

Variation No. 1 of the Fingal Development Plan 2017-2023 was adopted at a Council meeting on 9th December 2019. The variation explained the following:

## Noise

Noise Zones have been prepared in relation to aircraft noise associated with Dublin Airport as outlined in Table 7.2 below and supported by the following objectives. The approach taken in preparing these noise zones is considered to be supportive of National Policy Objective 65 set out in the Department of Housing Planning and Local Government (DHPLG) National Planning Framework 2040, February 2018, to:

*"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".*

This approach also has regard for land use planning which is a component of the ICAO Balanced Approach to Aircraft Noise Management, as set out under EU Regulation 598/2014. This approach is therefore considered also to align with the key objective set out in the Dublin Airport Noise Action Plan 2019, which is:

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

There is a need to minimise the adverse impact of noise without placing unreasonable restrictions on development and to avoid future conflicts between the community and the operation of the airport. Three noise zones are shown in the Development Plan maps, Zones B and C within which the Council will continue to restrict inappropriate development, and Zone A within which new provisions for residential development and other noise sensitive uses will be actively resisted. An additional assessment zone, Zone D is also proposed to identify any larger residential developments in the vicinity of the flight paths serving the Airport in order to promote appropriate land use and to identify encroachment.

Table 7.2 presents the four aircraft noise zones and the associated objective of each zone along with an indication of the potential noise exposure from operations at Dublin Airport. The zones are based on potential noise exposure levels due to the airport using either the new northern or existing southern runway for arrivals or departures.

The noise zoning system has been developed with the overarching objective to balance the potential impact of aircraft noise from the Airport on both external and internal noise amenity. This allows larger development which may be brought forward in the vicinity of the Airport's flight paths to be identified and considered as part of the planning process. The focus of the noise zones is to ensure compatibility of residential development and ensuring compatibility with pertinent standards and guidance in relation to planning and noise, namely:

- National Planning Framework 2040, DHPLG, February 2018;
- ProPG: Planning & Noise – New Residential Development, May 2017;
- British Standard BS8233:2014 'Guidance on sound insulation and noise reduction for
- buildings'; and
- ICAO guidance on Land-use Planning and Management in Annex 16, Volume I, Part IV and in
- the ICAO Doc 9184, Airport Planning Manual, Part 2 — Land Use and Environmental Control.

Where development includes other non-residential noise sensitive receptors, alternative design guidance will need to be considered by the developer. Non-residential buildings and uses which are viewed as being noise sensitive within the functional area of FCC include hospitals, residential care facilities and schools.

Table 7.2 Aircraft Noise Zones		
Zone	Indication of Potential Noise Exposure during Airport Operations	Objective
D	<p>≥ 50 and &lt; 54 dB LAeq, 16hr and ≥ 40 and &lt; 48 dB Lnight</p>	<p>To identify noise sensitive developments which could potentially be affected by aircraft noise and to identify any larger residential developments in the vicinity of the flight paths serving the Airport in order to promote appropriate land use and to identify encroachment.</p> <p><i>All noise sensitive development within this zone is likely to be acceptable from a noise perspective. An associated application would not normally be refused on noise grounds, however where the development is residential-led and comprises nonresidential noise sensitive uses, or comprises 50 residential units or more, it may be necessary for the applicant to demonstrate that a good acoustic design has been followed.</i></p> <p><i>Applicants are advised to seek expert advice.</i></p>
C	<p>≥ 54 and &lt; 63 dB LAeq, 16hr and ≥ 48 and &lt; 55 dB Lnight</p>	<p>To manage noise sensitive development in areas where aircraft noise may give rise to annoyance and sleep disturbance, and to ensure, where appropriate, noise insulation is incorporated within the development</p> <p><i>Noise sensitive development in this zone is less suitable from a noise perspective than in Zone D. A noise assessment must be undertaken in order to demonstrate good acoustic design has been followed.</i></p> <p><i>The noise assessment must demonstrate that relevant internal noise guidelines will be met. This may require noise insulation measures.</i></p> <p><i>An external amenity area noise assessment must be undertaken where external amenity space is intrinsic to the development's design. This assessment should make specific consideration of the acoustic environment within those spaces as required so that they can be enjoyed as intended. Ideally, noise levels in external amenity spaces should be designed to achieve the lowest practicable noise levels.</i></p>

