Economist Report for St. Margarets The Ward (SMTW) Residents Group regarding Dublin Airport Authority (daa) Proposal at Dublin Airport – *Health Cost Impact*

10 April 2025

Executive Summary

St. Margarets The Ward Residents Group (SMTW) is a volunteer group of local community members living in Counties Fingal and Meath in the vicinity of Dublin Airport with work/professional experience and skills in medicine/healthcare, planning, aviation, noise, science and engineering, the environment, media/communications, law and other areas. The Group has commissioned this report from PMCA Economic Consulting to estimate the health costs associated with noise due to aircraft at Dublin Airport.

Publicly available research shows that the numbers of people affected by such noise are appreciably large. According to a report published in 2024 by the Aircraft Noise Competent Authority (ANCA) (the relevant authority in regard to aircraft noise in Ireland), 71,388 people were highly annoyed and 32,526 people were highly sleep disturbed due to exposure to aircraft noise at Dublin Airport in 2023, which is by-far the largest airport in the State with a share of all passengers among the main airports in Ireland (Cork, Kerry, Knock and Shannon as well as Dublin) which averaged 85% during 2012-2023. With reference to relevant research regarding the numbers of people highly annoyed and highly sleep disturbed at Brussels Airport, a third impact variable – the number of people with cardiovascular problems as a result of exposure to aircraft noise – may also be estimated for Dublin Airport, where the analysis carried out in this report by PMCA suggests that the number of people affected in this way was 16,746 in 2023.

Earlier this year, Dublin Airport Authority's (daa's) application to increase passenger numbers at Dublin Airport from 32 million to 36 million per year was ruled invalid by Fingal County Council. On 6 February, daa re-submitted its 36m passenger application to the Council, again without any infrastructure included.

The analysis in the table below summarises the key results of the ANCA review (2024) (Current State (2023)) and also summarises daa-projected future numbers of highly annoyed and highly sleep disturbed people due to aircraft activity in 2026 (under two scenarios – Future Baseline (2026) and Future Proposed (2026)). The table also shows the corresponding cardiovascular costs, the DALYs (disability-adjusted life years) and the cost associated with each scenario. The Future Proposed (2026) scenario has an estimated noise cost of over €689m, which is very large (even though the numbers of people highly annoyed and high sleep disturbed in 2026 are lower compared with the Current State). All three scenarios breach the Noise Abatement Objective (NAO) 2019 limit of 1,533 people affected by aircraft noise greater than or equal to 55 dB (decibels) at night-time (23:00-07:00) for Dublin Airport which ANCA established in 2022.

The Numbers of People Affected by Aircraft Noise at Dublin Airport in 2023 and 2026

Scenario	Highly Annoyed	Highly Sleep Disturbed	Cardiovascular	DALYs	Cost €m
Current State (2023)	71,388	32,562	16,746	5,849	772,083,948
Future Baseline (2026)	57,688	24,651	13,264	4,576	604,022,120
Future Proposed (2026)	62,283	29,729	14,823	5,223	689,409,031

Source: This table reproduces Table 17 in the main body of the report (p. 20).

1. Introduction

This report is prepared by Dr. Pat McCloughan, Managing Director of PMCA Economic Consulting, for St. Margarets The Ward Residents Group (hereinafter SMTW) which is a volunteer group of local community members living in Counties Fingal and Meath in the vicinity of Dublin Airport with work/professional experience and skills in medicine/healthcare, planning, aviation, noise, science and engineering, the environment, media/communications, law and other areas.

According to the website set up by SMTW and Fingal Organised Residents' Movement (FORUM), the aim of both SMTW and FORUM is *"to provide information and support to those affected by aircraft noise and pollution in communities throughout North County Dublin (Fingal) and Meath including: Swords, St. Margarets, Portmarnock, Malahide, The Ward, Rolestown, Kilsallaghan, Kilcoskan, Oldtown, Ballyboughal, Ratoath, Ashbourne, Wotton, Kilbride, Greenougue, Fleenstown, and many more communities that want to raise awareness of the impact of the new North Runway on local residents".*

Earlier this year, Dublin Airport Authority's (daa's) application to increase passenger numbers at Dublin Airport from 32 million to 36 million per year was ruled invalid by Fingal County Council. In communicating its decision, the Council stated that *"the application failed to comply with three separate articles of the 2001 Planning and Development Regulations"*, which generally relate *"to information contained in applications that obscures, rather than clarifies, the extent of a proposed development; which contains regulatory noncompliance; inadequate and ambiguous information; and concerns that the nature and extent of a proposed development goes beyond its factual description"*. The Council further remarked that the application was *"also invalid because the proposed description of the development in the public notices is non-compliant with the relevant regulations and is inadequate and misleading"* and the Council also stated that it is *"a matter of great concern to the planning authority [Fingal County Council] that such a significant planning application is invalid. Pre-planning is available to assist applicants but did not take place for this application"*.[1]

Commenting on daa's application, SMTW noted its timing *"just days before Christmas [2024]"* and the seeking of an appreciable increase in passenger numbers (12.5%) *"without any infrastructure included"*.

Then on 6 February, daa re-submitted its 36m passenger per annum application to Fingal County Council, again without any infrastructure included. The public has 5 weeks to read the application and make a submission to the Council. As stated on its website, SMTW understands the importance of Dublin Airport but *"proper planning and sustainability needs to be followed by all, including Dublin Airport!"*.[2]

In view of this background and context, SMTW has commissioned PMCA to prepare a report on the health costs associated with aircraft noise at Dublin Airport. All tables of analysis are given in the Annex.

2. Scale and Development of Dublin Airport

Publicly available data from the Central Statistics Office (CSO) show that there were 33,262,941 passengers at Dublin Airport in 2023 (the latest year to which the CSO data pertain at the time of preparing this report). This exceeded the 32m passenger cap issued to Dublin Airport by An Bórd Pleanála (ABP) when granting planning permission for the building of Terminal 2 in 2007.

[1] Quotes reproduced from the article carried in https://www.irishtimes.com/business/2025/01/14/move-to-increase-dublin-airport-passenger-cap-to-36m-ruled-invalid/.

[2] Quotes reproduced from the website https://www.wrongwaydaa.com/observations.

The CSO data also show that the passenger cap was previously breached in 2019 (32,676,251) (the corresponding data for 2024 were not publicly available from the CSO at the time of preparing this report).[3] Nevertheless, other publicly available (from the daa) show that passenger numbers at Dublin Airport in 2024 were 34,634,007, which were up by 3.2% on the numbers in 2023 (33,522,594).[4]

The CSO data show that passenger numbers at Dublin Airport grew by 74% during 2012-2023, which far exceeded the corresponding growth rates of the other main airports in the State (Cork 20%, Kerry 45%, Knock 20% and Shannon 48%). There was a significant fall in passenger numbers at Dublin Airport in 2020 (from 32,676,251 in 2019 to 7,267,240, a reduction of 78%). Similar falls were also experienced at the other main airports (reflecting the severity of Covid-19 in 2020 and 2021) but passenger numbers recovered strongly in 2022.

Dublin Airport's share of all passenger numbers among the main airports in the State was 84.9% in 2023 and averaged 85% per year during 2012-2023 (Table 3). Dublin Airport is undoubtedly the dominant airport in the State. The level of concentration among the main airports is exceedingly high and reflects Dublin Airport's very high share of all passenger numbers in Ireland: in 2023, for example, the Herfindahl-Hirschman Index (HHI) of concentration was 7,285 and averaged 7,304 during 2012-2023, which indicate exceptionally high levels of concentration in the market for passenger flights in Ireland (generally speaking, a market with a HHI value of 1,800-2,000 is deemed highly concentrated).[5]

By way of comparison, the Dublin Region (comprising the four local authority areas of Fingal, Dublin City, South Dublin and Dún Laoghaire-Rathdown) had a population of 1,458,154 persons in Census 2022, which was equivalent to a 28.3% share of the population of the State in that year (5,149,139). While this population share is significant (for example, London's population of 8,866,180 accounted for 16% of the total population of England (56,489,800) in 2021), Dublin's share of Ireland's population is dwarfed by Dublin Airport's share of all passenger numbers in the State, which as observed averaged 85% during 2012-2023 and has grown from 80.6% at the beginning of the period (in 2012) (Table 3).

Another comparative economic metric relevant to consider in regard to the relative size of Dublin Airport in the provision of passenger air transport in Ireland is the number of people at work in FDI (foreign direct investment) companies in the State, where Dublin is the principal location. Data compiled by the Department of Enterprise, Trade and Employment (DETE) (which oversees the State agency responsible for FDI into Ireland) show that there were 132,941 people working in IDA Ireland client firms on a permanent full-time basis in Dublin in 2023, which was equivalent to a 45% share of the total number of 294,471 people working in such firms on that basis in Ireland in that year.

