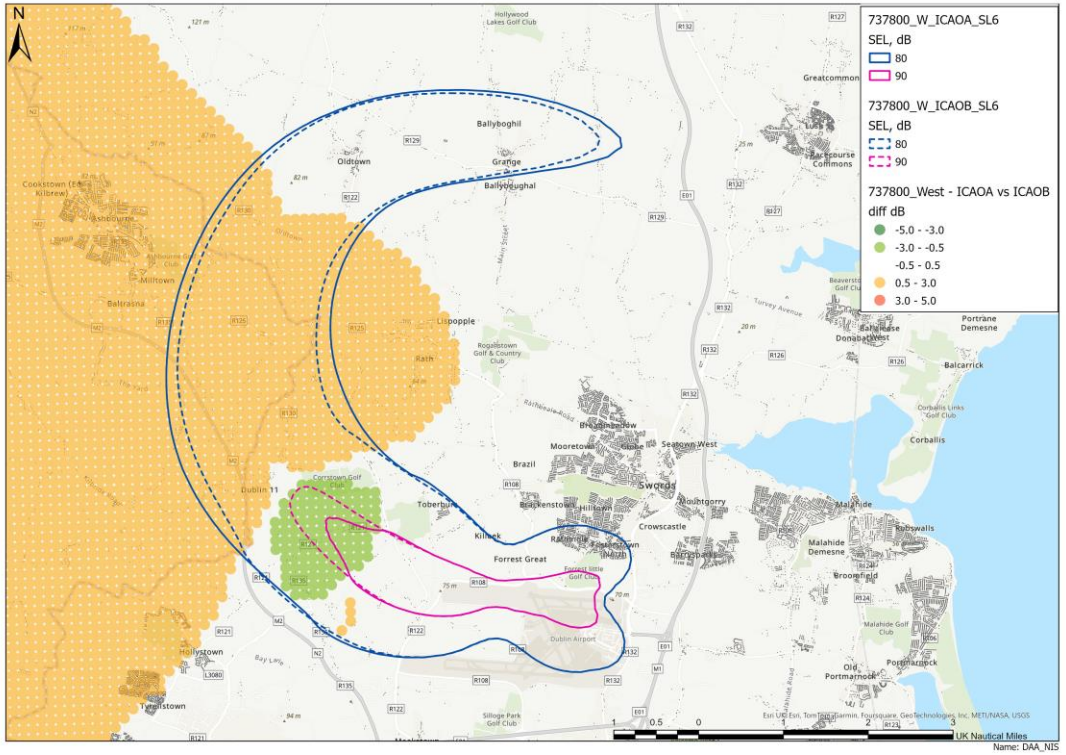
SEL difference:

The difference in the SEL between the ICAO-A and ICAO-B procedures is presented as a "heat" map. This indicates the differences over a wider area than those just that presented by the contours

The orange area indicates where the SEL for ICAO-A is higher than that for ICAO-B; the green area indicates areas where the SEL from ICAO-A is higher than that for ICAO-B.

Population density:

The grey spots provide an indication of areas of population

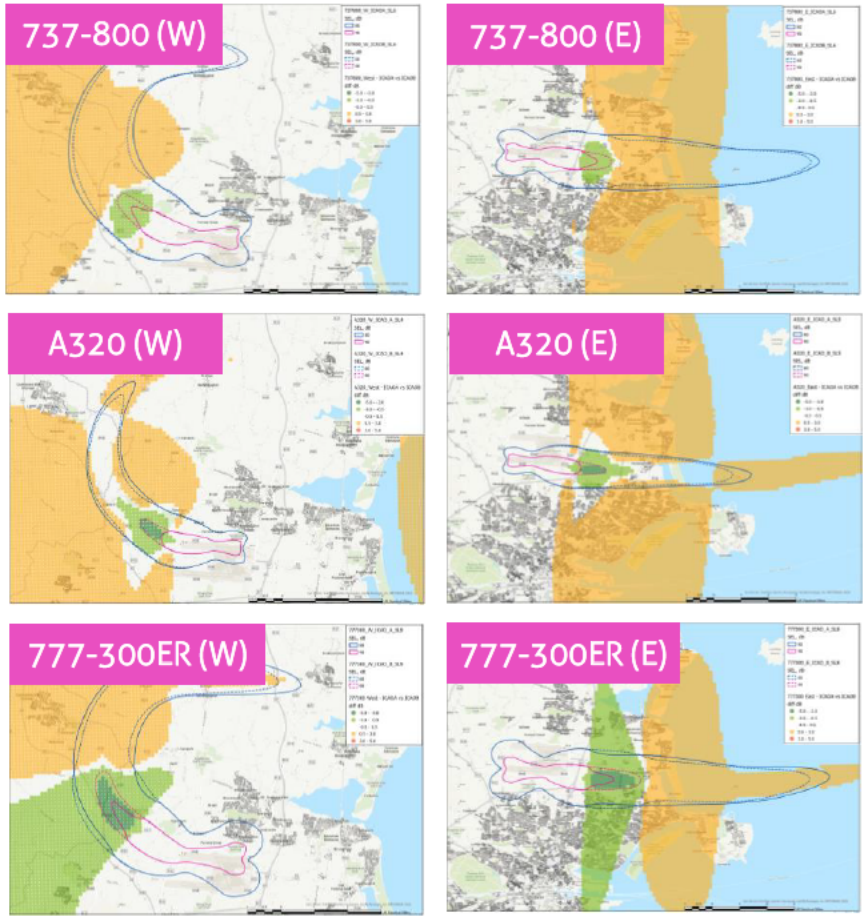


What difference does procedure make to aircraft event noise levels?

Summary

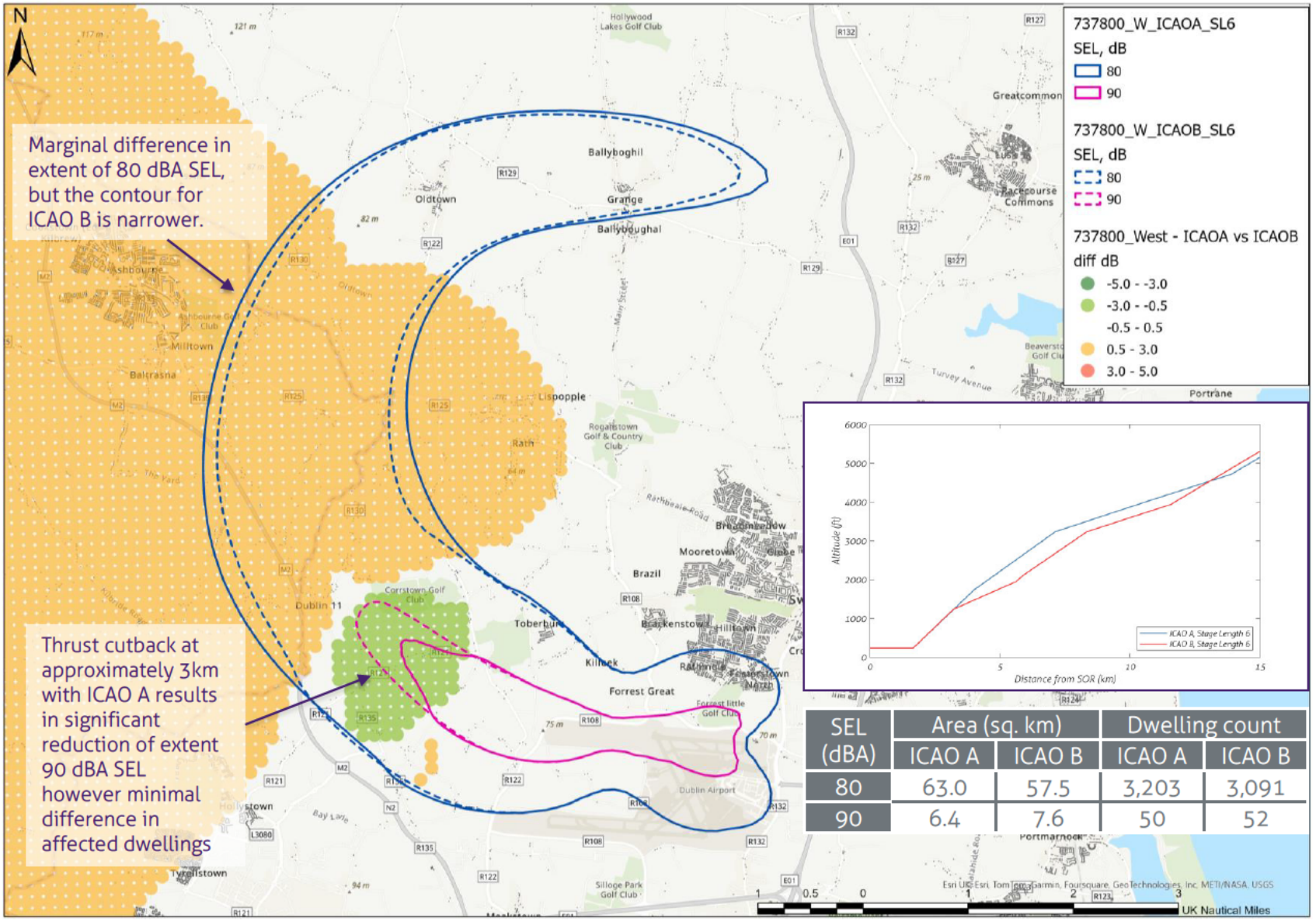
The images to the right present the difference and SEL contours for specific examples of the 737-800, A320, and 777-300ER aircraft. The selected stage length was based on the most common stage length (based on profile matching) flown by each aircraft type. The following pages present these in larger form.

- It is noted that the magnitude and pattern of difference for each aircraft type is different.
- Depending on the location relative to the flight path, there is between an approximately 4dB difference between the ICAO A and ICAO B procedures.
- Generally, the most substantial benefits of using the ICAO A procedure are directly below the flight path around the end of the 90dB SEL contour. The benefits of using the ICAO B procedures are further out across a wider swath either side of the flight path
- There is, broadly speaking, a common area that experiences benefits with all the types that is approximately 5-8km from start of roll .



What difference does procedure make to 737-800 event noise levels?