		<i>Applicants are strongly advised to seek expert advice.</i>
A	$\geq 63 \text{ dB LAeq, 16hr}$ and/or $\geq 55 \text{ dB Lnight}$	<p>To resist new provision for residential development and other noise sensitive uses.</p> <p><i>All noise sensitive developments within this zone may potentially be exposed to high levels of aircraft noise, which may be harmful to health or otherwise unacceptable. The provision of new noise sensitive developments will be resisted.</i></p>
<p>Notes:</p> <ul style="list-style-type: none"> <li>• 'Good Acoustic Design' means following the principles of assessment and design as described in ProPG: Planning &amp; Noise – New Residential Development, May 2017;</li> <li>• Internal and External Amenity and the design of noise insulation measures should follow the guidance provided in British Standard BS8233:2014 'Guidance on sound insulation and noise reduction for buildings'</li> </ul>		

We note that one of the guidance documents used to formulate the various noise zones is 'ProPG Planning & Noise New Residential Development, May 2017' and at the footnote to table 7.2 Aircraft Noise Zones it is noted that "Good Acoustic Design" means following the principles of assessment at design described in ProPG Planning & Noise – New Residential Development, May 2017.

We note at Noise Zone A where the noise is greater than or equal to 63 dB LAeq, 16hr and for 55 dB Lnight that all noise sensitive development within this zone may potentially be exposed to high levels of aircraft noise which may be harmful to health or otherwise unacceptable. The provision of new noise sensitive developments will be resisted.

It is therefore quite clear that Fingal County Council have introduced this restriction in Zone A on health grounds and in order to protect the health of people from aircraft noise by preventing residential development in Zone A as per the accompanying map attached.

Attached is FIG 2 taken from the ProPG Guidance. We note reference to sleeping in bedrooms between 23.00 and 7.00 hours that the maximum recommended noise level is 30 dB LAeq, 9hr and for a single event 45 dB LAmax. We note footnote 4 which states "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 45dB LAmax more than 10 times a night. However, when it is not reasonably practicable to achieve the guidance on the maximum noise levels but also on factors such as the source, number, distribution, predictability, and regularity of noise events (see appendix A).

Then at section A19 of Appendix A having gone through the issues associated with LAmax noise events it concludes that "in the light of the above it is clear, as recognised by BS8233 that the effects of noise on sleep from individual noise effects are an important consideration and that the initial site noise risk assessment should include the consideration of the individual noise events when the external LAmax exceeds 60 dB more than 10 times a night. A site should be regarded as high risk if the LAmax exceeds or is likely to exceed 80 dB more than 20 times a night. We note that the ProPG document refers continuously to the advice of the World Health Organisation (WHO) on this issue, and which is in line with the above.

We refer to the map SK/01 attached. We note that within the documentation submitted with the application are a number of instances of LAmax noise contours have been produced for only some types of aircraft in use at Dublin Airport. The aircraft in SK/01 is an Airbus A-330-300. The areas shaded in black are the LAmax 80dB for both runways to the west i.e., the St. Margaret's The Ward area. Obviously, the number of events at night are dependent on the number of this type of aircraft, however we note from the data presented that taken together with the other aircraft, this puts the shaded area in the high risk area.

Below is Figure 12 taken from the submitted documentation by DAA for LAmax at the Bay Lane Location NMTI which is 6.5km away from the start of the existing south runway most houses in St. Margaret's are far closer than this and therefore it follows are exposed to high levels of LAmax. Also, in total from the figures submitted by DAA for the 2<sup>nd</sup> half of 2019 noise records reports approximately 70% of all flights for the whole day were greater than 75 dB LAmax and 26% were greater than 78 dB LAmax.

Figure 12 shows the  $L_{A,MAX}$  distribution, for aircraft noise, for the second half year of 2019 for NMT 1.