Dublin's share in this regard has increased from 39% in 2011 to 41% in 2016 and to the 45% share observed in 2023 – yet these significantly large shares are much smaller than Dublin Airport's share of all passenger numbers at the main airports in the State in 2023 (85%).[6]

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[3] The latest data from the CSO at the time of preparing this report are for the third quarter of 2024 (2024Q3) (i.e. 2023 is the latest year for which full quarterly data are available). The data analysis showing the breaches to the passenger cap in 2019 and 2023 are evident in Table 1 in the Annex to this report (p. 7).

[4] The daa data are available at daa-Monthly-Statistics-December-2024.pdf.

[5] The HHI measure of concentration in a given market is defined as the sum of the squared market shares of all providers in the market (multiplied by 10,000 which is the square of 100 percentage points). The HHI is used in competition economics (mergers and market studies) and in the economic regulation of monopoly power in markets.

[6] Yet another comparative metric is the Dublin Region's share of all people at work in Ireland in Census 2022, using the CSO POWSCCAR (Place of Work, School or College Census of Anonymised Records) data (which are not publicly available). Analysis of the POWSCCAR data show that there were 649,900 people at work in the Dublin Region in 2022, meaning that the Dublin

To give international perspective to Dublin Airport's share of all passenger numbers in Ireland, Table 4 in the Annex shows the largest airports in the EU Member States by passenger numbers in 2023 and gives the shares of the largest airports in their respective countries (the Eurostat data include multiple airports in some of the countries, for example Germany and Spain).

The analysis presented in Table 4 shows that five Member States had monopoly airports in respect of passengers in 2023 (Estonia, Latvia, Luxembourg, Malta and Slovenia) while Dublin Airport's share of all passenger numbers in Ireland in that year was 85.2%, which is consistent with the analysis of the CSO data in Table 1-Table 3. Dublin Airport's dominant share of all passenger numbers in Ireland puts that airport in the top half (11th out of 39 airports) of the airports in the EU ranked on the basis of their shares of all passenger numbers in their respective Member States.

The UK is no longer in the EU and therefore not included in the Eurostat data but its largest airport (London Heathrow, one of the world's busiest) had total passenger numbers of 79,180,434 in 2023, which was equivalent to a share of 29% of the overall number of passengers at all airports in the UK in that year.[7]

Thus, Dublin Airport's share of all passenger numbers at the main airports in Ireland was approximately 85% in 2023, which illustrates the dominance of that airport in the State – the market shares and concentration 2012-23 are given in Table 3 in the Annex.

Dominance is an important concept in national (Irish) and European (EU) competition law. Generally speaking, a dominant undertaking in a relevant market is a provider having economic strength to the extent that it can behave to an appreciable extent independently of its rivals (actual or potential), customers and ultimately of consumers. A dominant undertaking is one which faces little or no competitive pressures from existing rivals, potential rivals, customers or consumers in its relevant market. The dominance attributed to Dublin Airport in the provision of air passenger transport in Ireland is reflected by the fact that the daa is regulated by the Irish Aviation Authority (IAA) (previously the Commission for Aviation Regulation, CAR).[8]

The very high market share (85%) attributed to Dublin Airport in the State, and the very large levels of concentration in the provision of passenger air transport numbers shown in Table 3, echo the findings of a report prepared by Oxford Economics entitled 'The Economic Impact of the Shannon Airport Group' (September 2023).[9] That report observed the following (pp. 4-5):

Region accounted for 36% of all such jobs in the State in that year (the POWSCCAR data include people who were working in fixed, known addresses in 2022 and exclude mobile workers without such addresses).

7 The UK data are publicly available at https://en.wikipedia.org/wiki/List_of_busiest_airports_in_the_United_Kingdom. Notice that the UK had higher passenger numbers in 2023 than any of the EU airports shown in Table 4.

8 Dominance is a legal principle in Irish and EU competition law generally defined as: *"a position of economic strength enjoyed by an undertaking which enables it to prevent effective competition being maintained on the relevant market by giving it the power to behave to an appreciable extent independently of its competitors, customers and ultimately of its consumers" (Chiquita*, OJ 1976 L 95/1, confirmed on appeal in Case 27/76, *United Brands Company and United Brands Continentaal BV v Commission* [1978] ECR 207) (the 'United Brands Principle'). The dominance principle established in the United Brands case was cited with approval in the Hoffman-La Roche case, to which the European Court of Justice (the highest court in the EU) added that *"such a position does not preclude some competition…but enables the undertaking…if not to determine, at least to have an appreciable influence on the conditions under which that competition will develop, and in any case to act largely in disregard of it so long as such conduct does not operate to its detriment"* (*Vitamins*, OJ 1976 L 223/27, confirmed on appeal in Case 85/76, *Hoffman-La Roche & Co AG v Commission* [1979] ECR 461). The United Brands and/or Hoffman-La Roche principles of dominance have been recited in numerous competition law cases that have come before the Irish courts over the years.

9 https://snnairportgroup.ie/media/h10hxxjy/230927-the-economic-impact-of-the-shannon-airport-group.pdf.

> *"While the outlook for growth in the aviation sector is positive, Ireland's aviation sector is one of the most concentrated in Europe … Rebalancing passengers to regional airports, such as Shannon, will bring a range of benefits to the Irish economy. A strong regional airport assists in building a more vibrant business environment, helping to unlock growth. If a country has an excessive reliance on a single airport, any disruptions, such as labour shortages, natural disasters, or technical failures, could cause a significant impact on the tourism sector, as well as the economy as a whole … Supporting regional airports will also enable the Government's wider regional growth objectives, as set out in Project Ireland 2040 [National Planning Framework]".*

In regard to the regions of Ireland, the Nomenclature of Territorial Units for Statistics (NUTS) was created by Eurostat (the statistics agency of the EU) in order to define territorial units for the production of regional statistics across the European Union. In 2003 the NUTS classification was established within a legal framework (Regulation (EC) No 1059/2003). The NUTS regions of Ireland are set out in Table 5 in the Annex to this report. As shown in that table, there are three NUTS 2 Regions in Ireland: the Northern and Western Region; the Southern Region; and the Eastern and Midland Region (within which is the NUTS 3 Dublin Region, where Dublin Airport is situated, within the Fingal County Council administrative area).

The following facts illustrate the relative economic strength of the NUTS 2 Eastern and Midland Region during 2011-2022, within which Fingal's population and jobs growth has fared strongly:

- Population growth in the Eastern and Midland Region during 2011-2022 was 15% compared with 10.5% in the Southern Region and 8.1% in the Northern and Western Region;
- The Eastern and Midland Region was the only NUTS 2 Region to experience growth in its population share of the State between 2011 and 2016;
- The population share of the NUTS 3 Dublin Region (comprising Fingal, Dublin City, South Dublin and Dún Laoghaire-Rathdown) grew by 2.1% during 2011-2022, which was the second highest of the eight NUTS 2 Regions (after the Mid-East Region, 4.1%);
- Fingal's population grew from 273,991 in 2011 to 330,506 in 2022, equivalent to growth of 20.6%, the highest of any county/local authority area in the State;
- Fingal's population share increased by 7.5% during 2011-2022, the highest of any county or local authority area in the State;
- The number of people at work in Fingal grew from 82,738 in 2011 to 115,834 in 2022 which in job share terms were 5.6% in 2011 and 6.4% in 2022, representing an increase of 13.9% which was the largest in the Dublin Region and one of the largest in the State.[10]

Undoubtedly the growth and development of Dublin Airport has contributed to the population and jobs growth observed in Fingal and in the NUTS 3 Dublin Region; however, such growth has not occurred in other parts of the State, particularly those parts lacking major transport infrastructure like motorways, railways and air passenger transport with European/global connectivity.

Turning to health, and in particular noise impacts due to air transport, the agency with responsibility for *"monitoring, and regulating where necessary, for the management of aircraft noise in the communities around Dublin Airport"* is the Aircraft Noise Competent Authority.

[10] The highest job share growth of any county/local authority area in the State was observed in Co. Meath (15.7%) which was due mainly to a huge increase in the number of commuters living in the county (many working in Dublin) switching to working from home in the wake of Covid-19.