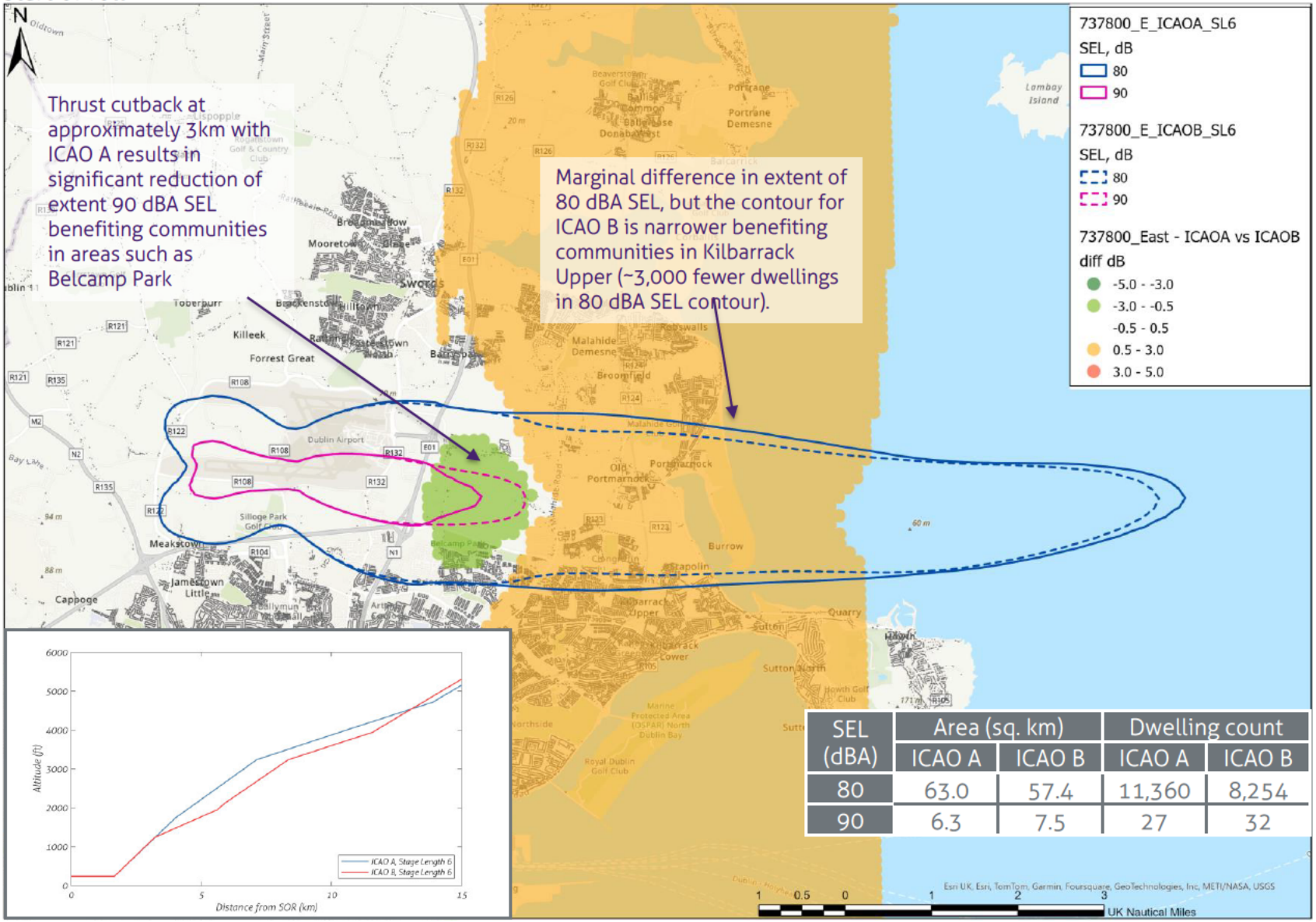
Data indicates ICAO A currently dominates (~82%). Substantial benefit (c.3dB) from ICAO A around 90 dBA SEL, 5.5km from start of roll.



SEL (dBA)	Area (sq. km)		Dwelling count	
	ICAO A	ICAO B	ICAO A	ICAO B
80	63.0	57.5	3,203	3,091
90	6.4	7.6	50	52

What difference does procedure make to 737-800 event noise levels?

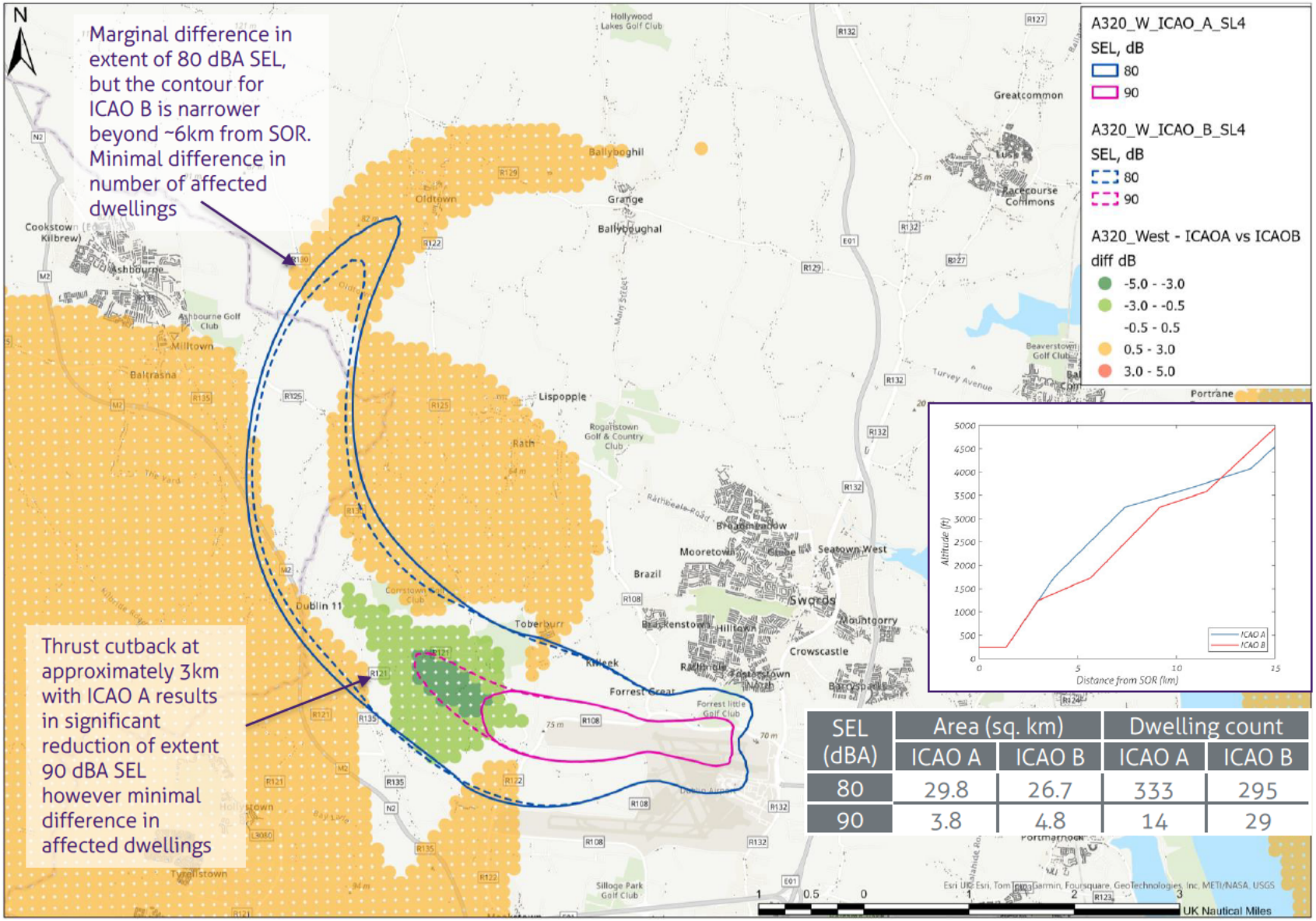
Data indicates ICAO A currently dominates (~82%). Substantial benefit (c.3dB) from ICAO A around 90 dBA SEL, 5.5km from start of roll.



SEL (dBA)	Area (sq. km)		Dwelling count	
	ICAO A	ICAO B	ICAO A	ICAO B
80	63.0	57.4	11,360	8,254
90	6.3	7.5	27	32

What difference does procedure make to A320 event noise levels?

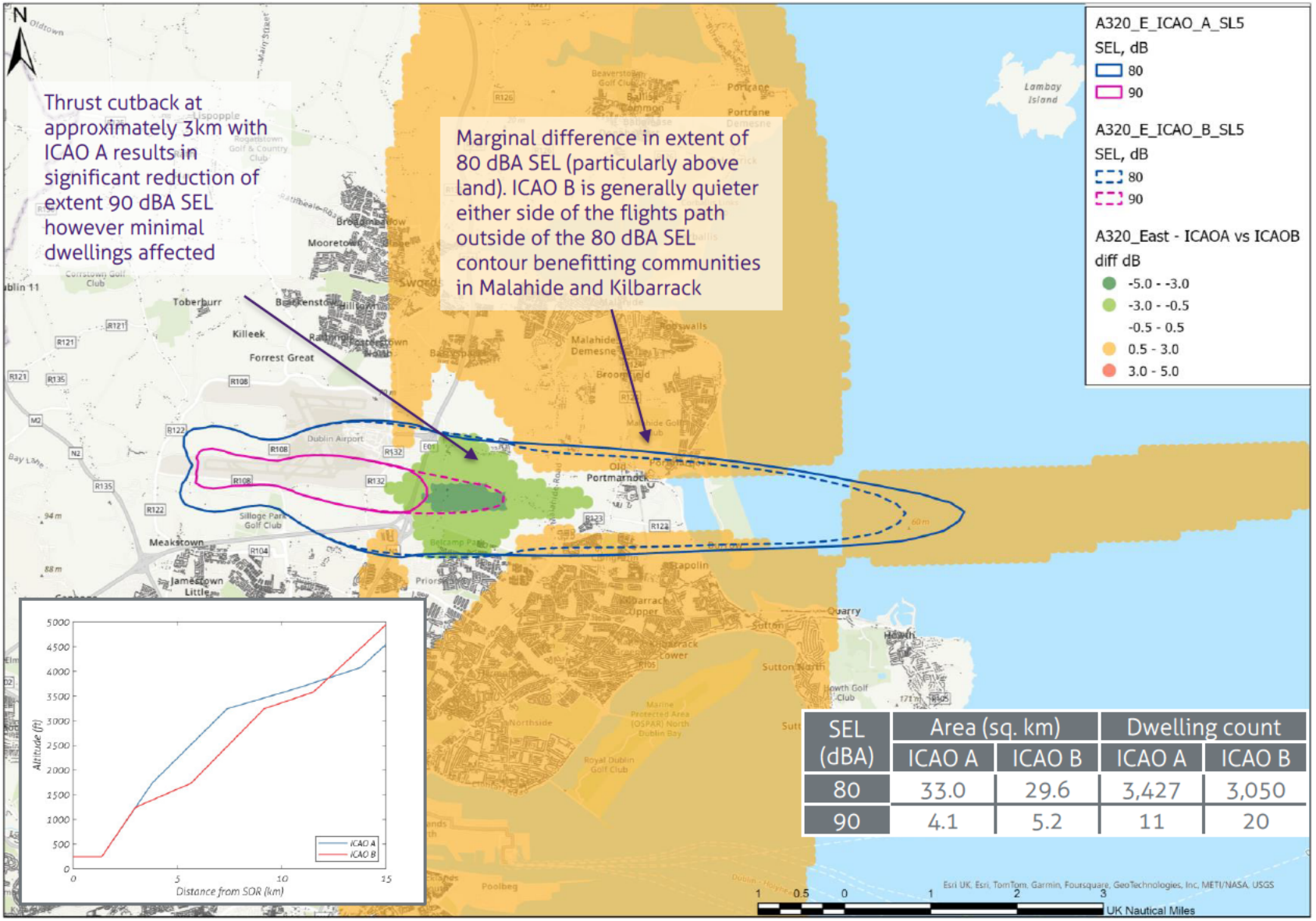
Data indicates ICAO A currently dominates (~96%). Substantial benefit (c.4dB) from ICAO A around 90 dBA SEL, 5km from start of roll.