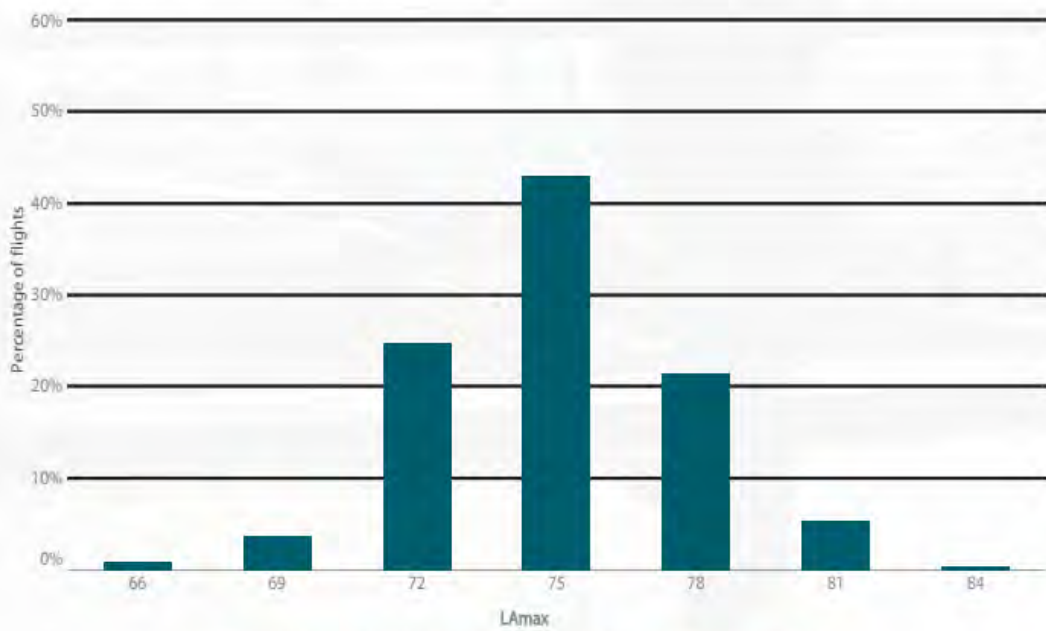


Figure 12:  $L_{A,MAX}$  levels distribution for NMT 1, July – December 2019

If sound insulation was acceptable for night insulation (which it most certainly is not as explained below). It would also not solve this problem as we have found out from sample noise readings inside bedrooms that have been recently insulated by DAA.

Very good sound insulation and window replacement could achieve a sound transmission reduction to the highest level of 30 dB and if the 5 dB improvement in sound insulation, as claimed by DAA is achieved through its insulation programme then this only equates to a reduction of 35 dB at most. Therefore, in most instances within the shaded areas in map SK/01  $L_{A,MAX}$  events due to aircraft within a bedroom will be greater than 45 dB  $L_{A,MAX}$ . Therefore, even if noise insulation is provided and as we have monitored in insulated houses, the noise levels within bedrooms will be exceeded over and above 45 dB  $L_{A,MAX}$  many times a night.

We refer to the TFT response to RFI 93 within the document submitted and in particular item (b).

The request was “the applicant is required to demonstrate the benefits of the proposed insulation scheme. Having regard for the €20,000 grant and the types of measures which can be afforded for the properties, included within the proposed eligibility boundary, information should be provided to demonstrate.

(b) How ventilation and overheating is to be addressed through the scheme"

The reply by TFT is as follows;

"Background ventilation to comply with building regulations Part F will be provided by way of either passive or mechanical ventilation to be selected by the owner of the property and permanent passive ventilation where required. As with the current scheme our primary aim is to mitigate against aircraft noise. In this regard, the matter of overheating in Ireland climate was not considered an issue of sufficient scale to warrant addition of mitigation to the very extensive number of measures already provided by the scheme."

Now everybody knows that the noise insulation scheme being provided under the existing scheme is in accordance with the current planning permission and is to mitigate against daytime noise only.

TFT and other consultants have taken it for granted that a noise insulation scheme is an acceptable mitigation measures for night noise also.

Residents are entitled to enjoy their house particularly at night and to be allowed to sleep with their windows open in a safe and healthy environment as they always have had up until this relevant action has been suggested.

In the Summer, there is no other option but to open windows to prevent overheating in our houses, but of course, TFT have not considered this because they cannot provide mitigation for it and give an excuse as if they are doing us a favour by providing the minimalist of noise insulation. This in no way solves the ventilation or overheating issue.

Also, with respect to ANCA RFI 128, Bickerdike Allen Partners response to this issue does not address the night noise problem whatsoever.

The current voluntary Dwelling Purchase Scheme is to solve daytime noise above the 69 dB LAeq 16hr contour. It is not to solve the night time noise issue.

As stated above, even the houses within the contours shaded black on SK/01 cannot achieve the required indoor noise environment as set out by ProPG and WHO and have to be included in a voluntary dwelling purchase scheme or relocation scheme in order to protect their health and wellbeing.