Established quite recently in 2019, ANCA is a separate and independent Directorate within Fingal County Council and *"is committed to delivering the highest possible quality of service … in an efficient, fair and transparent manner"*.[11]

ANCA's functions are to:

- Implement its statutory functions in a transparent and cost-effective manner;
- Assess proposals for development at Dublin Airport to ensure that improvements in the noise climate are maintained and improved upon;
- Monitor the impact of aircraft noise in the communities around Dublin Airport;
- Regulate for the management of aircraft noise in accordance with legislative provisions, including facilitating stakeholder participation; and
- Provide reliable and up-to-date information on its work in a format that is clear and accessible.[12]

As outlined in the ANCA Annual Report 2023, all airports in the EU with more than 50,000 civil aviation aircraft movements per year must be regulated for the purposes of noise management. Dublin Airport was the only airport in Ireland that met this threshold in 2023 and that position remains the case today. ANCA's mission is to ensure that the impact of aircraft noise at Dublin Airport and the surrounding neighbourhoods, is analysed, communicated, managed and reduced over time.

The ANCA Annual Report 2023 (p. 12) also states that *"Links to noise data is (sic.) available for Dublin on the ANCA website for both individual aircraft events and accumulated averaged contours."* The report also mentions that during 2023 the number of noise monitors around Dublin Airport was increased to 19, representing an increase of 171% since the programme began in 2020, and that additional monitors are scheduled to be commissioned during 2024.

3. Estimation of Health Costs to People due to Noise at Dublin Airport

3.1 ANCA Review of the Effectiveness of Noise Mitigation Measures at Dublin Airport

On 23 August 2024 ANCA published a report entitled 'A review of the effectiveness of noise mitigation measures at Dublin Airport in achieving the noise abatement objective during 2023'.[13] The report comprises the following sections: (1) aircraft noise management; (2) aircraft activity at Dublin Airport; (3) noise impact of aircraft activity at Dublin Airport; and (4) summary. The first section outlines the management of aircraft noise internationally, at European level and nationally in Ireland.

In the EU and Ireland, the management of aircraft noise is provided for by the following legislation:

- EU level;
    - EU Regulation (EU) 598/2014 – the Aircraft Noise Regulation, which aims to improve the noise environment around EU airports in order to ensure greater compatibility between aviation activities and residential areas, particularly in the case of night flights;

[11] Quotation reproduced from https://www.fingal.ie/aircraftnoiseca.

[12] The ANCA website also states that *"The ANCA team is supplemented and supported by national and international specialists when necessary to ensure that its functions are discharged in accordance with the rules and procedures of legislation. This ensures that the authority has access to the latest expertise and developments in new technologies relevant to aircraft noise management."* Quotation reproduced from the ANCA website https://www.fingal.ie/aircraftnoisceca/directorsmessage.

[13] The ANCA review report is available at https://www.fingal.ie/sites/default/files/2024-08/noise-mitigation-effectiveness-review-report-for-2023.pdf.

  - Environmental Noise Directive (2002/49/EC), which provides for the assessment and management of environmental noise.[14]
- Ireland level;
  - Aircraft Noise (Dublin Airport) Regulation Act 2019 – which relates specifically to Dublin Airport and includes the possibility to amend the Planning and Development Act 2000 to cater for the situation where development at Dublin Airport may give rise to an aircraft noise problem and to provide for related matters;[15]
  - European Communities (Environment Noise) Regulations 2018 – S.I. No. 549 of 2018 – which provides for strategic noise maps and action plans and revised noise maps and action plans to be made available to the public.

The ANCA review of the effectiveness of noise mitigation measures at Dublin Airport published in 2024 outlines progress on the Noise Abatement Objective (NAO) for Dublin Airport which ANCA established in June 2022. The NAO comprises five parts as follows:

- Part 1 Policy Objective – limit and reduce the long-term adverse effects of aircraft noise on health and quality of life, particularly at night, as part of the sustainable development of Dublin Airport;
- Part 2 Explaining the Objective – noise from Dublin Airport should be limited and reduced in line with principles of sustainable development and the Balanced Approach will be used to ensure that cost-effective, practicable and sustainable measures are implemented to achieve this;
- Part 3 Measureable Criteria – the NAO will be primarily measured through the number of people *"highly sleep disturbed"* and "*highly annoyed"* in accordance with the approach recommended by the World Health Organisation's (WHO's) Environmental Noise Guidelines 2018 as endorsed by the European Commission through Directive 2020/367, taking into account noise exposure from 45 dB L_{den} and 40 dB L_{night}.[16] These metrics describe those chronically disturbed by aircraft noise.[17]
- Part 4 Expected outcomes – the NAO provides for the following improvements in respect of the number of people highly sleep disturbed and highly annoyed in future years compared with 2019;
  - The number of people highly sleep disturbed and highly annoyed in 2030 will reduce by 30% compared with 2019
  - The number of people highly sleep disturbed and highly annoyed in 2035 shall reduce by 40% compared with 2019
  - The number of people highly sleep disturbed and highly annoyed in 2040 will fall by 50% compared with 2019
  - The number of people exposed to aircraft noise above 55 dB L_{night} and 65 dB L_{den} shall be reduced compared with 2019.
- Part 5 Monitoring – monitoring the NAO will be informed by annual reports which will be reviewed by ANCA as part of its obligations under the Aircraft Noise (Dublin Airport) Regulation Act 2019.

The ANCA review suggests high level measures that might be implemented to manage the impact of aircraft noise at Dublin Airport, namely:

- Measures introduced directly by daa;

[14] The Environmental Protection Agency (EPA) is responsible for reporting Ireland's noise figures to the EU (Noise guidelines | Environmental Protection Agency).

[15] https://www.irishstatutebook.ie/eli/2019/act/12/enacted/en/html.

[16] dB is short for decibel which is the unit measurement of noise levels. L_{den} symbolises day-evening-night noise in dB and L_{night} symbolises night noise in dB.

[17] See also the WHO's Environmental Noise Guidelines for the European Region (9789289053563-eng.pdf).

- Measures resulting from new technology developed by aircraft manufacturers;
- Flight procedures implemented by aircraft manufacturers;
- Planning conditions to mitigate the noise impact of development proposals;
- ANCA regulation; and
- Actions through the Noise Action Planning process.[18]

3.2 Numbers of People Affected by Exposure to Day-Evening-Night Noise (L_{den}) and Night Noise (L_{night}) at Dublin Airport in the ANCA Review (2024)

The ANCA review (2024) gives data on the numbers of people highly sleep disturbed and highly annoyed due to noise from aircraft activities at Dublin Airport in 2023, which can be used to estimate the health economic costs associated with aircraft noise at Dublin Airport (along with other information contained in a report published in 2023 by consultants Envisa which estimates the health economic costs due to aircraft noise at Brussels Airport).[19]

Table 11 in the Annex to this report by PMCA shows that 71,388 people were estimated to be highly annoyed due to exposure to day-evening-night-time aircraft noise (L_{den}) at Dublin Airport in 2023. Table 12 in the Annex shows that the number of people who were highly sleep disturbed through exposure to night-time aircraft noise (L_{night}) at Dublin Airport in 2023 was 32,562. These numbers of affected people are reproduced from the ANCA Review (2024).

3.3 Envisa Study of the Health Economic Impact of Aircraft Noise at Brussels Airport (2023)

The study entitled 'Health-Economic Impact of the Aircraft Noise from Brussels Airport' (March 2023) was commissioned from consultants Envisa by Bond Beter Leefmilieu, the key results of which are reproduced in Table 13 in the Annex to this report by PMCA.[20] The report estimated the following numbers of people annoyed, sleep disturbed and in addition affected by cardiovascular problems due to aircraft noise at Brussels Airport:

- Annoyance 220,000;
- Sleep disturbance 109,000; and
- Cardiovascular 53,000.

The estimated annual costs associated with the noise impacts at Brussels Airport in the Envisa report are summarised as follows:

- Highly annoyed cost €578,160,000;
- Highly sleep disturbed cost €1,007,160,000;
- Cardiovascular cost €897,600,000.

The total number of people affected was 382,000 and the total economic cost estimated was €2,482,920,000 or approximately €2.5 billion.

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[18] Nineteen specific noise management initiatives are given on page 10 of the ANCA review following a request to the daa from ANCA.

[19] The Envisa report is available at https://wakeupkraainem.be/wp-content/uploads/2023/06/ENVISA_Health-Economic-Impact-Brussels-Airport_March-2023.pdf.

[20] The weblink to the Envisa report is given in footnote 19. According to its website, Bond Beter Leefmilieu *"is the largest network of sustainable organisations in Flanders"* and its goal is that "*in 2050 everyone in Flanders will live well and healthily, without harming our planet"*. The economic sectors of interest to the organisation include *"transportation"* (https://www.bondbeterleefmilieu.be/english).