SEL (dBA)	Area (sq. km)		Dwelling count	
	ICAO A	ICAO B	ICAO A	ICAO B
80	29.8	26.7	333	295
90	3.8	4.8	14	29

What difference does procedure make to A320 event noise levels?

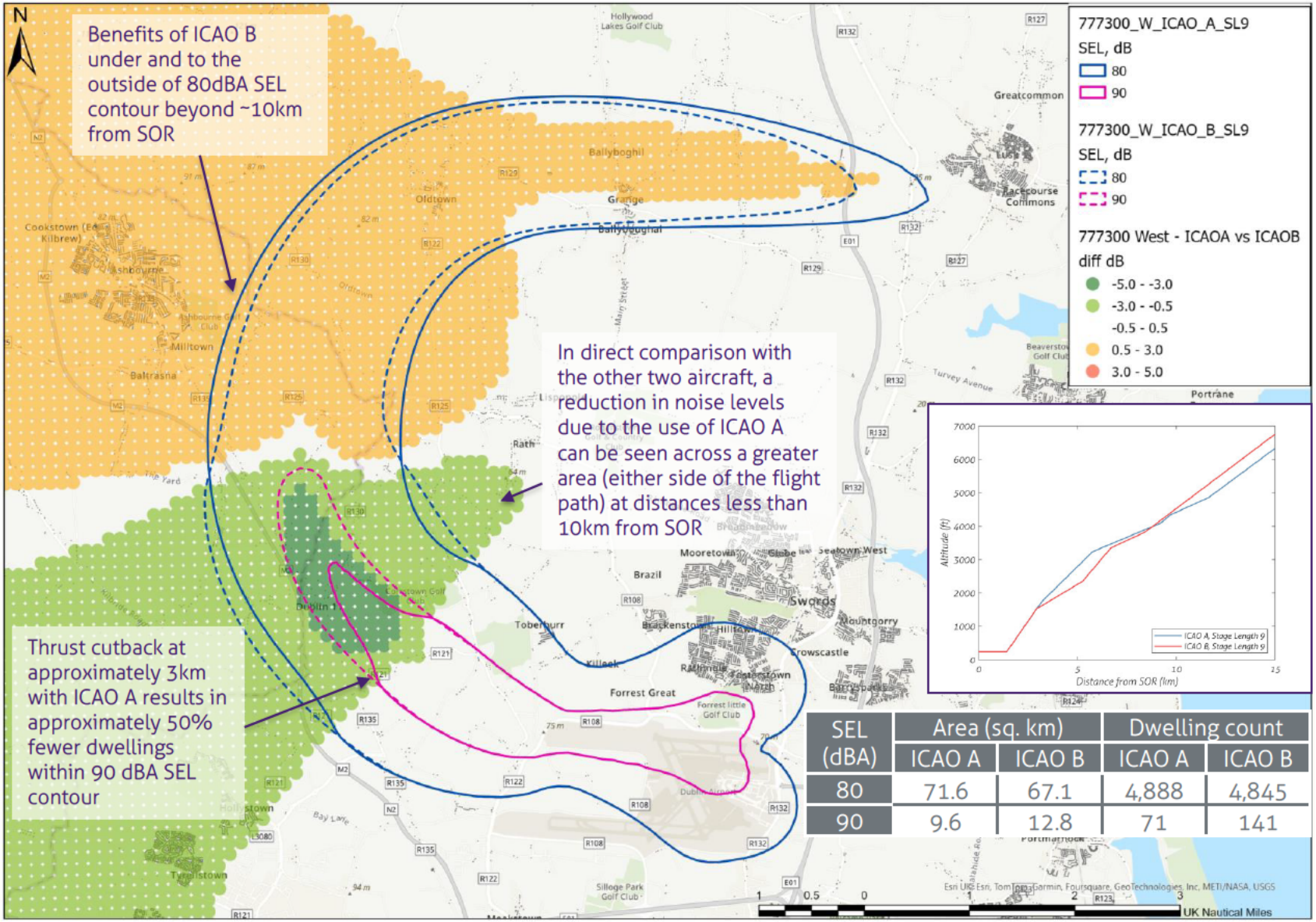
Data indicates ICAO A currently dominates (~96%). Substantial benefit (c.4dB) from ICAO A around 90 dBA SEL, 5km from start of roll.



SEL (dBA)	Area (sq. km)		Dwelling count	
	ICAO A	ICAO B	ICAO A	ICAO B
80	33.0	29.6	3,427	3,050
90	4.1	5.2	11	20

What difference does procedure make to 777-300ER event noise levels?

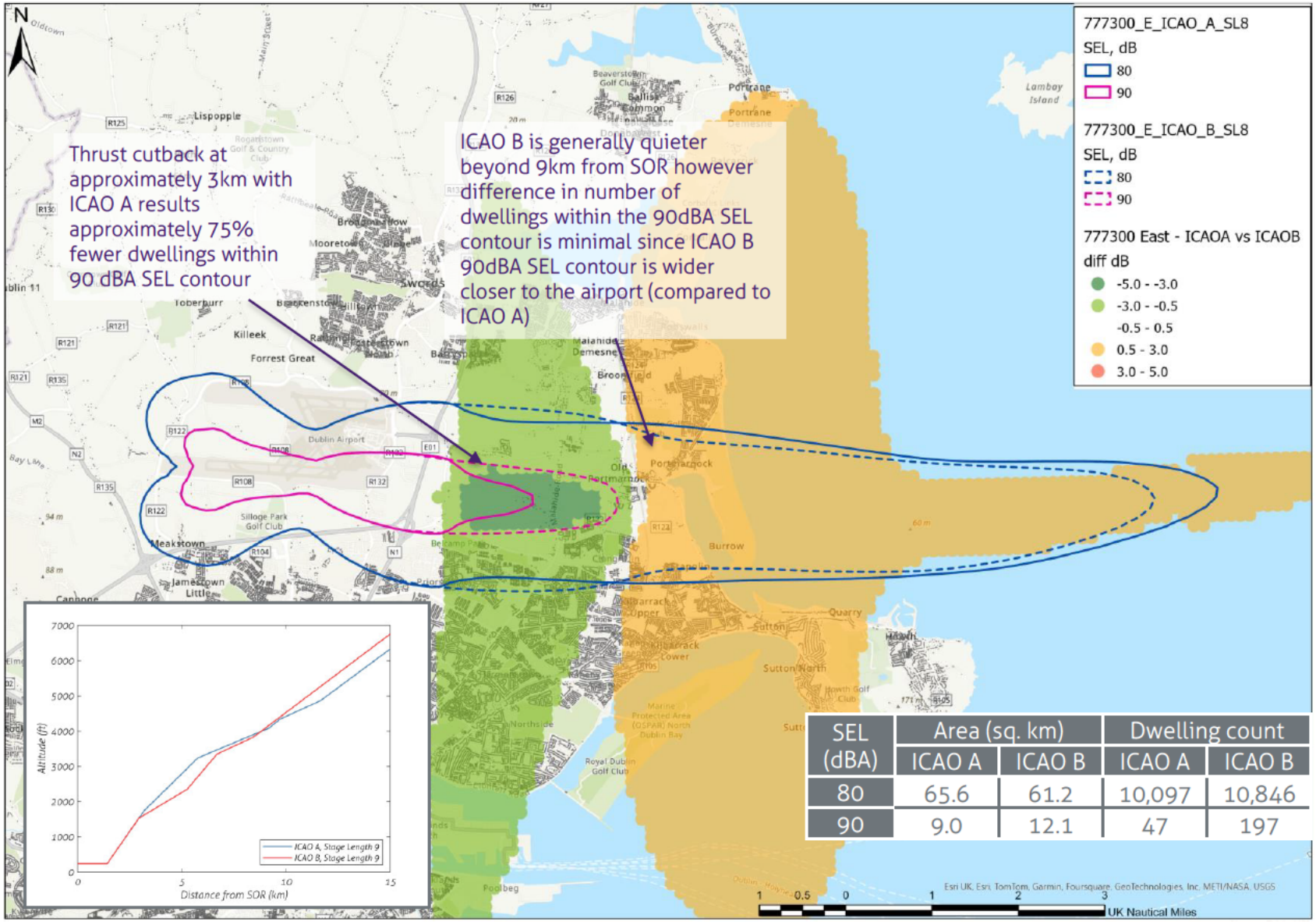
Data indicates ICAO A currently dominates . Substantial benefit (c.4dB) from ICAO A around 90 dBA SEL, 7kmfrom start of roll.



SEL (dBA)	Area (sq. km)		Dwelling count	
	ICAO A	ICAO B	ICAO A	ICAO B
80	71.6	67.1	4,888	4,845
90	9.6	12.8	71	141

What difference does procedure make to 777-300ER event noise levels?

Data indicates ICAO A currently dominates . Substantial benefit (c.4dB) from ICAO A around 90 dBA SEL, 5.kmfrom start of roll.



SEL (dBA)	Area (sq. km)		Dwelling count	
	ICAO A	ICAO B	ICAO A	ICAO B
80	65.6	61.2	10,097	10,846
90	9.0	12.1	47	197

What effect does stage length (i.e. height) have on aircraft event noise levels?

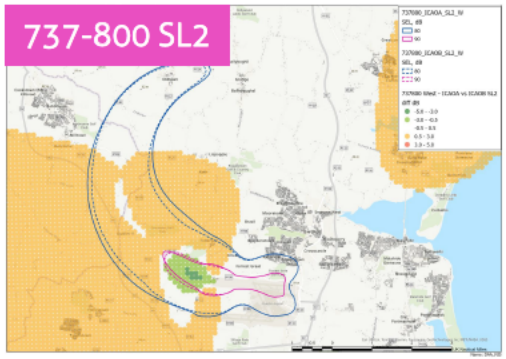
Summary

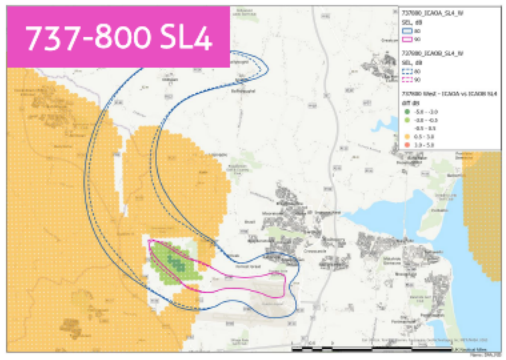
Stage length is the proxy that AEDT uses for the height element of the climb profile. A lower stage length number implies a shorter flight resulting in a higher aircraft.