Even closing all windows and enduring severe overheating in the summer will not protect residents from the harmful frequent noise events at night.

The same consultants Bickerdike Allen Partners refer in their submitted documentation on WHO guidelines as follows;

“The 1999 WHO Guidelines provide advice that for a good sleep, indoor sound pressure levels should not exceed approximately 45 dB LAmax more than 10-15 times per night. This guidance on internal noise levels remains current, accounting for sleeping with a bedroom window slightly open (and a reduction from outside to inside of 15 dB) this translated to an outside sound pressure level of 60 dB LAmax.

N60 Contours are therefore used in this assessment how, for a given point on the ground, the number of aircraft events producing a level of 60 dB LAmax or more will change between various scenarios.”

The proposed scenarios forecast for N60 Contours projected for 2025 on the easterly and westerly operations are set out on the attached figure 13c-38. It is stated in the documentation that the N60 Contours refer to night flights only.

Only a fraction of the population affected by these proposed night flight health interference activities are being proposed to be included in the Noise Insulation Scheme and yet DAA's own consultants are pointing out the potential health issues associated with this relevant action.

Again, we note that Fingal Planning Department took on board this exact same health advise when introducing the noise zones under variation #1 BUT as noted the area most affected by the noise from the airport are prohibited from construction of houses on health grounds, yet DAA propose to expose the residents of St. Margaret's The Ward to these noise situations in full knowledge of the health dangers of doing so.

There are numerous health studies and publications giving severe warnings of the serious health effect with respect to exposure to high noise events and frequent high noise events at night and its associated health effects from sleep deprivation as a result of noise.



What is also most concerning is the fact that an arm of Fingal County Council the Aircraft Noise Competent Authority (ANCA), are to be the official body which either refuse or sanction this relevant action and it is ANCA who will ultimately pay millions of Euros in compensation if they decide to expose residents to those extreme unhealthy noise conditions.

We note in the publication by ANCA "Aircraft Noise Mitigation at Dublin Airport overview of current systems and practices" under "Land -use planning and management" and "Property purchase and relocation schemes" it states "where aircraft noise could be harmful to health or quality of life, and could potentially result in an unacceptable living environment, schemes can be put in place to support those impacted to relocate. Property purchase and relocation schemes tend to result from either government intervention or planning decisions."

Therefore, even ANCA recognise that it is not the applicant in this case DAA who are going to propose such mitigation measures nor have they. They have not considered human health issues. The revised Ricondo Report does not include any mitigation measures regarding relocation etc. of the residents in the St. Margaret's The Ward area that are significantly affected from a health perspective with respect to the proposed relevant action which interferes with night time operations between the hours of 23.00 to 7.00 nor have they costed these mitigation measures.

It should be noted that all residents and dwellings affected by operations on the new North Runway between 23.00 and 7.00 are not affected by such operations currently and this will be a totally new noise situation that they will be exposed to that never existed previously. Yet Fingal County Planning Department upon consideration of all advice regarding health and planning issues decided to implement variation No. 1 to the current development plan taking into account all of the current guidance available and in particular ProPG Guidance. ANCA cannot now ignore this guidance in making their decision but if they do without providing mitigation measures to those now to be exposed to such seriously harmful noise events then there will without a doubt be legal action taken against them by the St. Margaret's The Ward Community for any and all health issues resulting from residents' exposure to noise.

No study or investigation of the population noted above which will be adversely affected by the "high risk" proposed noise situation particularly at night has been carried out by the DAA and we have been ignored in this regard.

Quite simply it appears to be money over human health as far as the DAA are concerned. The DAA could quite easily solve this by providing relocation to those seriously affected in the St. Margaret's The Ward area. They will in that circumstance obtain the lands most affected and this will balance out financially for them in the long run, regarding future development of these lands, re use of the housing for alternative uses etc. These mitigation measures need to be included in the decisions by ANCA the relevant action refused until such time as adequate mitigation measures are proposed. The proposed relevant action is totally based on economic consideration.