3.4 Estimated Health Economic Impacts due to Exposure to Aircraft Noise at Dublin Airport

The number of people with cardiovascular impacts due to exposure to aircraft noise at Dublin Airport are not known. Nonetheless the number may be roughly estimated using the Envisa study regarding Brussels Airport, in which the number of people experiencing cardiovascular impacts (53,000) accounted for 16.1% of the number of people both highly annoyed and highly sleep disturbed (329,000) (percentage figure subject to rounding). Applying this proportion to the number of people both highly annoyed and highly sleep disturbed due to aircraft noise at Dublin Airport (both the 71,388 and the 32,562 from Table 11 and Table 12 respectively) implies the estimate of 16,746 people with cardiovascular impacts due to aircraft noise at Dublin Airport in Table 14 (p. 19). The corresponding DALYs can be derived (using the disability weights for highly annoyed, high sleep disturbed and cardiovascular used in the Envisa report) and then the respective costs found by multiplying the DALYS by the €132,000 cost per DALY (used in the Envisa report), which sum up to €772,083,948, which is the total health impact cost due to exposure to aircraft noise at Dublin Airport.

3.5 Dublin Airport's 36m Passenger Application

Included in daa's submission is an aircraft noise impact assessment report (Annex B) and an air noise modelling methodology report (Appendix B.2) by UK-based professional services firm Bickerdike Allen Partners (BAP) on behalf of daa which pertains to the three scenarios. The three scenarios in the BAP aircraft noise impact assessment report are reproduced in Table 15 of this report by PMCA.

The numbers of people highly annoyed during the day time period have decreased as BAP have modelled the future scenarios with quieter aircraft. Boeing state that the 737 Max aircraft is quieter than the 737-800 aircraft type.[21] Comparing the night-time period in Table B.2.1 to that in Table B.2.3 of the BAP air noise modelling methodology report, the number of Boeing 737 Max aircraft has increased by 669 but the number of Boeing 737-800 aircraft has also increased (by 1,910). With additional noisier aircraft, one would expect the number of highly sleep disturbed people to increase rather than decrease.

As outlined earlier, Part 4 of the NAO (Expected outcomes) provides that the number of people exposed to aircraft noise above 55 dB L_{night} and 65 dB L_{den} shall be reduced compared with 2019. Table 6.1 of the BAP report provides these numbers for the three assessment scenarios and are reproduced in Table 16 of this report by PMCA. The figures show that the NAO greater ≥ 55 dB L_{night} limit of 1,533 in 2019 is breached significantly in all 3 scenarios (Current State, Future Baseline and Future Proposed).

[21] https://www.boeing.com/commercial/737max/by-design.

4. Summary and Conclusions

Just as Dublin is the capital and principal settlement in Ireland, so Dublin Airport is the largest passenger aircraft hub in the State. However, the relative size of Dublin Airport is much greater than the size of Dublin compared with other settlements in Ireland. Dublin's population in Census 2022 accounted for 28% of Ireland's total population, whereas Dublin Airport's share of all passengers at the main airports in Ireland (comprising the airports at Cork, Kerry, Knock and Shannon as well as Dublin Airport) averaged 85% during 2012-2023, having grown from 81% in 2012 to 85% in 2023. The provision of air passenger transport to and from Ireland is dominated by Dublin Airport and the relevant market for such services is extremely concentrated with a HHI (Herfindahl-Hirschman Index) in excess of 7,000 in recent years (a HHI greater than or equal to 1,800-2,000 indicates high concentration in the practice of Irish and European competition law/policy). Tourism is a major economic sector in Ireland and it is critical that competition is effective among the airports in the country. In the absence of *de facto* competition, economic regulation is required as a *deus ex machina* to ensure consumers get value for money but effective competition is always preferable to economic regulation.

A significant consequence of people living close to Dublin Airport in Counties Fingal and Meath is the noise impact of aircraft flying into and out of the airport. Many more people are highly annoyed and highly sleep disturbed due to aircraft noise at Dublin Airport. The ANCA report observes that 71,388 and 32,562 were highly annoyed and highly sleep disturbed respectively in 2023, to which may be added an estimated 16,746 people affected by cardiovascular issues, which together translate into a total of 120,696 people affected with health issues, the total health cost of which is estimated at €772,083,948 (Table 14, p. 19).

In regard to the daa's application to increase the number of passengers at Dublin Airport to 36m, it is puzzling to find in its submission a report by Bickerdike Allen Partners which refers to the preceding numbers of 71,388 people highly annoyed and 32,562 highly sleep disturbed currently (these are the latest facts observed in 2023) and then proceeds to predict future numbers of people highly annoyed and highly sleep disturbed lower than the 71,388 highly annoyed and 32,562 highly sleep disturbed in 2023 without any explanation.

The estimated costs associated with these groups of people, and those with cardiovascular issues due to aircraft noise at Dublin Airport (which are also estimated), are large (Table 17). In comparison with the estimated cost in 2023 (€772,083,948), the corresponding projections in 2026 are also very substantial: future baseline scenario €604,022,120; and future proposed scenario €689,409,031. All three scenarios in that table breach the Noise Abatement Objective (NAO) limit of 1,533 people affected by aircraft noise greater than or equal to 55 dB (decibels) at night-time (23:00-07:00) for Dublin Airport which ANCA established in 2022.

Annex of Data Analyses Referred to in the Main Body of the Report

Table 1: Passenger Numbers at the Main Airports in Ireland (2012-2023)

	Passenger Numbers												Growth (2012-2023)	
Airport	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**Cumulative**	**CAGR**
Cork	2,333,643	2,469,869	2,138,057	2,065,678	2,226,233	2,301,450	2,387,806	2,585,466	527,014	255,014	2,238,455	2,798,024	**20%**	**1.7%**
Dublin	19,090,781	23,894,925	21,694,893	24,962,518	27,778,888	29,454,474	31,319,419	32,676,251	7,267,240	8,266,271	27,793,345	33,262,941	**74%**	**5.2%**
Kerry	286,442	355,334	294,955	303,039	325,670	335,480	365,339	369,836	82,959	115,398	355,043	414,571	**45%**	**3.4%**
Knock	677,368	781,084	703,670	684,671	735,869	748,505	770,908	805,443	142,532	174,027	709,540	813,266	**20%**	**1.7%**
Shannon	1,286,139	1,670,358	1,555,225	1,642,888	1,674,567	1,599,390	1,677,661	1,616,422	273,934	322,162	1,421,957	1,897,599	**48%**	**3.6%**
Total	**23,674,373**	**29,171,570**	**26,386,800**	**29,658,794**	**32,741,227**	**34,439,299**	**36,521,133**	**38,053,418**	**8,293,679**	**9,132,872**	**32,518,340**	**39,186,401**	**66%**	**4.7%**

Source: CSO publicly available data, PMCA Economic Consulting analysis.

Table 2: Change in Passenger Numbers at the Main Airports in Ireland (2012-2023)

	Change in Passenger Numbers										
Airport	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
Cork	5.8%	-13.4%	-3.4%	7.8%	3.4%	3.8%	8.3%	-79.6%	-51.6%	777.8%	25.0%
Dublin	25.2%	-9.2%	15.1%	11.3%	6.0%	6.3%	4.3%	-77.8%	13.7%	236.2%	19.7%
Kerry	24.1%	-17.0%	2.7%	7.5%	3.0%	8.9%	1.2%	-77.6%	39.1%	207.7%	16.8%
Knock	15.3%	-9.9%	-2.7%	7.5%	1.7%	3.0%	4.5%	-82.3%	22.1%	307.7%	14.6%
Shannon	29.9%	-6.9%	5.6%	1.9%	-4.5%	4.9%	-3.7%	-83.1%	17.6%	341.4%	33.4%
Total	**23.2%**	**-9.5%**	**12.4%**	**10.4%**	**5.2%**	**6.0%**	**4.2%**	**-78.2%**	**10.1%**	**256.1%**	**20.5%**

Source: CSO publicly available data, PMCA Economic Consulting analysis.

Table 3: Passenger Shares and Concentration at the Main Airports in Ireland (2012-2023)

	Passenger Shares and Concentration												
Airport	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**Average**
Cork	9.9%	8.5%	8.1%	7.0%	6.8%	6.7%	6.5%	6.8%	6.4%	2.8%	6.9%	7.1%	6.9%
Dublin	80.6%	81.9%	82.2%	84.2%	84.8%	85.5%	85.8%	85.9%	87.6%	90.5%	85.5%	84.9%	85.0%
Kerry	1.2%	1.2%	1.1%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.3%	1.1%	1.1%	1.1%
Knock	2.9%	2.7%	2.7%	2.3%	2.2%	2.2%	2.1%	2.1%	1.7%	1.9%	2.2%	2.1%	2.3%
Shannon	5.4%	5.7%	5.9%	5.5%	5.1%	4.6%	4.6%	4.2%	3.3%	3.5%	4.4%	4.8%	4.8%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	
HHI	***6,639***	***6,823***	***6,869***	***7,169***	***7,277***	***7,387***	***7,424***	***7,443***	***7,733***	***8,218***	***7,378***	***7,285***	***7,304***

Source: CSO publicly available data, PMCA Economic Consulting analysis.