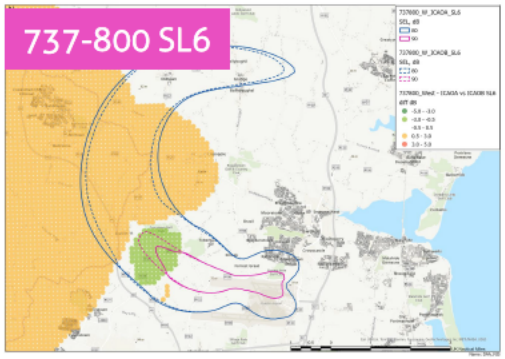
The images to the right present the difference and SEL contours for Stage Lengths (SLx) 2, 4 and 6 for an 737-800 aircraft. The following 3 pages present these in larger form.

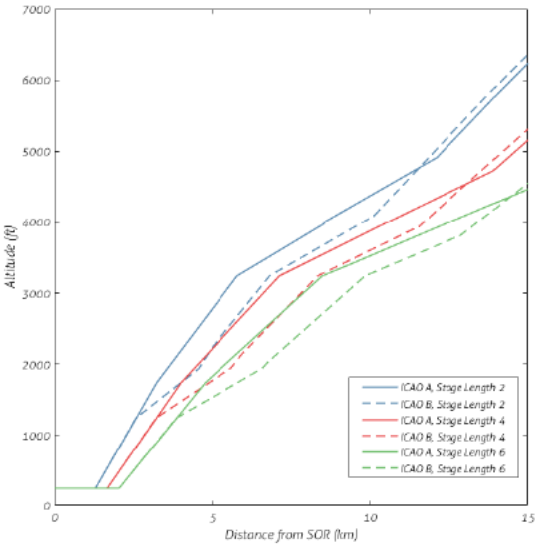
It can be seen that the noise levels are lower within the 90dBA SEL contour directly under the flight path on ICAO A departures. This area moves away from the airport with increasing stage length.

On ICOA A departures, the 737-800 is substantially higher than with ICAO B at a given distance and stage length – especially in the 4-6km range. This additional height (resulting in a more direct line of sight and less ground attenuation) contributes to the worsening of sideline noise.



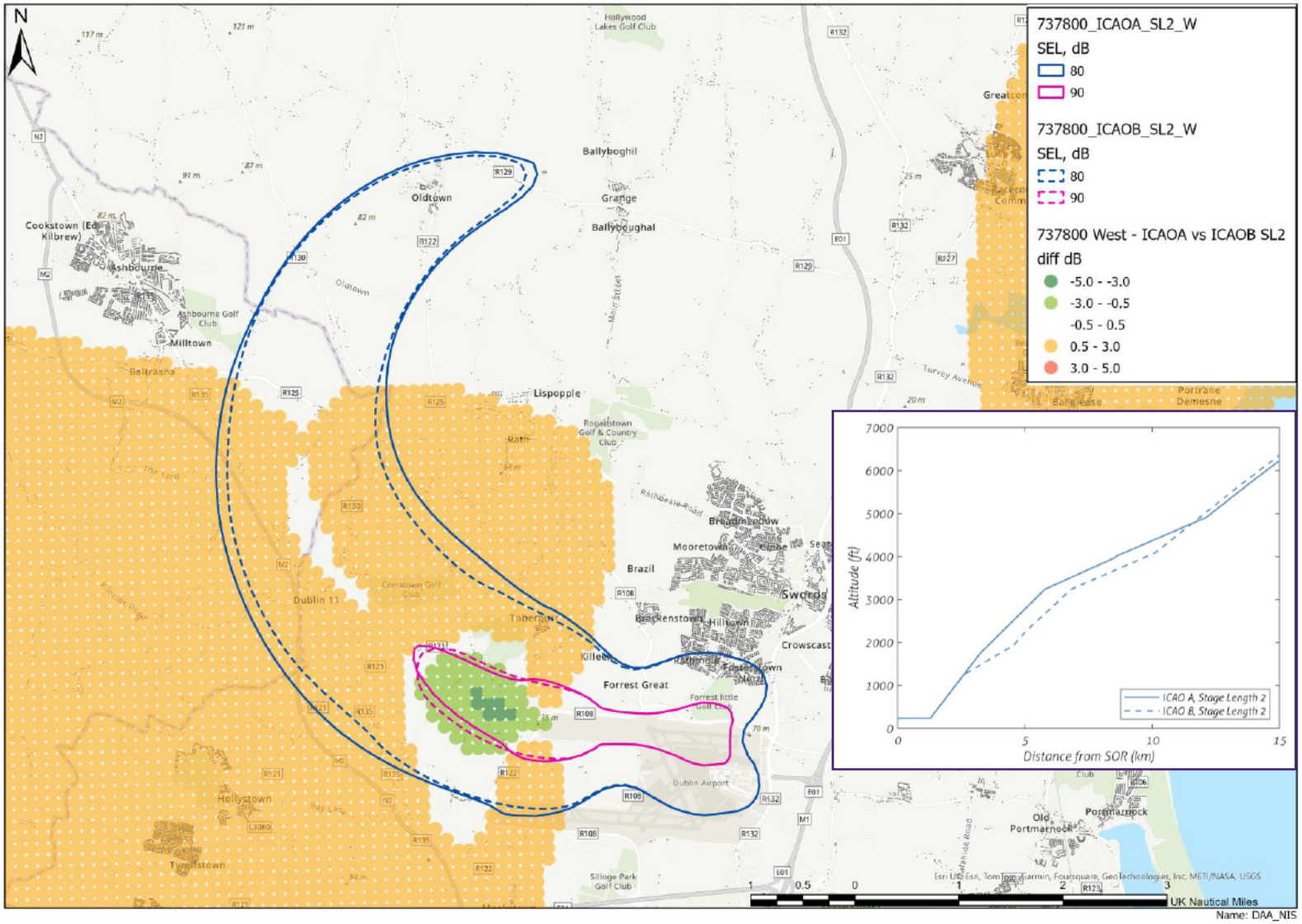






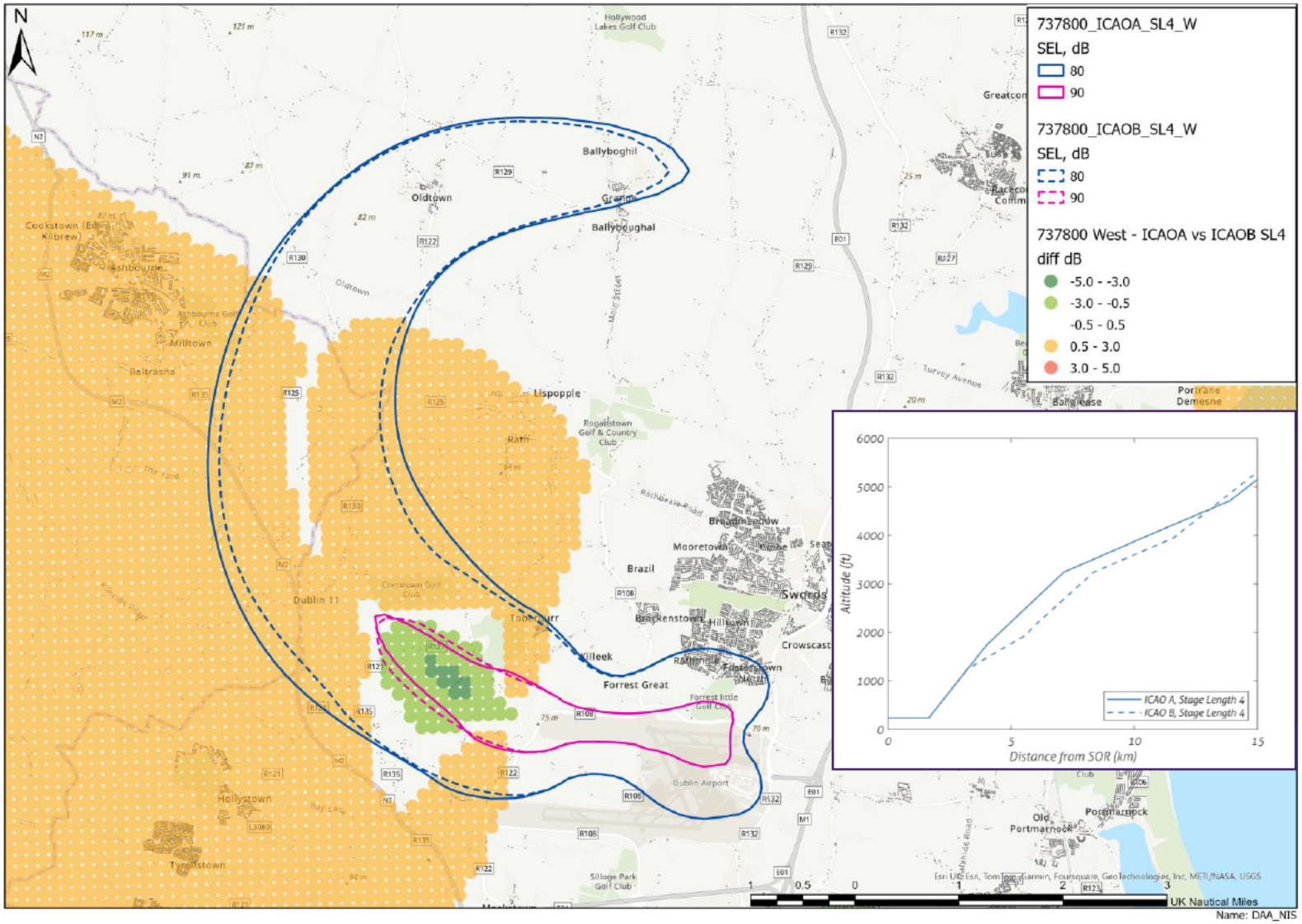
What effect does stage length (i.e. height) have on aircraft event noise levels?