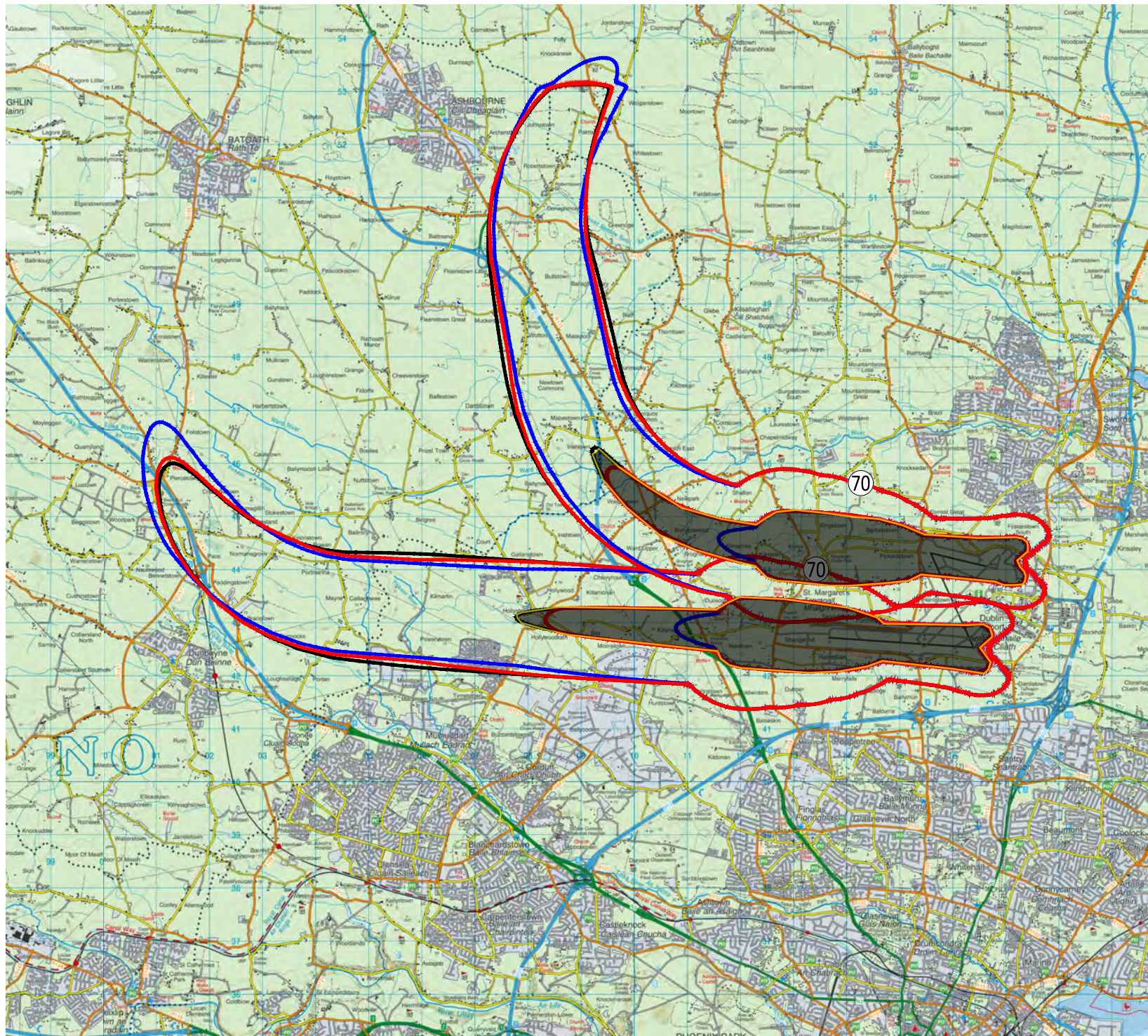
With reference to the Mott McDonald report under the heading "Driver of night movement demand" and "Aircraft Utilisation" it states, "if airlines were restricted to the 16h operating day (07.00 to 23.00) then the necessary level of utilisation would not be achievable, impacting on the economic viability of aircraft based on other airports."

Why then is it not a consideration from an economical point of view to relocate the proposed high risk areas exposed to the proposed noise situations. What they want to do it to provide an inadequate noise insulation scheme for the residents in the St. Margaret's The Ward area which leaves them exposed to high risk health issues and provide an insulation scheme that forces people to be locked into their houses in other areas to protect against harmful noise.

