

Annual Compliance Report

2021

Contents

Table of Contents

Contents	2
Introduction	4
Key Roles & Responsibilities.....	5
Non-Technical Summary	6
1.0 Noise Mitigation Measures at Dublin Airport	10
1.1 Complaint Metrics	12
1.2 Violation’s insights	16
1.3 Noise Monitoring.....	28
1.4 Noise Management Procedure	29
2.0 Traffic Distribution & Management	48
2.1 Runway layout and usage.....	48
2.2 Runway 16/34 usage	49
2.3 Flight routings and destinations.....	50
2.4 Busiest day flight tracks.....	51
2.5 Engine Ground Running data	54
3.0 Engagement forums	57
3.1 Community Liaison Group (CLG)	57
3.2 Dublin Airport Environmental Working Group (DAEWG).....	57
3.3 Drop-in Clinics	57
3.4 Other Engagement Channels.....	58
3.5 Insulation and Purchase Scheme data	58
4.0 Operating Restrictions / Flight Procedure changes	60
5.0 Fleet Mix / Chapter Assessment	62
6.0 Noise Contours	65
6.1 Contour Map Busiest Day Overlay	73
7.0 Noise Abatement Objective	79
8.0 Compliance with Noise Mitigation Measures	81
.....	84
9.0 Opportunities for Improvement	85
10.0 Conclusion – Opinion on Compliance	88
Glossary/Abbreviations	89
Appendix A - IFP Listings for 2021	90
Appendix B - ICAO Chapter Compliance (Manufacturer MTOW).....	91

Appendix C - NMT Dublin Noise Report	92
Appendix D - Progress Statement LU-5,6,7	93
Appendix E - Dublin Airport 2021 Noise Contours Report	94
Appendix F - Noise Management Procedure	95
Appendix G - Graphical Representation CDA Violations	96
Appendix H -Exposure Assessments.....	97
Appendix I -Table of Destinations	98

Introduction

The Aircraft Noise (Dublin Airport) Regulation Act 2019, Part 4, section 19 states that the airport shall on or before each anniversary of the date of commencement of this section, prepare and adopt a report in writing in the specified form on the compliance of airport users with noise mitigation measures and operating restrictions. The ANCA defined a Noise Abatement Objective (NAO) in 2022 whereby the principles and expected outcomes associated with the management of noise at Dublin Airport were set out. The NAO requires the reporting of specific WHO metrics against a baseline year of 2019 and is incorporated into the annual report.

daa have drafted a compliance report in accordance with the Act for the calendar year 2021 (1st Jan – 31st Dec) that is based on the requirements listed and report improvement correspondence received from the ANCA in 2020 and 2021.

The report is structured to set out the roles and responsibilities of stakeholders followed by a non-technical summary and description of noise mitigation measures in place at the airport. Further detail on wider community engagement, complaint metrics, noise contour maps and the performance of the noise monitoring terminals in place at the airport is then provided.

Further sections examine the Dublin Airport operation in 2021 , focusing on its traffic management and distribution. The report outlines the operating restrictions in place at the airport and provides a review of flight operations procedures and assessment of the fleet mix which could relate to noise. Final sections of the report provide an assessment of the airport's compliance with operating restrictions and the noise mitigation measures in place with proposals to avoid or reduce the failures of compliance.

Key Roles & Responsibilities

Dublin Airport

Dublin Airport's role within the Aircraft Noise Regulation Act is to ensure appropriate measures are in place for all airport users to comply with applicable noise mitigation measures.

NFTMS Team

The Noise and Flight Track Monitoring Systems team is a sub-group of the Infrastructure Energy, Environment and Utilities Management section at Dublin Airport. Its main roles include:

- Noise systems management (ANOMS, WebTrak Community Engagement tool and Noise Monitoring terminals)
- Track Keeping
- Complaint handling
- Regulatory and internal reporting of noise related matters
- Submission of noise related proposals to the IAA-ANSP for the update of the Aeronautical information Publication
- Update of the relevant aerodrome manual directions related to noise mitigation measures
- Support to relevant group sections for community engagement purposes

Airport Users (Airlines etc)

An airport user means a person responsible for the carriage of passengers, mail, or freight by air to or from the airport. By operating into and out of Dublin, all airport users must comply with the information set out in the Aeronautical Information Publication.

IAA-ANSP

The IAA-ANSP is the Irish national supervisory authority responsible for overseeing and regulating all aspects of civil aviation in Ireland.

ANSP

The Air Navigation Service Provider (ANSP) is responsible for the safe co-ordination of air traffic arriving into and departing from Dublin. The ANSP function is carried out by the Irish Aviation Authority.

ANCA

The Aircraft Noise Competent Authority (ANCA) is the competent authority for the purposes of the Aircraft Noise Regulation.

Non-Technical Summary

Dublin Airport entered 2021 following a very tough 2020. Business and operation at Dublin Airport were significantly impacted by the continuing fallout of COVID-19 led to effective grounding of aviation operations.

Mid 2021 started to see a gradual ramping up of the operation with the reopening of non-essential international travel in July 2021, however this return was impacted by the return of the Omicron variant. Route re-establishment and a return to pre-pandemic long and short-haul travel began to slowly become apparent in quarter four 2021 as evidenced by the busiest day track flights for the 10th December 2021 within this report.

Dublin Airport passenger numbers increased by 14% in 2021 to 8.5 million, when compared with 2020. However, 2021 passenger numbers were down by 74% when compared with 2019 as Covid-19 continued to have a massive impact on aviation globally. Two-thirds of all passengers (66%) who travelled through Dublin Airport in 2021 did so in August, September, October and November, equating to 5.6 million passengers. In total, 8.3 million passengers either started or ended their journey through Dublin Airport while 155,000 of the overall number used the airport as a transfer hub in 2021.

When compared with 2020 figures, short-haul traffic increased by 17% to 7.5 million, while long haul passenger numbers decreased by 1% to almost one million. However, this was a decrease of 83% when compared with pre-Covid-19 passengers for long-haul travel and 73% for short-haul in 2019.

During 2021, passenger numbers to and from Continental Europe increased by 33% versus 2020 levels to 5.3 million. Passengers travelling to and from Britain decreased by 10%, while transatlantic traffic increased by 5% compared with 2020. When compared with pre-Covid in 2019, traffic to and from Continental Europe was down by 69%, while passengers travelling to and from Britain was down by 79%.

Passenger numbers on flights to and from other international destinations, which included flights to the Middle East, declined by 21% compared with 2020. The number of people taking domestic flights increased by 13%. When compared with pre-Covid-19 passenger numbers, other international destinations were down 81%, with domestic travel down by 63% versus 2019.

In 2021, Dublin Airport facilitated 91,373 aircraft movements (landing or take-off) recorded in the ANOMS Noise and Track Keeping system. Most of the movements were conducted using Boeing 737-800 series aircraft (45.56%). Over 94% of aircraft using Dublin Airport in 2021 were aircraft of Chapter 4 classification or better.

The airport is licensed to operate 24 hours per day and in 2021 23.58% of movements took place during the night (23:00- 07:00). Runway 10R/28L is operated as the primary runway, facilitating 97.97% of the movements in 2021. High usage of the primary runway is preferential in terms of noise impact, since its flight paths traverse less populated areas than runway 16/34, whose flightpaths to the south are located over areas of Dublin. The operational decisions, as side from safety, that determine any use of the crosswind RWY 16/34 are described. The typical annual frequency and instances use of RWY 16/34 provide insight into the maintenance and essential repairs works required.

Dublin airport has several noise mitigations measures in place such as the above-mentioned preferred runway usage, limitations on reverse thrust usage, departure procedures and environmental corridors. Jet airliner aircraft (category C/D) are required to fly within these environmental corridors, which are based on the runway take-off flight path areas. Compliance figures for the noise abatement operating procedures are provided where possible and referenced against the preceding year. Where monitoring and measurement of any operating procedure was not undertaken within 2021, specific narrative is provided to detail, where technically feasible and possible, appropriate steps are underway to ensure full compliance.

The airport maintains and operates a Noise and Flight Track Monitoring System (NFTMS), consisting of 7 Noise Monitoring Terminals (NMT's), which are installed in the area around the airport. The results from the system

are used to report on noise levels around the airport and where possible to investigate track keeping against the noise abatement operating procedures. In 2021 the NMT's were operational 99% of the time. The NMT's located directly under the flight paths of runway 10/28 (NMT 1, 2 and 20) recorded 127,145 noise events associated with aircraft.

Graphs of L_{Amax} noise levels are presented for each NMT in the *Noise Mitigation Measures at Dublin Airport* section.

For 2021 99.61% of aircraft operated in accordance with track keeping rules in place. The track keeping rules are further set out in section 1.0 and detail the Noise Preferential Routes (NPR's), otherwise Environmental Noise Corridors, upon which the performance metric is measured. CAT C/D aircraft that breach the Environmental Noise Corridors are deemed a violation, sometimes classified as an infringement or non-compliance. Historical reporting of this performance metric discounted all those violations which occurred within the land boundary of Dublin Airport. This exemption was based on the practicality of applying the rule in a meaningful way. Weather related breaches of the environmental corridor at commencement of departure are common and will vary depending on the aircraft type and maximum take-off weight (MTOW). In most cases the majority of departures manage to return to compliant flight within the Dublin Airport land boundary and hence had been determined not to represent a violation.

The 99.61% track keeping metric is based on the no. of violations of the environmental noise corridors that took place outside of the daa land boundary. The unadjusted metric of 93.7% of departing CAT C/D applies when all violations are included.

Dublin Airport keeps track of all breaches in the NFTMS (the IAA-ANSP does not employ real-time access to the NFTMS). The NFTMS recorded 2,688 violations of the environmental noise corridors by departing CAT C/D aircraft, correlating to the 93.7% track keeping metric. Of these 2,688 violations 167 no. represented breaches of the environmental corridor outside the land boundary of Dublin Airport in 2021, correlating to the 99.61% track keeping metric.

There were no instances in 2021 of track keeping violations arising from changes to flight procedures. Failures by airport users to comply with noise mitigation measures involves aircraft flying off track and therefore breaching the environmental corridor without being directed to do so by the IAA-ANSP. In 2021, 29 queries were sent to the IAA-ANSP, Air Traffic Service Unit (ATSU) for investigation. Parameters and criteria outlining the determination of how and why a violation is issued to the IAA-ANSP is set out and provided in a flowchart format.

Dublin Airport also successfully progressed the inception of an environmental charges programme. As part of phase 1 of the environmental charging, a framework for noise charges was consulted upon, developed and implemented from 2021-22. Mott MacDonald Consultancy provided support to the Dublin Airport team in the review and application of an appropriate noise charging methodology solution. The application of the noise framework considered various methodologies, including ACI noise rating, ICAO chapters and a Quota Count (QC) system. A further desktop assessment was undertaken to consider existing noise charging models and a benchmarking exercise of UK and European airports noise charging.

Existing daa noise data including previous research and noise analysis works has aided the identification of basic requirements and will allowed the Dublin Airport and Mott MacDonald team to create a valid noise charging model through 2021. Two phase of airline consultation was undertaken by Dublin Airport during 2020 and 2021. The consultation followed the requirements of European Communities (Dublin Airport Charges) Regulations 2011. The Quota Count system was agreed as the most appropriate framework for the application of noise charges. Continued engagement with airport users and relevant regulatory bodies such as the Commission for Aviation Regulation (CAR), IAA-ANSP and the ANCA, will continue as the subsequent phases of the noise and environmental charges programme progresses. The noise and environmental charges will be reviewed annually as part of the overall airport charges consultation process.

The movements of aircraft-by-aircraft type referenced against 2020 along with detail on the ICAO chapter compliance set out how the majority of aircraft at Dublin Airport remain the quietest type.

The noise contour maps completed for 2021 set out the modelled noise impact of aircraft operations for the various standard noise metrics as well as a comparison of the Annual L_{DEN} Noise levels for 2020 and 2021. As expected, all of the 2021 contours are larger than their 2020 equivalents. This is due to the partial return from COVID-19 restrictions and the associated increase in movements in 2021 with returning passengers.

Significant system upgrade and improvement works commenced in 2020 have been built on throughout 2021. This has seen Dublin Airport improve its noise flight & track keeping capabilities and engagement as follows:

- WebTrak updated with weather layer and noise contour
- Environmental Noise corridor review and validation of alignment with Aeronautical Instrument Procedures
- Commencement of additional NMT survey and review
- Ongoing and improved daily data grooming of all noise data from noise monitoring terminals
- Airport Directions review
- Advancement of Environmental Noise Charges review and consultation with airport users and regulatory bodies.
- Ongoing works on the technical review and response to ANCA's Benchmark Assessment for additional Noise Monitoring terminals and community engagement has been commenced.

Reporting the performance of the NAO is detailed within the report. Measurement details of the metrics of number of people highly sleep disturbed and highly annoyed is set out within Appendix H in line with the methodology required by World Health Organisation's Environmental Noise Guidelines 2018.



1.0

Noise Mitigation Measures at Dublin Airport

1.0 Noise Mitigation Measures at Dublin Airport

The noise mitigations and improvement objectives in place at Dublin Airport are set out below in Table 1. The mitigation measures are aligned by type with the relevant elements of the ICAO balanced approach.

Item	Ref	Description	Source	ICAO Balanced Approach Element
1*	NS-1	Encourage daa to promote quieter aircraft through incentives such as Fly Quiet programmes.	FCC-NAP	Reduction of Noise at Source
2*	NS-2	Encourage daa to work with airline partners to introduce quieter aircraft, particularly at night – including consideration of incentives	FCC-NAP	Reduction of Noise at Source
3	NA-1	Two Runway Preferential Runway Programme	FCC NAP; daa NMP; AIP;	Reduction of Noise at Source
4	NA-2	Two Runway Noise Preferential Routes (NPR's) and Track Keeping	FCC NAP; daa NMP; AIP;	Reduction of Noise at Source
5	NA-3	Noise Abatement Departure Procedures (NADP) Climb Profile	FCC NAP; daa NMP; AIP;	Noise Abatement Operating Procedure
6	NA-4	Visual Approach Jet Aircraft (Cat C/D)	FCC NAP	Noise Abatement Operating Procedure
7	NA-5/6	Continuous Climb Operations / Continuous Decent Approach	IAA ATC	Noise Abatement Operating Procedure
8	NA-7	Reverse Thrust	FCC NAP; daa NMP; AIP;	Noise Abatement Operating Procedure
9	NA-8	Engine Ground Running	FCC NAP; daa NMP; AIP;	Noise Abatement Operating Procedure
10	NA-9	Monitor and Report	FCC NAP; daa NMP;	Noise Abatement Operating Procedure
11	LU-4	Sound Insulation (RNIS)	FCC NAP; daa NMP;	Land Use & Planning Management
12	LU-6	Voluntary Dwelling Purchase Scheme	NR - RFI 116	Land Use & Planning Management
13	LU-7	Voluntary School Sound Insulation	NR - RFI 116	Land Use & Planning Management
14	CE-1	Stakeholder Engagement	FCC NAP; daa NMP;	Monitoring & Community Engagement
15	CE-2	Community Engagement Programme	FCC NAP; daa NMP;	Monitoring & Community Engagement
16	CE-3	Noise & Flight Track Monitoring System	FCC NAP; daa NMP;	Monitoring & Community Engagement
17	CE-4	Noise Complaint Management Systems	FCC NAP; daa NMP;	Monitoring & Community Engagement

Table 1 – Noise Mitigation Measures at Dublin Airport. * NS-1, NS-2 are noise mitigation objectives as outlined in the FCC Noise Action Plan

Aircraft operators are instructed to ensure that, at all times, aircraft are operated in such a way as to cause the least disturbance practicable in areas surrounding the airport. A description of the specific noise abatement operating procedure measures is set out below.

Two Runway Preferential Runway Programme

This noise mitigation sets out how, where possible, runways are to be used to enable aircraft avoid noise-sensitive areas during the initial departure and final approach phases of flight. Runway 10R or Runway 28L is the required runway between 06:00hr and 23:00hr local time when the crosswind component is 20KT (knots) or less. Runway 28L will be the preferential runway when the tailwind component is 10KT (knots) or less and

braking action is assessed as good. Aircraft are required to use these runways except when operational reasons dictate otherwise.

If the crosswind component on Runway 10R or Runway 28L is greater than 20KT (knots), Runway 16 or Runway 34 may become the active runway. If the forecast crosswind component on Runway 10R or 28L is greater than 20KT (knots), Runway 16 or 34 may become the active runway. The use of Runway

16-34 shall kept to an absolute minimum subject to operational conditions and IAA-ANSP direction. Runways will be prioritised for noise abatement purposes between 23:00 and 06:00hr local time, subject to the same wind calculation method and values as used between 06:00 and 23:00hr local time. When weather conditions and flight movements permit, runway usage will be prioritised as follows:

Arrivals: #1 (Runway 10), #2 (Runway 16), #3 (Runway 28), #4 (Runway 34)

Departures: #1 (Runway 28), #2 (Runway 34), #3 (Runway 10), #4(Runway 16)

Two Runway Noise Preferential Routes and Track Keeping

Disruption is minimised by routing aircraft away from built-up areas, where and when possible. Unless directed otherwise by IAA-ANSP, all aircraft taking off from Dublin Airport will follow specific Noise Preferential Routes (NPR's), otherwise Environmental Noise Corridors. The NPRs are built to avoid and mitigate overflight of built-up areas. Aircraft flying inside the NPR corridors are deemed to be flying on-track. Once an aircraft reaches the end of the NPR, or is at an altitude of 3,000 feet, IAA-ANSP will vector the aircraft onto a more direct heading to its destination. Safety and environmental considerations may dictate that IAA-ANSP can turn aircraft off NPRs below 3,000 feet. Any off-track violations that constitute a complaint are investigated directly by daa and IAA-ANSP.

Aircraft must not leave their respective Environmental Corridor below 3,000ft above mean sea level or during the first 5 nautical miles while using Runways 28L, 16 or 34. Departures from Runway 10R must track the runway extended centreline to 5NM before commencing turn to the north, or to 6NM before commencing turn to the south. Departures from Runway 10R can be vectored by IAA-ANSP once above 3,000ft and over the sea. The corridors also apply for approaches to the reciprocal runway. The Environmental Corridors do not apply to Category A/B aircraft (light aircraft, turbo prop).

The corridors have a width of 180 metres at the departure end of the clearway, diverging at 12.5% on each side to a maximum width of 1.8km. Departures from all runways except Runway 10R, must track the runway extended centreline after take-off to 5NM before commencing turn, unless otherwise cleared by IAA-ANSP 3000ft above mean sea level (AMSL). Departures from Runway 10R must track the runway extended centreline to 5NM before commencing turn to the north, or to 6NM before commencing turn to the south. For departures from runway 10R, there is no upper vertical limit to the corridor.

Noise Abatement Departure Procedures (NADP) Climb Profile

NADP climb profiles are operating procedures setting out rates of climb etc. to a clean configuration speed. The procedures are intended to be beneficial in noise terms for noise-sensitive areas either in proximity or more distant from the airport. There is no comment within the guidance to designate what is in proximity or more distant. Dublin Airport progressed implementation of type NADP II climb profile into the AIP in 2021.

Visual Approach Jet Aircraft

Jet aircraft (Cat C/D) on visual approach to Runways 28L, 10R, 16 and 34 must join final approach no closer than 6NM from touchdown. Aircraft must follow a descent path which will not result in being at any time lower than the approach path which would otherwise be followed using the ILS glide-path.

Continuous Climb Operations/Continuous Descent Operations

Continuous climb operation along a standard departure procedure is intended to limit interruption of the climb profile to cruise altitude and reduces the noise experienced on the ground caused by thrust levels required to keep aircraft level and increases distance from noise-sensitive areas between an aircraft and receptor(s) as soon as possible.

Continuous descent are operations that reduce the noise experienced on the ground by reducing the overall thrust required during the initial descent and keeping aircraft at higher altitudes for a longer period of time.

Reverse Thrust

Reverse thrust is thrust projected in the opposite direction to normal and is used to decelerate an aircraft after landing, in the event of a rejected take off or otherwise. Reverse thrust should not be used during landing operations on any runway between 23:00- 06:00, except where operational or safety reasons dictate otherwise.

Engine Ground Running

Engine test runs are a normal part of the operations at Dublin Airport. Engine test runs must be carried out after heavy maintenance takes place on an aircraft to comply with international safety regulations. There are strict conditions that govern high powered engine test runs that take place at Dublin Airport. While technological advances in aircraft engine design mean that modern aircraft have a lower noise impact than older aircraft, we are very aware that noise impacts still exist and so there are strict controls on when engine test runs may be undertaken. Engine test runs are not permitted between 2000hrs and 0700hrs. All aircraft types may undertake testing between 0900 and 2000hrs, and only aircraft up to Code C may undertake engine testing between 0700 and 0900hrs requirement within aerodrome Manual, Direction 6.10 and mandated within the AIP.

Monitor & Report

Strict compliance with SID is mandatory and is monitored by measuring compliance with environmental corridors.

Large aircraft (Category C/D) are required to fly within the environmental corridors which are based on the runway take-off flight path areas. Figures 6,7 provide an overview of these corridors. The corridors have a width of 180 metres at the departure end of the clearway, diverging at 12.5% on each side to a maximum width of 1.8km. Departures from all runways except Runway 10R, must track the runway extended centreline after take-off to 5NM before commencing turn, unless otherwise cleared by ATC 3000ft above mean sea level (AMSL). Departures from Runway 10R must track the runway extended centreline to 5NM before commencing turn to the north, or to 6NM before commencing turn to the south. For departures from runway 10, there is no upper vertical limit to the corridor.

The corridors also apply for approaches to the reciprocal runway, except for circling approaches. The Environmental Corridors do not apply to Category A/B aircraft (light aircraft, turbo prop type aircraft).

1.1 Complaint Metrics

In 2021 191 people complained about 13,613 aircraft noise events. This represents an increase on 2020 when 112 people lodged 7,133 complaints. In 2021 one complainant was responsible for logging 12,285 complaints which was 90.2% of the total complaints received. The vast majority of the complaints received concerned the main runway, Runway 10/28.

Description	2020	2021	Note
Complaints	7133	13613*	90.85% increase
Complaint Responses acknowledged/issued	7133	13577	99.74% response rate
Referred to IAA-ANSP	96	29	
Violations that were subject of complaint not issued to IAA	N/A	7	Validation of complaint process has identified and is under review
IAA-ANSP Further Investigation Completed	39*	12	
IAA-ANSP Investigation to complainant	N/A	1	

Table 2 – Complaint statistics

*13,613 complaints identified on completion of validation exercise. This differs from the figures referenced below on graphs. 13,568 complaints have been logged in the Noise Flight Track Monitoring System. The use of test complaints accounts for the discrepancy.

Figures 1-5 below set out various complaints metrics for 2021 and provides more detailed review of performance. Figure 1 provides further detail of CAT C/D on track performance based on the total no. of violations for the year including those violations occurring within the Dublin Airport land boundary i.e. 2,688 no.

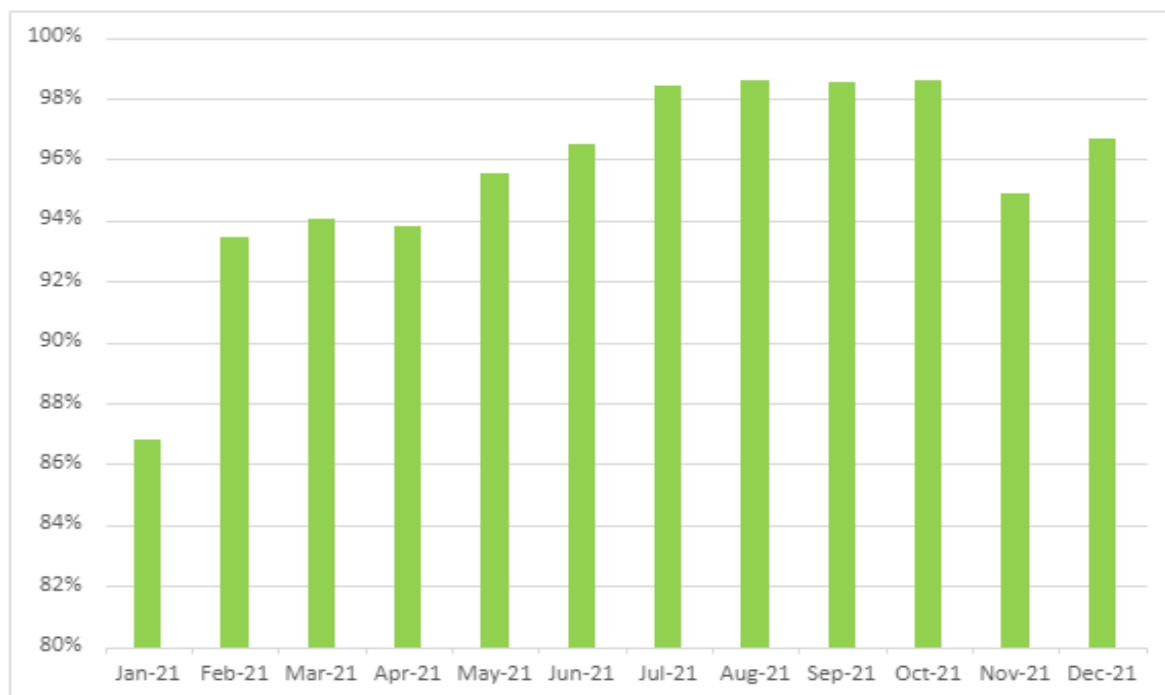


Fig. 1 - Category C/D Aircraft On Track Performance 2021

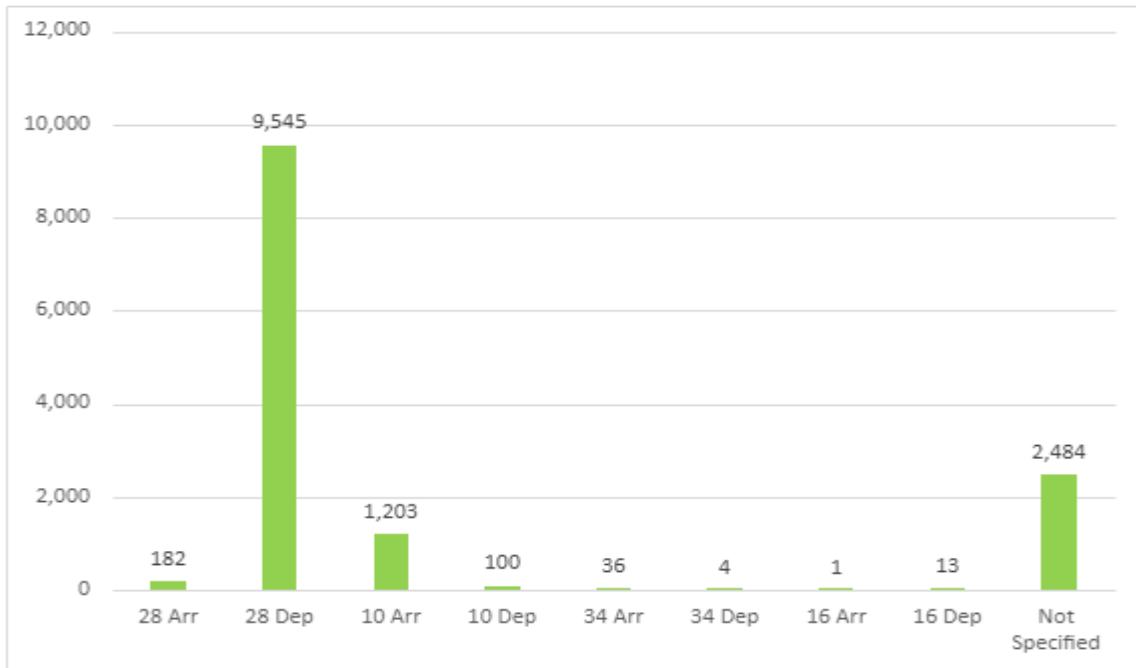


Fig. 2 - Noise Complaint Analysis by Runway 2021

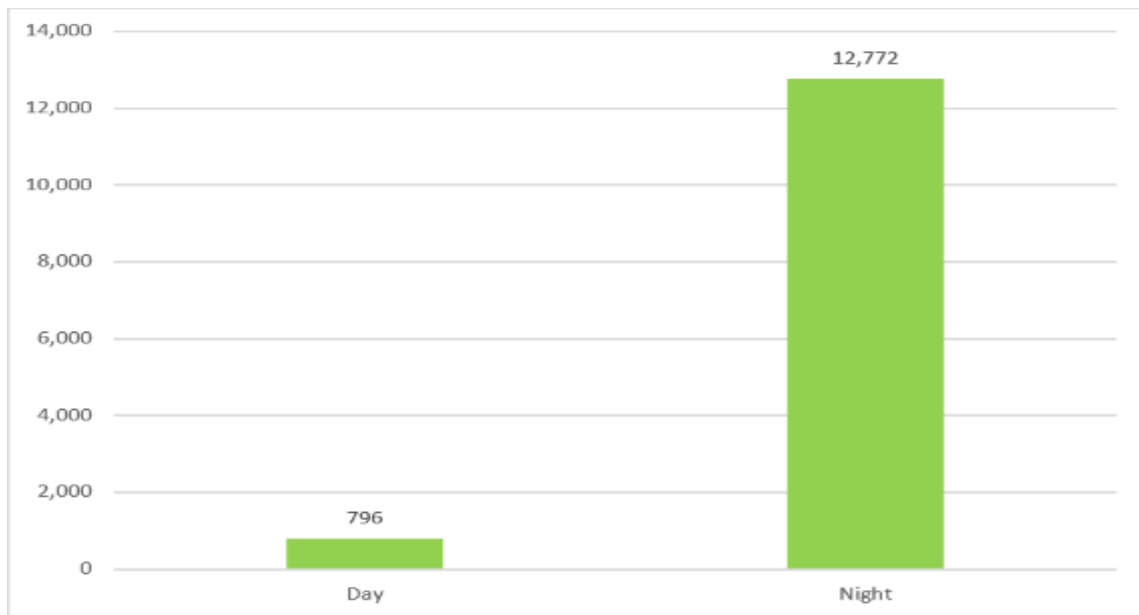


Fig. 3 - Day / Night Noise Complaints 2021

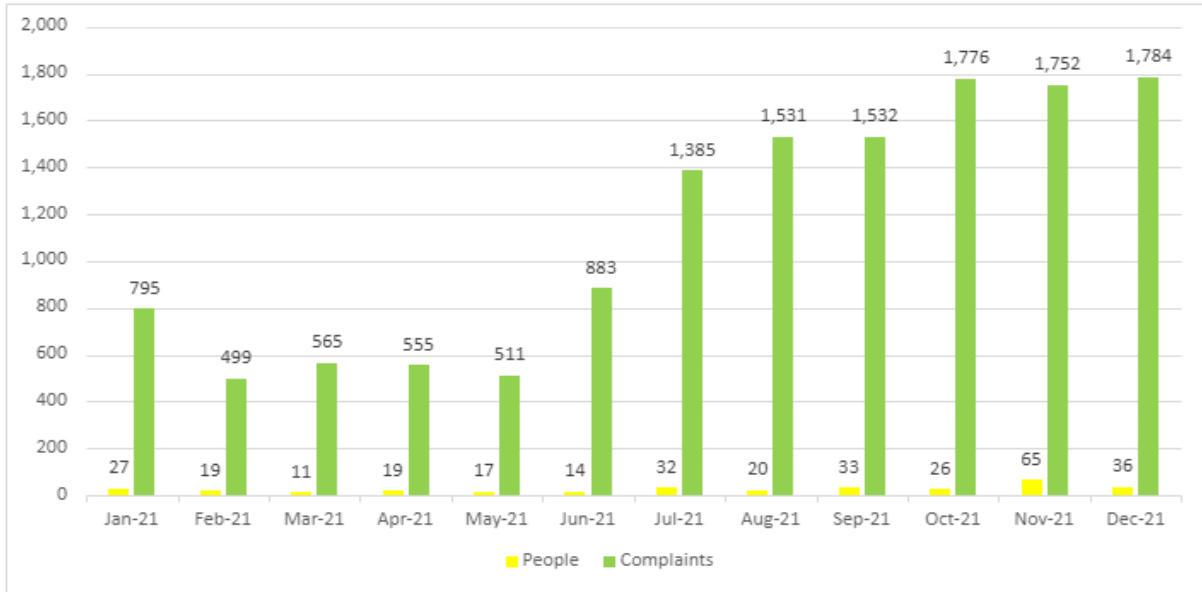


Fig. 4 - Noise Complaint Analysis 2021

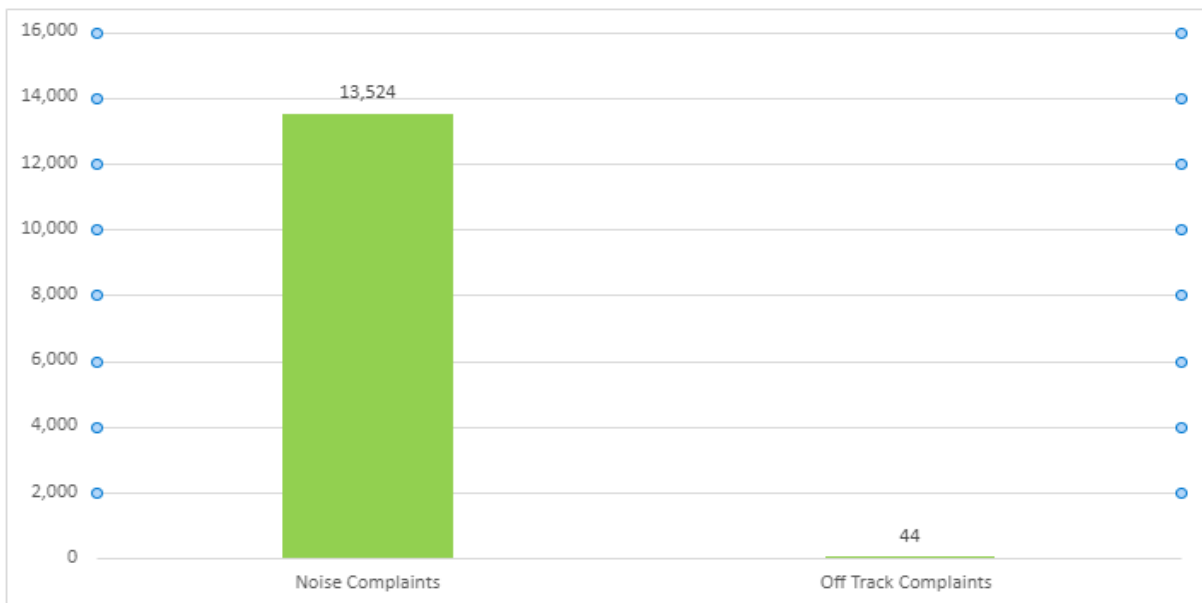


Fig. 5 - Noise Complaints Versus Off Track Complaints 2021

Fig 5. sets out 44 instances of where a complaint corresponded with the violation of an Environmental Noise Corridor outside of the Dublin Airport land boundary. 29 of these 44 complaints have been forwarded to the IAA-ANSP for further investigation with 12 having been processed. The remaining 17 no. complaints are marginal violations of the Environmental Noise Corridors that can be accounted for by system tolerance levels or weather conditions. 1 response form the 12 investigations completed has been issued to the relevant complainant.

With the introduction of the new ANOMS Noise and Track system into daa, the primary focus has been on validating and consolidating the noise mitigation rule set that will allow improved monitoring, measurement, and reporting. During 2021 the review of the existing system of noise gates that formed the basis of the environmental noise corridors has continued. This review will see the refinement of the corridors to ensure full alignment with the noise abatement operating procedures set out in the AIP.



Figure 6 – Environmental Noise Corridor

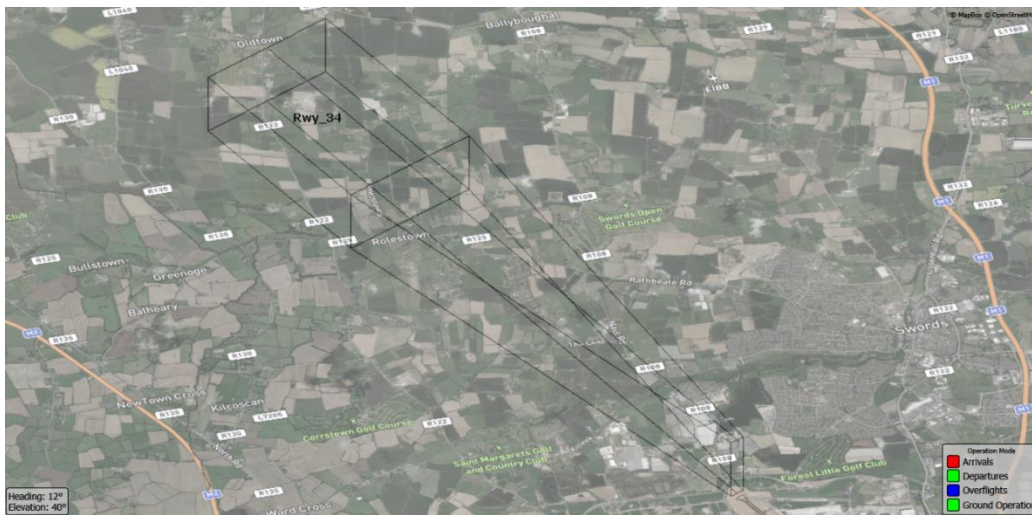


Fig. 7 – Environmental Noise Corridor

1.2 Violation's insights

The figures below outline specific insights into the instances of violations of flight track keeping at Dublin Airport throughout 2021.