737-800 Stage Length 2



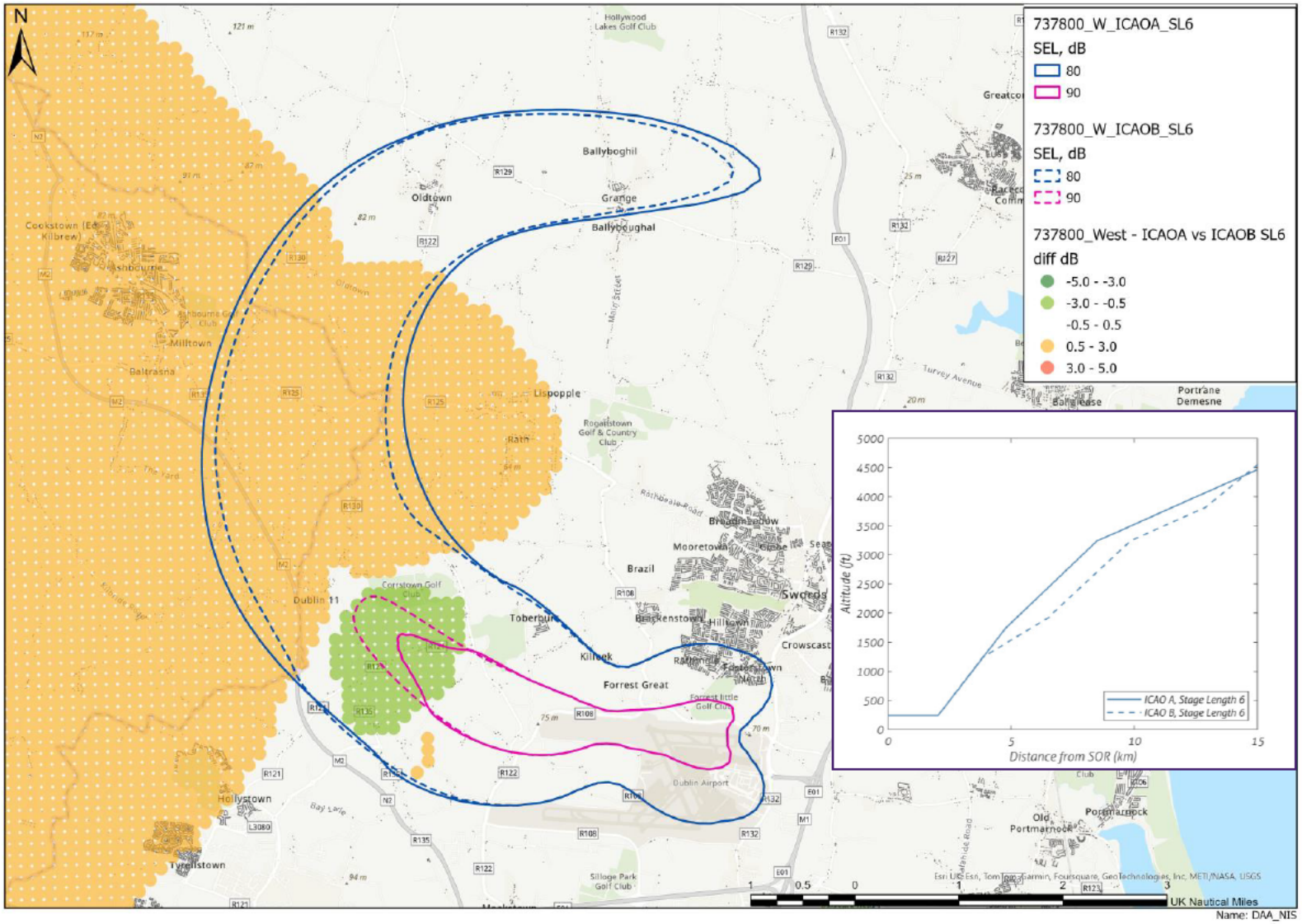
What effect does stage length (ie height) have on aircraft event noise levels?

737-800 Stage Length 4



What effect does stage length (ie height) have on aircraft event noise levels?

737-800 Stage Length 6



Contents

Procedure analysis indicates ICAO-A (or equivalent) is dominant

- Of more than 650 departure tracks analysed, around 73% are ICAO-A or an equivalent, the remainder are ICAO-B or an equivalent.
- The proportion of ICAO A departures appears to be greater (84%) when the airport is on westerly operations.

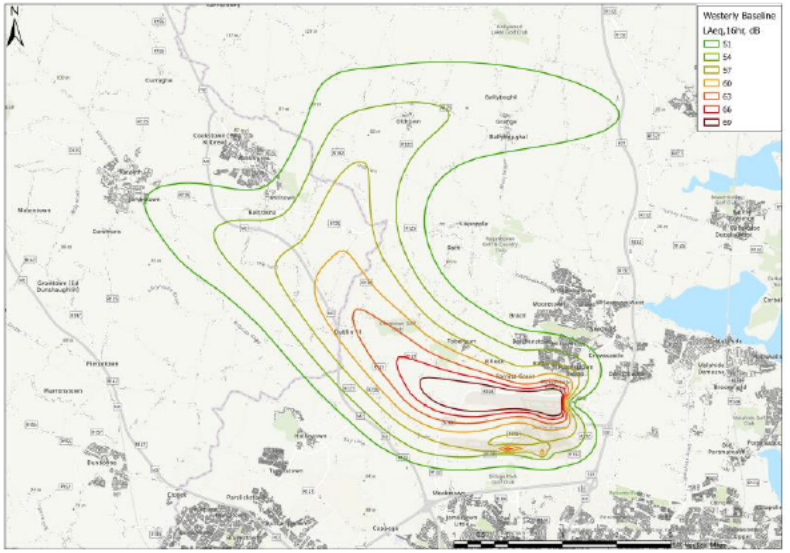
Departure Procedure	Westerly	Easterly	All
ICAO A	84%	61%	73%
ICAO B	16%	39%	27%
Total	100%	100%	100%

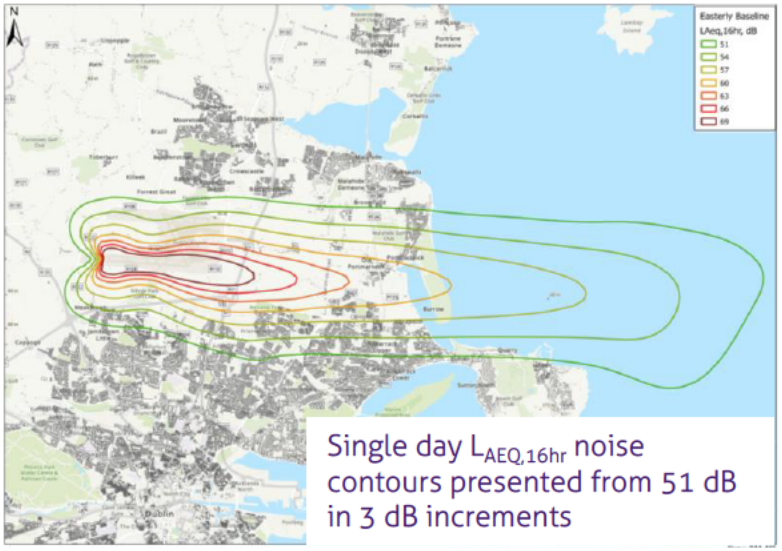
- [redacted] appear to have preference for flying for ICAO A on westerly departures and ICAO B on easterly departures
- [redacted] tend to fly ICAO A regardless of wind direction

Airline	Westerly			Easterly			Total			Total %		
	ICAO A	ICAO B	Total	ICAO A	ICAO B	Total	ICAO A	ICAO B	Total	ICAO A	ICAO B	Total
[redacted]	111	25	136	42	88	130	153	113	266	58%	42%	100%
[redacted]	74	7	81	76	12	88	150	19	169	89%	11%	100%
[redacted]	36	0	36	32	0	32	68	0	68	100%	0%	100%
[redacted]	3	4	7	3	4	7	6	8	14	43%	57%	100%
[redacted]	4	1	5	3	1	4	7	2	9	78%	22%	100%
[redacted]	3	1	4	3	2	5	6	3	9	67%	33%	100%
[redacted]	2	2	4	5	0	5	7	2	9	78%	22%	100%
[redacted]	4	0	4	4	0	4	8	0	8	100%	0%	100%
[redacted]	2	3	5	1	1	2	3	4	7	43%	57%	100%
[redacted]	1	2	3	2	2	4	3	4	7	43%	57%	100%
Other	47	9	56	28	16	44	75	25	100	75%	25%	100%
Total	287	54	341	199	126	325	486	180	666	73%	27%	100%

Contents

Daytime average noise levels: Average noise ($L_{Aeq,16hr}$) contours have been derived for one easterly day and one westerly day.





Single day $L_{AEQ,16hr}$ noise contours presented from 51 dB in 3 dB increments

Contents

Investigating the difference change of procedure would make to overall average noise levels.

Average $L_{Aeq,16hr}$ noise contours have been developed for a **single westerly and a single easterly day** using the "best fit" profile method described previously – this had approximately 84% ICAO A, 16% ICAO B on westerly operations and 61% ICAO A and 39% ICAO B on easterly operations.

The implications for these westerly and easterly days have been investigated using the following two cases:

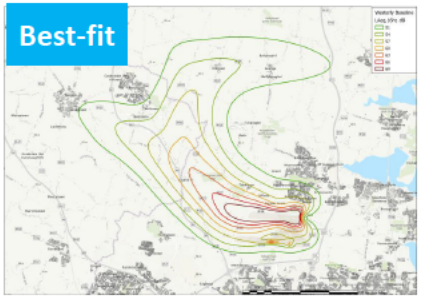
- All flights with an ICAO A profile; and
- All flights with an ICAO B profile.

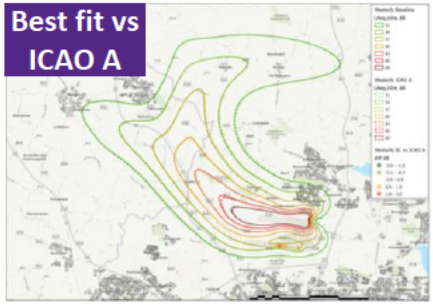
Differences have been derived and mapped using GIS:

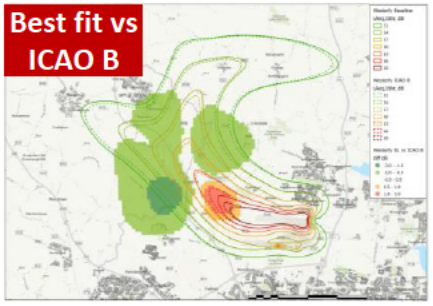
- between the current best fit and ICAO A result;
- between the current best fit and ICAO B result;
- between a case where all flights ICAO A and where all flights were ICAO B.

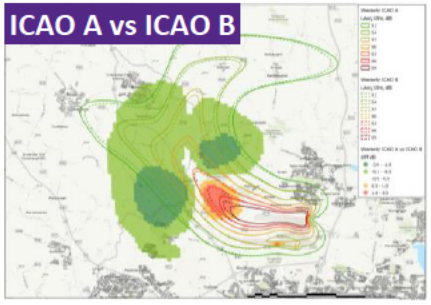
In summary, the results indicate that the choice of departure procedure would have a minimal impact on the number of dwellings within key contours on westerly operations however on easterly operations communities around Dublin Airport may experience a modest benefit from the adoption of an ICAO-B type procedure.

This analysis has made an implicit assumption that the average climb profile stage-length would be the same if flying ICAO-A or ICAO-B, ie a SL5 ICAO-B departure would move to an ICAO-A SL5 departure.