We note that in the Mott McDonald report on page 5 under the heading of "Annual Traffic Impact" and "Impact of operating restriction scenarios" and Scenario B which "applies to the current North Runway night operating restrictions (the 65/ night limit and no use of the North Runway 23.00-7.00 but does not apply the 32m annual passenger cap", the results indicate that the airport can cater for 42 million passengers by 2040. We therefore question the need for this proposed relevant action in the first place given the lack of mitigation measures proposed.

## Appendix **A**





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#### LEGEND:

- Current Procedure
- NADP1
- NADP2

Rev	Date	Description	Initials

#### REVISIONS

**Bickerdike  
Allen  
Partners**  
Architecture  
Acoustics  
Technology

121 Salusbury Road, London, NW6 6RG  
Email: [mail@bickerdikeallen.com](mailto:mail@bickerdikeallen.com)  
[www.bickerdikeallen.com](http://www.bickerdikeallen.com)

T: 0207 625 4411  
F: 0207 625 0250

Dublin Airport  
NADP Assessment

L<sub>Amax</sub> Noise Contours  
Departure Runway 28L  
Airbus A330-300

DRAWN: MP      CHECKED: DR

DATE: January 2019      SCALE: 1:100000@A4

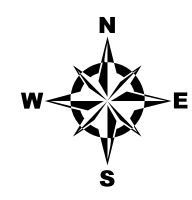
FIGURE No:

A11219/R02/DR014



## Appendix **B**

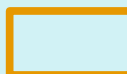




Noise Zones



Zone A  
≥ 63 dB LAeq,  
16hr and/or ≥ 55 dB Lnight



Zone B  
≥ 54 dB LAeq, 16hr and < 63 dB LAeq,  
16hr and ≥ 55 dB Lnight



Zone C  
≥ 54 dB LAeq, 16hr and < 63 dB LAeq,  
16hr and ≥ 48 dB Lnight and < 55 dB Lnight



Local Objective No.54 Removed





## Appendix **C**



CYAL50218188  
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LEGEND:

- 10 - 24 N60
- 25 - 49 N60
- 50+ N60

Rev	Date	Description	Initials

REVISIONS

**Bickerdike  
Allen  
Partners**  
Architecture  
Acoustics  
Technology

121 Salisbury Road, London, NW6 6RG  
Email: [mail@bickerdikeallen.com](mailto:mail@bickerdikeallen.com) T: 0207 625 4411  
[www.bickerdikeallen.com](http://www.bickerdikeallen.com) F: 0207 625 0250

Dublin Airport  
Change to Permitted Runway Operations

Forecast N60 Noise Contours  
2025 Proposed Scenario  
Figure 13C-38

DRAWN: MP	CHECKED: DC
DATE: July 2021	SCALE: 1:250000@A4

Drawing No:  
A11267\_19\_DR727\_3.0



## Appendix **D**

## Annual Traffic Impact

### Impact of Operating Restriction Scenarios

- This study has developed busy day forecast schedules and analysed the impacts of operating restrictions for four scenarios, in addition to the original daa input schedule, as summarised in the tables opposite.
- Scenario A** is the daa input busy day forecast schedules, aligned with the Centreline annual forecast case. Flights are timed at commercially and operationally 'ideal' timings and are not smoothed to fit within airport capacities
  - Scenario B** applies the current North Runway night operating restrictions (the 65/night limit and no use of the North Runway 23:00-07:00), but does not apply the 32m annual passenger cap  
*The night restrictions severely limit traffic growth, delaying post-Covid recovery to 2019 traffic levels by around 2 years (from 2025 to 2027).*
  - Scenario C** is an unconstrained schedule with no night limits or annual passenger cap. The daa input schedule (Scenario A) has been coordinated within the physical runway capacity constraints, adjusting flight times to smooth demand, but Scenario C has the same volume of flights as the daa input schedule. The runways are assumed to operate in mode Option 7b (see page 8) and according to the capacities discussed in Section 3 (page 20) of this report.  
*Runway capacity is sufficient to accommodate the full daa input forecast schedule with relatively minor schedule timing adjustments. Unconstrained annual forecast passengers can be accommodated*
  - Scenario D** applies the 32m annual passenger cap to the runway capacity coordinated schedules of Scenario C, but does not apply the night operating restrictions (Conditions 3d and 5)  
*The 32m passenger level is reached in 2025. The 32m cap begins to have an impact from 2024 as traffic growth approaches the 32m capped level asymptotically*
  - Scenario E** applies the 32m annual passenger cap to the night operating constrained schedule of Scenario B.  
*The 32m passenger level is reached around 2027*
  - Scenario F** applies the restriction to operate one runway only 23:00-07:00, but without the 65/night movement cap and without the 32m annual passenger cap.  
*Constrained runway capacity in the 06:00-07:00 hour for first-wave departures limits growth in DUB-based aircraft flying*