Track keeping violations refer to breaches of the Environmental Noise Corridors and relevant other rules as set out in the AIP and described in the Non-Technical Summary above. Note that all violations irrespective of whether occurring within the daa land boundary or otherwise are represented in the figures below.

For context against overall airport activity the count of overall movements per hour at Dublin Airport is provided as the figures representing track violations below refer to Cat C/D aircraft only. Current Continuous Climb Operation (CCO) and Continuous Descent Approach (CDA) procedures are under IAA-ATC control and are monitored by EUROCONTROL. Graphical representation of CDA violations is provided for indicative purposes in Appendix G. The introduction of appropriate rules within Dublin Airport monitoring systems has allowed the measurement of such procedures but requires further discussion with IAA-ANSP to ensure accuracy relevant to IAA-ATC specific details.

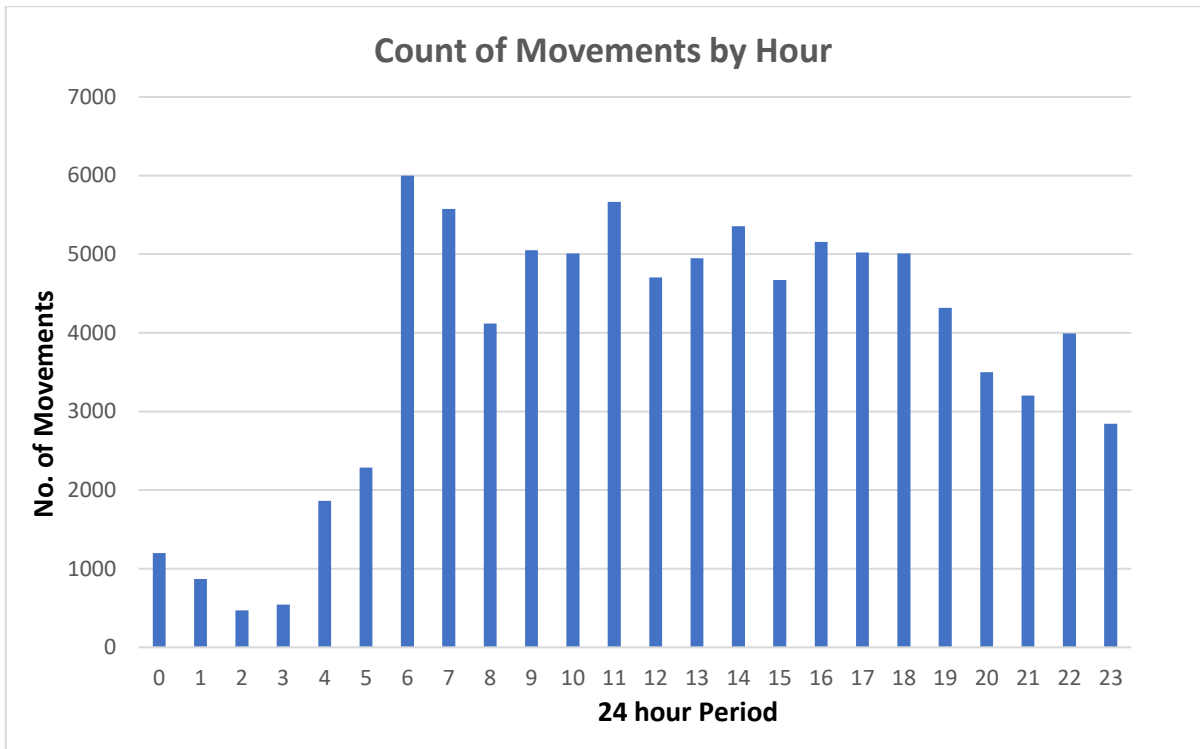


Fig. 8 – Movements by Hour (24 hr period, 0 ~ 00:00....23 ~ 23:00)

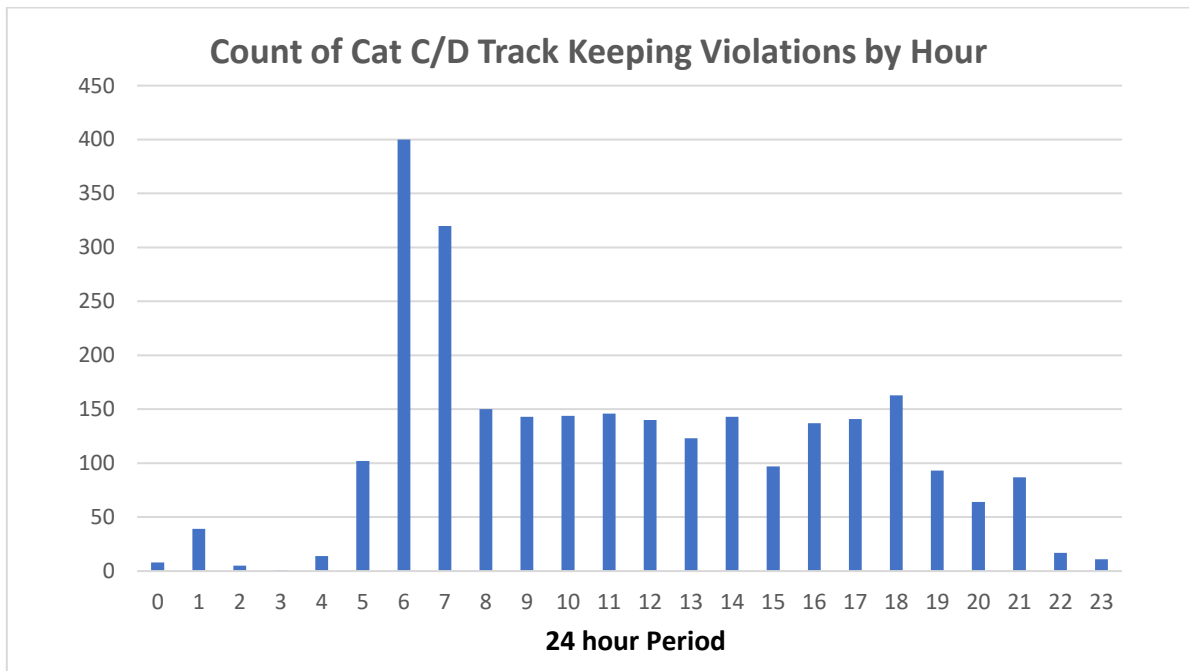


Fig. 9 – Violations by Hour (24 hr period, 0 ~ 00:00....23 ~ 23:00)

The alignment of violations by hour with the first wave of departures from Dublin Airport is consistent with the movements per hour outlined in Fig. 9 and further outlined in the time-of-day graph in Fig. 8.

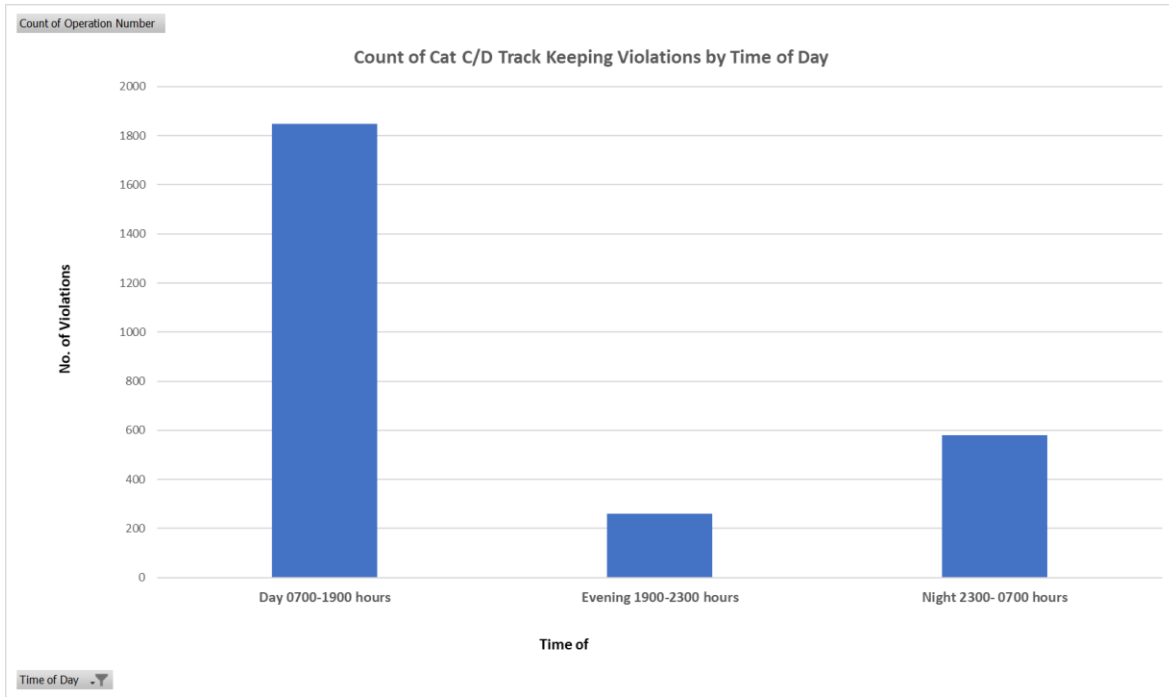


Fig. 10 – Violations by Time of Day

While the insights provided are not unexpected, they do serve to highlight the importance of early morning operations to airport users and a possible area for further engagement and improvement.

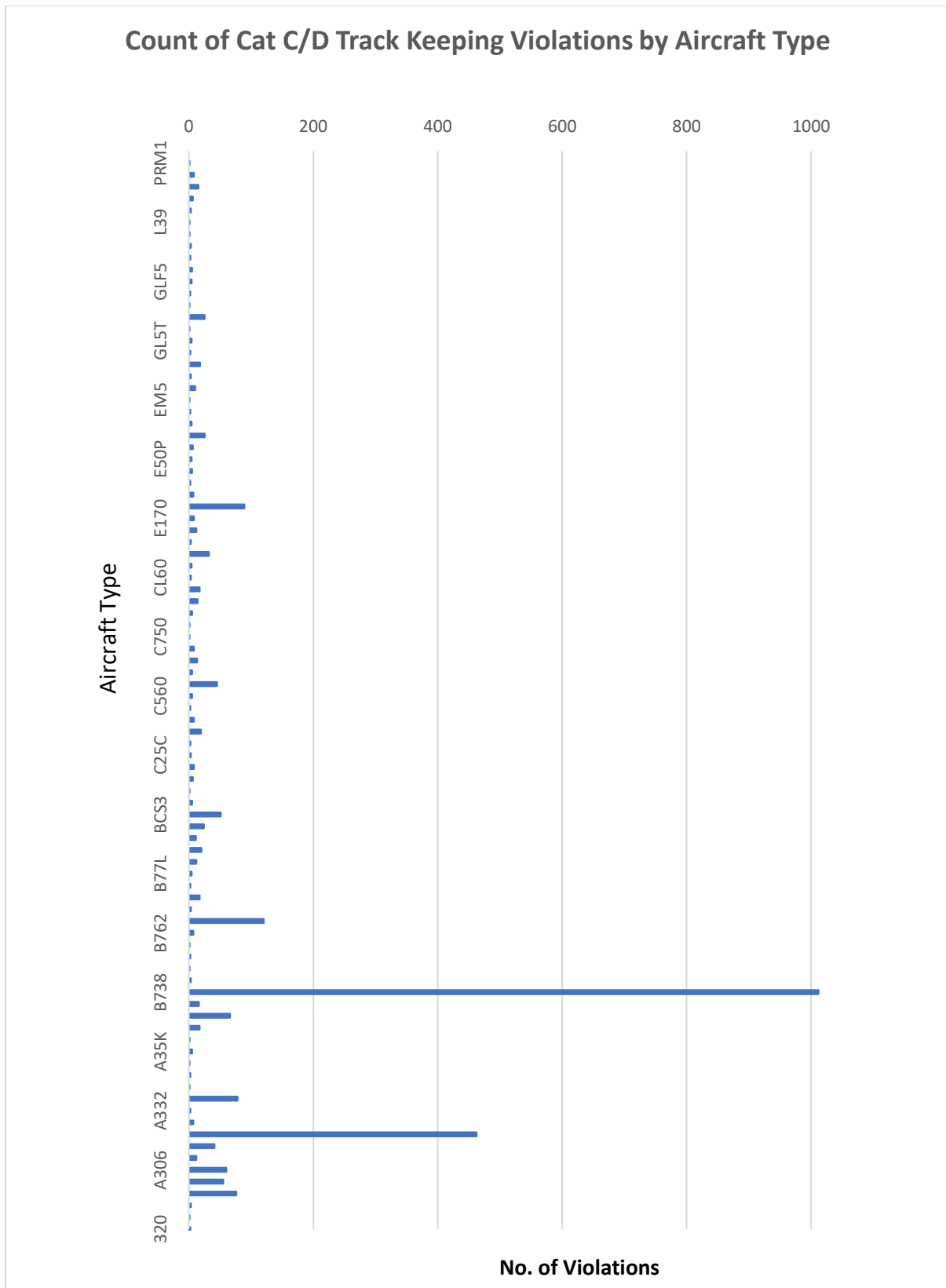


Fig. 11 – Violations by Aircraft Type

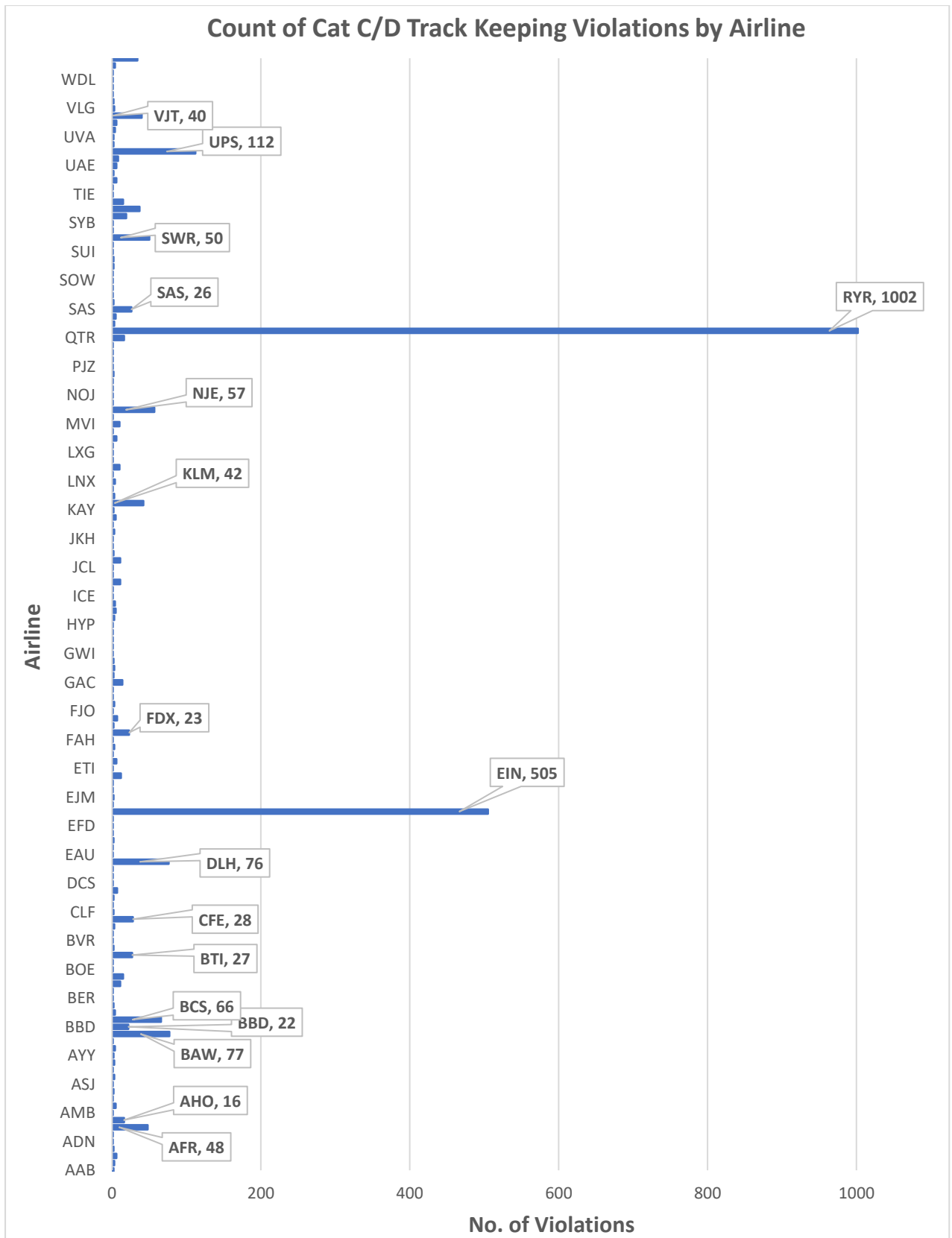


Fig. 12 – Violations by Airline

As Fig. 11 suggests the majority of violations are correlated with the aircraft operated by the largest carriers based at Dublin Airport, and when viewed in conjunction with Figs. 8-10 the prevalence of track keeping anomalies for the first wave of departures is readily apparent.

Dublin Airport is committed to improving Airline performance management and has advanced noise as a standing item at the DAOPG meeting held with all relevant Airport Users. In particular the topics of Continuous Climb and Continuous Descent Operations and adherence to the Environmental corridors is discussed. Ongoing working group discussions with both the IAA-ANSP and the two primary airlines operating at Dublin Airport are in progress to improve adherence and develop reporting programmes for CCO and CDO.

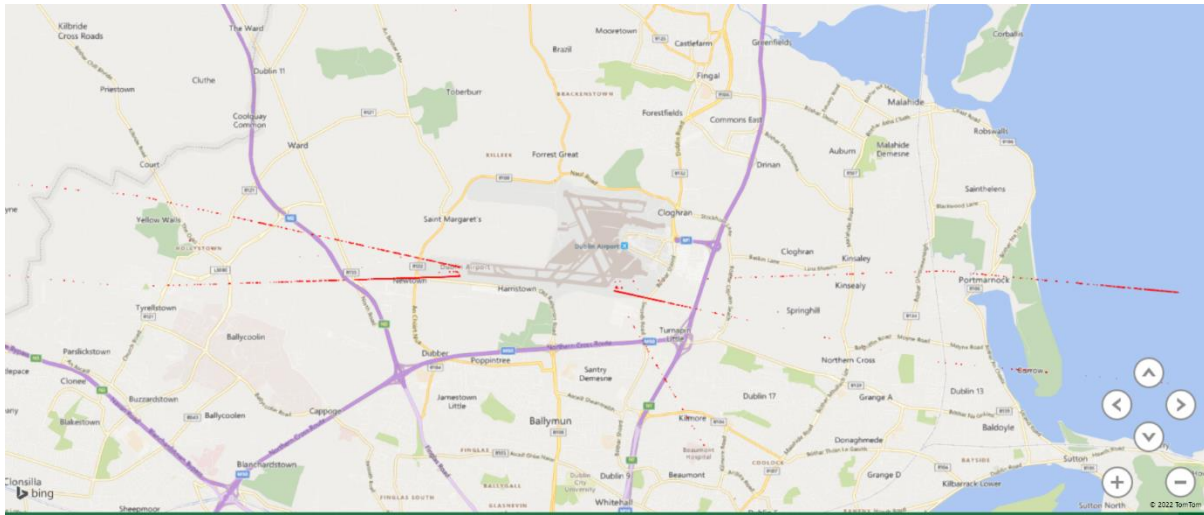


Fig. 13 – Locations of violations

The location of identified violations is detailed in Fig. 13 above. Each of the red dots represents the point at which a corridor violation of CAT C/D aircraft occurred. It is worthwhile noting that the majority of the violations occur within the land boundary of the airport and have merged back into the environmental noise corridor prior to exiting the boundary of the airport. Under the rules of the AIP these infringements still represent a violation and are counted as such but are not issued to IAA-ANSP for further investigation or included in the reported track keeping figures as set out in Section 8 Table 16.

Additional information including the aircraft tracks with elevation colours and by period of day is set out in the figures below to better provide understanding of the violations.