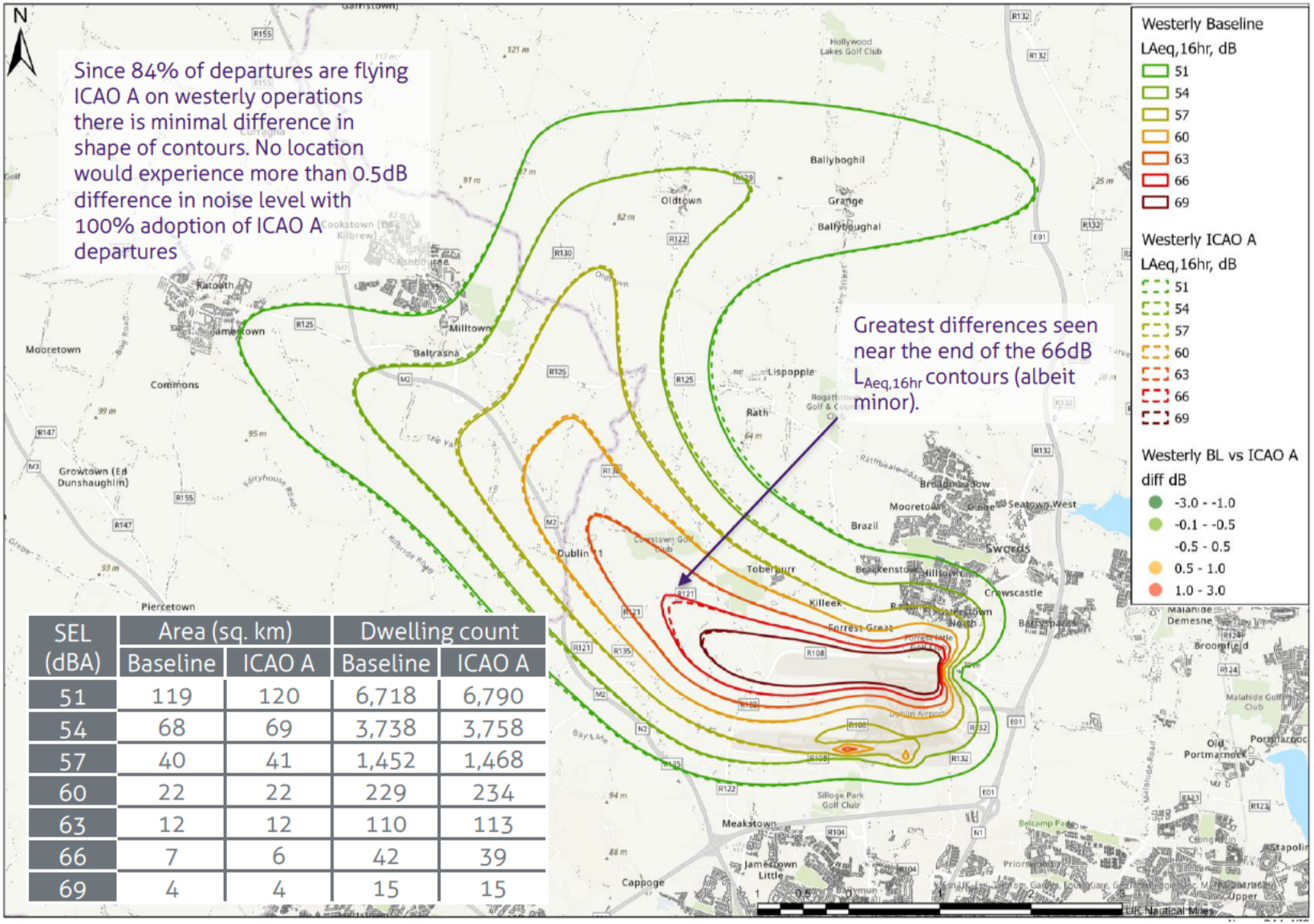






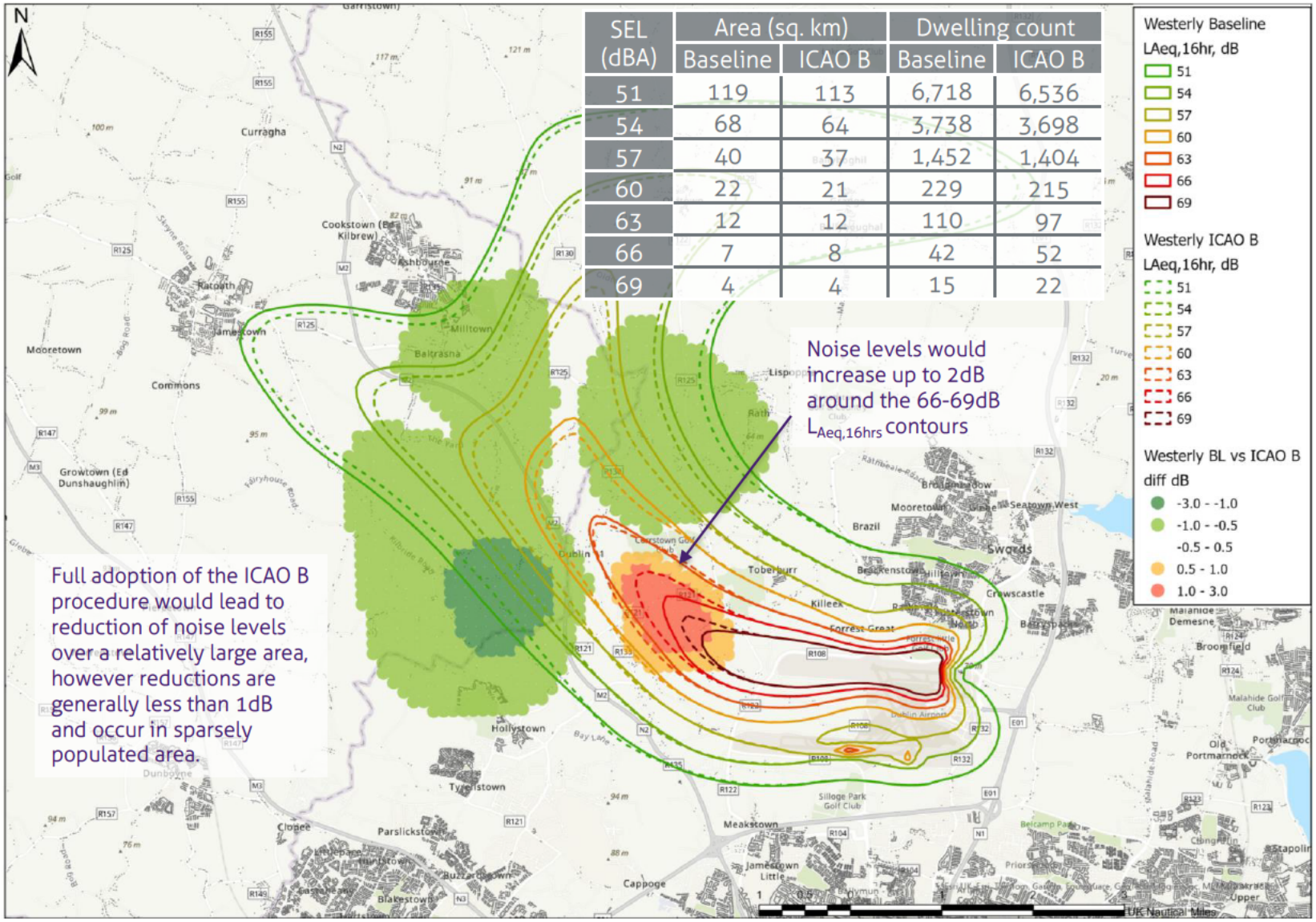


Westerly day. Comparison of baseline to 100% ICAO A departures.



SEL (dBA)	Area (sq. km)		Dwelling count	
	Baseline	ICAO A	Baseline	ICAO A
51	119	120	6,718	6,790
54	68	69	3,738	3,758
57	40	41	1,452	1,468
60	22	22	229	234
63	12	12	110	113
66	7	6	42	39
69	4	4	15	15

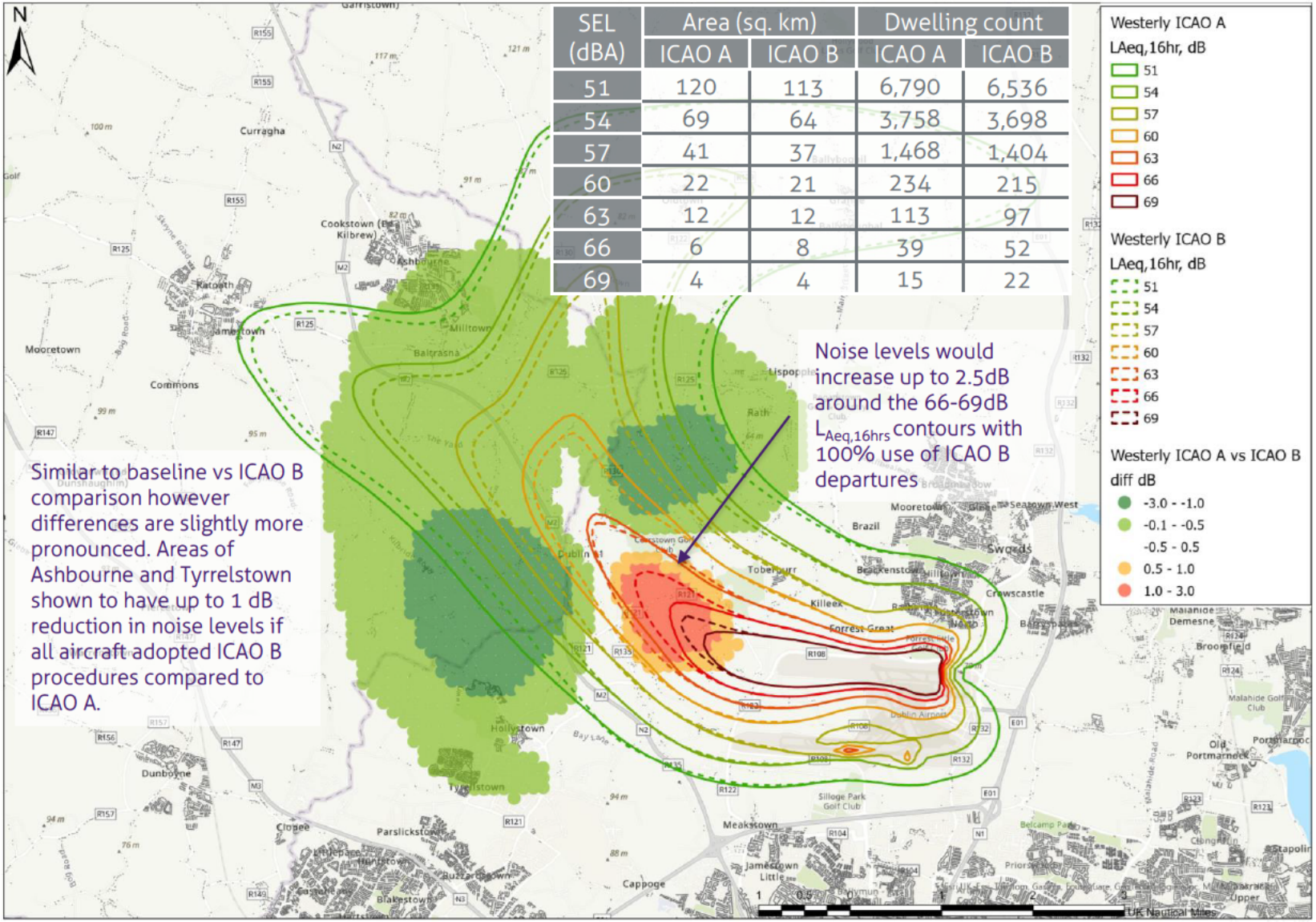
Westerly day. Comparison of baseline to 100% ICAO B departures.