Scenario	Condition 3d (single runway)	Condition 5 (night limits)	32m cap	Description
A	na	None	No	daa input schedule
B	2300-0700	65/night	No	Night limit constraints
C	2300-0600	None	No	Unconstrained (runway capacity only)
D	2300-0600	None	Yes	32m cap only
E	2300-0700	65/night	Yes	Night limits + 32m cap
F	2300-0700	None	No	Single runway 2300-0700 only

Scenarios	A	B	C	D	E	F
2015	25.0					
2016	27.9					
2017	29.6					
2018	31.5					
2019	32.9	32.9	32.9	32.9	32.9	32.9
2020	7.4	7.4	7.4	7.4	7.4	7.4
2021	7.9	7.9	7.9	7.9	7.9	7.9
2022	21.0	19.6	21.0	21.0	19.6	20.6
2023	26.7	24.9	26.7	26.7	24.9	26.2
2024	31.2	29.3	31.2	30.8	29.3	30.8
2025	32.3	30.4	32.3	32	30.4	31.9
2026	34.0	31.6	34.0	32	31.2	33.3
2027	35.6	32.8	35.6	32	32	34.7
2028	37.0	33.9	37.0	32	32	36.2
2029	38.4	35.1	38.4	32	32	37.6
2030	39.6	36.3	39.6	32	32	39.0
2031	40.5	37.0	40.5	32	32	39.7
2032	41.3	37.6	41.3	32	32	40.4
2033	42.1	38.2	42.1	32	32	41.0
2034	42.7	38.9	42.7	32	32	41.7
2035	43.4	39.5	43.4	32	32	42.4
2036	44.0	40.0	44.0	32	32	43.0
2037	44.7	40.5	44.7	32	32	43.6
2038	45.3	41.0	45.3	32	32	44.2
2039	46.0	41.5	46.0	32	32	44.7
2040	46.6	42.0	46.6	32	32	45.3
<b>Traffic Impact</b>						
2022-2025	-	-7.0	0.0	-0.7	-7.0	-1.7

Source: Mott MacDonald analysis, based on daa Centreline forecast scenario

## Appendix **E**

### Aircraft Utilisation

- ▶ A key driver of airline cost efficiency and competitiveness is the ability to achieve high levels of utilisation of their aircraft assets. The chart below illustrates the lines-of-flying (flights throughout the day) for representative DUB based aircraft.
- ▶ If airlines were restricted to a 16h operating day (07:00-23:00) then the necessary level of utilisation would not be achievable, impacting on the economic viability of aircraft based at DUB. Ryanair, for example, has operating bases at a number of airports and if it could not operate profitably at DUB then it would likely choose to base more of its aircraft at other airports.
- ▶ In this case, the traffic lost is not just the night period flights but also the daytime flights that the based aircraft would have operated throughout the day.
- ▶ If high aircraft utilisation cannot be achieved due to the reduced operating day resulting from the night restrictions, then the consequence is also likely to be higher fares for passengers' on remaining services.

- ▶ The 1h time difference between Ireland and mainland Europe means that flights need to leave early (before 07:00) to arrive in time for business passengers to have full working day at their destination<sup>(1)</sup>.
- ▶ The geographical position of DUB means that there are longer sector distances to many European destinations than from other competing hub airports. This means that DUB requires longer operating days than competing European hubs. Similarly, DUB's proximity to North America compared to the rest of Europe means that transatlantic flights arrive earlier in DUB than at other European airports.

► The DUB hub connecting model is predicated on early morning long haul arrivals and early short haul departures able to return to connect with the long haul departures. Without this connecting traffic, the Irish point-to-point market would be too small on its own to support many transatlantic services.

- If aircraft lines-of-flying are squeezed into a shorter operating day there will be less flexibility in the schedule to cope with delays and disruption.