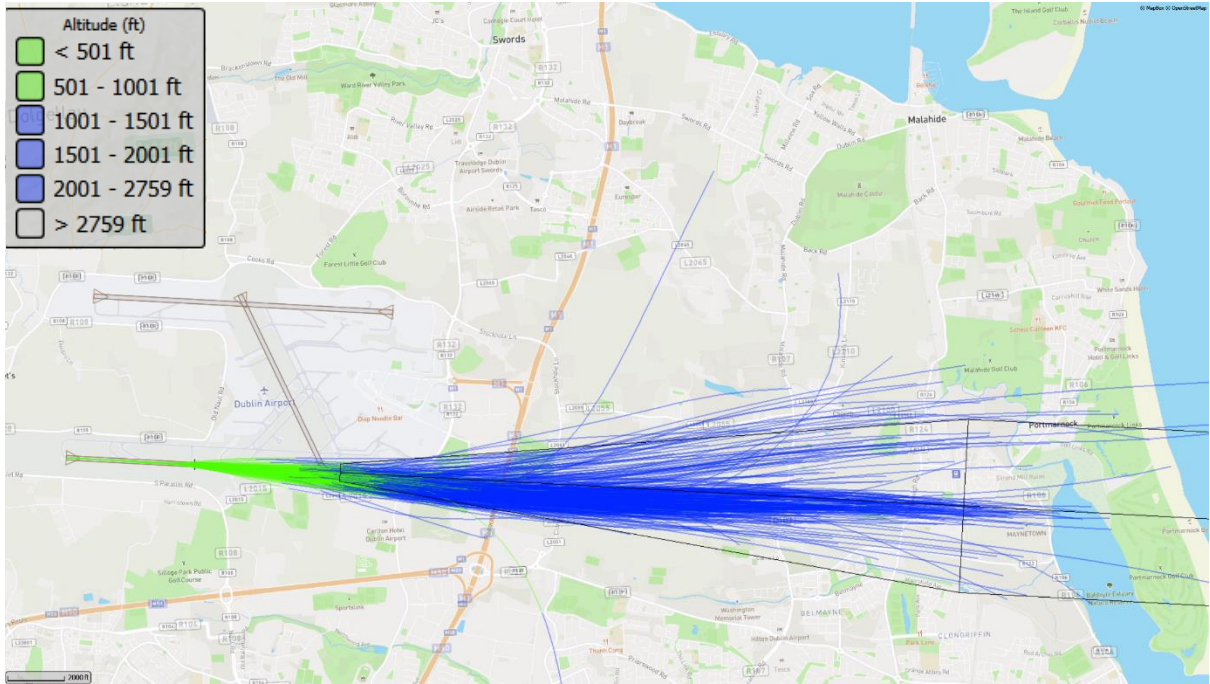


Fig. 14 – RWY 10R violations, Day

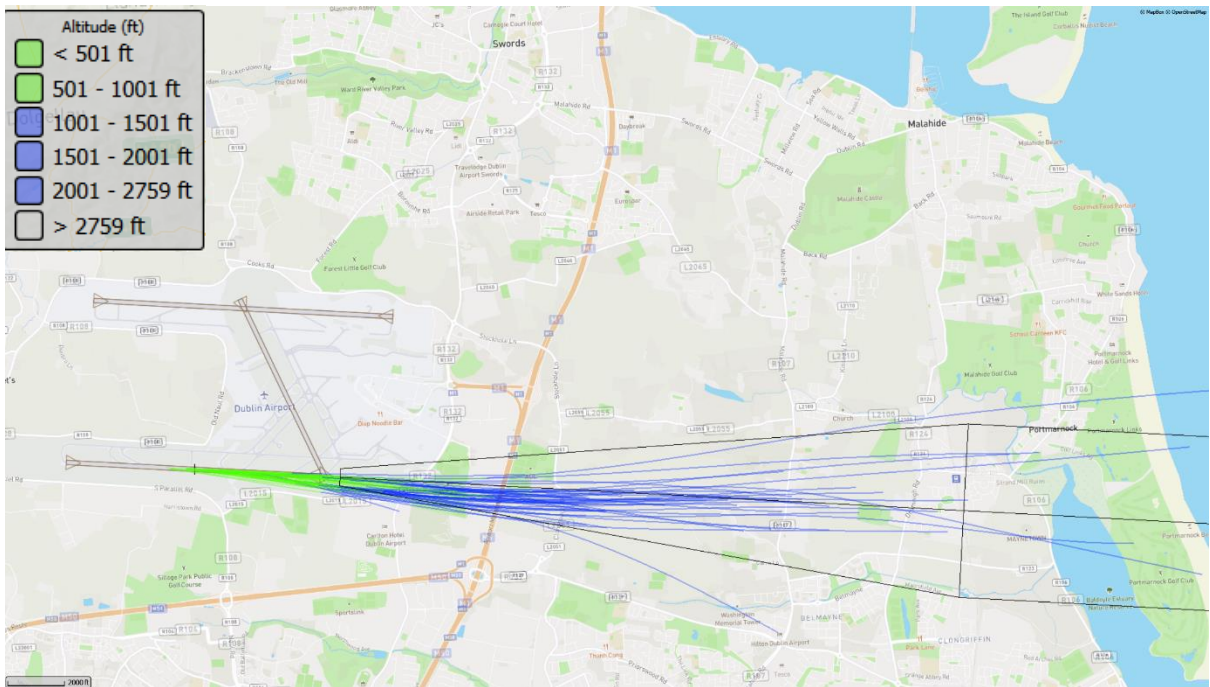


Fig. 15 – RWY 10R violations, Evening

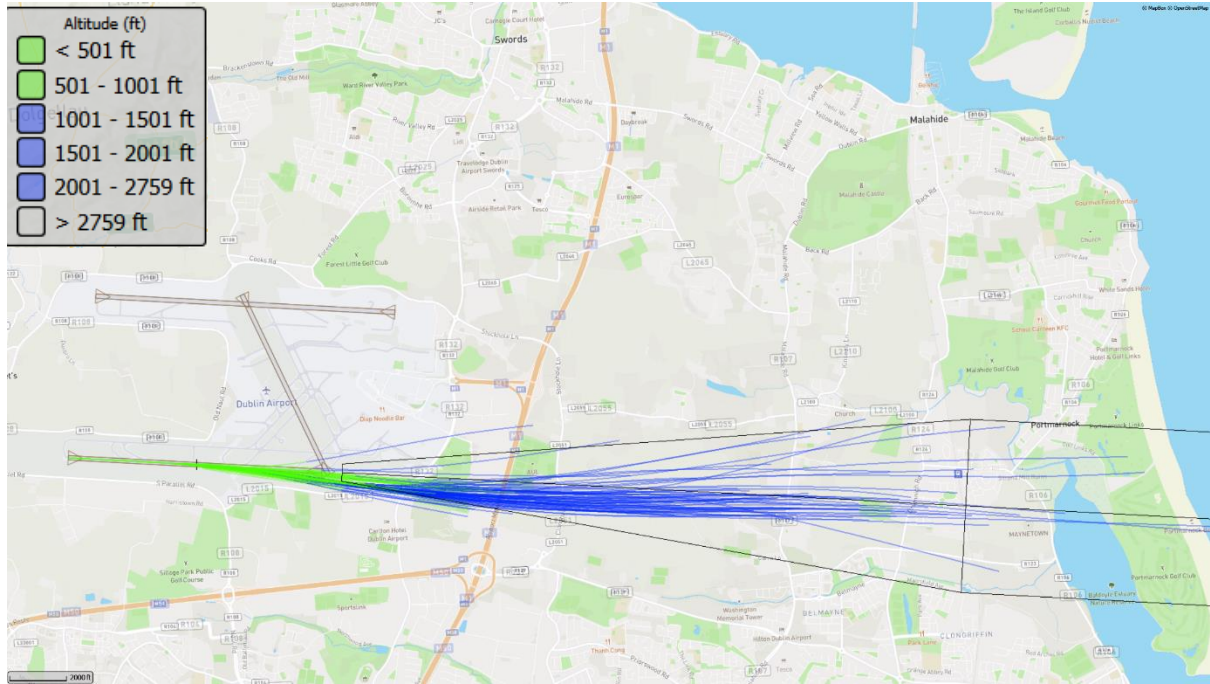


Fig. 16 – RWY 10R violations, Night

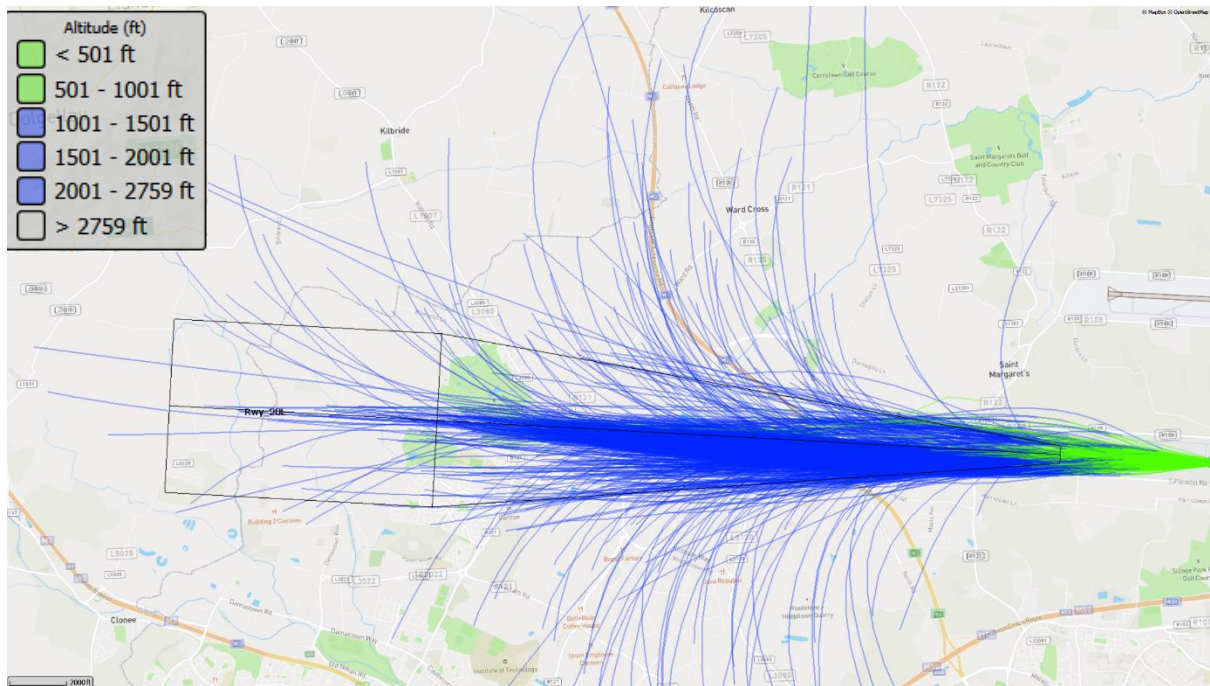


Fig. 17 – RWY 28L violations, Day

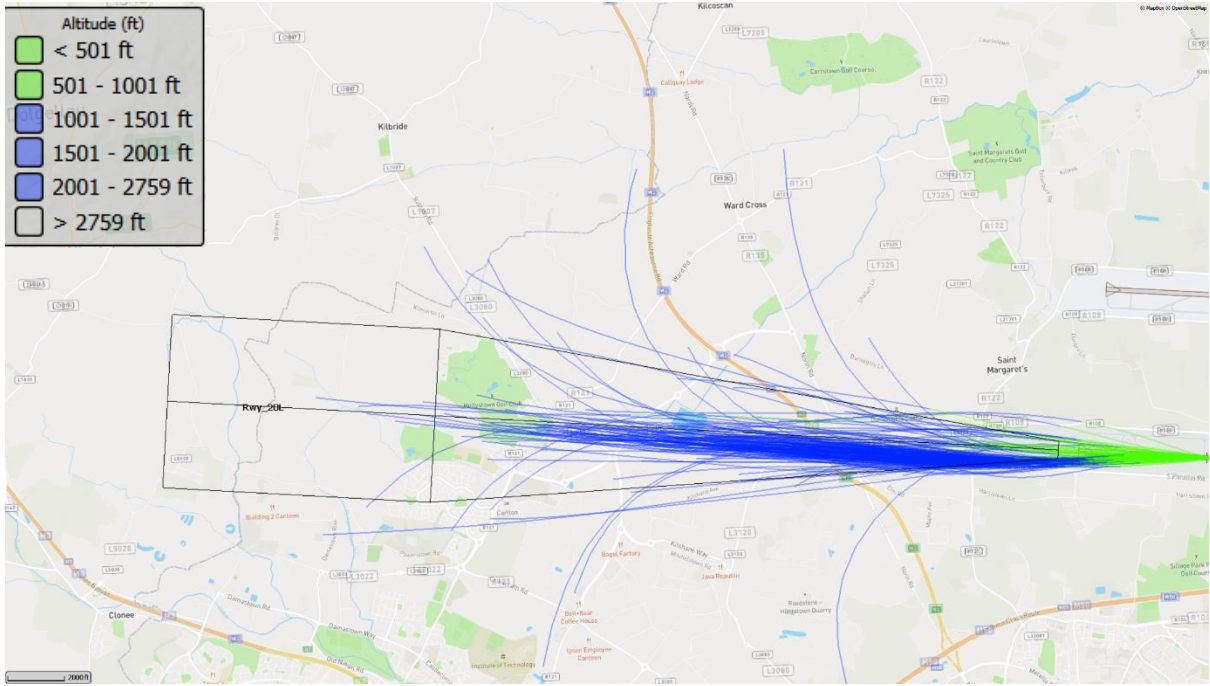


Fig. 18 – RWY 28L violations, Evening

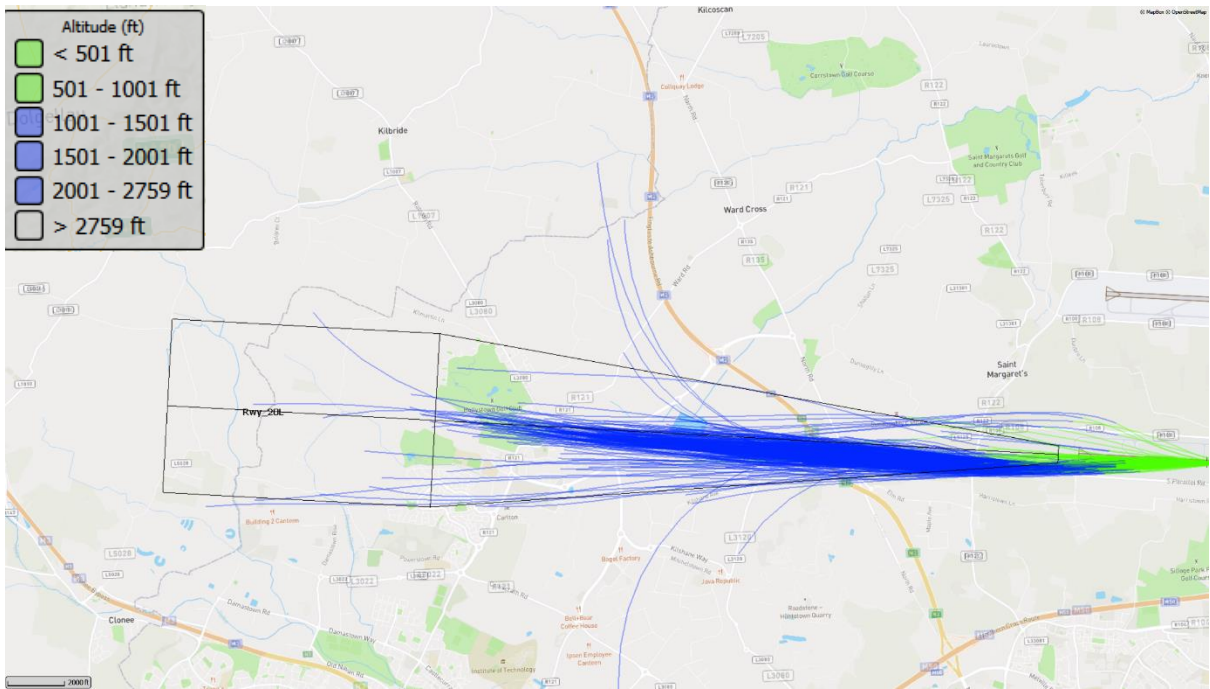


Fig. 19 – RWY 28L violations, Night

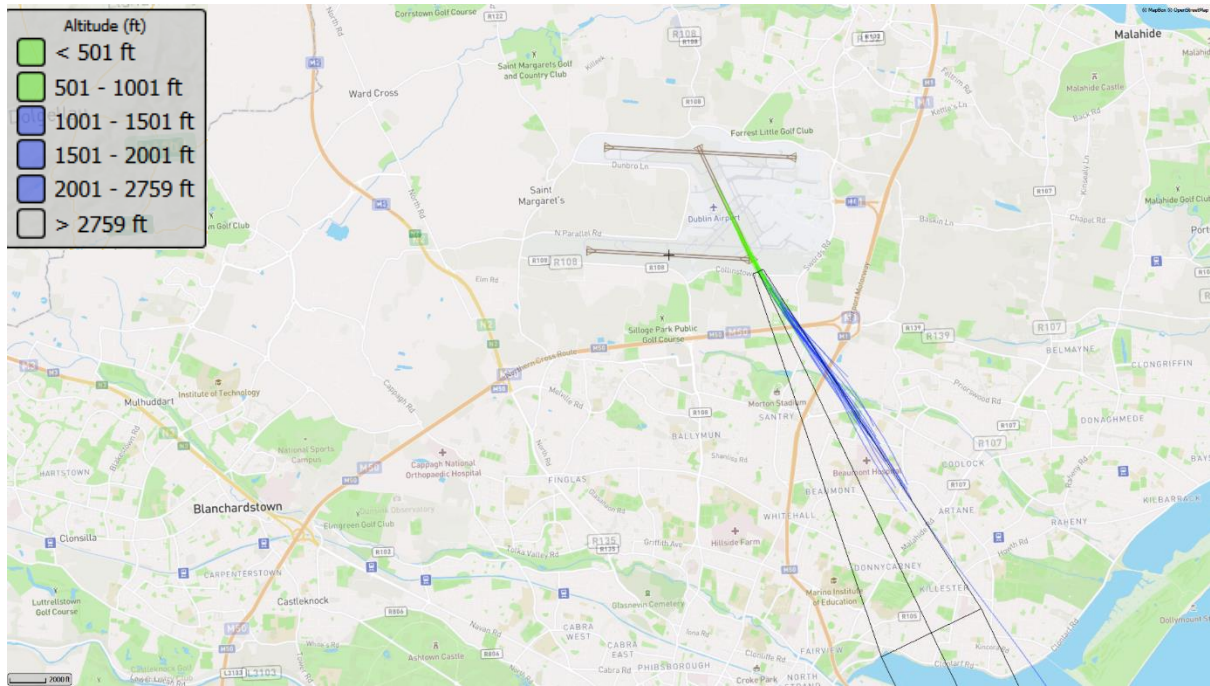


Fig. 20 – RWY 16 violations, Day

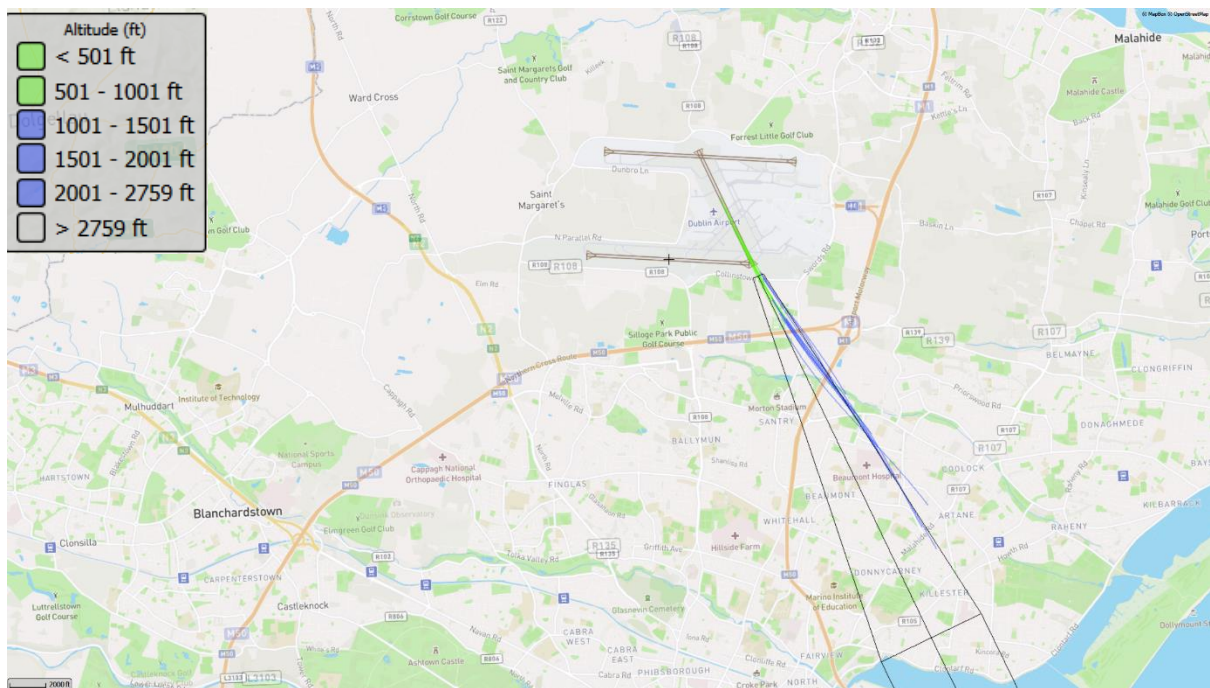


Fig. 21 – RWY 16 violations, Night

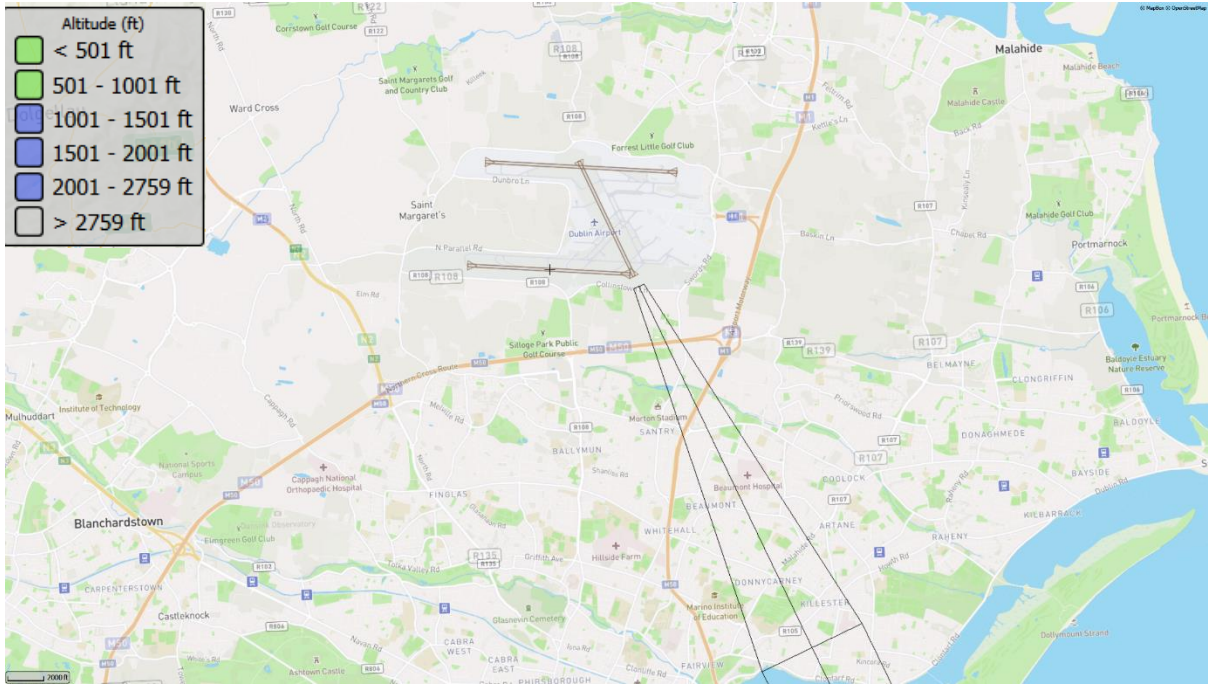


Fig. 22 – RWY 16 violations, Evening

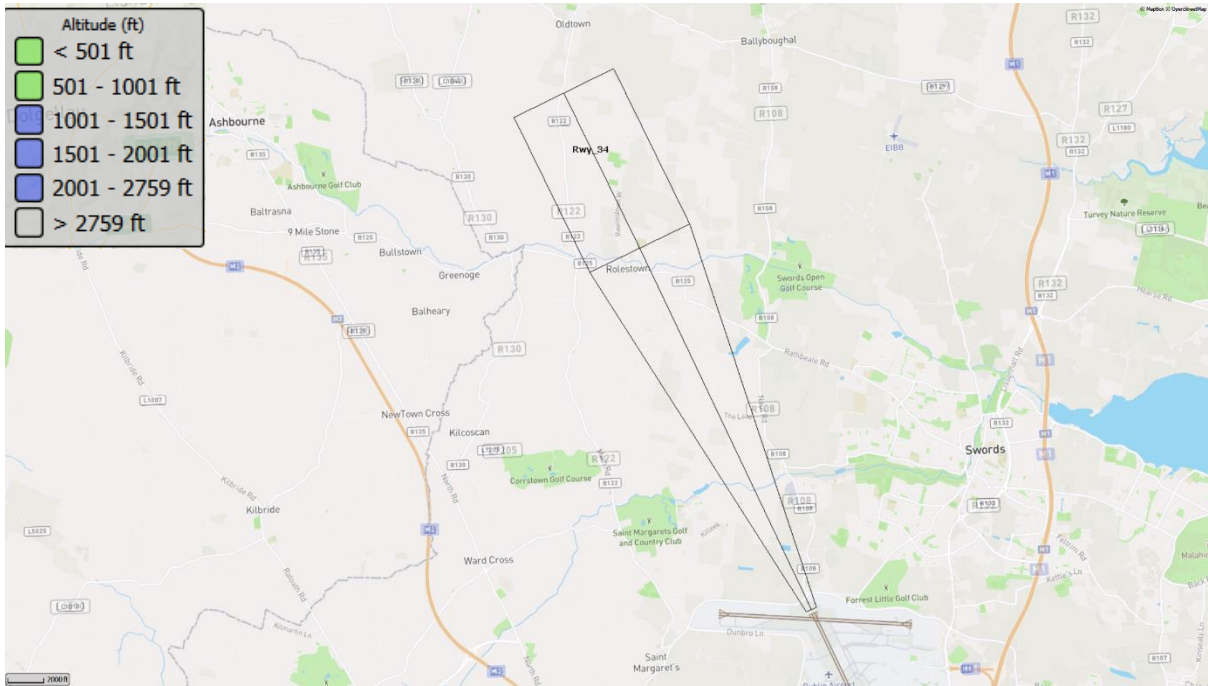


Fig. 23 – RWY 34 violations, Day

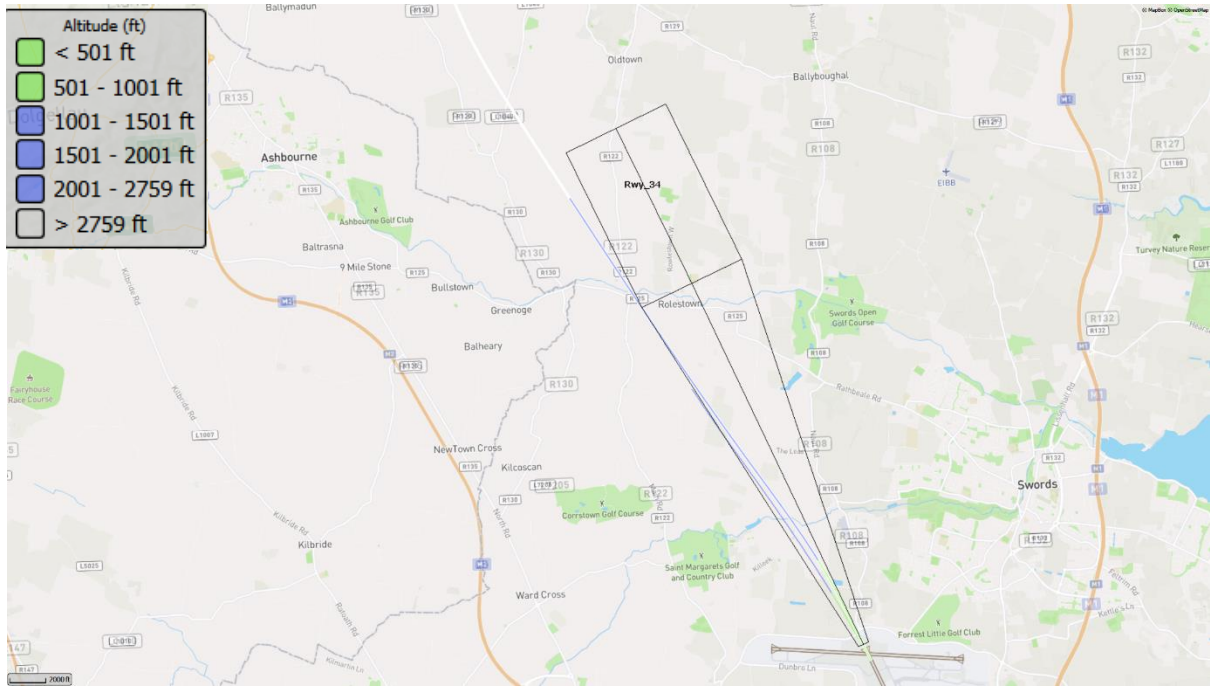


Fig. 24 – RWY 34 violations, Night

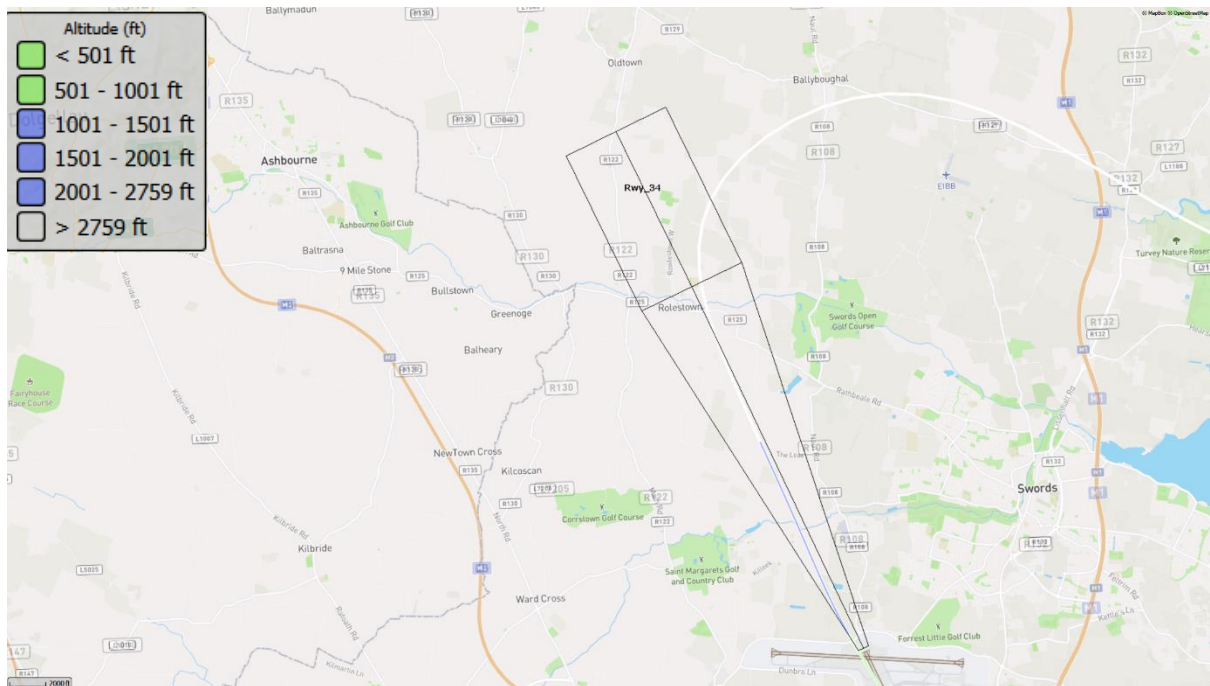


Fig. 25 – RWY 34 violations, Evening

1.3 Noise Monitoring

Dublin airport's Noise & Flight Track Monitoring Service consists of 7 Noise Monitoring Terminals (NMT's), which are installed in the area around the airport. The current system is provided by Envirosuite, with a new Noise & Track Monitoring System having been commissioned by daa in 2020 to improve the performance of noise monitoring at Dublin Airport.

The NMT's are set to record continuously and to trigger a noise event when two conditions are met. The first condition is the noise threshold level. The noise threshold level needs to be exceeded before recording is initiated. The noise threshold levels are continuously adjusted by the system to ensure maximum correlation between noise and individual operations. The second condition is the length of the recorded noise event. The recorded noise event should last for at least 10 seconds. Due to its proximity to agricultural, roads, and/or urban areas, NMT's can be triggered not just by aviation noise. It is for this reason the system is designed to correlate a noise event with an aircraft departing or landing. Similarly, the system can detect when the noise originates from a weather event, such as thunder or other stormy conditions.

Figure 26 shows the locations of the NMT's in 2021 .

- NMT 1: Bay Lane, monitoring runway 28 departures and runway 10 arrivals.
- NMT 2: St. Doolaghs, monitoring runway 10 departures and runway 28 arrivals.
- NMT 3: Bishopswood, monitoring the local area.
- NMT 4: Feltrim, monitoring the local area.
- NMT 5: Balcultry, monitoring runway 34 departures and runway 16 arrivals.
- NMT 6: Artane, monitoring runway 16 departures and runway 34 arrivals.
- NMT 20: Coast Road, monitoring runway 10 departures and runway 28 arrivals.

Figure 26 below shows the location of the noise monitoring terminals 2021. Refer to Appendix D for further detail.

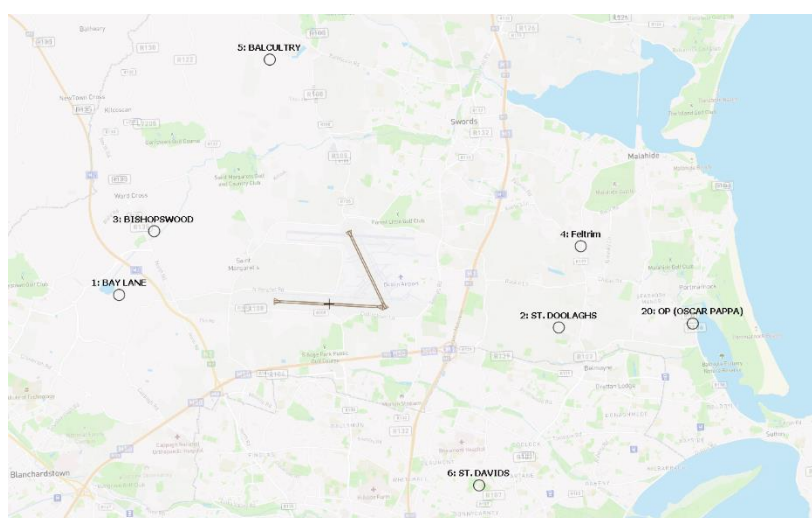


Fig. 26 – Location of NMT's in 2021

1.4 Noise Management Procedure

The flowchart in Fig. 27 sets out the process and methodology whereby members of the public can make a complaint regarding aircraft noise and how such complaints are investigated by Dublin Airport. Additional information is available in Appendix F.

In particular, the criteria applied in determining whether any complaints, non-compliances or violations are issued to IAA-ANSP is set out. Effectively, the NFTMS analyst will analyse the flight in question to determine if an aircraft has breached the environmental noise corridor. Correspondence with the IAA-ANSP will then be initiated as set out in the flowchart in order to determine the details and specific vector information for the flight details of the breach. Receipt of answer from IAA-ANSP will determine whether further engagement with the relevant airport users is required prior to an official response being issued.

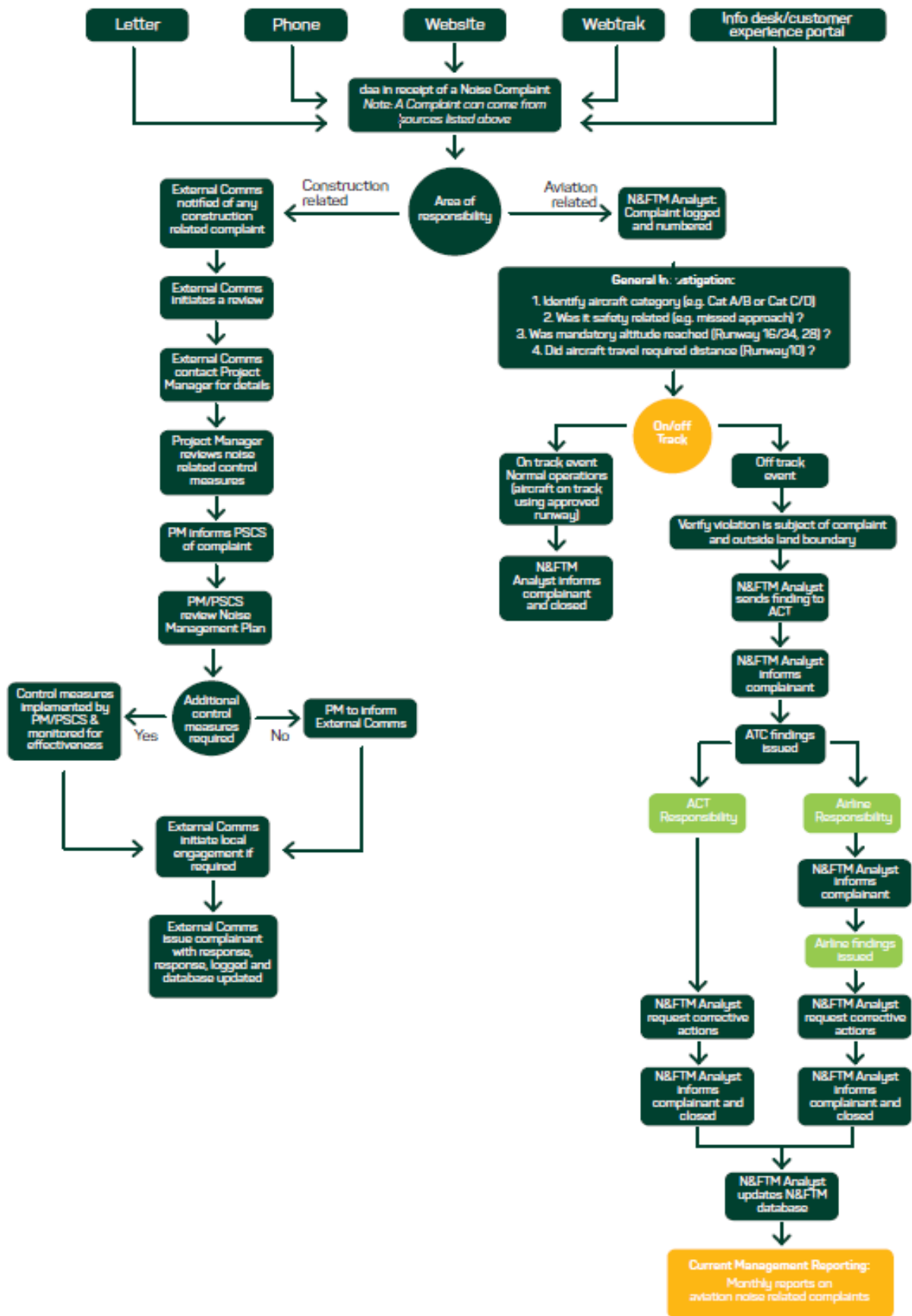
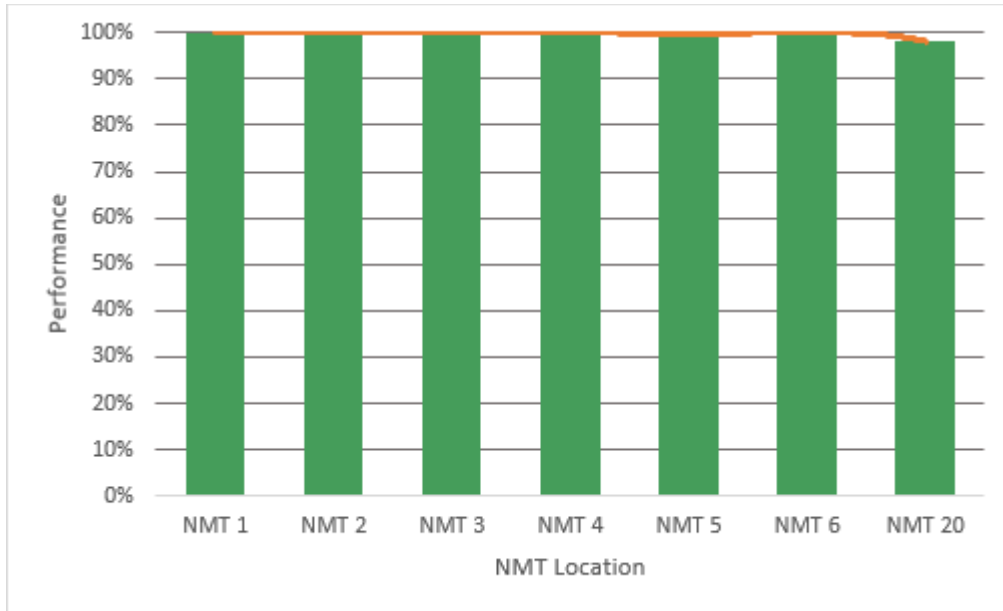


Fig. 27 – Noise Management Procedure Flow chart

NMT operational status 2021

Figure 28 provides an overview of the percentage of time the NMT’s were operational during 2021. To ensure that Noise Monitoring Terminals keep working within specific limits, internal calibration checks are completed every 6 hours. During this short period, the NMT’s are out of operation for short periods of time and do not record noise events. The figure shows that all NMT’s were operational 99% of the time. Further detail on NMT operation is available in Appendix C.



NMT Location	Performance
NMT 1	100.0%
NMT 2	100.0%
NMT 3	100.0%
NMT 4	99.9%
NMT 5	99.8%
NMT 6	100.0%
NMT 20	98.1%
Grand Total	99.7%

Fig. 28 – Uptime and Operational Status of NMT’s, January – December 2021

Noise events

As mentioned, the system automatically classifies noise as aircraft noise, weather related noise or noise related to normal human activity. Due to their location relative to the airport and flight paths, the NMT’s record less or more aircraft noise. NMT’s located directly under the flight paths of runway 10L/28R (NMT 1, 2 and 20) mostly record aircraft noise events. NMT 6, located in North Dublin mostly records noise events related to normal human activity, due to its busy surroundings and the limited use of runway 16/34. Fig. 19 below details the noise events breakdown by type for 2021.

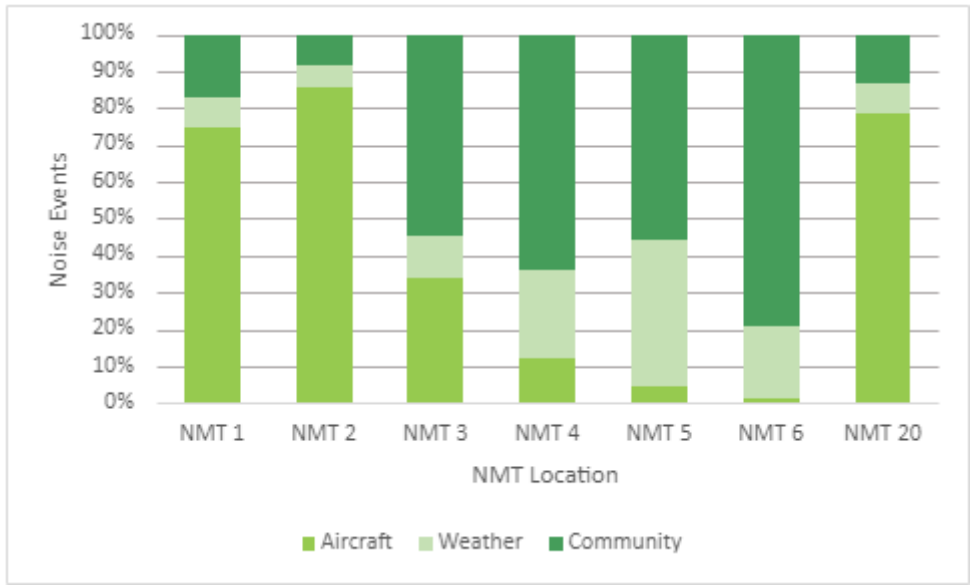


Fig. 29 – Noise Events breakdown per NMT

Average hourly noise levels per NMT

The figures in this section present the average noise levels measured by the NMT’s per hour of the day. Both noise levels of all noise events (total noise), and for those events that were correlated to aircraft movements are presented.

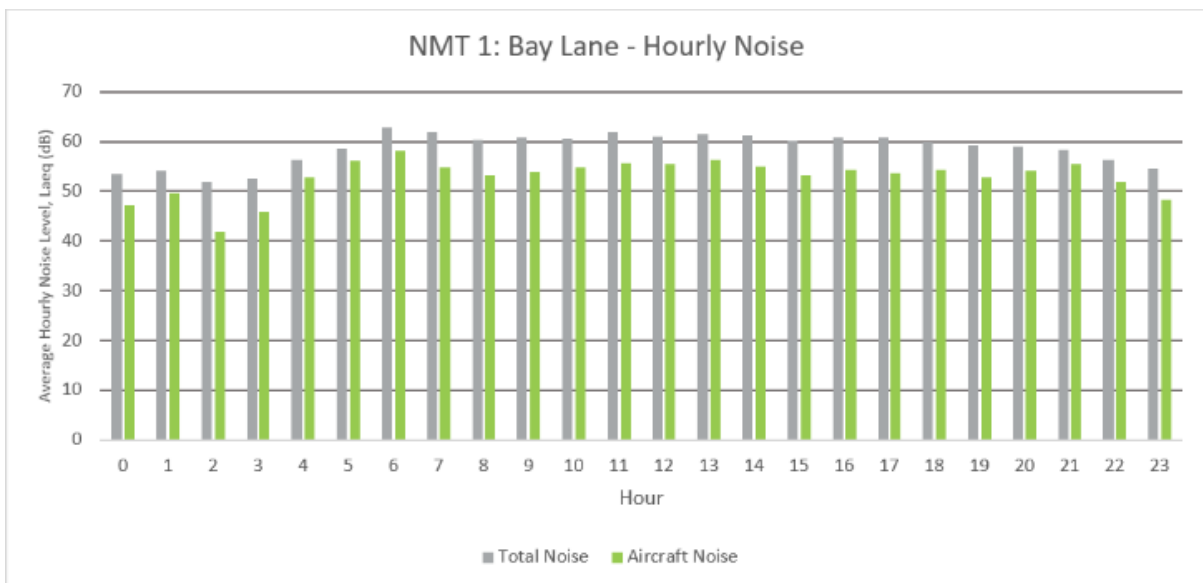


Fig. 30 – NMT 1 hourly noise(24 hr period, 0 ~ 00:00...23 ~ 23:00)

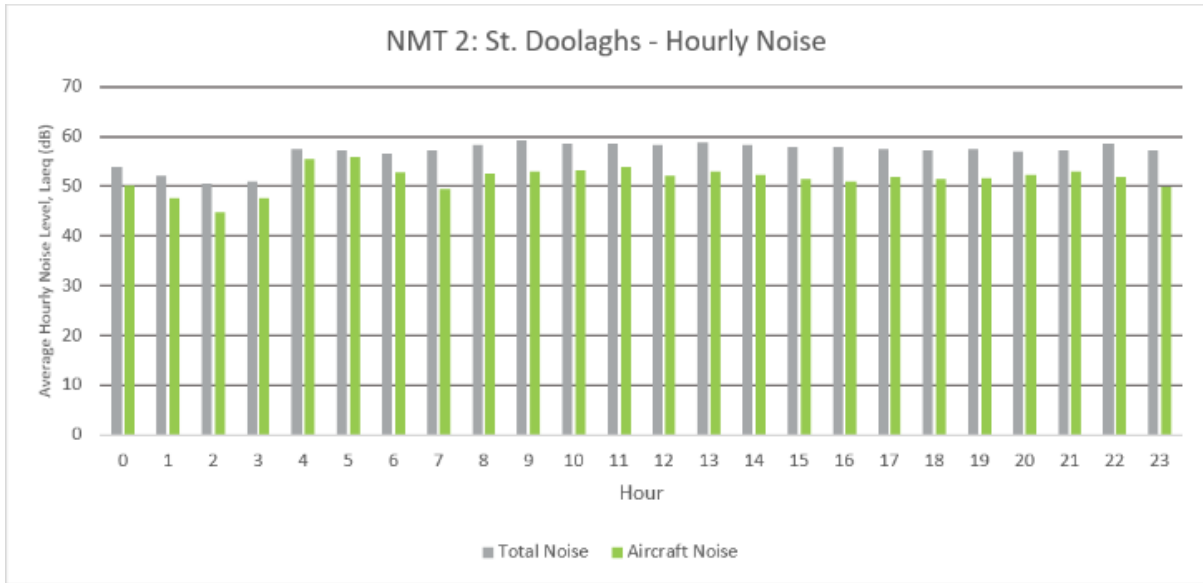


Fig. 31 – NMT 2 hourly noise(24 hr period, 0 ~ 00:00...23 ~ 23:00)

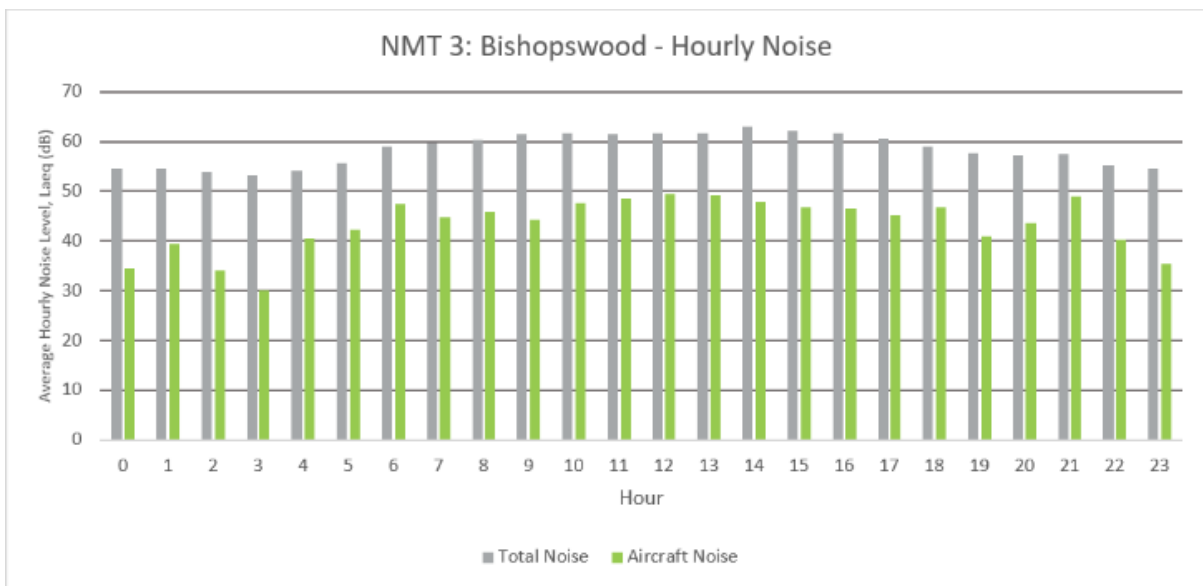


Fig. 32 – NMT 3 hourly noise(24 hr period, 0 ~ 00:00...23 ~ 23:00)