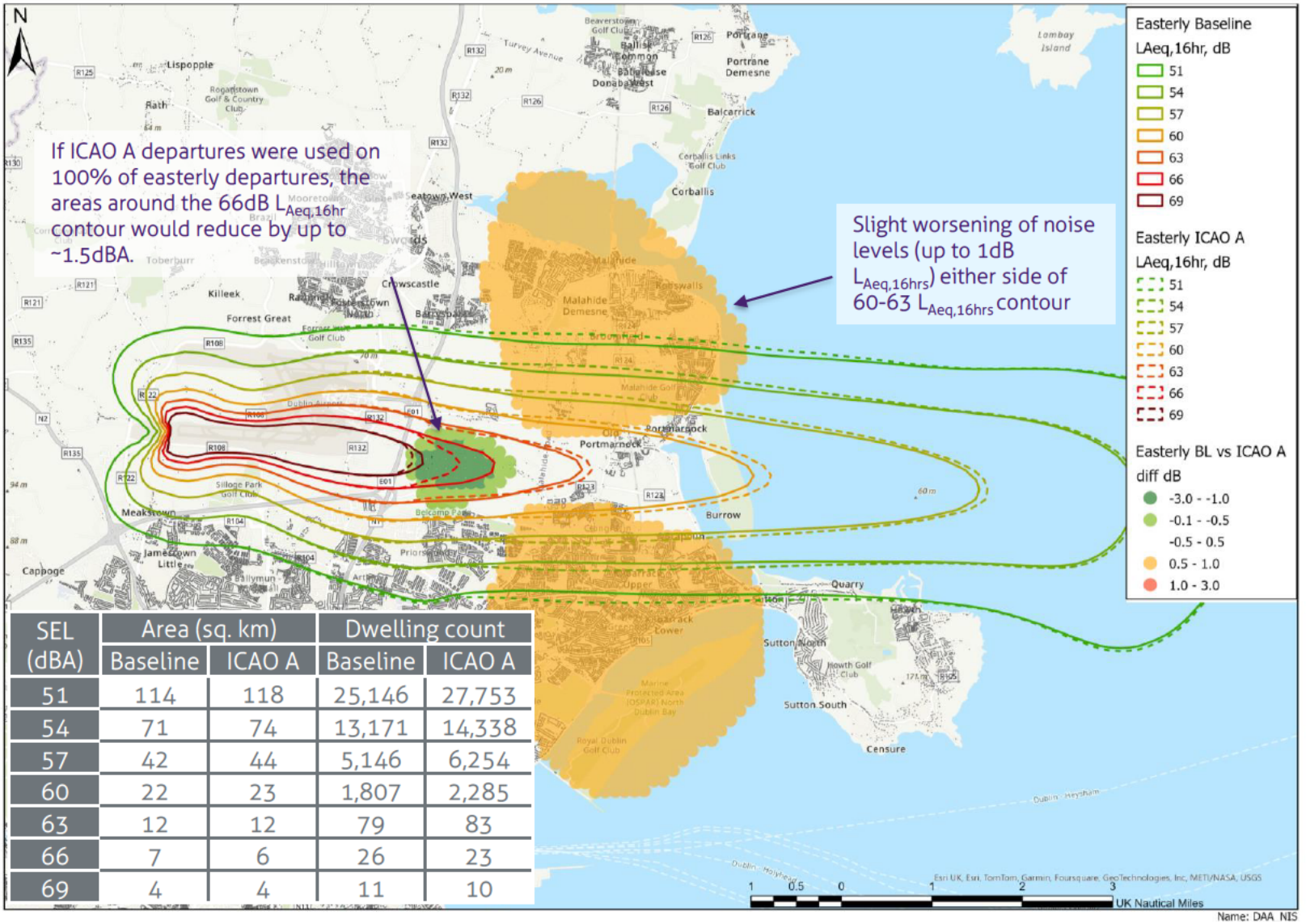
SEL (dBA)	Area (sq. km)		Dwelling count	
	Baseline	ICAO B	Baseline	ICAO B
51	119	113	6,718	6,536
54	68	64	3,738	3,698
57	40	37	1,452	1,404
60	22	21	229	215
63	12	12	110	97
66	7	8	42	52
69	4	4	15	22

Westerly day. Comparison of 100% ICAO A to 100% ICAO B departures.

SEL (dBA)	Area (sq. km)		Dwelling count	
	ICAO A	ICAO B	ICAO A	ICAO B
51	120	113	6,790	6,536
54	69	64	3,758	3,698
57	41	37	1,468	1,404
60	22	21	234	215
63	12	12	113	97
66	6	8	39	52
69	4	4	15	22

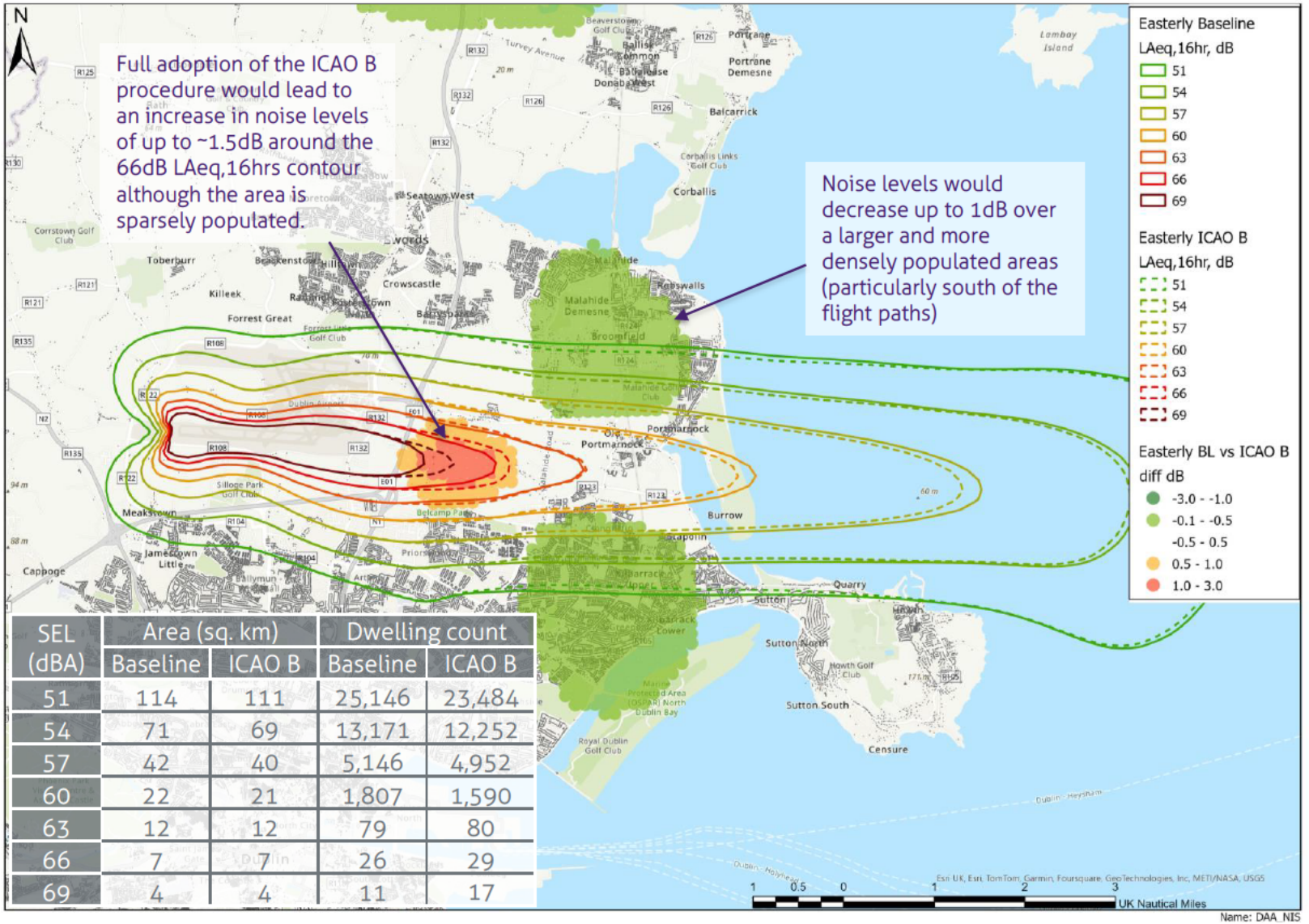


Easterly day. Comparison of baseline to 100% ICAO A departures.



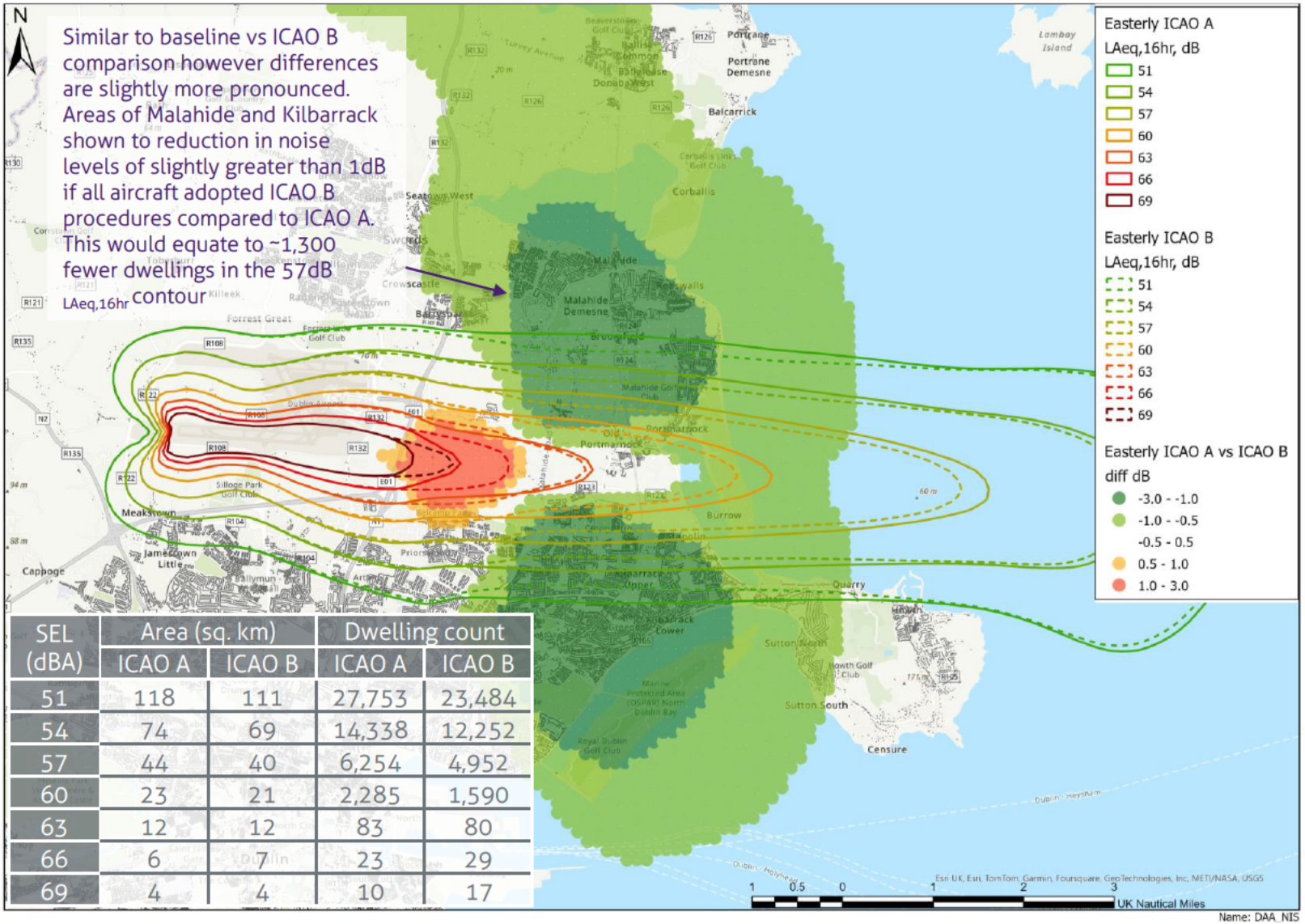
SEL (dBA)	Area (sq. km)		Dwelling count	
	Baseline	ICAO A	Baseline	ICAO A
51	114	118	25,146	27,753
54	71	74	13,171	14,338
57	42	44	5,146	6,254
60	22	23	1,807	2,285
63	12	12	79	83
66	7	6	26	23
69	4	4	11	10