Table 4: Largest Airports in EU Member States and National Shares of Passenger Numbers (2023)

		Airport in Country			
Rank	European Country	Airport Name	Passengers	Passengers at All Airports in Country	Airport Share of All Airports
1	Estonia	Lennart Meri Tallinn	2,946,000	2,946,000	100.0%
2	Latvia	Riga	6,619,000	6,619,000	100.0%
3	Luxembourg	Luxembourg	4,792,000	4,792,000	100.0%
4	Malta	Luqa	7,813,000	7,813,000	100.0%
5	Slovenia	Ljubljana Brnik	1,268,000	1,268,000	100.0%
6	Hungary	Budapest Liszt Ferenc International	14,609,000	14,915,000	97.9%
7	Finland	Helsinki Vantaa	15,412,000	16,603,000	92.8%
8	Czechia	Praha Ruzyne	13,789,000	14,925,000	92.4%
9	Austria	Wien Schwechat	29,655,000	33,063,000	89.7%
10	Netherlands	Amsterdam Schiphol	61,888,000	71,336,000	86.8%
11	Ireland	Dublin	33,248,000	39,040,000	85.2%
12	Denmark	Kobenhavn Kastrup	26,699,000	31,737,000	84.1%
13	Slovakia	Bratislava M.R. Stefanik	1,811,000	2,433,000	74.4%
14	Sweden	Stockholm Arlanda	21,838,000	29,441,000	74.2%
15	Lithuania	Vilnius International	4,396,000	5,992,000	73.4%
16	Cyprus	Larnaka International	8,054,000	11,616,000	69.3%
17	Belgium	Brussels	22,175,000	32,341,000	68.6%
18	Bulgaria	Sofia	7,162,000	10,562,000	67.8%
19	Romania	Bucuresti Henri Coanda	14,620,000	22,964,000	63.7%
20	Portugal	Lisboa	33,636,000	61,105,000	55.0%
21	Greece	Athinai Eleftherious Venizelos	28,230,000	63,465,000	44.5%
22	France	Paris Charles de Gaulle	67,390,000	160,064,000	42.1%
23	Poland	Warszawa Chopina	18,460,000	50,169,000	36.8%
24	Croatia	Zagreb Franjo Tudjman	3,696,000	10,821,000	34.2%
25	Germany	Frankfurt Main	59,260,000	185,279,000	32.0%
26	Spain	Adolfo Suárez Madrid Barajas	60,138,000	236,027,000	25.5%
27	Portugal	Porto	15,183,000	61,105,000	24.8%
28	Italy	Roma Fiumicino	40,312,000	162,860,000	24.8%
29	Spain	Barcelona El Prat	49,812,000	236,027,000	21.1%
30	France	Paris Orly	32,290,000	160,064,000	20.2%
31	Germany	München	37,009,000	185,279,000	20.0%
32	Italy	Milano Malpensa	25,901,000	162,860,000	15.9%
33	Spain	Palma de Mallorca	31,093,000	236,027,000	13.2%
34	Germany	Berlin Brandenburg	23,053,000	185,279,000	12.4%
35	Germany	Düsseldorf	19,093,000	185,279,000	10.3%
36	Italy	Bergamo Orio al Serio	15,973,000	162,860,000	9.8%
37	Spain	Malaga Costa del Sol	22,285,000	236,027,000	9.4%
38	Spain	Alicanti	15,724,000	236,027,000	6.7%
39	Spain	Gran Canaria	13,832,000	236,027,000	5.9%

Source: Eurostat air passenger transport statistics (https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Air_passenger_transport_statistics), PMCA Economic Consulting analysis.

Table 5: The NUTS Regions of Ireland

NUTS 1	NUTS 2	NUTS 3	County	Local Authority
Ireland	Northern & Western	Border	Cavan	Cavan County Council
			Donegal	Donegal County Council
			Leitrim	Leitrim County Council
			Monaghan	Monaghan County Council
			Sligo	Sligo County Council
		West	Galway	Galway City Council
				Galway County Council
			Mayo	Mayo County Council
			Roscommon	Roscommon County Council
	Southern	Mid-West	Clare	Clare County Council
			Limerick	Limerick City & County Council
			Tipperary	Tipperary County Council
		South-East	Carlow	Carlow County Council
			Kilkenny	Kilkenny County Council
			Waterford	Waterford City & County Council
			Wexford	Wexford County Council
		South-West	Cork	Cork City Council
				Cork County Council
			Kerry	Kerry County Council
	Eastern & Midland	Dublin	Dublin	Dublin City Council
				Fingal County Council
				Dún Laoghaire-Rathdown Council
				South Dublin Council
		Mid-East	Kildare	Kildare County Council
			Louth	Louth County Council
			Meath	Meath County Council
			Wicklow	Wicklow County Council
		Midland	Laois	Laois County Council
			Longford	Longford County Council
			Offaly	Offaly County Council
			Westmeath	Westmeath County Council

Source: CSO, PMCA.

Table 6: The NUTS 2 Regions of Ireland – Population and Population Shares (2011, 2016 and 2022)

	Population of the NUTS 2 Regions of Ireland and the State in the Census Years 2011, 2016 and 2022											
	Population			Population Change (%)			Population Share (%)			Population Share Change (%)		
NUTS 2 Region	**2011**	**2016**	**2022**	**2011-2016**	**2016-2022**	**2011-2022**	**2011**	**2016**	**2022**	**2011-2016**	**2016-2022**	**2011-2022**
Northern & Western	837,350	847,442	905,439	1.2%	6.8%	8.1%	18.2%	17.8%	17.6%	-2.5%	-1.2%	-3.6%
Southern	1,541,439	1,585,906	1,703,393	2.9%	7.4%	10.5%	33.6%	33.3%	33.1%	-0.9%	-0.7%	-1.5%
Eastern & Midland	2,209,463	2,328,517	2,540,307	5.4%	9.1%	15.0%	48.2%	48.9%	49.3%	1.5%	0.9%	2.5%
State	**4,588,252**	**4,761,865**	**5,149,139**	**3.8%**	**8.1%**	**12.2%**	**100.0%**	**100.0%**	**100.0%**			
Concentration (HHI)							***3,781***	***3,817***	***3,837***			

Source: CSO Census data, PMCA analysis.

Table 7: The NUTS 3 Regions of Ireland – Population and Population Shares (2011, 2016 and 2022)

	Population of the NUTS 3 Regions of Ireland and the State in the Census Years 2011, 2016 and 2022)											
	Population			Population Change (%)			Population Share (%)			Population Share Change (%)		
NUTS Region	**2011**	**2016**	**2022**	**2011-2016**	**2016-2022**	**2011-2022**	**2011**	**2016**	**2022**	**2011-2016**	**2016-2022**	**2011-2022**
NUTS 3 Border	391,994	394,333	419,473	0.6%	6.4%	7.0%	8.5%	8.3%	8.1%	-3.1%	-1.6%	-4.6%
NUTS 3 West	445,356	453,109	485,966	1.7%	7.3%	9.1%	9.7%	9.5%	9.4%	-2.0%	-0.8%	-2.8%
NUTS 3 Mid-West	467,759	473,269	505,369	1.2%	6.8%	8.0%	10.2%	9.9%	9.8%	-2.5%	-1.2%	-3.7%
NUTS 3 South-East	409,146	422,062	457,410	3.2%	8.4%	11.8%	8.9%	8.9%	8.9%	-0.6%	0.2%	-0.4%
NUTS 3 South-West	664,534	690,575	740,614	3.9%	7.2%	11.4%	14.5%	14.5%	14.4%	0.1%	-0.8%	-0.7%
NUTS 3 Mid-East	653,984	688,857	764,154	5.3%	10.9%	16.8%	14.3%	14.5%	14.8%	1.5%	2.6%	4.1%
NUTS 3 Midland	282,410	292,301	317,999	3.5%	8.8%	12.6%	6.2%	6.1%	6.2%	-0.3%	0.6%	0.3%
NUTS 3 Dublin	1,273,069	1,347,359	1,458,154	5.8%	8.2%	14.5%	27.7%	28.3%	28.3%	2.0%	0.1%	2.1%
State	**4,588,252**	**4,761,865**	**5,149,139**	**3.8%**	**8.1%**	**12.2%**	**100.0%**	**100.0%**	**100.0%**			
Concentration (HHI)							***1,571***	***1,594***	***1,598***			

Source: CSO Census data, PMCA analysis.