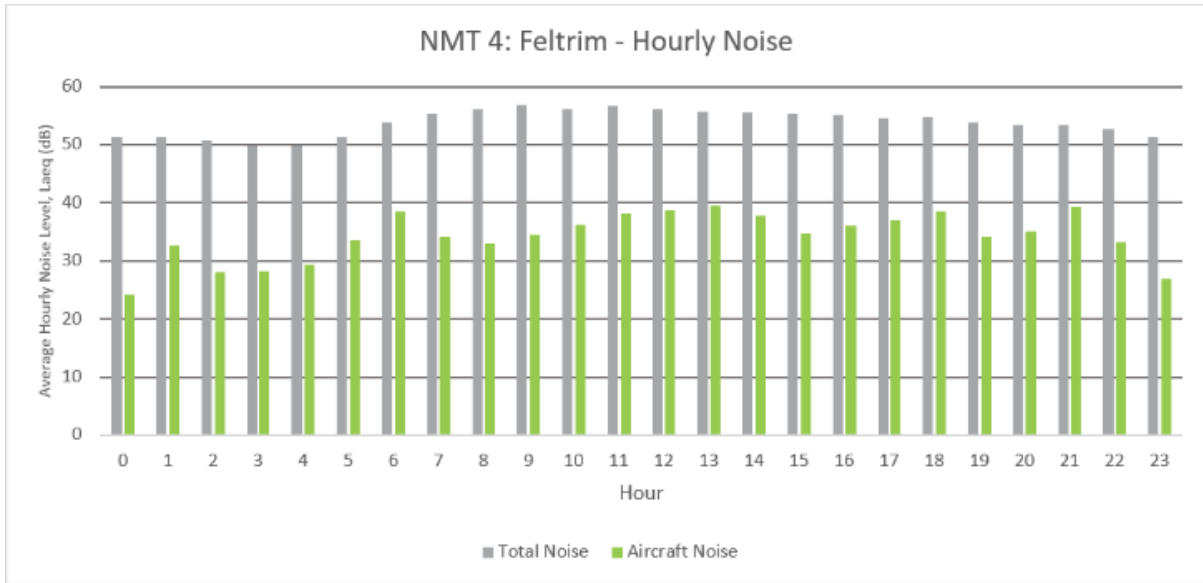


Fig. 33 – NMT 4 hourly noise(24 hr period, 0 ~ 00:00...23 ~ 23:00)

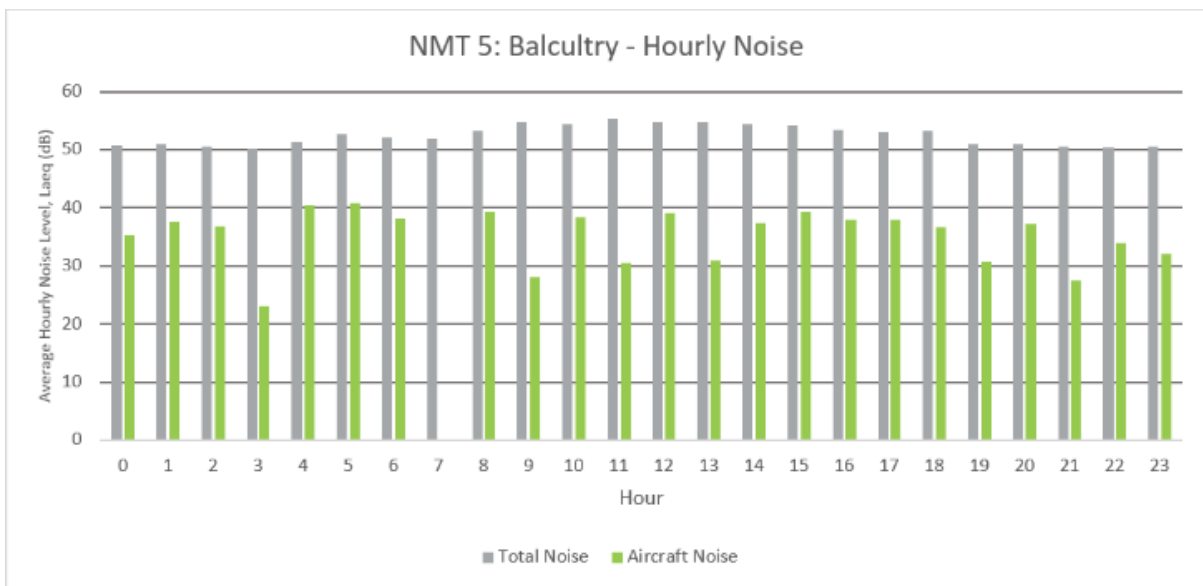


Fig. 34 – NMT 5 hourly noise(24 hr period, 0 ~ 00:00...23 ~ 23:00)

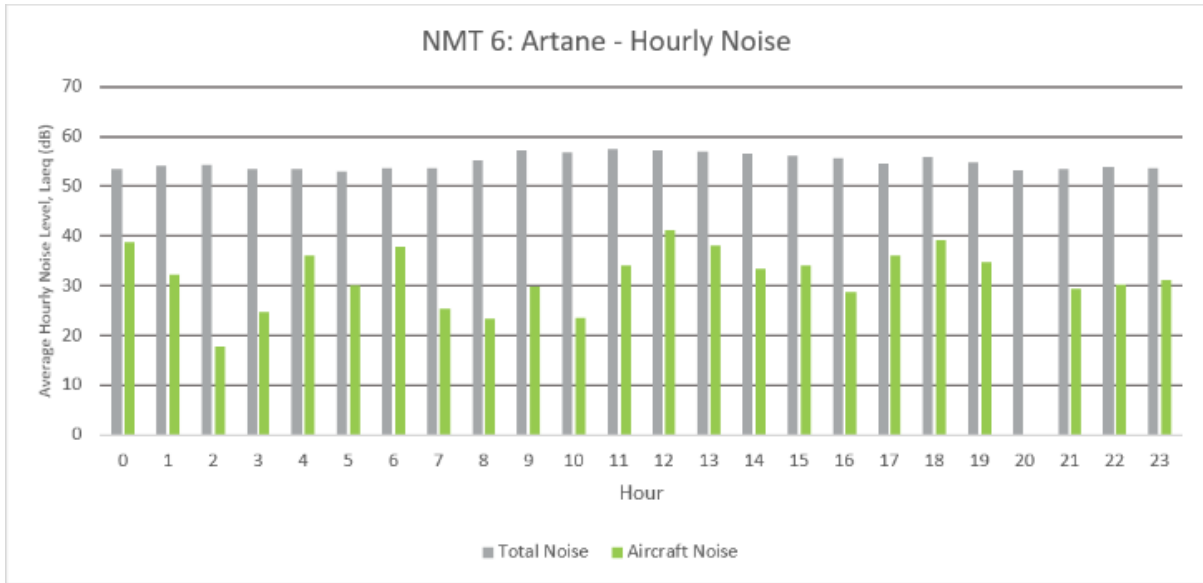


Fig. 35 – NMT 6 hourly noise(24 hr period, 0 ~ 00:00...23 ~ 23:00)

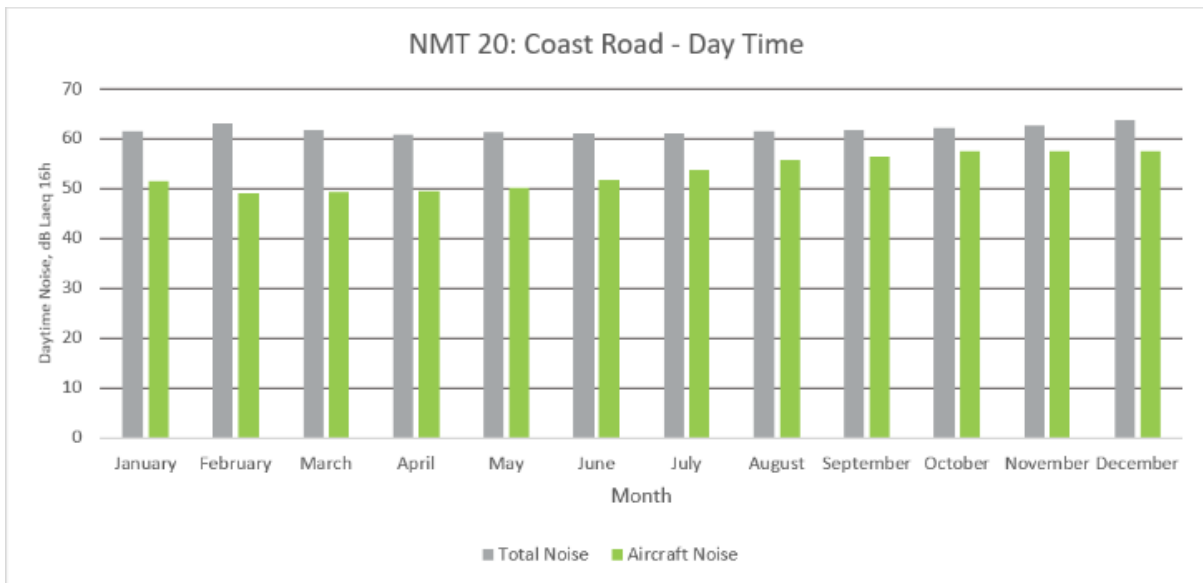


Fig. 36 – NMT 20 hourly noise

Average noise levels per NMT (day)

The figures in this section present the average noise levels measured by the NMT’s during daytime periods (07:00 – 23:00). Recorded noise levels during these time segments are averaged over the 16-hour period. This procedure is followed both for all noise events (total noise), and for those events that were correlated to aircraft movements. The results shown are presented per month.

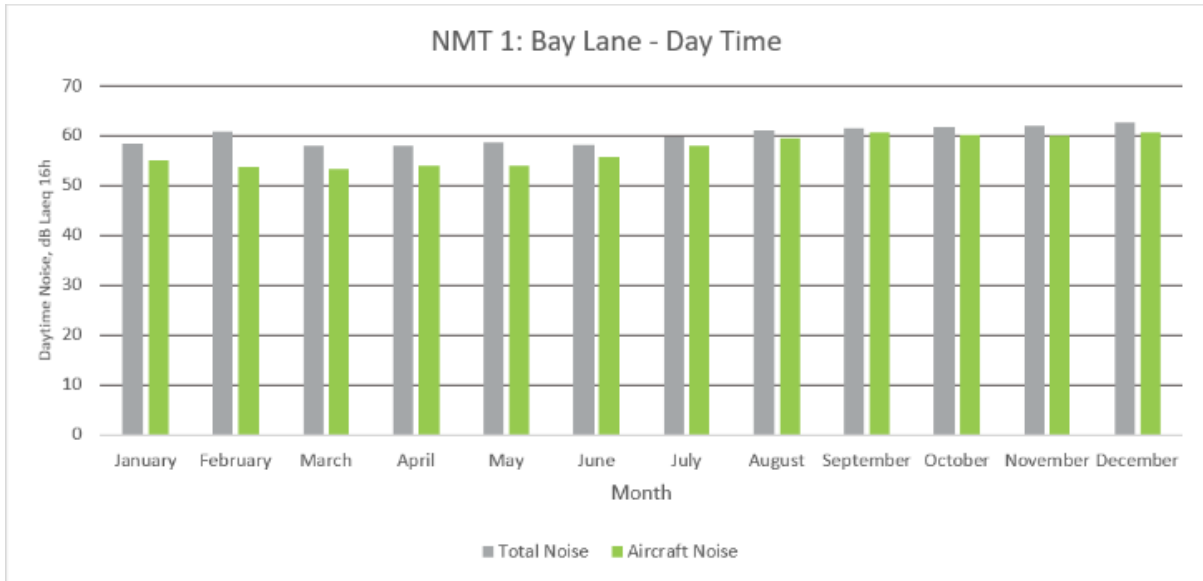


Fig. 37 – NMT 1 day time noise

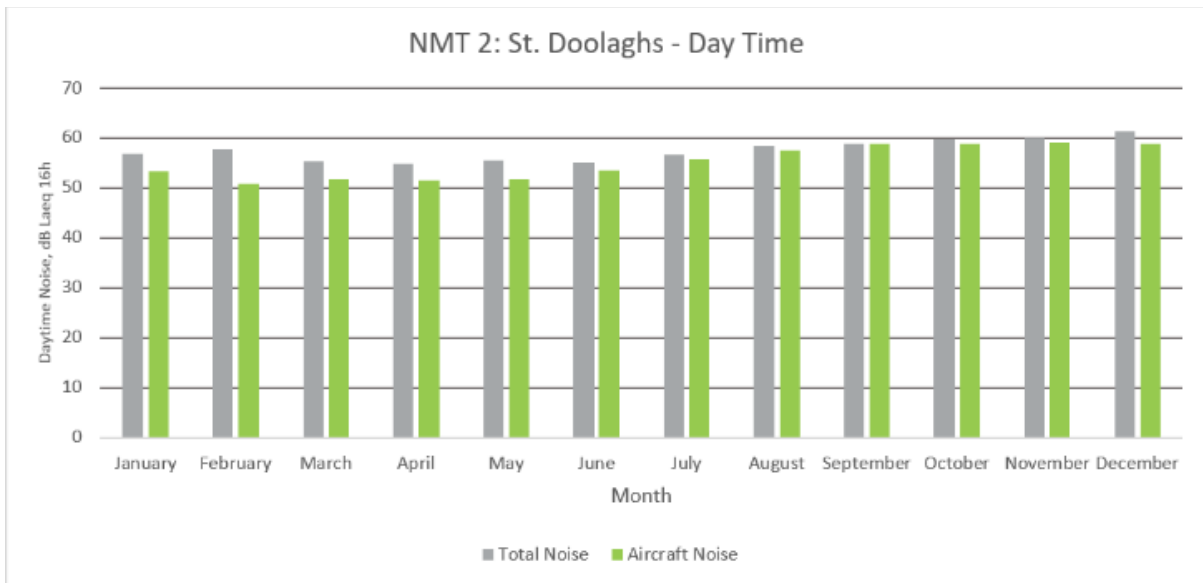


Fig. 38 – NMT 2-day time noise

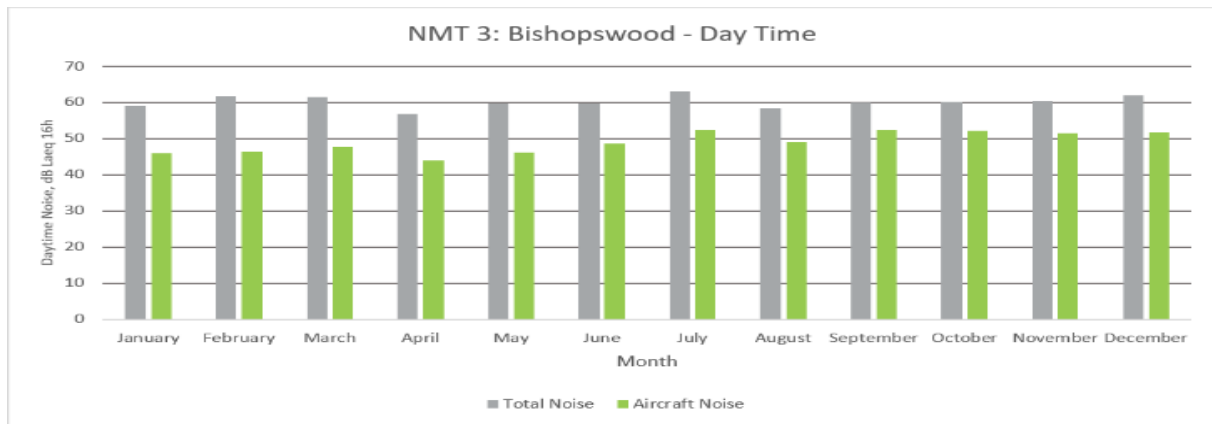


Fig. 39 – NMT 3-day time noise

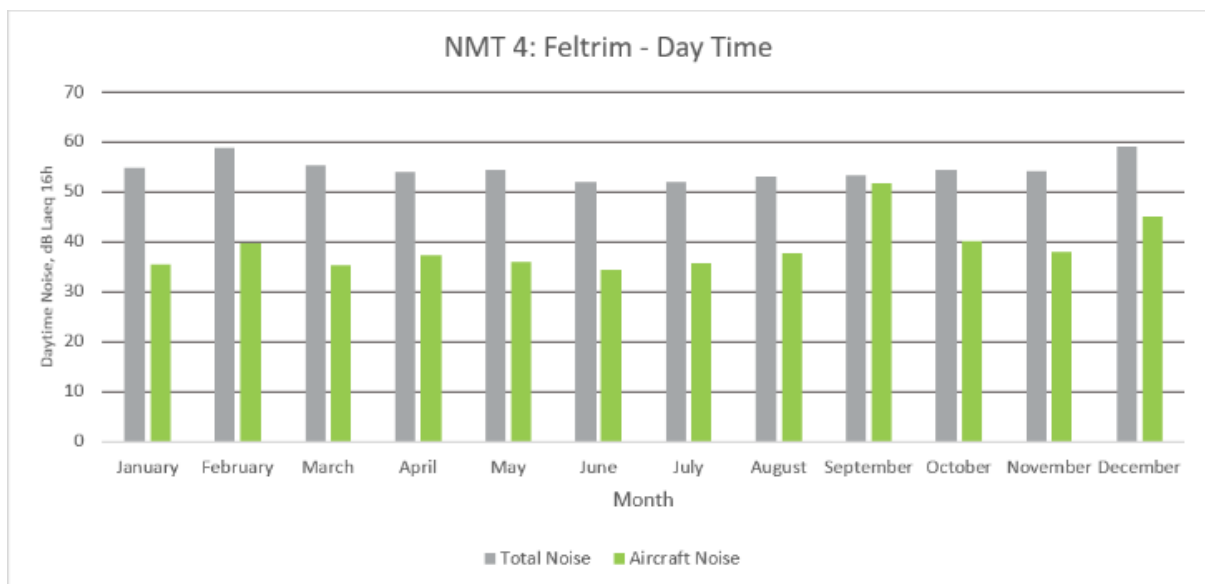


Fig. 40 – NMT 4-day time noise

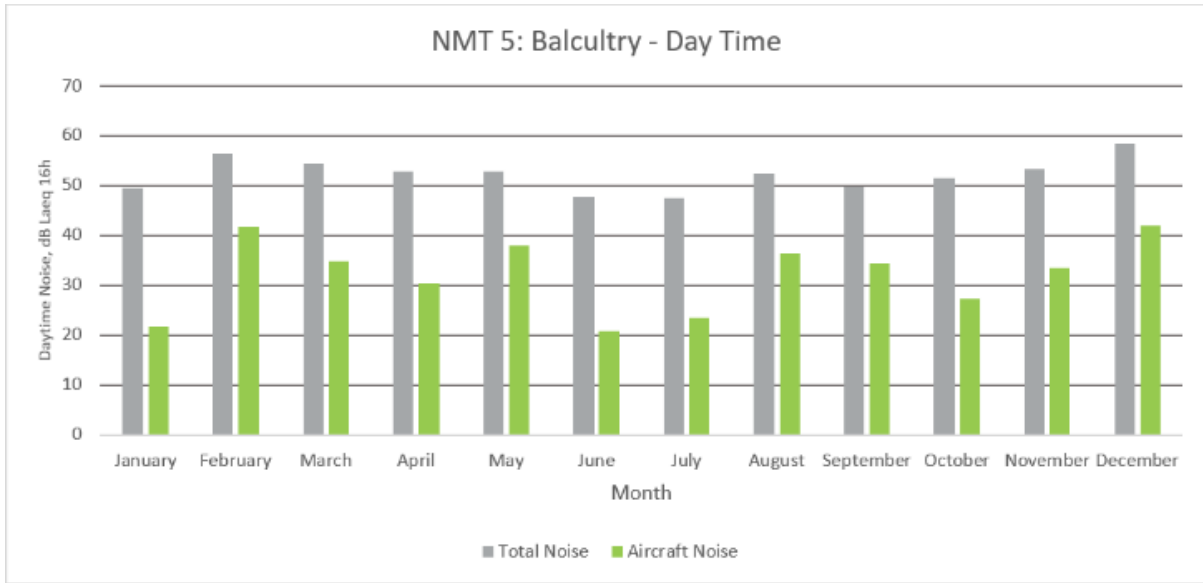


Fig. 41 – NMT 5-day time noise

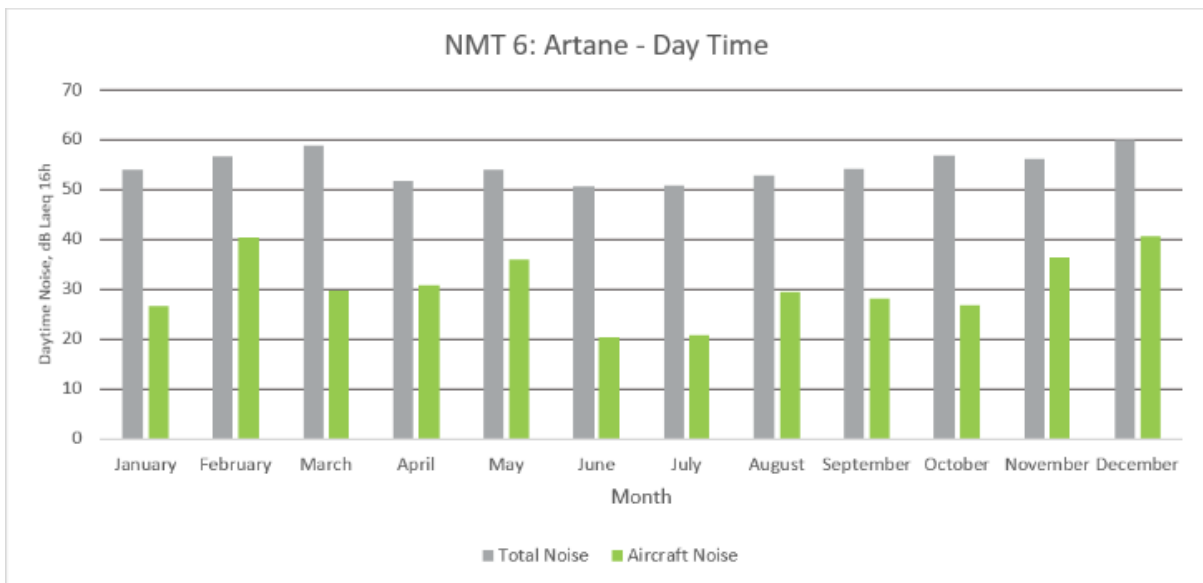


Fig. 42 – NMT 6-day time noise

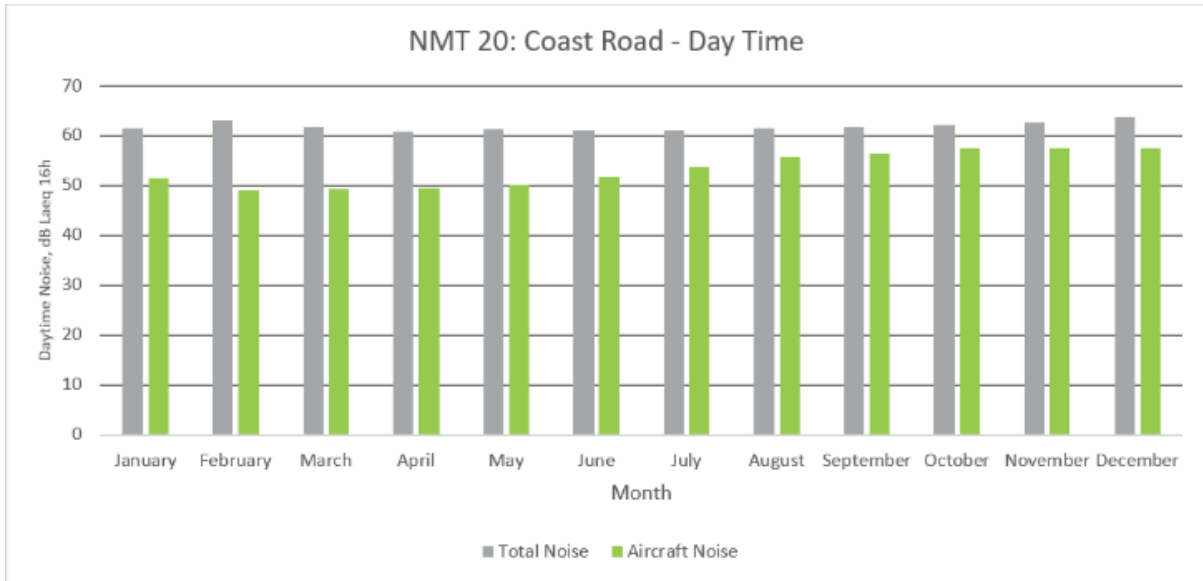


Fig. 43 – NMT 20-day time noise

Average noise levels per NMT (night)

The figures in this section present the average noise levels measured by the NMT’s during night-time periods (23:00 – 07:00). Recorded noise levels during these time segments are averaged over the 8-hour period. This procedure is followed both for all noise events (total noise), and for those events that were correlated to aircraft movements. The results shown are presented per month.

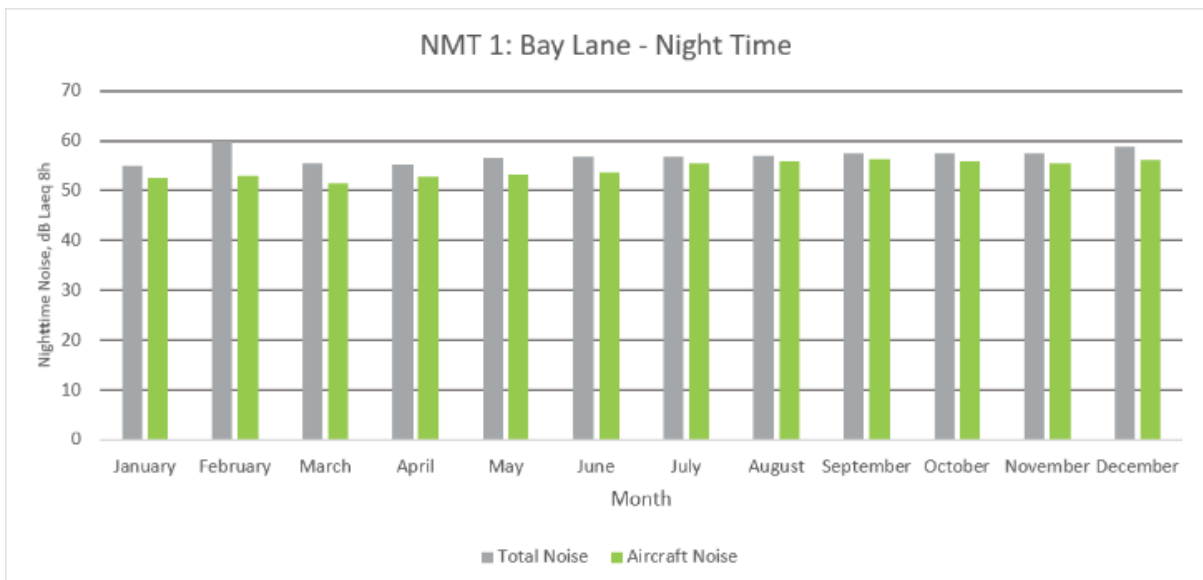


Fig. 44 – NMT 1 night-time noise

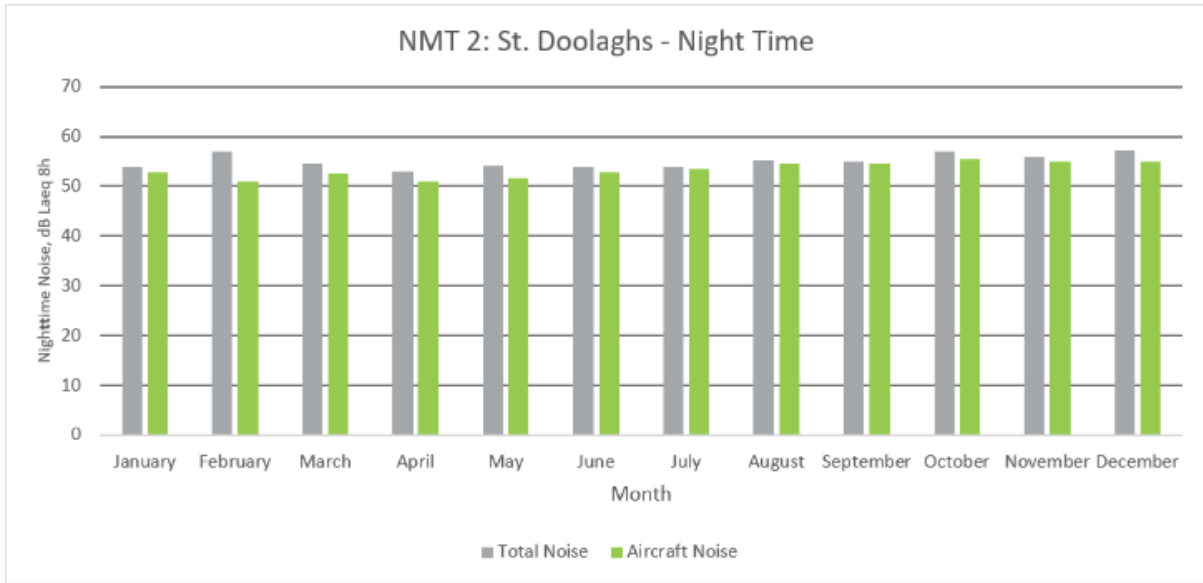


Fig. 45 – NMT 2 night-time noise

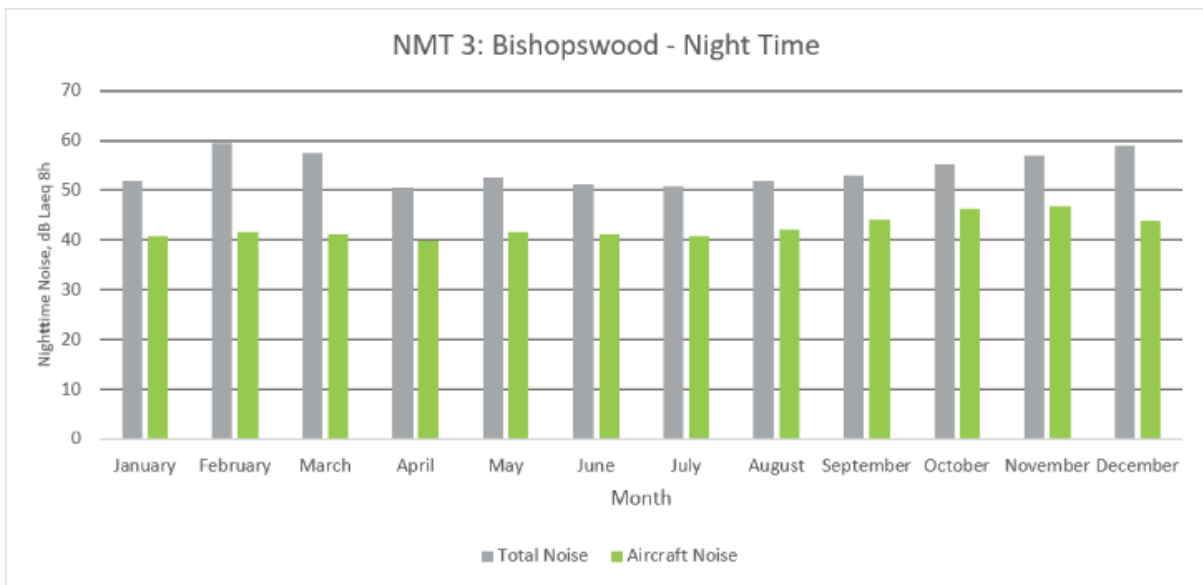


Fig. 46 – NMT 3 night-time noise

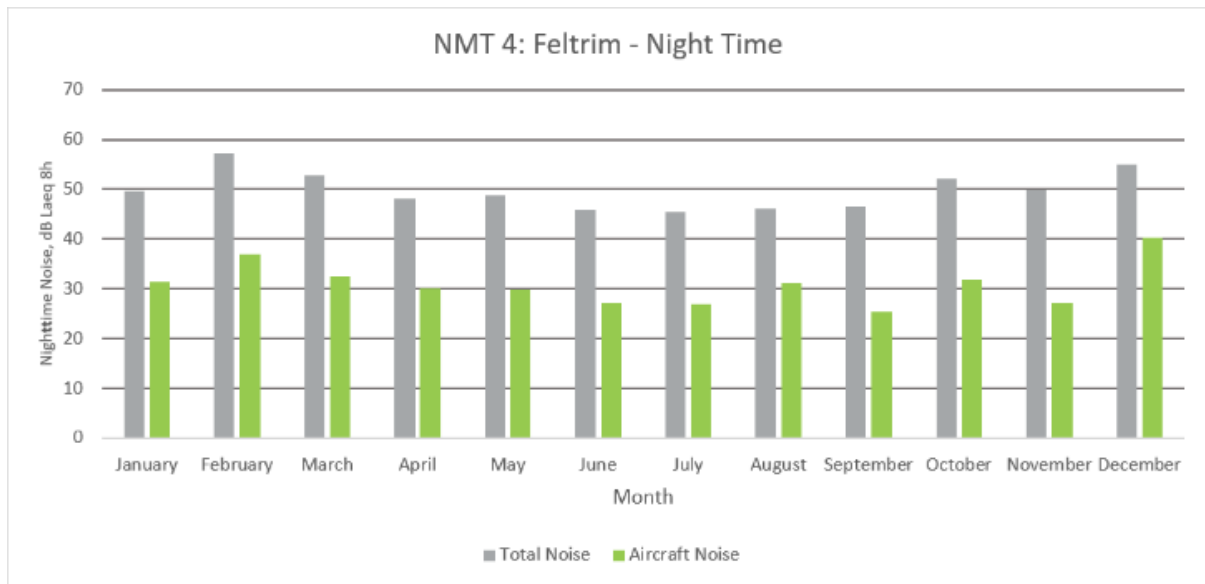


Fig. 47 – NMT 4 night-time noise

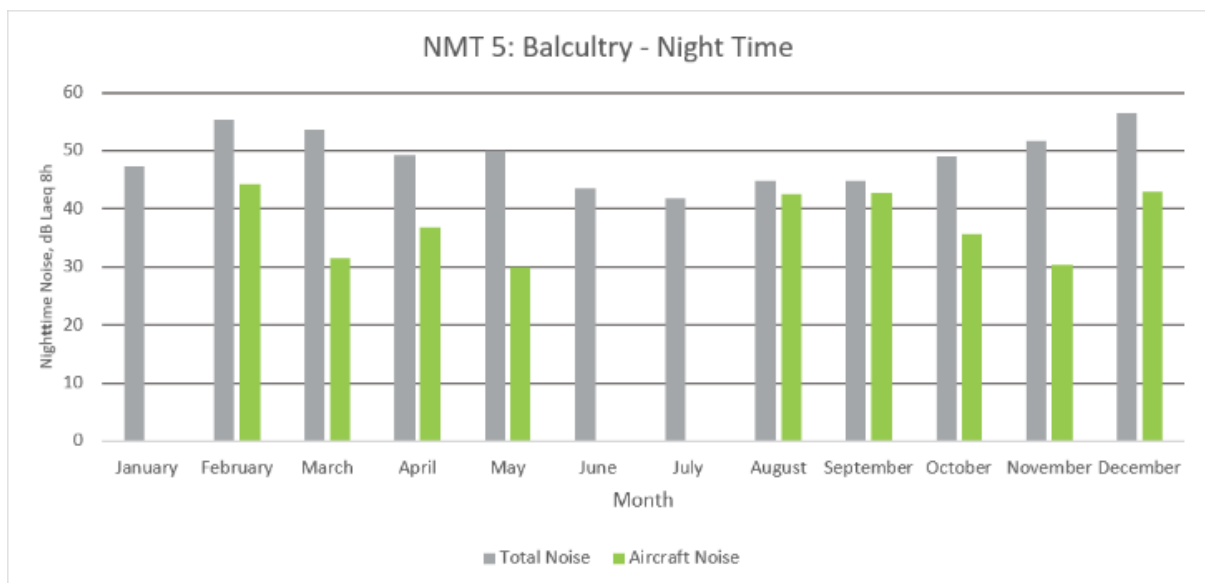


Fig. 48 – NMT 5 night-time noise

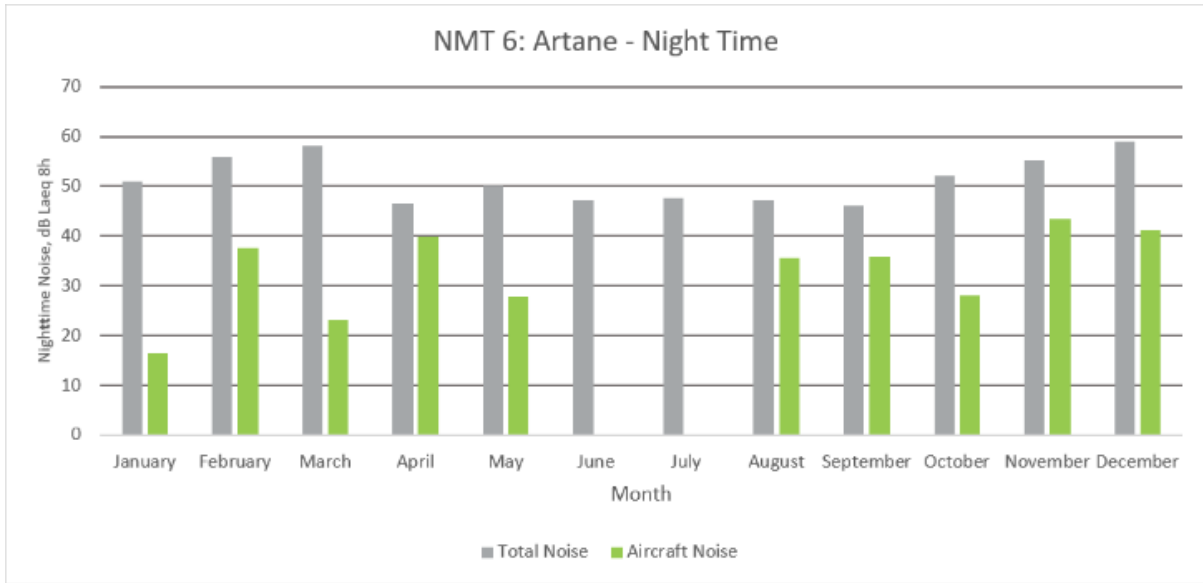


Fig. 49 – NMT 6 night-time noise

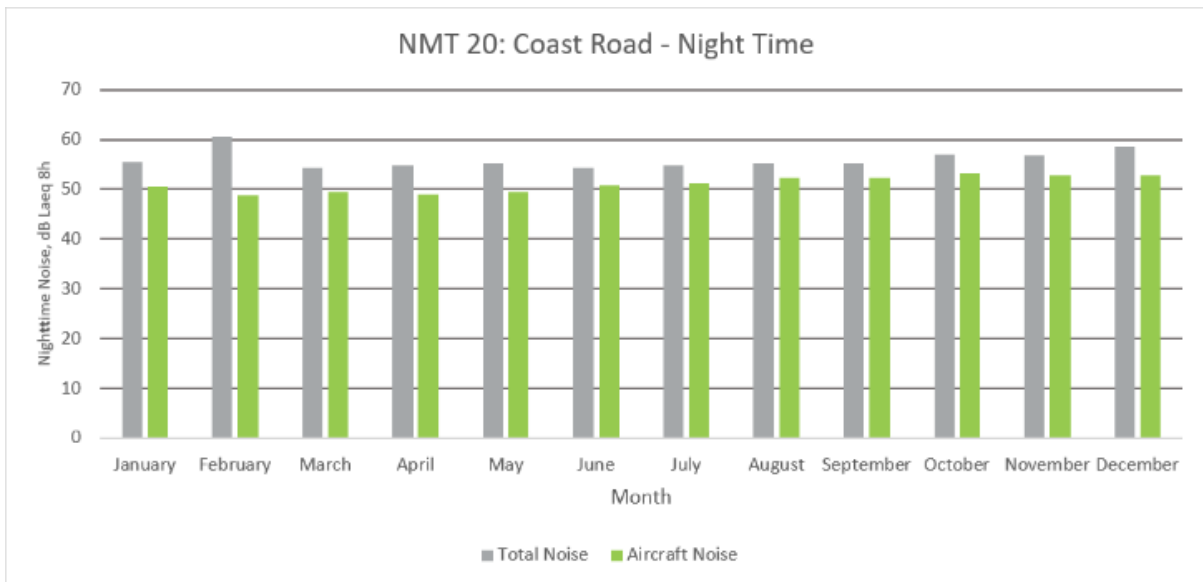


Fig. 50 – NMT 20 night-time noise

LA_{max} noise levels per NMT

The figures in this section show the LA_{max} distribution for aircraft noise per NMT. LA_{max} indicates the maximum recorded noise level per correlated aircraft-noise event. The distribution is calculated by determining the number of occurrences per 3 dB bracket.