Easterly day. Comparison of baseline to 100% ICAO B departures.



SEL (dBA)	Area (sq. km)		Dwelling count	
	Baseline	ICAO B	Baseline	ICAO B
51	114	111	25,146	23,484
54	71	69	13,171	12,252
57	42	40	5,146	4,952
60	22	21	1,807	1,590
63	12	12	79	80
66	7	7	26	29
69	4	4	11	17

Easterly day. Comparison of 100% ICAO A to 100% ICAO B departures.



SEL (dBA)	Area (sq. km)		Dwelling count	
	ICAO A	ICAO B	ICAO A	ICAO B
51	118	111	27,753	23,484
54	74	69	14,338	12,252
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63	12	12	83	80
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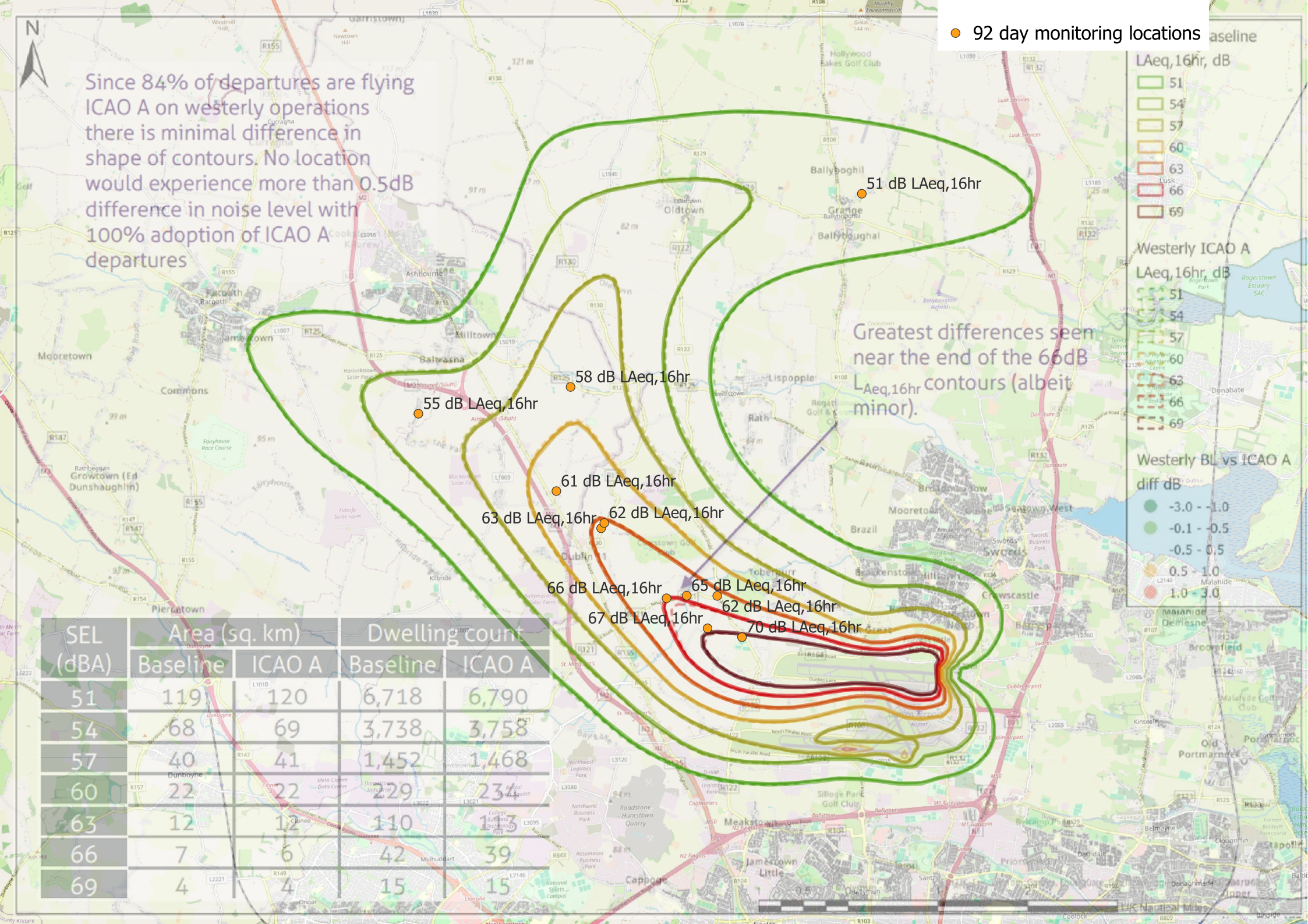
Contents

Summary. Adopting ICAO-B as standard departure procedure on easterly operations could reduce the number of people exposed to aircraft noise > 60 dB $L_{Aeq,16hr}$

The implications of the two NADP families on noise exposure from departures from Dublin Airport has been investigated using modelling tools.

- Analysis indicates that around 73% of departures are using an ICAO A or equivalent procedure.
- At the individual aircraft event level, ICAO A shows clear benefits over ICAO B of up to ~4dB for those under the flight path, but to the sideline there can be an increase in noise level possibly due to height differences that result from the procedures.
- Westerly Operations:
  - There would be little change to the noise environment to the west of the airport if all aircraft adopted the ICAO A profile since 85% of departures already use the ICAO A profile.
  - If all aircraft switched to the ICAO B profile there would be areas within the 66dB $L_{Aeq16hr}$ contour that would experience an increase in noise levels of up to 2dB while a larger area, predominantly outside the 60dB $L_{Aeq,16hr}$ contour, would experience up to a 1dB decrease in average noise levels. Due to the population distribution the number of dwellings in each contour band would not change significantly.
- Easterly Operations:
  - Noise levels would decrease up to 1.5dB within the 66dB $L_{Aeq,16hr}$ contour with 100% ICAO A departures while areas to the side of the main flight path would increase up to 1dB increasing the number of dwellings within the 57dB $L_{Aeq,16hr}$ contour by 1,100 compared to the current mix of profiles.
  - Conversely, noise levels would increase up to 1.5dB within the 66dB $L_{Aeq,16hr}$ contour with 100% ICAO B departures while areas to the side of the main flight path would decrease up to 1dB decreasing the number of dwellings within the 57 and 60dB $L_{Aeq,16hr}$ contour by 200. This would represent a 12% decrease in dwellings within 60dB $L_{Aeq,16hr}$ contour (and 4-7% decrease in the number of dwellings in the 51-57dB $L_{Aeq,16hr}$ contours) .

Appendix I - 2



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Appendix J

also note Mr. Lumley's statement as to the unsatisfactory manner in which interactions have been addressed suggesting that it would be optimally addressed in a separate chapter. While noted, again the regulations do not dictate the actual manner in which the EIS is to be laid out.

A number of the appellants have detailed areas where they believe the EIS fails in terms of identifying the effects of the project. In the general context I would concur with the view expressed by Mr. O'Donnell that an EIS is not required to identify every likely effect of the proposal but the '*likely significant* effects'. In my opinion the word *significant* is of material importance. If every likely effect is required to be detailed the production of an EIS would be virtually impossible.

However of great import at this juncture is Mr. Thornely-Taylor's view that as the noise section of the EIS fails to describe the likely 'significant' effects of the project it therefore fails to meet the requirements of the regulations. Undoubtedly noise is a material issue arising in the case and I note that the matter of significance was discussed at the oral hearing with further details sought by way of a section 132 notice consequent to same. Notwithstanding same Mr. Thornely-Taylor's interpretation of the Regulations in terms of the requirements of the EIS document would appear to be correct and the failure to deal with same is certainly a notable omission. As to whether this omission would prejudice the validity of the document is open to question and, as suggested by Mr. Thornely-Taylor, the Board may wish to seek legal advice on this matter.

As to the adequacy of the actual information in the EIS it is my opinion that the Environmental Impact Statement effectively provides the starting point within the larger Environmental Impact Assessment process of which the Board is involved in. I would suggest that the statement should be seen as a contribution towards the process of making available to the relevant decision maker, in this case the Board, the information necessary to enable the decision to be made. The document before the Board was prepared and lodged to the planning authority in December 2004 and it is reasonable to infer that the information provided was relevant at the time of the drawing up of the document. It is also reasonable to expect that relevant information may change and evolve during the EIA and decision making process. In this case new and additional information has been submitted by way of further information, clarification of further information, at the Oral Hearing and by way of response to section 132 notices. I submit that it is reasonable that this information be taken into account by the Board in making its decision. In my opinion the substantive issue is whether the information now before the Board is sufficient to enable it to make a proper assessment of the current proposal and to adjudicate on the potential impacts of the proposed development. I propose that this issue of adequacy is best addressed under the relevant sections of this assessment.

CONDITIONS

1. The development shall be carried out in accordance with the plans and particulars and the Environmental Impact Statement lodged with the application as amended by the further plans and particulars received by the planning authority on the 9th day of August, 2005, including the Environmental Impact Statement Addendum, and the 3rd day of March, 2006 and received by An Bord Pleanála on the 30th day of August, 2006, the 5th day of March, 2007 and in the oral hearing, except as may otherwise be required in order to comply with the following conditions.

   Reason: In the interest of clarity.

2. This permission is for a period of 10 years from the date of this order.

   Reason: In the interest of clarity.

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 9th 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.