0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300
	DUB		BVA		DUB			FEU			DUB				KRK			DUB
	DUB	BHK		DUB		NCL		DUB		CRL		DUB			BZG			DUB
DUB					ACE						DUB				BRU		GLA	DUB
DUB										AMS						TXL		DUB
DUB			ALC				DUB			SCQ					MAN		DUB	
	DUB		COG			DUB			VFM						COG			DUB

**Mott MacDonald** Global Aviation

## Appendix **F**

ACTIVITY	LOCATION	07:00 – 23:00 HRS	23:00 – 07:00 HRS
Resting	Living room	35 dB $L_{Aeq,16\text{ hr}}$	-
Dining	Dining room/area	40 dB $L_{Aeq,16\text{ hr}}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16\text{ hr}}$	30 dB $L_{Aeq,8\text{ hr}}$ 45 dB $L_{Amax,F}$ (Note 4)

NOTE 1 The Table provides recommended *internal  $L_{Aeq}$  target* levels for overall noise in the design of a building. These are the sum total of structure-borne and airborne noise sources. Ground-borne noise is assessed separately and is not included as part of these targets, as human response to ground-borne noise varies with many factors such as level, character, timing, occupant expectation and sensitivity.

NOTE 2 The *internal  $L_{Aeq}$  target* levels shown in the Table are based on the existing guidelines issued by the WHO and assume normal diurnal fluctuations in external noise. In cases where local conditions do not follow a typical diurnal pattern, for example on a road serving a port with high levels of traffic at certain times of the night, an appropriate alternative period, e.g. 1 hour, may be used, but the level should be selected to ensure consistency with the *internal  $L_{Aeq}$  target* levels recommended in the Table.

NOTE 3 These *internal  $L_{Aeq}$  target* levels are based on annual average data and do not have to be achieved in all circumstances. For example, it is normal to exclude occasional events, such as fireworks night or New Year's Eve.

NOTE 4 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  $L_{Amax,F}$ , 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 45dB  $L_{Amax,F}$  more than 10 times a night. However, where it 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).

NOTE 5 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. Where it is not possible to meet internal target levels with windows open, internal noise levels can be assessed with windows closed, however any façade openings used to provide whole dwelling ventilation (e.g. trickle ventilators) should be assessed in the "open" position and, in this scenario, the internal  $L_{Aeq}$  target levels should not normally be exceeded, subject to the further advice in Note 7.

NOTE 6 Attention is drawn to the requirements of the Building Regulations.

NOTE 7 Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal  $L_{Aeq}$  target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved. The more often internal  $L_{Aeq}$  levels start to exceed the internal  $L_{Aeq}$  target levels by more than 5 dB, the more that most people are likely to regard them as "unreasonable". Where such exceedances are predicted, applicants should be required to show how the relevant number of rooms affected has been kept to a minimum. Once internal  $L_{Aeq}$  levels exceed the target levels by more than 10 dB, they are highly likely to be regarded as "unacceptable" by most people, particularly if such levels occur more than occasionally. Every effort should be made to avoid relevant rooms experiencing "unacceptable" noise levels at all and where such levels are likely to occur frequently, the development should be prevented in its proposed form (see Section 3.D).

Figure 2. ProPG Internal Noise Level Guidelines (additions to BS8233:2014 shown in blue)

## Appendix **G**

## Examples of Aircraft Noise Mitigation Measures

### Land-Use Planning and Management

Land and buildings surrounding airports can be planned and managed in order to mitigate aircraft noise at those locations. Some examples include:



#### Zoning

Zoning can be used to ensure that aircraft noise is taken into account when planning decisions are made in areas around airports. Typically, zoning can help advise on the compatibility of a location for noise-sensitive development. It can help to advise on, for example, what form of sound insulation is required for a development to be made compatible.

#### Noise Insulation Schemes

One of the most common means of mitigating aircraft noise impact is to insulate buildings which are sensitive to noise, such as residential properties, schools and hospitals.

Depending on the scheme, full or partial financial contributions towards the insulation works may be provided. Examples of insulation measures include uprated windows, loft and roof insulation, acoustic door seals and ventilators.

#### Property Purchase and Relocation Schemes

Where aircraft noise impacts could be harmful to health or quality of life, and could potentially result in an unacceptable living environment, schemes can be put in place to support those impacted to relocate. Property purchase and relocation schemes tend to result from either government intervention or planning decisions. How the scheme operates can vary from airport to airport. For example, some schemes offer compensation based on a market valuation of the property and cover relocation costs. Other schemes may offer an increased valuation and cover payment of legal fees, taxes and relocation expenses.