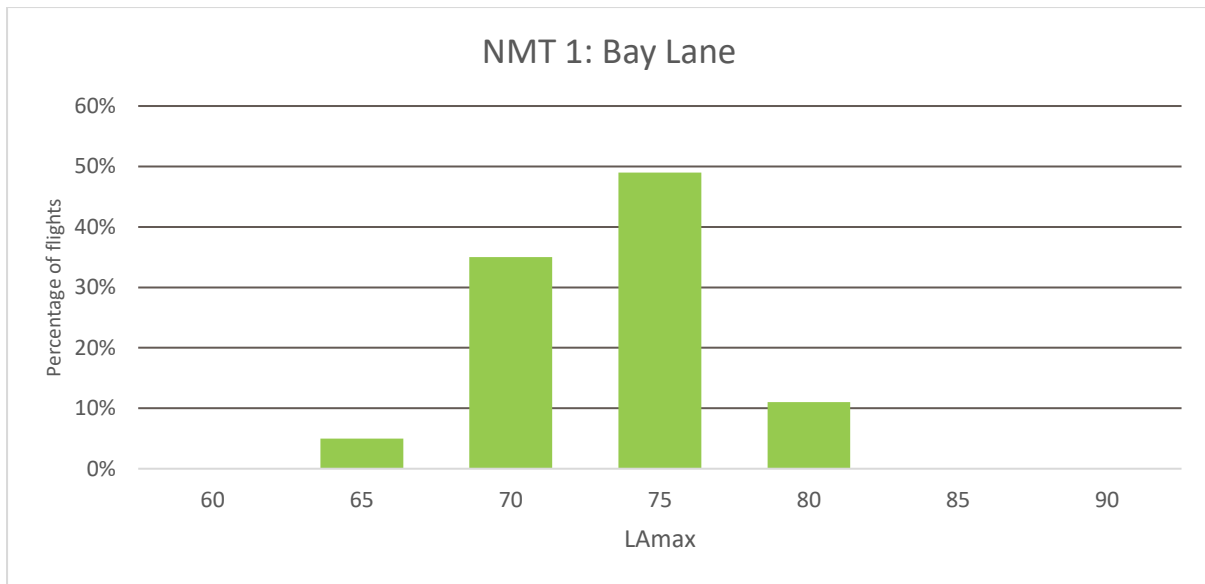


Fig. 51– NMT 1 L_{Amax} noise

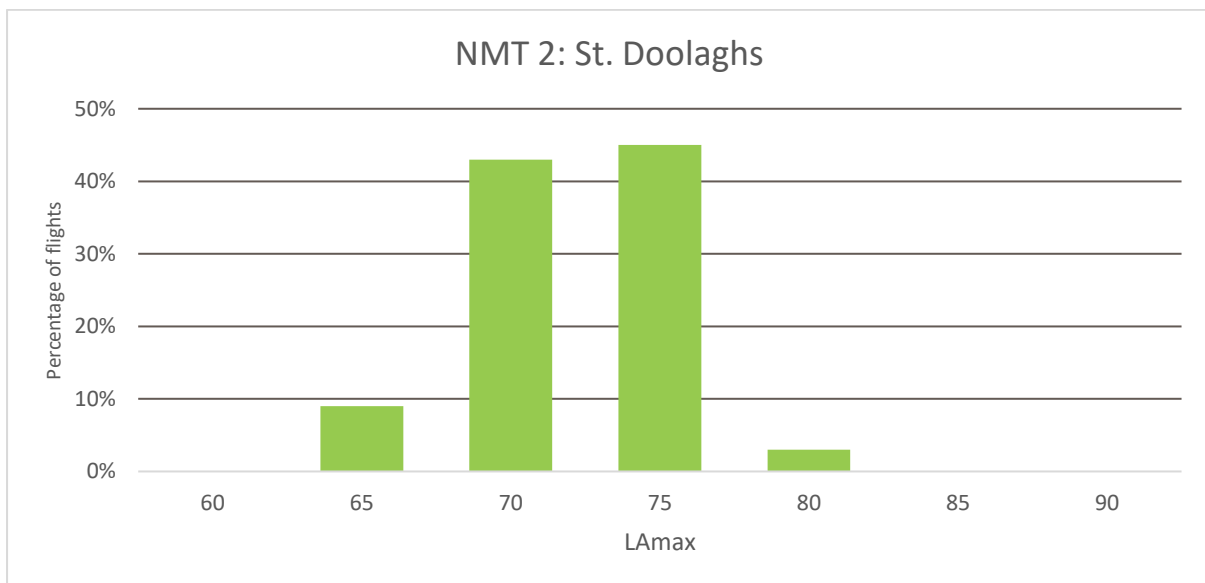


Fig. 52– NMT 2 L_{Amax} noise

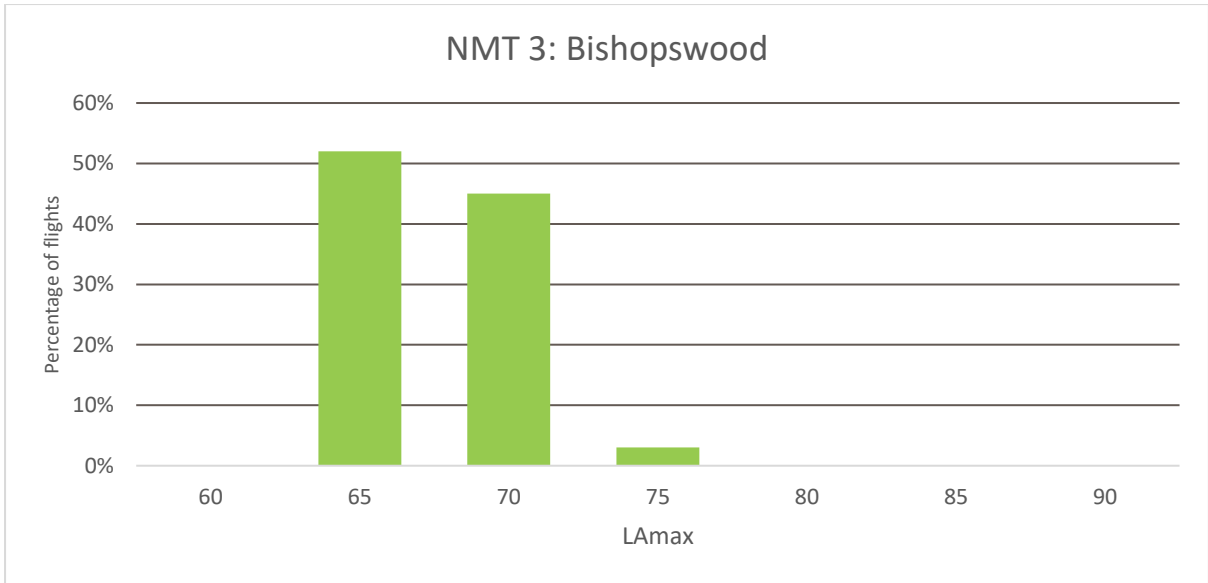


Fig. 53 – NMT 3 L_{Amax} noise

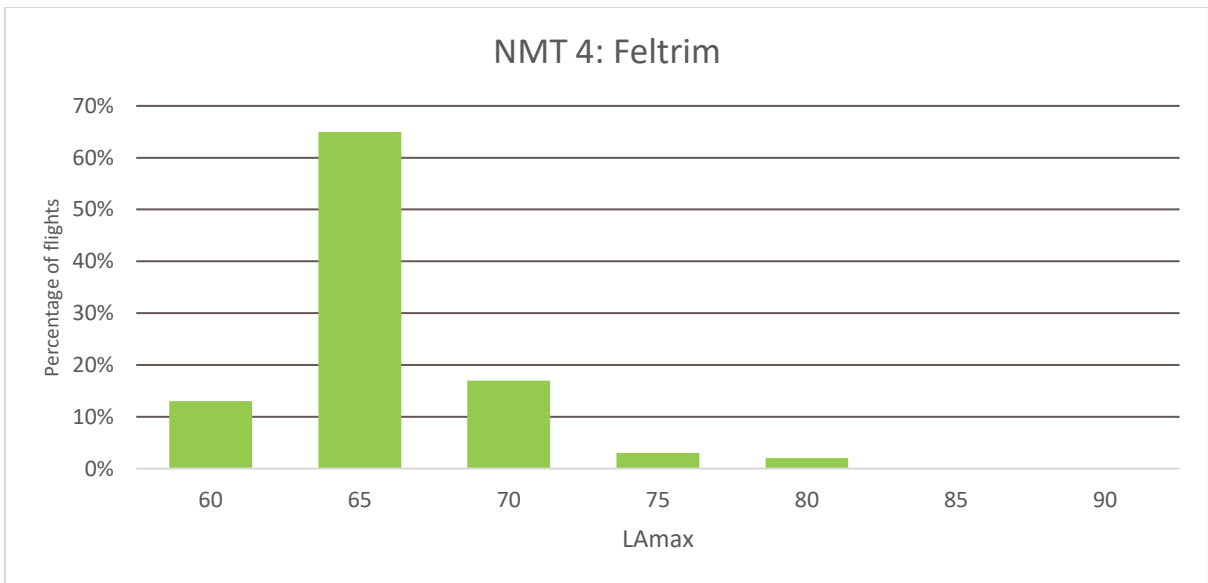


Fig. 54– NMT 4 L_{Amax} noise

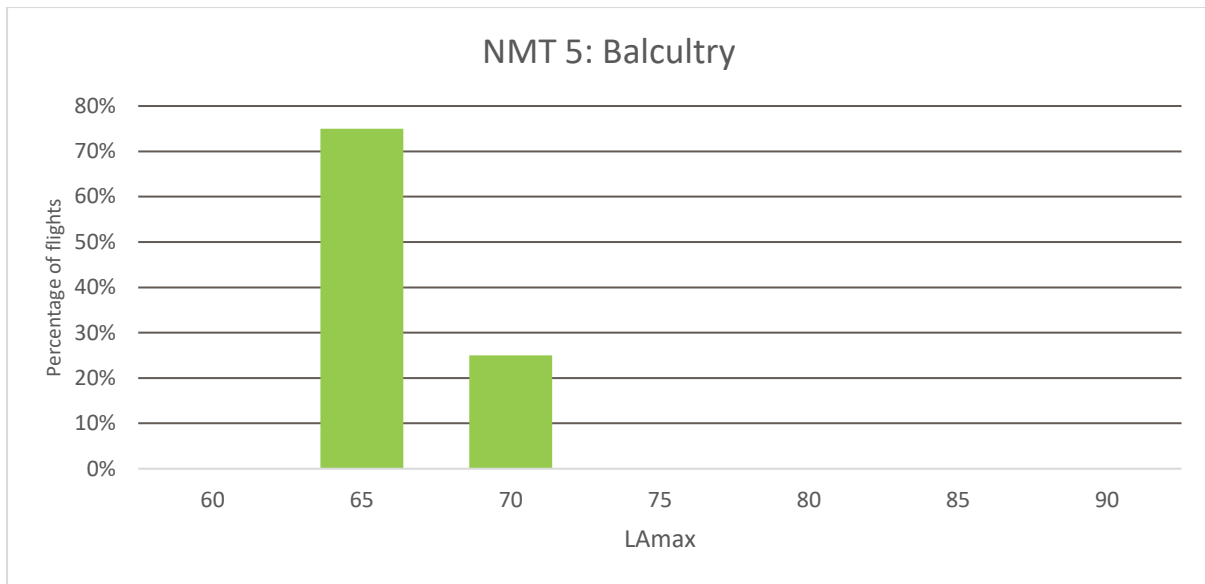


Fig. 55– NMT 5 L_{Amax} noise

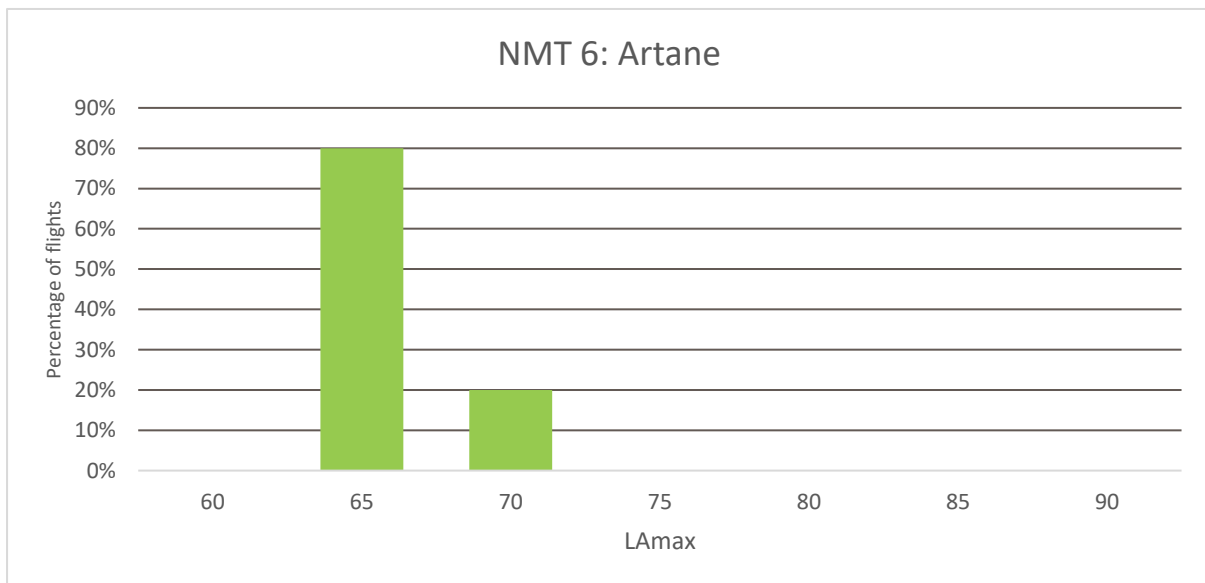


Fig. 56 – NMT 6 L_{Amax} noise

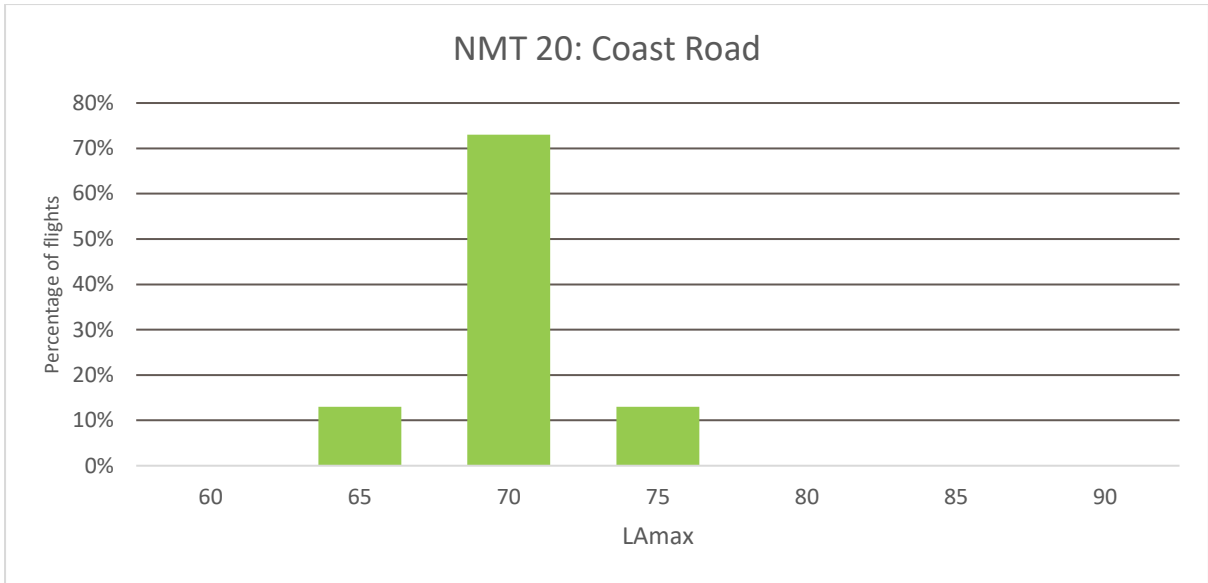


Fig. 57 – NMT 20 L_{Amax} noise



2.0

Traffic Distribution & Management

2.0 Traffic Distribution & Management

The noise impact around Dublin airport is affected by several factors, these include number of movements, types of aircraft used, runway usage and route usage. The sections below set out the statistics and detail for 2021.

Traffic numbers

In 2021, Dublin Airport facilitated 91,373 aircraft movements (landing or take-off) in the ANOMS NFTMS system.

Table 3 provides an overview of the number of movements per month. The airport is licensed to operate 365 days a year, 24 hours per day. In the winter season (Nov-Mar) Dublin Airport facilitates between 1,600 and 16,750 movements per month. In the summer period Dublin Airport facilitated between 2,050 and 8250 movements per month.

		Runway 10	Runway 10%	Runway 16	Runway 16%	Runway 28	Runway 28%	Runway 34	Runway 34%	Runway HH	Runway HH%	Total
Year	Total	11372	12.46%	750	0.82%	78404	85.79%	173	0.19%	674	0.74%	91373
2021	January	639	0.70%	2	0.00%	3315	3.63%	0	0.00%	30	0.03%	3986
2021	February	946	1.03%	239	0.26%	1404	1.54%	1	0.00%	53	0.06%	2643
2021	March	218	0.24%	24	0.03%	2735	2.99%	2	0.00%	37	0.04%	3016
2021	April	895	0.98%	12	0.01%	2063	2.26%	42	0.05%	52	0.06%	3064
2021	May	614	0.67%	61	0.07%	2627	2.87%	0	0.00%	58	0.06%	3360
2021	June	821	0.90%	0	0.00%	4322	4.73%	0	0.00%	56	0.06%	5199
2021	July	1325	1.45%	2	0.00%	6997	7.66%	2	0.00%	73	0.08%	8399
2021	August	1243	1.38%	75	0.08%	9536	10.43%	1	0.00%	72	0.08%	10927
2021	September	1376	1.51%	67	0.07%	10470	11.46%	2	0.00%	59	0.06%	11974
2021	October	177	0.19%	4	0.00%	12502	13.68%	5	0.01%	65	0.07%	12753
2021	November	166	0.18%	0	0.00%	12195	13.35%	117	0.13%	74	0.08%	12552
2021	December	2952	3.23%	264	0.29%	10238	11.20%	1	0.00%	45	0.05%	13500

Table 3 – RWY Usage metrics

The statistics referenced in Table 3 differ slightly from those detailed in Appendix H associated with the exposure assessments completed for the purposes of monitoring the noise abatement objective. This discrepancy exists due to requirement to maintain consistent sources of information relative to previous reports and assessments. The noise abatement objective statistics are referenced against 2019 statistics drawn from Dublin Airports operational Targit system while the previous Annual Compliance reports have been based on the radar data feed within the Noise Flight Tracking system.

2.1 Runway layout and usage

Dublin Airport currently operates two runways: a main east-west runway 10L/28R with a length of 2,637m, and a cross northwest-southeast runway 16/34 with a length of 2,072m.

Runway 10L/28R is operated as the primary runway. 85.79% of all movements used this runway in westerly operation and 12.46% in easterly operation. Runway 10L/28R is the required runway between 06:00 and 23:00 when the crosswind component is 20 kts or less. Runway 28R is the preferential runway when the tailwind component is 10 kts or less and braking action is assessed as good. Aircraft are required to use these runways except when operational reasons dictate otherwise. Between 23:00 and 06:00, runways are prioritised subject to the same wind calculation method and values as used between 06:00 and 23:00. Runway usage is also prioritised for noise abatement purposes during these hours when operation and weather conditions allow.

Runway 16/34 was used for only 1.01% of the movements in 2021 (1,760 movements). Runway 16/34 is only used when the crosswind component on runway 10L/28R exceeds 20 knots and is expected to persist for a prolonged period. It is also used during dual operations for peak departures between 06:30 and 08:00 or when maintenance is conducted on runway 10L/28R. High usage of the primary runway is preferential in terms of noise impact, since the areas underneath its flight paths are less populated than runway 16/34, whose flight

paths to the south are located over Dublin. Most departure operations overfly North Dublin when Runway 16 is operational. Runway 34 is rarely used for arrivals.

2.2 Runway 16/34 usage

As detailed above there are instances, aside from safety and crosswind component, that determine the operational use of RWY 16/34. Generally, these operational decisions are maintenance driven with particular reasoning and instances through 2021 including:

- **Rubber Removal**
Each aircraft landing leaves rubber residue from the aircraft's tyres which in turn starts to progressively build up on the surface of the runway. This accumulation of rubber on the runway can compromise the gripping or friction levels required for aircraft to land safely. To ensure our runway is safe, we engage specialist contractors to remove this rubber residue using ultra high-pressure washing equipment. This work is carefully planned and was carried out at night-time between 23:00 – 04:30 on four occasions in 2020 so as not to impact the day-to-day flight operations.
- **Grass Cutting**
Birds can be a major hazard at all international airports, and it is a challenge to keep them away from the airfield. Dublin Airport has over 670 acres of grasslands which needs to be managed carefully to stop birds nesting and foraging for food on the airfield.
Grass cutting involves a trained team using a combination of tractors and mowers, ride-on mowers, and grass trimmer's to maintain the grass areas.
The teams work their way progressively around the around the airfield cutting the grass around all lights and signs, taking care not to impact on the day-to-day operations as they complete their work. Dublin Airport has a long grass policy which deters birds from landing on the airfield, this means that the grass is never cut too short.
For areas that cannot be cut during the daytime hours, the team completes cutting activities at night-time in co-ordination with airport operations. These works took place on four occasions in 2021 between 23:30 – 04:30 for a period of a week. During these times, the northerly approach to the secondary runway R16 was used.
- **Quarterly Visual Inspection**
Dublin Airport completed quarterly hourly inspections on RWY 10/28 during daytime hours typically between 14:00 – 15:00 when there is minimal or widebody movements. This necessitates the use of RWY 16/34.
- **Redesignation of Paint Markings**
In preparation for the operational readiness phase and opening of the Norther Runway redesignation markings on RWY 10R/28L were inspected/touched up between the hours of 23:00 and 04:30. The works required the usage of RWY 16/34 on at least 1 occasion.
- **Paint Markings**
The visibility of the paint marking for pilots is of paramount importance. These markings suffer from wear due to aircraft traffic. Closures to complete these works were planned to be undertaken concurrently with grass cutting and rubber removal.
- **Pavement and AGL Repairs**

When conducting pavement repairs on supporting taxiway to the southern runway, we must close 10R/28L. These works are planned to align with closures for other preventative maintenance works being undertaken on the runway.

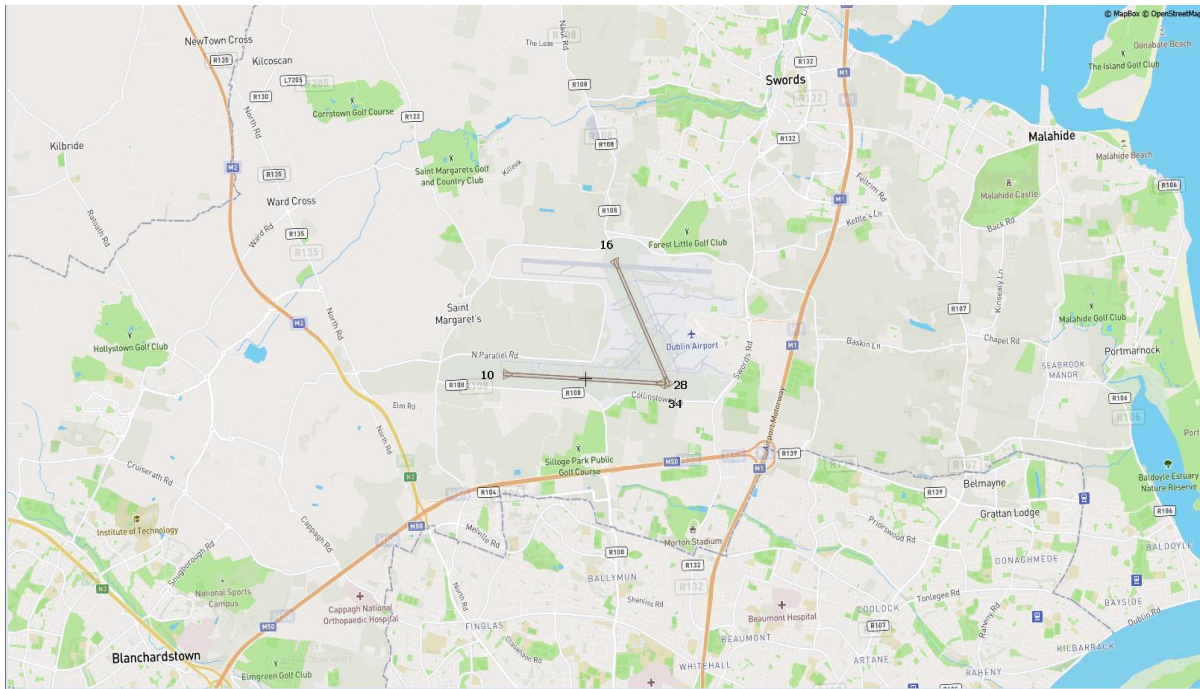


Fig. 58– RWY layout

Runway designation	Arrivals only	Departures only	Total
28L	39076	39316	78392
10R	5714	5651	11365
34	111	62	173
16	416	334	750

Table 4 – RWY usage statistics

2.3 Flight routings and destinations

Additional insight into traffic movement, routing and destination is provided below in Fig. 59. A schedule of the destinations flown to from Dublin Airport is provided in Appendix I.

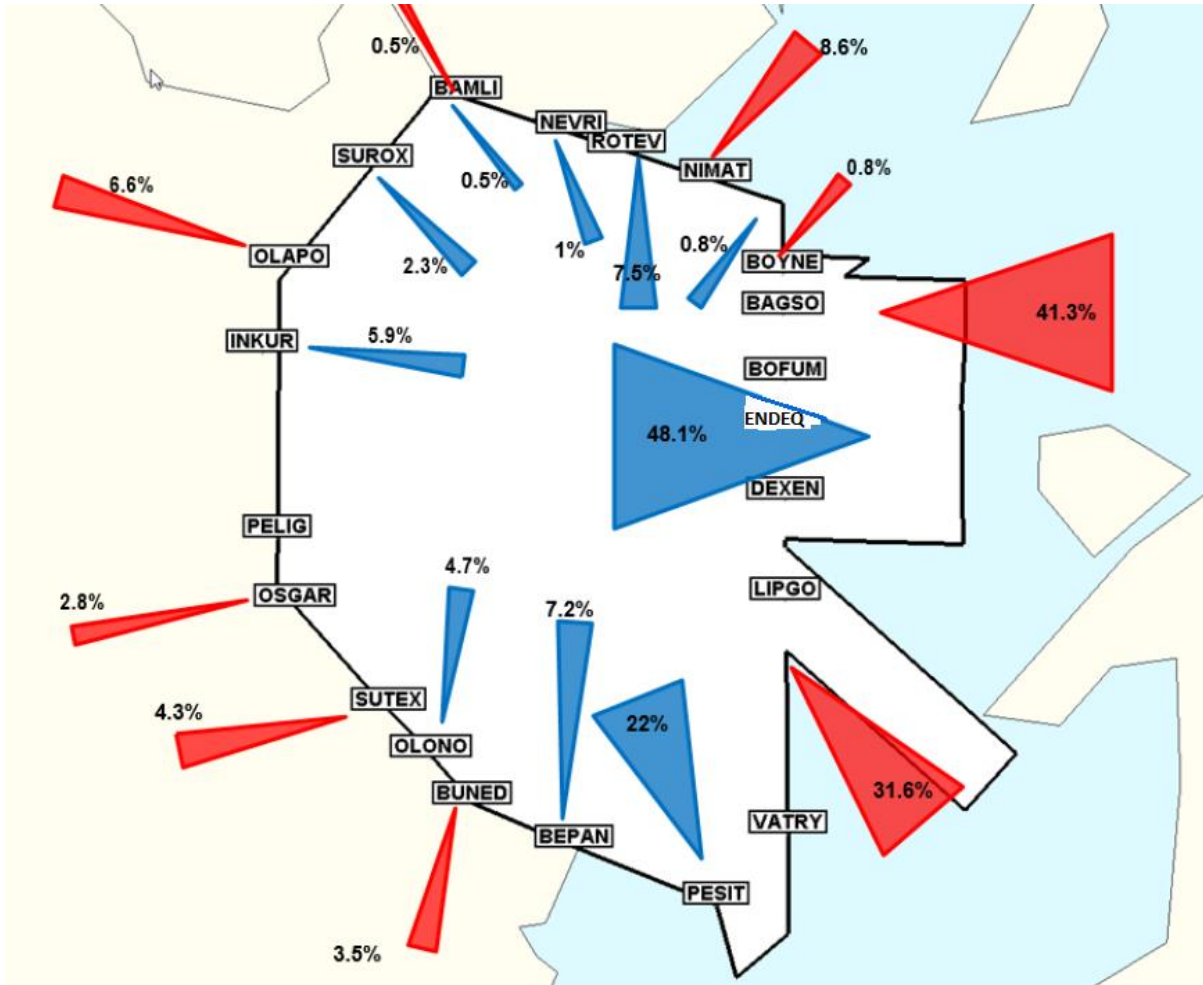


Fig. 59: General traffic flow routings

2.4 Busiest day flight tracks

2021 was the year that a slow return from Covid commenced worldwide. In the northern hemisphere, the summer months are typically the busiest but at Dublin airport, however owing to the slow return and removal of restrictions the busiest day in 2021 was 10th December. The images below are screenshots of tracks from the ANOMS NFTMS system. The images show arrival and departure tracks for the day, split into Category A/B and C/D aircraft groups.