Table 8: The NUTS 2 Regions, NUTS 3 Regions and Counties of Ireland – Population and Population Shares (2011, 2016 and 2022)

	Population of the NUTS 2 and NUTS 3 Regions and Counties of Ireland in the Census Years 2011, 2016 and 2022											
	Population			Population Change (%)			Population Share (%)			Population Share Change (%)		
NUTS Region and County	2011	2016	2022	2011-2016	2016-2022	2011-2022	2011	2016	2022	2011-2016	2016-2022	2011-2022
NUTS 2 Northern and Western	837,350	847,442	905,439	1.2%	6.8%	8.1%	18.2%	17.8%	17.6%	-2.5%	-1.2%	-3.6%
NUTS 3 Border	391,994	394,333	419,473	0.6%	6.4%	7.0%	8.5%	8.3%	8.1%	-3.1%	-1.6%	-4.6%
Cavan	73,183	76,176	81,704	4.1%	7.3%	11.6%	1.6%	1.6%	1.6%	0.3%	-0.8%	-0.5%
Donegal	161,137	159,192	167,084	-1.2%	5.0%	3.7%	3.5%	3.3%	3.2%	-4.8%	-2.9%	-7.6%
Leitrim	31,798	32,044	35,199	0.8%	9.8%	10.7%	0.7%	0.7%	0.7%	-2.9%	1.6%	-1.4%
Monaghan	60,483	61,386	65,288	1.5%	6.4%	7.9%	1.3%	1.3%	1.3%	-2.2%	-1.6%	-3.8%
Sligo	65,393	65,535	70,198	0.2%	7.1%	7.3%	1.4%	1.4%	1.4%	-3.4%	-0.9%	-4.3%
NUTS 3 West	445,356	453,109	485,966	1.7%	7.3%	9.1%	9.7%	9.5%	9.4%	-2.0%	-0.8%	-2.8%
Mayo	130,638	130,507	137,970	-0.1%	5.7%	5.6%	2.8%	2.7%	2.7%	-3.7%	-2.2%	-5.9%
Roscommon	64,065	64,544	70,259	0.7%	8.9%	9.7%	1.4%	1.4%	1.4%	-2.9%	0.7%	-2.3%
Galway	250,653	258,058	277,737	3.0%	7.6%	10.8%	5.5%	5.4%	5.4%	-0.8%	-0.5%	-1.3%
NUTS 2 Southern	1,541,439	1,585,906	1,703,393	2.9%	7.4%	10.5%	33.6%	33.3%	33.1%	-0.9%	-0.7%	-1.5%
NUTS 3 Mid-West	467,759	473,269	505,369	1.2%	6.8%	8.0%	10.2%	9.9%	9.8%	-2.5%	-1.2%	-3.7%
Clare	*117,196*	*118,817*	*127,938*	*1.4%*	*7.7%*	*9.2%*	*2.6%*	*2.50%*	*2.48%*	*-2.3%*	*-0.4%*	*-2.7%*
Limerick	191,809	194,899	209,536	1.6%	7.5%	9.2%	4.2%	4.1%	4.1%	-2.1%	-0.6%	-2.7%
Tipperary	158,754	159,553	167,895	0.5%	5.2%	5.8%	3.5%	3.4%	3.3%	-3.2%	-2.7%	-5.8%
NUTS 3 South-East	409,146	422,062	457,410	3.2%	8.4%	11.8%	8.9%	8.9%	8.9%	-0.6%	0.2%	-0.4%
Carlow	54,612	56,932	61,968	4.2%	8.8%	13.5%	1.2%	1.2%	1.2%	0.4%	0.7%	1.1%
Kilkenny	95,419	99,232	104,160	4.0%	5.0%	9.2%	2.1%	2.1%	2.0%	0.2%	-2.9%	-2.7%
Waterford	113,795	116,176	127,363	2.1%	9.6%	11.9%	2.5%	2.4%	2.5%	-1.6%	1.4%	-0.3%
Wexford	145,320	149,722	163,919	3.0%	9.5%	12.8%	3.2%	3.1%	3.2%	-0.7%	1.2%	0.5%
NUTS 3 South-West	664,534	690,575	740,614	3.9%	7.2%	11.4%	14.5%	14.5%	14.4%	0.1%	-0.8%	-0.7%
Cork	519,032	542,868	584,156	4.6%	7.6%	12.5%	11.3%	11.4%	11.3%	0.8%	-0.5%	0.3%
Kerry	145,502	147,707	156,458	1.5%	5.9%	7.5%	3.2%	3.1%	3.0%	-2.2%	-2.0%	-4.2%
NUTS 2 Eastern and Midland	2,209,463	2,328,517	2,540,307	5.4%	9.1%	15.0%	48.2%	48.9%	49.3%	1.5%	0.9%	2.5%
NUTS 3 Mid-East	653,984	688,857	764,154	5.3%	10.9%	16.8%	14.3%	14.5%	14.8%	1.5%	2.6%	4.1%
Kildare	210,312	222,504	247,774	5.8%	11.4%	17.8%	4.6%	4.7%	4.8%	1.9%	3.0%	5.0%
Louth	122,897	128,884	139,703	4.9%	8.4%	13.7%	2.7%	2.7%	2.7%	1.0%	0.2%	1.3%
Meath	184,135	195,044	220,826	5.9%	13.2%	19.9%	4.0%	4.1%	4.3%	2.1%	4.7%	6.9%
Wicklow	136,640	142,425	155,851	4.2%	9.4%	14.1%	3.0%	3.0%	3.0%	0.4%	1.2%	1.6%
NUTS 3 Midland	282,410	292,301	317,999	3.5%	8.8%	12.6%	6.2%	6.1%	6.2%	-0.3%	0.6%	0.3%
Laois	80,559	84,697	91,877	5.1%	8.5%	14.0%	1.8%	1.8%	1.8%	1.3%	0.3%	1.6%
Longford	39,000	40,873	46,751	4.8%	14.4%	19.9%	0.8%	0.9%	0.9%	1.0%	5.8%	6.8%
Offaly	76,687	77,961	83,150	1.7%	6.7%	8.4%	1.7%	1.6%	1.6%	-2.0%	-1.4%	-3.4%
Westmeath	86,164	88,770	96,221	3.0%	8.4%	11.7%	1.9%	1.9%	1.9%	-0.7%	0.2%	-0.5%
NUTS 3 Dublin	1,273,069	1,347,359	1,458,154	5.8%	8.2%	14.5%	27.7%	28.3%	28.3%	2.0%	0.1%	2.1%
Fingal	273,991	296,020	330,506	8.0%	11.6%	20.6%	6.0%	6.2%	6.4%	4.1%	3.3%	7.5%
Dublin City	527,612	554,554	592,713	5.1%	6.9%	12.3%	11.5%	11.6%	11.5%	1.3%	-1.2%	0.1%
South Dublin	265,205	278,767	301,075	5.1%	8.0%	13.5%	5.8%	5.9%	5.8%	1.3%	-0.1%	1.2%
Dún Laoghaire-Rathdown	206,261	218,018	233,860	5.7%	7.3%	13.4%	4.5%	4.6%	4.5%	1.8%	-0.8%	1.0%
State	**4,588,252**	**4,761,865**	**5,149,139**	**3.8%**	**8.1%**	**12.2%**	**100.0%**	**100.0%**	**100.0%**			

Source: CSO Census data, PMCA analysis.

Table 9: The NUTS 2 Regions, NUTS 3 Regions and Counties of Ireland – Resident Workers and Resident Workers Shares (2011, 2016 and 2022)