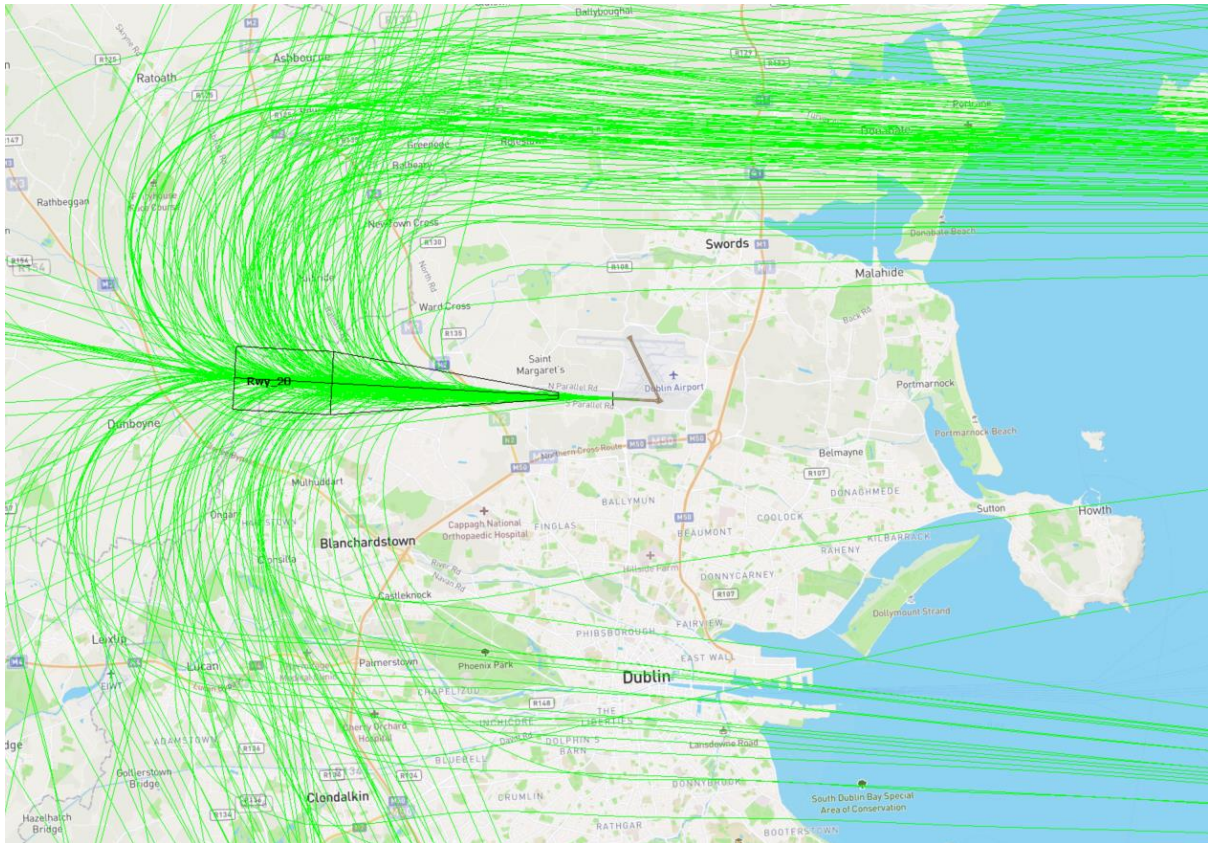


Fig. 60: Tracks of category C/D departures on 10th December 2021

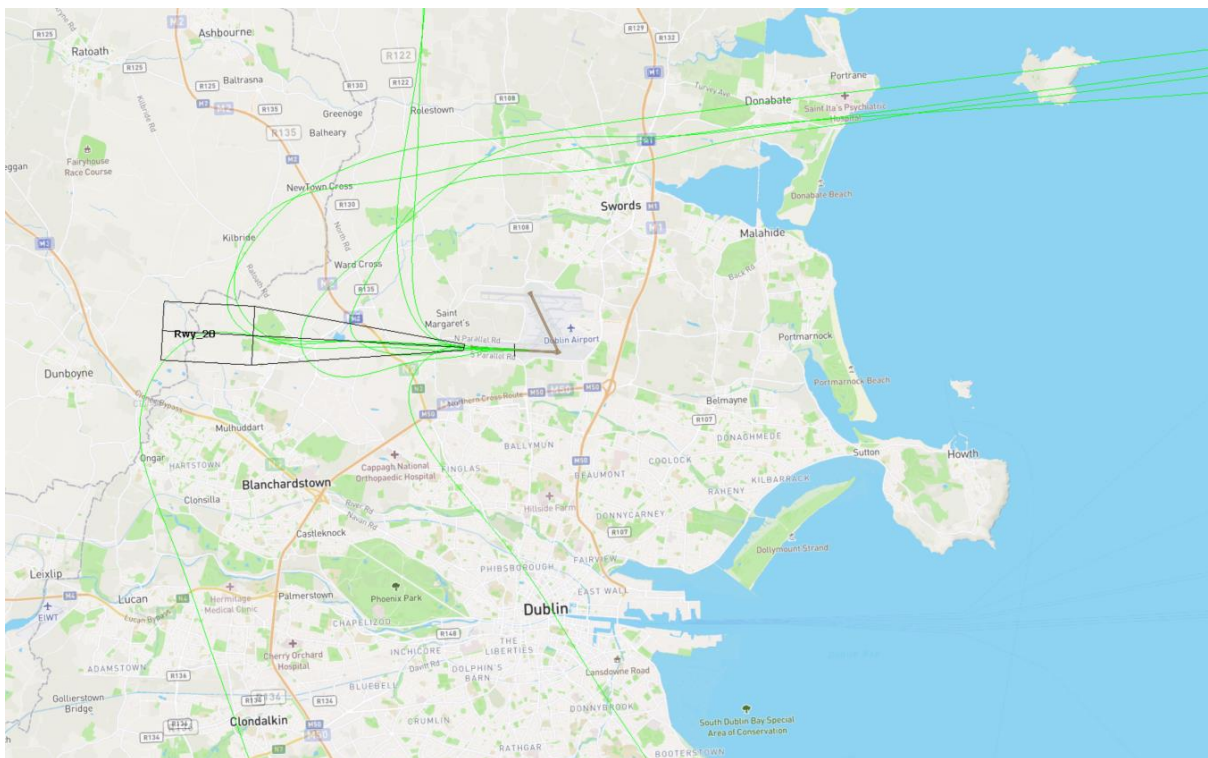


Fig. 61: Tracks of category A/B departures on 10th December 2021

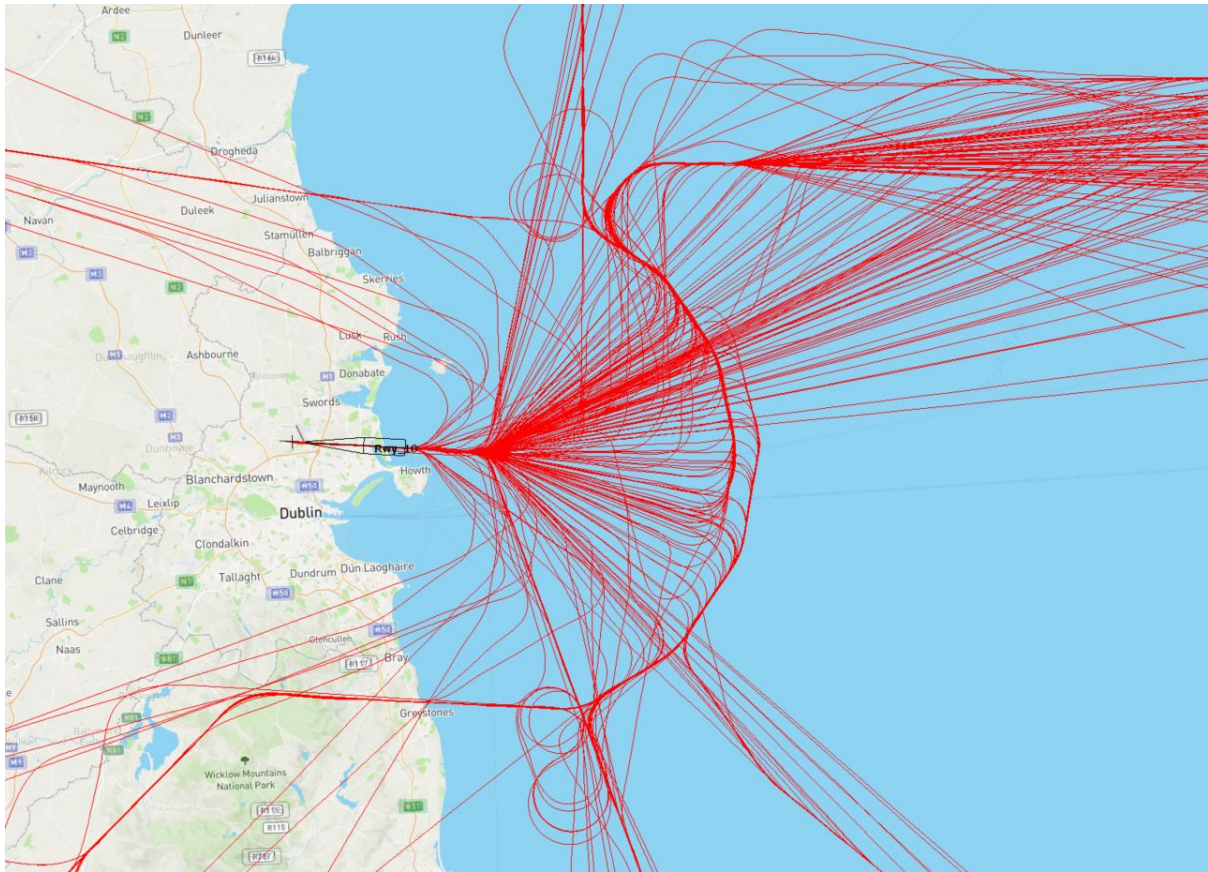


Fig. 62: Tracks of category C/D arrivals on 10th December 2021

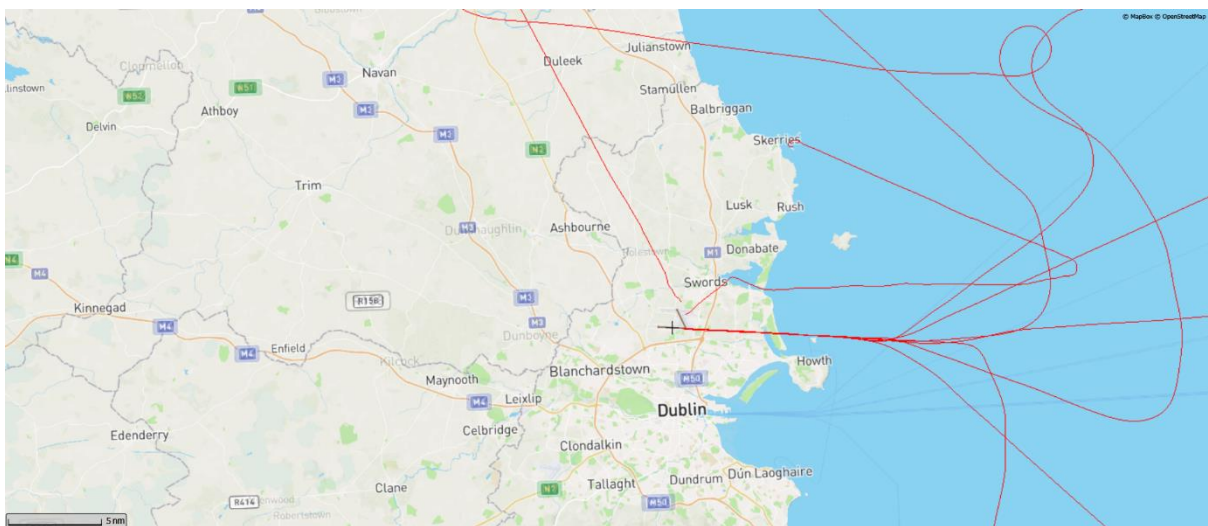


Fig. 63: Tracks of category A/B arrivals on 10th December 2021

2.5 Engine Ground Running data

Engine ground running is facilitated in section 5 of the AIP and sets out the requirements for both high power and idle speed runs for at 5 no. designated test site locations, aircraft stands and the facilitation of larger aircraft.

The logging of engine ground running is completed by the daa Airside Management Unit and is compiled in an operations log. For 2021 engine ground running was facilitated at Engine Test sites 1, 4 and RWY 16/34 for high power while idle speed runs were completed on stand as required. Operational logging of idle speed test runs is not ordinarily undertaken by the daa Airside Management Unit and as such Table 5 and 6 below details the 2020-2021 comparison without idle speed. The duration of the tests performed in 2021 are further noted in Table 7 by time of day.

Location	2020	2021
Test Site 1 (high power)	184	94
Rwy 16/34 (aircraft larger than code C/B757)	7	4
Test Site 4	N/A	2
Total	191	100

Table 5: 2020/2021 comparison total engine test runs

Engine test site 1 AC types split:

Aircraft Type	No.
737	21
738	21
A320	23
A321	5
ATR72	17
CRJ 900	3
E190	3
Fokker 50	1

Table 6: Engine test split by Aircraft type

Daytime			
Duration of Engine Tests (mins)	No.	Duration of Engine Tests (mins)	No.
>0 - <=5	1	105-110	2
> 5 - <=10		110-115	1
010-15	2	115-120	
15-20	2	120-125	
20-25	5	125-130	
25-30	5	130-135	
30-35	9	135-140	1
35-40	7	140-145	
40-45	9	145-150	
45-50	4	150-155	
50-55	0	155-160	
55-60	8	160-165	
60-65	12	165-170	
65-70	3	170-175	
70-75	6	175-180	
75-80	2	180-185	
80-85	2	185-190	
85-90	1	190-195	
90-95	0	195-200	
95-100	1	200-205	
100-105			

Night time			
Duration of Engine Tests (mins)	No.	Duration of Engine Tests (mins)	No.
>0 - <=5		105-110	
> 5 - <=10		110-115	
010-15	1	115-120	
15-20		120-125	1
20-25	1	125-130	
25-30	2	130-135	
30-35		135-140	
35-40		140-145	
40-45		145-150	
45-50	1	150-155	
50-55		155-160	
55-60		160-165	
60-65		165-170	
65-70		170-175	
70-75		175-180	
75-80	1	180-185	
80-85	1	185-190	
85-90	1	190-195	
90-95	1	195-200	
95-100		200-205	
100-105	1		

Table 7: 2021 engine test duration by time of day

3.0

Engagement Forums



3.0 Engagement forums

daa is a neighbour to many communities on whom we depend to operate Dublin Airport on a daily basis. We are fully committed to being a responsible airport operator and a good neighbour. daa understand that a balance needs to be achieved in terms of operating an international airport and the needs of our local communities. That is why we have a long record of engaging with our neighbours about the issues that are of importance to them, particularly those relating to aviation noise.

daa has established multiple engagement channels and forums which have been and continue to be very successfully employed to communicate and engage with our neighbours in the most meaningful and effective manner.

3.1 Community Liaison Group (CLG)

The independently chaired CLG was set up in 2016 on foot of An Bord Pleanála's North Runway Planning Conditions decision condition 28. This condition establishes that a Community Liaison Group be established, involving representation of the Saint Margaret's Community, Fingal County Council and the Dublin Airport Authority with composition of the committee to be decided with prior agreement with the planning authority and align with

The group meets bimonthly to discuss matters of interest to the local community including current and future plans for the area, airport operations and environmental issues. When required or requested, experts attend the meetings to provide an opportunity for detailed discussion on a topic that is deemed to be of particular importance to the group.

This is a hugely beneficial forum to facilitate information exchange with the community and to address issues raised, where possible. The forum also provides a solid platform for all three bodies to communicate in an open and transparent manner.

The Community Liaison Group met on 9th February 6th April 18th May 6 July 15th September and 7th December 2021. Meetings took place online due to Covid, but face-to-face meetings will resume when participant consensus indicates.

3.2 Dublin Airport Environmental Working Group (DAEWG)

The independently chaired DAEWG was established on 1st July 2005 initially as the Dublin Airport Stakeholder and existed through various iterations until renamed in September 2015 and is a voluntary group. The group comprises members from daa, Fingal County Council, the Irish Aviation Authority and residential membership of those local communities impacted by Dublin Airport operations including Saint Margaret's, The Ward, Santry, Swords, Malahide and Portmarnock.

The group meets on a quarterly basis to discuss environmental issues and is provided with updates on noise, air quality, water quality and current/planned projects. When required or requested, experts attend the meetings to provide an opportunity for detailed discussion on a topic that is deemed to be of particular importance to the group.

The Dublin Airport Environmental Working Group met on 10 March, 16 June, 22 September and 17 November 2021. Meetings took place online due to Covid, and the group voted for a hybrid of face-to-face and online meetings from end of 2022.

3.3 Drop-in Clinics

Drop-in clinics are held on a bi-monthly basis in local areas (St. Margaret's, Swords, Santry, Kinsealy/Feltrim, Portmarnock and Malahide), utilising local community centres, where possible. The purpose of the clinics is to provide an opportunity for local residents to raise any queries regarding current operations and planned projects

at Dublin Airport. The drop-in clinics have been very well received and afford an opportunity to engage face-to-face with local residents and to listen to and address their concerns. Clinics were suspended in 2021 in compliance with Government guidelines but will resume when appropriate to do so.

3.4 Other Engagement Channels

Whilst we would normally hold face-to-face meetings with individual residents and groups on matters of interest, this was not possible in 2021 because of Covid restrictions. To combat this and to enhance our engagement particularly on planned projects, for example, a Virtual Reality Portal was created which provides virtual materials and information as would appear at a public event to explain the North Runway Relevant Action Application in non-technical terms and to provide access to high-resolution interactive noise mapping amongst other relevant information.

In addition, we also undertook virtual meetings with individual residents, and home visits to local residents who were unable to engage virtually, where necessary and in compliance with safety guidelines; maintenance of fully-manned freephone and email channels; continual update of websites to provide accurate, current information; regular updates to over 1,000 subscribers to the update service; issue relevant information via press releases and social media; local Elected Representatives appraised of ongoing issues.

3.5 Insulation and Purchase Scheme data

Table 8 below provides details of the number of residential properties that are eligible for either one of the Sound Insulation or house purchase schemes. The number of properties that have benefitted from the schemes is also set out.

	Sound Insulation			Purchase Scheme
	Residential Noise Insulation Scheme (RNIS)	Home Sound Insulation Programme (HSIP).	Voluntary Schools Sound Insulation	Voluntary Dwelling Purchase Scheme
Eligible	125	77	4	38
Benefited/Accepted	104	53	3	10

Table 8: Insulation and Purchase scheme details

4.0

Operation Restrictions / Flight Procedure Changes

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Te

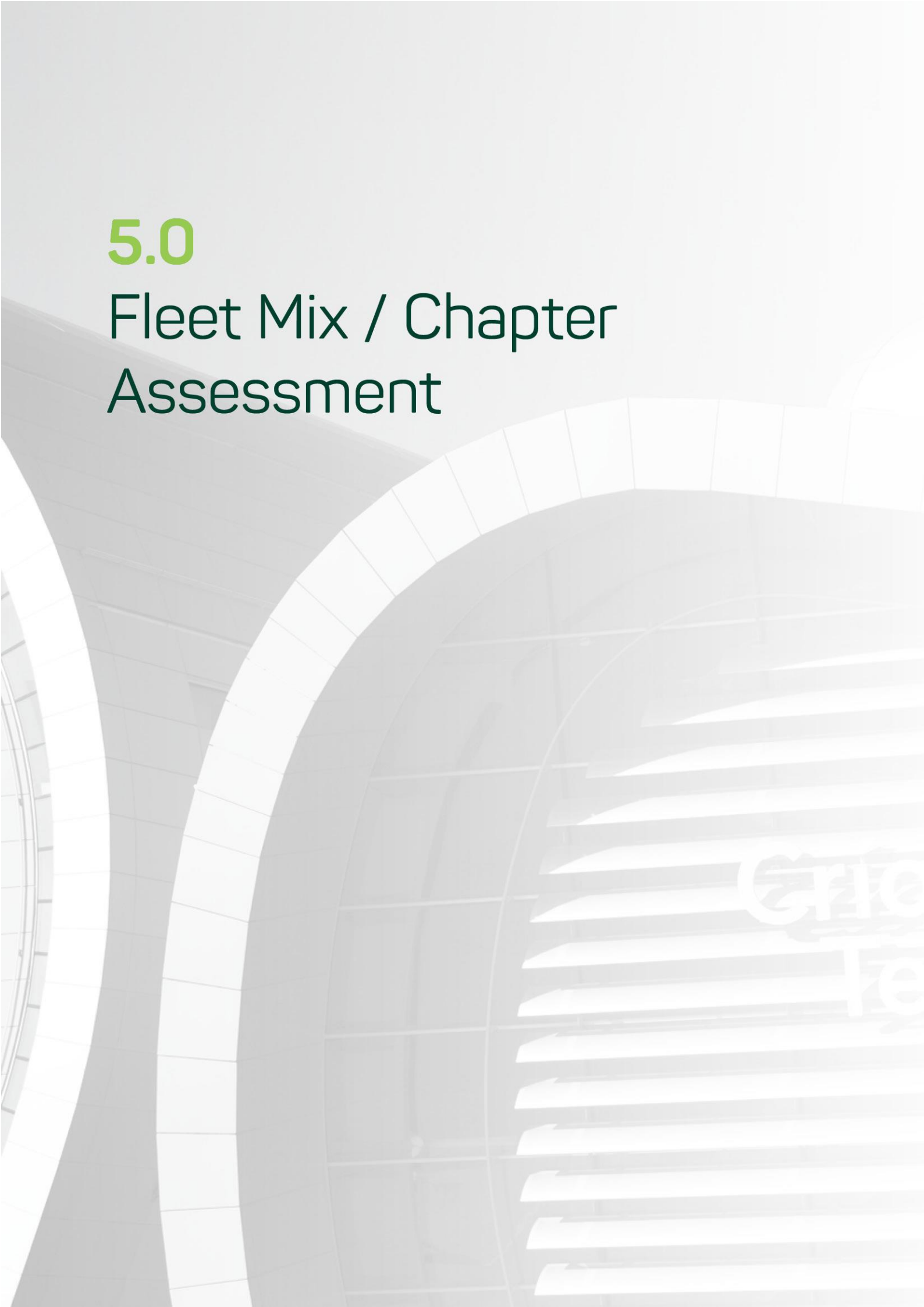
4.0 Operating Restrictions / Flight Procedure changes

In 2021 no effective operating restrictions were in place at Dublin Airport. The three noise related operating restrictions associated with the operations of the North Runway planning permission (Condition 3d, 4 and 5) were not effective in 2021 and therefore these operating restrictions are as yet not in force.

Review of the instrument flight procedure listings schedule set out in Appendix A was undertaken with the IAA-ANSP and the Safety, Regulation and Compliance department at daa. Determination reached that no changes to flight procedures were completed in 2021 that could have had any impact on violations management.

5.0

Fleet Mix / Chapter Assessment



5.0 Fleet Mix / Chapter Assessment

The distribution of aircraft type groups based on movements for both 2020 and 2021 is shown below. Only aircraft types with more than 200 movements are shown to improve readability. As can be seen, in both years the B737-800 (B738) and A320 aircraft types were used the most. Most of the aircraft configurations (engine types and take-off weights) of these two types are compliant with chapter 4 limits.

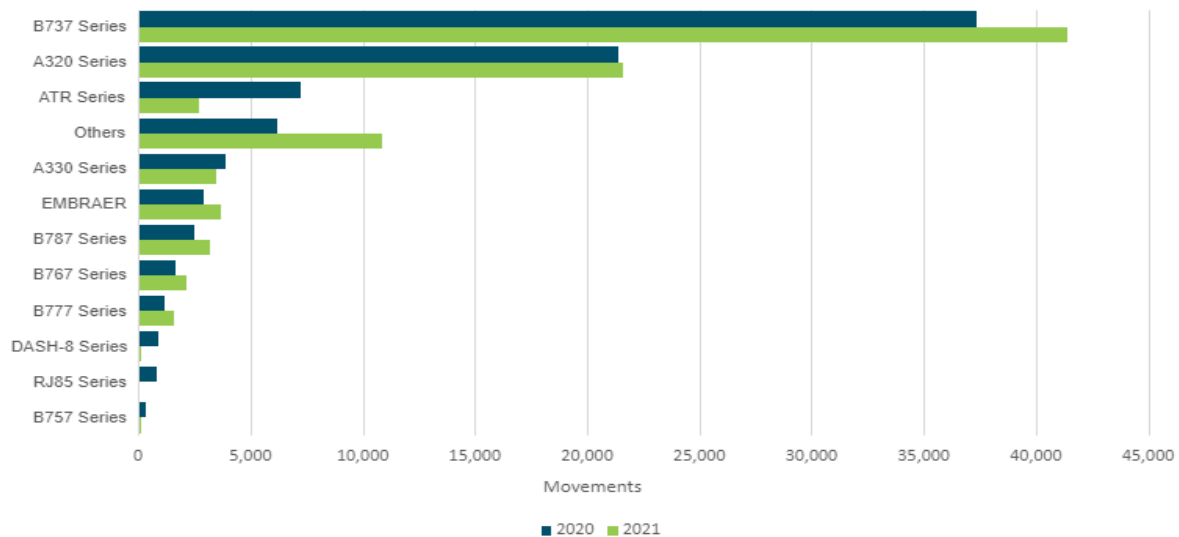


Fig. 64: Aircraft type and fleet mix, 2021 vs 2020

The schedule of operations for 2021 listing the individual movements by aircraft type and registration has been reviewed. This schedule included noise certification data and registration maximum take-off weight (MTOW) as provided by the airport users in the latest Fleet Declaration Forms. Further details on ICAO Chapter compliance are provided in Appendix B.

The review of the types undertaking the majority of operations at Dublin Airport is set out below in Table 8 and referenced against 2019 and 2020. The results show that the large majority of the operations, over 90% in 2021, were by aircraft that meet at least the Chapter 4 standard. Of these, over 21% also meet the more stringent Chapter 14 standard. These are similar to the split in 2020.

Very few of the operations in 2021 were by aircraft types which do not meet the Chapter 4 requirement. In 2021 these were all are classified as marginally complaint Chapter 3. Aircraft in this category have reduced from 1.2% in 2020 to 0.2% in 2021 of the activity in the respective years.

Since the latest update to the definition of marginally compliant Chapter 3 aircraft in 2020, to avoid being classed as marginally compliant, an aircraft has to almost meet the Chapter 4 standards. In 2021 there were no aircraft which were classed as Chapter 3 but not marginally compliant. By comparison there were 2 such aircraft in 2020 (0.002% of the total).

As in 2020, relatively few operations in 2021 were by helicopters or light propeller aircraft. Requirements for these aircraft are given in different ICAO chapters which are not directly comparable.

A small proportion of the operations in 2021 did not have complete data and it was therefore not possible to assess these aircraft. This generally related to movements by business jets which are typically smaller and quieter than the main passenger flights.

Item	2019 (%)	2020 (%)	2021 (%)
ICAO Noise Chapter Assessment using Certified MTOW	73.8% Chapter 4	71.7% Chapter 4	72.5% Chapter 4
	21.8% Chapter 14	22.6% Chapter 14	21.5% Chapter 14
	95.6% >Chapter 4	94.3% >Chapter 4	94% >Chapter 4

Table 9 – Chapter Assessment comparison 2019-2021

Chapter	Percentage of Flights	
	2020	2021
Chapter 3 Marginal	1.2%	0.2%
Chapter 3	0.0%	0.0%
Chapter 4	71.7%	72.5%
Chapter 14	22.6%	21.5%
Helicopter and Light Propeller Aircraft	1.9%	2.3%
Unknown	2.7%	3.6%

Table 10 – Latest ICAO Noise Chapter Assessment Results

6.0

Noise Contours



6.0 Noise Contours

Noise Contours

Bickerdike Allen Partners (BAP) have been retained by daa to produce the noise contours for 2021. The contours produced for Dublin Airport are based on the annual movements using the L_{den} and L_{night} metric. Noise contours have also been produced based on the movements in the 92-day summer period (16th June to 15th September) for two metrics, the $L_{Aeq,16h}$ average daytime metric and $L_{Aeq,8h}$ average night-time metric. The report is available in full in Appendix E and sets out detailed methodology, validation, and assumptions.

The individual 2021 noise contours, and comparison of the 2020 and 2021 noise contours is represented in the figures below. Actual aircraft movements in 2021 and noise levels from the Dublin Airport NMT's have been used to create the noise contours using a similar methodology to that used to produce the 2019 and 2020 contours.

The areas of the 2021 annual L_{den} , L_{night} , $L_{Aeq,16h}$, and $L_{Aeq,8h}$ contours are shown below in the Tables below, where they are compared with the 2019 contour areas.

Metric Value,	Contour Area, km ²	
	2021	2020
dB L_{den}		
≥ 45	290.6	237.2
≥ 50	111	90.3
≥ 55	45.8	36.5
≥ 60	16	12.5
≥ 65	5.6	4.4
≥ 70	2	1.6
≥ 75	0.8	0.7

Table 11 – Contour Areas, L_{den} Metric

Metric Value,	Contour Area, km ²	
	2020	2021
dB L_{night}		
≥ 40	172.3	138.7
≥ 45	75.3	59.8
≥ 50	28.3	21.7
≥ 55	9.8	7.5
≥ 60	3.5	2.7
≥ 65	1.3	1
≥ 70	0.6	0.4

Table 12 – Contour Areas, L_{night} Metric

Metric Value,	Contour Area, km ²	
dB L _{Aeq,16h}	2021	2020
≥ 51	55.2	34.2
≥ 54	30.1	18
≥ 57	15.8	9.6
≥ 60	8.5	5.1
≥ 63	4.5	2.8
≥ 66	2.5	1.5
≥ 69	1.4	0.9

Table 13 – Contour Areas, L_{Aeq,16h} Metric

Metric Value,	Contour Area, km ²	
dB L _{Aeq,8h}	2021	2020
≥ 45	89.8	66.1
≥ 48	52.4	37.3
≥ 51	28.4	19.7
≥ 54	14.9	10.4
≥ 57	8	5.5
≥ 60	4.2	3
≥ 63	2.3	1.6

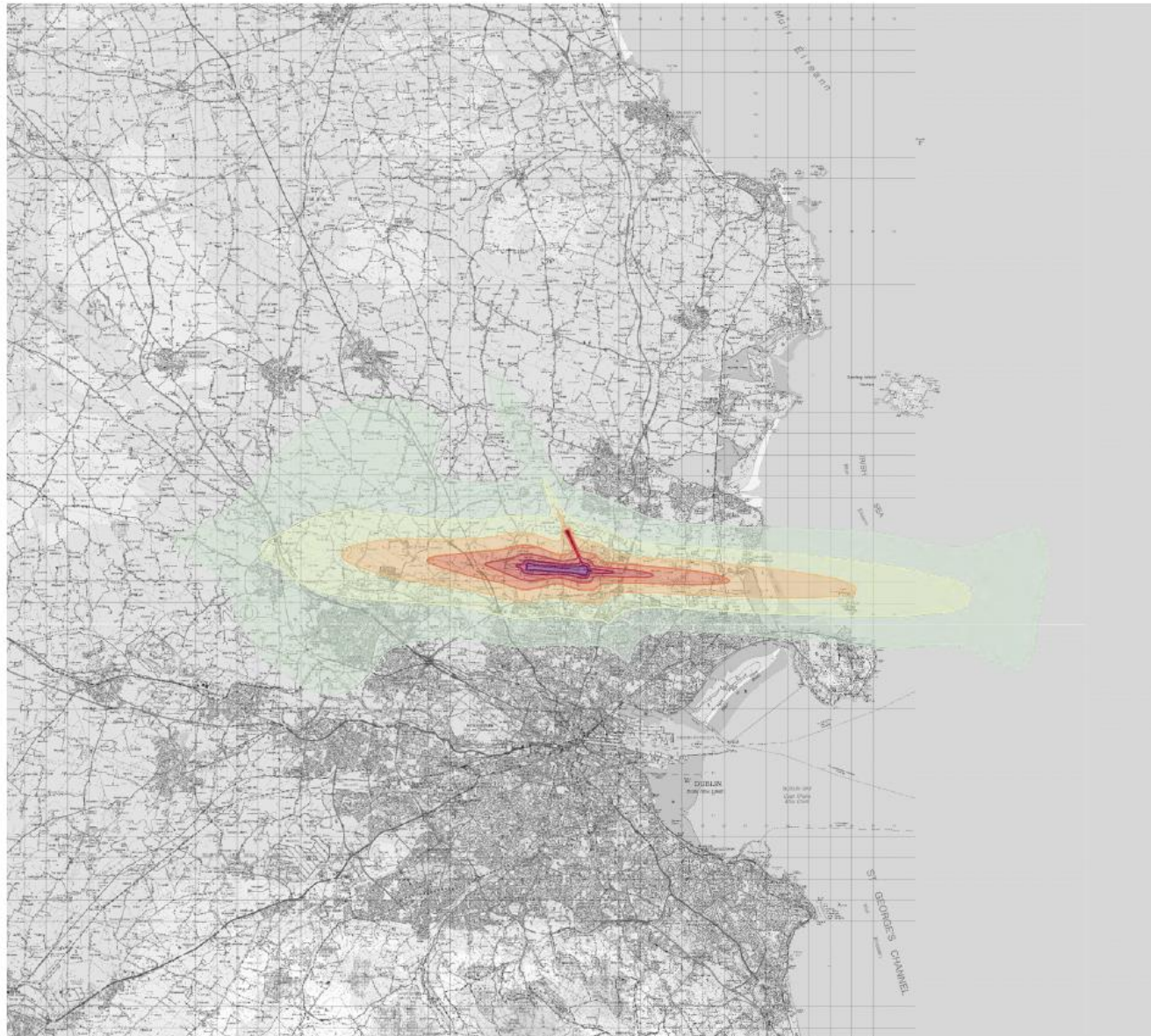
Table 14 – Contour Areas, L_{Aeq,8h} Metric

All of the 2021 contours are larger than their 2020 equivalents, due to the increase in movements in 2021, as the airport recovers from the effects of the COVID-19 pandemic. The increase is greater for the summer contours as the distribution of flights over the year was affected by the Covid-19 pandemic (annual flights 2021 vs 2020 grew 4%, whereas summer flights grew 43%). The 2020 annual L_{den} and L_{NIGHT} contours are shown as well as Summer Day and Summer Night. A comparison of the 2020 and 2021 annual L_{den} contours at 45 and 65 dB(A) is also shown.

When reviewing the comparison figures it is evident that the 2021 contours are larger overall than those in 2020, however there are differences in the shape of the contours between the two years. There are two main reasons for this.

The first reason is that the analysis of radar tracks has resulted in routes that are more dispersed than previously modelled, which makes the contour a bit shorter and wider in certain areas – this is noticeable for the north and south turns for departing aircraft which used Runway 28.

The second reason is that the contour has grown more to the east than to the west. This is due to a change in the modelled modal split. The 2020 contours were produced by modelling the actual runway use for each flight. This resulted in an overall modal split of 90-10 between Runway 28 and Runway 10. In 2021, reporting required the use of a 10-year average modal split. This meant the 2021 modelled modal split was 76-24 rather than the actual split of 87-13. Changes in modal split tend to have more effect on the part of the contour to the east of the airport, as the relative change is greater for the noisier departure operations (i.e. the relative change from 10 to 24 for Runway 10 departures is bigger than the relative change from 90 to 76 for Runway 28 departures).



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LEGEND:

- 45 - 49 dB(A) L_{den}
- 50 - 54 dB(A) L_{den}
- 55 - 59 dB(A) L_{den}
- 60 - 64 dB(A) L_{den}
- 65 - 69 dB(A) L_{den}
- 70 - 74 dB(A) L_{den}
- 75+ dB(A) L_{den}

Rev	Date	Description	Initials

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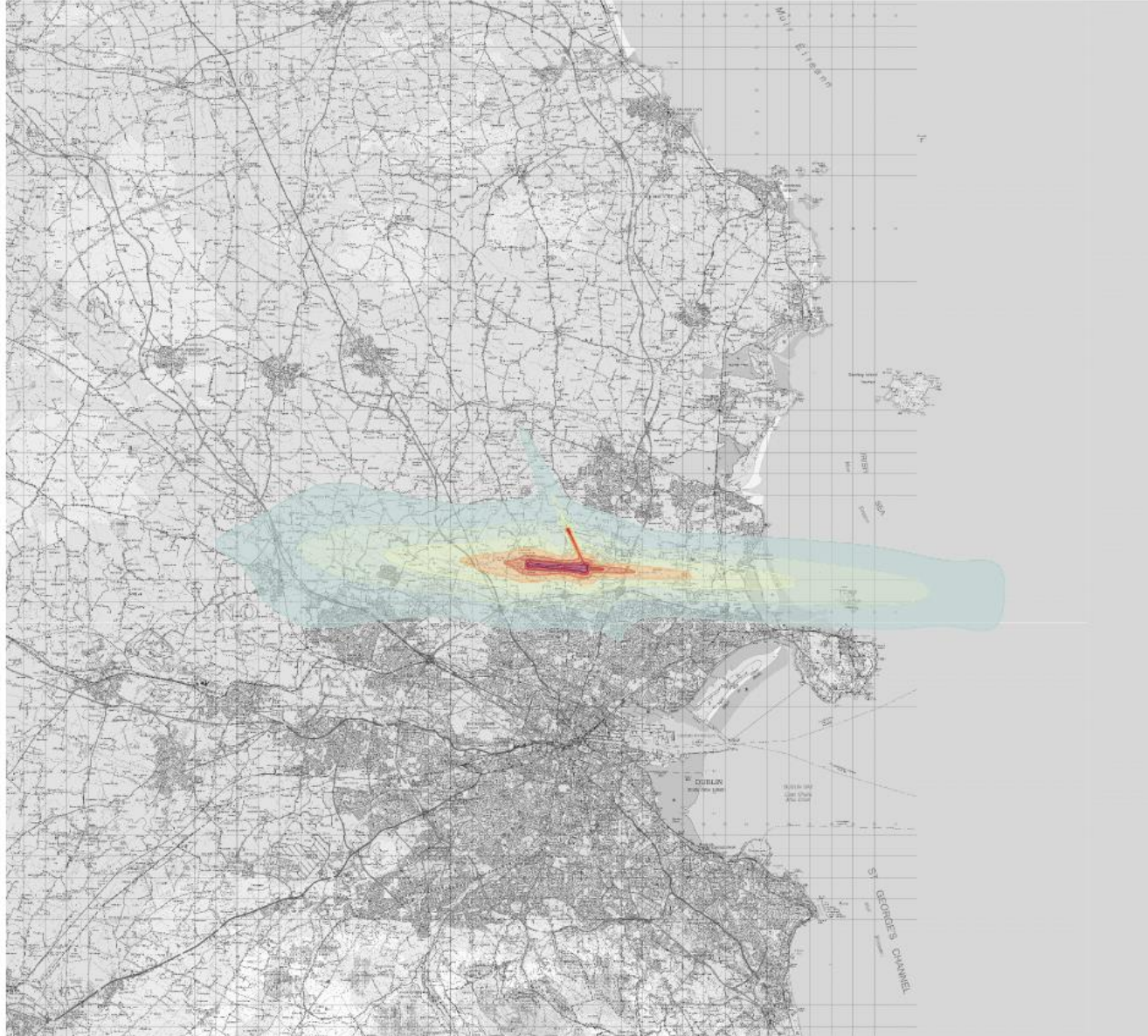
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**Dublin Airport
Annual Noise Contours**

**Figure 01
2021 Annual L_{den} Noise Contours**

DRAWN: NW **CHECKED: DC**
DATE: August 2022 **SCALE: 1:250000@A4**

Drawing No:
A11429_01_DR008_1.0



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LEGEND:

- 40 - 44 dB(A) L_{night}
- 45 - 49 dB(A) L_{night}
- 50 - 54 dB(A) L_{night}
- 55 - 59 dB(A) L_{night}
- 60 - 64 dB(A) L_{night}
- 65 - 69 dB(A) L_{night}
- 70+ dB(A) L_{night}

Rev	Date	Description	Initials

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**Dublin Airport
 Annual Noise Contours**