	Resident Workers in the NUTS 2 and NUTS 3 Regions and Counties of Ireland in the Census Years 2011, 2016 and 2022											
	Resident Workers			Resident Workers Growth (%)			Resident Workers Share (%)			Resident Workers Share Growth (%)		
Region and County	2011	2016	2022	2011-2016	2016-2022	2011-2022	2011	2016	2022	2011-2016	2016-2022	2011-2022
NUTS 2 Northern and Western	306,951	333,031	384,543	8.5%	15.5%	25.3%	17.3%	16.9%	16.8%	-2.5%	-0.8%	-3.3%
NUTS 3 Border	138,013	150,033	174,550	8.7%	16.3%	26.5%	7.8%	7.6%	7.6%	-2.3%	0.0%	-2.4%
Cavan	26,742	29,971	34,936	12.1%	16.6%	30.6%	1.5%	1.5%	1.5%	0.7%	0.2%	0.8%
Donegal	51,885	56,818	66,844	9.5%	17.6%	28.8%	2.9%	2.9%	2.9%	-1.6%	1.1%	-0.5%
Leitrim	11,792	12,543	14,667	6.4%	16.9%	24.4%	0.7%	0.6%	0.6%	-4.4%	0.5%	-4.0%
Monaghan	22,748	25,203	28,222	10.8%	12.0%	24.1%	1.3%	1.3%	1.2%	-0.5%	-3.8%	-4.2%
Sligo	24,846	25,498	29,881	2.6%	17.2%	20.3%	1.4%	1.3%	1.3%	-7.8%	0.7%	-7.2%
NUTS 3 West	168,938	182,998	209,993	8.3%	14.8%	24.3%	9.5%	9.3%	9.2%	-2.7%	-1.4%	-4.0%
Mayo	47,730	50,123	57,068	5.0%	13.9%	19.6%	2.7%	2.5%	2.5%	-5.6%	-2.2%	-7.7%
Roscommon	23,991	25,488	29,227	6.2%	14.7%	21.8%	1.4%	1.3%	1.3%	-4.5%	-1.5%	-6.0%
Galway	97,217	107,387	123,698	10.5%	15.2%	27.2%	5.5%	5.4%	5.4%	-0.8%	-1.0%	-1.8%
NUTS 2 Southern	580,078	636,903	740,173	9.8%	16.2%	27.6%	32.8%	32.3%	32.3%	-1.4%	-0.2%	-1.5%
NUTS 3 Mid-West	174,240	187,421	217,640	7.6%	16.1%	24.9%	9.8%	9.5%	9.5%	-3.4%	-0.2%	-3.6%
Clare	44,523	48,274	55,154	8.4%	14.3%	23.9%	2.51%	2.45%	2.40%	-2.6%	-1.8%	-4.4%
Limerick	70,089	76,235	89,880	8.8%	17.9%	28.2%	4.0%	3.9%	3.9%	-2.3%	1.3%	-1.0%
Tipperary	59,628	62,912	72,606	5.5%	15.4%	21.8%	3.4%	3.2%	3.2%	-5.2%	-0.8%	-6.0%
NUTS 3 South-East	147,972	164,085	195,428	10.9%	19.1%	32.1%	8.4%	8.3%	8.5%	-0.4%	2.3%	2.0%
Carlow	19,274	21,800	26,572	13.1%	21.9%	37.9%	1.1%	1.1%	1.2%	1.6%	4.7%	6.4%
Kilkenny	36,875	40,564	45,539	10.0%	12.3%	23.5%	2.1%	2.1%	2.0%	-1.2%	-3.5%	-4.7%
Waterford	41,243	44,901	54,765	8.9%	22.0%	32.8%	2.3%	2.3%	2.4%	-2.2%	4.8%	2.5%
Wexford	50,580	56,820	68,552	12.3%	20.6%	35.5%	2.9%	2.9%	3.0%	0.9%	3.7%	4.6%
NUTS 3 South-West	257,866	285,397	327,105	10.7%	14.6%	26.9%	14.6%	14.5%	14.3%	-0.6%	-1.5%	-2.1%
Cork	204,145	227,023	261,793	11.2%	15.3%	28.2%	11.5%	11.5%	11.4%	-0.1%	-0.9%	-1.0%
Kerry	53,721	58,374	65,312	8.7%	11.9%	21.6%	3.0%	3.0%	2.8%	-2.4%	-3.9%	-6.1%
NUTS 2 Eastern and Midland	883,615	1,000,794	1,169,022	13.3%	16.8%	32.3%	49.9%	50.8%	51.0%	1.8%	0.4%	2.1%
NUTS 3 Mid-East	254,541	285,900	342,042	12.3%	19.6%	34.4%	14.4%	14.5%	14.9%	0.9%	2.8%	3.7%
Kildare	84,945	95,345	114,328	12.2%	19.9%	34.6%	4.8%	4.8%	5.0%	0.8%	3.0%	3.9%
Louth	43,659	49,701	58,738	13.8%	18.2%	34.5%	2.5%	2.5%	2.6%	2.3%	1.5%	3.9%
Meath	73,798	82,607	100,709	11.9%	21.9%	36.5%	4.2%	4.2%	4.4%	0.6%	4.7%	5.3%
Wicklow	52,139	58,247	68,267	11.7%	17.2%	30.9%	2.9%	3.0%	3.0%	0.4%	0.7%	1.1%
NUTS 3 Midland	103,016	113,358	135,480	10.0%	19.5%	31.5%	5.8%	5.8%	5.9%	-1.1%	2.7%	1.5%
Laois	30,086	33,245	39,623	10.5%	19.2%	31.7%	1.7%	1.7%	1.7%	-0.7%	2.4%	1.7%
Longford	13,769	15,064	19,190	9.4%	27.4%	39.4%	0.8%	0.8%	0.8%	-1.7%	9.5%	7.6%
Offaly	27,288	30,114	34,955	10.4%	16.1%	28.1%	1.5%	1.5%	1.5%	-0.8%	-0.3%	-1.1%
Westmeath	31,873	34,935	41,712	9.6%	19.4%	30.9%	1.8%	1.8%	1.8%	-1.5%	2.6%	1.0%
NUTS 3 Dublin	526,058	601,536	691,500	14.3%	15.0%	31.4%	29.7%	30.5%	30.1%	2.7%	-1.2%	1.5%
Fingal	117,534	132,154	154,123	12.4%	16.6%	31.1%	6.6%	6.7%	6.7%	1.0%	0.2%	1.2%
Dublin City	217,368	256,634	295,330	18.1%	15.1%	35.9%	12.3%	13.0%	12.9%	6.1%	-1.1%	4.9%
South Dublin	105,332	117,998	136,318	12.0%	15.5%	29.4%	5.9%	6.0%	5.9%	0.7%	-0.7%	-0.1%
Dún Laoghaire-Rathdown	85,824	94,750	105,729	10.4%	11.6%	23.2%	4.8%	4.8%	4.6%	-0.8%	-4.1%	-4.9%
State	**1,770,644**	**1,970,728**	**2,293,738**	**11.3%**	**16.4%**	**29.5%**	**100.0%**	**100.0%**	**100.0%**			

Source: CSO Census data, PMCA analysis.

Table 10: The NUTS 2 Regions, NUTS 3 Regions and Counties of Ireland – Jobs and Jobs Shares (2011, 2016 and 2022)