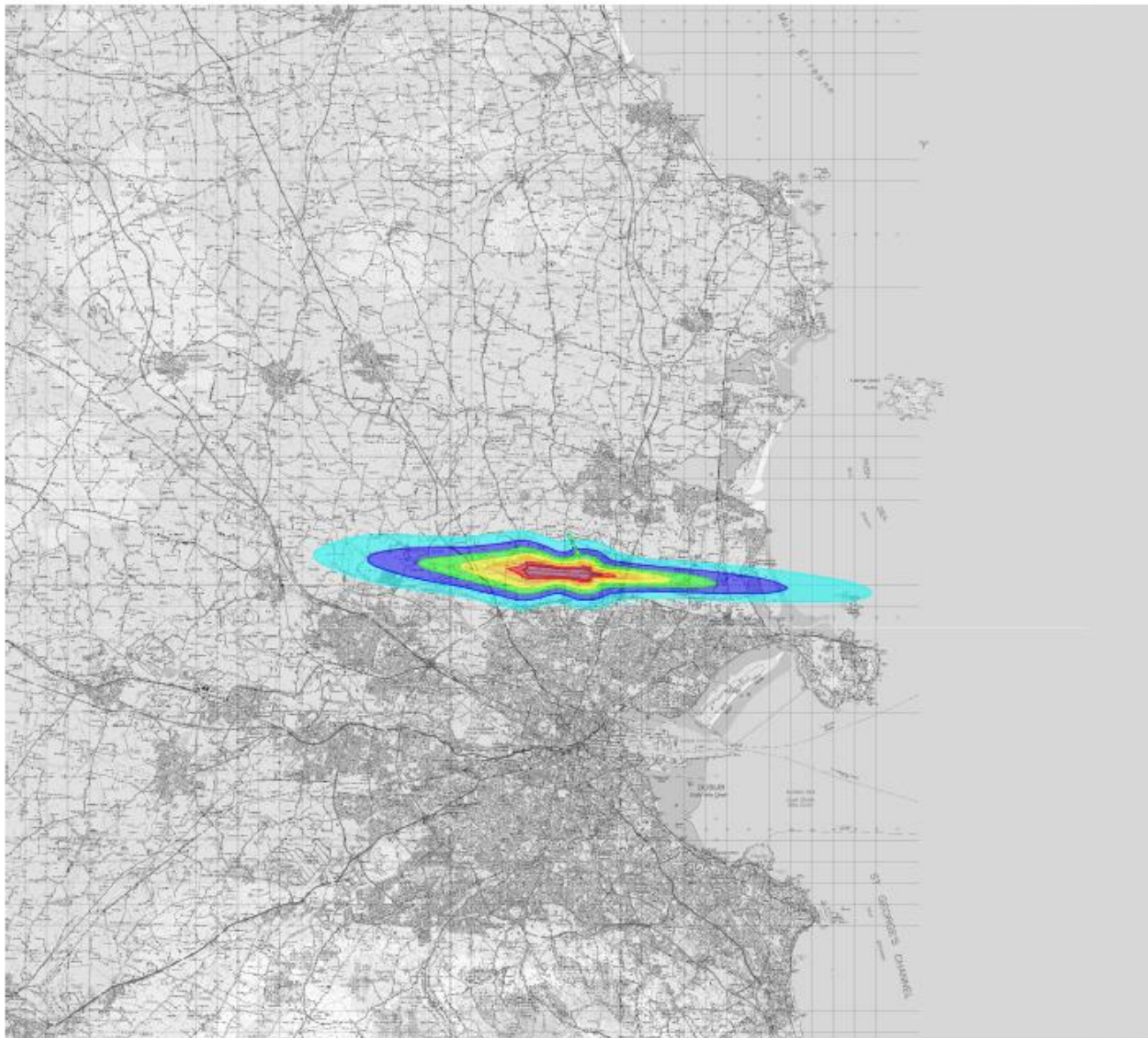
**Figure 02
 2021 Annual L_{night} Noise Contours**

DRAWN: NW CHECKED: DC

DATE: August 2022 SCALE: 1:250000@A4

Drawing No:

A11429_01_DR009_1.0



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LEGEND:

■	51 - 53 dB(A) $L_{Aeq,16h}$
■	54 - 56 dB(A) $L_{Aeq,16h}$
■	57 - 59 dB(A) $L_{Aeq,16h}$
■	60 - 62 dB(A) $L_{Aeq,16h}$
■	63 - 65 dB(A) $L_{Aeq,16h}$
■	66 - 68 dB(A) $L_{Aeq,16h}$
■	69+ dB(A) $L_{Aeq,16h}$

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**Dublin Airport
 Annual Noise Contours**

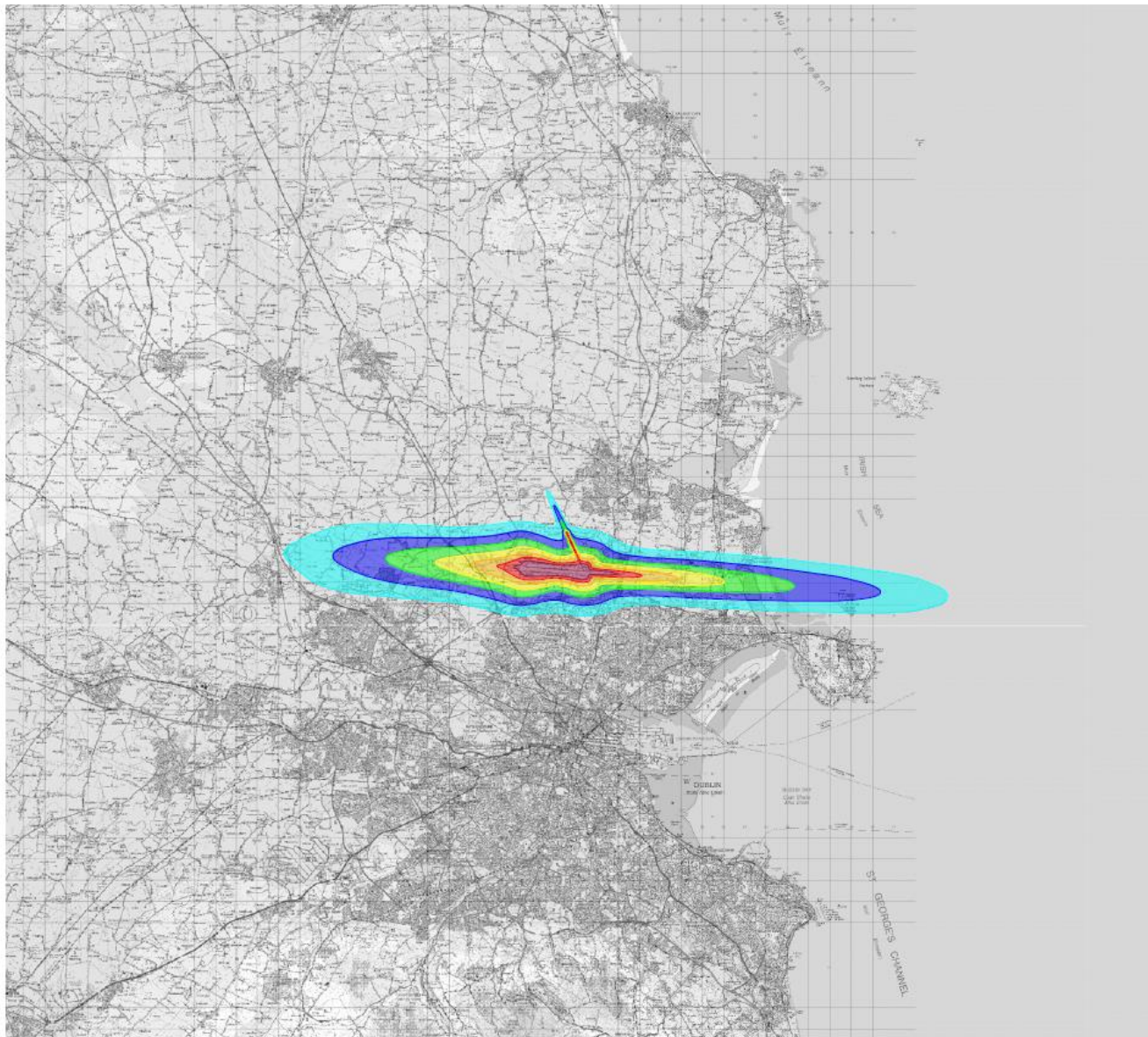
**Figure 03
 2021 Summer Day Noise Contours**

DRAWN: NW CHECKED: DC

DATE: August 2022 SCALE: 1:250000@A4

Drawing No:

A11429_01_DR010_1.0



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LEGEND:

- 45 - 47 dB(A) $L_{Aeq,8h}$
- 48 - 50 dB(A) $L_{Aeq,8h}$
- 51 - 53 dB(A) $L_{Aeq,8h}$
- 54 - 56 dB(A) $L_{Aeq,8h}$
- 57 - 59 dB(A) $L_{Aeq,8h}$
- 60 - 62 dB(A) $L_{Aeq,8h}$
- 63+ dB(A) $L_{Aeq,8h}$

Rev	Date	Description	Initials

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**Dublin Airport
 Annual Noise Contours**

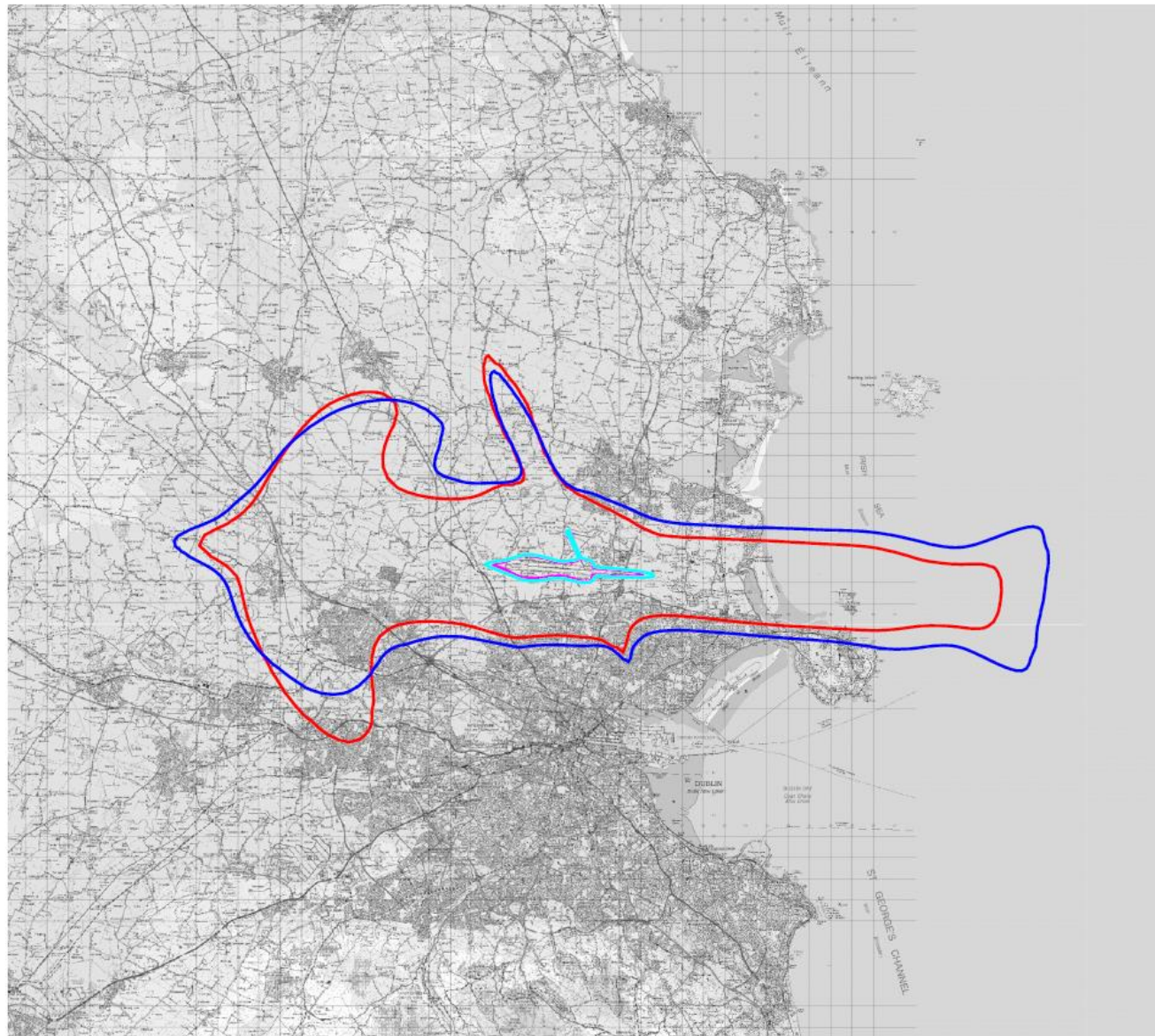
**Figure 04
 2021 Summer Night Noise Contours**

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DATE: August 2022 SCALE: 1:250000@A4

Drawing No:

A11429_01_DR0011_1.0



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LEGEND:

- Noise Contours,
- 2020 45 dB(A) L_{den}
- 2020 65 dB(A) L_{den}
- 2021 45 dB(A) L_{den}
- 2021 65 dB(A) L_{den}

Rev	Date	Description	Initials

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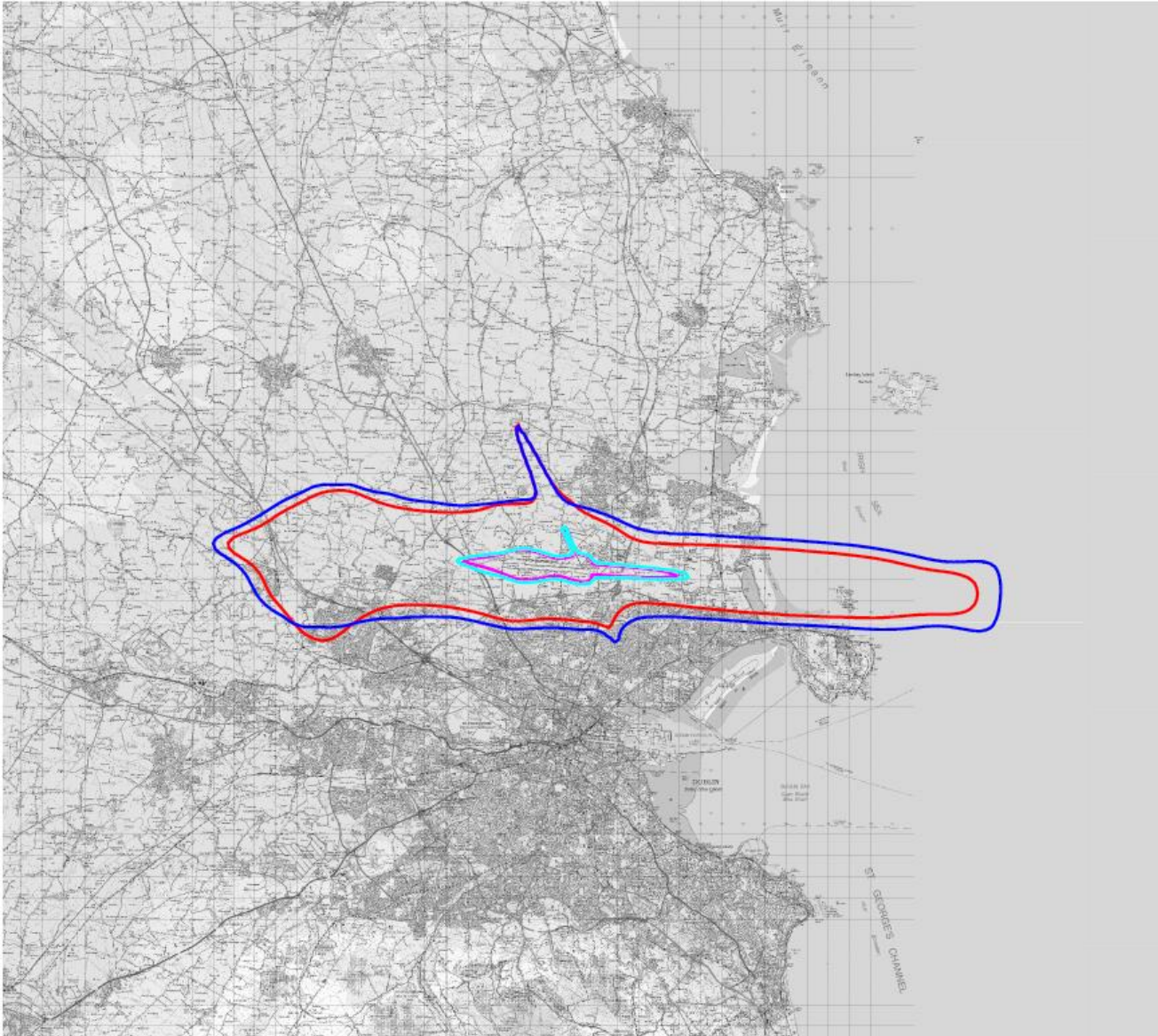
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**Dublin Airport
Annual Noise Contours**

**Figure 05
Comparison of 2020 and 2021
Annual L_{den} Noise Contours**

DRAWN: NW	CHECKED: DC
DATE: August 2022	SCALE: 1:250000@A4

Drawing No:
A11429_01_DR0012_1.0



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LEGEND:
 Noise Contours,
 — 2020 40 dB(A) L_{night}
 — 2020 55 dB(A) L_{night}
 — 2021 40 dB(A) L_{night}
 — 2021 55 dB(A) L_{night}

Rev	Date	Description	Initials
2.0	30/11/22	Corrected legend	NW

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**Dublin Airport
 Annual Noise Contours**

**Figure 06
 Comparison of 2020 and 2021
 Annual L_{night} Noise Contours**

DRAWN: NW CHECKED: DC
 DATE: November 2022 SCALE: 1:250000@A4

Drawing No:
A11429_01_DR013_2.0

6.1 Contour Map Busiest Day Overlay

The figures below set out the 2021 aircraft noise contours of L_{DEN} and L_{NIGHT} with the typical busiest day aircraft tracks for each RWY. The distribution of aircraft operations can be related directly with the modelled noise impact.

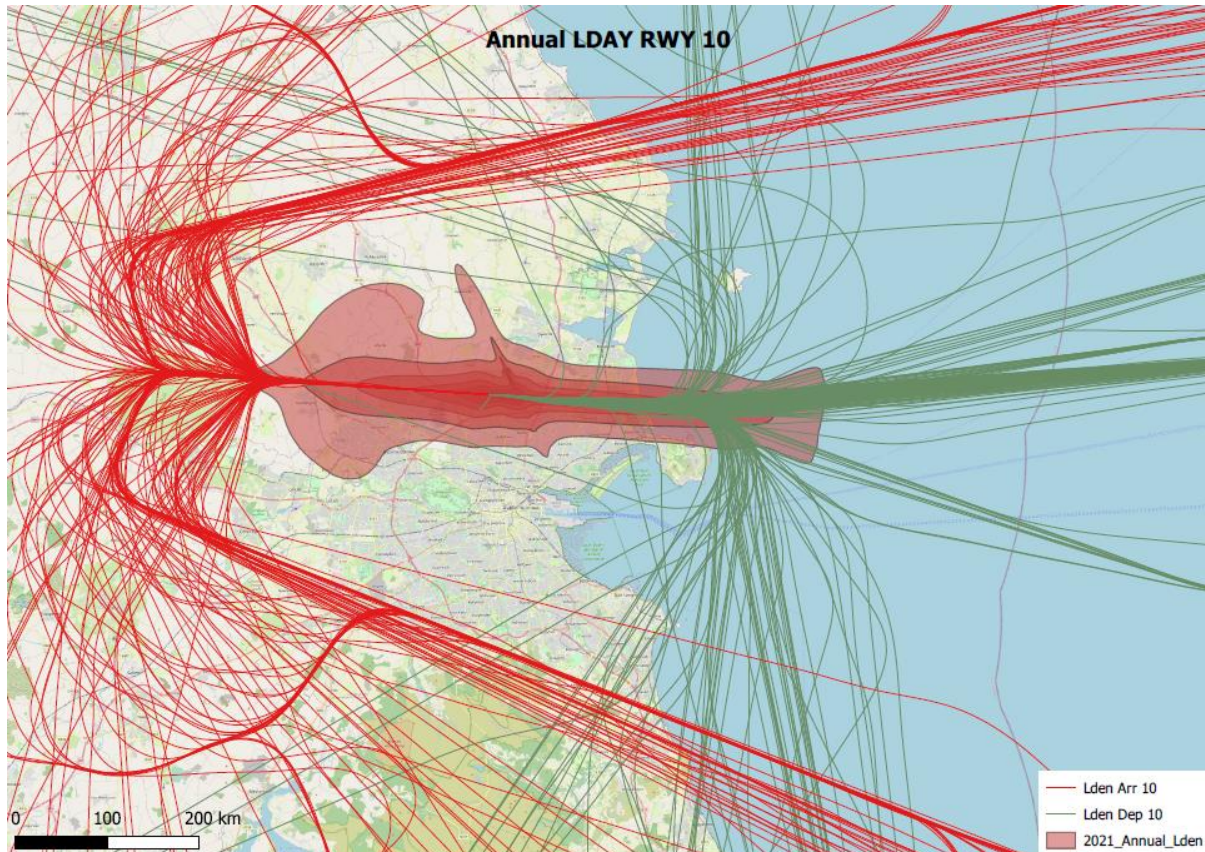


Fig. 52: Annual L_{DEN} RWY 10 – Busiest day Flight tracks

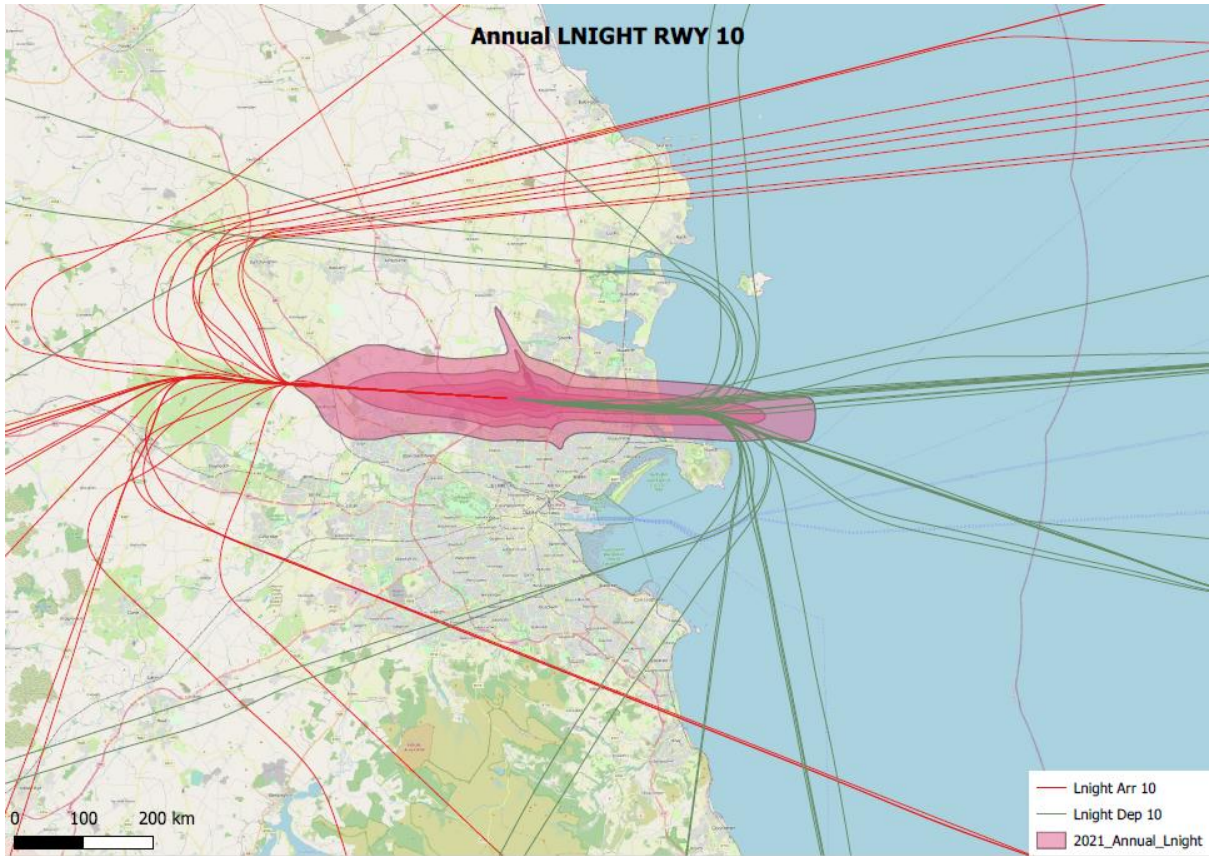


Fig. 53: Annual L_{NIGHT} RWY 10 – Busiest day Flight tracks

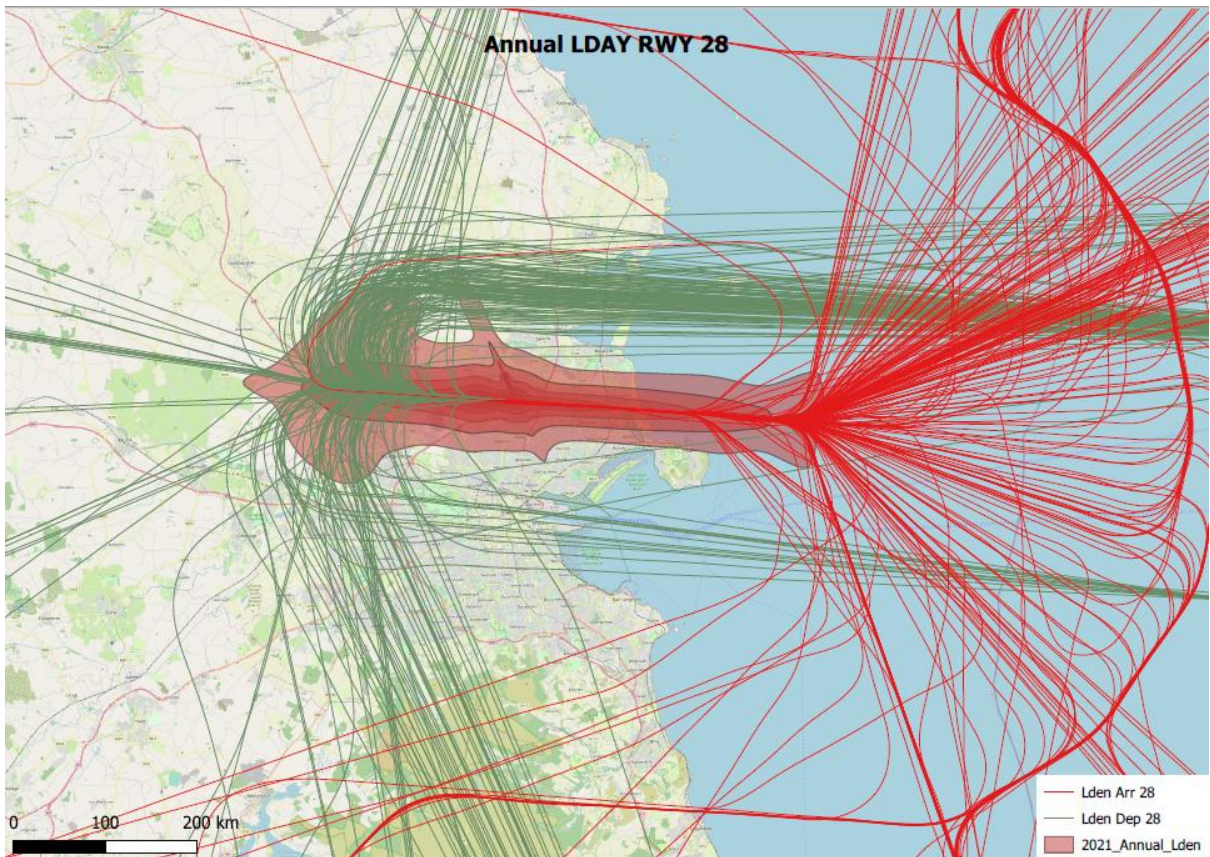


Fig. 54: Annual L_{DAY} RWY 28 – Busiest day Flight tracks

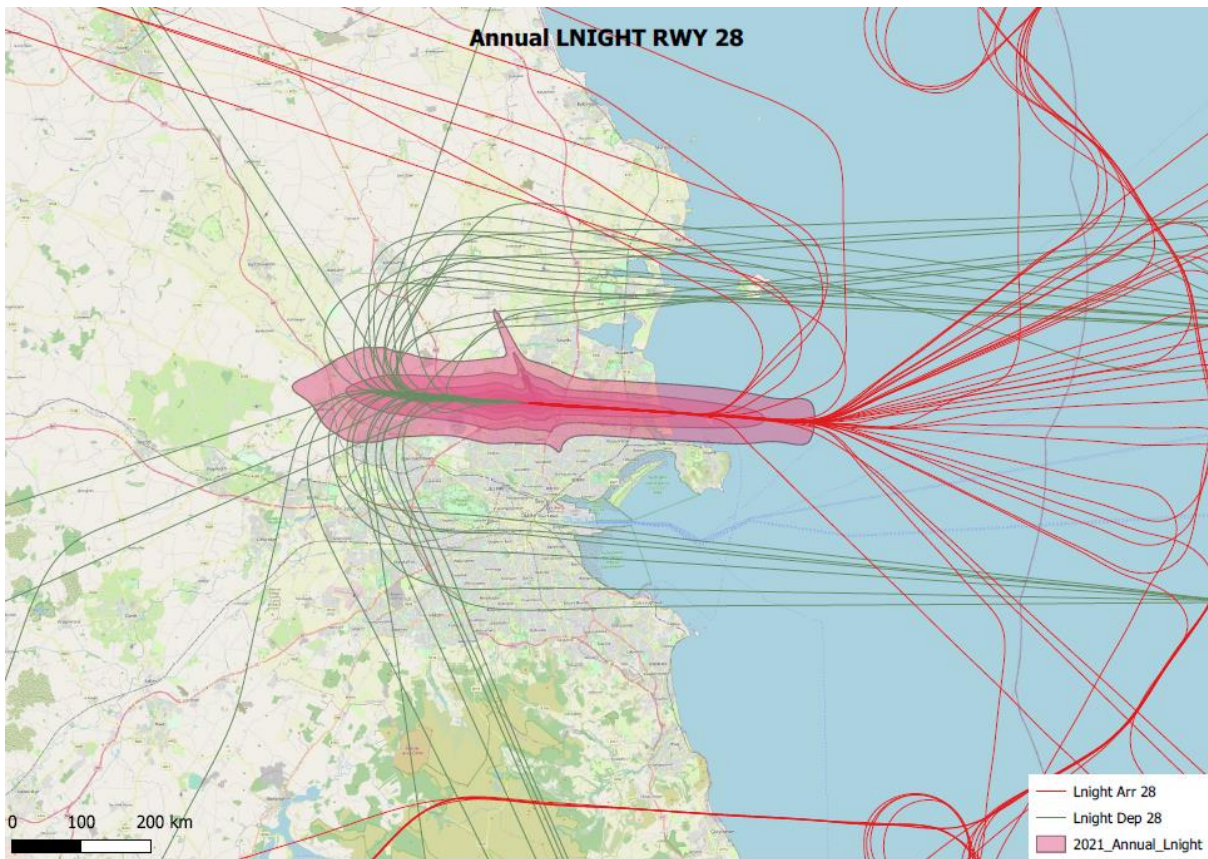


Fig. 55: Annual L_{NIGHT} RWY 28 – Busiest day Flight tracks

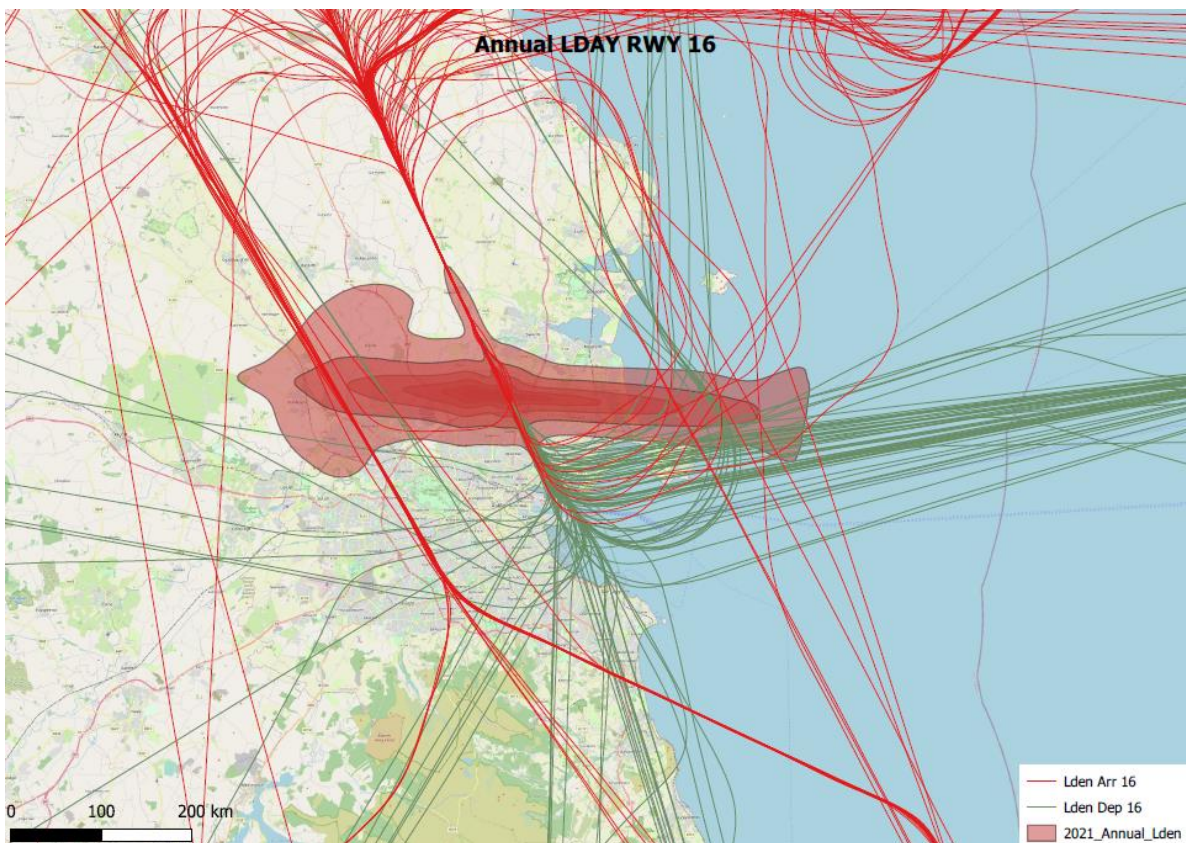


Fig. 56: Annual L_{DEN} RWY 16 – Busiest day Flight tracks

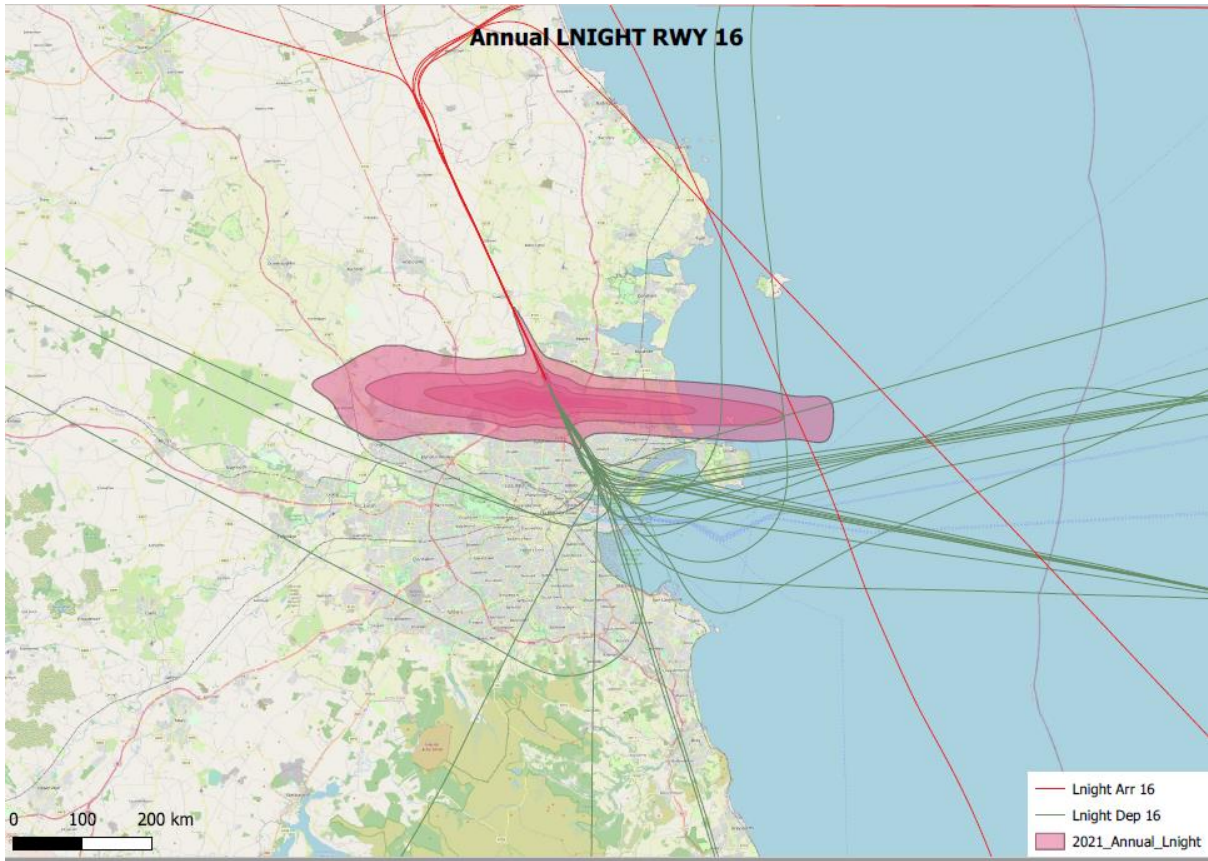


Fig. 57: Annual L_{NIGHT} RWY 16 – Busiest day Flight tracks

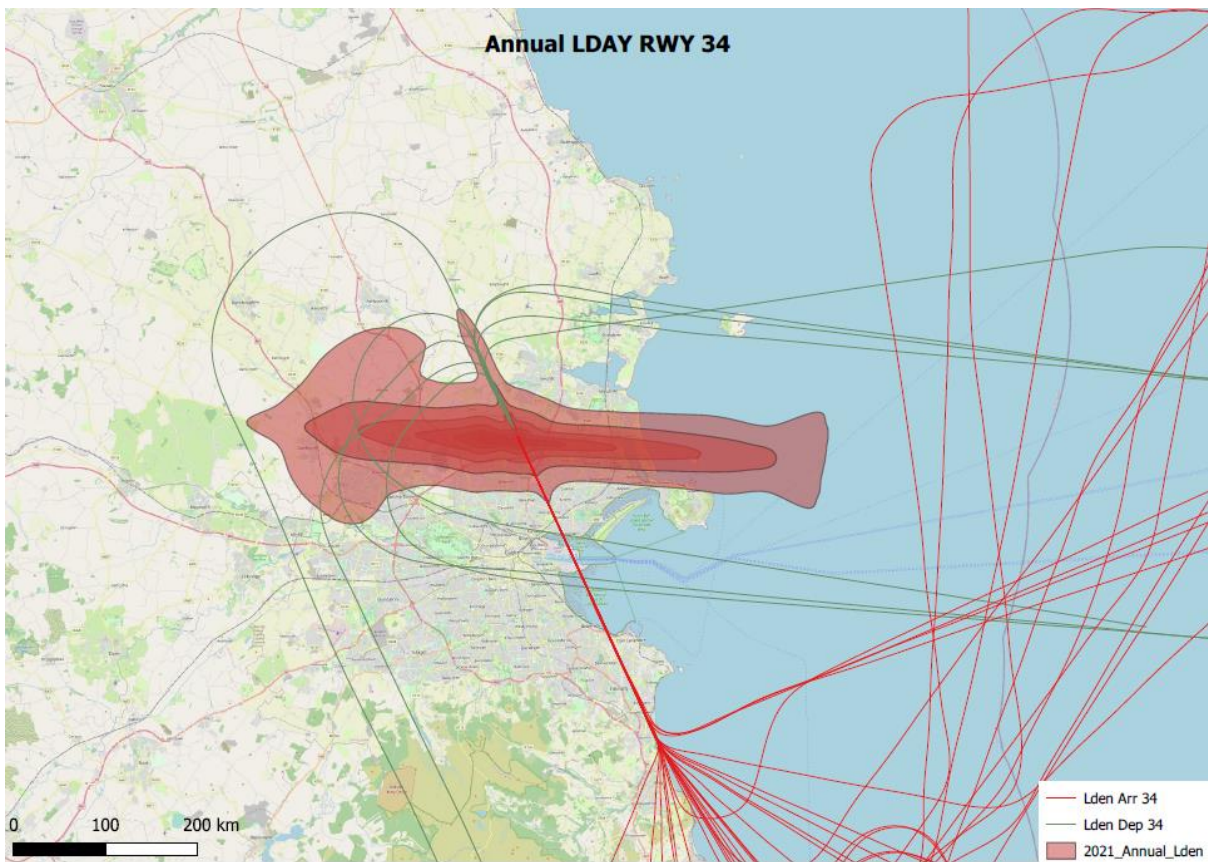


Fig. 58: Annual L_{DEN} RWY 34 – Busiest day Flight tracks

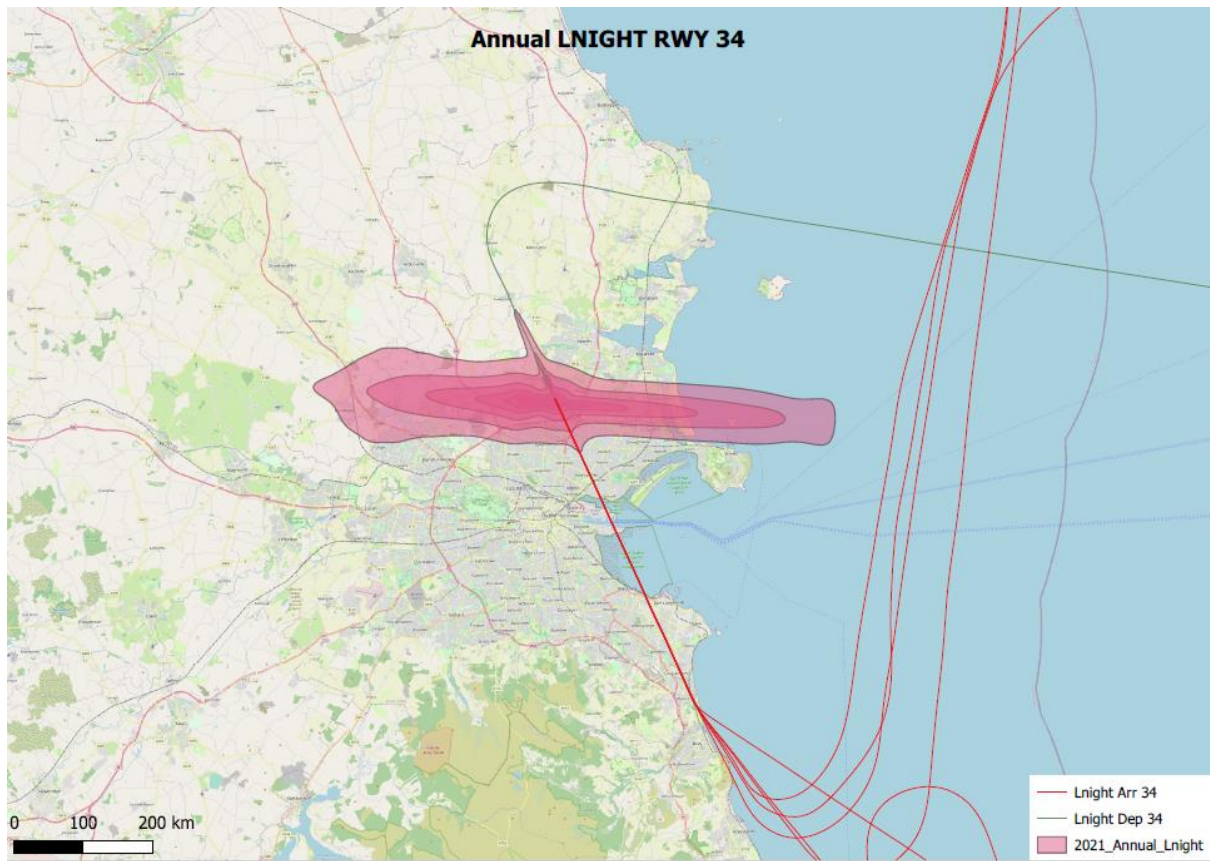


Fig. 59: Annual L_{NIGHT} RWY 34 – Busiest day Flight tracks

7.0

Noise abatement objective



7.0 Noise Abatement Objective

Table 15 provides the high-level performance metrics required by the NAO to demonstrate performance. Further detail of the 2021 contours with the 2019 Q2 population set for comparison is available in Appendix H along with the relevant calculation details and noise contour report.

Noise Abatement Objective					
Year	Population Set	No. People HA*	No. People HSD*	No. People ≥ 65 dB L _{den}	No. People ≥ 55 dB L _{night}
2019	2019 Q2	115,740	47,044	285	1,533
2021	2022 Q1	40,405	19,740	65	235

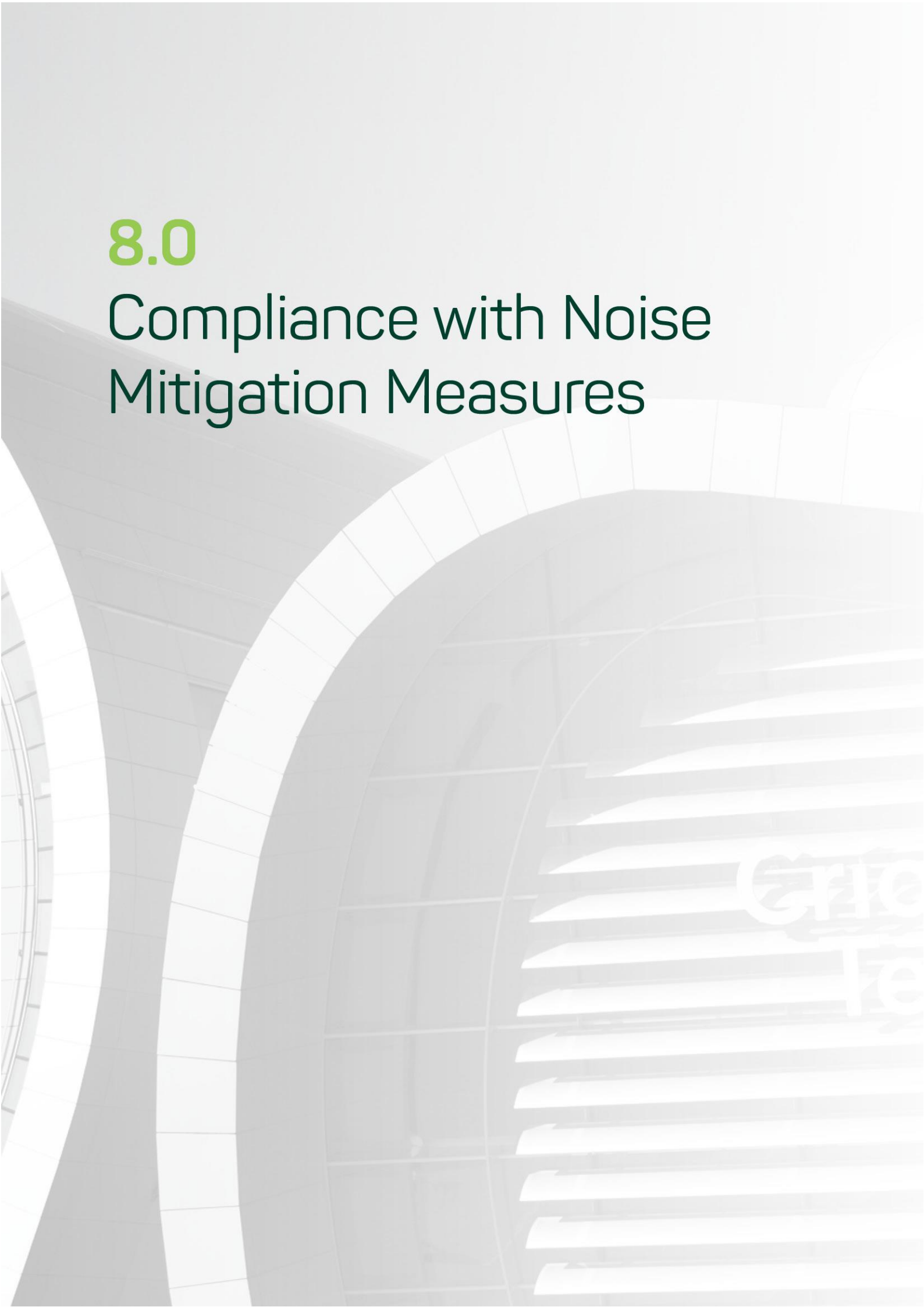
Table 15 – Noise Abatement Objective metrics

*HA- Highly Annoyed

** HSD – Highly Sleep Disturbed

8.0

Compliance with Noise Mitigation Measures



8.0 Compliance with Noise Mitigation Measures

Table 16 details the noise mitigations in place at Dublin and provides further information on the method of monitoring in place and other measures to ensure compliance. An opinion on compliance with the relevant noise measure is provided and where possible this is evidenced with statistics referencing the preceding year. A general statement on the performance and effectiveness is given that is further expanded within the Opportunities for Improvement section.

Noise Mitigation Measures

Reduction of Noise at Source																		
Ref	Source	Description	Method of Monitoring/Systems		Other Measure/Enforcement	Opinion on Compliance			Effectiveness/Performance									
			Method	System														
NS-1	FCC-NAP	Encourage daa to promote quieter aircraft through incentives such as FlyQuiet programme	Quarterly Fleet Declaration reviews compiled by daa Shared Services Centre. Minuted DAOPG meetings.	N/A	Engagement with Airlines is undertaken via the monthly DAOPG meetings.	In Progress			Discussions continued throughout 2021 on the promotion of quieter aircraft and the appropriate use of metrics and methodology to track performance improvement. Agreement on more detailed tracking is subject to collaborative agreement with airport stakeholders.									
NS-2	FCC-NAP	Encourage daa to work with airline partners to introduce quieter aircraft, particularly at night – including consideration of incentives	Quarterly Fleet Declaration review compiled by daa Shared Services Centre is tracked for metrics and improvement.	N/A	Airline performance and general aviation noise metrics are included as standing item on monthly DAOPG meeting held by daa with all relevant Airport Users.	In Progress			Consultations around Environmental Noise Charging to incentivise quieter aircraft were completed within 2021. Shadow charging planned for Q1 and 2 2022 with effective implementation for Winter 2022 scheduled.									
Noise Abatement Operating Procedures																		
Ref	Source	Description	Method of Monitoring/Systems		Other Measure/Enforcement	Opinion on Compliance			Effectiveness/Performance									
			Method	System														
NA-1	FCC NAP; daa NMP; AIP;	Two Runway Preferential Runway Programme	Flight Track Keeping	ANOMS	Enforcement of NA-1 not applicable. IAA ANSP determine RWY usage based on aviation safety and environmental considerations. Preferential routing mandated in AIP.	<table border="1"> <thead> <tr> <th colspan="3">Compliant</th> </tr> <tr> <th>2019</th> <th>2020</th> <th>2021</th> </tr> </thead> <tbody> <tr> <td>26% usage RWY 10 ~1.5% usage RWY 16 72% usage RWY 28 ~0.5% usage RWY 34 N/A</td> <td>10.3% usage RWY 10 1.5% usage RWY 16 86.8% usage RWY 28 0.5% usage RWY 34 0.9% Helicopter</td> <td>12.46% usage RWY 10 0.82% usage RWY 16 85.79% usage RWY 28 0.19% usage RWY 34 0.74% Helicopter</td> </tr> </tbody> </table>			Compliant			2019	2020	2021	26% usage RWY 10 ~1.5% usage RWY 16 72% usage RWY 28 ~0.5% usage RWY 34 N/A	10.3% usage RWY 10 1.5% usage RWY 16 86.8% usage RWY 28 0.5% usage RWY 34 0.9% Helicopter	12.46% usage RWY 10 0.82% usage RWY 16 85.79% usage RWY 28 0.19% usage RWY 34 0.74% Helicopter	The low level of Departures off Rws 34,10 and 16 respectively indicates close to minimum usage and adherence to operating procedure.
Compliant																		
2019	2020	2021																
26% usage RWY 10 ~1.5% usage RWY 16 72% usage RWY 28 ~0.5% usage RWY 34 N/A	10.3% usage RWY 10 1.5% usage RWY 16 86.8% usage RWY 28 0.5% usage RWY 34 0.9% Helicopter	12.46% usage RWY 10 0.82% usage RWY 16 85.79% usage RWY 28 0.19% usage RWY 34 0.74% Helicopter																
NA-2	FCC NAP; daa NMP; AIP;	Two Runway Noise Preferential Routes (NPR's) and Track Keeping -	Flight Track Keeping	ANOMS	daa Noise Management Plan sets out track keeping procedures and where required processes to escalate investigations to IAA-ANSP and relevant airport users as necessary.	<table border="1"> <thead> <tr> <th colspan="3">Compliant</th> </tr> <tr> <th>2019</th> <th>2020</th> <th>2021</th> </tr> </thead> <tbody> <tr> <td>99.2% Track Keeping</td> <td>99.14% Track Keeping</td> <td>99.55% Track Keeping</td> </tr> </tbody> </table>			Compliant			2019	2020	2021	99.2% Track Keeping	99.14% Track Keeping	99.55% Track Keeping	Continued requirement for improvement to Track Keeping against all off track violations identified. Streamlined investigation of violations subject to IAA-ATC review to be advanced.
Compliant																		
2019	2020	2021																
99.2% Track Keeping	99.14% Track Keeping	99.55% Track Keeping																
NA-3	FCC NAP; daa NMP; AIP;	Noise Abatement Departure Procedures (NADP) Climb Profile	Currently there is no known method to automatically track compliance with NADP.	N/A	NADP is mandated within the AIP. daa engages with Airport Users on implemented NADP.	Opinion not available at this time			Promulgation of NADP 2 into AIP completed in 2021. Survey review of effectiveness planned following full calendar year of implementation.									
NA-4	FCC NAP	Visual Approach Jet Aircraft (Cat C/D)	Currently system monitors all approaches but cannot distinguish between visual approach and instrument approach.	N/A	Visual approach of Jet Aircraft (Cat C/D) is mandated within the AIP. Air Traffic Control maintains written procedures to join final approach track closer than 6m from touchdown.	Opinion not available at this time			Track Keeping statistics indicate good performance and adherence to procedures.									
NA-5/6	IAA ATC	Continuous Climb Operations / Continuous Descent Approach	Monitoring, tracking and performance measurement performed by Performance Review division of EUROCONTROL.	EUROCONTROL	Statutory monitoring and reporting via IAA-ANSP and EUROCONTROL.	<table border="1"> <thead> <tr> <th colspan="3">Compliant</th> </tr> <tr> <th>2019</th> <th>2020</th> <th>2021</th> </tr> </thead> <tbody> <tr> <td>CCO - 99.4% below FL 105. CDO - 53.5% below FL75</td> <td>CCO - 99.8% below FL 105. CDO - 58.3% below FL75</td> <td>CCO - 99.8% below FL 105. CDO - 61.5% below FL75</td> </tr> </tbody> </table>			Compliant			2019	2020	2021	CCO - 99.4% below FL 105. CDO - 53.5% below FL75	CCO - 99.8% below FL 105. CDO - 58.3% below FL75	CCO - 99.8% below FL 105. CDO - 61.5% below FL75	CCO % Compliance indicates good performance. Relatively lower CDO % compliance indicative of air space and current procedures in place at Dublin Airport. CDO operations at Dublin is restricted by neighbouring airspace structures. Most recently, from an Irish perspective continuous descent operations (CDO), from January to December 2021 the amount of time flown level during descents into Irish airports averaged 64.1 seconds per descent, 90.3 seconds lower than in 2019, in context the average for the top European airports in 2021 was 127.3 seconds
Compliant																		
2019	2020	2021																
CCO - 99.4% below FL 105. CDO - 53.5% below FL75	CCO - 99.8% below FL 105. CDO - 58.3% below FL75	CCO - 99.8% below FL 105. CDO - 61.5% below FL75																
NA-7	FCC NAP; daa NMP; AIP;	Reverse Thrust	Currently no method of monitoring	N/A	Limited use of reverse thrust is mandated within the AIP.	Opinion not available at this time			Investigation of potential monitoring measures remains to be commenced and will form part of wider technical review and assessment of systems.									
NA-8	FCC NAP; daa NMP; AIP;	Engine Ground Running	Monitoring completed by daa Airside Management Unit and compiled in local operations log.	N/A	Requirement within Aerodrome Manual Direction 6.10 and mandated within the AIP.	<table border="1"> <thead> <tr> <th colspan="3">Compliant</th> </tr> <tr> <th>2019</th> <th>2020</th> <th>2021</th> </tr> </thead> <tbody> <tr> <td>96% compliance 20:00-07:00. 95.95% compliance 07:00-09:00 CAT C/D only</td> <td>97% compliance 20:00-07:00. 98.25% compliance 07:00-09:00 CAT C/D only</td> <td>100% compliance 20:00-07:00. 97% compliance 07:00-09:00 CAT C/D only</td> </tr> </tbody> </table>			Compliant			2019	2020	2021	96% compliance 20:00-07:00. 95.95% compliance 07:00-09:00 CAT C/D only	97% compliance 20:00-07:00. 98.25% compliance 07:00-09:00 CAT C/D only	100% compliance 20:00-07:00. 97% compliance 07:00-09:00 CAT C/D only	Performance is adequate. Non compliances refer to Weekend early run of Code C aircraft only.
Compliant																		
2019	2020	2021																
96% compliance 20:00-07:00. 95.95% compliance 07:00-09:00 CAT C/D only	97% compliance 20:00-07:00. 98.25% compliance 07:00-09:00 CAT C/D only	100% compliance 20:00-07:00. 97% compliance 07:00-09:00 CAT C/D only																
NA-9	FCC NAP; daa NMP;	Monitor and Report	General text detailing NFTMS operations	ANOMS, Webtrak	daa Noise Management Plan sets out monitoring and reporting requirements and procedures	Partial compliance			Requirement for improvement to monitoring and reporting of all off track violations remain. Despite improvement to process and procedures there remains potential for better identification and turnaround in partnership with IAA-ANSP and IAA-ATC.									

Land Use Planning & Management									
Ref	Source	Description	Method of Monitoring/Systems		Other Measure/Enforcement	Opinion on Compliance		Effectiveness/Performance	
			Method	System					
LU-5	FCC NAP; daa NMP;	Sound Insulation (RNIS)	Community Engagement Department, Communications Department	N/A	Condition 7 of An Bord Pleanala Planning Permission NR	Compliant		157 of 202 eligible houses have benefited.	
LU-6	NR - RFI 116	Voluntary Dwelling Purchase Scheme	Community Engagement Department, Communications Department	N/A	Condition 6 of An Bord Pleanala Planning Permission NR	Compliant		10 of 38 eligible properties have benefited from the scheme to date.	
LU-7	NR - RFI 116	Voluntary School Sound Insulation	Community Engagement Department, Communications Department	N/A	Condition 9 of An Bord Pleanala Planning Permission NR	Compliant		6 eligible schools acoustically tested. 3 of 4 qualifying schools have had or are in the process of having measures installed.	
Monitoring & Community Engagement									
Ref	Source	Description	Method of Monitoring/Systems		Other Measure/Enforcement	Opinion on Compliance		Effectiveness/Performance	
			Method	System					
CE-1	FCC NAP; daa NMP;	Stakeholder Engagement	Community Engagement Department, Communications Department	N/A	DAOPG/Scheduled Meetings	Compliant		DAOPG well established and attended. Noise included as standing	
CE-2	FCC NAP; daa NMP;	Community Engagement Programme	Community Engagement Department, Communications Department	N/A	Condition 28 of An Bord Pleanala Plan	Compliant		CLG, DAEWG and drop in clinic forums well established and attended.	
CE-3	FCC NAP; daa NMP;	Noise & Flight Track Monitoring System	Collation of data on aircraft movements and the measurement of resultant noise	ANOMS/WebTrak	N/A	Compliant		The NFTMS has continued to enable the analysis of aircraft movements to assess whether they are operating within defined corridors. The measurement of resultant noise levels at key locations on the approach and departure routes has been maintained and improved throughout 2021. Rule input governing the treatment of noise corridors within the system was validated while investigations for the location of a noise monitor at engine test site 1 were progressed. Deployment of this noise monitor was scheduled for 2022. Works on the technical review and benchmarking for additional noise monitoring terminals did not advance as much as anticipated within 2021 and is identified for more thorough advancement within 2022. This work will provide guidance on enhancements of the system including the placement of additional noise monitoring terminals.	
CE-4	FCC NAP; daa NMP;	Noise Complaint Management Systems	Process and respond to all aviation related noise complaints in a timely manner	WebTrak, various	daa NMP, TBC	Not compliant		Manual nature of investigations of violations requires further collaborative work with IAA-ANSP. Process and procedures for dealing with indirect complaints submitted via daa Customer Experience Portal/ Airport Operations Control centre and the reception desk to be improved. Response times generally in line with ambition.	
						2019	2020	2021	
						15,160 complaints / 15,160 complaints processed / 15,157 Complaints responded to / 56 of 56 complaints further investigated and closed	7,133 complaints / 7,133 complaints processed / 7,133 Complaints responded to / 39 of 96 complaints further investigated and closed	13,613 complaints / 13,658 logged on NFTMS / 135,77 complaints responded to / 1 of 29 further complaints investigated closed out	

Table 16 – Noise Mitigations Measure Compliance Table



9.0

Opportunities for Improvement

9.0 Opportunities for Improvement

The noise mitigation measure compliance table detailed in Table 17 presents an opinion on the effectiveness or performance of the relevant measure. This commentary has been reviewed against the relevant requirement within the Aircraft Noise (Dublin Airport) Regulation Act 2019, Part 4, section 19, and the source documents. Where technically feasible and possible, opportunities for improvement have been presented in Table 15. A number of these opportunities had been identified within 2021 and are currently in progress. The multi-disciplinary and agency requirements of some of the opportunities will require further investigation, review and consultation with Regulatory bodies and airport users ahead of any planned implementation.

Opportunities for Improvement						
OFI	Ref	Criteria/Policy	Opportunity For Improvement finding:	Consultation Requirement	Status:	Expected Implementation:
OFI-001	NA-2	Two Runway Noise Preferential Routes (NPR's) and Track Keeping	Efficient monitoring of movements against vectoring of aircraft would allow more streamlined approach to improved Track Keeping and Complaint handling.	Consultation with IAA-ANSP required to agree IT system management, work practice change and associated governance and protocol approval	Consultation commenced.	Consultations commenced late in 2021 with expected outcome of deficient reporting of violations by Dublin Airport to remain until agreed process and procedure is put in place. This will require mitigation with manual investigation where possible. Targeted implementation Quarter 1 2023.
OFI-002	NA-3	Noise Abatement Departure Procedures (NADP) Climb Profile	Promulgate NADP 2 through AIP. Ensure annual survey completed by airport users on adherence to NADP 2 procedures.	Airport users, ANSP, daa Operations	Completed	Manual reporting of NADP II compliance expected for Annual Report 2022.
OFI-003	NA-4	Visual Approach Jet Aircraft (Cat C/D)	The NFTMS is unable to distinguish between an instrument or visual approach taken. Complete analysis on potential for use of joining point gate within ANOMS to provide metrics on whether an aircraft has breached the Environmental Corridors. Thereafter discussions with IAA-ANSP could identify if vectored to do so.	Consultation with IAA-ANSP required to review potential for implementation.	Commenced as part of Track Keeping improvement programme as per OFI-001	TBA pending technical feasibility confirmation.
OFI-004	NA-5/6	Continuous Climb Operations / Continuous Descent Operations	Potential for development of EIDW specific CCO/CDO procedures that would better reflect procedures at Dublin Airport. Possible use of shadow rule set to be investigated.	Consultation with IAA-ANSP ongoing and to form part of the general airspace design review to be undertaken by IAA-ANSP in 2022/2023.	Shadow rule implementation within the Noise Flight Track Keeping system is in progress pending outline agreement and consultation with stakeholders	Q2 2023
OFI-005	NA-7	Reverse Thrust	Investigation of potential monitoring measures to be reviewed as part of wider technical review and assessment of systems.	Airport user and internal consultation and engagement with subject matter experts.	Not commenced	TBA pending technical feasibility confirmation.
OFI-006	NA-9	Monitor and Report	Update of complaint handling procedures to detail process for track violation reporting.	Internal consultation	Initial improvements made to procedures but further work and communication on ad hoc complaint handling and indirect issue is required.	Ongoing
OFI-007	NA-9	Monitor and Report	Review of NMT locations and requirement for additional monitoring to be completed. Engagement with relevant stakeholders and community with regard to site selection.	Community, ANCA, internal consultation	Commenced. Initial investigations and stakeholder briefing sessions completed. Confirmation of correlation factor of existing NMT's with aviation noise confirmed. Alignment of additional NMT locations with expected flight tracks in progress.	Q1 2023 - Completion of additional 15 fixed NMT's and 2 mobile NMT's.
OFI-008	NAO	Noise Abatement Objective	Inclusion of required reporting and assessments into Annual Compliance reports.	ANCA, internal consultation	Initial schedule of information requirements received and provided for 2019 v 2021 dataset.	For 2022 Annual Compliance report.
OFI-009	General	Section 19 (4) a-f responses	Ensure specific response to requirements to the Dublin Airport Noise Act (2019) Section 19 (4) a-f is satisfied	ANCA, internal consultation	Clarification of further information received from ANCA. Inclusion of information within updated 2020 report and 2021 annual report completed.	Completed - pending comment from ANCA

Table 17 – Opportunities for improvement

10.0

Conclusion - Opinions on Compliance



10.0 Conclusion – Opinion on Compliance

The review completed by daa on the compliance of airport users with noise mitigation measures and operating restrictions has identified that there is general compliance with the majority of measures in place. On the basis of the information reviewed, conformance with and the noise mitigation measures and the requirements of The Aircraft Noise (Dublin Airport) Regulation Act 2019, Part 4, section 19 exists^{Note 1}. Where minor non-conformities exist and are identified as part of the review, proposals are put forward as part of planned works to investigate the potential for monitoring against industry best practice. A number of these proposals will require significant engagement with airport users and regulatory bodies.

Note 1

Dublin Airport are continuing the process of investigating and proposing an overall performance indicator or hi level measure that will indicate annual compliance. The determination of the indicator(s) will be based on:

- Appropriateness for measuring and monitoring
- Ability to enable Dublin Airport adequately demonstrate noise performance improvement to the ANCA.
- Incorporation of Noise Abatement Objective reporting

As Table 14 sets out the noise mitigation measures with individual variables that could significantly affect noise performance. The determination of annual compliance for the purposes of the Aircraft Noise (Dublin Airport) Regulation Act 2019, Part 4, section 19 is based on:

- The preceding year of the report used as the baseline
- Equal weighting applied to each noise mitigation measure
- The sum balance of noise mitigation measures improving against those disimproving indicates compliance or otherwise

Glossary/Abbreviations

A/B category aircraft	Category of smaller aircraft, containing propeller aircraft, turboprop aircraft, Whisperjets and other small general aviation aircraft powered by jets engines.
AIP	Aeronautical Information Procedure/Publication
ANCA	Aircraft Noise Competent Authority
ANSP	Air Traffic Service Provider
ANOMS	Advanced Noise & Track Monitoring System
ATSU	Air Traffic Service Unit
ATC	Air Traffic Control
CAR	Civil Aviation Regulator
C/D category aircraft	Large aircraft, such as Airbus and Boeing aircraft, Bombardier Canadair Regional Jet series, business jets and Embraer aircraft.
CCO	Continuous Climb Operations
CDO	Continuous Descent Operations
Clearway	End part of the runway
CLG	Community Liaison Group
daa	Dublin airport authority
NMP	Noise Management Plan
DAOPG	Dublin Airport Operations Planning Group
DAEWG	Dublin Airport Environmental Working Group
dB	Decibels, a unit of sound pressure
FCC NAP	Fingal County Council Noise Action Plan
HR	Hour
IAA	Irish Aviation Authority
ILS	Instrument Landing System
ICAO	International Civil Aviation Organisation
KT	knots
LA _{Eq}	Equivalent average sound level
LA _{max}	LA _{max} is the maximum value that the A-weighted sound pressure level reaches during a measurement period
LAP	Local Area Plan
L _{den}	L _{den} is the weighted average of the yearly individual noise level during day, evening and night.
L _{night}	L _{night} is the weighted average of the yearly individual noise level specifically during the night (23:00 – 07:00)
MTOW	Maximum Take Off Weight
NADP	Noise Abatement Departure Procedures
NAO	Noise Abatement Objective
NM	Nautical Miles
NMP	daa Noise Management Plan
Reverse thrust	Using the engine of the aircraft for braking after landing on the runway
SID	Standard Instrument Departure

Appendix A - IFP Listings for 2021

Appendix B - ICAO Chapter Compliance (Manufacturer MTOW)

Appendix C - NMT Dublin Noise Report

Appendix D - Progress Statement LU-5,6,7

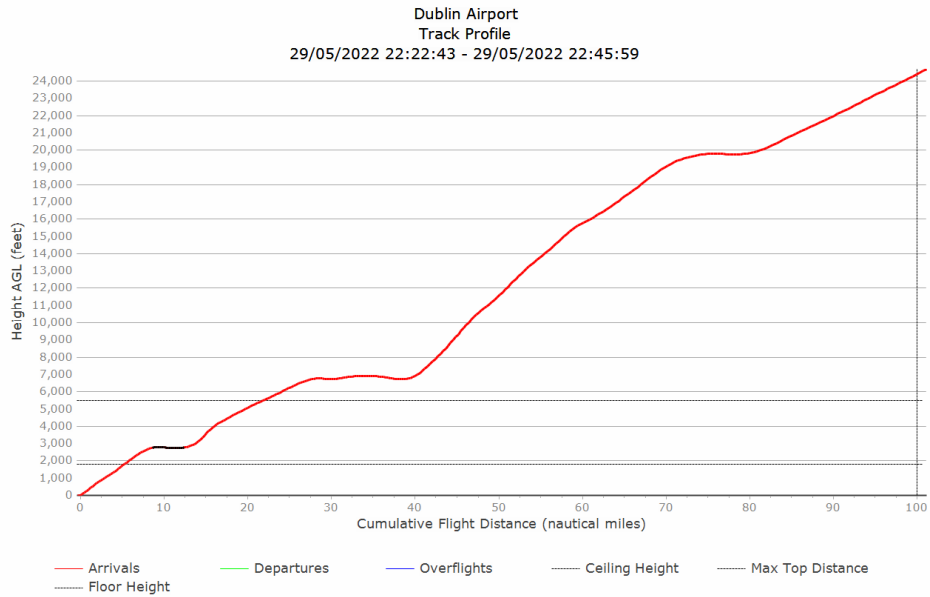
Appendix E - Dublin Airport 2021 Noise Contours Report

Appendix F - Noise Management Procedure

Appendix G - Graphical Representation CDA Violations

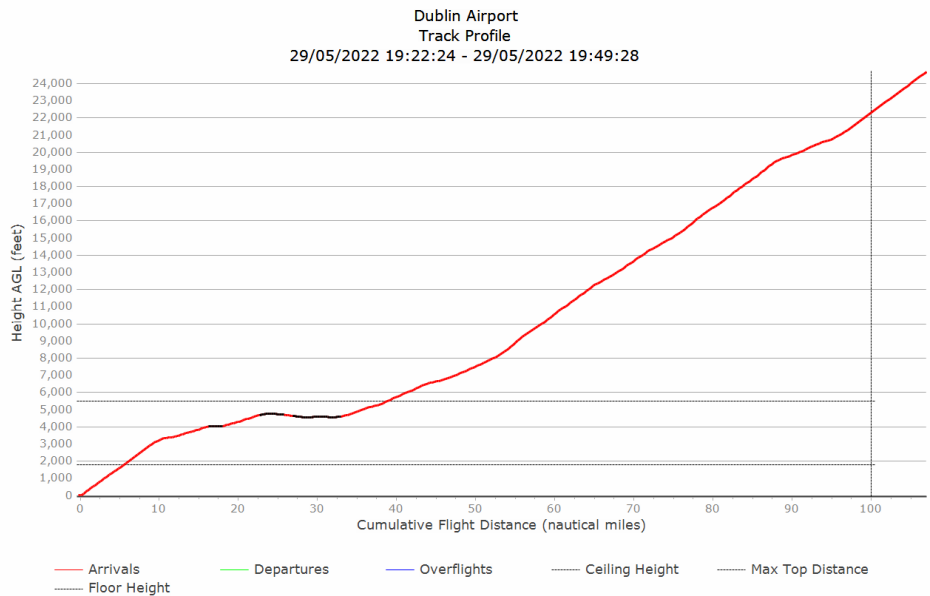
Name: CDA
 Floor Height (feet AGL): 1800
 Ceiling Height (feet AGL): 5500
 Min Segment Length (nm): 2.00
 Max Segment Length (nm): 2.50
 Max Height Variation (feet): 50
 Max Level Segments: 1
 Max Assessment Distance (nm): 100.00
 No Ascent: False
 Use TOD: False

 From 22:40:51 to 22:42:03
 Length 4.026 nm.



Name: CDA
 Floor Height (feet AGL): 1800
 Ceiling Height (feet AGL): 5500
 Min Segment Length (nm): 2.00
 Max Segment Length (nm): 2.50
 Max Height Variation (feet): 50
 Max Level Segments: 1
 Max Assessment Distance (nm): 100.00
 No Ascent: False
 Use TOD: False

 From 19:38:40 to 19:40:20
 Length 6.315 nm.
 From 19:40:36 to 19:41:28
 Length 3.275 nm.
 From 19:42:44 to 19:43:24
 Length 2.003 nm.



Appendix H -Exposure Assessments

Appendix I -Table of Destinations