	Jobs in the NUTS 2 and NUTS 3 Regions and Counties of Ireland in the Census Years 2011, 2016 and 2022											
	Jobs			Jobs Growth (%)			Jobs Share (%)			Jobs Share Growth (%)		
Region and County	**2011**	**2016**	**2022**	**2011-2016**	**2016-2022**	**2011-2022**	**2011**	**2016**	**2022**	**2011-2016**	**2016-2022**	**2011-2022**
NUTS 2 Northern and Western	232,799	245,916	278,806	5.6%	13.4%	19.8%	15.8%	15.6%	15.4%	-1.8%	-0.8%	-2.6%
NUTS 3 Border	101,984	106,347	122,349	4.3%	15.0%	20.0%	6.9%	6.7%	6.8%	-3.1%	0.7%	-2.4%
Cavan	19,251	20,660	23,424	7.3%	13.4%	21.7%	1.3%	1.3%	1.3%	-0.2%	-0.8%	-1.0%
Donegal	37,358	39,727	46,498	6.3%	17.0%	24.5%	2.5%	2.5%	2.6%	-1.1%	2.4%	1.3%
Leitrim	8,042	7,581	8,913	-5.7%	17.6%	10.8%	0.5%	0.5%	0.5%	-12.4%	2.9%	-9.8%
Monaghan	16,520	17,305	19,394	4.8%	12.1%	17.4%	1.1%	1.1%	1.1%	-2.6%	-1.9%	-4.5%
Sligo	20,813	21,074	24,120	1.3%	14.5%	15.9%	1.4%	1.3%	1.3%	-5.9%	0.2%	-5.7%
NUTS 3 West	130,815	139,569	156,457	6.7%	12.1%	19.6%	8.9%	8.8%	8.7%	-0.8%	-1.9%	-2.7%
Mayo	36,944	38,369	42,475	3.9%	10.7%	15.0%	2.5%	2.4%	2.4%	-3.4%	-3.1%	-6.5%
Roscommon	14,422	14,840	17,154	2.9%	15.6%	18.9%	1.0%	0.9%	1.0%	-4.3%	1.2%	-3.2%
Galway	79,449	86,360	96,828	8.7%	12.1%	21.9%	5.4%	5.5%	5.4%	1.1%	-1.9%	-0.8%
NUTS 2 Southern	472,984	504,401	570,344	6.6%	13.1%	20.6%	32.2%	31.9%	31.6%	-0.9%	-1.1%	-1.9%
NUTS 3 Mid-West	141,950	147,728	163,541	4.1%	10.7%	15.2%	9.7%	9.4%	9.1%	-3.2%	-3.1%	-6.3%
Clare	33,538	34,761	36,872	3.6%	6.1%	9.9%	2.3%	2.2%	2.0%	-3.6%	-7.2%	-10.6%
Limerick	63,054	67,986	76,875	7.8%	13.1%	21.9%	4.3%	4.3%	4.3%	0.2%	-1.1%	-0.8%
Tipperary	45,358	44,981	49,794	-0.8%	10.7%	9.8%	3.1%	2.8%	2.8%	-7.8%	-3.1%	-10.7%
NUTS 3 South-East	116,590	124,891	144,789	7.1%	15.9%	24.2%	7.9%	7.9%	8.0%	-0.4%	1.4%	1.0%
Carlow	15,026	16,009	19,870	6.5%	24.1%	32.2%	1.0%	1.0%	1.1%	-0.9%	8.6%	7.6%
Kilkenny	27,485	29,931	33,167	8.9%	10.8%	20.7%	1.9%	1.9%	1.8%	1.2%	-3.0%	-1.8%
Waterford	36,411	38,423	44,656	5.5%	16.2%	22.6%	2.5%	2.4%	2.5%	-1.9%	1.7%	-0.2%
Wexford	37,668	40,528	47,096	7.6%	16.2%	25.0%	2.6%	2.6%	2.6%	0.0%	1.7%	1.7%
NUTS 3 South-West	214,444	231,782	262,014	8.1%	13.0%	22.2%	14.6%	14.7%	14.5%	0.5%	-1.1%	-0.6%
Cork	171,611	188,573	214,865	9.9%	13.9%	25.2%	11.7%	11.9%	11.9%	2.2%	-0.3%	1.9%
Kerry	42,833	43,209	47,149	0.9%	9.1%	10.1%	2.9%	2.7%	2.6%	-6.2%	-4.5%	-10.4%
NUTS 2 Eastern and Midland	763,014	829,520	956,229	8.7%	15.3%	25.3%	51.9%	52.5%	53.0%	1.1%	0.9%	2.0%
NUTS 3 Mid-East	158,680	172,744	215,153	8.9%	24.6%	35.6%	10.8%	10.9%	11.9%	1.2%	9.0%	10.3%
Kildare	55,918	62,985	78,638	12.6%	24.9%	40.6%	3.8%	4.0%	4.4%	4.7%	9.3%	14.4%
Louth	32,809	35,451	41,473	8.1%	17.0%	26.4%	2.2%	2.2%	2.3%	0.5%	2.4%	2.8%
Meath	38,822	41,757	55,195	7.6%	32.2%	42.2%	2.6%	2.6%	3.1%	0.0%	15.7%	15.7%
Wicklow	31,131	32,551	39,847	4.6%	22.4%	28.0%	2.1%	2.1%	2.2%	-2.8%	7.1%	4.1%
NUTS 3 Midland	75,469	78,848	91,176	4.5%	15.6%	20.8%	5.1%	5.0%	5.1%	-2.9%	1.2%	-1.7%
Laois	17,780	18,505	22,657	4.1%	22.4%	27.4%	1.2%	1.2%	1.3%	-3.2%	7.1%	3.7%
Longford	10,724	11,410	13,197	6.4%	15.7%	23.1%	0.7%	0.7%	0.7%	-1.1%	1.2%	0.1%
Offaly	18,925	19,782	22,726	4.5%	14.9%	20.1%	1.3%	1.3%	1.3%	-2.8%	0.5%	-2.3%
Westmeath	28,040	29,151	32,596	4.0%	11.8%	16.2%	1.9%	1.8%	1.8%	-3.3%	-2.2%	-5.4%
NUTS 3 Dublin	528,865	577,928	649,900	9.3%	12.5%	22.9%	36.0%	36.6%	36.0%	1.6%	-1.6%	0.0%
Fingal	82,738	94,751	115,834	14.5%	22.3%	40.0%	5.6%	6.0%	6.4%	6.5%	7.0%	13.9%
Dublin City	293,350	319,092	336,761	8.8%	5.5%	14.8%	20.0%	20.2%	18.7%	1.1%	-7.6%	-6.6%
South Dublin	79,996	84,627	104,232	5.8%	23.2%	30.3%	5.4%	5.4%	5.8%	-1.6%	7.8%	6.0%
Dún Laoghaire-Rathdown	72,781	79,458	93,073	9.2%	17.1%	27.9%	5.0%	5.0%	5.2%	1.5%	2.5%	4.0%
State	**1,468,797**	**1,579,837**	**1,805,379**	**7.6%**	**14.3%**	**22.9%**	**100.0%**	**100.0%**	**100.0%**			

Source: CSO Census data, PMCA analysis.
Note: The particular CSO data used for the compilation of this table are from the CSO's POWSCCAR data from Censuses 2011, 2016 and 2022 (which are not publicly available).

Table 11: Number of People Highly Annoyed due to Exposure to Day-Evening-Night-Time Aircraft Noise at Dublin Airport (2023)

Number of People by Exposure to Day-Evening-Night Noise (L_{den}) (2023)							
45-49 dB	50-54 dB	55-59 dB	60-64 dB	65-69 dB	70-74 dB	> 75 dB	Total
37,959	20,983	8,753	3,532	148	13	0	**71,388**

Source: Figure 8 of the ANCA report entitled 'A review of the effectiveness of noise mitigation measures at Dublin Airport in achieving the noise abatement objective during 2023' (weblink in footnote 13), PMCA Economic Consulting analysis.

Table 12: Number of People Highly Sleep Disturbed due to Exposure to Night-Time Aircraft Noise at Dublin Airport (2023)

Number of People Highly Sleep Disturbed by Exposure to Night Noise (L_{night}) (2023)							
40-44 dB	45-49 dB	50-54 dB	55-59 dB	60-64 dB	65-69 dB	> 70 dB	Total
20,101	7,252	4,003	1,147	55	4	0	**32,562**

Source: Figure 12 of the ANCA report entitled 'A review of the effectiveness of noise mitigation measures at Dublin Airport in achieving the noise abatement objective during 2023' (weblink in footnote 13), PMCA Economic Consulting analysis.

Table 13: Summary of the Key Results in the Envisa Report on the Health Economic Impact of Aircraft Noise from Brussels Airport (March 2023)

Noise Impact	No. People	DALYs	Cost €m
Highly Annoyed	220,000	4,380	578,160,000
Highy Sleep Disturbed	109,000	7,630	1,007,160,000
Cardiovascular	53,000	6,800	897,600,000
Total	**382,000**	**18,810**	**2,482,920,000**

Source: The link to the Envisa report entitled 'Health-Economic Impact of the aircraft noise from Brussels Airport is given in footnote 19 of the present report by PMCA. Totals derived by PMCA.

Table 14: Summary of the Health Economic Impact of Aircraft Noise at Dublin Airport (2023) – Totals Affected

Noise Impact	No. People	DALYs	Cost €m
Highly Annoyed	71,388	1,421	187,607,664
Highy Sleep Disturbed	32,562	2,279	300,872,880
Cardiovascular	16,746	2,149	283,603,404
Total	**120,696**	**5,849**	**772,083,948**

Source: Numbers of people highly annoyed and highly sleep disturbed reproduced from Table 11 and Table 12 (PMCA analysis). DALYS and health cost based on the numbers in the Envisa report (2023) (figures subject to rounding).

Table 15: Numbers of People Highly Annoyed, Highly Sleep Disturbed and Overall Passenger Numbers at Dublin Airport in 2023 and 2026 in the Bickerdike Allen Partners Study for the daa (December 2024)

Scenario	Highly Annoyed	Highly Sleep Disturbed	Passengers (m)
Current State (2023)	71,388	32,562	33.5
Future Baseline (2026 without the Increase in Passengers)	57,688	24,651	32
Future Proposed (2026 with the Increase in Passengers)	62,283	29,729	36

Source: Reproduced from Annex B in the BAP report.

Table 16: Aircraft Noise Effects at Dublin Airport

Scenario	Pop ≥ 65 dB L_{den}	Pop 55 ≥ dB L_{night}
2019	285	1,533
Current State	322	4,465
Future Baseline (2026)	264	2,970
Future Proposed (2026)	267	3,068

Source: Table of values reproduced from Table 6.1 of the BAP report.

Table 17: The Numbers of People Affected by Aircraft Noise at Dublin Airport in 2023 and in the Future Baseline and Future Proposed Scenarios

Scenario	Highly Annoyed	Highly Sleep Disturbed	Cardiovascular	DALYs	Cost €m
Current State (2023)	71,388	32,562	16,746	5,849	772,083,948
Future Baseline (2026)	57,688	24,651	13,264	4,576	604,022,120
Future Proposed (2026)	62,283	29,729	14,823	5,223	689,409,031

Source: The future baseline (2026) and future proposed (2026) scenarios are contained in the daa's re-submitted application for 36 million passengers at Dublin Airport, PMCA Economic Consulting analysis.